

# WOOD WORK TECHNICIAN

NSQF LEVEL - 3

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## TRADE PRACTICAL

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SECTOR : WOOD & CARPENTRY

(As per revised syllabus July 2022 - 1200 of hrs)



Directorate General of Training

DIRECTORATE GENERAL OF TRAINING  
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP  
GOVERNMENT OF INDIA



**NATIONAL INSTRUCTIONAL  
MEDIA INSTITUTE, CHENNAI**

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Post Box No. 3142, CTI Campus, Guindy, Chennai - 600 032

**Sector : Wood & Carpentry**

**Duration: 1 Year**

**Trade : Wood Work Technician - Trade Practical - NSQF Level - 3 (Revised - 2022)**

**Developed & Published by**



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## FOREWORD

The Government of India has set an ambitious target of imparting skills to 30 crores people, one out of every four Indians, by 2020 to help them secure jobs as part of the National Skills Development Policy. Industrial Training Institutes (ITIs) play a vital role in this process especially in terms of providing skilled manpower. Keeping this in mind, and for providing the current industry relevant skill training to Trainees, ITI syllabus has been recently updated with the help of Mentor Councils comprising various stakeholder's viz. Industries, Entrepreneurs, Academicians and representatives from ITIs.

The National Instructional Media Institute (NIMI), Chennai has now come up with instructional material to suit the revised curriculum for **Wood Work Technician- Trade Practical - NSQF Level - 3 (Revised 2022) in Wood & Carpentry Sector under annual Pattern**. The NSQF Level - 3 (Revised 2022) Trade Practical will help the trainees to get an international equivalency standard where their skill proficiency and competency will be duly recognized across the globe and this will also increase the scope of recognition of prior learning. NSQF Level - 3 (Revised 2022) trainees will also get the opportunities to promote life long learning and skill development. I have no doubt that with NSQF Level - 3 (Revised 2022) the trainers and trainees of ITIs, and all stakeholders will derive maximum benefits from these IMPs and that NIMI's effort will go a long way in improving the quality of Vocational training in the country.

The Executive Director & Staff of NIMI and members of Media Development Committee deserve appreciation for their contribution in bringing out this publication.

Jai Hind

**SHRI. ATUL KUMAR TIWARI., I.A.S.,**

Secretary  
Ministry of Skill Development & Entrepreneurship,  
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## PREFACE

The National Instructional Media Institute (NIMI) was established in 1986 at Chennai by then Directorate General of Employment and Training (D.G.E & T), Ministry of Labour and Employment, (now under Directorate General of Training, Ministry of Skill Development and Entrepreneurship) Government of India, with technical assistance from the Govt. of the Federal Republic of Germany. The prime objective of this institute is to develop and provide instructional materials for various trades as per the prescribed syllabus under the Craftsman and Apprenticeship Training Schemes.

The instructional materials are created keeping in mind, the main objective of Vocational Training under NCVT/NAC in India, which is to help an individual to master skills to do a job. The instructional materials are generated in the form of Instructional Media Packages (IMPs). An IMP consists of Theory book, Practical book, Test and Assignment book, Instructor Guide, Audio Visual Aid (Wall charts and Transparencies) and other support materials.

The trade practical book consists of series of exercises to be completed by the trainees in the workshop. These exercises are designed to ensure that all the skills in the prescribed syllabus are covered. The trade theory book provides related theoretical knowledge required to enable the trainee to do a job. The test and assignments will enable the instructor to give assignments for the evaluation of the performance of a trainee. The wall charts and transparencies are unique, as they not only help the instructor to effectively present a topic but also help him to assess the trainee's understanding. The instructor guide enables the instructor to plan his schedule of instruction, plan the raw material requirements, day to day lessons and demonstrations.

IMPs also deals with the complex skills required to be developed for effective team work. Necessary care has also been taken to include important skill areas of allied trades as prescribed in the syllabus.

The availability of a complete Instructional Media Package in an institute helps both the trainer and management to impart effective training.

The IMPs are the outcome of collective efforts of the staff members of NIMI and the members of the Media Development Committees specially drawn from Public and Private sector industries, various training institutes under the Directorate General of Training (DGT), Government and Private ITIs.

NIMI would like to take this opportunity to convey sincere thanks to the Directors of Employment & Training of various State Governments, Training Departments of Industries both in the Public and Private sectors, Officers of DGT and DGT field institutes, proof readers, individual media developers and coordinators, but for whose active support NIMI would not have been able to bring out this materials.

**Chennai - 600 032**

**EXECUTIVE DIRECTOR**

## ACKNOWLEDGEMENT

National Instructional Media Institute (NIMI) sincerely acknowledges with thanks for the co-operation and contribution extended by the following Media Developers and their sponsoring organisations to bring out this Instructional Material (**Trade Practical**) for the trade of **Wood Work Technician - NSQF Level - 3 (Revised 2022)** under **Wood & Carpentry** Sector for ITIs.

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NIMI records its appreciation for the Data Entry, CAD, DTP operators for their excellent and devoted services in the process of development of this Instructional Material.

NIMI also acknowledges with thanks the invaluable efforts rendered by all other NIMI staff who have contributed towards the development of this Instructional Material.

NIMI is also grateful to everyone who has directly or indirectly helped in developing this Instructional Material.

# INTRODUCTION

## TRADE PRACTICAL

The trade practical manual is intended to be used in practical workshop. It consists of a series of practical exercises to be completed by the trainees during the Course of the **Wood Work Technician** Trade supplemented and supported by instructions/ informations to assist in performing the exercises. These exercises are designed to ensure that all the skills in compliance with NSQF LEVEL - 3 (Revised 2022) syllabus are covered.

This manual is divided into Ten modules. The Ten modules are given below.

- Module 1 Safety precautions hand tools and timber**
- Module 2 Framing housing dovetail broadening & lengthening joints**
- Module 3 Simple furniture making**
- Module 4 Wood carving**
- Module 5 Wood finishing**
- Module 6 Advanced wood working machine**
- Module 7 Modular kitchen**
- Module 8 Basic fitting**
- Module 9 Modular furniture**
- Module 10 Building construction - Wood aluminium and PVC**

The skill training in the shop floor is planned through a series of practical exercises centred around some practical project. However, there are few instances where the individual exercise does not form a part of project.

While developing the practical manual a sincere effort was made to prepare each exercise which will be easy to understand and carry out even by below average trainee. However the development team accept that there is a scope for further improvement. NIMI looks forward to the suggestions from the experienced training faculty for improving the manual.

## TRADE THEORY

The manual of trade theory consists of theoretical information for the Course of the **Wood Work Technician** Trade. The contents are sequenced according to the practical exercise contained in NSQF LEVEL - 3 (Revised 2022) syllabus on Trade practical. Attempt has been made to relate the theoretical aspects with the skill covered in each exercise to the extent possible. This correlation is maintained to help the trainees to develop the perceptual capabilities for performing the skills.

The Trade Theory has to be taught and learnt along with the corresponding exercise contained in the manual on trade practical. The indications about the corresponding practical exercises are given in every sheet of this manual.

It will be preferable to teach/learn the trade theory connected to each exercise atleast one class before performing the related skills in the shop floor. The trade theory is to be treated as an integrated part of each exercise.

The material is not for the purpose of self learning and should be considered as supplementary to class room instruction.

## CONTENTS

Exercise No.	Title of the Exercise	Learning Outcome	Page. No.
	<b>Module 1 : Safety precautions hand tools and timber</b>		
1.1.01	Demonstrate first aid method and basic training		1
1.1.02	Identification of different wooden sample pieces for hard wood softwood grains and their applications		9
1.1.03	Identification of annual ring knots shakes and checks		12
1.1.04	Demonstrate hand operated tools and showing different audio - visual clips		13
1.1.05	Identification and use of different types of measuring marking and testing tools and their applications		15
1.1.06	Identification and use of different types of work holding devices		19
1.1.07	Demonstrate use of machinery and hand operated portable tools and their safety		20
1.1.08	Demonstrate the use of bench vice bench hook bench stop and their application		22
1.1.09	Demonstrate different types of saws - Ripping cross cutting curve cutting and oblique sawing		23
1.1.10	Use and practice of portable power circular saw		29
1.1.11	Sharpening and setting of saw blade		32
1.1.12	Demonstrate the use of country drill hand drill ratchet brace breast drill and hand gauger and drill bits	1	34
1.1.13	Demonstrate the use of portable electrical drilling machine		37
1.1.14	Demonstrate the auger application		39
1.1.15	Planning face side and face edge		40
1.1.16	Demonstrate the use of marking gauge and mortise gauge		42
1.1.17	Test the accuracy of flatness and twistness of the surface by using try square		43
1.1.18	Demonstrate the use of winding strips cross planing and edge planing		44
1.1.19	Grinding and sharpening process of the plane blade/cutter		46
1.1.20	Demonstrate the portable power planer machine and its function		48
1.1.21	Demonstrate the use of different types of chisel chiselling chiselling along & across the grain		51
1.1.22	Grinding sharpening and honing of a chisel		56
1.1.23	Demonstrate the use of different types of striking tool hammer and mallets		57
1.1.24	Demonstrate the use of clamps 'G' or 'C' saw sharpening vice carpentry vice		58

Exercise No.	Title of the Exercise	Learning	Page. No. Outcome
	<b>Module 2 : Framing housing dovetail broadening &amp; lengthening joints</b>		
1.2.25	Single mortise and tenon joint		59
1.2.26	Double mortise and tenon joint		62
1.2.27	Plain haunched mortise and tenon joint		65
1.2.28	Mitre corner mortise and tenon joint		67
1.2.29	Tusk tenon and mortise joint		69
1.2.30	Bare faced mortise and tenon joint		71
1.2.31	Full housing joint		73
1.2.32	Bridle joint (tee bridle)		75
1.2.33	Stopped housing joint		77
1.2.34	Dovetail housing joint		79
1.2.35	Single dovetail joint		81
1.2.36	Common dovetail joint		84
1.2.37	Lapped dovetail joint		87
1.2.38	Secret mitre dovetail joint	2	89
1.2.39	Simple butt joint		91
1.2.40	Rebate butt joint		93
1.2.41	Pocket screw butt joint		95
1.2.42	Secret pocket screw butt joint		97
1.2.43	Glued butt joint with dowel		99
1.2.44	Tongue and groove joint		101
1.2.45	End half lap joint		103
1.2.46	End over lap joint		105
1.2.47	End bevel lap joint		106
1.2.48	Table scarf joint		108
1.2.49	End table scarf joint with wedge		110
1.2.50	Bevel scarf joint		112
	<b>Module 3 : Simple furniture making</b>		
1.3.51	Make tea table frame to lock four legs top rails and bottom rails		114
1.3.52	Half lap dovetail joint on tea table bottom rails		116
1.3.53	Tongue and groove joint on tea table top and assembly		117
1.3.54	Make a small wall bracket frame		120
1.3.55	Stopped tenon & mortise joint on small wall bracket frame to set the shelves		122
1.3.56	Make shelves by six pieces with single half lap dovetail joint and assemble with small wall bracket		123
1.3.57	Make a four side of chalk box tray with common dovetail joint		125



Exercise No.	Title of the Exercise	Learning Outcome	Page. No.
1.3.58	Make grooves on three sides of the chalk box tray		127
1.3.59	Make the lid with handle for chalk box		129
1.3.60	Make a common dovetail joint apply to lock four sides of chalk box tray		130
1.3.61	Make a base for chalk box and assemble		132
1.3.62	Layout of stool and make cutting list		134
1.3.63	Prepare standard height tapper legged stool		136
1.3.64	Demonstrate application of adhesive		138
1.3.65	Layout and making a notice board		139
1.3.66	Make a small rack with layout		141
1.3.67	Make a frame structure with the block board	2 & 3	143
1.3.68	Painting on frame with block board		145
1.3.69	Setting the glass on required location of the frame		147
1.3.70	Make a small table and small box		149
1.3.71	Use the sunmica and paste it on top of the table		154
1.3.72	Demonstrate on nailing practice		156
1.3.73	Demonstrate on screwing on job		159
1.3.74	Application of different types of nails and screws		163
	<b>Module 4 : Wood carving</b>		
1.4.75	Demonstrate wood carving	4	166
	<b>Module 5 : Wood finishing</b>		
1.5.76	Prepare surface for painting		170
1.5.77	Apply the paint		171
1.5.78	Prepare surface for varnishing by smoothing plane		172
1.5.79	Smoothing plane on knotty and interlocked cross grained		173
1.5.80	Smoothen surface by scraping with sand paper	5	174
1.5.81	Varnish on finished surface		176
1.5.82	Cleaning of furniture surface		177
1.5.83	Application of french polish		178
1.5.84	Application of wax polish		180
1.5.85	Remove the old polish and re polish the old furniture		181
1.5.86	Prepare an estimation of wooden furniture		183
	<b>Module 6 : Advanced wood working machines</b>		
1.6.87	Demonstrate the band saw machine with different parts and their functions		185
1.6.88	Demonstrate to the safety precaution with operational techniques		186
1.6.89	Remove and refit band saw blades		187
1.6.90	Grinding and setting operation of band saw blades		188

Exercise No.	Title of the Exercise	Learning Outcome	Page. No.
1.6.91	Ripping and cross cutting operation on band saw machine		189
1.6.92	Curve cutting by using band saw machine		191
1.6.93	Bevelling operation by band saw machine		193
1.6.94	Chamfering operation by band saw machine		195
1.6.95	Demonstrate circular saw machine parts and their operational techniques with safety precaution		197
1.6.96	Remove and refit of circular saw machine blade		198
1.6.97	Grinding and setting the circular saw machine blade		199
1.6.98	Ripping and cross cutting by using circular saw machine		200
1.6.99	Rebating and grooving operation by circular saw machines		202
1.6.100	Mitering operation by circular saw machine		204
1.6.101	Demonstrate portable power circular saw machine with different parts and their functions		206
1.6.102	Remove and refit of portable power circular saw machine blade		207
1.6.103	Demonstrate jointer/surface planer machine its parts and their operational techniques and safety precautions		208
1.6.104	Remove and refit of cutter of planing machine		209
1.6.105	Grinding and sharpening operation the cutter of planing machine		210
1.6.106	Surface planing operation on hard wood by surface planing machine	6	211
1.6.107	Thickness planing operation on hard wood by thickness planing machine		213
1.6.108	Chamfering operation by surface planing machine		214
1.6.109	Edge bevelling operation on hard wood by planing machine		216
1.6.110	Demonstrate pedestal grinding machine its parts and their operational		218
1.6.111	Demonstrate off hand grinding operation as per requirement of the trade		219
1.6.112	Grinding for mushroom head chisel chisel cutting edge drill bit and check corrections		220
1.6.113	Demonstrate pedestal drilling machine parts operational techniques and safety precautions		223
1.6.114	Different sizes of drill hole on wood		224
1.6.115	Use of counter sinking bit on job		226
1.6.116	Demonstrate care and maintenance on pedestal drilling machine		228
1.6.117	Demonstrate wood turning lathe parts turning chisels sets with operational technique and safety precautions		229
1.6.118	Remove the job and refit/set the job on wood turning lathe		231
1.6.119	Plain turning by wood turning lathe		233
1.6.120	Drilling boring and taper turning operation		235
1.6.121	Make chisel handle table lamp stand on wood turning lathe		238
1.6.122	Internal turning operation for lamp stand base using face plate and lamp stand assembling		242
1.6.123	Demonstrate working of mortise machine parts operational techniques and safety precaution		246

Exercise No.	Title of the Exercise	Learning Outcome	Page. No.
1.6.124	Adjustable along with feed and job holding by mortise machine		248
1.6.125	Mortising operation on chisel mortiser		249
1.6.126	Remove and refit of chain & sprocket wheel with the machine		251
1.6.127	Make groove of the face edge by mortise machine		252
1.6.128	Demonstrate the different sanding machine its parts operational techniques and safety precaution		253
1.6.129	Sanding operation using sanding machine		255
	<b>Module 7 : Modular kitchen</b>		
1.7.130	Demonstrate the modular kitchen cabinet operational technique and working safety precautions		257
1.7.131	Plan for making desired moduler kitchen cabinet		259
1.7.132	Select proper material and tool for making kitchen cabinet		261
1.7.133	Prepare layout for kitchen cabinet structure	7	264
1.7.134	Make the material as per cabinet layout and check the dimensions		267
1.7.135	Structuring the kitchen cabinet and finally finishing with sunmica and hardware		273
1.7.136	Check for accuracy and finishing of moduler kitchen cabinet		281
	<b>Module 8 : Basic fitting</b>		
1.8.137	Mark and make hanging plate corner plate name plate corner clamp and angle plate	8	283
1.8.138	Make bolt nut and washer		290
1.8.139	Grind chisel drill and check for correct cutting angle		295
	<b>Module 9 : Modular furniture</b>		
1.9.140	Demonstrate on modular furniture study and plan the making of desired cabinet		296
1.9.141	Select proper material and tool for making cabinet	9	299
1.9.142	Prepare the layout for cabinet structure		300
1.9.143	Make the material as per layout, finish the cabinet frame and check the cabinet		302
1.9.144	Structuring the cabinet and finishing with sunmica and hardware		306
	<b>Module 10 : Building construction - Wood aluminium and PVC</b>		
1.10.145	Revision of basic joint related with building work		310
1.10.146	Mark and making door frame (model)		312
1.10.147	Making single panel door shutter		315
1.10.148	Making glazed door shutter frame	10	318
1.10.149	Fitting moulding with glass in door frame		320
1.10.150	Marking and making window frame and window shutter		321
1.10.151	Use protection bar in window frame		326
1.10.152	King post and queen post roof trusses layout		328
1.10.153	Make model type king post and queen post		330

Exercise No.	Title of the Exercise	Learning Outcome	Page. No.
1.10.154	Angular cutting of aluminium two track channel sliding window outer frame		335
1.10.155	Join angular aluminium sliding window shutter box by screw and modern sliding window bearing		337
1.10.156	Aluminium sliding window shutter joining by fibre glass		339
1.10.157	Fibre glass shutter fitted with sliding window aluminium channel outer frame		341
1.10.158	Mark make assembling and fixing of PVC door for kitchen W.C bath		343
1.10.159	Removal of old painting by application of chemical paint remover		349
1.10.160	New painting for door window stair and furniture		350
1.10.161	Plain and smoothing of door and window and staircase railing		351
1.10.162	Apply synthetic enamel primer on the new surface	10	352
1.10.163	Apply synthetic enamel paint or oil paint on the priming surface as finishing coat		353
1.10.164	Identification of simple floor construction		354
1.10.165	Use the cogged joint for wooden floors		355
1.10.166	Demonstrate different type basement floor single joist wooden floor double joist wooden floor and framed joist wooden floor		357
1.10.167	Make structure of wooden partition wall		359
1.10.168	Repair and recondition furniture door window and staircase hand railing		361

## LEARNING / ASSESSABLE OUTCOME

On completion of this book you shall be able to

S.No.	Learning Outcome	Ref.Ex.No
1	<b>Identify timber / wood / Plywood, apply measuring, marking and testing instrument, Cutting Saws, shaving tools, paring Tools, Screwing Tools, Abrading tools and other holding and supporting devices with following safety precautions.</b>	1.1.01 - 1.1.07
2	<b>Identify and apply portable power saw and Mitre saw and Jig saw machines for Ripping, cross cutting, oblique sawing and curve cutting, Mitring etc.</b>	1.1.08 - 1.1.14
3	<b>Analyze the surface finish with exact sizing by planning operations, with identifying and applying various shaving tools or portable power planning machine.</b>	1.1.15 - 1.1.20

4	Identify and apply various paring tools and analyze and choose the positioning and employ holding device for chiselling with better finish.	1.1.21 - 1.1.24
5	Identify and classify various types of joints, analyze and prepare correct joint at correct position, related with strength and appearance.	1.2.25 - 1.3.53
6	Make small wooden job as per drawing with schedule sizes of timber or alternatives of timber i.e. FRP, MDF, FOAM, WPC using various hardware.	1.3.54 - 1.3.74
7	Analyze and identify various carving tools and convert a wooden block/ piece into a decorative article.	1.4.75
8	Demonstrate Seasoning, Conversion and preservation of Timber, wooden item through surface finishing with various processes such as Painting, polishing & varnishing etc.	1.5.76 - 1.5.86
9	Demonstrate ripping, cross cutting, curve cutting etc. on band saw/ circular saw machine and grinding and setting of blade/ cutter.	1.6.87 - 102
10	Demonstrate different operations on Jointer/surface Planer/ Thickness planer machine along with sharpening blades. (Range of operations - Surfacing, thicknessing, chamfering, edge bending etc.)	1.6.103 -109
11	Demonstrate working on pedestal grinding (Range of operations - grinding of mushroom head, cutting edge of tools, drills, etc.)	1.6.110 -112
12	Demonstrate working on pedestal /portable drilling machine, use of different types of drill bits, make holes of different sizes in correct location on woodwork.	1.6.113 - 116
13	Demonstrate different operations on wood turning lathe along with sharpening of cutting tools.	1.6.117 - 122
14	Demonstrate different operations on Tenon and mortise machine.	1.6.123 -129
15	Demonstrate different operations on Sanding machine.	1.7.130 - 136
16	Demonstrate on Modular Kitchen (Domestic)	1.8.137 - 139
17	Produce component involving different operations of fitting work and check for functionality.	1.9.140 - 144
18	Demonstrate on Modular Furniture (office and Domestic).	1.10.145 - 158
19	Prepare various roof truss, door and windows frame, shutters, assembling & fixing (wooden, aluminium & PVC).	1.10.159 - 163
20	Paint various door, windows frame, stair and furniture (wooden or aluminum).	1.10.164 - 168
21	Prepare various type of wooden floor, partition wall, and stair etc. Check, identify, analyze the design, Installation and repair the wooden job.	

## SYLLABUS

Duration	Reference Learning Outcome	Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)
Professional Skill 50 Hrs;  Professional Knowledge 10 Hrs	Identify timber / wood / Plywood, apply measuring, marking and testing instrument, Cutting Saws, shaving tools, paring Tools, Screwing Tools, Abrading tools and other holding and supporting devices with following safety precautions.	<ol style="list-style-type: none"> <li>1. Demonstrate first aid, fire safety equipment, different types of fire extinguisher and their application. (10hrs.)</li> <li>2. Identification of different wooden sample piece i.e. - soft wood &amp; hard wood, wooden grains etc. &amp; their applications. (04hrs.)</li> <li>3. Identification of wooden sample piece (Annual ring, knots, shakes &amp; chinks etc.). (03hrs.)</li> <li>4. Demonstrate use of hand operated tools and showing different audio-visual clips. (08 hrs.)</li> <li>5. Identification and use of different types of the measuring, marking and testing tools &amp; their applications. (10hrs.)</li> <li>6. Identification and use of different types of work holding devices. (06hrs.)</li> <li>7. Demonstrate use of machinery and hand operated portable tools and their safety. (09 hrs.)</li> </ol>	<ul style="list-style-type: none"> <li>• Introduction of carpentry trade.</li> <li>• General discipline, workshop discipline &amp; Housekeeping.</li> <li>• Safety precaution in the workshop and industrial safety.</li> <li>• Importance of P.P.E, Types of PPE and their application.</li> <li>• Introduction of timber, growth of timber trees, cross-section of exogenous tree trunk, types of tree, different part of a tree, Soft &amp; hard wood, their differences.(05 hrs)</li> <li>• Common Indian timbers.</li> <li>• Defects in timber, diseases of timber, knots, shakes, grains etc.</li> <li>• Introduction of carpentry hand tools, classification and uses of marking, work holding devices.</li> <li>• Measuring &amp; testing tools. (05 hrs)</li> </ul>
Professional Skill 25 Hrs;  Professional Knowledge 05 Hrs	Identify and apply portable power saw and Mitre saw and Jig saw machines for Ripping, cross cutting, oblique sawing and curve cutting, Mitring etc.	<ol style="list-style-type: none"> <li>8. Demonstrate the use of bench vice, bench hook, bench stop&amp; their application. (03 hrs.)</li> <li>9. Demonstrate different types of saws- ripping, cross cutting, curve cutting, oblique sawing. (04 hrs.)</li> <li>10. Use and practice Portable power circular saw. (04hrs.)</li> <li>11. Sharpen and set different type saw blade. (06 hrs.)</li> <li>12. Demonstrate the use of country drill, hand drill, ratchet brace, Breast drill and hand augers &amp; bits. (04hrs.)</li> <li>13. Demonstrate the use of portable electrical drill machine. (02hrs.)</li> <li>14. Demonstrate the Auger application. (02hrs.)</li> </ol>	<ul style="list-style-type: none"> <li>• Type of bench vice and their uses.</li> <li>• Introduction of different saw and their uses.</li> <li>• Introduction of power circular saw and its use.</li> <li>• Type of special saw and its uses i.e. -compass saw, coping saw, bow saw, fret saw.</li> <li>• Saw sharpening and sharpening tools. (05 hrs)</li> <li>• Description of boring tools - Types, Parts, functions, size and application.</li> <li>• Description of portable electrical drill machine.</li> <li>• Drill bits, types, sizes etc.</li> <li>• Hand augers description, sizes of augers, application of hand augers. (05 hrs)</li> </ul>

Professional Skill 25 Hrs;  Professional Knowledge 05 Hrs	Analyze the surface finish with exact sizing by planning operations, with identifying and applying various shaving tools or portable power planning machine.	15.Planning face, face edge. (04 hrs.) 16.Demonstrate the use of marking, mortise gauge etc. (04 hrs.) 17. Test the accuracy of flatness and twistness of the surface by using try square. (04hrs.) 18.Demonstrate the use of winding strips, cross planning, edge planning. (04hrs.) 19.Grinding and Sharpening process of the planer blade/ cutter. (05 hrs.) 20.Demonstration of portable power planer machine and its function. (04 hrs.)	<ul style="list-style-type: none"> <li>Type of different planes and their proper uses in woodwork - Description, function and its size, setting, knowledge of sharpening and uses etc.</li> <li>Knowledge of using marking gauges.</li> <li>Important instruments necessary for checking flatness and twistness of surface.</li> <li>Sharpening and grinding angle of cutter.</li> <li>Portable power planer - useful in modern woodwork and new technology design. (05 hrs)</li> </ul>
Professional Skill 25 Hrs;  Professional Knowledge 05 Hrs	Identify and apply various paring tools and analyze and choose the positioning and employ holding device for chiselling with better finish.	21.Demonstrate the use of different types of chisel, chiselling, chiselling along& across the grain. (08hrs.) 22.Grind/ sharpen and honing of a chisel. (08hrs.) 23.Demonstrate use of different types of striking tool, hammer and mallets. (04hrs.) 24.Demonstrate the use of clamps 'G' or 'C', saw sharpening vice, carpentry vice etc. (05hrs.)	<ul style="list-style-type: none"> <li>Different type chisels - Definition, identification, their uses.</li> <li>Necessity of grinding and sharpening.</li> <li>Striking tools- Definition, types, application.</li> <li>Files - Types, uses</li> <li>Care &amp; maintenance of files</li> <li>Function of work bench, bench vice, bench hook, etc. (05 hrs)</li> </ul>
Professional Skill 70 Hrs;  Professional Knowledge 30Hrs	Identify and classify various types of joints, analyze and prepare correct joint at correct position, related with strength and appearance.	<b>Demonstration and making framing joint</b> 25.Single Mortise and tenon Joint. (03hrs.) 26.Double tenon & mortise joint. (02hrs.) 27.Plain hunched tenon and mortise joint. (02 hrs.) 28.Mitre corner tenon & mortise joint. (02hrs.) 29.Task tenon mortise joint. (02 hrs.) 30.Bare faced tenon joint. (03hrs.)  <b>Demonstration and making Housing joints</b> 31.Full housing joint. (02 hrs.) 32.Bridle joint etc. (02hrs.) 33.Stopped housing joint. (02 hrs.) 34.Dovetail housing joint. (03 hrs.)  <b>Demonstration and making dovetail joint</b> 35.Single dovetail joint. (03 hrs.) 36.Common dovetail joint. (03 hrs.) 37.Lapped dovetail joint. (03 hrs.) 38.Secret mitre dovetail joint uses of dovetail template. (03 hrs.)	<ul style="list-style-type: none"> <li>Seasoning of timber - Definition, advantage and disadvantage of seasoning.</li> <li>Moisture content in timber and its effect on timber.</li> <li>Characteristics of wood, physical and mechanical properties of wood.</li> <li>Quality of good timber.</li> <li>Define the classification of wooden joint.</li> <li>Description of different types joint.</li> <li>Uses of joint: Framing joint angle joint and lengthening joint etc. (09 hrs)</li> <li>Preservation of timber.</li> <li>Application of different types of preservation &amp; Process of each treatment.</li> <li>Definition of housing joint.</li> <li>Different type of housing joint.</li> <li>Uses of housing joint.</li> <li>Description of different dovetail joint and their function.</li> <li>Uses of dovetail joint.</li> <li>Glues - Types of glue and their uses. (07 hrs)</li> </ul>

		<p><b>Demonstration and Making broadening joints</b></p> <p>39. Simple butt joint by hard wood (100 mm width and 15mm thick). (02 hrs.)</p> <p>40. Riveted butt joint on hard wood (100mm width and 25mm thick). (02 hrs.)</p> <p>41. Pocket screw butt joint on hard wood (100mm width and 15mm thick). (02 hrs.)</p> <p>42. Secret pocket screw butt joint on teak wood or hard wood (100mm width and 100mm thick). (04 hrs.)</p> <p>43. Glued butt joint with dowel by a hard wood (100mm width and 15mm thick). (02 hrs.)</p> <p>44. Tongue and groove joint on hard wood (100mm width and 15mm thick). (03 hrs.)</p>	<ul style="list-style-type: none"> <li>• Broadening joint description.</li> <li>• Types of broadening joint.</li> <li>• Application of broadening joint.</li> <li>• Setting of end side according to annual Rings as well as matching the grain stranding.</li> <li>• Advantage of adhesives use and their types.</li> <li>• Method of Dowel application. (07 hrs)</li> </ul>
		<p><b>Making lengthening joint</b></p> <p>45. End half lap joint on hard wood (50mm X 50mm). (02hrs.)</p> <p>46. End over lap joint by hard wood 150mm X 25mm. (01 hr)</p> <p>47. End bends lap joint on hard wood (50mm X25mm). (02 hrs.)</p> <p>48. Table scrat joint on hard wood (50mm X 50m). (03 hrs.)</p> <p>49. Too then end table &amp; scarf joint on hard wood (50mm X 50m). (03 hrs.)</p> <p>50. Bend scarf joint on teak wood or hard wood (50mm X 50m). (03 hrs.)</p> <p>Making of Frame using different type of joints -</p> <p>51. Stopped Tenon &amp; mortise Joint on hard wood to make tea table frame to lock four legs, top rail and bottom rails. (02 hrs.)</p> <p>52. Lapped half lap dovetail joint on bottom rails on hard wood. (02 hrs.)</p> <p>53. Tongue &amp; Groove joint on tabletop by hard wood as a broadening joint. (02 hrs.)</p>	<ul style="list-style-type: none"> <li>• Lengthening joint description.</li> <li>• Types of lengthening joint.</li> <li>• Application of different lengthening joint.</li> <li>• Setting of two taper wedges.</li> <li>• Advantages of table &amp; scarf joint.</li> <li>• Veneer, Plywood</li> <li>• Types of plywood</li> <li>• Advantage of plywood</li> <li>• Application of plywood, block board, laminated board, hard board, insulation board, mica etc. (07 hrs)</li> </ul>
<p>Professional Skill 100 Hrs; Professional Knowledge 10Hrs</p>	<p>Make small wooden job as per drawing with schedule sizes of timber or alternatives of timber i.e. FRP, MDF, FOAM, WPC using various hardware.</p>	<p><b>Make small wall bracket -</b></p> <p>54. Make joint on hard wood to make small frame. (03hrs.)</p> <p>55. Stopped Tenon &amp; Mortise joint on hard wood in the frame to set the selves. (02hrs.)</p> <p>56. Make selves by six pieces of hard wood with single lapped half lap dovetail joint with frame (two nos. of selves). (03 hrs.)</p>	



	<p>57. Four sides of chalk box. (100mm X 120mm X 100mm) locked with hard wood by common dovetail joint (3 pin). (03 hrs.)</p> <p>58. Grooves on three sides. (02 hrs.)</p> <p>59. Make the lid &amp; base with Masonite with handle levelled with top. (02 hrs.)</p> <p>60. Common dovetail joint apply to lock four sides of tray (400mm X 300mm X 200mm). (02 hrs.)</p> <p>61. Bases made with ply wood (5mm thick) and make the handle. (02 hrs.)</p>	<ul style="list-style-type: none"> <li>• Parts &amp; terms of portable disc sander.</li> <li>• Application of portable disc sander.</li> <li>• Care &amp; maintenance of disc sander.</li> <li>• Method of making a wooden partition.</li> <li>• Door frames.</li> <li>• Door &amp; window panels. (02 hrs)</li> </ul>
<p>62. Layout of stool and make cutting List for mass production. (03hrs.)</p> <p>63. Prepare standard height tapper legged stool as per layout. (03hrs.)</p> <p>64. Demonstrate application of adhesive. (03 hrs.)</p> <p>65. Layout making for notice board or display board by hard board, plywood and insulation board. (03 hrs.)</p> <p>66. Making a small rack by layout with hard wood and plywood. (02 hrs.)</p>	<ul style="list-style-type: none"> <li>• Calculation of timber required for stool.</li> <li>• List out the sequence of operation of the job.</li> <li>• Timbers used in furniture work - describe Sal, teak, gamar, pine, deodar etc.</li> <li>• Properties and characteristics of different furniture wood. (02 hrs)</li> </ul>	
<p>67. Make Frame structure with the block board, layout as per the size and cutting by portable circular saw machine with Common dovetail joint used in the structure. (8 hrs.)</p> <p>68. Painting and polishing or fixing sun mica with adhesive. (08 hrs.)</p> <p>69. Setting glasses and hard works as on required location. (03 hrs.)</p>	<ul style="list-style-type: none"> <li>• Conversion and types of conversion.</li> <li>• Parallel sawing</li> <li>• Radial sawing</li> <li>• Quarter sawing</li> <li>• Tangential sawing</li> <li>• Process and advantage</li> <li>• Design of wooden wall unit uses in bed room, dining hall, library, office, workshop classroom. (02hrs)</li> </ul>	
<p>70. Make a small table use of lock, hinges, hasp and staple etc. making a small box with sun mica top. (Mortise and tenon joint. 'T' half tap dovetail joint. Secret dovetail joint). (17 hrs.)</p> <p>71. Uses sun mica and pest on the top of table. (05 hrs.)</p>	<ul style="list-style-type: none"> <li>• Uses of joint for small table to stranger strength.</li> <li>• Manufacturing process of various boards and sheets.</li> <li>• Types of hinges, Uses of hinges</li> <li>• Types of door lock &amp; their different uses. (02 hrs)</li> </ul>	
<p><b>Demonstration on nailing screwing on job</b></p> <p>72. Use selected nail for the table and small box. (12 hrs.)</p> <p>73. Use selected screw for the table and small box. (08 hrs.)</p> <p>74. Application of different types of Nails, screws etc. (06 hrs.)</p>	<p>Nails and screws -</p> <ul style="list-style-type: none"> <li>• Nail and screws - type, Uses etc.</li> <li>• Nut, bolts and washer - types and Uses</li> <li>• Lock hinges hasp and staple.</li> <li>• Knowledge of other fittings - types, sizes and lenses. (02 hrs)</li> </ul>	

Professional Skill 25 Hrs; Professional Knowledge 05 Hrs	Analyze and identify various carving tools and convert a wooden block/ piece into a decorative article.	75. Demonstrate wood carving using carving tools, sharpen carving tools and finish by smoothing. (25 hrs.)	<ul style="list-style-type: none"> <li>Description of different carving tools.</li> <li>Tools required for ornamental carving.</li> <li>Properties of wood.</li> <li>Preparation a bill of materials.</li> <li>Estimate the material. (05 hrs)</li> </ul>
Professional Skill 40 Hrs; Professional Knowledge 08Hrs	D e m o n s t r a t e Seasoning, Conversion and preservation of Timber, wooden item through surface finishing with various processes such as Painting, polishing & varnishing etc.	76. Prepare surface for Painting. (02 hrs.) 77. Apply paints. (03 hrs.) <b>Varnish surface of woodwork</b> 78. Prepare surface for varnishing by smoothing plane. (03 hrs.) 79. Smoothing plane on knotty and interlocked cross grained. (04 hrs.) 80. Smoothen surface by scraping with sandpaper or portable sander machine. (03 hrs.) 81. Varnish on finished surface. (04 hrs.)	<ul style="list-style-type: none"> <li>Paints, ingredients of paints.</li> <li>Name of the agent of paints.</li> <li>Method of preparation of surface for staining.</li> <li>Necessary tools and equipment required for staining.</li> <li>Uses of different grade sandpaper.</li> <li>Portable sander machine - uses</li> <li>Preparation of putty and use.</li> <li>Staining - type, process, methods applied for different timber. (04 hrs)</li> </ul>
		<b>Polishing of Furniture -</b> 82. Cleaning of furniture surface. (02hrs.) 83. Application of French polish. (05hrs.) 84. Application of wax polishes. (05hrs.) 85. Remove old polish and re-polish old furniture. (05hrs.) 86. Prepare an estimation of wooden furniture. (04hrs.)	<ul style="list-style-type: none"> <li>Description &amp; method of French polish.</li> <li>Method of wax polish and its uses.</li> <li>Methods of old furniture re-polish.</li> <li>Estimation process of wooden furniture. (04 hrs)</li> </ul>
Professional Skill 60 Hrs; Professional Knowledge 14 Hrs	Demonstrate ripping, cross cutting, curve cutting etc. on band saw/ circular saw machine and grinding and setting of blade/ cutter.	87. Demonstrate band saw machine with different parts & their functions. (05 hrs.) 88. Demonstration to the safety precaution with operational techniques. (05 hrs.) 89. Remove and refit band saw blades. (02 hrs.) 90. Grinding and setting operation of band saw blade. (04 hrs.)	<ul style="list-style-type: none"> <li>Describe constructional features of band saw machine.</li> <li>Types of band saw machine.</li> <li>Sizes of band saw machine.</li> <li>Parts of band saw machine.</li> <li>Function of band saw machine.</li> <li>P.P.E for band saw machine (03 hrs.)</li> </ul>
		91. Ripping & cross cutting operation on band saw machine with hard wood. (05 hrs.) 92. Curve cutting operation on hard board or soft wood or ply board by band saw machine. (04 hrs.) 93. Bevelling operation on hard wood/ soft wood. (05 hrs.) 94. Chamfering operation on hard wood/ soft wood/ ply board by bend saw machine. (05 hrs.)	<ul style="list-style-type: none"> <li>Operation of band saw machine.</li> <li>Safety precaution of bad saw machine.</li> <li>Care &amp; maintenance of band saw machine with oiling &amp; greasing. (07 hrs)</li> </ul>

		<p>95. Demonstrate circular saw machine, its parts and their operational techniques with safety precaution. (04 hrs.)</p> <p>96. Remove and refit of circular saw blade. (02 hrs.)</p> <p>97. Grinding and setting operation of the circular saw blade. (04 hrs.)</p> <p>98. Ripping &amp; cross cutting operation on hard wood/ soft wood/ ply wood (not less than 12 mm) by circular saw machine. (04hrs.)</p> <p>99. Rebating &amp; grooving operation on hard wood/ soft wood by circular saw machine. (04 hrs.)</p> <p>100. Mitering operation on hard wood/ soft wood/ plywood (not less than 12 mm) (02 hrs.)</p> <p>101. Demonstrate portable Circular saw machine with different parts &amp; their functions. (04 hrs.)</p> <p>102. Remove and refit of saw blade. (01 hr.)</p>	<ul style="list-style-type: none"> <li>Describe circular saw machine.</li> <li>Types of circular saw machine.</li> <li>Sizes of circular saw machine.</li> <li>Identify the parts of circular saw machine.</li> <li>Function of circular saw machine.</li> <li>Different types of saw blades used in circular saw machine.</li> <li>Safety precaution of circular saw machine.</li> <li>Care &amp; maintenance of circular saw machine with oiling &amp; greasing.</li> <li>Operation of portable type circular saw machine.</li> <li>Safety precautions</li> <li>P.P.E for the circular saw machine (04 hrs)</li> </ul>
<p>Professional Skill 40 Hrs;</p> <p>Professional Knowledge 08Hrs</p>	<p>Demonstrate different operations on Jointer/ surface Planer/ Thickness planer machine along with sharpening blades. (Range of operations - Surfacing, thicknessing, chamfering, edge bending etc.)</p>	<p>103. Demonstrate Jointer/surface Planer machine, its parts and their operational techniques and safety precaution. (04 hrs.)</p> <p>104. Remove and refit of cutter of planning machine. (04 hrs.)</p> <p>105. Sharpening and honing operation of cutter of planning machine. (10 hrs.)</p>	<ul style="list-style-type: none"> <li>Describe of planning machine.</li> <li>Types of planning machine.</li> <li>Sizes of planning machine.</li> <li>Parts of surface/thickness planning machine.</li> <li>Function of surface/ thickness planning machine.</li> <li>P.P.E for the surface/ thickness planning machine.</li> <li>(04 hrs)</li> </ul>
		<p>106. Surfacing operation on hard wood/ soft wood by planning machine. (06hrs.)</p> <p>107. Thickness operation on hard wood/ soft wood by planning machine. (05hrs.)</p> <p>108. Chamfering Operation (06hrs.)</p> <p>109. Edge bending operation on hard wood/ soft wood by planning machine. (05hrs.)</p>	<ul style="list-style-type: none"> <li>Operation of surface / thickness planning machine.</li> <li>Safety precaution of surface / thickness planning machine.</li> <li>Care &amp; maintenance of surface / thickness planning machine</li> <li>Oiling &amp; greasing. (04 hrs)</li> </ul>
<p>Professional Skill 25 Hrs;</p> <p>Professional Knowledge 05 Hrs</p>	<p>Demonstrate working on pedestal grinding (Range of operations - grinding of mushroom head, cutting edge of tools, drills, etc.)</p>	<p>110. Demonstrate pedestal grinding machine, its parts and their operational techniques with safety precautions. (06hrs.)</p> <p>111. Demonstrate off hand grinding operation as per requirement of the trade. (07 hrs.)</p> <p>112. Grind mushroom head, cutting edge of tools, drill bits and check correctness. (12 hrs.)</p>	<ul style="list-style-type: none"> <li>Pedestal grinding machine - Description, Types, Sizes, Parts, Function, Operation of pedestal grinding machine.</li> <li>Safety precaution and P.P.E for the pedestal grinding machine</li> <li>Care &amp; maintenance of pedestal grinding machine with oiling &amp; greasing. (05 hrs)</li> </ul>

Professional Skill 25 Hrs; Professional Knowledge 05 Hrs	Demonstrate working on pedestal /portable drilling machine, use of different types of drill bits, make holes of different sizes in correct location on woodwork.	113.Demonstrate pedestal drilling machine and its parts & their operational techniques and safety precaution. (06 hrs.) 114.Make different sizes of drill hole on wooden block/ job using straight/ taper shank drill bit. (10 hrs.) 115.Use of counter sinking bit on job. (07 hrs.) 116.Demonstrate care & maintenance. (02 hrs.)	<ul style="list-style-type: none"> <li>• Pedestal drilling machine - Description, Types, Sizes, Parts, Function, Operation of pedestal drilling machine.</li> <li>• Safety precaution and P.P.E for the pedestal drilling machine</li> <li>• Care &amp; maintenance of pedestal drilling machine with oiling &amp; greasing</li> <li>• Types of drill bits used in drill machine.(05 hrs)</li> </ul>
Professional Skill 25 Hrs; Professional Knowledge 05 Hrs	Demonstrate different operations on wood turning lathe along with sharpening of cutting tools.	117.Demonstrate wood turning lathe, its parts & chisels sets with operational technique and safety precaution. (04 hrs.) 118.Remove, grind and refit cutting tools and set job. (04 hrs.) 119.Plain turning operation on hard wood/ soft wood by wood turning lathe. (04 hrs.) 120.Drilling, boring, taper turning operation on hard wood/ soft wood by wood turning lathe. (05 hrs.) 121.Make chisel handle, table lamp stand, etc on wood turning lathe. (05 hrs.) 122.Internal turning operation using face plate. (03 hrs.)	<ul style="list-style-type: none"> <li>• Wood turning lathe - Description, Types, Sizes, Parts, Function, Types, Operation of wood turning lathe.</li> <li>• Safety precaution and P.P.E for wood turning lathe.</li> <li>• Care &amp; maintenance of wood turning lathe with oiling &amp; greasing.</li> <li>• Types and application of set of chisels</li> <li>• Signature of cutting tools. (05 hrs)</li> </ul>
Professional Skill 25 Hrs; Professional Knowledge 05 Hrs	Demonstrate different operations on Tenon and mortise machine.	123.Demonstrate working of mortise machine, its part, their operational techniques and safety precaution. (06 hrs.) 124.Adjust table along with feed and job holding. (03 hrs.) 125.Mortising operation on hard wood/ soft wood (300mmX50 mm X 25mm). (05 hrs.) 126.Remove and refit of chain & sprocket with the machine. (05 hrs.) 127.Make groove at the face or edge on the job. (06 hrs.)	<ul style="list-style-type: none"> <li>• Mortise machine - Description, Types, Sizes, Parts, Function, Operation of mortise machine.</li> <li>• Safety precaution and P.P.E for mortise machine.</li> <li>• Care &amp; maintenance of mortise machine with oiling &amp; greasing</li> <li>• Calculation of timber, weight, area, volume etc. (05 hrs)</li> </ul>
Professional Skill 25 Hrs; Professional Knowledge 05 Hrs	Demonstrate different operations on Sanding machine.	128.Demonstrate working of different types Sanding machine, its part, their operational techniques and working safety precaution. (10 hrs.) 129.Operation on hard wood/ soft wood by using sanding machine. (15hrs.)	<ul style="list-style-type: none"> <li>• Sanding machine - Description, Types, Parts of sanding machine.</li> <li>• Safety precaution and P.P.E for sanding machine. (05 hrs)</li> </ul>
Professional Skill 60 Hrs; Professional Knowledge 10 Hrs	Demonstrate on Modular Kitchen (Domestic)	130.Demonstrate the modular kitchen and operational technique and working safety precautions (09 hrs.) 131.Study the drawing and make a plan for making desired Cabinet (09hrs) 132.Select proper material and tool for making Cabinet. (06hr.)	<ul style="list-style-type: none"> <li>• Introduction of Modular Kitchen</li> <li>• Different hand tool including machineries.</li> <li>• Different allocation</li> <li>• Different Material and its characteristics, application.</li> <li>• Assemble Procedure.</li> </ul>

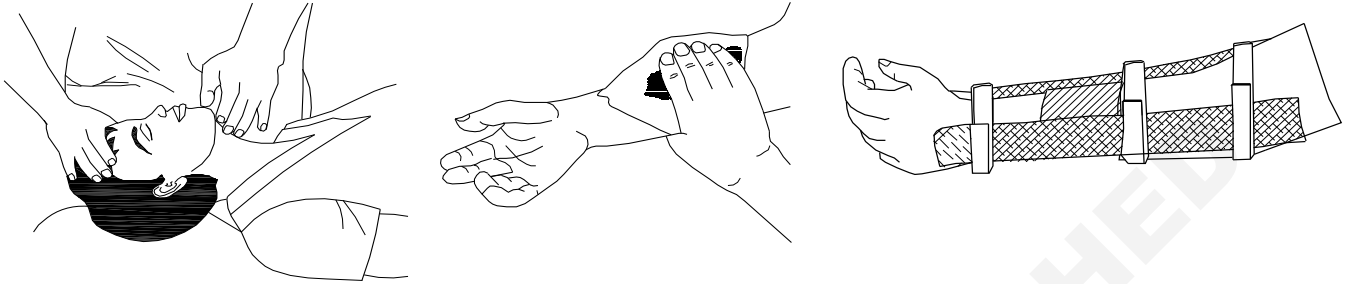
Professional Skill 25 Hrs;		<p>133.Prepare layout for Structure (09 hrs.)</p> <p>134.Make the material as per layout considering scale and check the dimensions. (09 hrs.)</p> <p>135.Perform Structuring the cabinet with Plywood material and finally finishing with the sunmica and hardware. (09hrs.)</p> <p>136.Check for accuracy and finishing of the job. (09 hrs.)</p>	<ul style="list-style-type: none"> <li>• Application of hardware.</li> <li>• Different types of timber used.</li> <li>• Types of Job dressing.</li> <li>• Application of Sunmica in different Colour contrast. (10 hrs)</li> </ul>
Professional Knowledge 05 Hrs  Knowledge 05 Hrs	Produce component involving different operations of fitting work and check for functionality.	<p>137.Mark and make hanging plate, corner plate, name plate, different types of clamps and angle plate by chipping, sawing filling, drilling, counter sinking etc. (14 hrs.)</p> <p>138.Make nuts, bolts, washers, screws by drilling, taping and dieing. (06hrs.)</p> <p>139.Grind chisels, drills and check for correct cutting angle. (05hrs.)</p>	<p><b>General safety in fitting shop</b></p> <ul style="list-style-type: none"> <li>• Types of marking and cutting tools and their uses. (viz., marking block, chisels, hammer, hacksaw, files, etc.)</li> <li>• Uses and maintenance of tools - Steel rule, try squares, scribe, divider, callipers and other tools. Marking table, marking block etc.</li> <li>• Application of bench vice, clamps.</li> <li>• Types of drill bits, counter boring tool, taps and dies used in fitting work.</li> <li>• Types of nuts, bolts, washers, machine screws etc. (05 hrs)</li> </ul>
Professional Skill 40 Hrs;  Professional Knowledge 8 Hrs	Demonstrate on Modular Furniture (office and Domestic).	<p><b>Modular Furniture</b></p> <p>140.Study the drawing and make a plan for making desired Cabinet. (06hrs.)</p> <p>141.Select proper material and tool for making Cabinet. (08hrs.)</p> <p>142.Prepare layout for Structure. (12hrs.)</p> <p>143.Make the material as per layout considering scale, and check the dimensions, Check for accuracy and finishing of the job. (10hrs.)</p> <p>144.Perform Structuring the cabinet with Plywood material and finally finishing with the sunmica and hardware. (04hrs.)</p>	<ul style="list-style-type: none"> <li>• Introduction of Modular Furniture.</li> <li>• Different hand tool including machineries and application.</li> <li>• Different allocation.</li> <li>• Different material and its characteristics, application.</li> <li>• Assemble Procedure.</li> <li>• Application of hardware.</li> <li>• Different types of timber used .</li> <li>• Types of Job dressing.</li> <li>• Application of Sunmica in different Colour contrast. (08 hrs)</li> </ul>
Professional Skill 70 Hrs;  Professional Knowledge 13 Hrs	Prepare various roof truss, door and windows frame, shutters, assembling & fixing (wooden, aluminium & PVC).	<p>145.Revision of basic joint related with building work. (02 hrs.)</p> <p>146.Making door shutter. (03 hrs.)</p> <p>147.Making panel door. (06 hrs.)</p> <p>148.Making door glazed shutter. (03 hrs.)</p> <p>149.Fitting moulding with glass. (03 hrs.)</p>	<ul style="list-style-type: none"> <li>• Introduction about building construction.</li> <li>• Different type door &amp; windows and different size.</li> <li>• Different type panel used for panel shutter, glazed shutter.</li> <li>• Substitute of wood viz., block board, hard board etc. (03 hrs)</li> </ul>
		<p>150.Marking and making window frame and window shutter. (06 hrs.)</p> <p>151.Use protection bar. (02 hrs.)</p> <p>152.Roof trusses layout. (04hrs.)</p> <p>153.Make Model type king post and queen post. (08 hrs.)</p>	<ul style="list-style-type: none"> <li>• Description of window frame and shutter</li> <li>• Uses of frame and shutter of window</li> <li>• Definition of roof trusses</li> <li>• Terms of king post and queen post. (04 hrs)</li> </ul>

		<p><b>Prepare sliding window &amp; 'Z' battened window by aluminum channel</b></p> <p>154. Angular cutting of aluminium bar at different angle and size. (03 hrs.)</p> <p>155. Join angular aluminium bar by screw and modern adhesive like dendrite, feviquick etc. (03 hrs.)</p> <p>156. Aluminium channel bar joining by fibre glass (03 hrs.)</p> <p>157. Fiber glass shutter fitted with aluminium channel. (03 hrs.)</p>	<ul style="list-style-type: none"> <li>• Description of aluminium</li> <li>• Anodising of the aluminium windows, channel, section etc.</li> <li>• Knowledge of different aluminium section, channels required for manufacturing the windows.</li> <li>• Drilling of aluminium bar and joining by screw and adhesive.</li> <li>• Knowledge of fibre glass</li> <li>• Introduce about rubber padding /gasket and aluminium wheel.</li> <li>• Uses of channel window which is involved in building construction. (04 hrs)</li> </ul>
		<p>158. Assembling and fixing of P.V.C door for kitchen and W.C bath. (21 hrs.)</p> <ul style="list-style-type: none"> <li>• Cutting angular wise P.V.C door frame.</li> <li>• Forming shape by joining adhesive and screwing.</li> <li>• P.V.C shutter door finish by adhesive and screwing.</li> <li>• Assembling &amp; fixing the PVC door.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses of P.V.C as substitute of wood.</li> <li>• Give more get-up and cheapest in price.</li> <li>• New style framing work.</li> <li>• Modern technologies follow up P.V.C moulding.</li> <li>• Advantages and disadvantages (02 hrs)</li> </ul>
Professional Skill 25 Hrs; Professional Knowledge 05 Hrs	Paint various door, windows frame, stair and furniture (wooden or aluminum).	<p>159. Removal of old painting by application of chemical paint remover. (04 hrs.)</p> <p>160. New painting for door, window stair, furniture, etc. (04 hrs.)</p> <p>161. Plain and smoothing of door &amp; window and staircase railing. (05 hrs.)</p> <p>162. Apply Synthetic enamel primer on the new surface. (08 hrs.)</p> <p>163. Apply synthetic enamel paint or oil paint on the priming surface as finishing coat. (04 hrs.)</p>	<ul style="list-style-type: none"> <li>• Apply of removing old painting by new chemical then after repainting on furniture</li> <li>• Uses of new painting and priming on furniture. (05 hrs)</li> </ul>
Professional Skill 35 Hrs; Professional Knowledge 8 Hrs	Prepare various type of wooden floor, partition wall, and stair etc. Check, identify, analyze the design, Installation and repair the wooden job.	<p>164. Identification of simple floor construction. (07hrs.)</p> <p>165. Use the cogged joint for wooden floors. (07hrs.)</p> <p>166. Demonstrate different type basement floor single joint wooden floor and double joint wooden floor. (07hrs.)</p> <p>167. Make structure of wooden partition wall. (07hrs.)</p> <p>168. Repair and recondition furniture, door and window, staircase hand railing. (07hrs.)</p>	<ul style="list-style-type: none"> <li>• Purpose of using floor construction with different types of joist.</li> <li>• Basic principal of repairing work, door window, staircase rack etc.</li> <li>• Illustrate of nail screw bracket angle plate nut bolt, etc.</li> <li>• Economic factors and material estimates.</li> <li>• Hilti laser tools, types and their applications (8 hrs)</li> </ul>

**Demonstrate first aid method and basic training**

- Objectives:** At the end of this exercise, you shall be able to
- rescue breathing for an unconscious victim of different condition
  - perform treatment for stopping of bleeding.

**TASK 1**



**TASK 2**

Fig 1

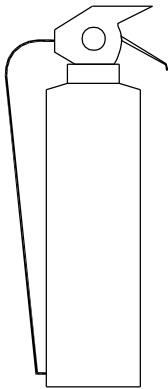


Fig 2

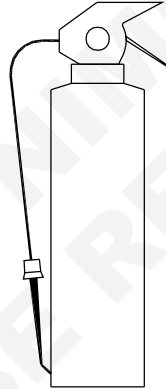


Fig 3

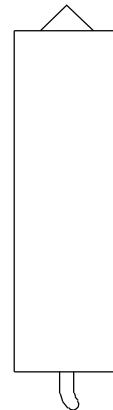


Fig 4



Fig 5

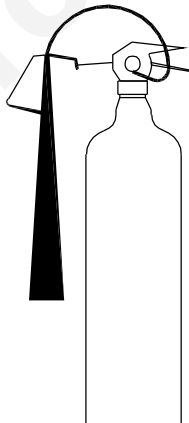


Fig 6

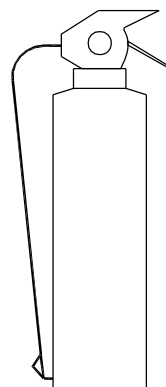
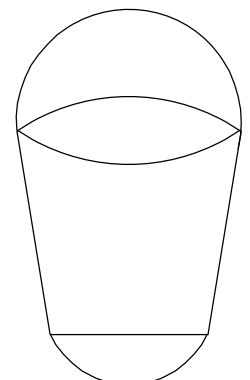


Fig 7



## Job Sequence

**Assumption - For easy manageability, Instructor may arrange the trainees in group and ask each group to perform one method of resuscitation.**

### TASK 1: Rescue the victim from electric shock and observe his condition

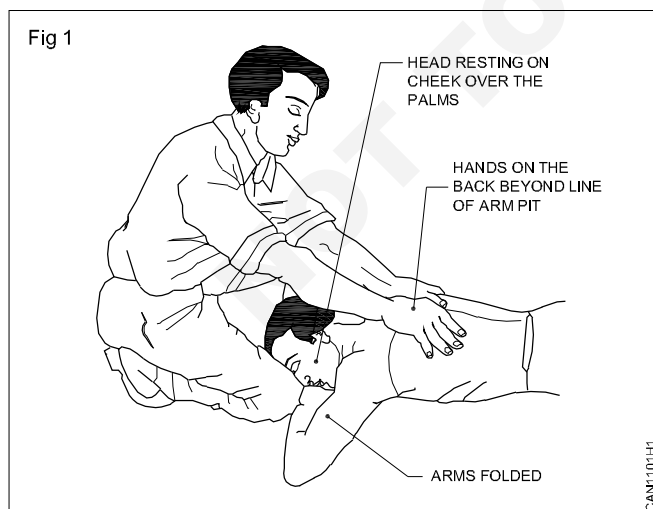
#### Prepare the victim to receive artificial respiration

- Loosen the tight clothing which may interfere with the victim's breathing.
- Remove any foreign materials or false teeth from his mouth and keep the victim's mouth open.
- Bring the victim safely to the level ground, taking necessary safety measures.
- Start artificial respiration immediately without delay. Do not waste too much time in loosening the clothes or trying to open the tightly closed mouth.
- Avoid violent operations to prevent injury to the internal parts of the victim.
- Send word for a doctor immediately.

#### Resuscitate the victim by Nelson's arm - Lift back pressure method

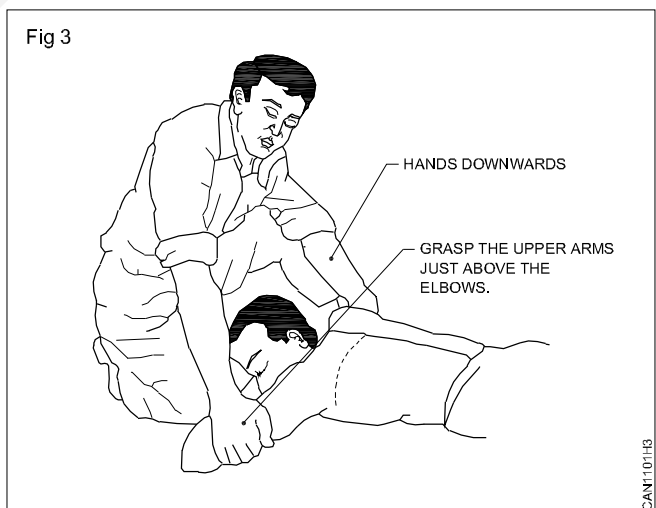
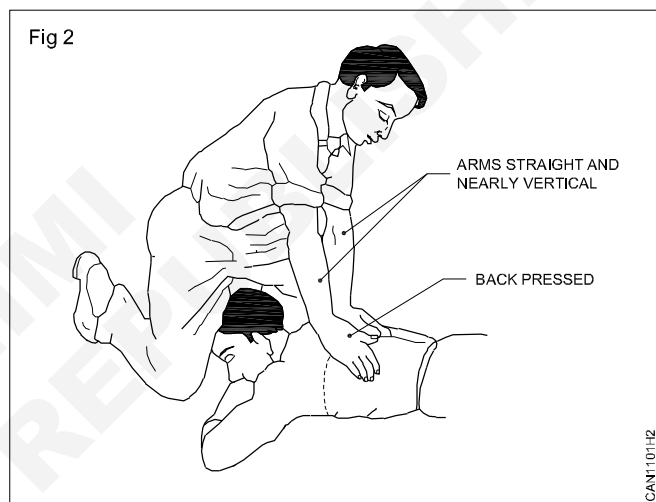
**Nelson's arm-lift back pressure method must not be used in case there are injuries to the chest and belly.**

- Place the victim prone (that is face down) with his arms folded with the palms one over the other and the head resting on his cheek over the palms. Kneel on one or both knees near the victim's hand. Place your hands on the victim's back beyond the line of the armpits, with your fingers spread outwards and downwards, thumbs just touching each other as in Fig 1.



- Gently rock forward keeping your arms straight until they are nearly vertical, and steadily pressing the victim's back as shown in Fig 2 to force the air out of the victim's lungs.

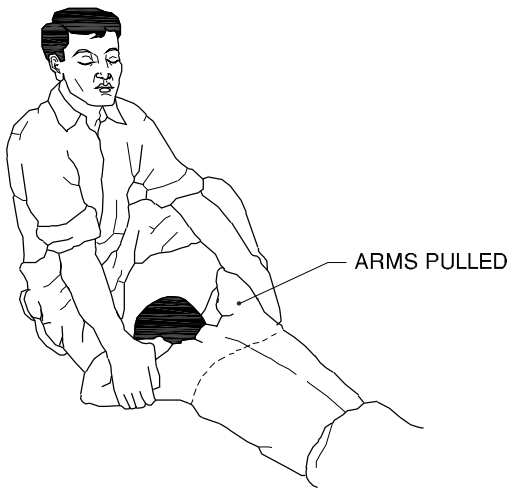
- Synchronise the above movement of rocking backwards with your hands sliding downwards along the victim's arms, and grasp his upper arm just above the elbows as shown in Fig 3. Continue to rock backwards.
- As you rock back, gently raise and pull the victim's arms towards you as shown in Fig 4 until you feel tension in his shoulders. To complete the cycle, lower the victim's arms and move your hands up to the initial position.



- Continue artificial respiration till the victim begins to breathe naturally. Please note, in some cases, it may take hours.
- When the victim revives, keep the victim warm with a blanket, wrapped up with hot water bottles or warm bricks; stimulate circulation by stroking the insides of the arms and legs towards the heart.



Fig 4



- Keep him in the lying down position and do not let him exert himself.

**Do not give him any stimulant until he is fully conscious.**

**Resuscitate the victim by Schafer's method**

**Do not use this method in case of injuries to victim on the chest and belly.**

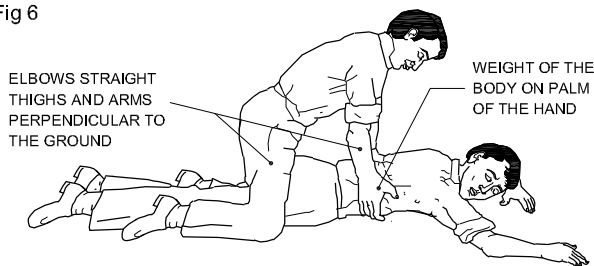
- Lay the victim on his belly, one arm extended direct forward, the other arm bent at the elbow and with the face turned sideward and resting on the hand or forearm as shown in Fig 5.

Fig 5



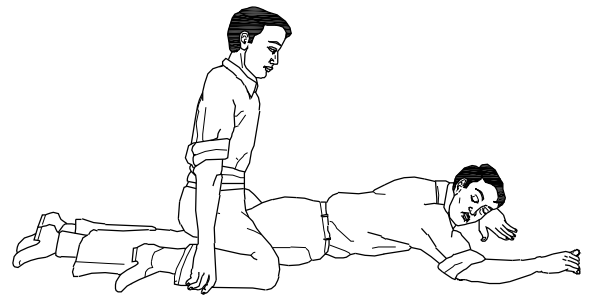
- Kneel astride the victim, so that his thighs are between your knees and with your fingers and thumbs positioned as in Fig 5.
- With the arms held straight, swing forward slowly so that the weight of your body is gradually brought to bear upon the lower ribs of the victim to force the air out of the victim's lungs as shown in Fig 6.

Fig 6



- Now swing backward immediately removing all the pressure from the victim's body as shown in Fig 7, thereby, allowing the lungs to fill with air.

Fig 7

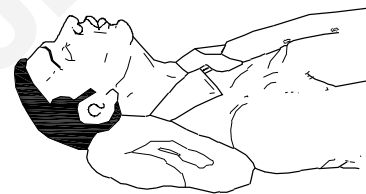


- After two seconds, swing forward again and repeat the cycle twelve to fifteen times a minute.
- Continue artificial respiration till the victim begins to breathe naturally.

**Resuscitate the victim by mouth-to-mouth method**

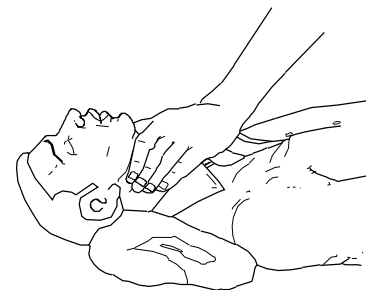
- Lay the victim flat on his back and place a roll of clothing under his shoulders to ensure that his head is thrown well back. (Fig 8)

Fig 8



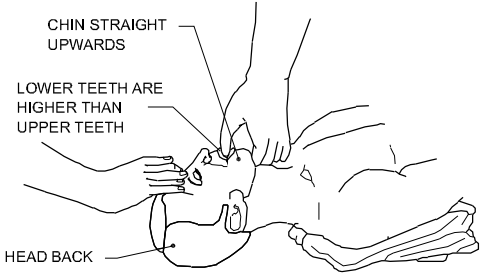
- Tilt the victim's head back so that the chin points straight upward. (Fig 9)

Fig 9



- Grasp the victim's jaw as shown in Fig 10, and raise it upward until the lower teeth are higher than the upper teeth; or place fingers on both sides of the jaw near the ear lobes and pull upward. Maintain the jaw position throughout the artificial respiration to prevent the tongue from blocking the air passage.
- Take a deep breath and place your mouth over the victim's mouth as shown in Fig 11 making airtight contact. Pinch the victim's nose shut with the thumb and forefinger. If you dislike direct contact, place a porous cloth between your mouth and the victim's. For an infant, place your mouth over his mouth and nose.

Fig 10



CANT101:HA

- Repeat this exercise at the rate of 10 - 15 times per minute till the victim responds.
- Continue this exercise till the arrival of the doctor.

**Resuscitate a victim who is under cardiac arrest (CPR) cardio pulmonary**

**In cases where the heart has stopped beating, you must act immediately.**

- Check quickly whether the victim is under cardiac arrest.

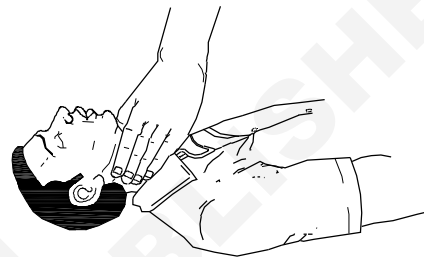
**Cardiac arrest could be ascertained by the absence of the cardiac pulse in the neck (Fig 13), blue colour around lips and widely dilated pupil of the eyes.**

Fig 11



CANT101:HB

Fig 13



CANT101:HD

- Blow into the victim's mouth (gently in the case of an infant) until his chest rises. Remove your mouth and release the hold on the nose, to let him exhale, turning your head to hear the rushing out of air. The first 8 to 10 breathings should be as rapid as the victim responds, thereafter the rate should be slowed to about 12 times a minute (20 times for an infant).

**If air cannot be blown in, check the position of the victim's head and jaw and recheck the mouth for obstructions, then try again more forcefully. If the chest still does not rise, turn the victim's face down and strike his back sharply to dislodge obstructions.**

**Sometimes air enters the victim's stomach as evidenced by a swelling stomach. Expel the air by gently pressing the stomach during the exhalation period.**

- Lay the victim on his back on a firm surface.
- Kneel alongside facing the chest and locate the lower part of the breastbone. (Fig 14)

**Resuscitate the victim by Mouth-to-Nose method**

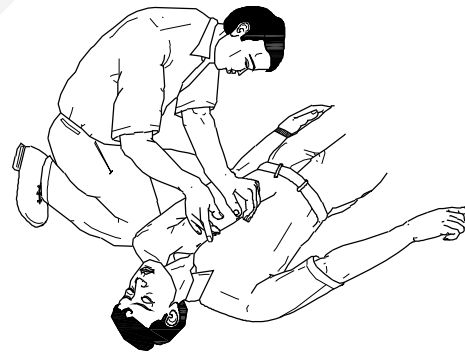
**Use this method when the victim's mouth will not open, or has a blockage you cannot clear.**

Fig 12



CANT101:HC

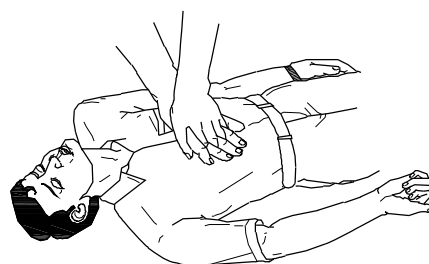
Fig 14



CANT101:HE

- Place the palm of one hand on the centre of the lower part of the breastbone, keeping your fingers off the ribs. Cover the palm with your other hand and lock your fingers together as shown in Fig 15.

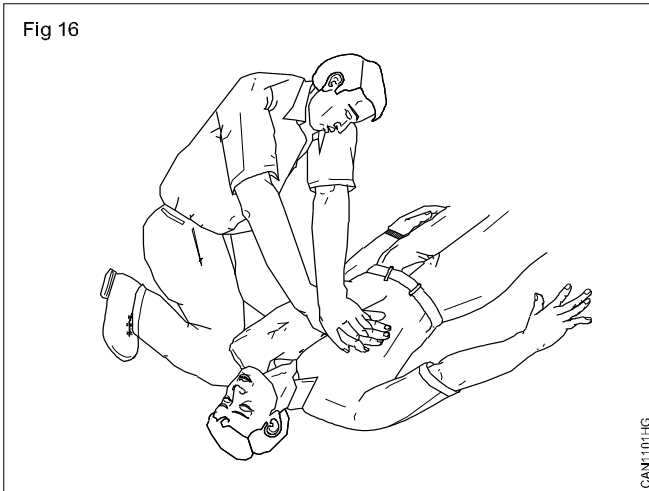
Fig 15



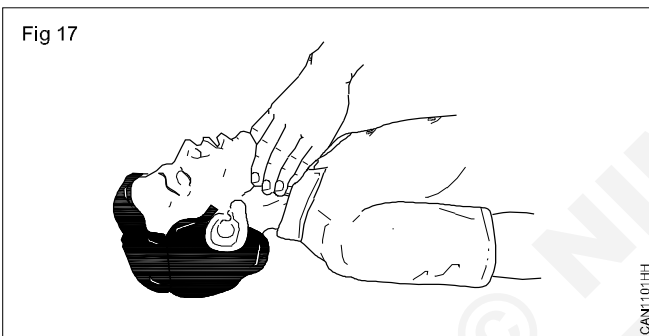
CANT101:HF

- Use the fingers of one hand to keep the victim's lips firmly shut, seal your lips around the victim's nostrils and breathe into him. Check to see if the victim's chest is rising and falling. (Fig 12)

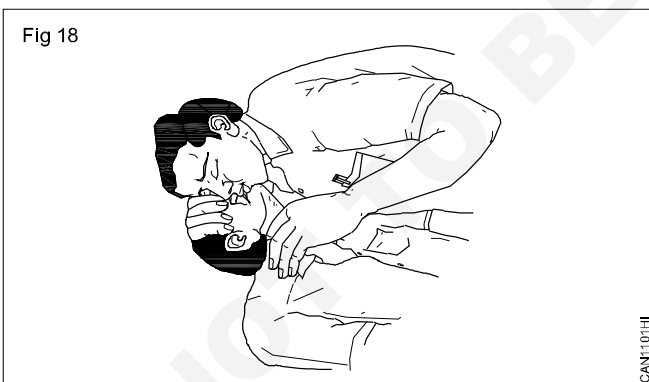
- Keeping your arms straight, press sharply down on the lower part of the breastbone; then release the pressure. (Fig 16)
- Repeat step 5, fifteen times at the rate of atleast once per second.



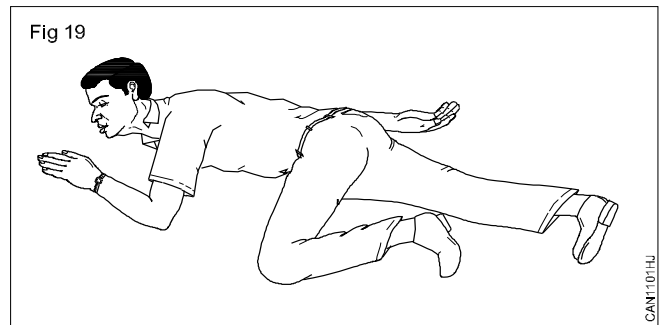
- Check the cardiac pulse. (Fig 17)



- Move back to the victim's mouth to give two breaths (mouth-to-mouth resuscitation). (Fig 18)



- Continue with another 15 compressions of the heart followed by a further two breaths of mouth-to-mouth resuscitation, and so on, check the pulse at frequent intervals.



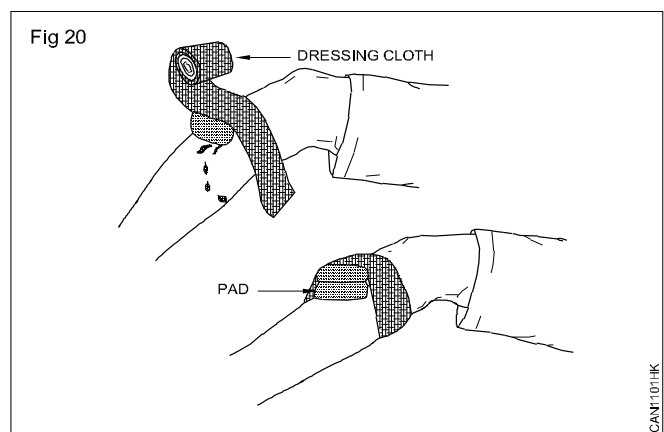
- As soon as the heartbeat returns, stop the compressions immediately but continue with mouth-to-mouth resuscitation until natural breathing is fully restored.
- Place the victim in the recovery position as shown in Fig 19. Keep him warm and get medical help quickly.

#### Other steps

- Send word for a doctor immediately.
- Keep the victim warm with a blanket, wrapped up with hot water bottles or warm bricks; stimulate circulation by stroking the insides of the arms and legs towards the heart.

#### Treatment for bleeding victim

- Determine the location of the bleeding.
- Elevate the injured area above the heart if possible.
- Apply direct pressure to the bleeding area with sterile cloth.
- Keep the pressure on for 5 seconds.
- Check to see if the bleeding has stopped if not apply further pressure for 15 minutes.
- Clean the wound.
- Bandage the wound with pad of soft material. (Fig 20)
- Advice victim to take treatment from doctor.



#### TASK 2: Identify the different types of fire safety equipment/ fire extinguisher

Instructor may provide (or) arrange different types of fire safety equipment, fire extinguisher/ chart and explain the trainees how to identify the fire safety equipment/ fire extinguisher and their application.

- Trainees will note down all the displayed fire safety equipments names and their application.
- Record it in table 1.
- Get it checked by the instructor.

Table 1

Fig No.	Name of the fire safety equipment/ fire extinguisher	Classification of fire
1		
2		
3		
4		
5		
6		
7		

**TASK 3: Application of fire extinguisher**

**Instructor shall display all the fire extinguisher in the section and brief their name, uses and the working condition of each fire extinguisher**

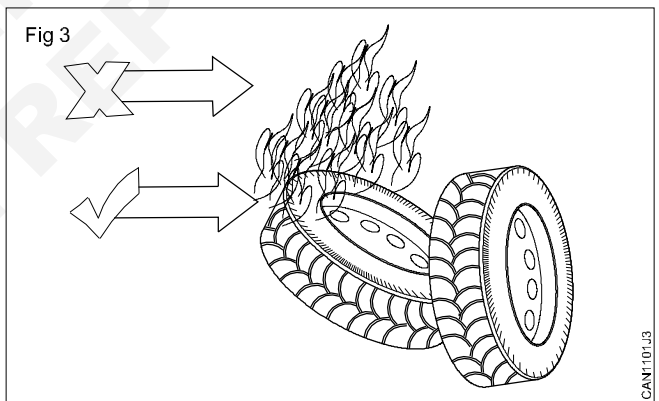
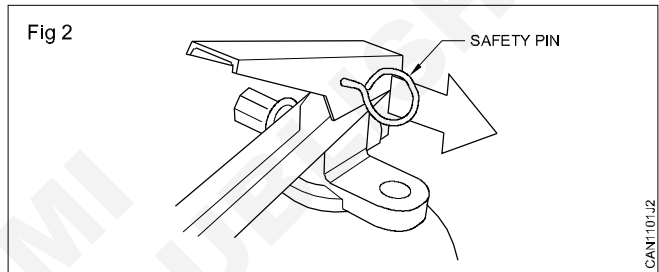
- Alert people surrounding by shouting fire, fire, fire when observe fire.
- Inform fire service or arrange to inform immediately.
- Open emergency exit and ask them to go away.
- Put "Off" electrical power supply.

**Do not allow people to go nearer to the fire**

- Analyze and identify the type of fire. Refer Table 1.

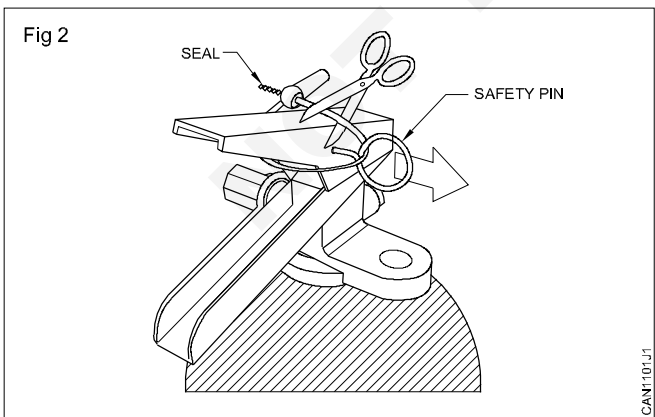
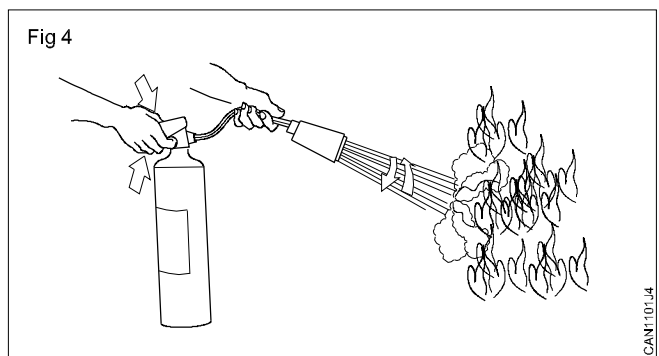
**Assume the fire is 'B' type (flammable liquefiable solids)**

- Select CO<sub>2</sub> (carbon dioxide) fire extinguisher
- Locate and pick up CO<sub>2</sub> fire extinguisher. Check for its expiry date.
- Break the seal. (Fig 1)



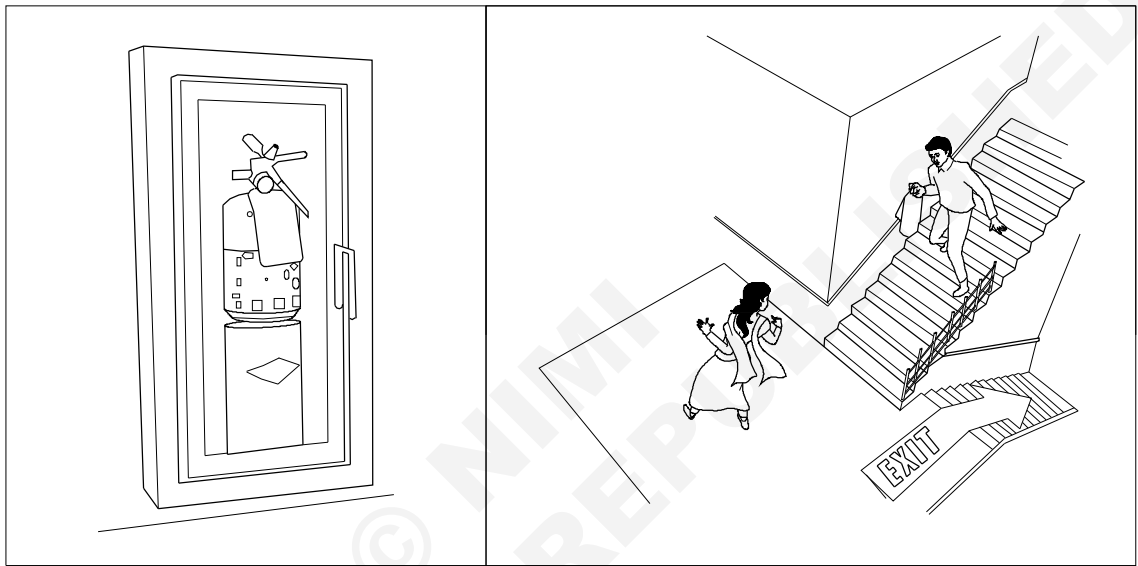
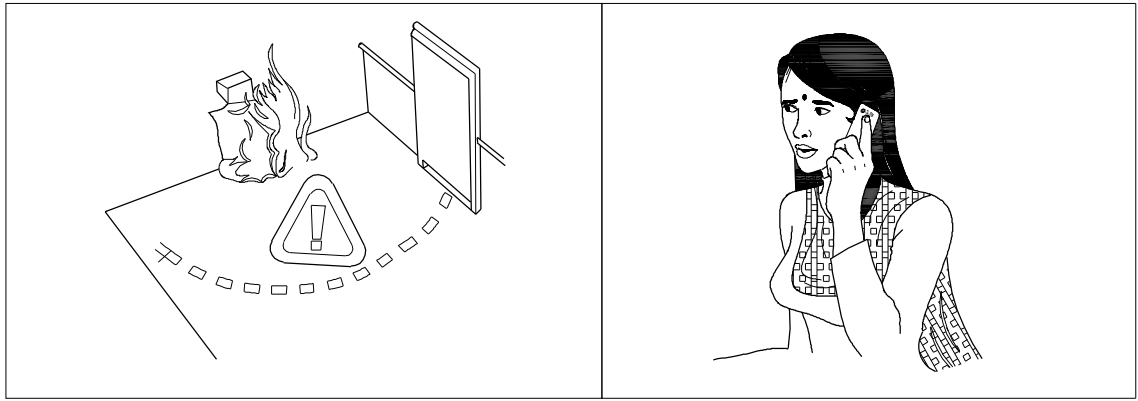
**Keep your self low**

- Squeeze the handle lever slowly to discharge the agent (Fig 4)



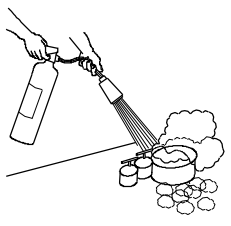
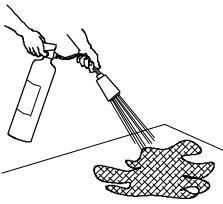
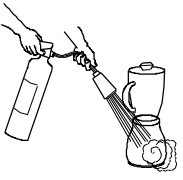
- Pull the safety pin from the handle (Fig 2) (Pin located at the top of the fire extinguisher) (Fig 2)
- Aim the extinguisher nozzle or hose at the base of the fire (this will remove the source of fuel fire) (Fig 3)

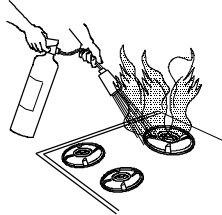
- Sweep side to side approximately 15 cm over the fuel fire until the fire is put off. (Fig 4)



CAN1101E3

**Table1**

Class 'A'	Wood, paper, cloth, solid material	
Class 'B'	Oil based fire (grease, gasoline, oil) & liquefiable solids	
Class 'C'	Gas and liquefied gases	

Class 'D'	Metals and electrical equipment	
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**Fire extinguishers are manufactured for use from the distance.**

- Remember that your life is more important than property. So don't place yourself or others at risk.

**Caution**

- While putting off fire, the fire may flare up.
- Do not be panic so long as it put off promptly
- If the fire doesn't respond well after you have used up the fire extinguisher move away your self away from the fire point.
- Do not attempt to put out a fire where it is emitting toxic smoke, leave it to the professionals.

**In order to remember the simple operation of fire extinguisher**

**Remember**

**P.A.S.S. This will help to use fire extinguisher**

**P for pull**

**A for aim**

**S for squeeze**

**S for sweep**

**TASK 4 : Practice on workshop safety and discipline**

**Switch OFF all the machinery and equipment before starting the cleaning process. Use a mask to cover the mouth and nose.**

- Use vacuum cleaners to suck dust from areas where a brush or cloth cannot help.
- Collect the waste materials found in the lab and put it in the specified dustbin.

**Instructor has to brief the japanese 5S concept to the trainees before starting the work.**

**Sort**

**Set in order**

**Shine**

**Standardise**

**Sustain**

**Dusting and cleaning can be arranged by dividing the trainees into groups under the supervision of the instructor.**

- Clean places where grease or oil has been split on the floor

**Note down abnormal things that you noticed while cleaning and report it to the instructor to take corrective action.**

- Identify the areas/equipment/machine that need to be cleaned.
- Keep the movable items in one place and group them.
- Clean the dust carefully, without damaging any part/ connection in the machine/equipment, using a cloth.
- Use wet dusting cloth on areas that are wired.
- Remove rust on parts of the equipment (or) devices using an emery sheet.

- Pull all the materials and equipment used for cleaning in their respective places.

- Inspect and ensure that all machines are working after cleaning in the presence of the instructor.

- Discuss abnormal things that you came across while cleaning with the instructor. Prepare report if the instructor asks for it.

**Do not remove lubricants in the machine while wiping/ cleaning.**

**Instructor may assign trainees the responsibility of cleaning in batches. Disposal of waste may be organised as a routine activity by coordinating with the stores.**

**Identification of different wooden sample pieces for hard wood, softwood, grains and their applications**

**Objectives :** At the end of this exercise you shall be able to

- identify the different wooden sample pieces and their applications
- identify the hard wood and soft wood
- Identify the growth and grains.



						1.1.02
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE	<b>IDENTIFICATION OF DIFFERENT SAMPLE WOODEN PIECES FOR HARD WOOD, SOFT WOOD, GRAINS AND THEIR APPLICATIONS</b>				DEVIATIONS	TIME : 4hrs
					CODE NO. CAN1102E1	

TASK - 2

Fig 1

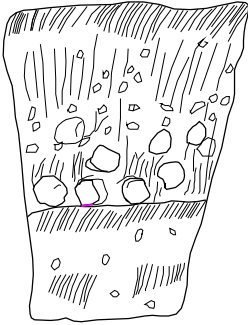
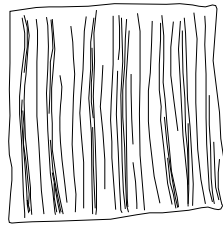
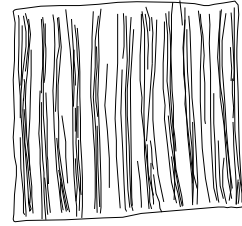


Fig 2



(A)



(B)

Fig 3



Fig 4

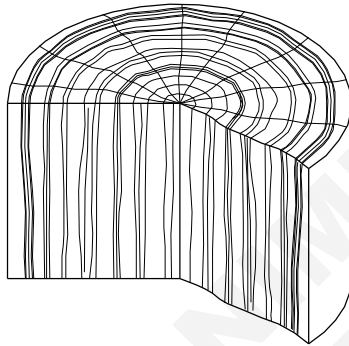


Fig 5

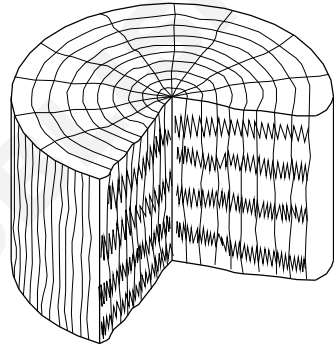


Fig 6

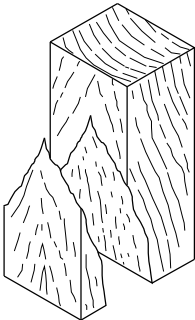


Fig 7

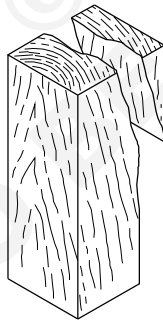
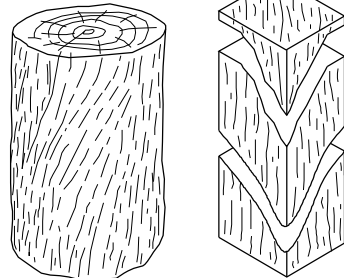
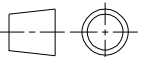


Fig 8



						1.1.02
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE	<b>IDENTIFICATION OF GROWTH AND GRAINS</b>				DEVIATIONS	TIME : 4hrs
					CODE NO. CAN1102E2	



## Job Sequence

Instructor shall display and demonstrate to the students regarding the different types of wooden sample pieces in the section and brief the names, soft wood, hard wood and grains and their applications.

- Trainees will note down all the displayed wooden pieces names like a hard wood and soft wood.
- Record them in table 1,2 and 3.
- Get it checked by the instructor.

TASK 1: Identify the wooden sample pieces

Table 1

Fig No.	Name of the wood	Wood applications
1		
2		
3		
4		
5		
6		
7		
8		
9		

Identify the soft wood and hard wood

Table 2

Fig No.	Hard wood	Soft wood
1		
2		
3		
4		
5		
6		
7		
8		
9		

TASK 2: Identify the growth and grains

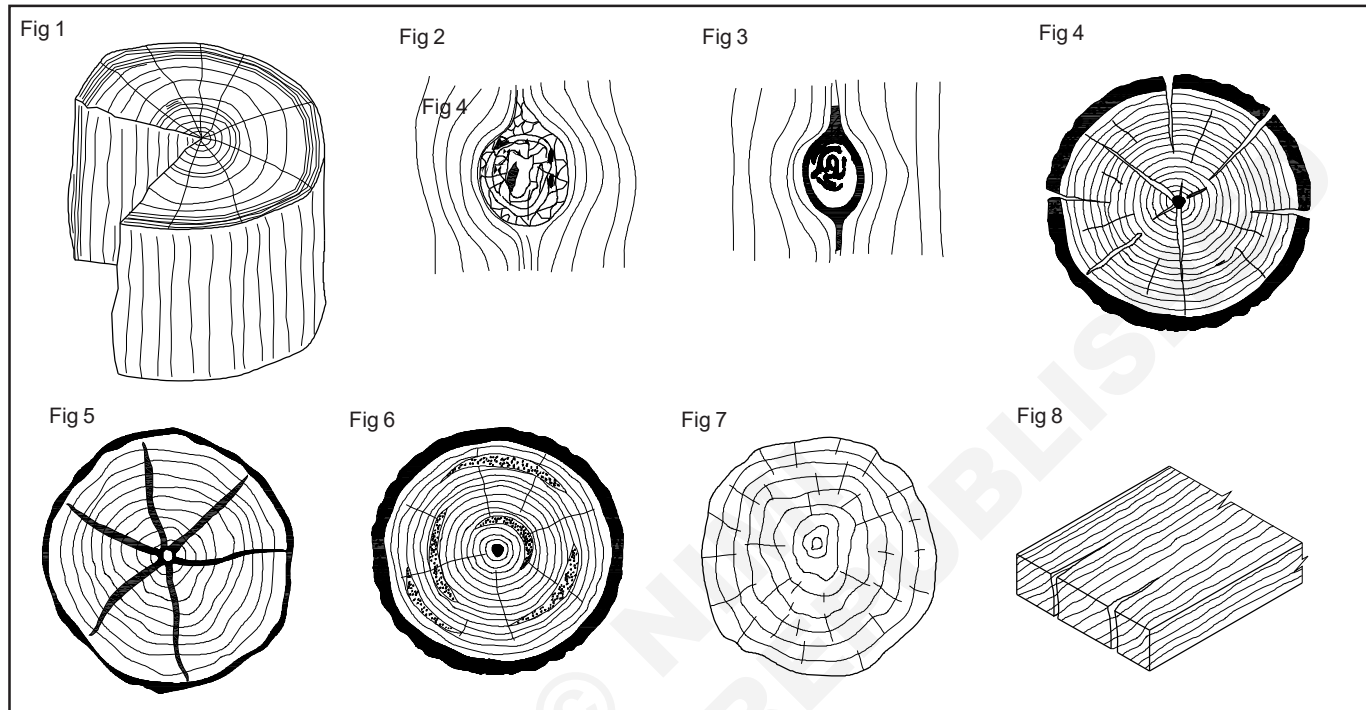
Table 3

Fig No.	Name of the growth/grain	Remarks
1		
2		
3		
4		
5		
6		
7		
8		

Identification of annual ring, knots, shakes and checks

Objectives : At the end of this exercise you shall be able to

- identify the name of annual ring
- identify the name of knots
- identify the name of shakes
- identify the name of checks.



Job Sequence

Instructor shall display the wooden sample pieces in the section and brief their annual ring, knots, shakes and checks names of each wooden sample pieces.

- Trainees will note down all the displayed wooden sample pieces like a annual ring, knots shakes and checks.
- Record it in table 1.
- Get it checked by the instructor.

Identify the knots, shakes and checks

Table 1

Fig No.	Name of the part/defects	Remarks
1		
2		
3		
4		
5		
6		
7		
8		

**Demonstrate hand operated tools and showing different audio - visual clips**

**Objectives :** At the end of this exercise you shall be able to

- identify the different hand operated tools
- demonstrate the use of hand operated tools for operation
- demonstrate the audio - visual clips.

Fig 1

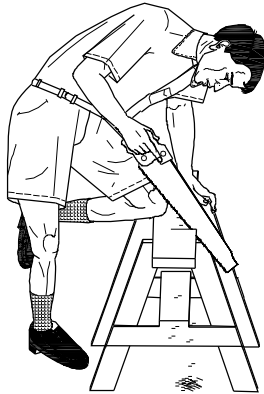


Fig 2



Fig 3

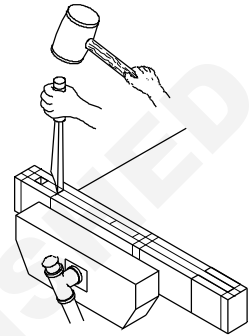


Fig 4

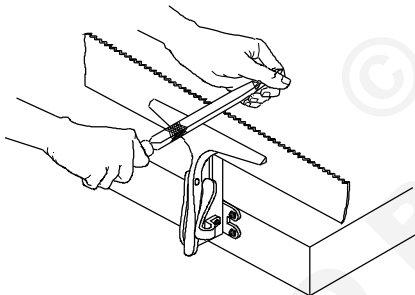


Fig 5



Fig 6

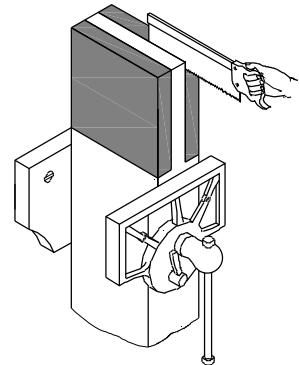
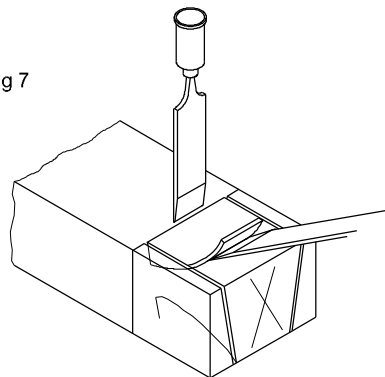


Fig 7



1						1.1.04
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATE THE HAND OPERATED TOOLS AND SHOWING DIFFERENT AUDIO VISUAL CLIPS</b>				TOLERANCE	TIME 8hrs
					CODE NO. CAN1104E1	

## Job Sequence

Instructor shall display and demonstrate to the student regarding the hand operated tools and audio - visual clips.

- Trainees will note down all the displayed tools, names and uses
- Record it in table 1.
- Get it checked by the instructor.

Table 1

Fig No.	Name of the tool	Name of the operation	Link address
1			<a href="https://www.youtube.com/watch?v=xpu75Lq9aFU">https://www.youtube.com/watch?v=xpu75Lq9aFU</a>
2			<a href="https://www.youtube.com/watch?v=PWaPWX1dFzc">www.youtube.com/watch?v=PWaPWX1dFzc</a>
3			<a href="https://www.youtube.com/watch?v=vbneBMOQE98">https://www.youtube.com/watch?v=vbneBMOQE98</a>
4			<a href="https://www.youtube.com/watch?v=OltxTmU3ebk">https://www.youtube.com/watch?v=OltxTmU3ebk</a>
5			<a href="https://www.youtube.com/watch?v=luntduZGGT0">https://www.youtube.com/watch?v=luntduZGGT0</a>
6			<a href="https://www.youtube.com/watch?v=aBodzmUGtdw">https://www.youtube.com/watch?v=aBodzmUGtdw</a>
7			<a href="https://www.youtube.com/watch?v=zLH2uN_L041">https://www.youtube.com/watch?v=zLH2uN_L041</a>

**Identification and use of different types of measuring, marking and testing tools and their applications.**

**Objectives :** At the end of this exercise you shall be able to

- identify the measuring tools, use and their applications
- identify the marking tools use and their applications
- identify the testing tools use and their applications.

TASK - 1

DIRECT READING MEASURING TOOLS

Fig 1

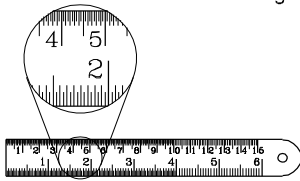


Fig 2

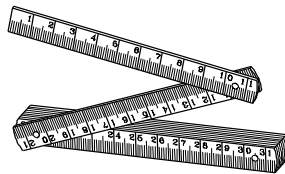


Fig 3

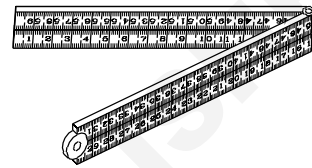


Fig 4

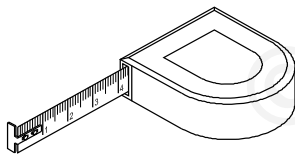
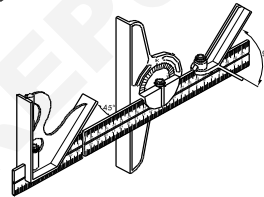


Fig 5



INDIRECT READING MEASURING TOOLS

Fig 6



Fig 7

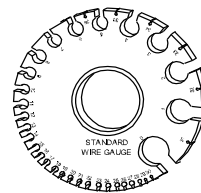
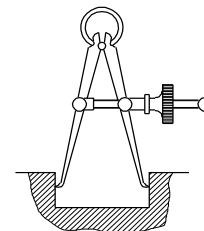


Fig 8



1						1.1.05
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>IDENTIFICATION AND USE OF MEASURING TOOLS &amp; THIER APPLICATIONS</b>				TOLERANCE	TIME 10hrs
					CODE NO. CAN1105E1	

TASK -2 MARKING TOOLS

Fig 1

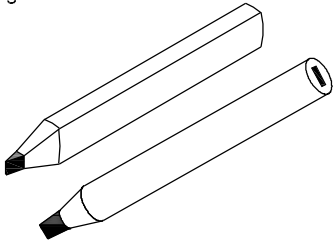


Fig 2

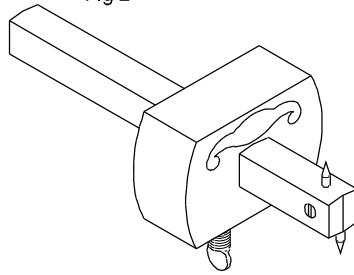


Fig 3

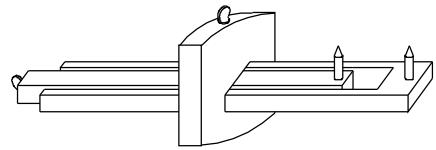


Fig 4

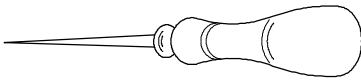


Fig 5



Fig 6

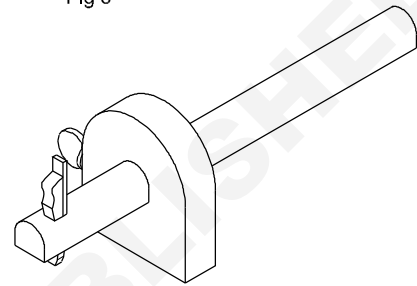


Fig 7

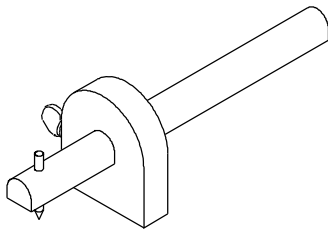


Fig 8

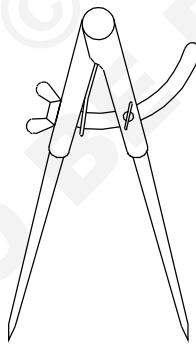


Fig 9



1						1.1.05
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>IDENTIFICATION OF MARKING TOOLS &amp; THIER APPLICATIONS</b>				TOLERANCE	TIME 10hrs
					CODE NO. CAN1105E2	

TASK - 3 TESTING TOOLS

Fig 1

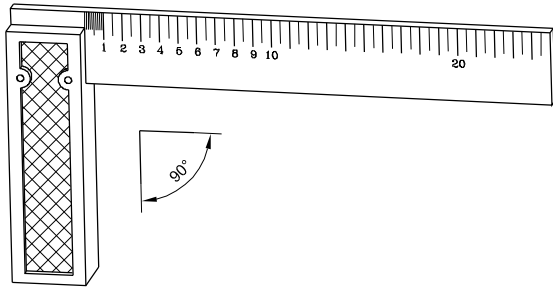


Fig 2

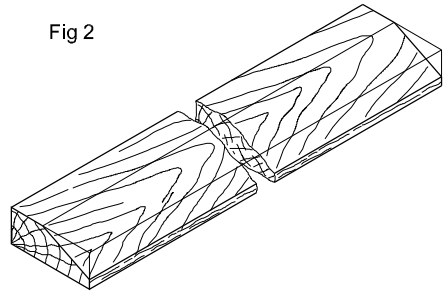


Fig 3

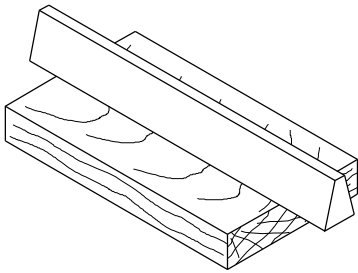


Fig 4

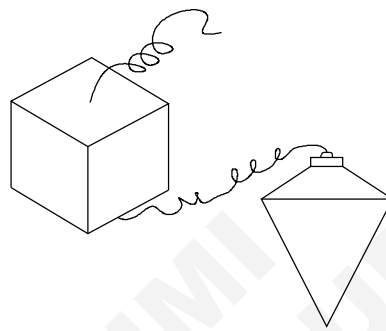


Fig 5

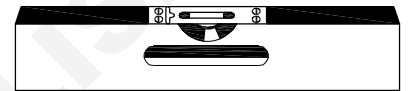


Fig 6

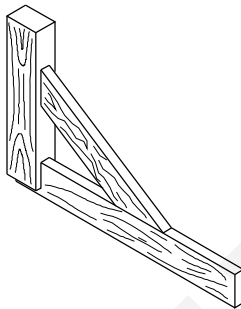


Fig 7

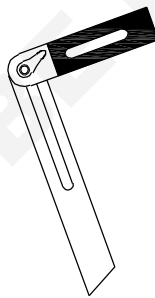
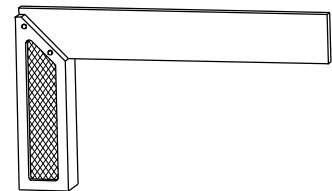


Fig 8



1						1.1.05
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>IDENTIFICATION OF MARKING &amp; TESTING TOOLS &amp; THIER APPLICATIONS</b>				TOLERANCE	TIME 10hrs
					CODE NO. CAN1105E3	

## Job Sequence

Instructor shall display all the measuring, marking and testing tools in the section and brief their names, uses and their applications of each tool.

- Trainees will note down all the displayed names and uses.
- Record it in table 1,2 and 3.
- Get it checked by the instructor

Table 1

TASK - 1 : Identify the measuring tools, use and their application.

Fig No.	Name of tool	Uses	Tool applications
1			
2			
3			
4			
5			
6			
7			
8			

Table 2

TASK - 2 : Identify the marking tools, use and their applications

Fig No.	Name of tool	Uses	Tool applications
1			
2			
3			
4			
5			
6			
7			
8			
9			

Table 3

TASK - 3 : Identify the testing tool, use and their application

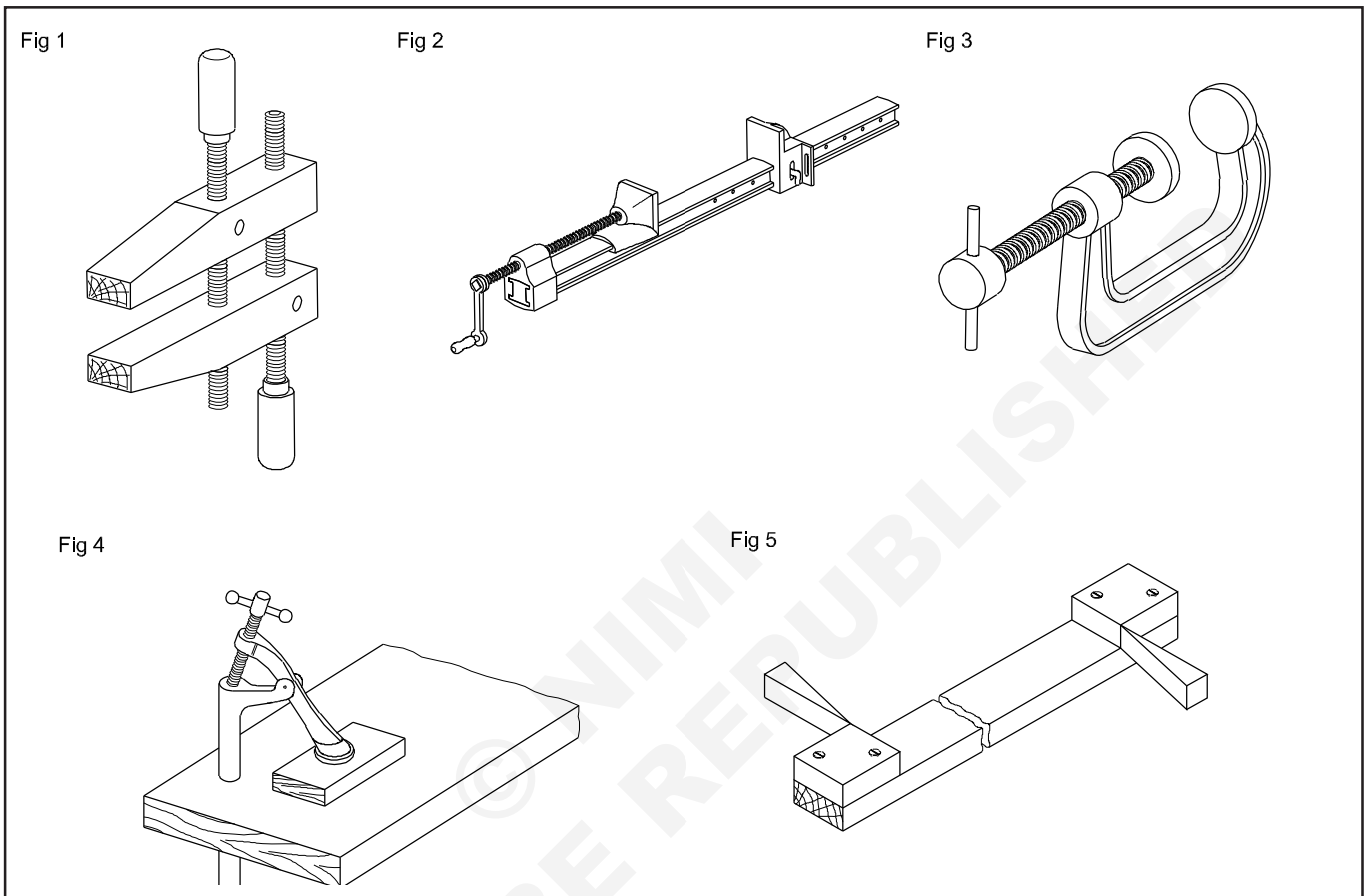
Fig No.	Name of tool	Uses	Tool applications
1			
2			
3			
4			
5			
6			
7			
8			



**Identification and use of different types of work holding devices**

**Objectives :** At the end of this exercise you shall be able to

- identify the work holding devices
- identify the holding devices for specific uses.



**Job Sequence**

**Instructor shall display all the work holding devices in the section and brief their names, uses and the working condition of each work holding devices.**

- Trainees will note down all the displayed work holding device names and uses.
- Record it in table 1.
- Get it checked by the instructor.

**Table 1**

**Identification of work holding device**

Fig No.	Name of work holding devices	Uses
1		
2		
3		
4		
5		

**Demonstrate use of machinery and hand operated portable tools and their safety**

Objectives : At the end of this exercise you shall be able to

- identify the portable hand operated machinery
- identify the hand operated portable tools
- use and their safety.

TASK - 1 PORTABLE MACHINERY

Fig 1

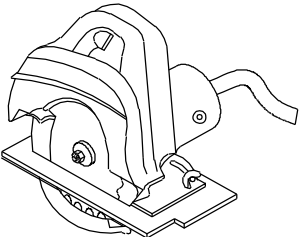


Fig 2

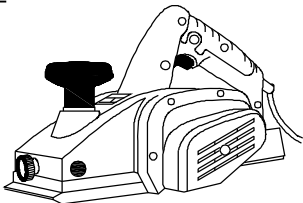


Fig 3

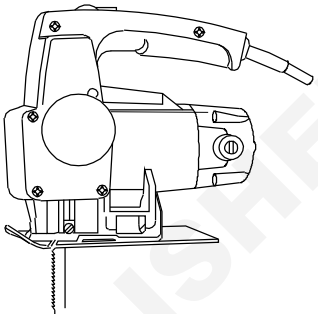


Fig 4

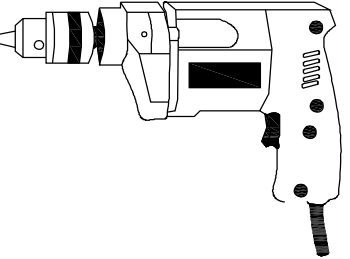


Fig 5

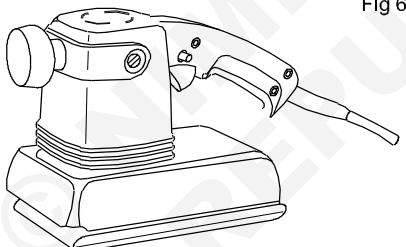


Fig 6

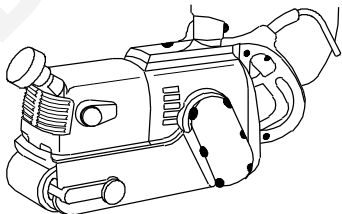


Fig 7

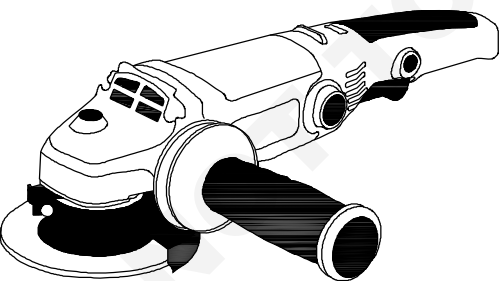
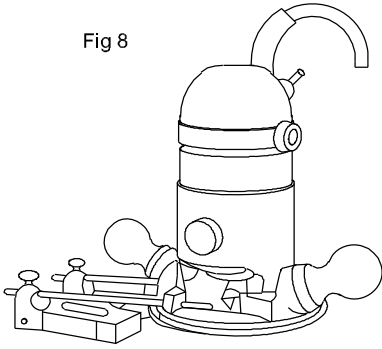

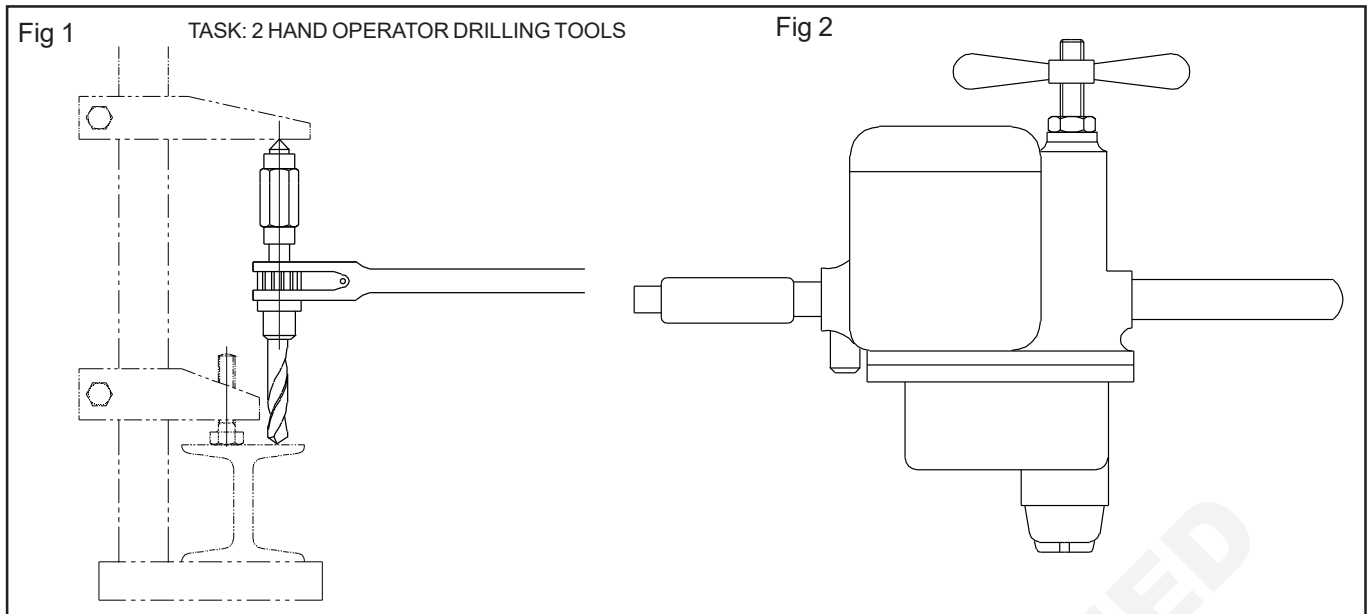


Fig 8



1						1.1.07
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATE USE OF MACHINERY AND HAND OPERATED PORTABLE TOOLS</b>				TOLERANCE	TIME 9hrs
					CODE NO. CAN1107E1	



## Job Sequence

**Instructor shall display and demonstrate to the students regarding the use of machinery and hand operated portable tools and their safety.**

- Trainees will note down all the displayed machinery and hand operated tools names and uses.
- Record it in table 1 and 2.
- Get it checked by the instructor.

Table 1

### TASK 1: Identify the portable machinery

Fig No.	Name of the machinery	Uses	Record the safety precautions to be followed while working in carpentry job
1			
2			
3			
4			
5			
6			
7			
8			

Table 2

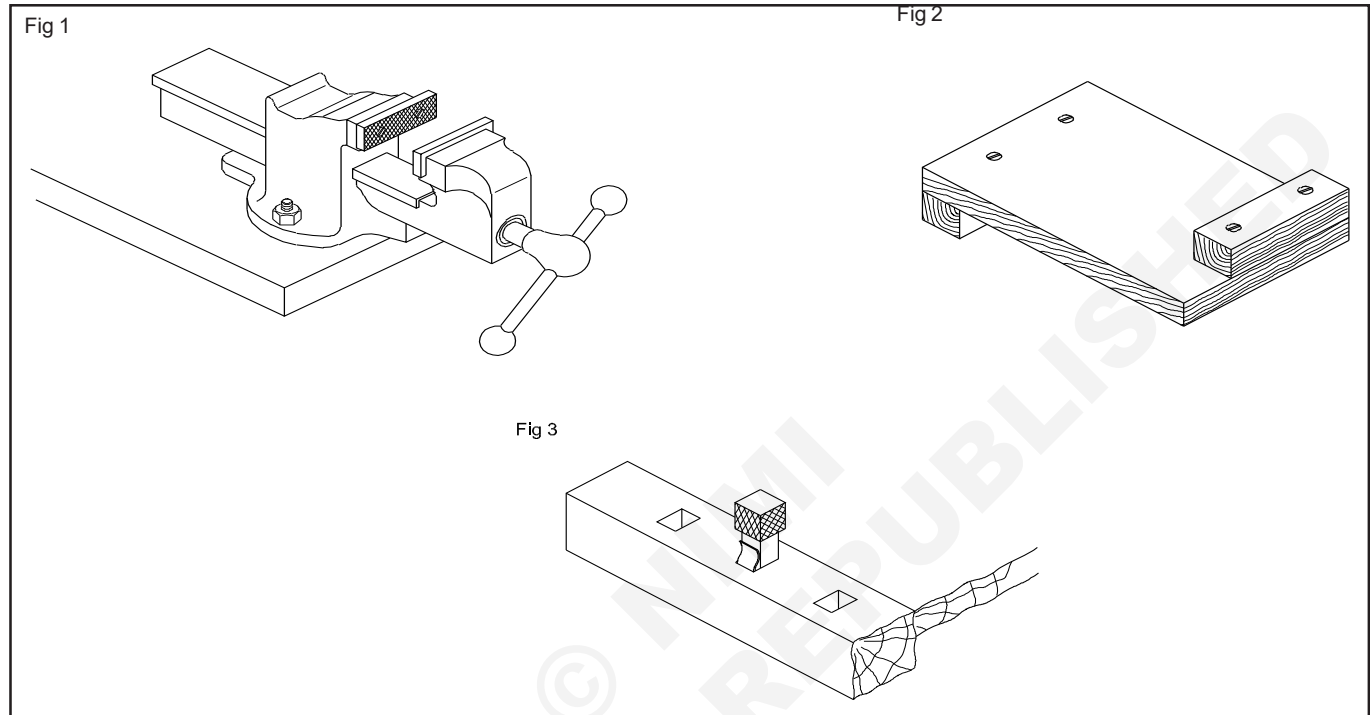
### TASK 2: Identify the hand operated drilling tools

Fig No.	Name of the hand operated drilling tool	Uses	Record the safety precautions to be followed while working in carpentry job
1			
2			

**Demonstrate the use of bench vice, bench hook, bench stop and their application**

**Objectives :** At the end of this exercise you shall be able to

- identify the bench vice and their application
- identify the bench hook and their application
- identify the bench stop and their application.



**Job Sequence**

**Instructor shall display and demonstrate to the students regarding the bench vice, bench hook and bench stop in the selection and brief their names, uses and their application of each equipment.**

- Record it in table 1.
- Get it checked by the instructor.

- Trainees will note down all the displayed equipments names and uses.

**Table 1**

Fig No.	Name of equipment	Uses	Application
1			
2			
3			

**Demonstrate different types of saws - Ripping, cross cutting, curve cutting and oblique sawing.**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate the different types of saws
- perform ripping
- perform cross cutting
- perform oblique sawing
- perform mark the job
- clamp the job in the carpenter's vice.

TASK - 1

Fig 1

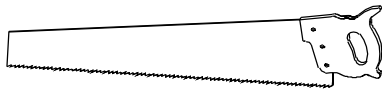


Fig 2

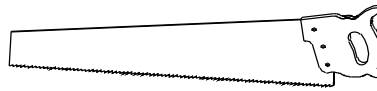


Fig 3

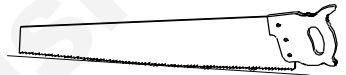


Fig 4



Fig 5



Fig 6

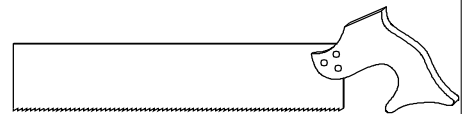


Fig 7

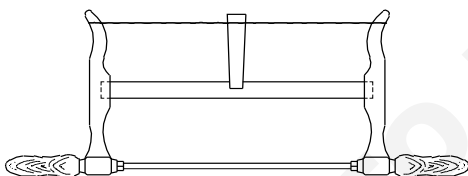


Fig 8

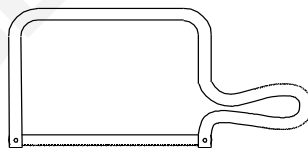


Fig 9

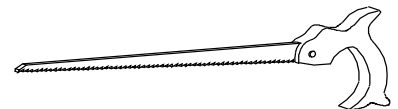


Fig 10

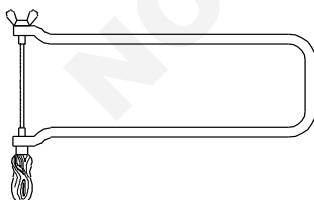


Fig 11

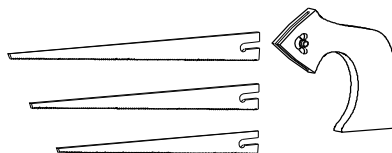
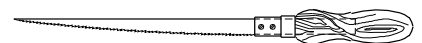
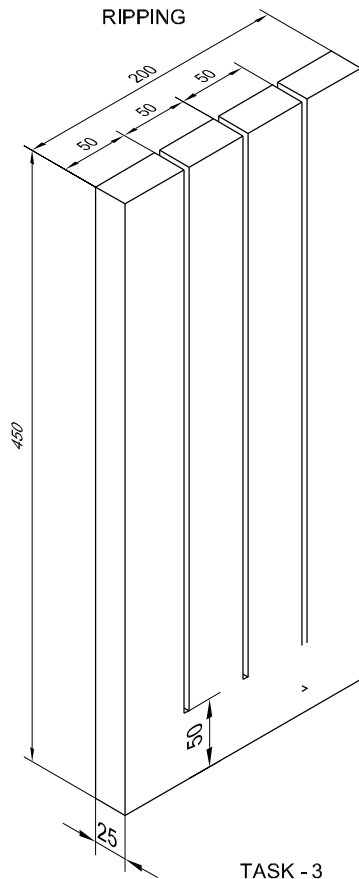


Fig 12

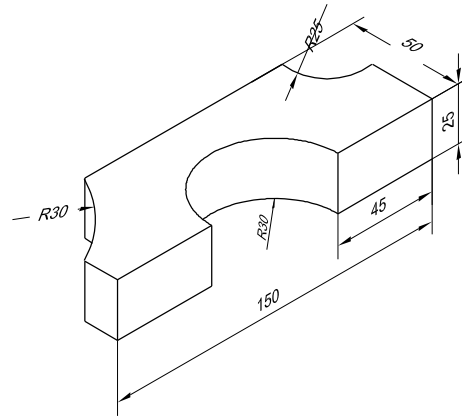


						1.1.09
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATE THE DIFFERENT TYPES OF SAWS- RIPPING, CROSS CUTTING,CURVE CUTTING AND OBLIQUE SAWING</b>				TOLERANCE	TIME: 4hrs
					CODE NO. CA20N1109E1	

TASK - 2

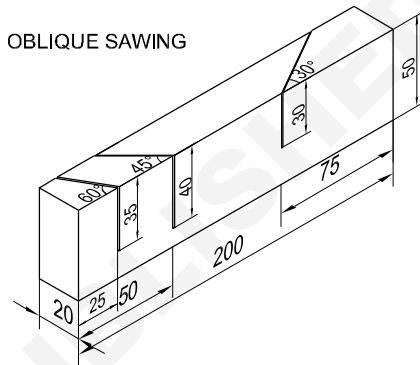


TASK - 4 CURVE CUTTING



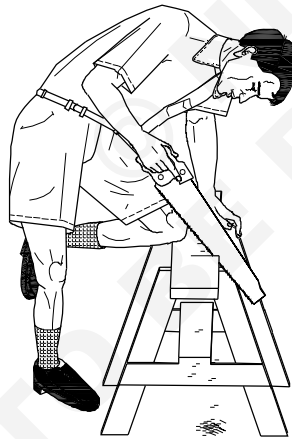
TASK - 5

OBLIQUE SAWING



TASK - 3

CROSS CUTTING



1	50x20x200		HARD WOOD			
1	50x25x150		HARD WOOD			
1	100x25x200		HARD WOOD			
1	200 x 25 x 450		HARD WOOD			1.1.09
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>SAWING PRACTICE RIPPING, CROSS CUTTING,CURVE CUTTING AND OBLIQUE SAWING</b>				TOLERANCE	TIME
					CODE NO. CAN1109E2	

## Job Sequence

Instructor shall display and demonstrate to the students all the saws in the section and brief their names, uses and the working condition of each saws.

- Trainees will note down all the displayed saws names and uses.
- Record it in table 1
- Get it checked by the instructor.

Table 1

### TASK 1: Identify the saws

Fig No.	Name of the saw	Remarks
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

### TASK 2: Ripping

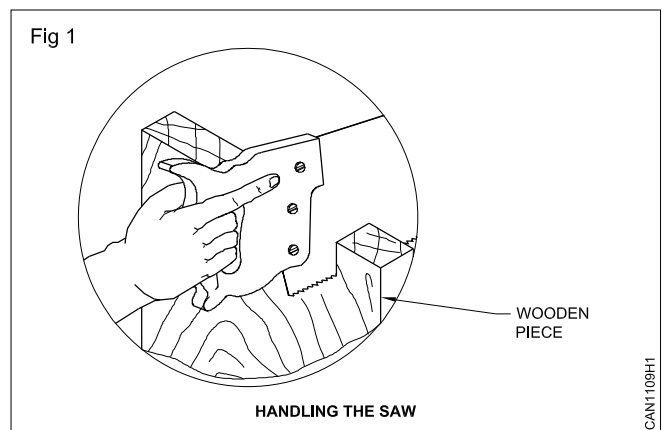
- Check the wooden piece size with a folding rule.
- Mark the job as per drawing using try square and marking gauge. Hold the job firmly and vertically in the carpenter's vice vertically leaving 150mm above the vice and parallel to jaws. (Fig 1)
- Set and mark the saw. Grip the saw handle with right hand index finger along the side. (Fig 1)

#### Precaution

Clean the wooden piece on all sides from sand stone.

Check whether the material is within required size of 450 x 25 x 200mm.

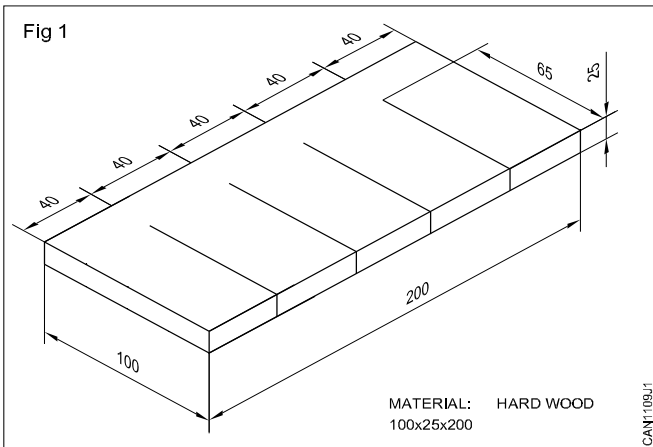
- Place the saw on marked line at an angle of 65°.
- Hold the handle to form an angle of 65° with job. (Fig 1)



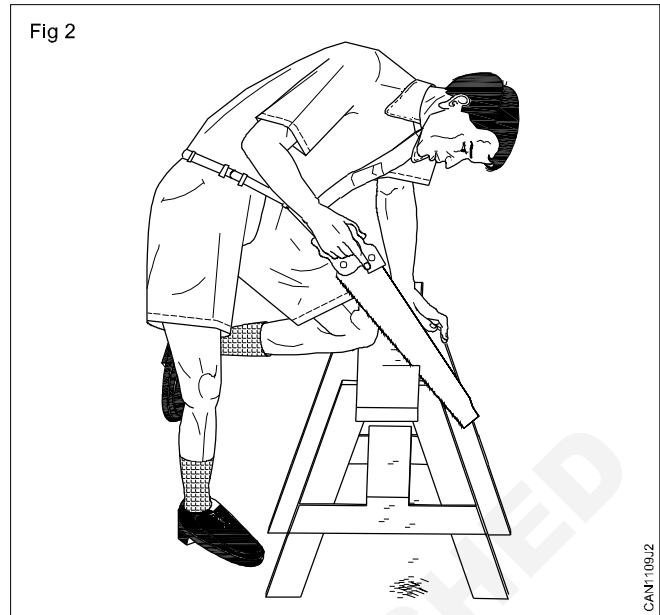
- Move the saw forward and backward with even pressure to form a saw cut using left hand thumb as a guide.
- Saw to a depth of 400mm on marked line of the job.
- Repeat the sawing for the other marked lines.
- Finish the rip sawing.

### TASK 3: Sawing across the grain on horse or trestles

- Check the wooden piece size using folding rule
- Mark the job as per drawing using try square, folding rule and pencil Fig 1.



- Take the cross-cut saw and sharpen it, and keep it ready for sawing.
- Hold the job on the trestle firmly fixing with your knee. (Fig 2)
- Hold the saw at an angle of  $45^\circ$  on the lines marked.
- Start sawing the job by pushing and pulling back the saw with uniform pressure.
- Use gentle strokes at the end to avoid tearing of wood.
- When sawing across the grain the free hand to be brought across to hold the cut piece.



- The saw can be tested for its vertical line with try square.
- While finishing use mild strokes to avoid tearing of wood.

#### Note

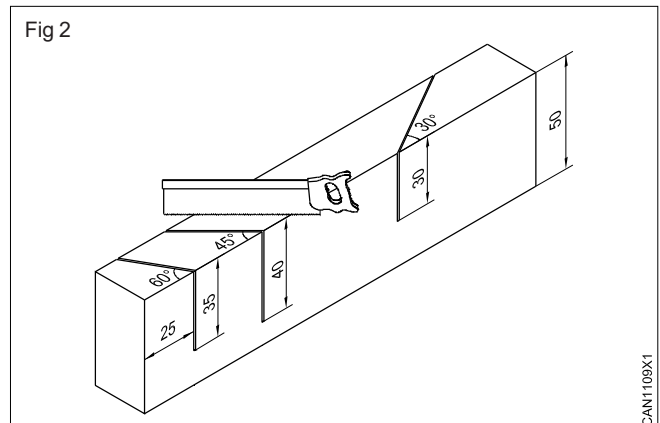
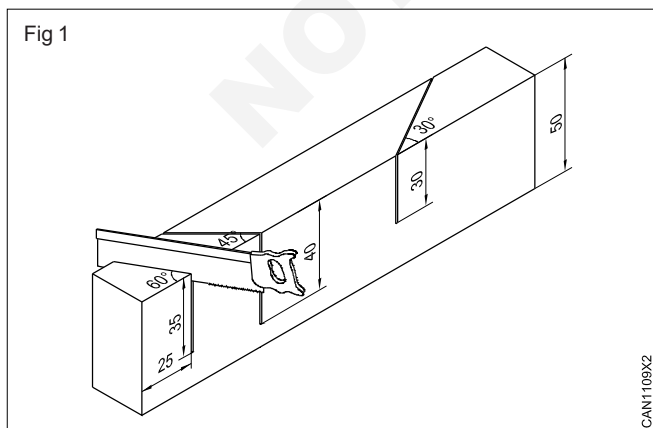
**The sighting eye should be directly above the saw.**

**The saw, wrist, elbow and shoulder should all be in one line.**

- Repeat the same procedure for other three lines.

### TASK 4: Oblique sawing across the grain

- Check the wooden piece for its size using folding rule.
- Mark the job as per sketch with the bevel square, pencil and try square.
- Mark the angles  $60^\circ$ ,  $45^\circ$ , and  $30^\circ$  line across the grain.
- Hold, the job in the carpenter's vice with 50mm side upwards.

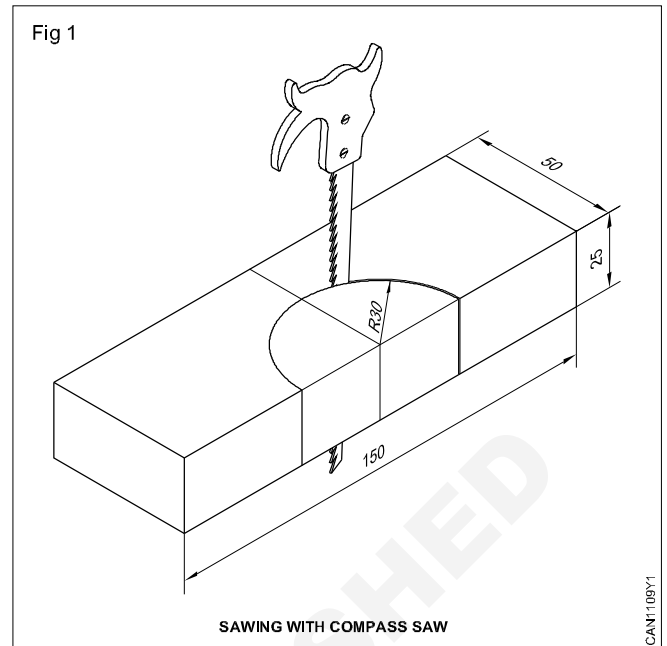


- Tighten the job.
- Hold the Tenon saw on  $60^\circ$  line and start sawing with uniform pressure to a depth of 35mm. (Figs 1 & 2)
- Hold the Tenon saw on  $45^\circ$  line and start sawing to a depth of 40mm.
- Hold the Tenon saw on  $30^\circ$  line and start sawing to a depth of 30mm & Job finishing (Figs 1 & 2)



## TASK 5 : Curving sawing

- Check the job for flatness and squareness with try square.
- Mark the lines on both sides of the job as per drawing shown with the help of wing compass, folding rule and support piece.
- Hold the job on work bench with the face side of 150 mm facing upwards by using 'G' clamp.
- Set the saw on marked line.
- Start sawing the semicircle from the face edge, half portion from right and half from left and complete it using compass saw. Fig (1)
- Hold the job so that the corner B is upwards.
- Set the compass saw on marked lines of R 30 and start sawing from any of the face edge and complete it carefully.
- Hold the job so that the corner C of radius 25mm is upwards. keep the saw on the marked lines.
- Start sawing slowly with the compass saw and complete it



## Skill sequence

### Job holding

**Objective:** This shall help you to

- **clamp the job in carpenter's vice.**

Clean the jaws of carpenter's bench vice, by cleaning wire brush making it free from saw dust.

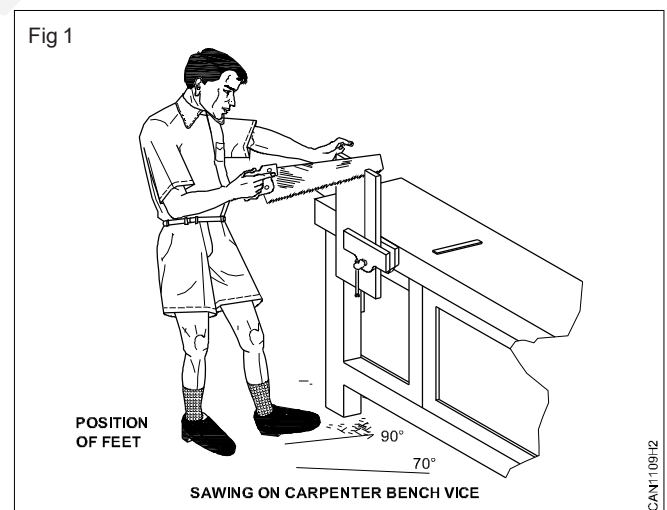
Open the jaws of the carpenter vice by turning the handle anti-clock-vice direction.

Open the jaws wide enough to hold the job vertically.

Hold the job vertically 150 mm above the vice, and parallel to jaws. Close and tighten the jaws to hold job firmly in the vice. (Fig 1)

**Do not over tighten the job.**

**Keep the waste wooden pieces on both the sides of the jaws while sawing**



### Marking the ripping

**Objective:** This shall help you to

- **mark the ripping.**

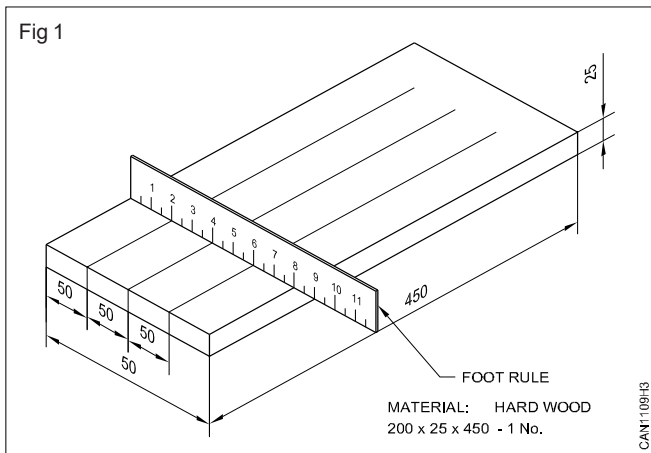
#### Marking

Place the job horizontally on the work bench.

With carpenter's pencil, folding rule and straight edge mark 50mm from the left of the job.

Continue marking at intervals of 50mm to length of 400mm.

Repeat the procedure on end side, and back side keeping the try squares on the edge of the end side. Mark the line with straight edge. (Fig 1)



## Marking of oblique sawing

**Objective:** This shall help you to

- mark the oblique sawing.

Hold the bevel square close to the face side and mark  $60^\circ$  at a distance of 25mm from left.

Hold the try square close on the face side and mark  $90^\circ$  line from the  $60^\circ$  angle mark at a distance, 25mm from left and to the depth of 35mm.

Repeat the same procedure for  $45^\circ$  and  $30^\circ$  angles also.

## Marking of curve sawing

**Objective:** This shall help you to

- mark the curve sawing.

Place the job horizontally free from dust and dirt.

Measure the centre point length wise.

Place the wing compass on the centre (A) and draw the semicircle of radius 30mm on both sides with the help of support piece.

Draw perpendicular line from point D and F to join DE and FG.

Now  $DE = FG = 25\text{mm}$  (thickness). Fig 1.

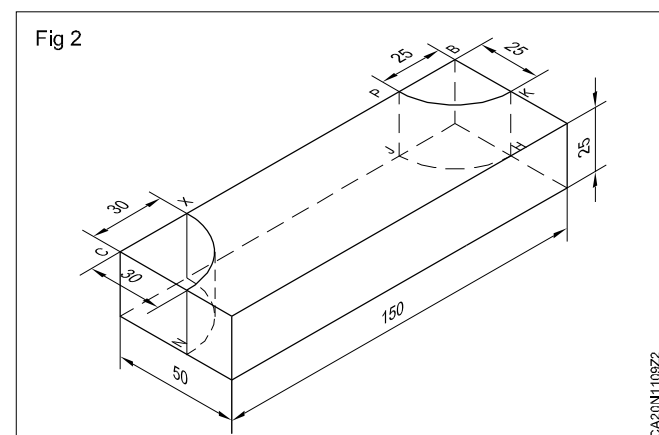
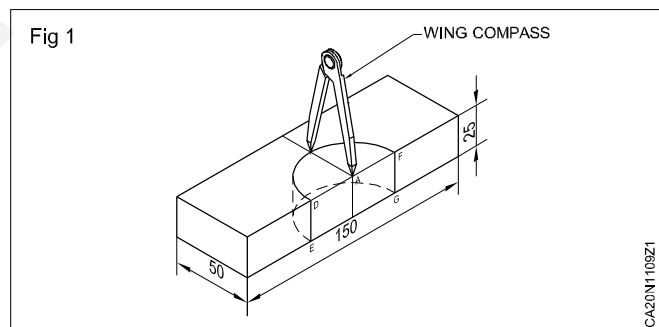
Keep the job as it is. Place the wing compass on the point B and draw the arcs of 25mm on both sides joining P and K using the guide piece. (Fig 2)

Draw and complete the corner circle, on the edge side and back side.

Draw perpendicular KH and PJ.

$KH = PJ = 25\text{mm}$ .

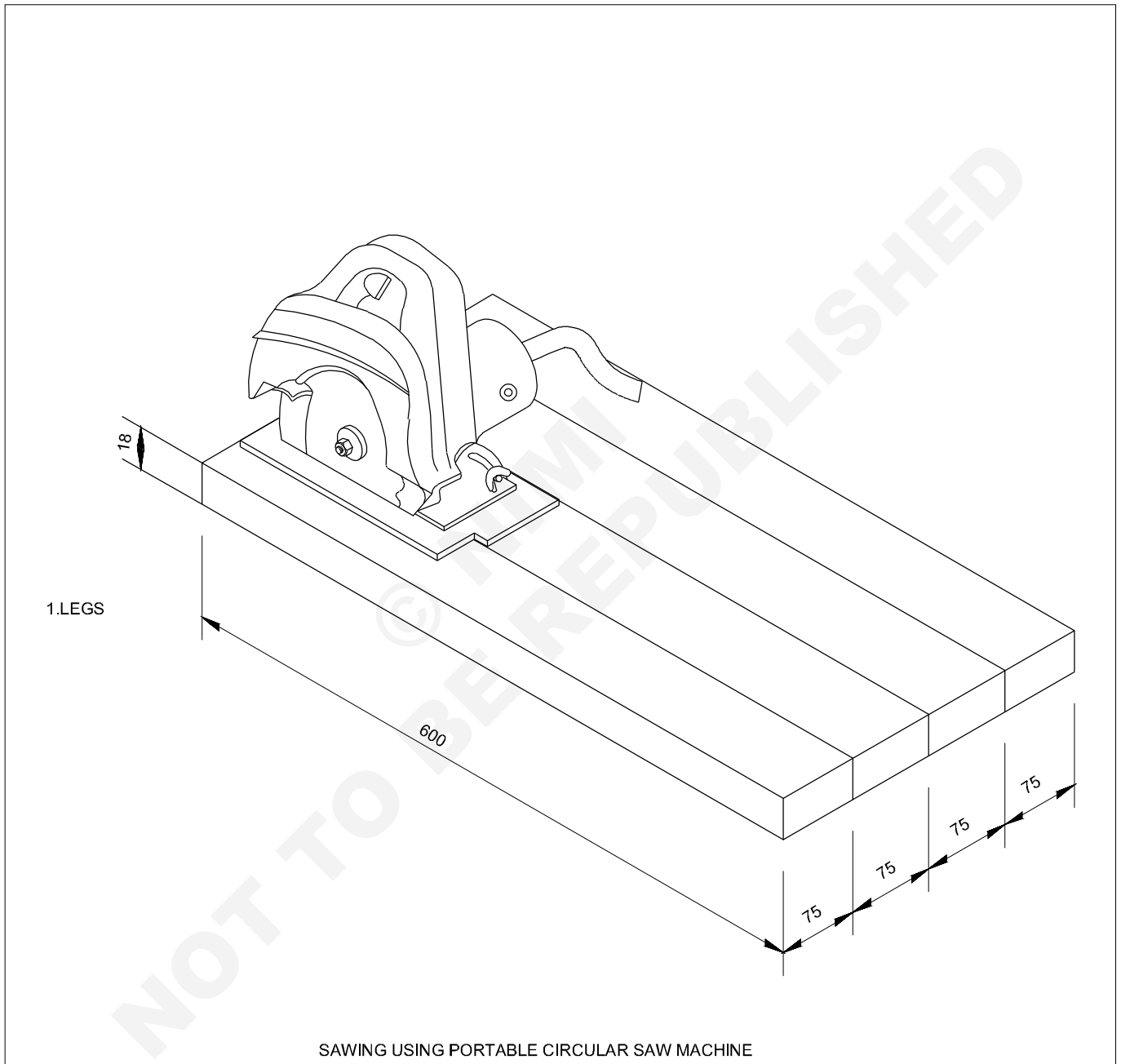
Place the wing compass on the point C and draw the arcs of 30mm on both sides joining X and Z. (Fig 2). Draw perpendicular lines XY and ZN.



**Use and practice of portable power circular saw**

**Objectives :** At the end of this exercise you shall be able to

- set the circular saw for sawing
- perform the sawing operation with portable power circular saw.

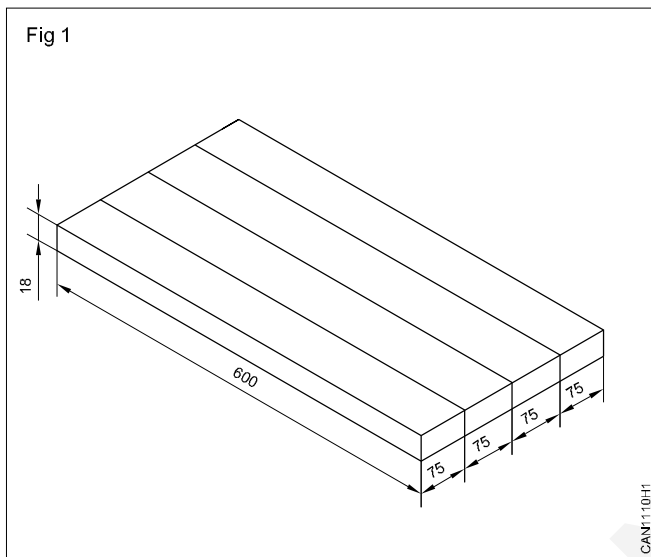


1	300x18x600mm		PLYWOOD	4	1	1.1.10
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>USE AND PRACTICE OF PORTABLE POWER CIRCULAR SAW</b>				DEVIATIONS ±1	TIME 4hrs
					CODE NO. CAN1110E1	

## Job Sequence

### Perform the sawing operation with portable circular saw machine

- Check the wooden piece size using folding rule.
- Mark as per the drawing using marking gauge and try square Fig .1
- Draw three parallel lines on the job of distance of 75mm. width size using folding rule carpenter pencil and marking gauge Fig 1.
- Place the job on work bench.



- Set the blade on portable power circular saw on the part of arbor.
- Set the cutting guide on depth of job thickness.
- Support the straight edge in parallel line in job.
- Stock must be hold flat on the table again it the cutting guide
- Switch on the machine
- Start sawing slowly with even pressure.
- Saw the stock angle the marked pencil line
- Repeat the same procedure for all other marked line

### Precautions

- Make sure the plug and lead is not damaged
- On-off switch works properly.
- Avoid cutting small pieces.
- Don't wear long hair use a dust mask
- Move the circular saw against in the straight edge.
- Sawing forward only

## Skill sequence

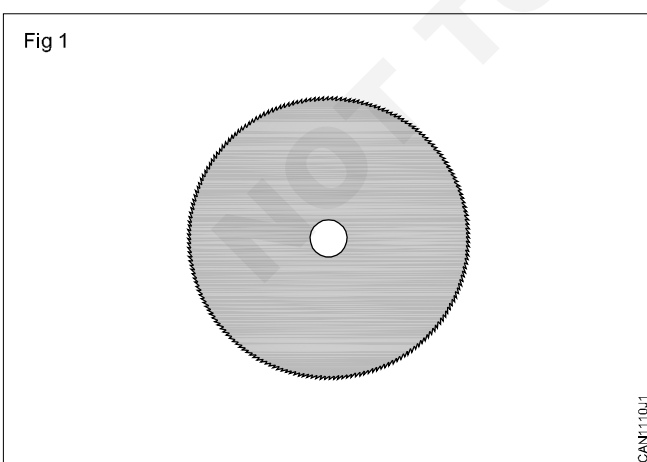
### Selection of blade

**Objective:** This shall help you to

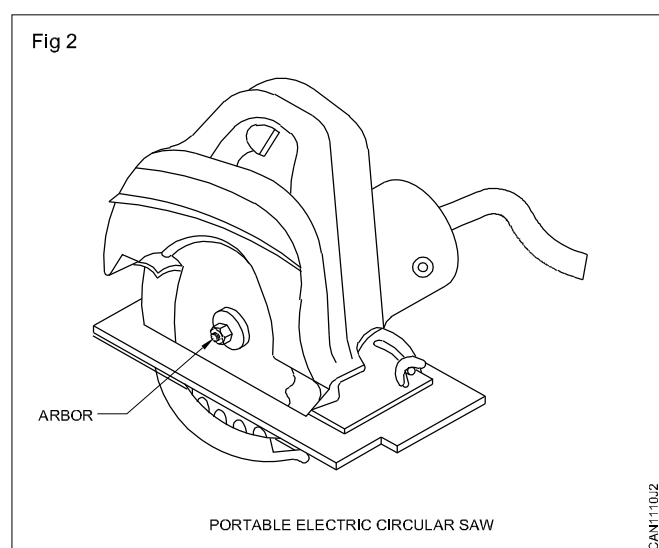
- set the blade in portable power circular saw.

Select blade for the application

Proper size and shape arbor hole. (Fig 1)



Place the blade on the arbor and tighten nut with spanner. (Fig 2)



Move the table support the cutting tighten the guide.  
Lock them in position on cutting guide.  
check all the adjustment

- **Always wear safety goggles.**
- **Use sharp blades.**
- **Does it have the proper size and shape arbor hole.**

## Set the work piece

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**Objective:** This shall help you to  
• **perform operation.**

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### Sawing operation

Hold the job against the cutting guide.  
Test the saw cut by feeding a rough piece  
Saw on marked line by machine pushing the job

Continue the process with even pressure and complete the sawing operation.

**If you hear a clicking noise switch off the machine.**  
**Note: Round log should not be cut.**

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## Sharpening and setting of saw blade

**Objectives :** At the end of this exercise you shall be able to

- perform topping the saw teeth
- perform re-sharpening the saw teeth
- perform teeth setting the saw
- sharpen the saw teeth.

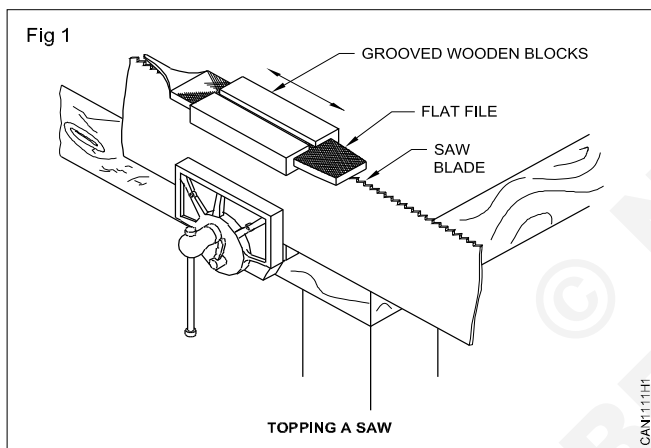
### Job Sequence

#### Topping (Fig 1)

Fix the saw in the saw vice if required by keeping a waste wooden piece on both the sides of jaws.

Set the flat in the grooved wooden block to level all the teeth by running a fine flat file, along the length of the saw teeth.

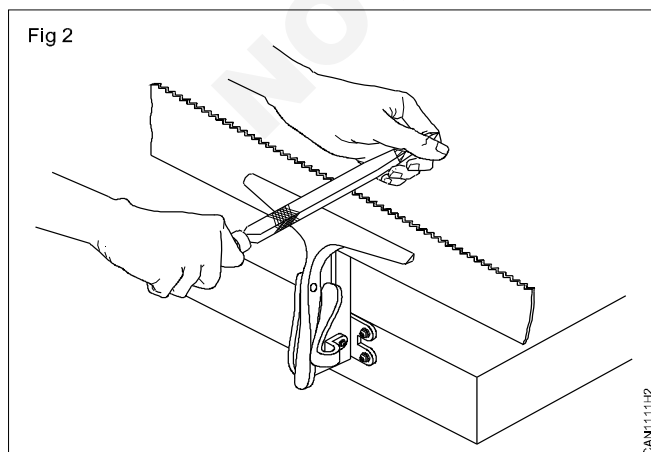
The file must be kept flat and passed lightly, over the tops of the teeth and levelled.



#### Re - Sharpening (Fig 2)

File all the teeth to their correct shape and size with slim taper triangular saw file,

Press firmly against each gullet, and held at right angles across the blade. Make all the teeth the same shape, the front edge being 70° to 80° to the line of the teeth.



Maintain the same grip throughout filing.

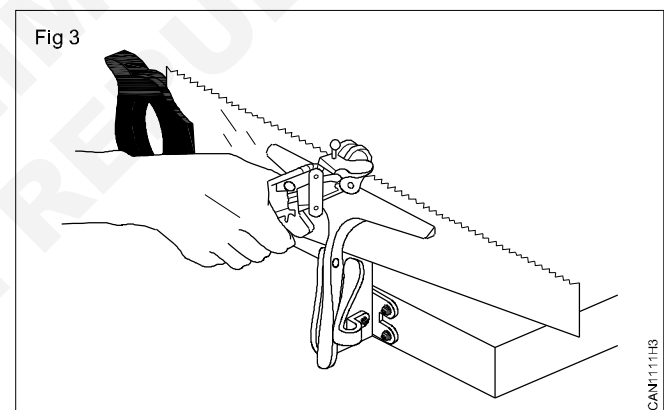
File each gullet until teeth of the finished side hits a point and half the flat on the next teeth is filed away.

At the end of the reshaping process, the teeth should all be in one and the same level and shape.

#### Saw setting (Fig 3)

When a saw is being set the blade should be fastened into the saw clamp.

When one row of the teeth has been set, the saw is reversed in the clamp and then the other row is bent.

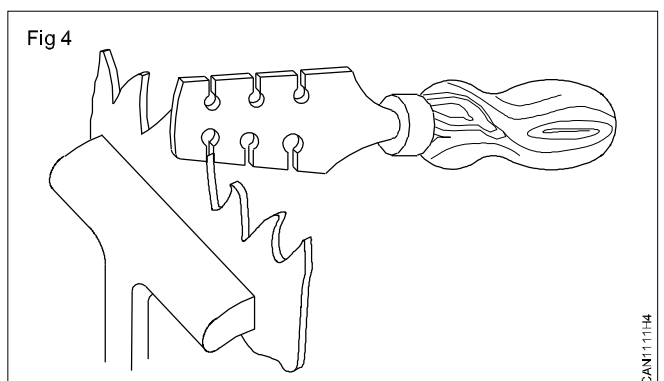


#### Setting (Fig 4)

##### The notched saw setting

Notched setting operation consists of bending over the teeth alternately to one side and then to the other.

The notched saw set demands more practice than the pilers.



### Piler saw set (Fig 5)

The pilers can be adjusted to the size of the teeth.

Bend every teeth about two-thirds of its length, and to the same degree side way.

Total thickness of saw set should be  $1\frac{1}{2}$  times the saw thickness.

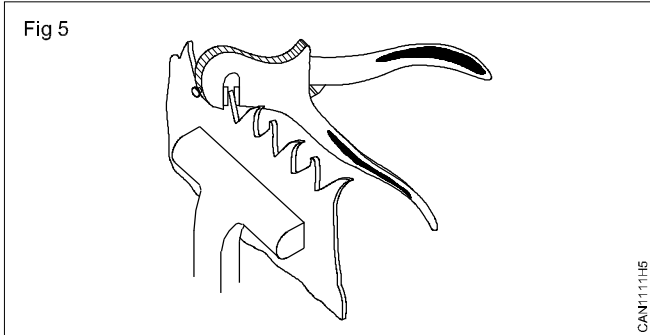
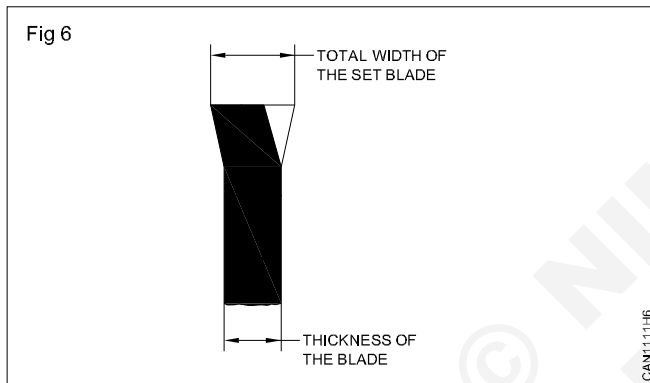


Fig 6 (1) Thickness of the blade  
(2) Total width of the set blade.



### Sharpening (Fig 7)

Select a tapered triangular saw file with slightly round corner.

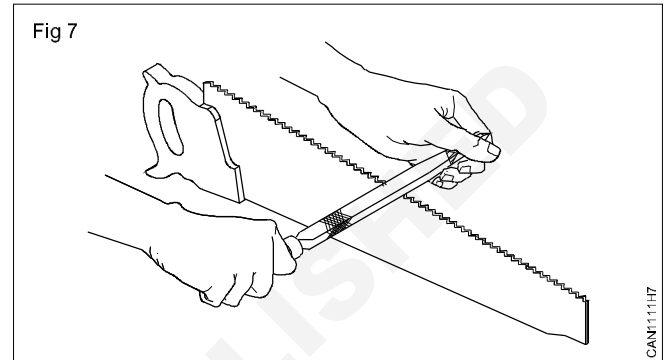
Start sharpening at the point of the saw.

Sharp the tooth of the saw at 30° to 45°.

Hold the file at 90° both vertically and horizontally while filing the tooth of the saw.

Remove the burr produced by the file by passing an oil stone lightly along the side of the teeth.

Check the saw teeth.



**Demonstrate the use of country drill, hand drill, ratchet brace, breast drill and hand gauger and drill bits**

**Objectives :** At the end of this exercise you shall be able to

- identify the boring tools
- identify the drill bits
- use of boring tools and drill bits.

TASK - 1

Fig 1

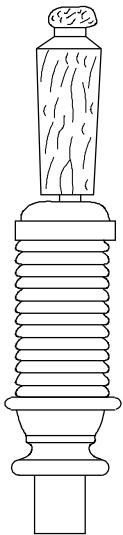


Fig 2

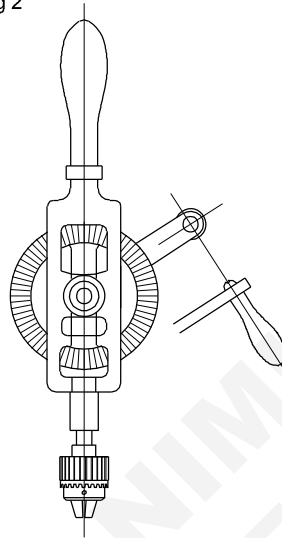


Fig 3

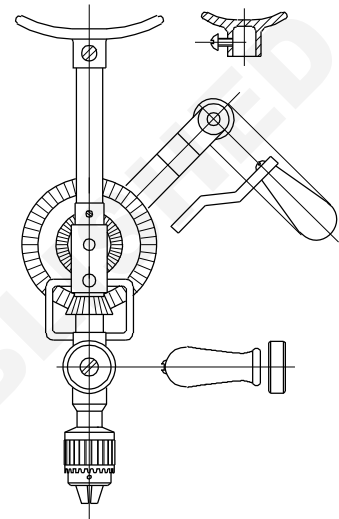


Fig 4

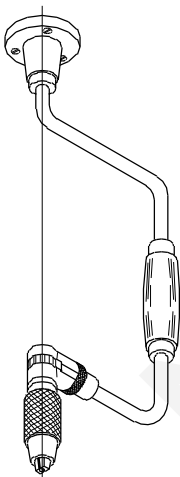


Fig 5

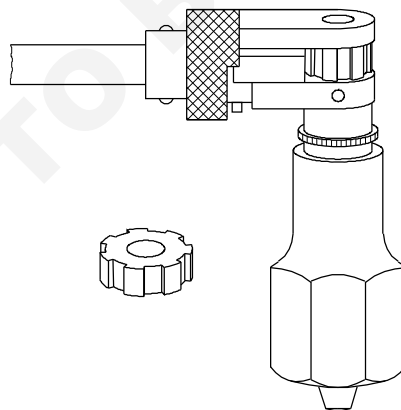
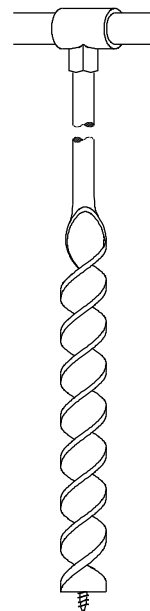


Fig 6



						1.1.12
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATE THE USE OF COUNTRY DRILL, HAND DRILL, RATCHET BRACE, BREAST DRILL &amp; HAND AUGER</b>				DEVIATIONS	TIME 4hrs
					CODE NO. CAN1112E1	



TASK - 2

Fig 1

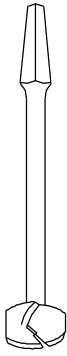


Fig 2

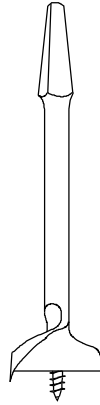


Fig 3



Fig 4

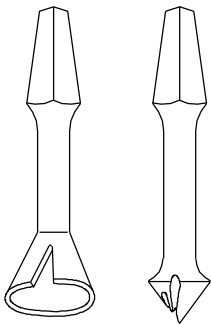


Fig 5

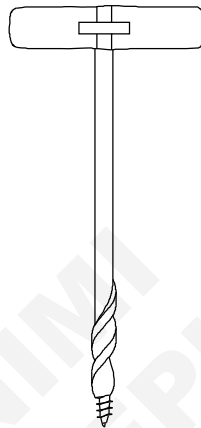


Fig 6

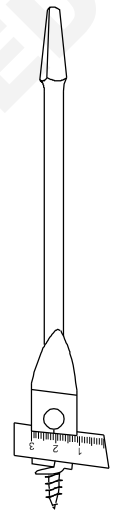


Fig 7

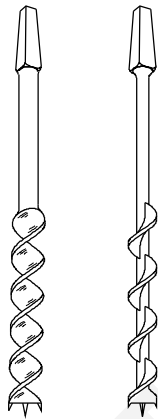
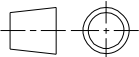


Fig 8



Fig 9



						1.1.12
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATE THE DRILL BITS</b>				DEVIATIONS	TIME
					CODE NO. CAN1112E2	

## Job Sequence

Instructor shall display and demonstrate to the students regarding the country drill, hand drill, ratchet brace, breast drill and hand auger & drill bits in the section and brief their names, uses and the working condition of each boring tools and bits.

- Trainees will note down all the displayed boring tools names and uses.
- Record it in table 1 and 2.
- Get it checked by the instructor.

Table 1

TASK 1 : Identify the boring tools

Fig No.	Name of the boring tool	Use
1		
2		
3		
4		
5		
6		

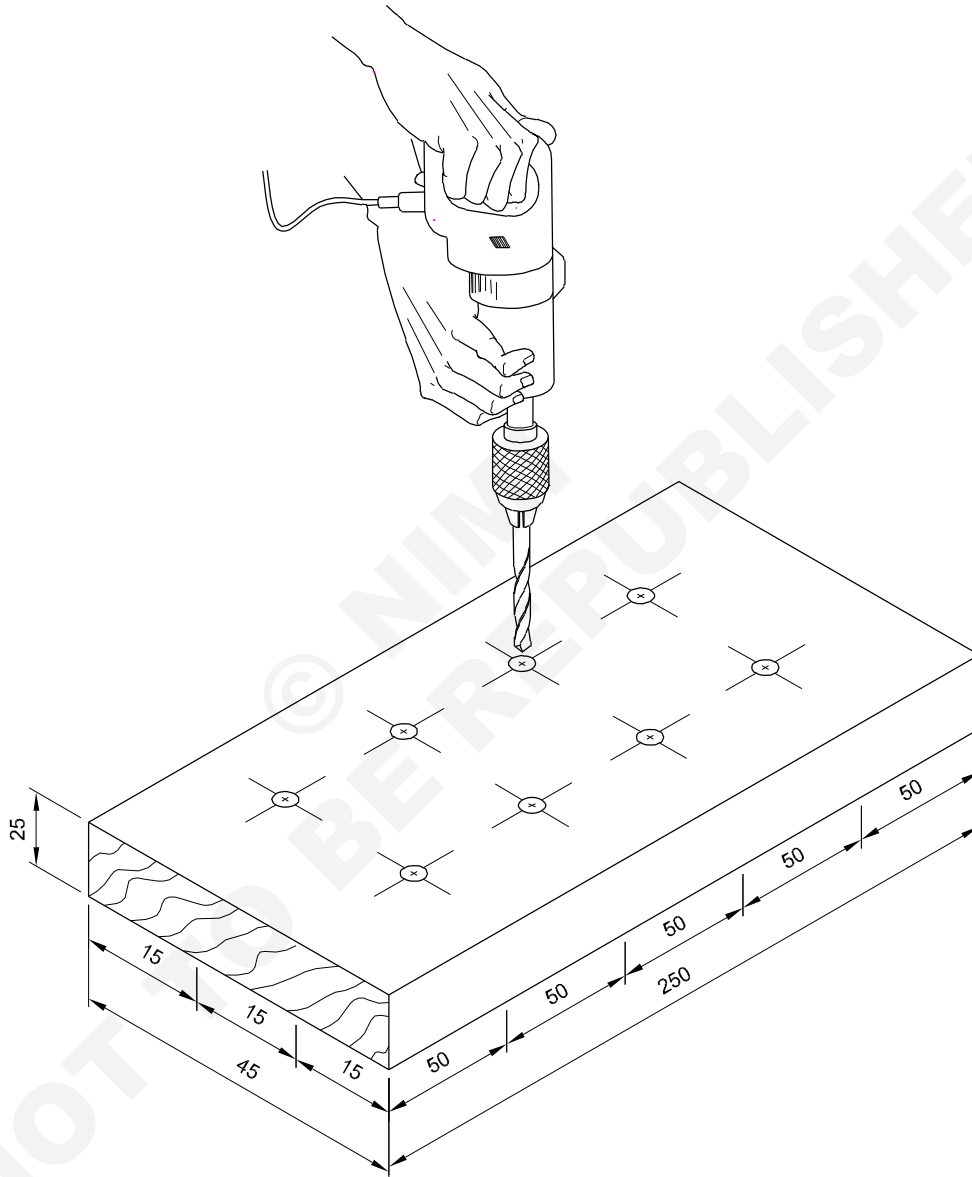
Table 2

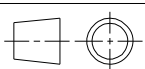
TASK 2 : Identify the drill bits

Fig No.	Name of the drill bit	Use
1		
2		
3		
4		
5		
6		
7		
8		
9		

**Demonstrate the use of portable electrical drilling machine**

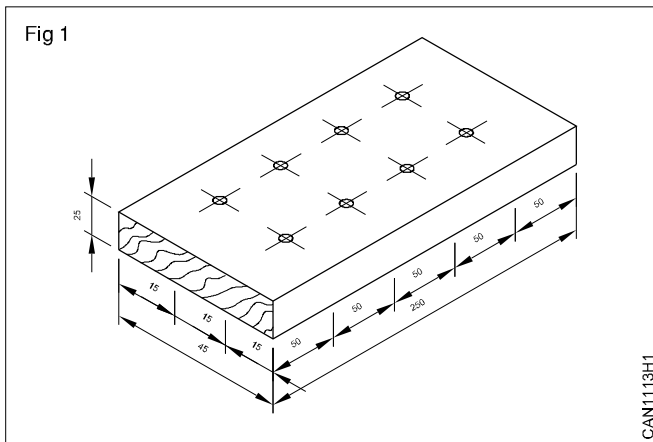
**Objective :** At the end of this exercise you shall be able to  
 • demonstrate the use of portable electrical drilling machine.



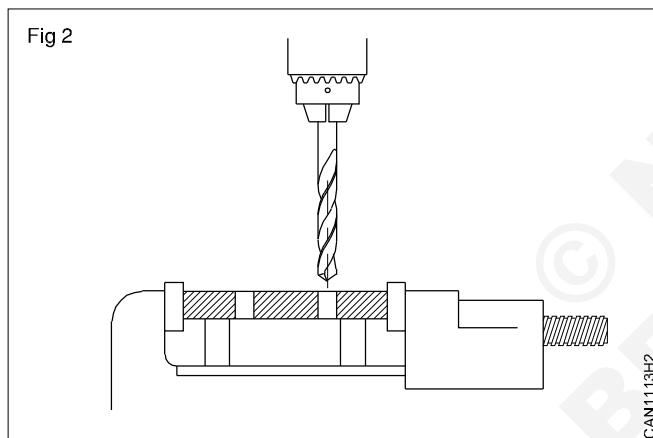
1	45x25x250mm	SEMI-PRODUCT	HARD WOOD			1.1.13
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATE THE USE OF PORTABLE ELECTRICAL DRILLING MACHINE</b>				DEVIATIONS	TIME 2hrs
					CODE NO. CAN1113E1	

## Job Sequence

Instructor shall display and demonstrate to the students regarding the use of portable electrical drill machine



- Check the size of the wooden piece 45 x 25 x 250 mm using folding rule.
- Mark locate the centres for the hole as per drawing using try square and folding rule. (Fig 1)



## Skill Sequence

### Prepare the drilling machine

**Objectives :** This shall help you to

- set the portable drilling machine.

#### Drilling

Select a drill bit as per the size. (Fig 1)

Insert the key into chuck hole and rotate anti-clock- wise to open the jaws.

Tighten the jaws firmly by rotating the key handle clockwise.

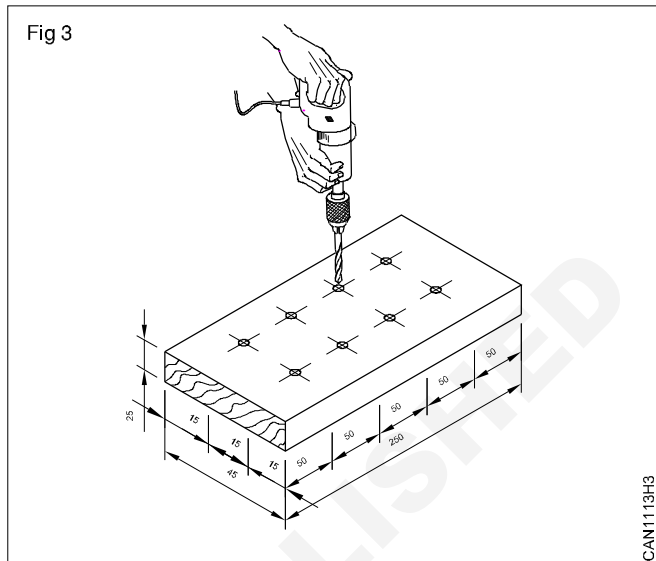
Place the drill bit on marked point of the job.

Hold the drilling machine vertically to the job.

Switch on the machine and drill a hole on marked point of the job.

Give the pressure evenly while drilling to get full depth.

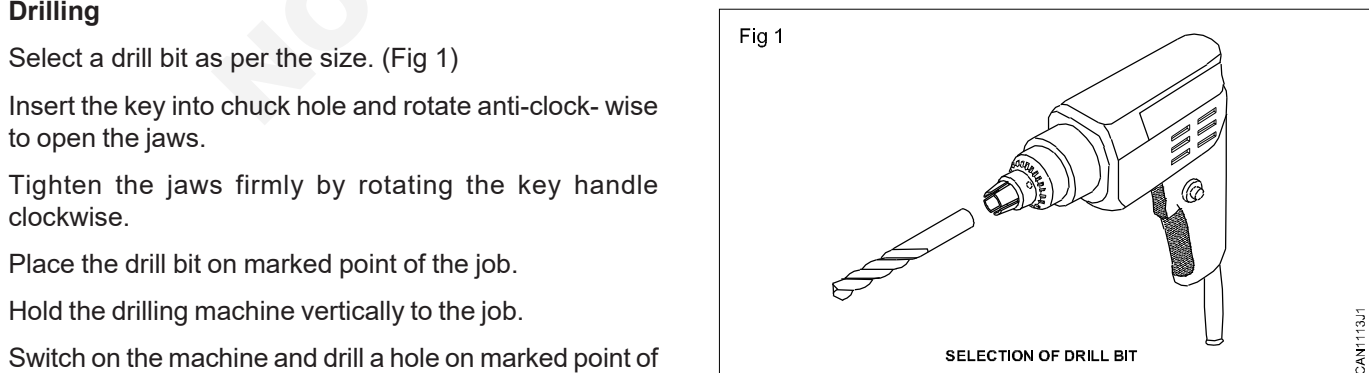
- Centre punch the located drill centres
- Mount the job in a bench vice Fig 2.
- Select the drill bit and fix on drill chuck with chuck key.



- Place the drill bit on punched mark of the drill.
- Switch on the drilling machine
- Drill the through hole. (Fig 3)
- Give the pressure evenly while drilling to get full depth.
- Similarly repeat the same process to drill other holes.

**Make sure the drill or bit is secured in the chuck. Remove chuck key**

**Allow the motor to attain full speed before commencing to drill.**



## Demonstrate the auger application

**Objective:** At the end of this exercise you shall be able to

- demonstrate the auger application.

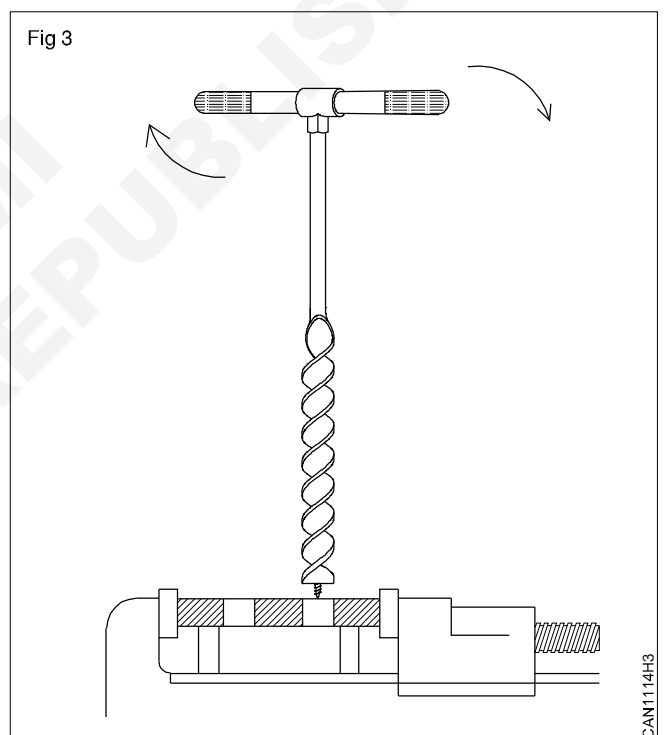
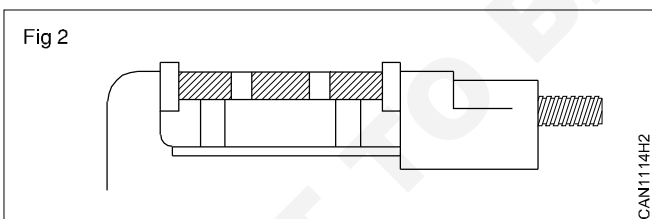
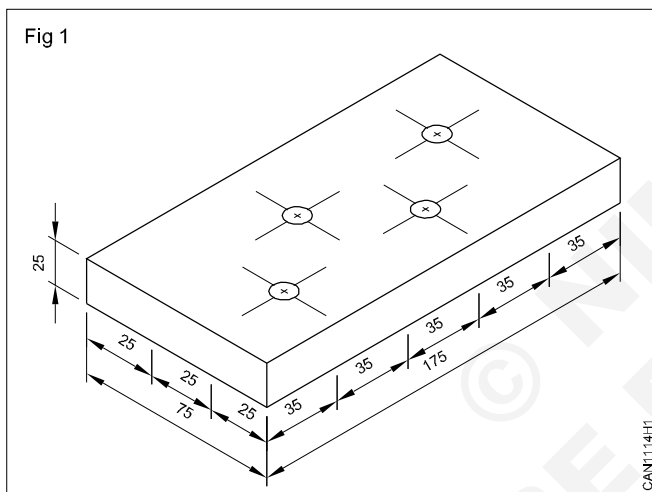
### Job Sequence

Instructor shall display and demonstrate to the students regarding the use of hand auger application.

- Check wooden piece size 75x25x115 mm using folding rule.
- Mark the locating holes using folding rule, marking gauge, try square as per the drawing. (Fig 1)

- Hold the wooden work piece in vice firmly. (Fig 2)
- Set the auger on locating the position and rotate in clock wise direction to make the hole. (Fig 3)
- Similarly repeat above process to make the other hole as per drawing

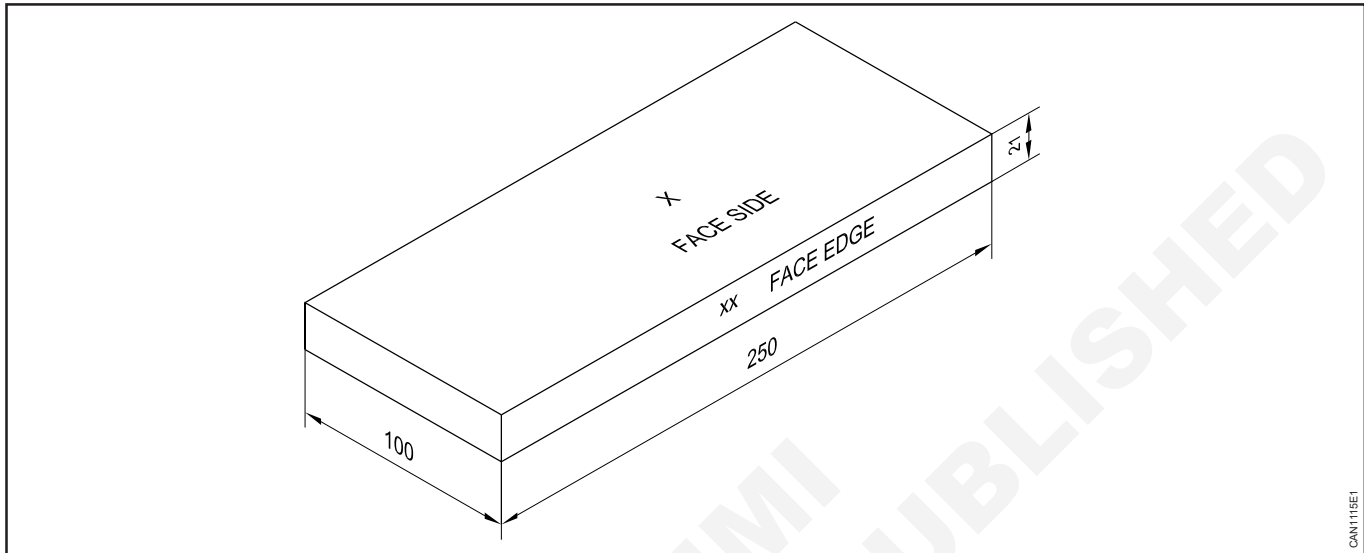
Care should be taken not to damage the auger threaded point.



## Planning face side and face edge

**Objectives:** At the end of this exercise you shall be able to

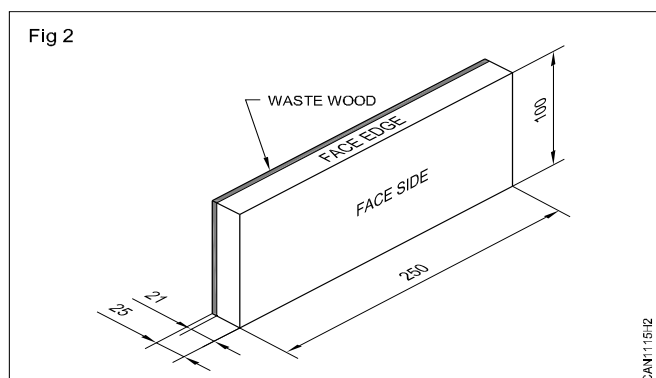
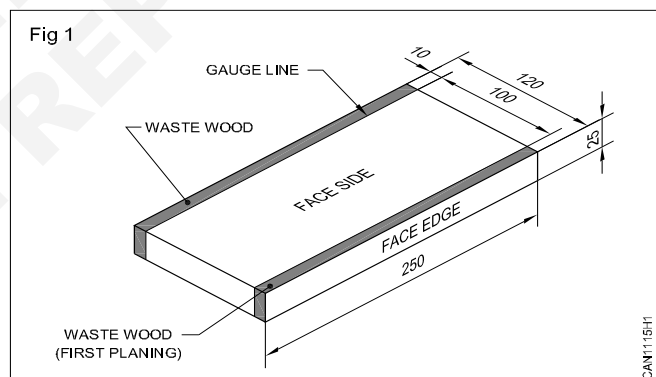
- set the plane for planning
- set the jack plane blade
- plane a wooden piece to face side and face edge
- take care and use the plane.



## Job Sequence

### Plane the face side, face edge 120x25x250mm

- Set the jack plane for planning.
- Place the job on the work bench or hold the job on the carpenter's vice with face side up.
- Keep the packing piece between the job and the vice.
- Keep the job horizontally flat in the vice.
- Start planning the face side with jack plane.
- Check its flatness with try square.
- Mark the face side on the job using pencil.
- Place the face edge up and hold it in the vice with packing piece.
- Plane it along the face edge.
- Check its squareness and flatness of the job.
- Mark the face edge on the job using pencil.
- Gauge to the required width of 100mm on both sides using the marking gauge from the face edge. Plane down the gauge lines. Test for straightness and squareness. (Fig 1)
- Set the marking gauge 21mm for the required thickness.
- Gauge to the required thickness of 21mm from the face side using marking gauge on both the edges. Plane down the gauge lines. Test for flatness. (Fig 2)



**Note:** While planning keep the left foot in forward position and parallel to the work bench. Right foot obliquely under the work bench. Right fore arm should be in line with the plane. Left hand is held on the front part of the plane. Planning should be in the direction of grain.

## Skill Sequence

### Movement of the plane

**Objective:** This shall help you to

- set the job and plane.

Place the job against bench stop.

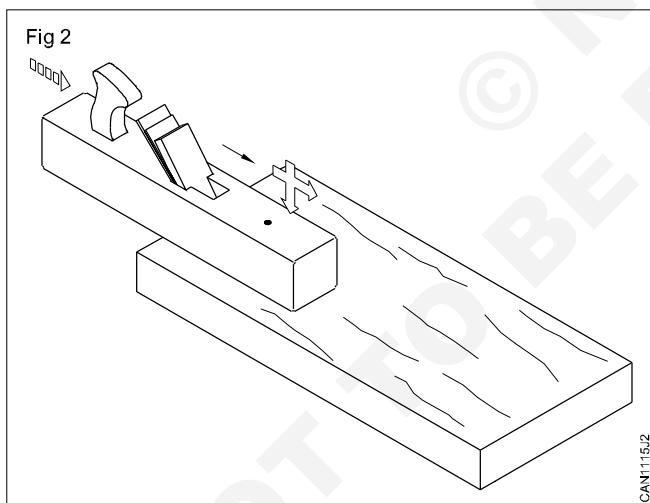
Hold the plane with the right hand, keeping the index finger on the side.

Place the palm of left hand on the toe of the plane thumb and fingers on the side. (Fig (1))



Stand near the bench with left foot forward at 70° with the neck and the right foot at a convenient distance.

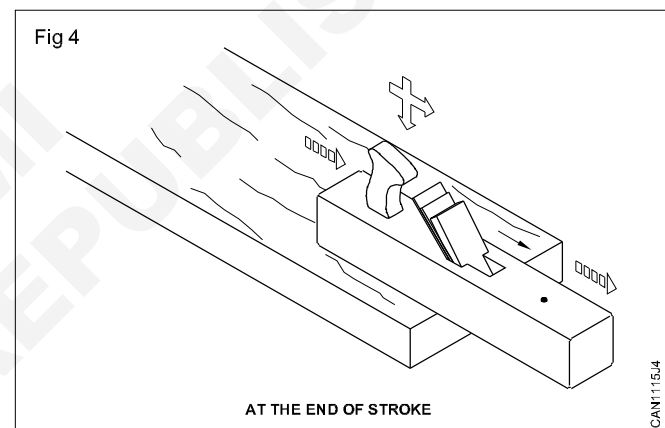
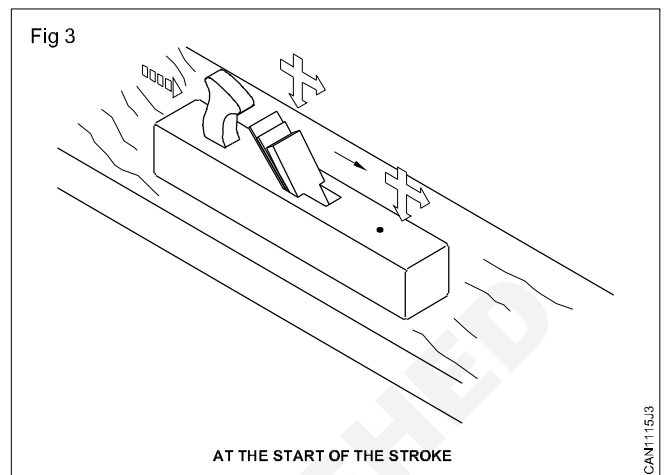
Place the plane straight on the job and give forward strokes (Fig 2)



At the beginning of stroke exert more pressure with left hand as the stroke proceeds, gradually the pressure by the left hand is reduced, more pressure comes to the right hand. The main object is to keep the plane always horizontal. (Figs 3 & 4)

Release the pressure on the back stroke and merely draw the plane to the first position.

Check the flatness of the surface occasionally with try square or straight edge



Repeat the procedure till the surface becomes flat.

Clean the job and clean the bench and tools.

#### Precautions

- 1 Do not give pressure by right hand when you start the planing.
- 2 Do not put pressure by left hand at the end of the stroke.

Try to plane the wood uniformly.

Do not plane continuously without checking the surface.

Do not take a big cut for finishing.

**Keep the plane when not in use on its side and not on its cutting edge.**

A jack plane is used to plane the wood to the required size.

**Demonstrate the use of marking gauge and mortise gauge**

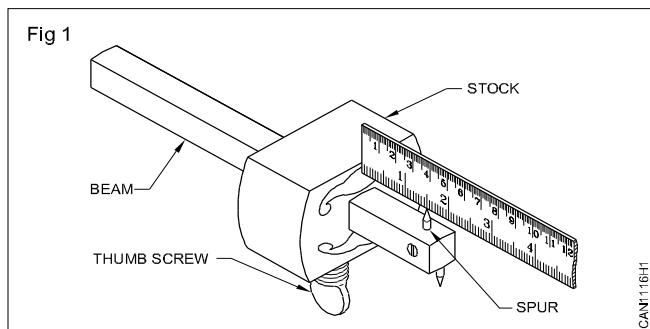
**Objective:** At the end of this exercise you shall be able to  
 • demonstrate the use of marking gauge and mortise gauge.

**Job Sequence**

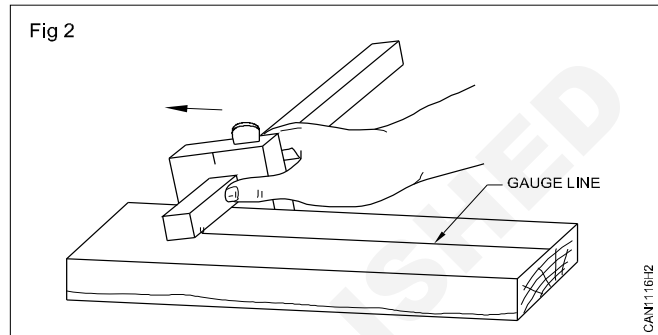
**Instructor shall display and demonstrate to the students regarding the use of marking and mortise gauge.**

**TASK 1 : Perform the marking gauge and their application**

- Hold the gauge in left hand keeping the spur up.
- Hold the steel rule in right hand and set the required distance between stock and spur. Keep the graduation of steel rule in front. (Fig 1) Tighten the thumb screw.



- Check the measurement of accuracy.
- Hold the gauge stock in right hand thumb on top.
- Place one end of the piece against the bench stop and other end in left palm.
- Place gauge stock in contact with the face edge of the piece and spur touching the piece lightly in slanting position
- Give forward stroke on the stock near the end (Fig 2)



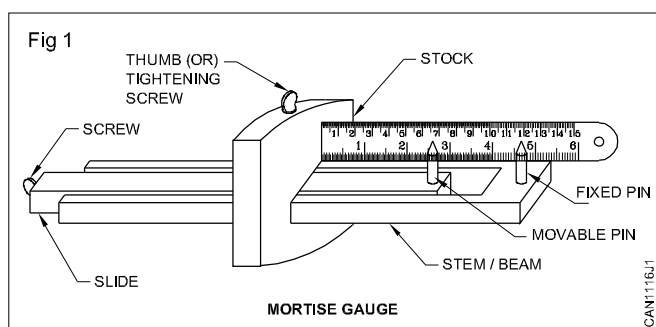
- Hold the piece in left hand and complete the gauge mark.
- Check the gauge mark with steel rule.

**Precautions**

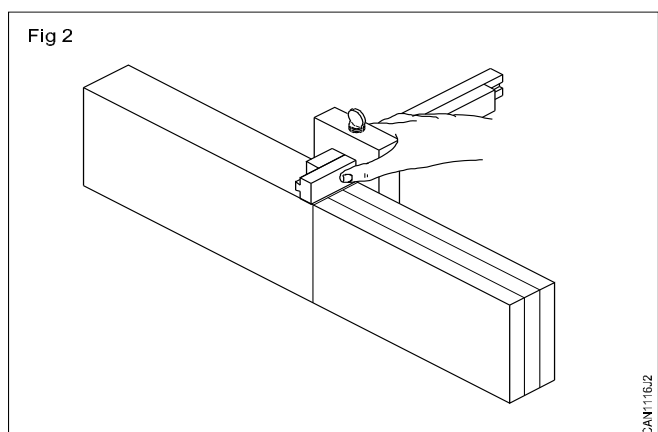
- Do not use a long spur for gauging.**
- Do not see the distance by keeping the rule flat.**
- Do not press spur while gauging. Do not try to make a deep gauge.**
- Keep the stock face rubbing against the straight edge.**

**TASK 2 : Perform the mortise gauge and their application**

- Hold the gauge in left hand keeping the spur up.
- Hold the steel rule in right hand and set the required distance between stock two spurs can be spaced at different distance and mark two parallel lines at a time. Keep the direction of the steel rule in front. (Fig 1) Tighten the thumb screw.
- Check the measurement of accuracy.
- Hold the gauge stock in right hand thumb on top.
- Place one end of the piece against the bench stop and other end in left palm.



- Place gauge stock in contact with the face edge of the piece and spur touching the piece lightly in slanting position. Give forward stroke on the stock near the end.
- Hold the piece in left hand and complete the gauge marking parallel lines of tenons.
- Similarly process to marked tenon line as per drawing. (Fig 2) Check the gauge mark with steel rule.





**Test the accuracy of flatness and twistness of the surface by using try square.**

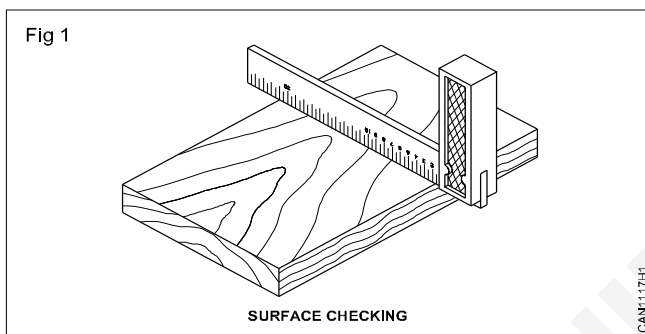
**Objectives:** At the end of this exercise you shall be able to

- test the accuracy of flatness
- test the accuracy of the squareness
- test the accuracy of the twistness.

**Job Sequence**

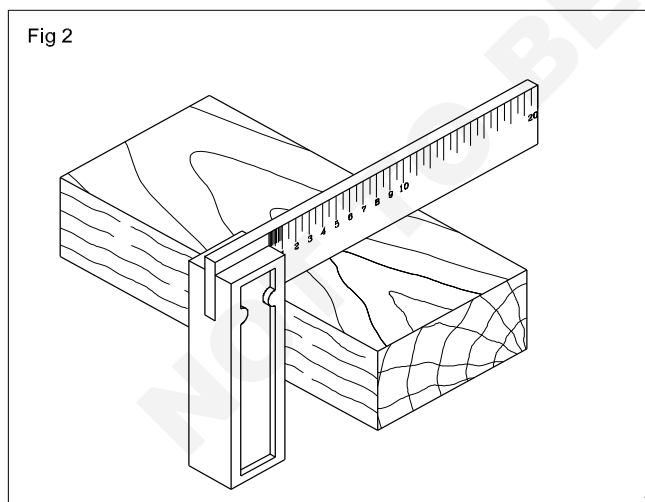
**Test the accuracy of the flatness (Fig 1)**

- Place the job on the work bench.
- Hold the try square in right hand.
- Test the flatness of the surface.



**Test the accuracy of the squareness (Fig 2)**

- Place the job on the work bench
- Hold the try square in right hand.
- Test the squareness of the job



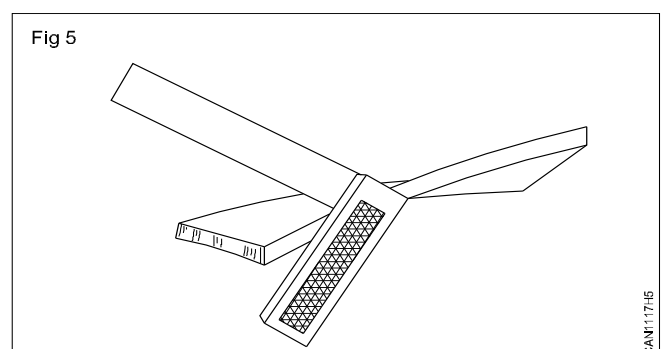
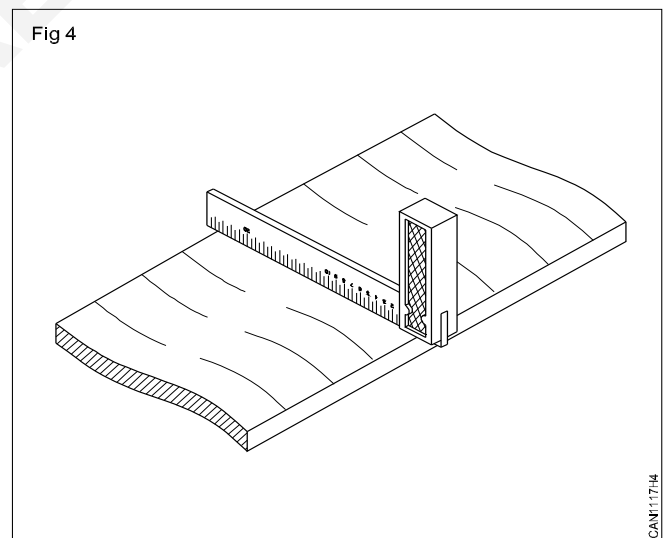
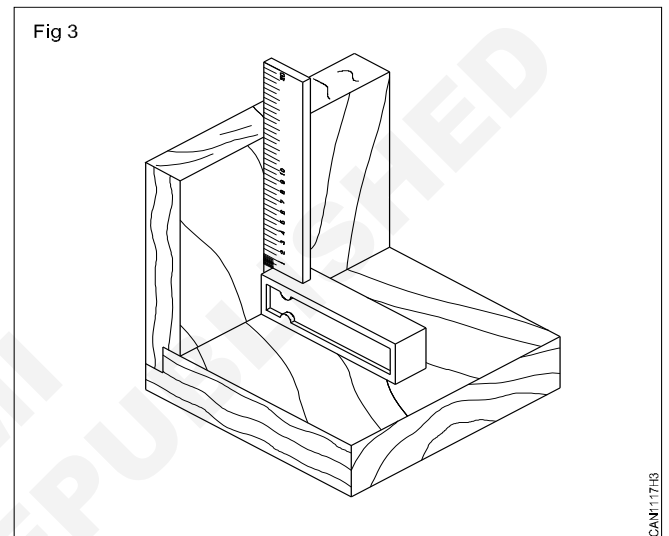
**Test the accuracy of the inside squareness (Fig 3)**

- Place the job on the work bench.
- Hold the try square in right hand.
- Test the inside squareness of the job .

**Test the accuracy of the twistness on surface (Fig4&5)**

- Place the job on the work bench.

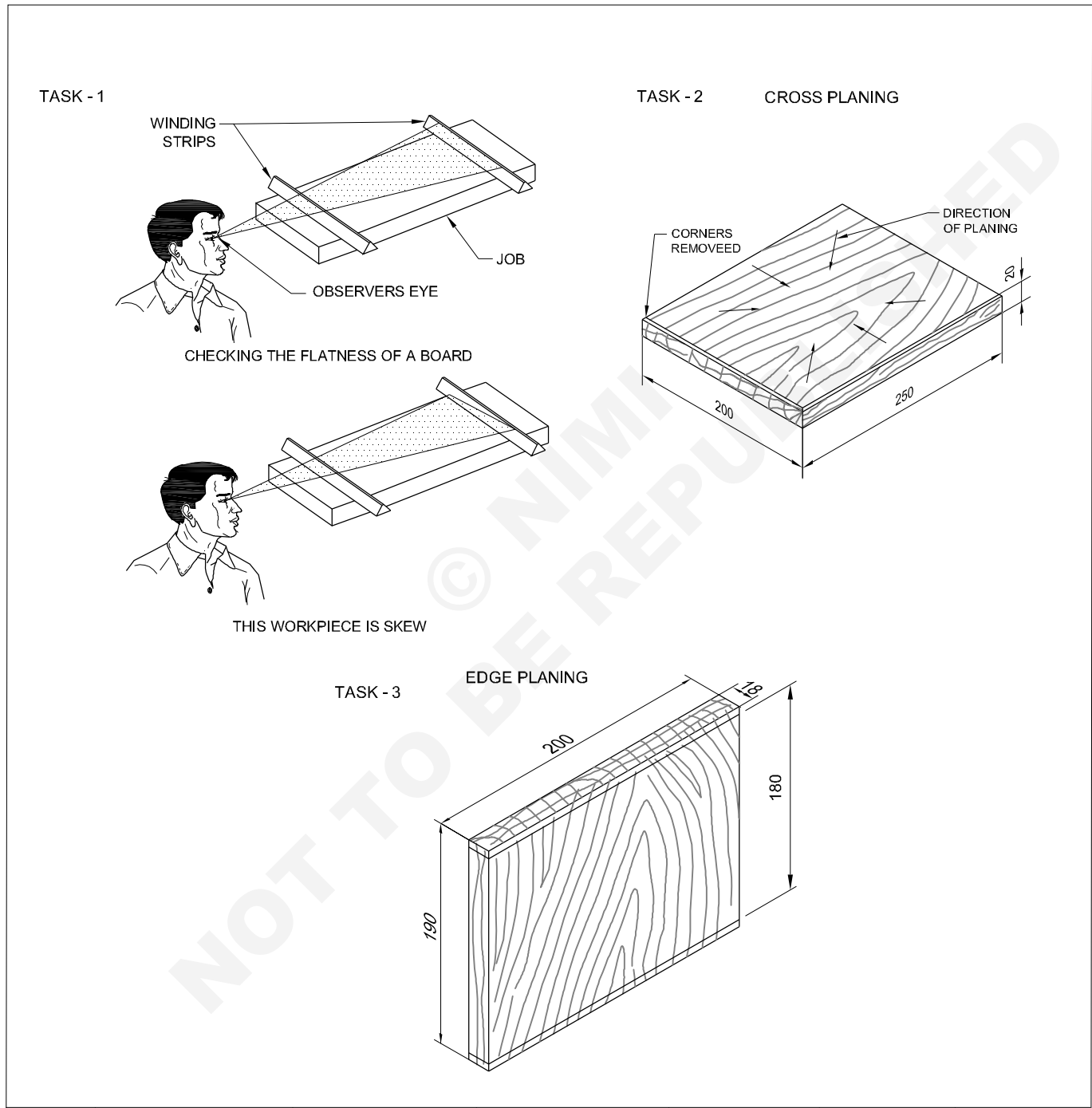
- Hold the try square in right hand.
- Test the twistness on s surface.



**Demonstrate the use of winding strips, cross planing and edge planing**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate the winding strips
- plane the cross grain
- plane the edge.



1	200x25x250mm		HARDWOOD			1.1.18
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATE THE USE OF WINDING STRIPS, CROSS PLANING AND EDGE PLANING</b>				TOLERANCE	TIME 4hrs
					CODE NO. CAN1118E1	

# Job Sequence

**Instructor shall display and demonstrate to the students regrading the use of winding strips.**

- Trainees will note down all the displayed testing tools name and uses.
- Record it in table 1.
- Get it checked by the instructor.

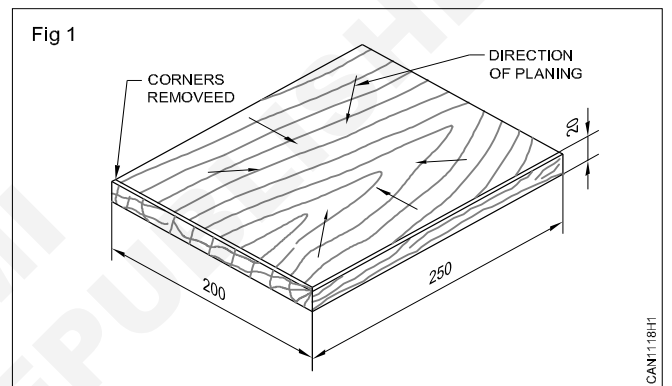
**Table 1**

**TASK 1 : Identify the testing tools**

Fig No.	Name of the testing tools	Uses
1		

**TASK 2 : Cross planning**

- Set the jack plane for planing.
- Place the job on the work bench or hold the job on the carpenter's vice with face side up.
- Hold the job 200 x 25 x 250mm in the vice.
- Tight the job 15mm above the vice, keeping the packing piece sideways.
- Trim off the corners with firmer chisel to avoid splintering.
- First plane along the grain in one edge. Then plane from the other edge.
- Plane diagonally from one edge corner to the other.
- Plane towards the middle from the edges (Fig 1). Check flatness with try square and straight edge.

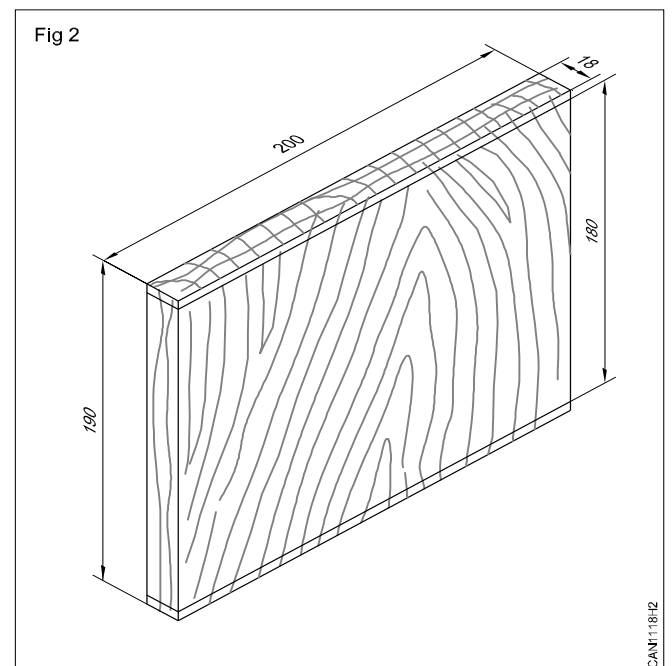


- Plane again if high spots are found repeat the procedure till you get a levelled surface with a measurement of 200 x 20 x 250mm.

**Keep the blade sharp to plane across the grain.**

**TASK 3 : Edge planning**

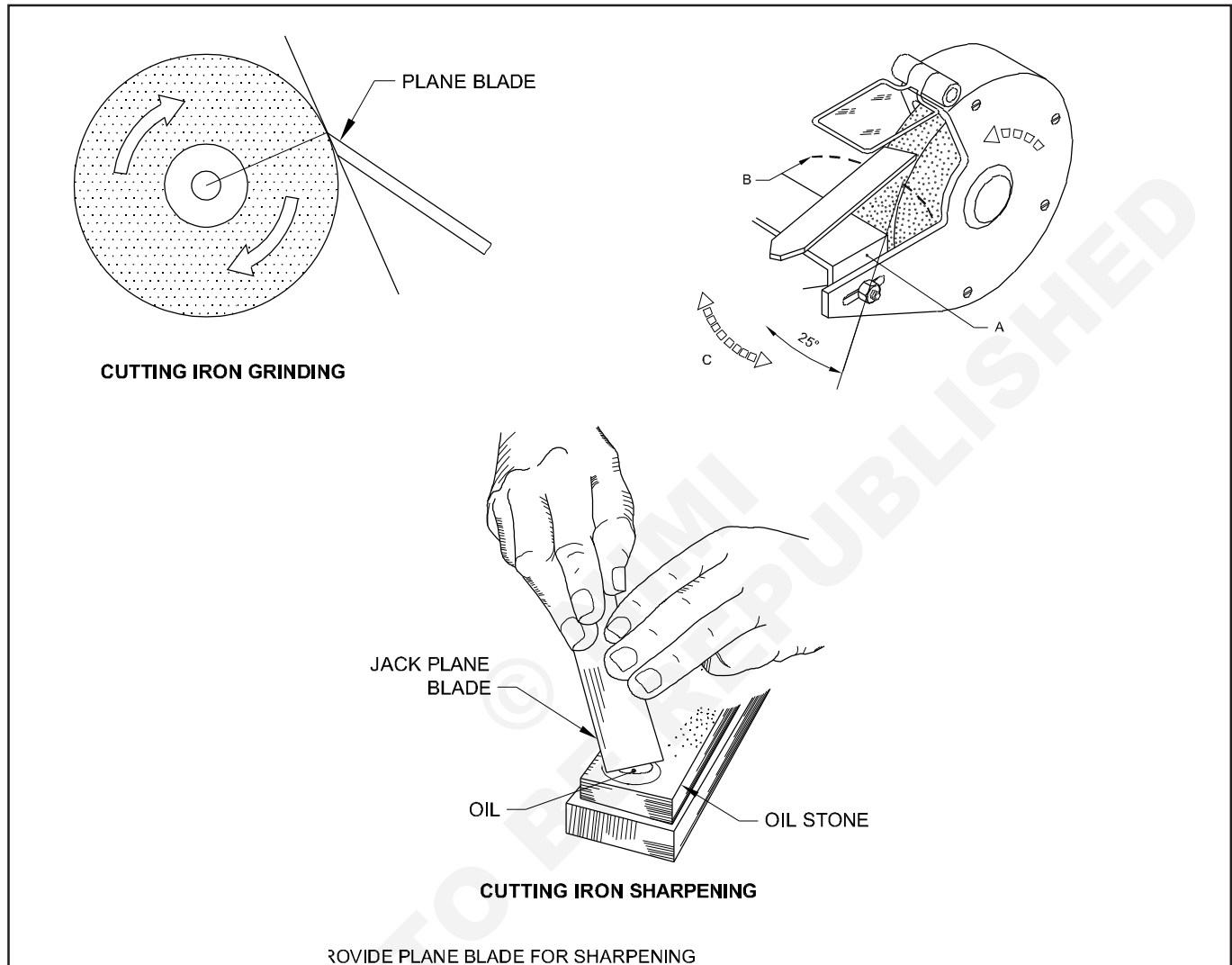
- Check the measurements of the job.
- Trim off the corner with firmer chisel to avoid splintering.
- Hold the job in the vice.
- Before starting to plane, clamp a waste piece of wood behind the corner to avoid splintering of the job. (Fig 1)
- Start planning from one end.
- Continue the planning till you get a levelled surface.
- Start planning from the other end.
- Continue the planning from both end towards middle till you get a levelled surface.
- Remove the waste wood attached at the end.
- Check the levelled surface with a try square.
- Repea the same procedure for other end.



**Grinding and sharpening process of the plane blade/cutter**

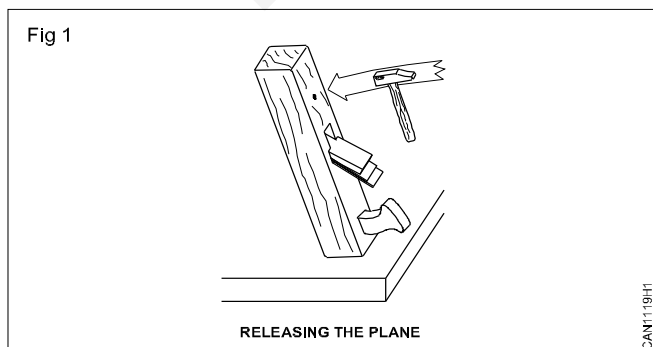
**Objectives:** At the end of this exercise you shall be able to

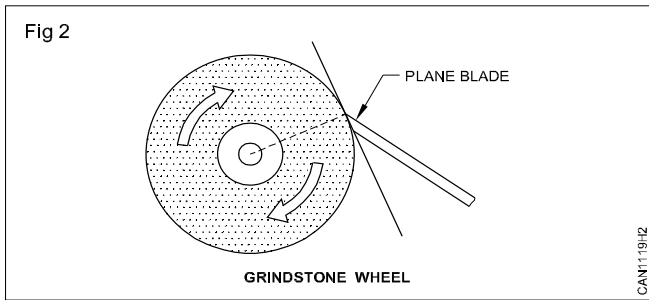
- grind the plane blade
- sharpen the plane blade.



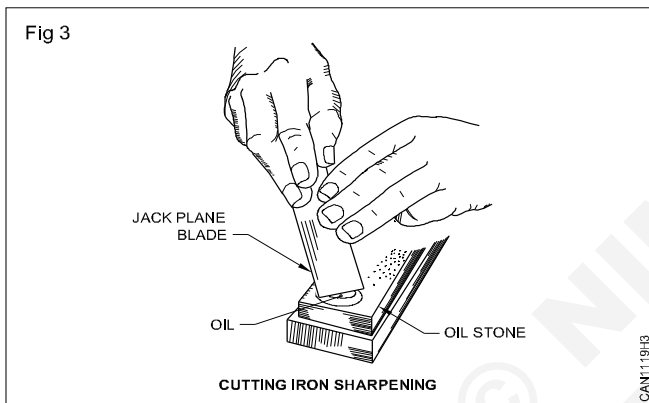
**Job Sequence**

- Select the jack plane.
- Remove cutting iron, cap iron and the wedge from the jack plane by slightly striking by hammer (Fig 1).
- Select the grinding wheel
- Check the grinding wheel for cracks
- Ensure that there is enough coolant in the container. Lower the protecting shield near the tool rest.
- Adjust the tool rest 2mm closer to the wheel, if necessary
- Switch on the grinder machine
- Hold the cutting bevel across of the cutting iron must at an angle of 20° to 25° (Fig 2).

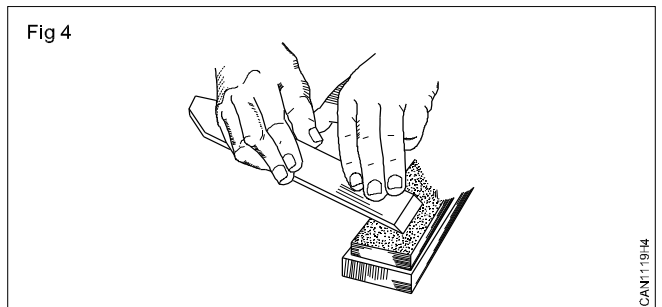




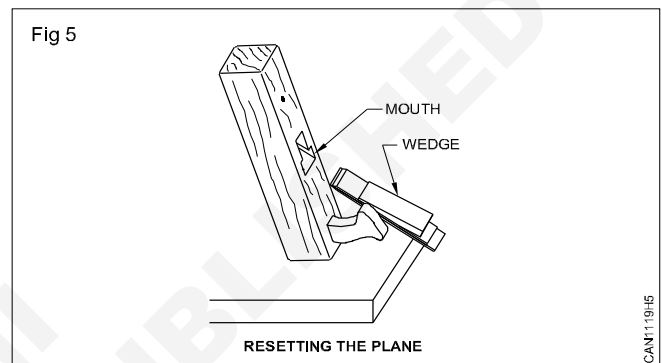
- Rest the body of the cutting iron on the tool rest allow the point to touch the wheel.
- Keep the pressure as minimum as possible to prevent excessive heating of the cutting bevel.
- Finish the grinding of cutting iron with oil stone
- Place the blade until the cutting edge is parallel on the stone. (Fig 3)
- Move the blade backward and forward on width of the stone until a burr is formed on the flat side of the blade.



- Turn the blade over and hold it perfectly flat on the stone. Rub from side to side until burr has disappeared to get fine cutting edge. (Fig 4)



- Reset the cap iron, cutting iron and the wedge of jack plane (Fig 5).



- Set the cap iron and cutting iron keeping a gap of 1mm
- Dip the cutting iron in a coolant frequently

**Avoid blue colour from cutting edge I.C annealing effect**

## Skill sequence

### sharpening and honing of plane blade

**Objective:** This shall help you to

- **sharpen of cutting iron with oil stone.**

Sharpening of a plane blade is necessary to produce a keen cutting edge for good surface finish, and perfect planning with minimum effort.

Sharpening and honing : The process of sharpening is carried out on oilstone by rubbing the blade with its bevel down, maintaining a constant and correct angle, 25° to 30°. This rubbing is continued until a burr or wire edge is produced.

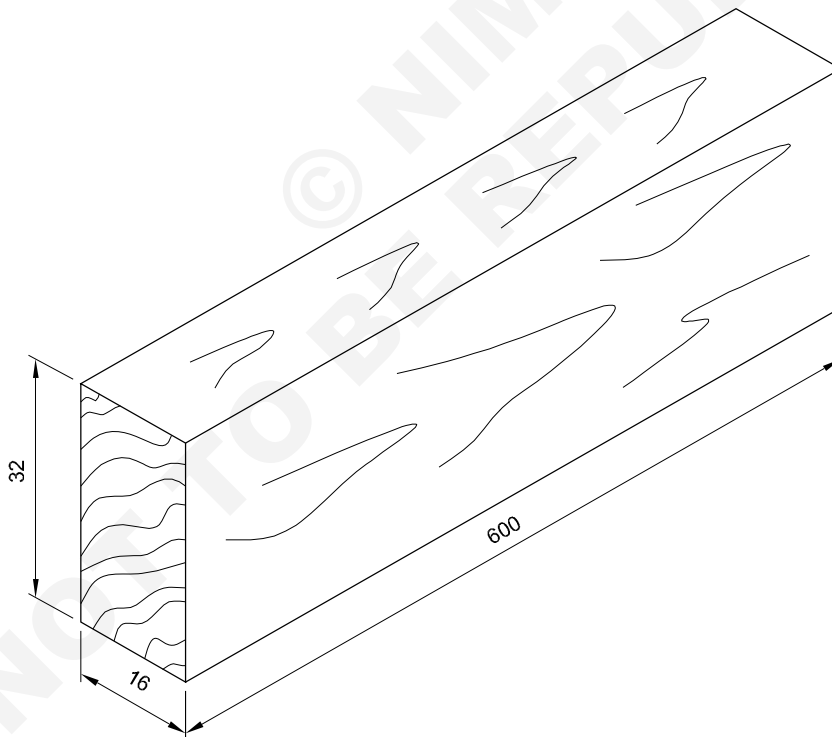
The burr is removed by rubbing the back of the flat face of the plane blade on the oilstone, keeping its bevel up.

During sharpening, oil is used to minimise the heat caused due to friction and to float off the metal particles from the pores of the oilstone so as to prevent clogging of the oilstone.

**demonstrate the portable power planer machine and its function**

**Objectives :** At the end of this exercise you shall be able to

- demonstrate the portable power planer machine
- plan the surface
- sharpen the planer blade
- set the planer blade.



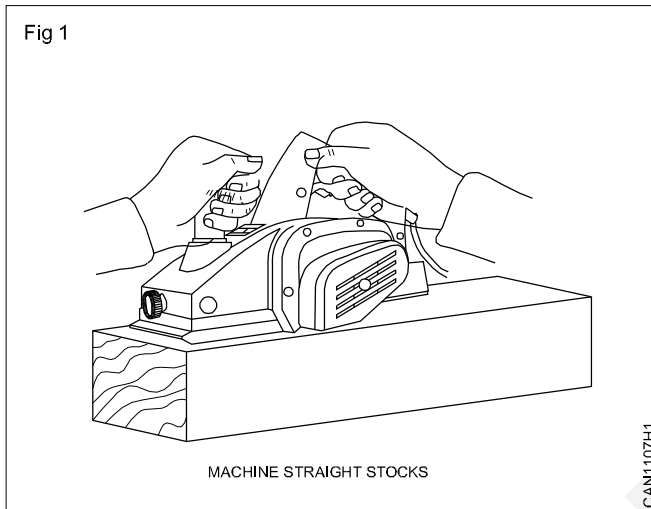
1	50x35x600mm		HARDWOOD			1.1.20
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATE THE PORTABLE POWER PLANER MACHINE AND ITS FUNCTION</b>				TOLERANCE	TIME 4hrs
					CODE NO. CA20N1120E1	

# Job Sequence

## TASK 1

**Instructor shall display and demonstrate to the students regarding function of portable power planer machine.**

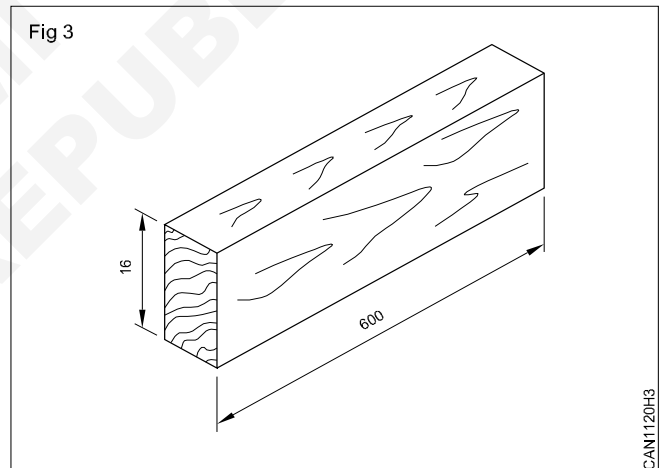
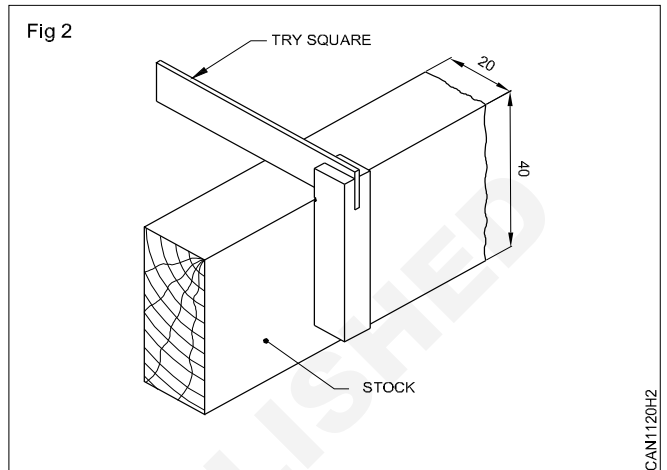
- Sharpen the planer blade using oil stone
- Set the planer blade in the cutter head using allen key
- Set the infeed table and out feed table



- Place the job against bench stop
- Hold the plane with the right hand keeping the index finger on the trigger switch.
- Place the left hand on the front handle of the plane
- Trigger switch on the machine
- Place the machine straight on the job and give forward stroke (Fig 1)
- Main objective is to keep the machine always horizontal
- Feed the job against the cutter head for planing required size.

- Trigger switch off the machine
- Check the flatness and thickness of planed wooden piece using try square and steel rule. (Fig 2)

**Keep the machine on its side when not in use not in use on the side not on its cutting edge**



- Finish the job (Fig 3).

## Skill sequence

### Grinding and sharpening of plane blade

**Objective :** This shall help you to

- **grind and sharpen the planer blade.**

#### Grinding and sharpening

##### Grinding

Open the jaws of the grinding machine to insert the cutter.

Insert the cutter in between the jaws of the grinding machine.

Set the cutter evenly projecting from the jaws of the grinding machine.

The projection of the cutter should be 10 mm to 14 mm from the jaws of the grinding machine. (Fig 1)

Tight the cutter with jaws of the grinding machine properly.

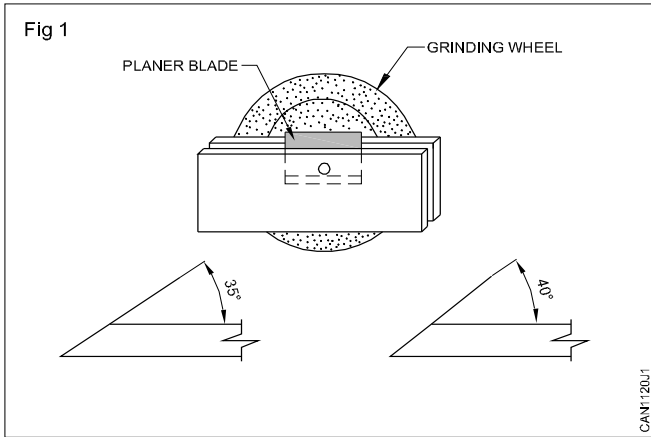
Set the angle of the jaws to 30° for grinding the cutter.

Adjust the cutter against the grinding wheel for grinding.

Switch on the machine.

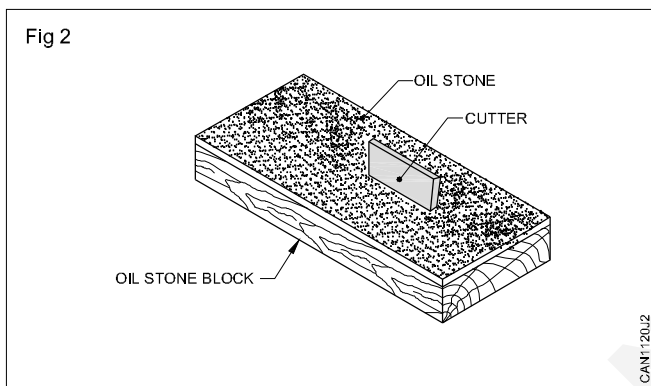
Move the cutter to and fro against the grinding wheel uniformly by hand.

Continue the grinding till the required angle of cutter is obtained.



### Sharpening

Keep the oil stone with oil stone block on workbench stop. Place the grounded edge of the blade on the surface the oil stone. (Fig 2)



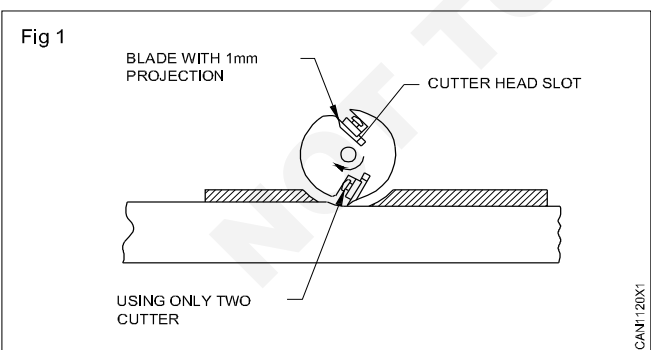
### Planner blade setting

**Objective :** This shall help you to

- set the planner blade.

Setting the planer blades/cutters

Place the blade in the slot of the cutter head (Fig 1)



Set the blade with 3 mm projection outside from the cutter head and parallel to the cutter head using cutter lock bar.

Check the projection of the cutter.

Tight the blade on the cutter head with bolt using allen spanner.

Test the projection of the blade edges by rotating the cutter head.

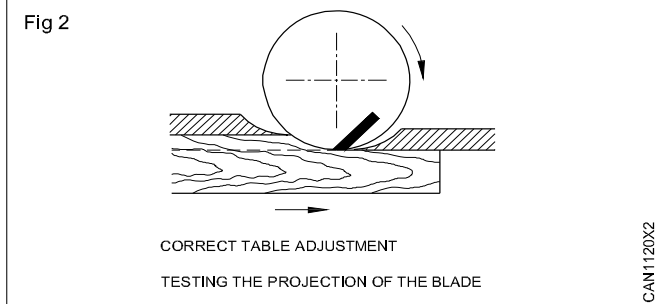
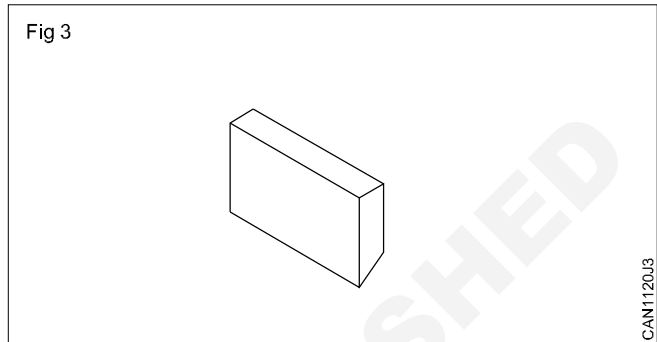
Use proper recommended lubrication oil while sharpening.

move the cutter backward and forward on full length with the oil stone until a burr is formed on the flat side of the cutter.

The burr can be felt by rubbing lightly with a finger tip.

Turn the blade over and hold it perfectly flat on the stone, rub from side to side until burr has disappeared.

Continue the sharpening procedure till you get fine cutting edge. (Fig 3)



### Precautions

- Check electrical and mechanical parts
- Keep the lead behind the plane
- Do not force the plane to cut rapidly

Generally two cutting blades are bolted to a cutting block.

- Gears or belts connected to an electric motor.
- Mounted on the body of the plane
- Depth of cut up to 6mm



**Demonstrate the use of different types of chisel, chiselling, chiselling along & across the grain**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate the use of different types of chisels
- chisel across the grain
- mark the piece
- chisel across the grain and along the grain.

TASK - 1

Fig 1

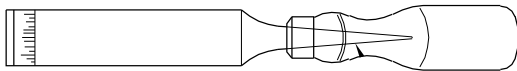


Fig 2

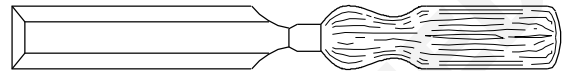


Fig 3

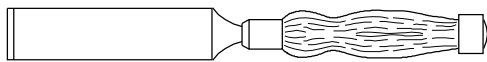


Fig 4



Fig 5



Fig 6

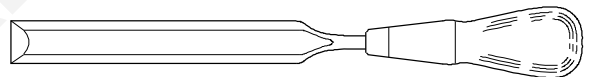
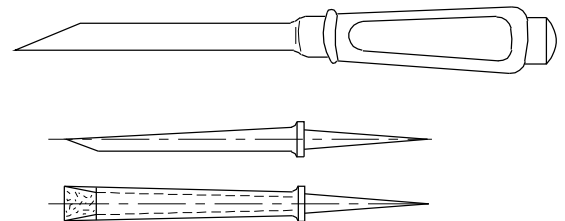


Fig 7

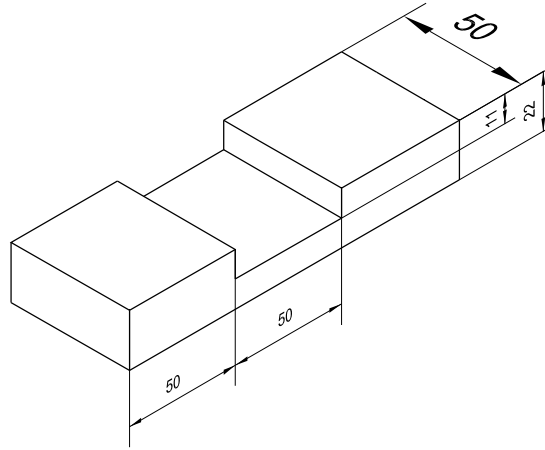


Fig 8

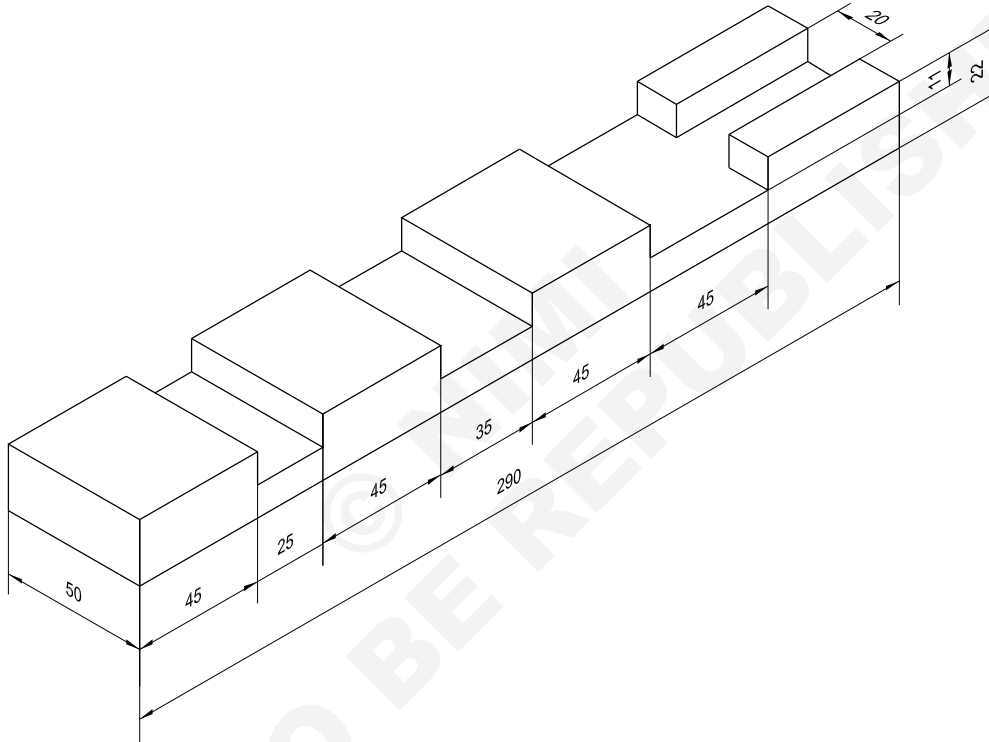


1	60 x 25 x 300mm		HARD WOOD			1.1.21
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:2	<b>DEMONSTRATE THE USE OF DIFFERENT TYPES OF CHISEL</b>				TOLERANCE ±2.0 mm	TIME 8hrs
					CODE NO. CAN1121E1	

TASK - 2



TASK - 3



1	60 x 25 x 160mm		HARD WOOD			1.1.21
1	60 x 25 x 300mm		HARD WOOD			1.1.21
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:2	<b>DEMONSTRATE THE CHISELLING, CHISELLING ALONG AND ACROSS THE GRAIN</b>				TOLERANCE ±2.0 mm	TIME 8hrs
					CODE NO. CAN1121E2	

# Job Sequence

## TASK 1 : Identify the chisels and uses

**Instructor shall display and demonstrate to the students regarding the name and use of different types of chisels.**

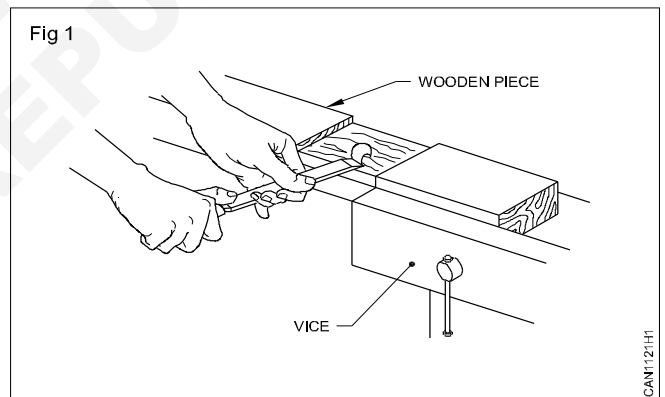
- Trainees will note down all the displayed tools names.
- Record it in table 1.
- Get it checked by the instructor.

Table 1

Fig No.	Name of the chisel	Uses
1		
2		
3		
4		
5		
6		
7		
8		

## TASK 2 : Chiselling across the grain

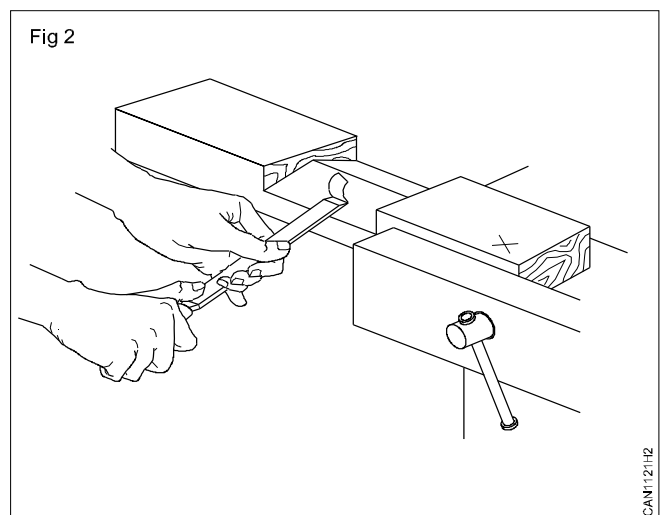
- Grind and sharpen the firmer chisel.
- Plane the job to the required size of 50x22x150mm.
- Hold the job on the vice and check it with try square for its flatness.
- With scribe and try square mark out lines at a distance 50mm and 100 from left side.
- Hold the tenon saw on the line marked and saw it to a 50mm and 100mm from left side.
- Repeat the procedure for the other side saw it to a depth of 11mm.
- Hold the firmer chisel in your right hand on the handle and guide the blade with left hand.
- Control the movement of the chisel with them and fore finger.
- Push it on the space to be cut.
- Start a chiselling away from you the bevel of the chisel turned upwards.
- Chisel in an inclined direction up to middle of the portion Fig 1.



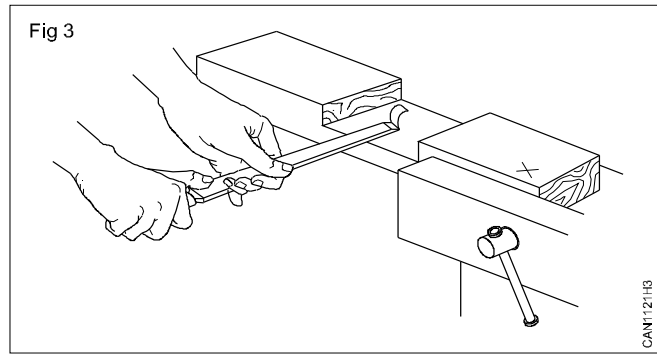
- Chisel the waste material away from you up to middle portion.
- Repeat the chiselling as shown in Fig 2.

**Safety precaution**  
**Never hold your hand or finger before the cutting edge.**  
**Never use a chisel without a proper handle**

- Reverse the work piece so that the back side comes to front and hold in the vice.



- Start chiselling slowly to make flat portion.
- Repeat the procedure for the other side. Saw it to a depth of 10mm.
- Smooth the bottom and side walls with firmer chisels. (Fig 3)
- Finish the job.



## TASK 2 : Chiselling across the grain and along the grain

Check the raw material for its size

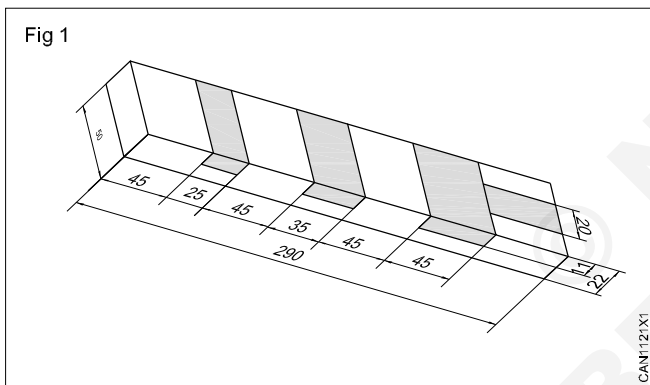
Plane the job to the required size of 50x22x290mm

Mark the measurement on the job as per the drawing. (Fig 1)

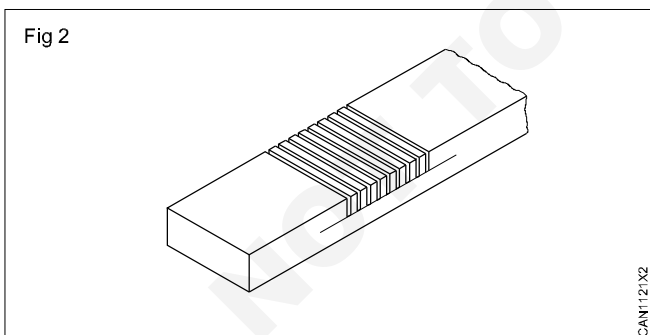
Hold the job in the vice.

Cut the shoulder line down to the centre line (Depth 11mm) with tenon saw.

Keep the tenon saw at 90° to ensure cutting at right angles.



Cut on waste side of the shoulder line. (Fig 2)

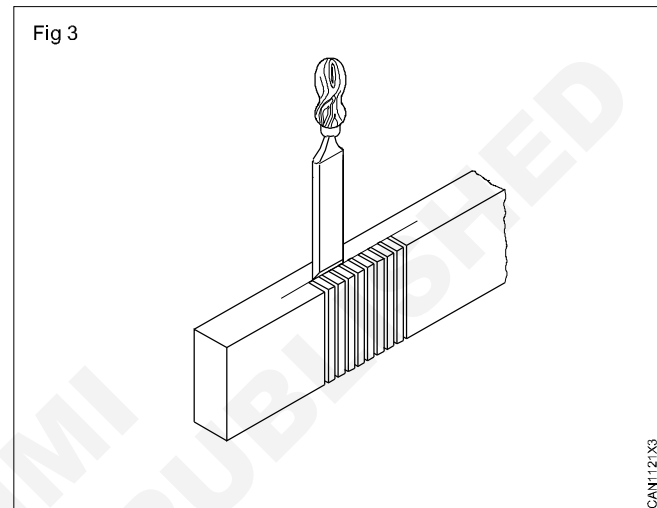


With the tenon saw make several saw cuts in between the shoulder lines almost to the centre line.

Place the job flat on the work bench.

With the help of firmer chisel and mallet, remove the surplus material on both sides preventing splitting of wood.

Chisel out excess wood little by little starting from the top and bottom. (Fig 3)



Smooth the bottom (Trench) portion with firmer chisel. (Fig 4)

Repeat it for the other trenches also.

### Chiselling along the grain.

**Use a 20mm firmer chisel to chisel out the waste wood.**

Make several saw cuts with Tenon saw on the lines marked. (Fig 4)

Chisel out waste material in middle portion.

Hold the firmer chisel on the shoulder line and slowly tap with mallet.

Chisel out the excess wood in the middle slowly by striking from one edge to the other.

Smooth the bottom (Trench) with firmer chisel and finish it. (Fig 5)

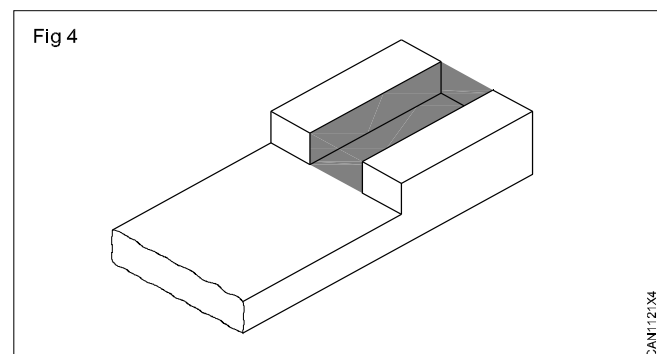
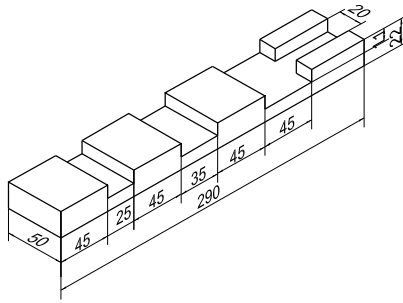


Fig 5



CAN1121X5

## Skill sequence

### Marking for chiselling

**Objective :** This shall help you to

- mark the job for chiselling across the grain.

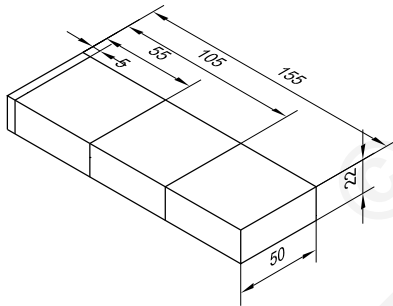
#### Marking sequence

Hold the job 160x60x25 on the bench or vice.

Plane it to size 160x50x22

With try square and steel rule mark 5mm, 105mm and 155mm from one end of the job. (Fig 1)

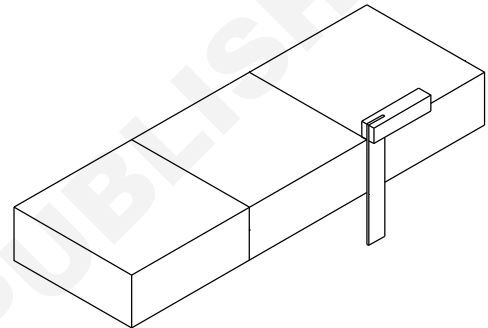
Fig 1



CAN1121J1

Hold the stock of the try square closely in contact with face edge and mark lines with scribe and wooden rule at the distance of 5mm, 55mm, 105mm & 155mm on all four sides. (Fig 2)

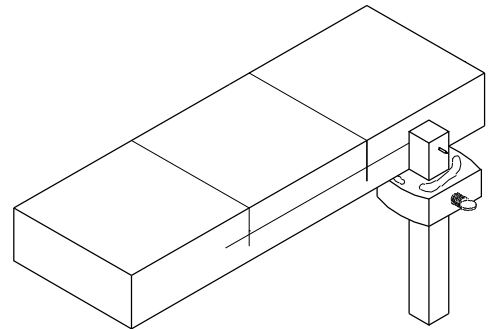
Fig 2



CAN1121J2

Set the marking gauge to 11 mm and scribe on the middle of face edge and its opposite side. (Fig 3)

Fig 3



CAN1121J3

**Grinding, sharpening and honing of a chisel**

**Objectives :** At the end of this exercise you shall be able to

- grind the chisel
- hone the chisel.

**Job Sequence**

**Grinding the chisel**

Select the grinding wheel.

Check the grinding wheel for cracks

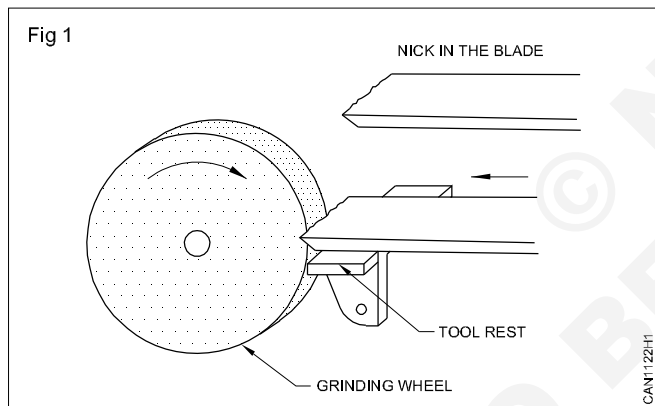
Ensure that there is enough coolant in the grinder machine container.

Adjust the tool rest 2mm closer to the grinding wheel if necessary

Switch on the grinder machine

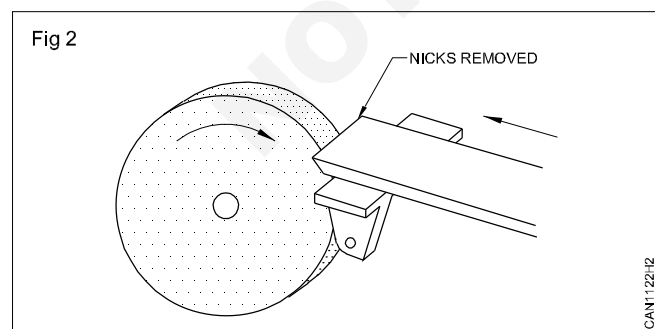
Rest the chisel blade on the tool rest allow nicks to touch the wheel surface

Remove the Nicks in the blade by slightly pushing the blade against grinding wheel. (Fig 1)



Adjust the tool rest of the grinder to the required angle of 25°.

Place the blade over the tool rest and move the chisel evenly across the wheel to get required sharpness. (Fig 2)



**Precaution**

**Never touch the wheel while rotating.**

**Avoid burning of the blade.**

**Cool the blade frequently in water.**

**Never allow the blade to become blue.**

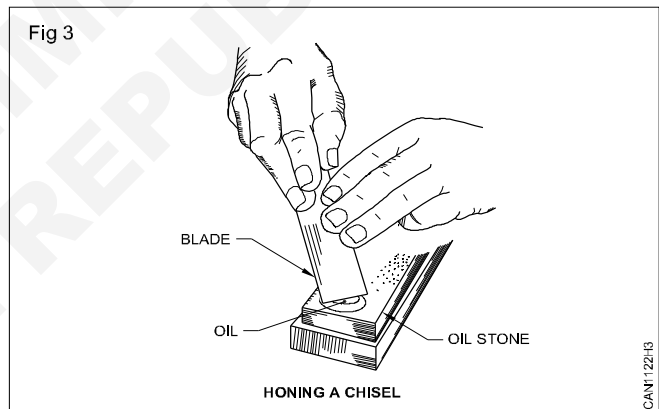
**Wear safety goggles while grinding.**

**Honing a chisel**

Wet the surface of the oil stone with oil. (Fig 3)

Lay the cutting bevel on the surface.

Place the blade until the cutting edge is parallel on the stone.



Hold the blade at an angle of 30° to the oil stone. (Fig 4)

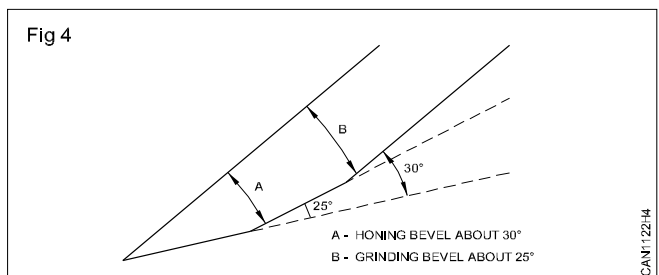
Move the chisel backward and forward to full length and width of the stone until a burr is formed on the flat side of the blade.

The burr can be felt by rubbing lightly with a finger tip.

Turn the blade over and hold it perfectly flat on the stone. Rub from side to side until burr has disappeared.

Repeat the same procedure till you get fine cutting edge.

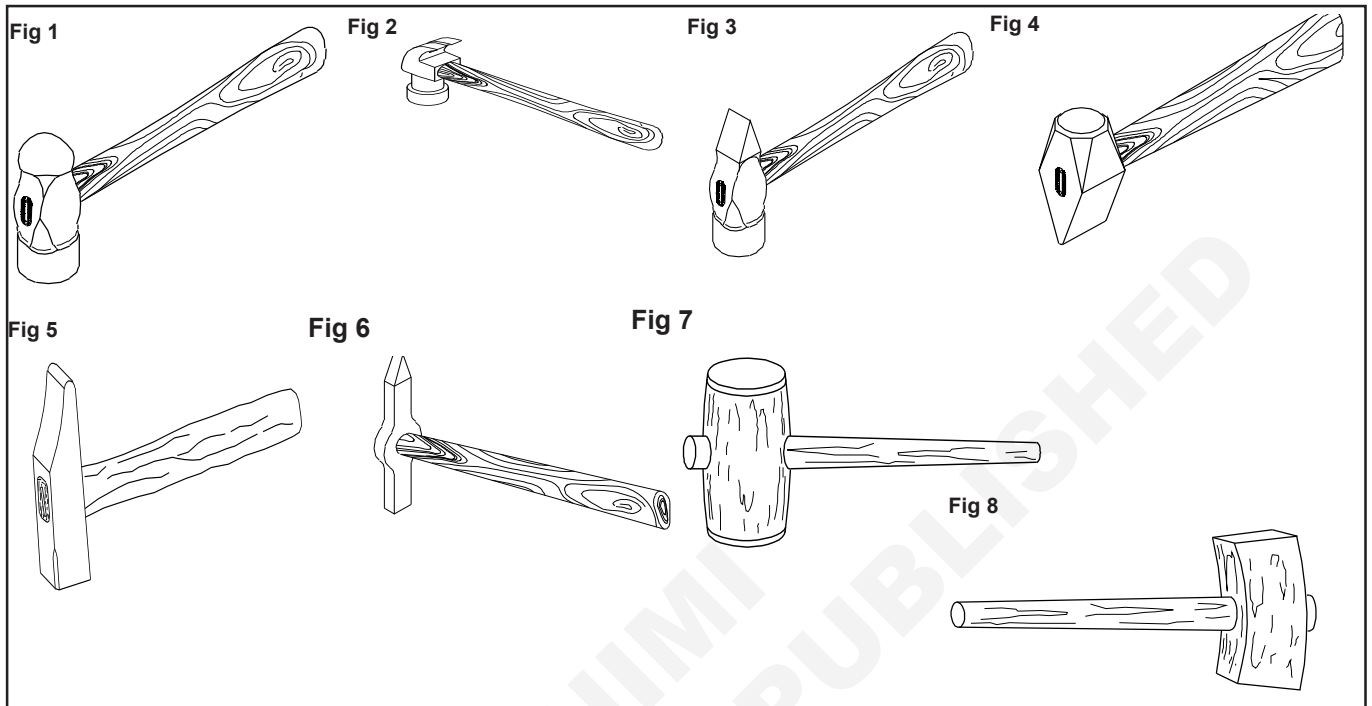
**Note: Instructor provide chisel for sharpening**



**Demonstrate the use of different types of striking tool, hammer and mallets.**

**Objective:** At the end of this exercise you shall be able to

- identify the striking tools and uses.



**Job Sequence**

Instructor shall display and demonstrate to the students regarding the name and use of different types of striking tools, hammer and mallets.

- Trainees will note down all the displayed striking tools names and uses.
- Record it in table 1.
- Get it checked by the instructor.

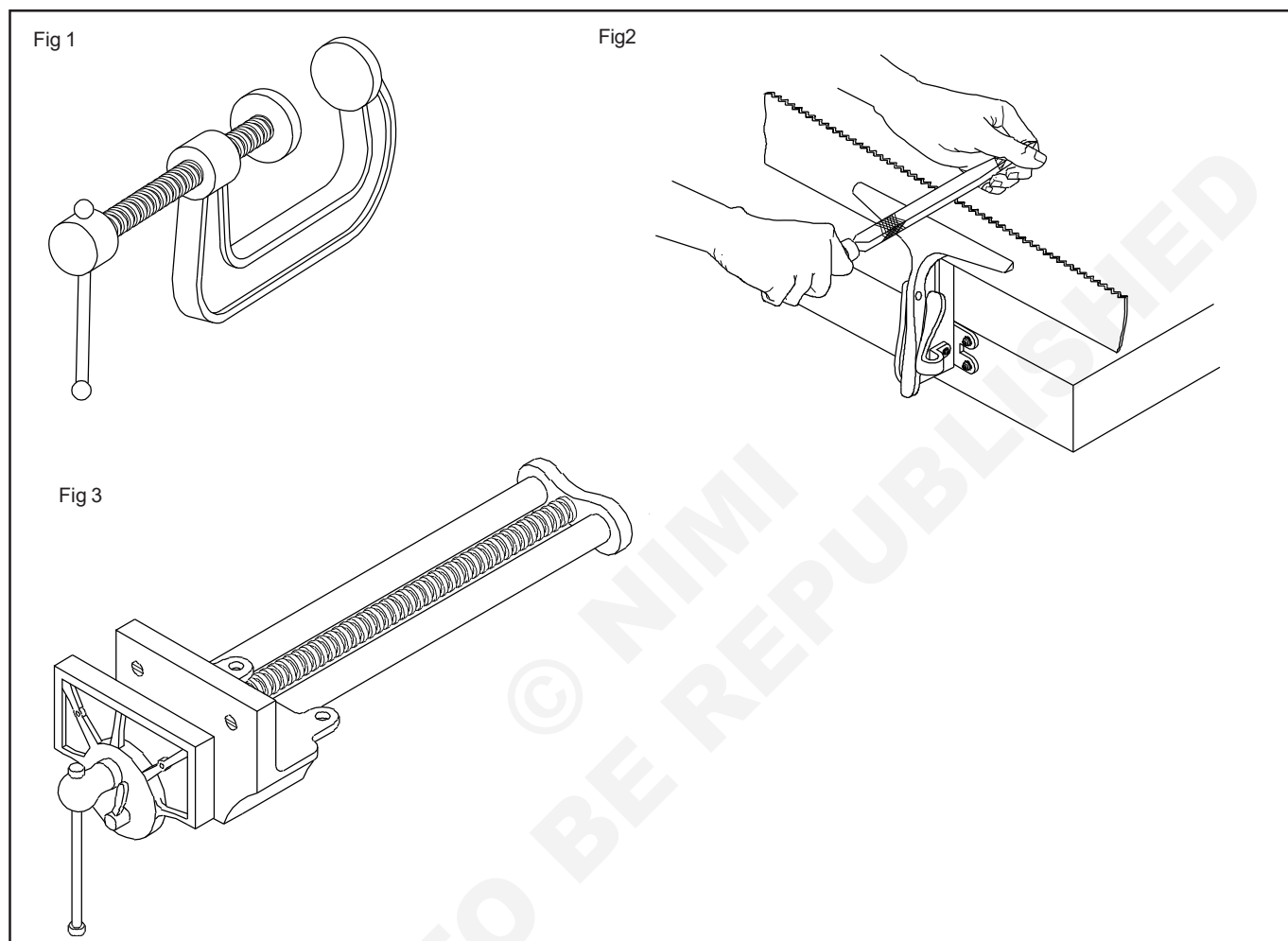
**Table 1**

Fig No.	Name of the striking tools	Uses
1		
2		
3		
4		
5		
6		
7		
8		

**Demonstrate the use of clamps 'G' or 'C', saw sharpening vice, carpentry vice**

**Objectives :** At the end of this exercise you shall be able to

- identify the clamps and vice
- demonstrate the use of clamps and vice.



**Job Sequence**

**Instructor shall display and demonstrate to the students regarding the name and use of 'G' or 'C' clamps, saw sharpening vice and carpentry vice.**

- Trainees will note down all the displayed tools names and uses.
- Record it in table 1.
- Get it checked by the instructor.

**Table 1**

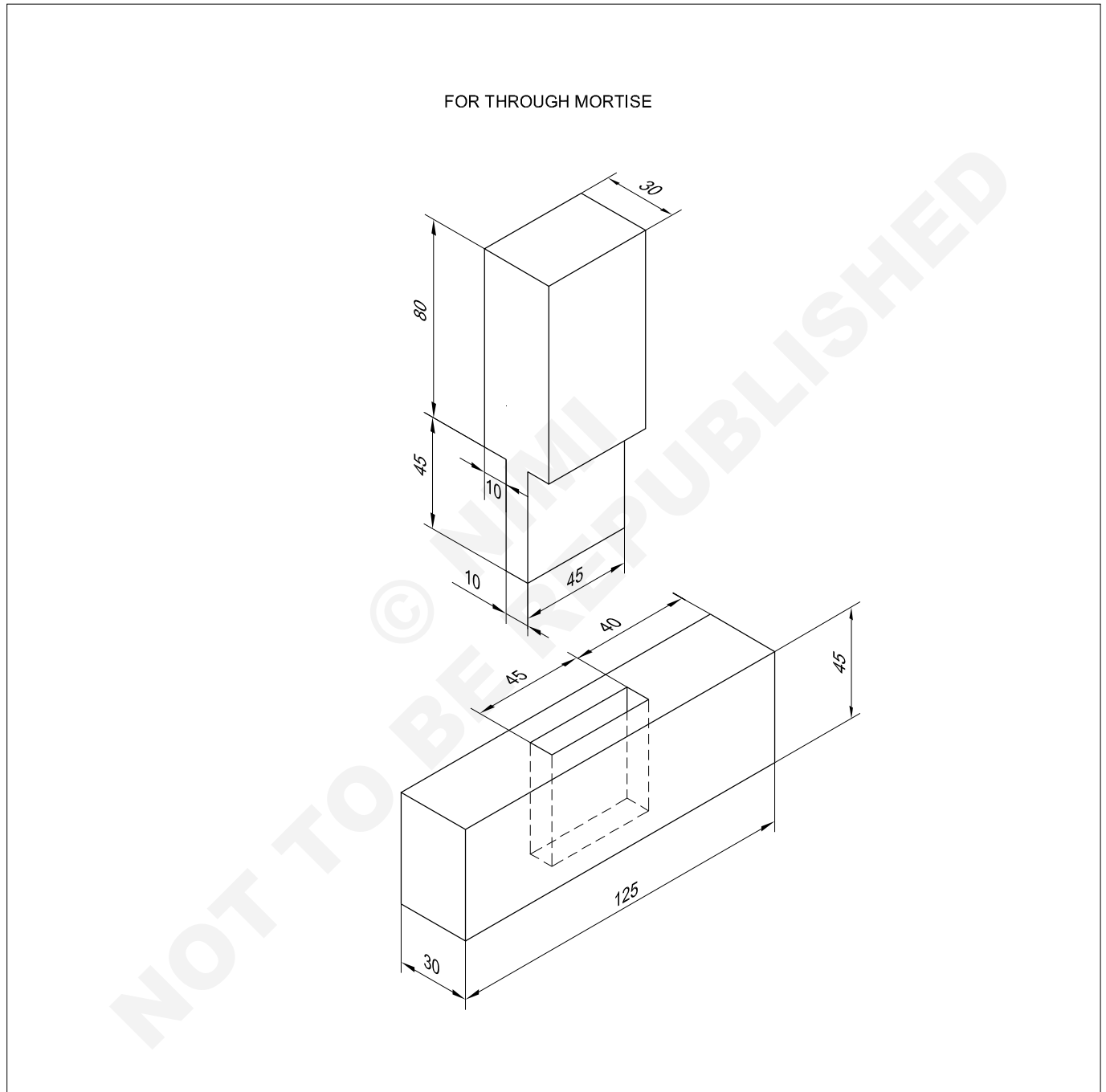
Fig No.	Name of the clamp and vices	Uses
1		
2		
3		



Single mortise and tenon joint

Objectives: At the end of this exercise you shall be able to

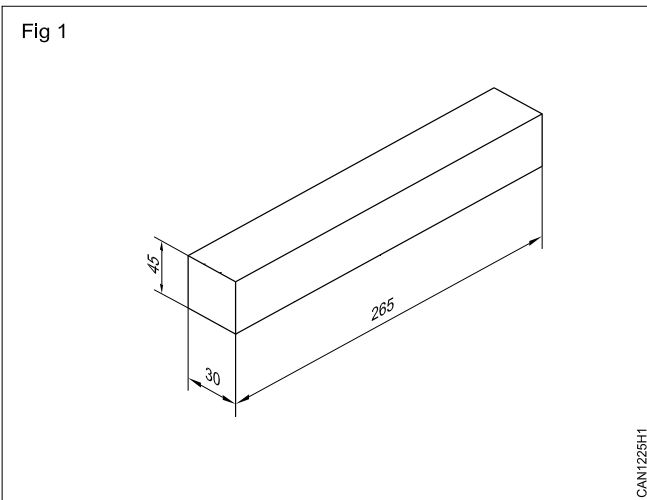
- make the mortise and tenon
- assemble and finish the mortise and tenon joint.



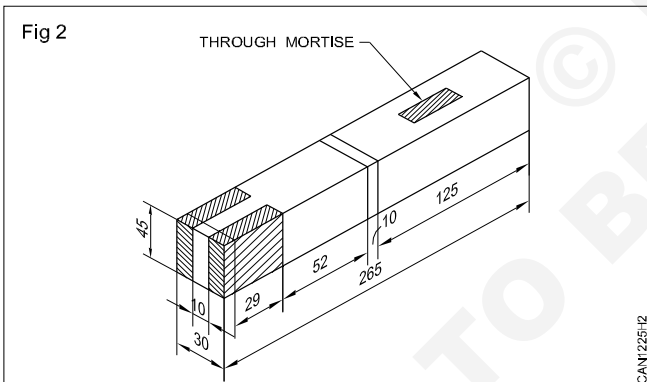
1	50x38x275mm		HARD WOOD			1.2.25
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>SINGLE MORTISE AND TENON JOINT</b>				TOLERANCE ±2.0 mm	TIME 3hrs
					CODE NO. CA20N1225E1	

## Job Sequence

- Check the wooden piece for its size using folding rule. 275 x 50 x 38mm - 1 No.
- Plane it to size where in the width = 45 mm Thickness = 30 using jack plane. (Fig 1)



- Check the work piece for its flatness and squareness and markise gauge.
- Mark the given dimension on the job as per drawing using scribe, folding rule and try square and mortise gauge (Fig 2)
- Hold the work piece in the vice. (Fig 3)



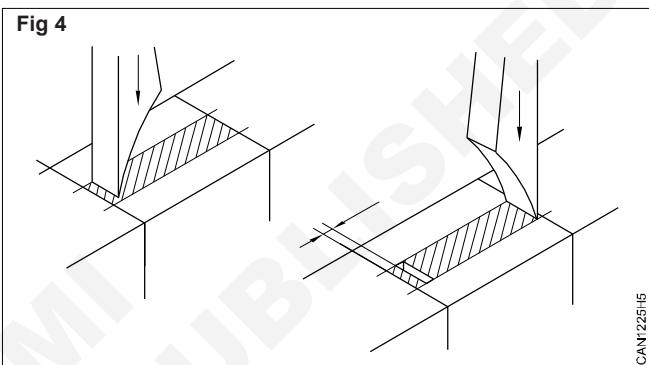
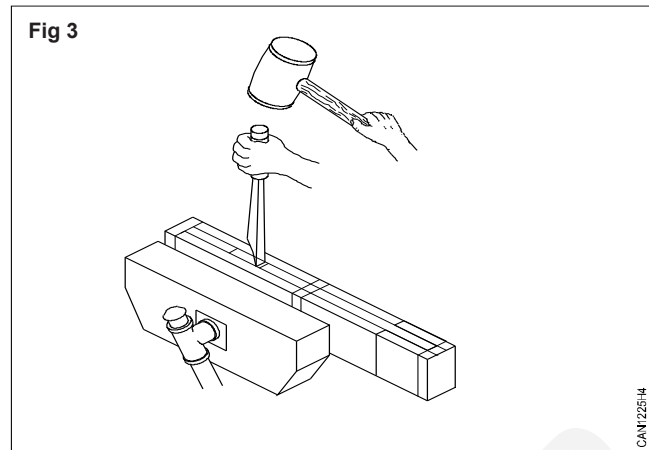
- Hold the mortise chisel (6 mm) in left hand and the mallet in the right hand, start chopping out the mortise at a distance of 2 mm from the lines. (Fig 4)

**Care should be taken to see that mortise does not become wider than the chisel.**

**Hold the mortise chisel square to the surface.**

**Do not chip right upto the end lines of the mortise.**

- Chop out first layer about 10 mm and then cut next layer until half the height is reached. (Fig 5a)



- Reverse the work piece upside down in the vice and start chopping out from the other side. (Fig 5b)
- Check whether the walls of mortise are straight. (Fig 5c)
- When the mortise holes are finished to size clear the mortise using mortise and firmer chisel.
- Saw the tenon walls right upto the lines of the shoulder, with the use of bench hook. (Fig 6)
- Saw down the tenon walls of the tenons (Fig 7).
- Keep the saw on the waste side of the line.
- Saw off the end wastes of tenon and finish the flat surfaces. (Fig 8)
- Saw off the end wastes of the piece. (Fig 9)
- When two pieces are ready to be fit, check if they will fit snugly and are flush when fitted.

**Tenon should be square to mortise piece.**

- Fit the mortise with their tenons and after fitting there should not be any movement in the joints. (Fig 10)
- Check with the try square.
- Finish the mortise and tenon joint with smoothing plane

Fig 5a

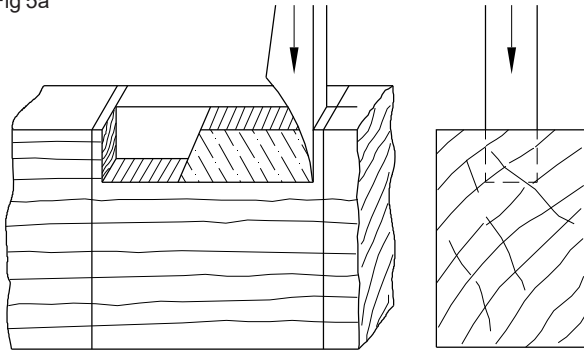


Fig 5b

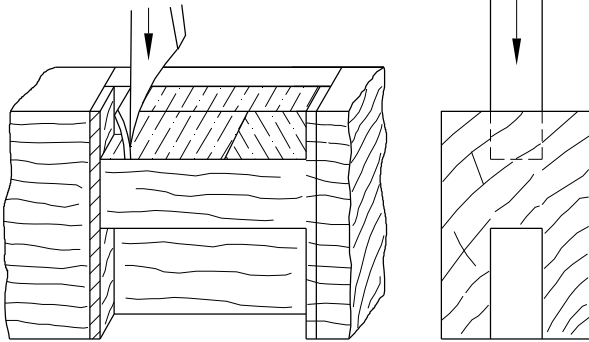
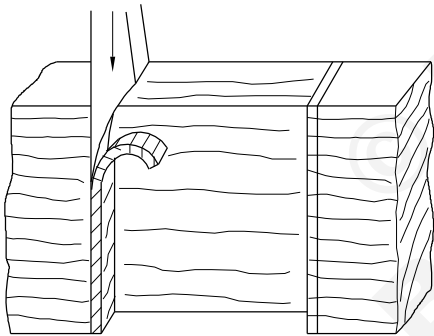
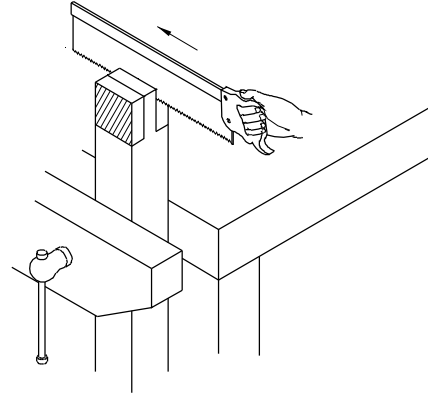


Fig 5c



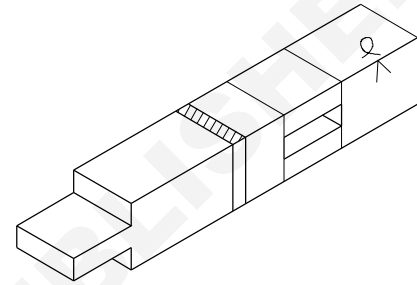
CAN1225H6

Fig 7



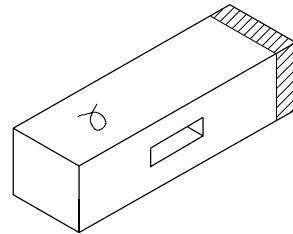
CAN1225H6

Fig 8



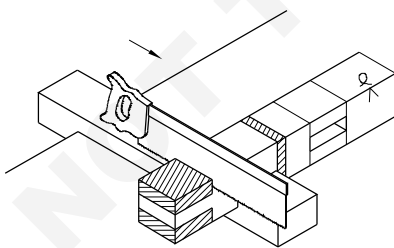
CAN1225H9

Fig 9



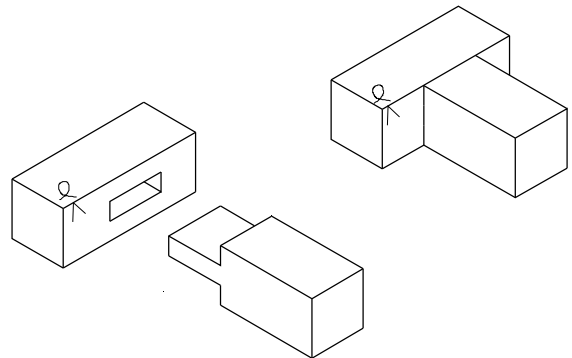
CAN1225HA

Fig 6



CAN1225H7

Fig 10

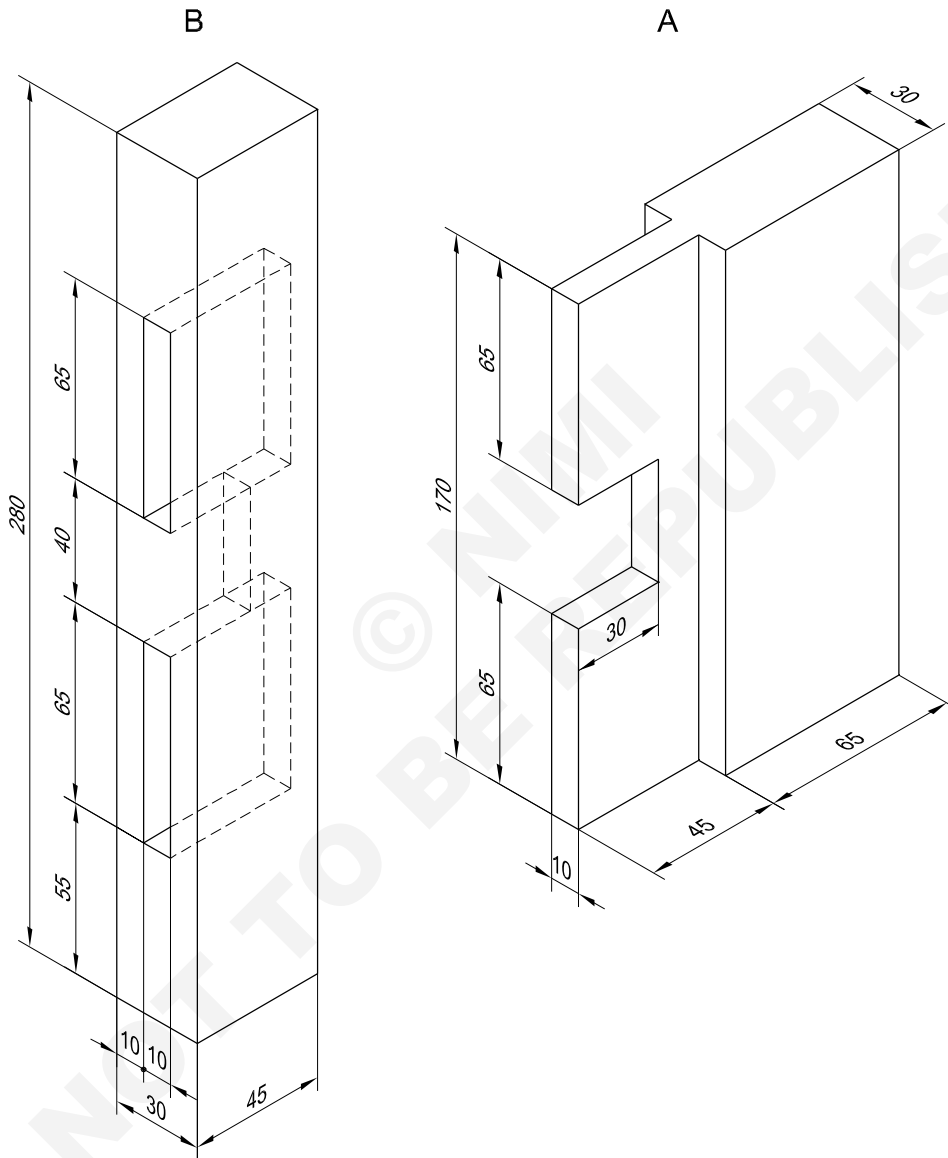


CAN1225HB

**Double mortise and tenon joint**

**Objectives:** At the end of this exercise you shall be able to

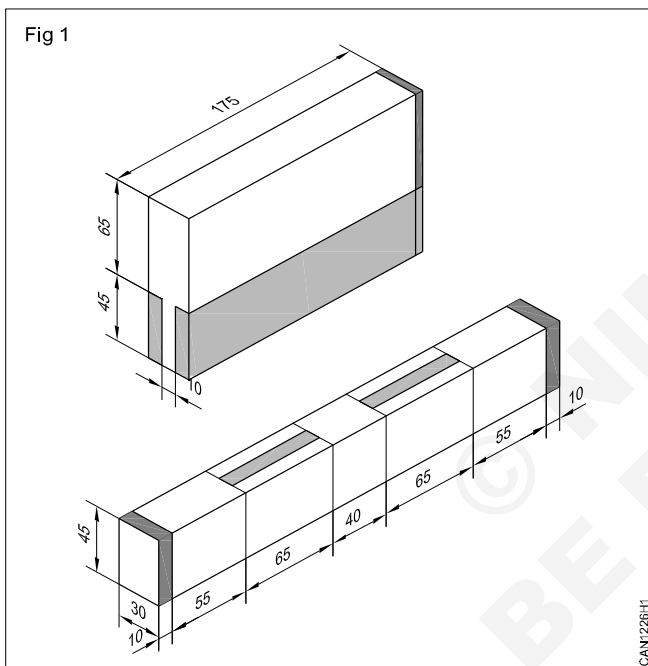
- make a double tenon
- make a double mortise
- assemble the mortise and tenon.



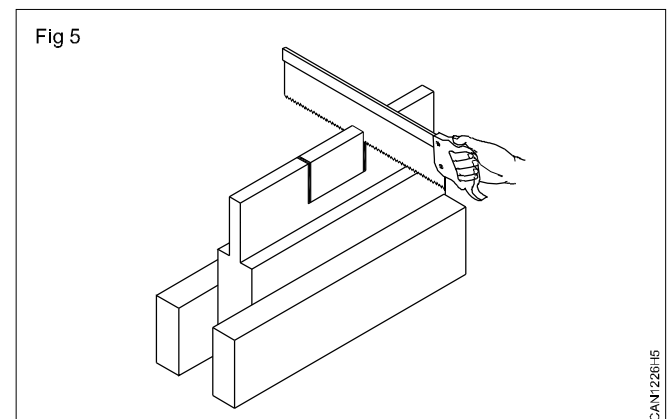
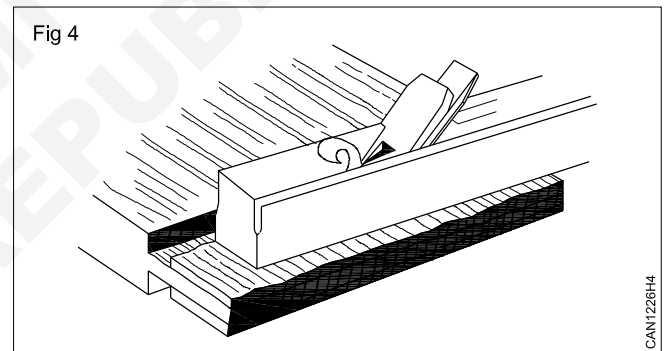
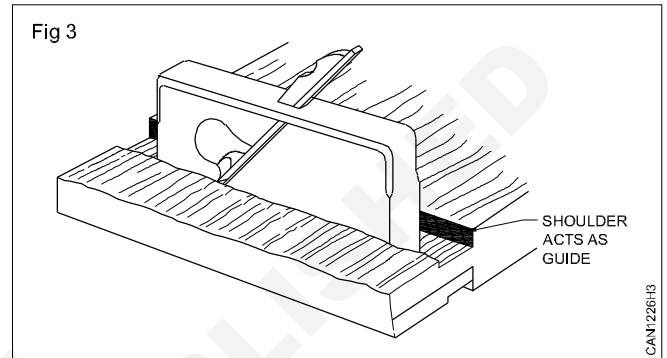
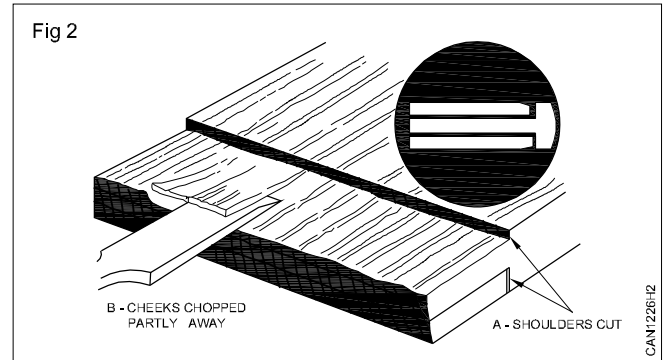
1	120 x 38 x 175		HARD WOOD			
1	50 x 38 x 300		HARD WOOD			1.2.26
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DOUBLE MORTISE AND TENON JOINT</b>				TOLERANCE ± 2 mm	TIME 2hrs
					CODE NO. CA20N1226E1	

## Job Sequence

- Check the wooden pieces and plane it to the size of 175x30x110mm using it folding rule jack plane and try square
- Mark the measurement on the job as per drawing Tenon part (Fig 1) using folding rule, try square, morise gouge and scribe
- Check the wooden piece and plane it to the size of 45 x 30 x 280 mm using folding rule, jack plane and try square
- Keeping the stock of mortise gauge close to the face side, mark the middle 10 mm distance through out the length of face edge.
- Mark the measurements on the job as per drawing. (Mortise) Fig 1.

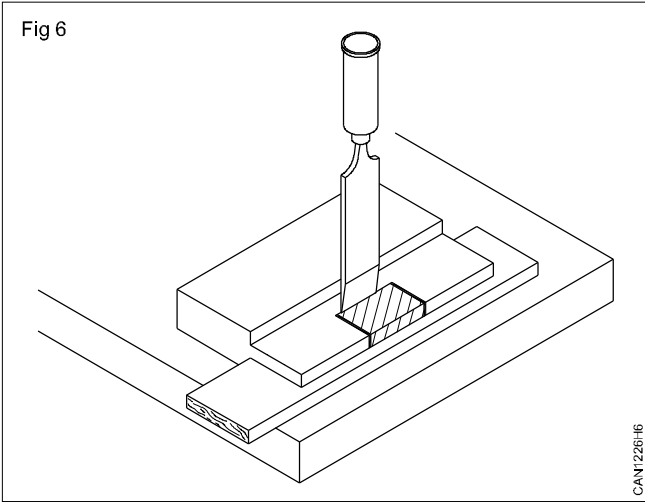


- Hold the job horizontally in the vice.
- Saw down to a fraction short of the gauge line.
- Keep the saw squarely.
- Chip away the flat surface and shoulder with a firmer chisel.
- Cut a shallow sloping groove on the waste side using firmer chisel. (Fig 2)
- Take the rebate plane and plane across the grain. (Fig 3)
- Trim the tenon part to the required thickness using jack plane. (Fig 4)
- Hold the job in the vice vertically. Keep the saw on the waste portion squarely and start sawing the waste. (Fig 5)



- Cut the centre waste part of the tenon with a firmer chisel and finish both the tenons. (Fig 6)
- Cut the waste ends with a tenon saw.
- Make the double mortise using mortise chisel and mallet (Fig 7)
- Finish the mortise to the required sided

Fig 6

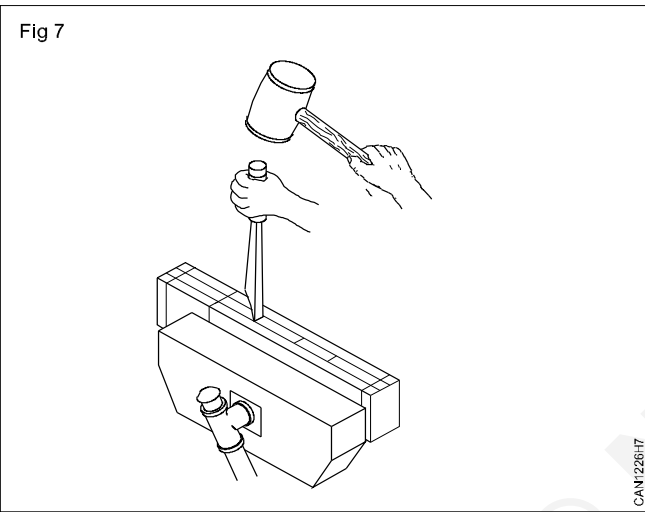


CAN1226H6

Care should be taken to see that the mortise does not become wider than the chisel.  
The chisel should be held square to the surface.

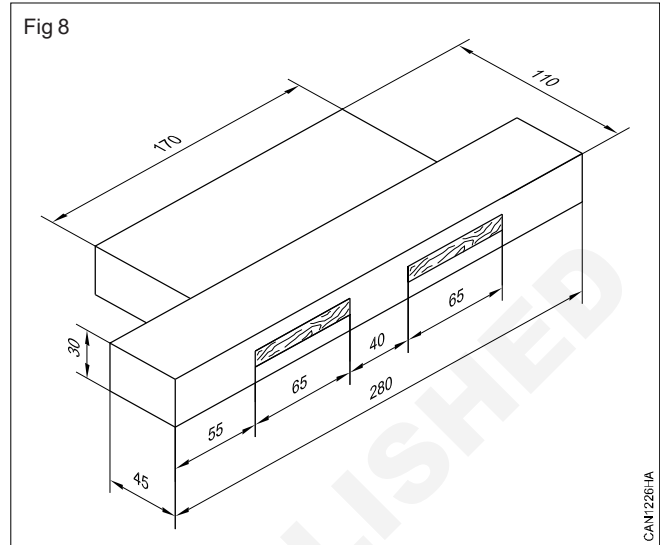
- Assemble the tenon and mortise properly and finish the joint. (Fig 8)

Fig 7



CAN1226H7

Fig 8

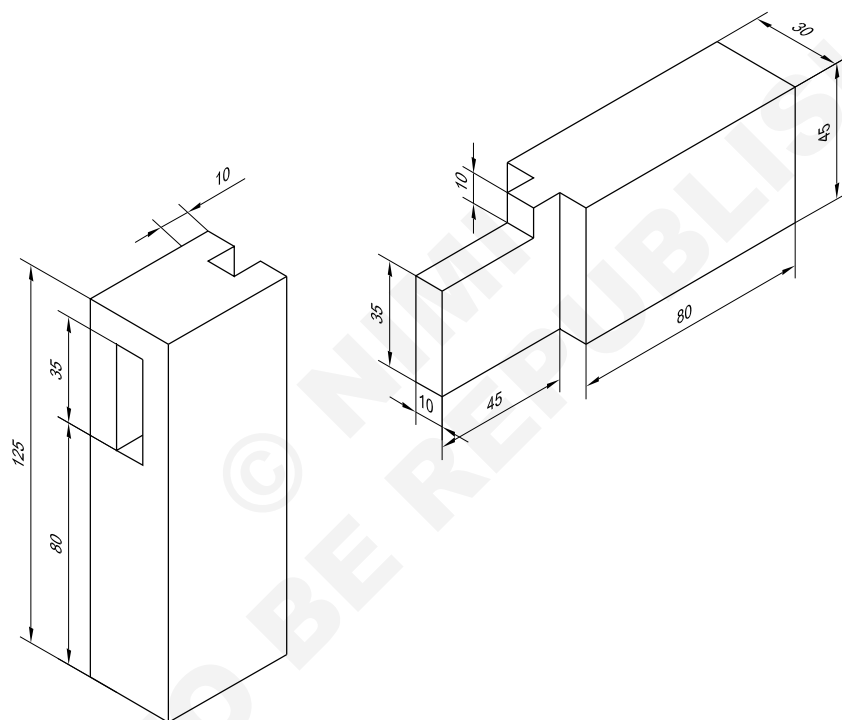


CAN1226H8

**Plain haunched mortise and tenon joint**

**Objectives:** At the end of this exercise you shall be able to

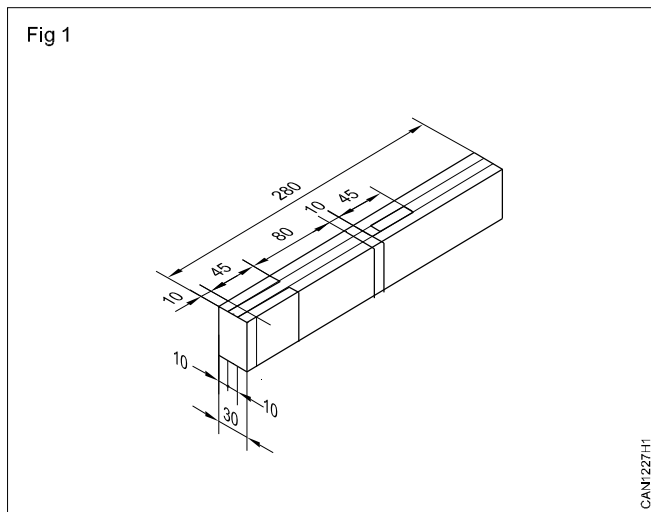
- make a haunched mortise and tenon.
- assemble and finish the haunched mortise and tenon joint.



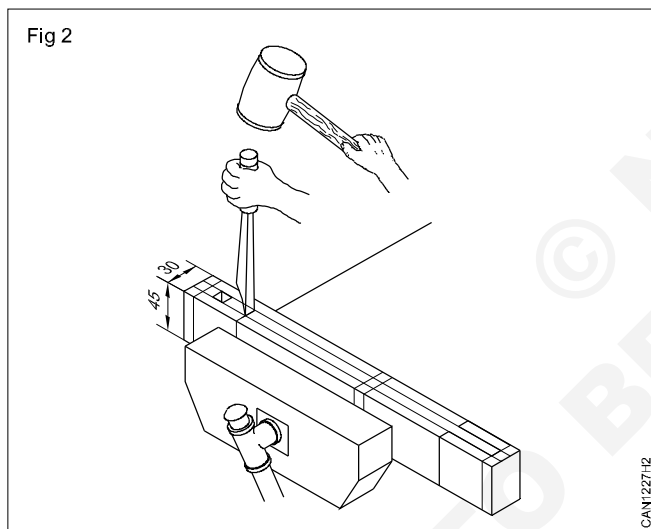
1	50 x 38 x 280mm		HARD WOOD			1.2.27
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>PLAIN HAUNCHED MORTISE AND TENON JOINT</b>				TOLERANCE ±2.0 mm	TIME 2hrs
					CODE NO. CAN1227E1	

## Job Sequence

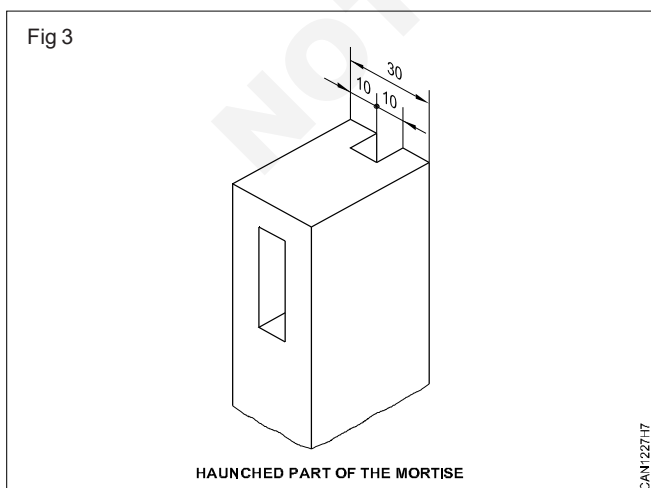
- Check the workpiece and planing to size of the workpiece 45x30x280mm and marking of the measurement as per the drawing using folding rule, try square, jack plane, mortise gauge and scribe (Fig 1)



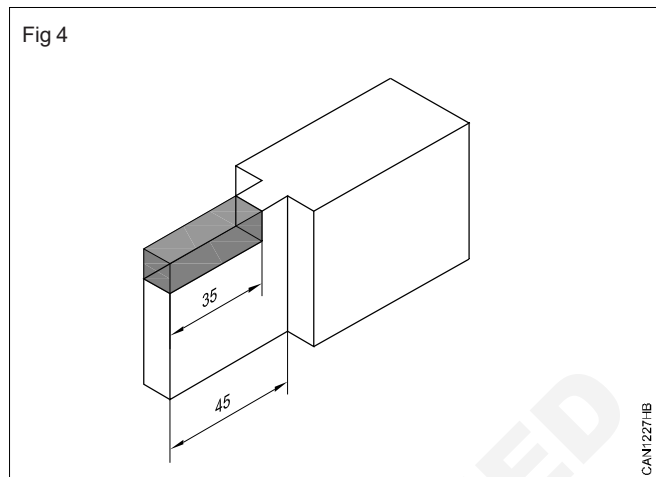
- Make the haunched mortise using mortise chisel, firmer chisel and mallet (Fig 2)



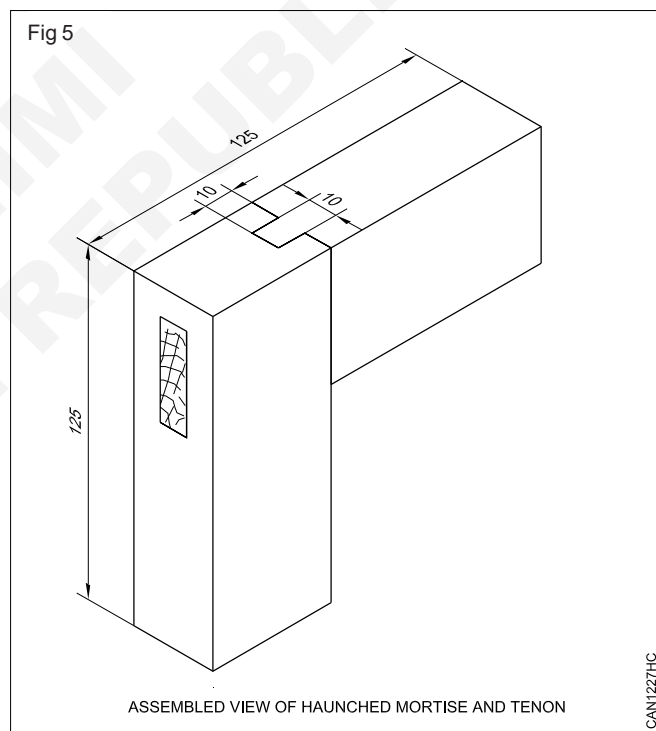
- Hold the mortise upside down and prepare the hunch to a size of 10 x 10 x 10mm. (Fig 3)



- Preparing the tenon shown in Fig 4



- Finish the haunched tenon using firmer chisel.
- Assemble the haunched tenons in the mortises by gently tapping it with mallet and finish the job as per drawing. (Fig 5)

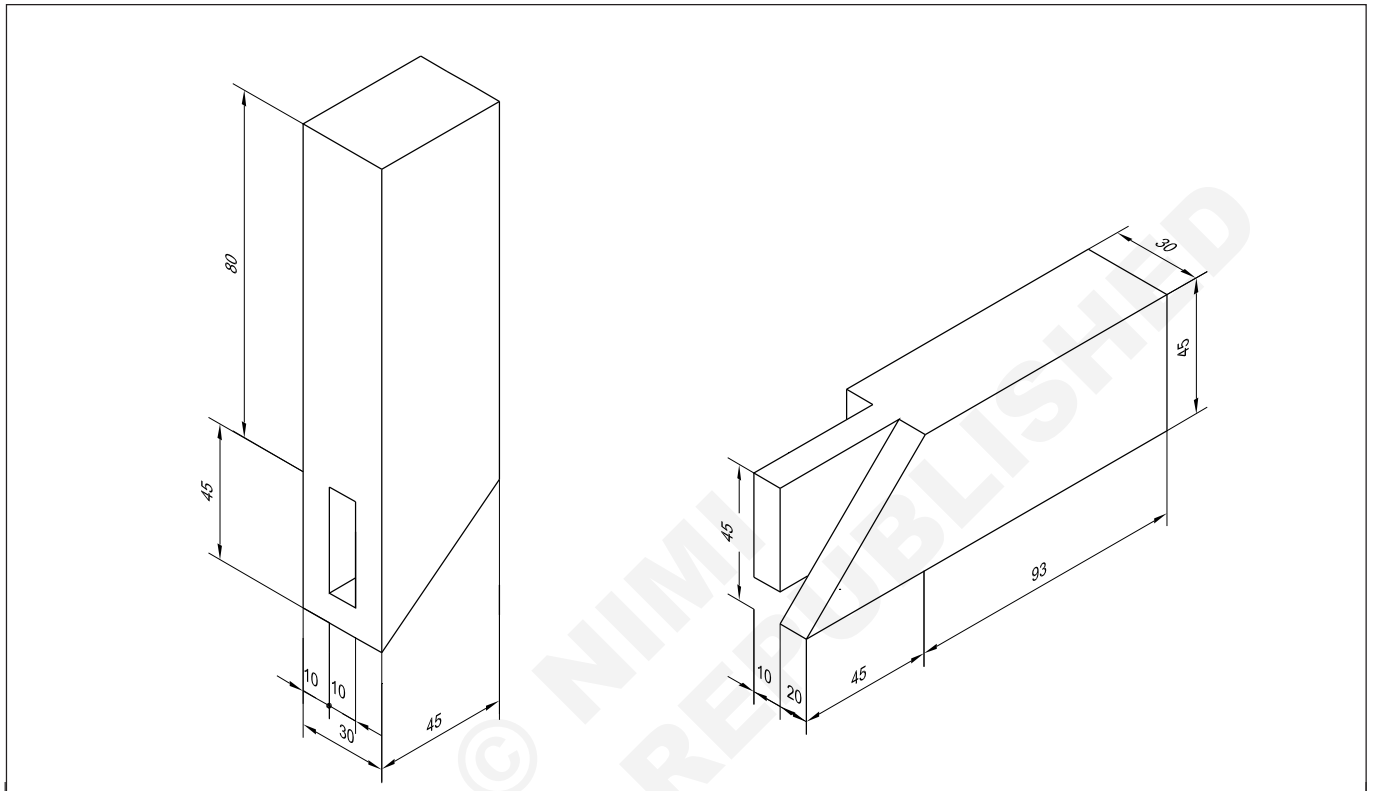




Mitre corner mortise and tenon joint

Objectives: At the end of this exercise you shall be able to

- make the mitre corner mortise and tenon
- assemble and finish the mitre corner mortise and tenon joint.



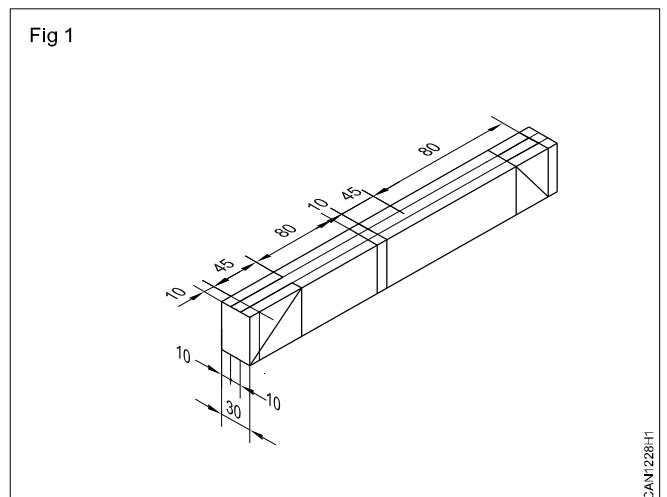
1	50 x 38 x 280mm		HARD WOOD			1.2.28
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>MITRE CORNER MORTISE AND TENON JOINT</b>				TOLERANCE ±2.0 mm	TIME 2hrs
					CODE NO. CA20N1228E1	

Job Sequence

Truing up the stock

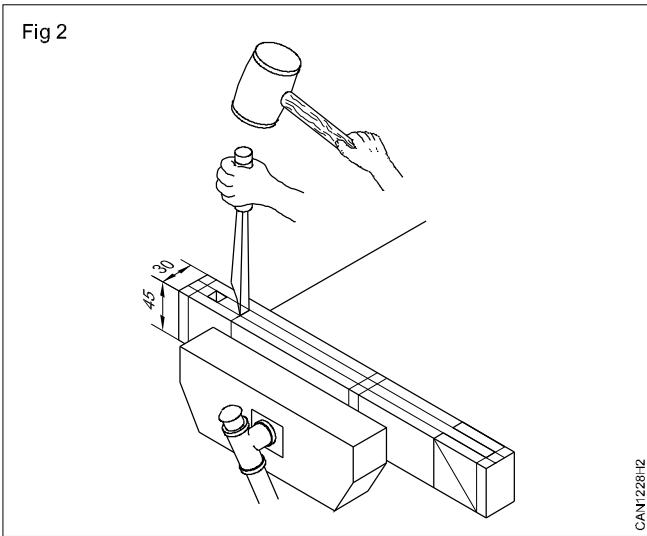
- The stock should be planed to the required size in the usual way called truing - up - the stock.
- Test the work piece for flatness and squareness between the side and edge surface using try square.
- After truing up the size of the work piece 45 x 30 x 280mm.
- Mark the job as per the drawing using folding rule try square, scribe, Mortise gauge and bevel square

Fig 1

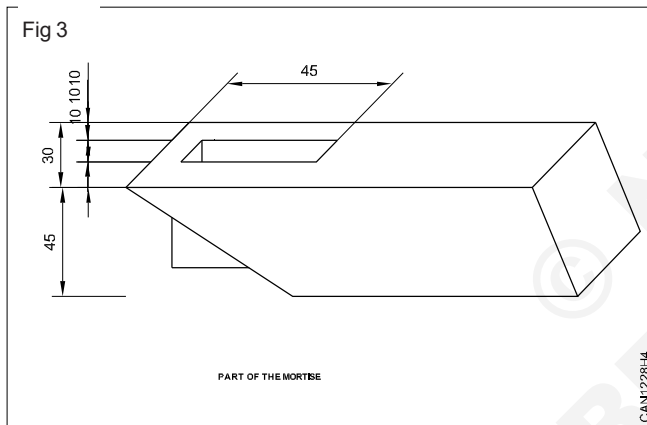


CANI228E1

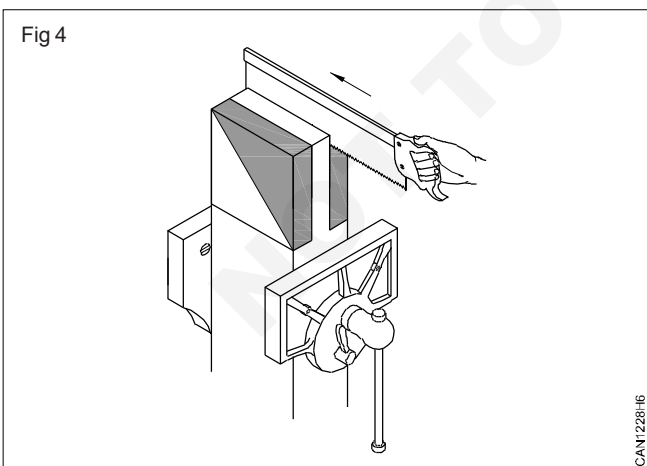
- Make the mortise using mortise chisel, firmer chisel and mallet (Fig 2)
- Leave 10 mm margin from left sides. Cut to a 10 mm thickness on the line marked at 45° angle with tenon



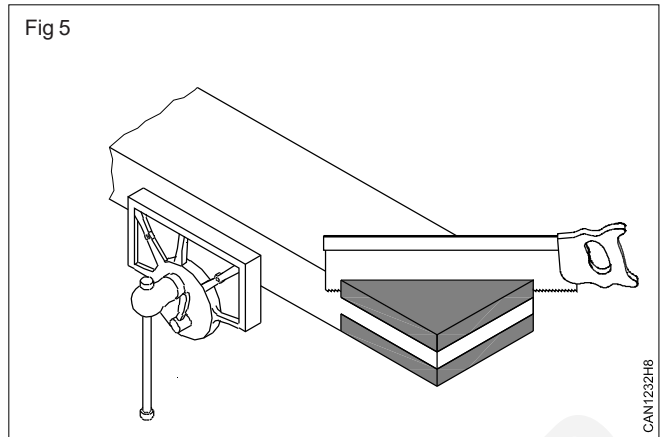
saw and Finish it and smoothen the mortise as shown in the sketch. (Fig 3)



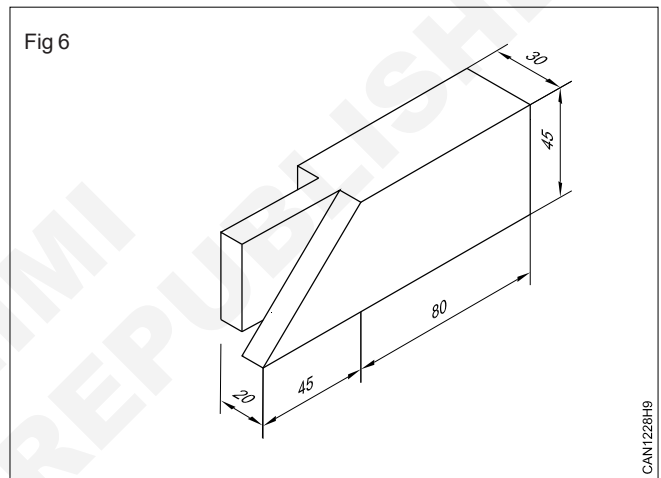
- Keep the saw on the waste side of tenon line (Fig 4)



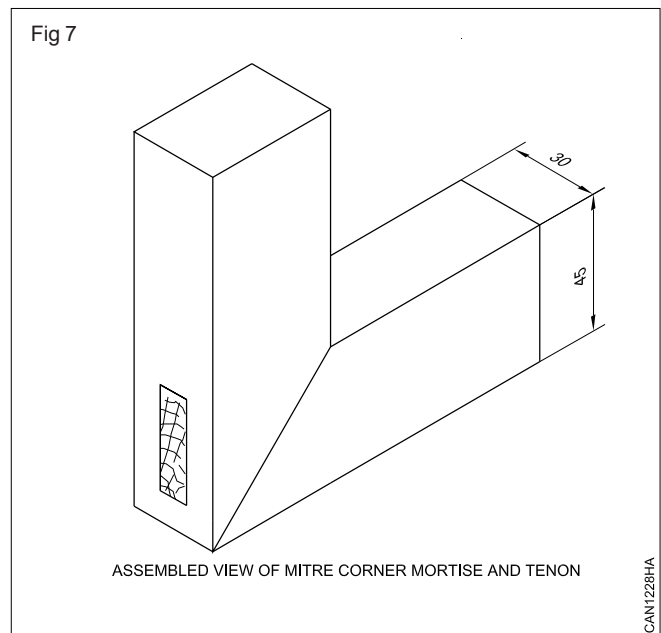
- Reverse the piece in the vice and go on sawing 45° angular line with tenon saw as per drawing. (Fig 5)



- Finish the tenon surfaces and flatten it smoothly using firmer chisel. (Fig 6)



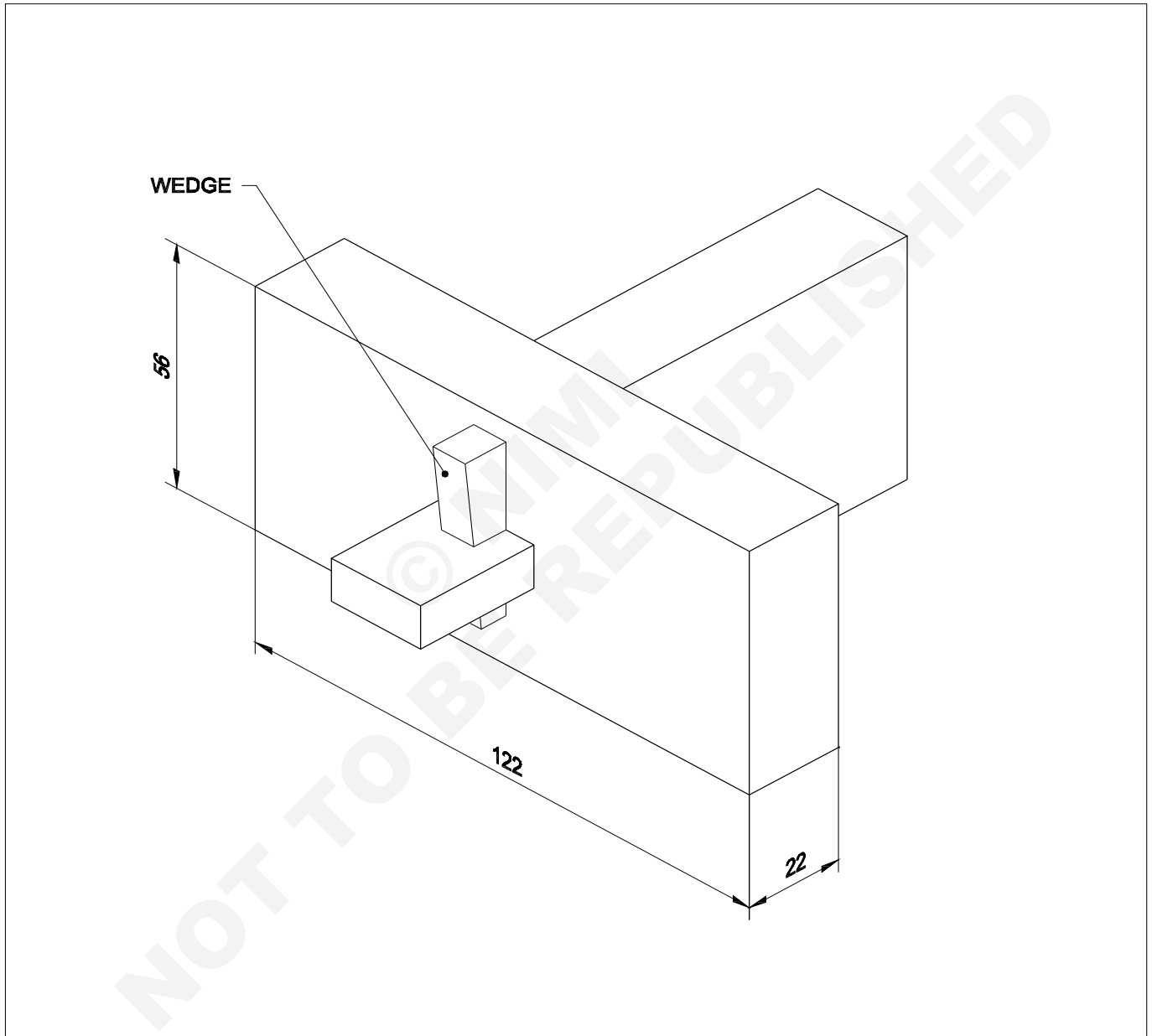
- Assemble the tenon in the mortise by gently tapping it with mallet and finish the job as per drawing. (Fig 7)



**Tusk tenon and mortise joint**

**Objectives :** At the end of this exercise you shall be able to

- make the tusk tenon
- make the tusk mortise
- make the wedge
- assemble and finish the tusk tenon and mortise joint.



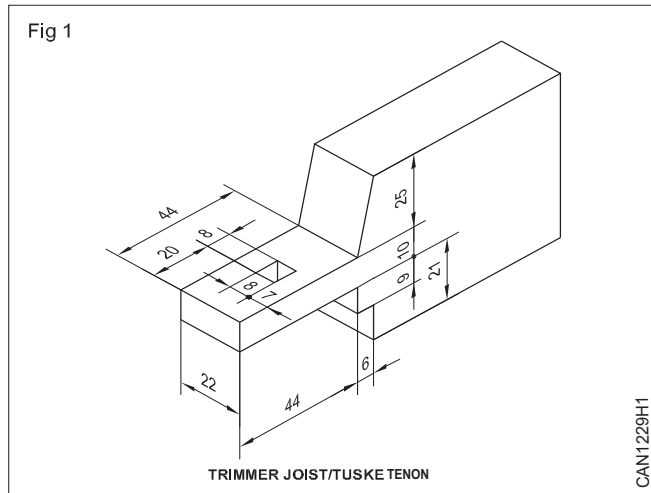
1	12 x 12 x 50		TEAK WOOD			
2	75 x 25 x 450		TEAK WOOD			1.2.29
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>TUSK TENON AND MORTICE JOINT</b>			DEVIATIONS ± 2.0 mm	TIME: 2hrs
					CODE NO. CA20N1229E1	

## Job Sequence

- Plane the tusk tenon and mortise pieces to the required size of 56mm width and 22mm thickness using jack plane.

### Tenon

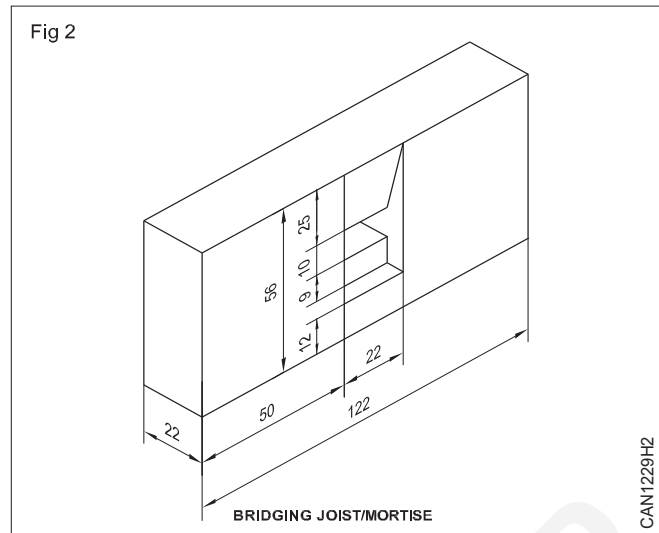
- Mark on left end of the trimmer joist mark 20mm length (the tenon projection) 8mm (thickness of the wedge) and 22 mm (length of the tenon) using try square, scribe and wooden rule. (Fig 1).



- Square the marked lines on other three sides also. (Fig 1)
- Set the marking gauge for 25mm (the tenon shoulder) and transfer the same measurements of face side and opposite side on left end of the trimmer joist. (Mark facing against the face edge of the trimmer joist). (Fig1).
- Follow the above same procedure to mark 35mm, and 44 mm on face side and opposite side on left end of the trimmer joist (Mark facing against face edge of the work piece).(Fig 1).
- Place the work piece on work bench vice properly. (Fig1)
- Saw on waste portion of the tenon surface with correct measurements smoothly using firmer chisel. (Fig 1)
- make the mortise thickness of the wedge tenon surface carefully without changing the required measurements. (Fig 1).

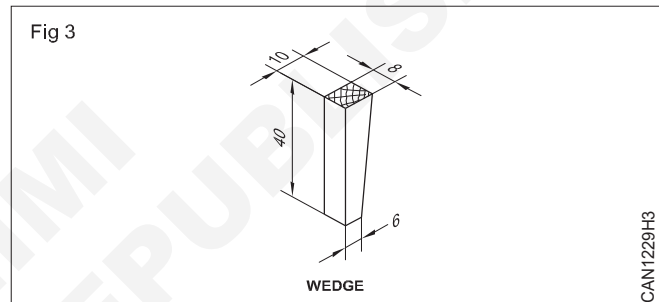
### Mortise

- Leave 50mm in the left end, mark 22mm on face side of the bridging joist as a mortise part to insert the tenon of the trimmer joist. (Fig 2).
- Set the marking gauge for 25mm and transfer the same measurements on face side and the opposite side of the mortise part of the bridges joist (use the marking gauge facing against the face edge of the joist). (Fig2).
- Follow the above said procedure to mark the measurements of 35mm and 44mm on face side and the opposite side of the bridging joist. (Fig 2).
- Finish the mortis as per the given measurements correctly. (Fig 2)

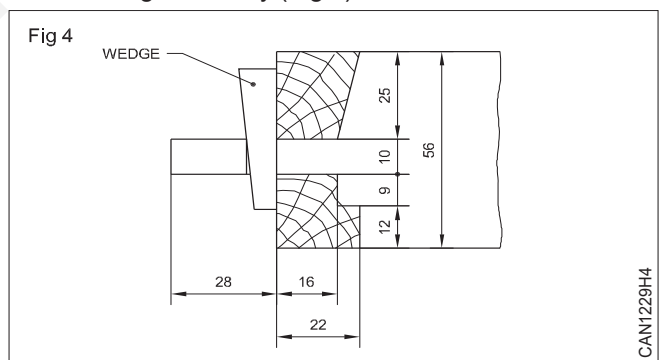


### Wedge

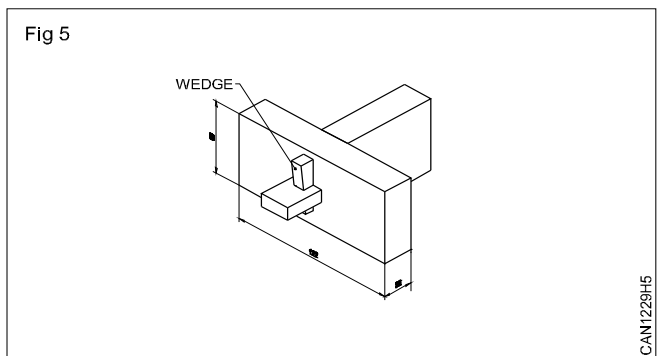
- Plane the wedge piece to the required width of 10mm and 8mm thickness. (Fig 3).
- Mark and make the wedge as per the drawing Fig 3



- Assemble the tusk tenon and mortise together properly (Fig 4).
- Insert the wedge piece through the mortise and tighten the wedge carefully (Fig 4).



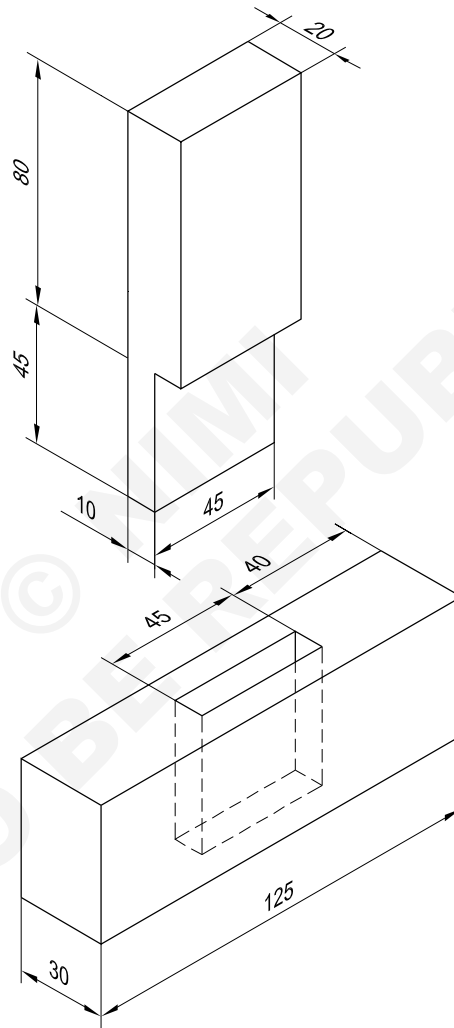
- Check and Finish the joint using try square and smoothing plane.(Fig 5)



**Bare faced mortise and tenon joint**

**Objectives :** At the end of this exercise you shall be able to

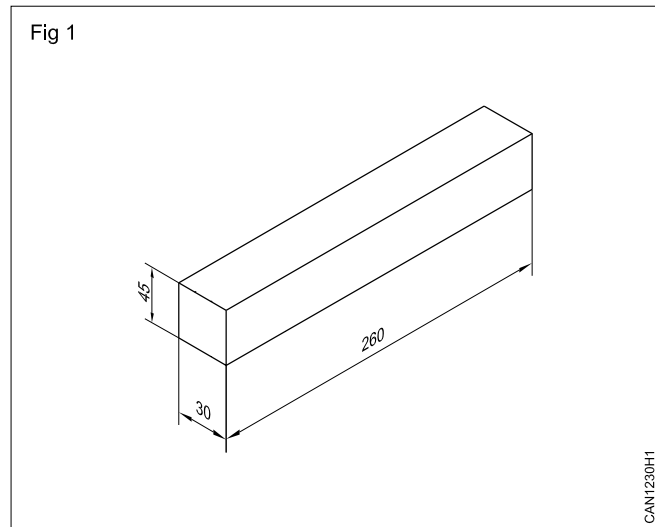
- make bare faced mortise and tenon.
- assemble and finish bare faced mortise and tenon joint.



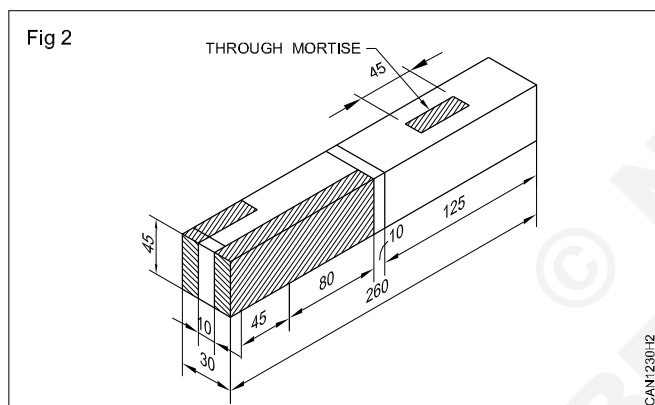
1	50x38x260mm		HARD WOOD			1.2.30
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>BARE FACED MORTISE AND TENON JOINT</b>			TOLERANCE ±2.0 mm	TIME 3hrs
					CODE NO. CA20N1230E1	

## Job Sequence

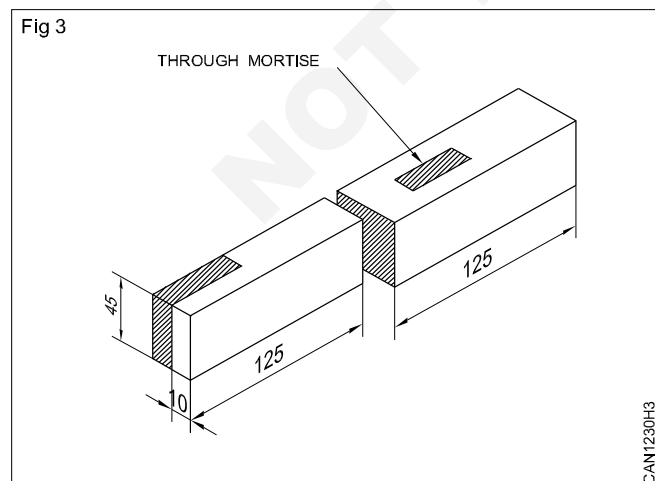
- Check the wooden piece and plane it to size of 30x45x260 mm (Fig 1)



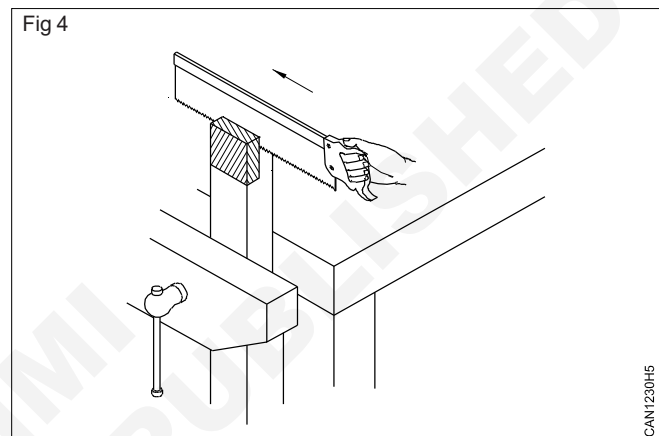
- Mark the given dimension on the job as per drawing mark the given figure using folding rule and scriber Fig 2



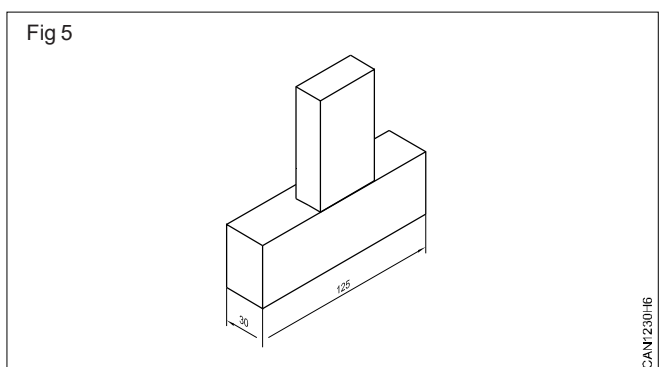
- Set the  $\frac{1}{3}$  rd (one third) thickness in mortise gauge and marking gauge scribe marking out lines on edge and ends of the job and mortise and tenon as per drawing (Fig 3)



- Cut the piece into equal parts using tenon saw plane piece cut with parts.
- Make the mortise as per drawing (Fig 3) using mortise chisel, firmer chisel and mallet
- When the mortise holes are finished to size clear the mortise as per drawing
- One tenon piece keep the plane to size wherein the width = 45 mm Thickness = 20 mm (Fig 3)
- Hold the work tenon piece in the vice.
- Saw down the tenon walls of the tenons only one shoulder cut (Fig 4)

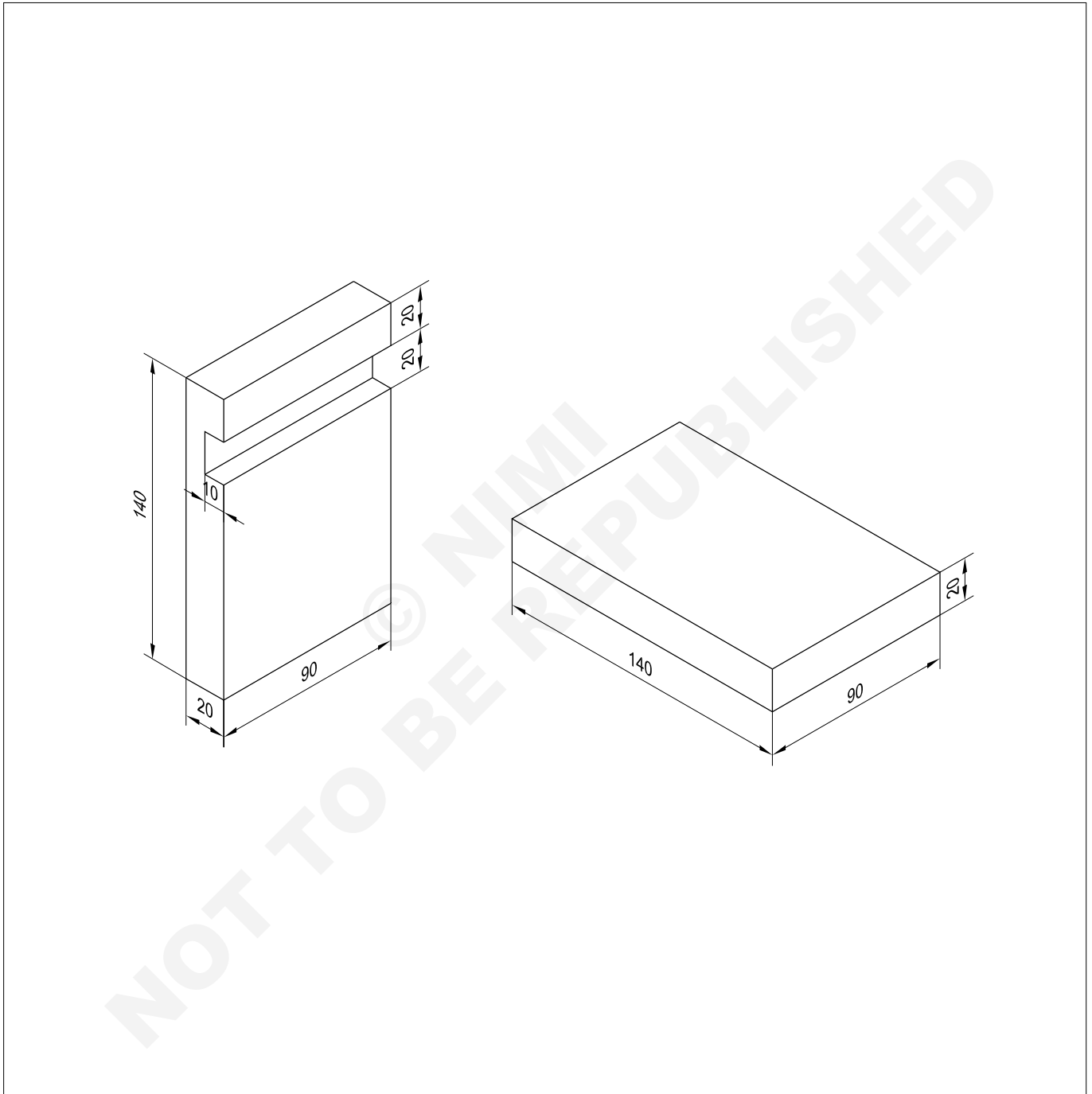


- Saw tenon walls right up to lines of the finish the bare face tenon flat surface
- Assemble the bare face tenon and mortise properly and after fitting there should not be any movement in the joints.
- Check with the try square.
- Finish the job using smoothing plane. (Fig 5)



**Full housing joint**

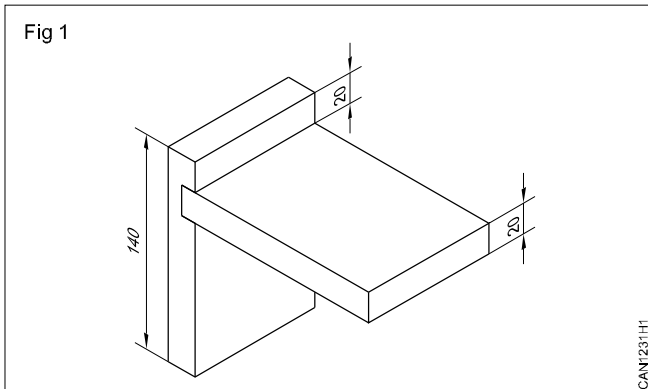
- Objectives:** At the end of this exercise you shall be able to
- make a housing joint (through housing and its pin part).



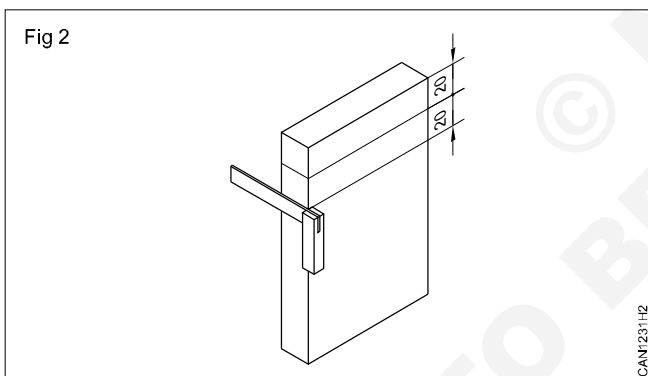
1	100 x 25 x 300		HARD WOOD			1.2.31
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>FULL HOUSING JOINT</b>				TOLERANCE ±2.0 mm	TIME 2hrs
					CODE NO. CA20N1231E1	

## Job Sequence

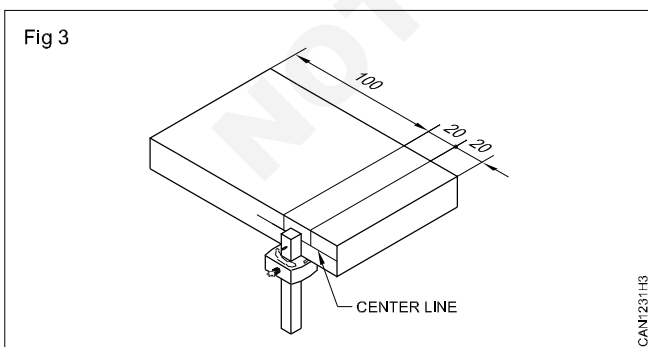
- Check the wooden piece for its size using four fold woodenrule.
- Plane the raw material to the required size using jack plane.
- Plane it squarely to the size of 90 x 20 x 300mm.
- Cut the wooden piece into two pieces with a tenon saw to the size of 90 x 20 x 140mm to square.
- Mark the dimensions on trench piece as per drawing. using try square marking gauge, scribe and pencil ( Fig 1).



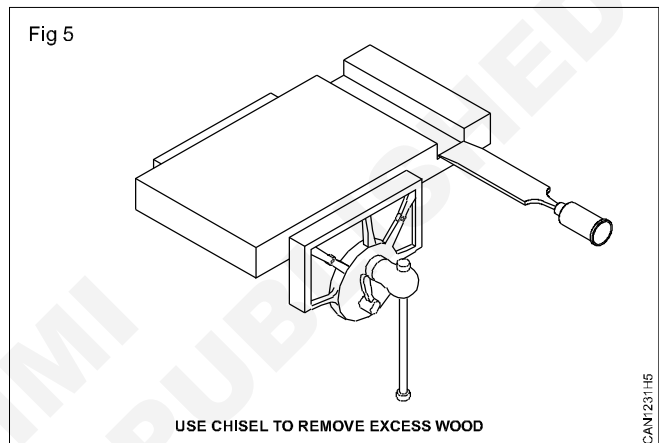
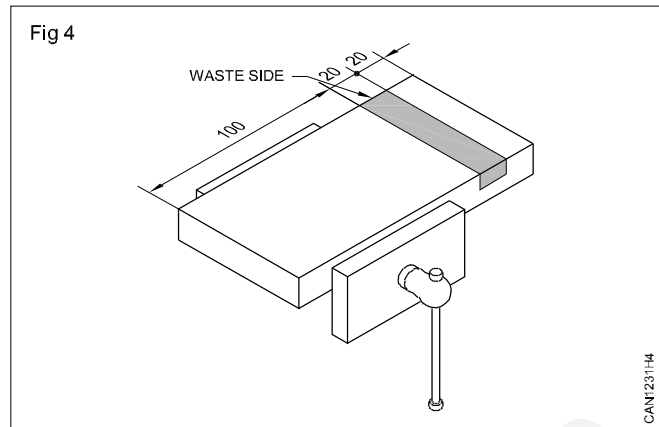
- Finish the lines with try-square and mark on the edge sides.(Fig 2)



- Mark 10mm housing depth on both the edges using marking gauge. (Fig 3)



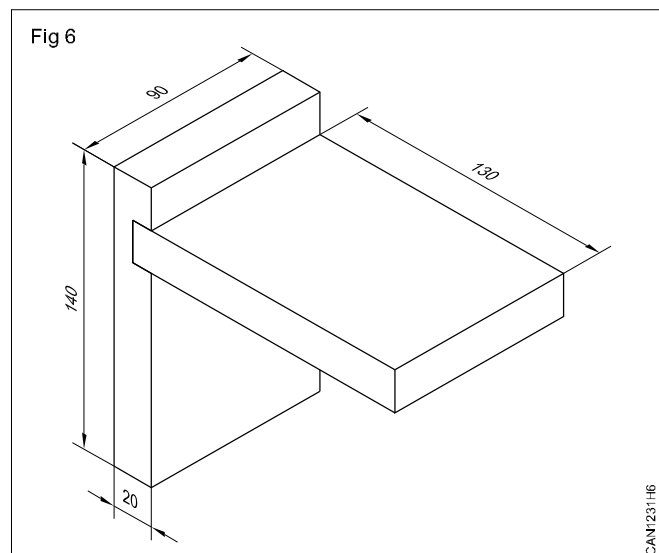
- Place the wood in the vice. (Fig 4)
- Cut the sides of the housing down to the centre line using tenon saw. (Fig 4)



- Remove the excess wood using firmer chisel. (Fig 5)

**Router plane may also be used to plane down upto the centre line.**

- Place the end of the other piece in the housing.
- If the housing is tight pare the sides slightly with the chisel and clean it.
- Assemble the job. (Fig 6)
- Check the accuracy of the inside squareness using try square.

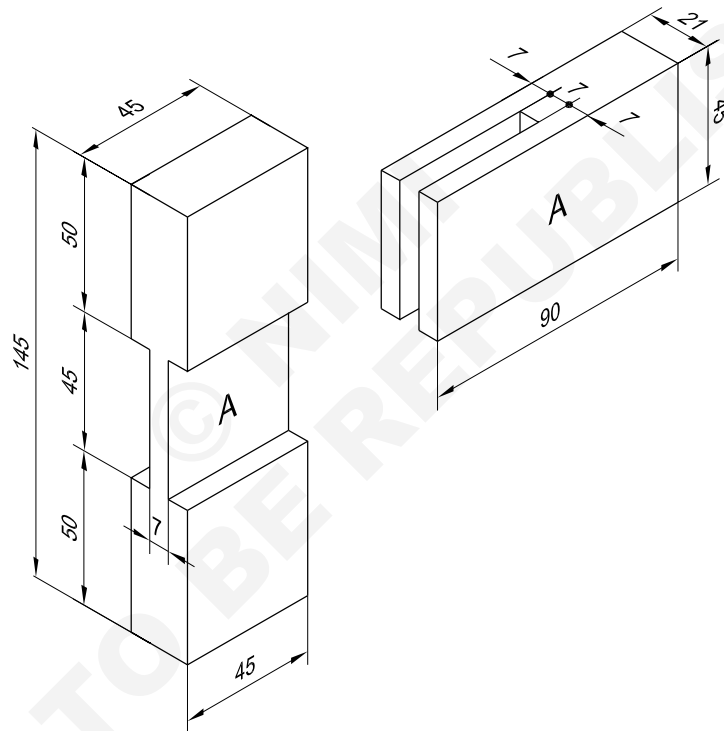




**Bridle joint (tee bridle)**

Objective: At the end of this exercise you shall be able to

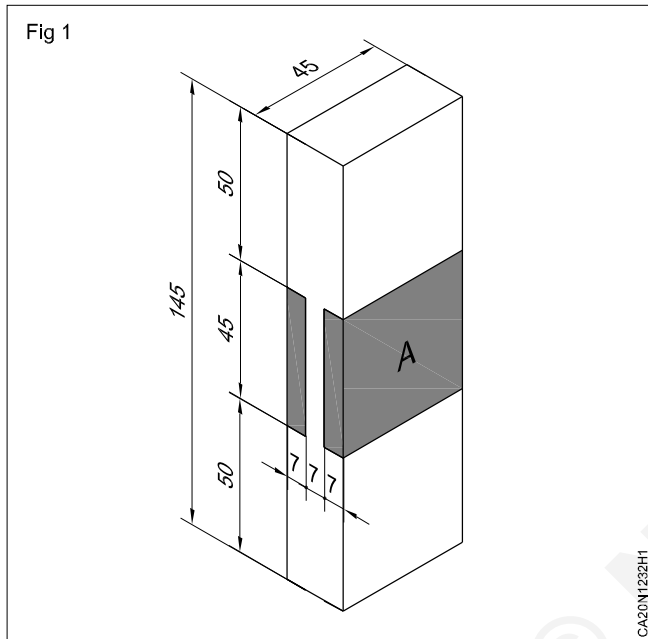
- mark and make the bridle joint



1	50x25x250mm		HARD WOOD			
1	50x25x300mm		HARD WOOD			1.2.32
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>BRIDLE JOINTS ( TEE BRIDLE)</b>				TOLERANCE $\pm 2.0$ mm	TIME 2hrs
					CODE NO. CA20N1232E1	

## Job Sequence

- Check the wooden pieces for its size using four fold woodenrule.
- Plane the material to the required size as per drawing using jack plane.
  - 45 x 21 x 150 - 1 No.
  - 45 x 21 x 150 - 1 No.
- Measure and mark job as per drawing using scribe, try square and mortise gauge. (Fig 1)

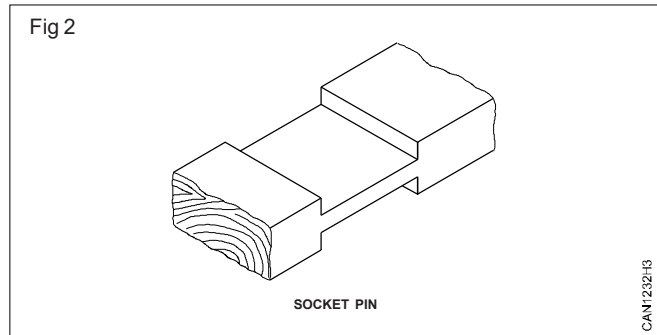


### Make the socket pin

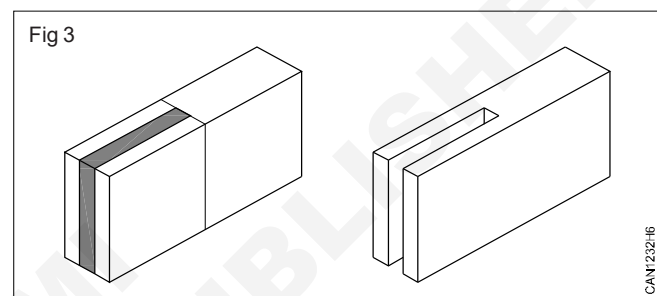
- Hold the socket pin piece in the vice horizontally and with tenon saw cut the shoulder portion to a depth of 7mm (upto the gauge line) on right and left sides.
- Reverse the socket pin piece and hold it horizontally in the vice.
- Cut the shoulder lines upto the gauge line 7mm on both sides (right and left) using tenon saw.
- Chisel off the waste portion slowly and carefully finish the trench surface on the face side and on its reverse side. (Fig 2) using firmer chisel.

### Make the socket

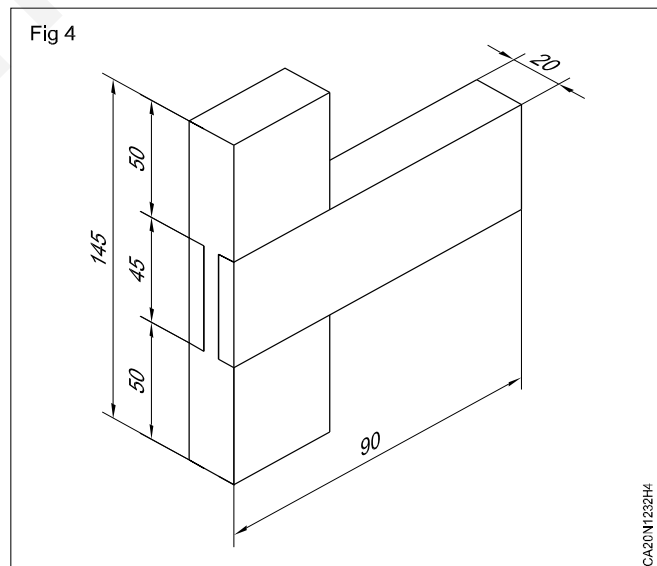
- Hold the socket piece in the carpenter's vice.
- Keep the saw near to the marked line.



- Start sawing up to the shoulder line. Saw near to the gauge lines. (Fig 3)
- Chisel off the waste portions and remove the excess wood and smoothen it flat.



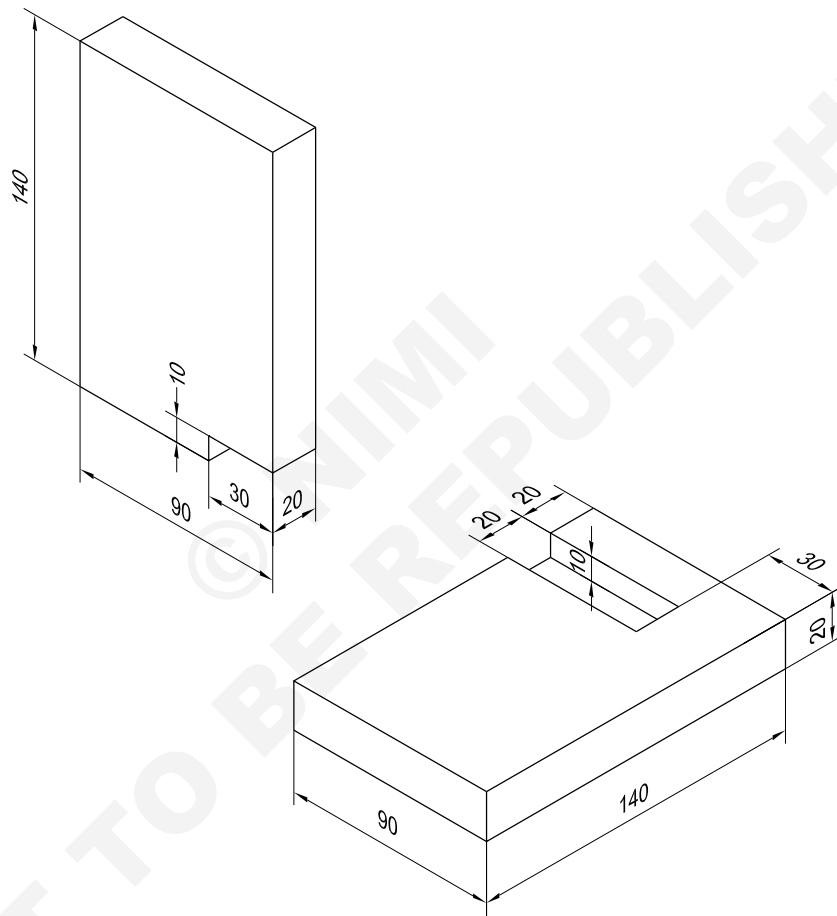
- Finish the socket surface
- Assemble the socket pieces with the pin piece by joining it gently.
- Finish the job using smoothing plane. (Fig 4).

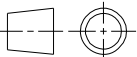


Stopped housing joint

Objective: At the end of this exercise you shall be able to

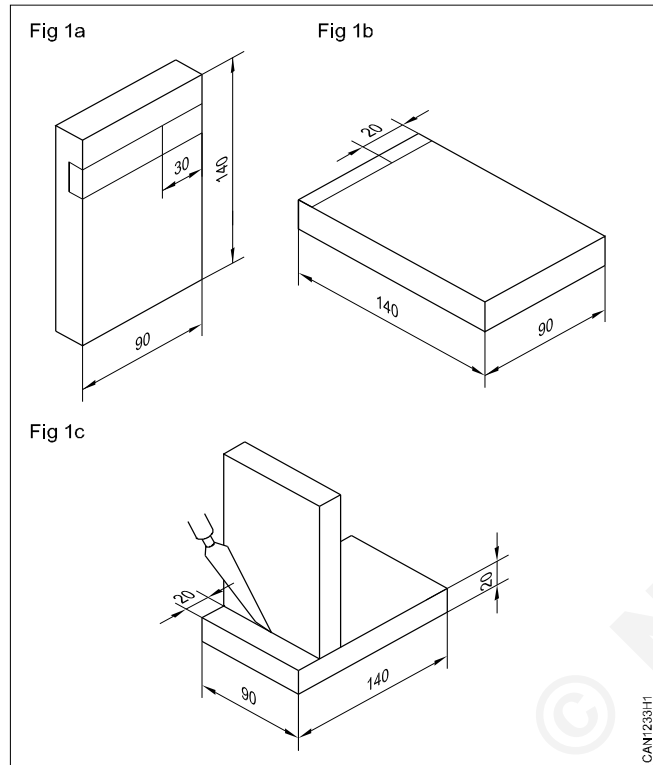
- mark and make a housing joint with stop shoulder and stop pin.



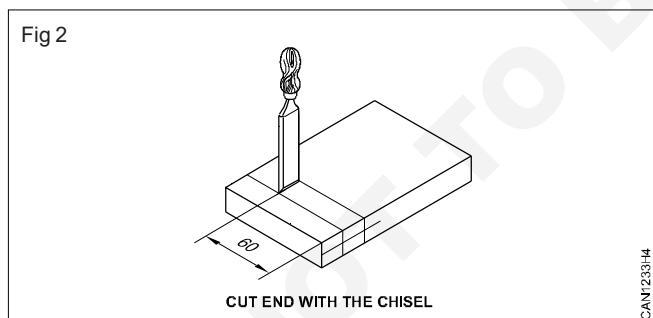
1	100 x 25 x 300mm		HARD WOOD			1.2.33
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>STOPPED HOUSING JOINT</b>				TOLERANCE ±2 mm	TIME 2hrs
					CODE NO. CA20N1233E1	

## Job Sequence

- Check the wooden piece and plane to the required size (90x20x300 mm) as per the drawing
- Cut the plank into two pieces with a tenon saw and finish the size of 90 x 20 x 140mm with square end.
- Mark the dimensions on the job as per drawing using try square, scribe and marking gauge. (Fig 1a & 1b and 1c)



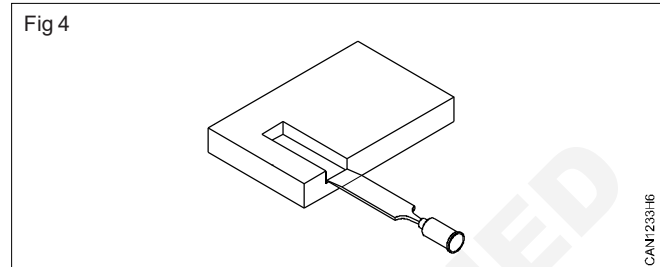
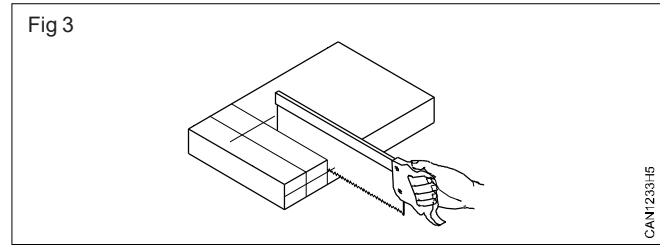
- Cut the end of the grain near the shoulder with firmer chisel. (Fig 2)



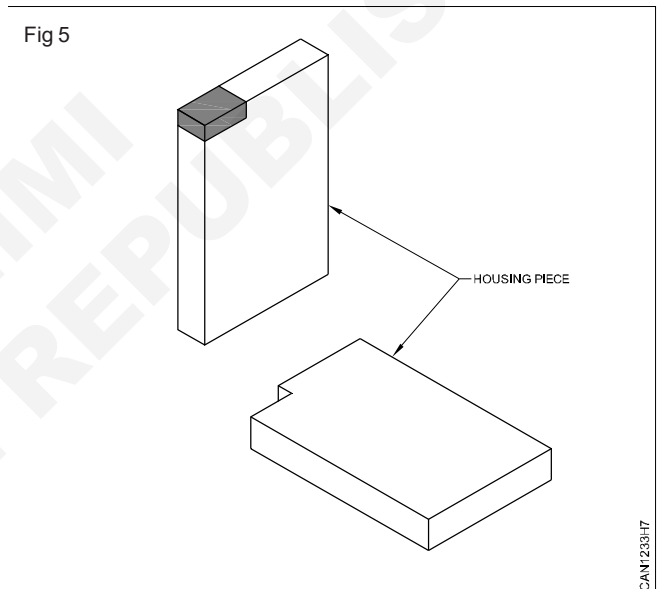
- Cut the sides of the grain with tenon saw down to the centre line. (Fig 3)

**Care should be taken to see that the cut is not extended beyond the shoulder line.**

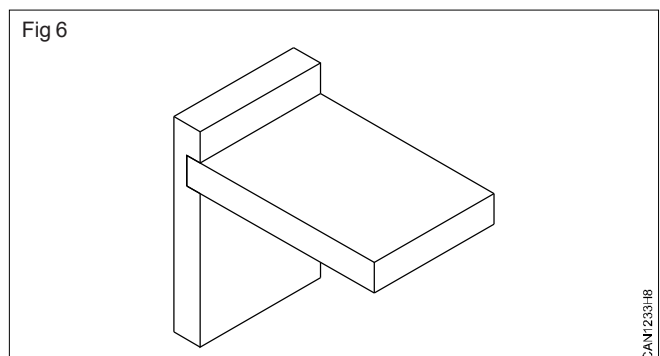
- Remove the excess wood with firmer chisel (19mm), square the shoulder. (Fig 4)
- Mark the shape of shoulder on housed pin piece i.e. 60 x 20 x 10mm.



- Place the wood in the vice and remove the excess material (30x20x10) with the Tenon saw. (Fig 5)

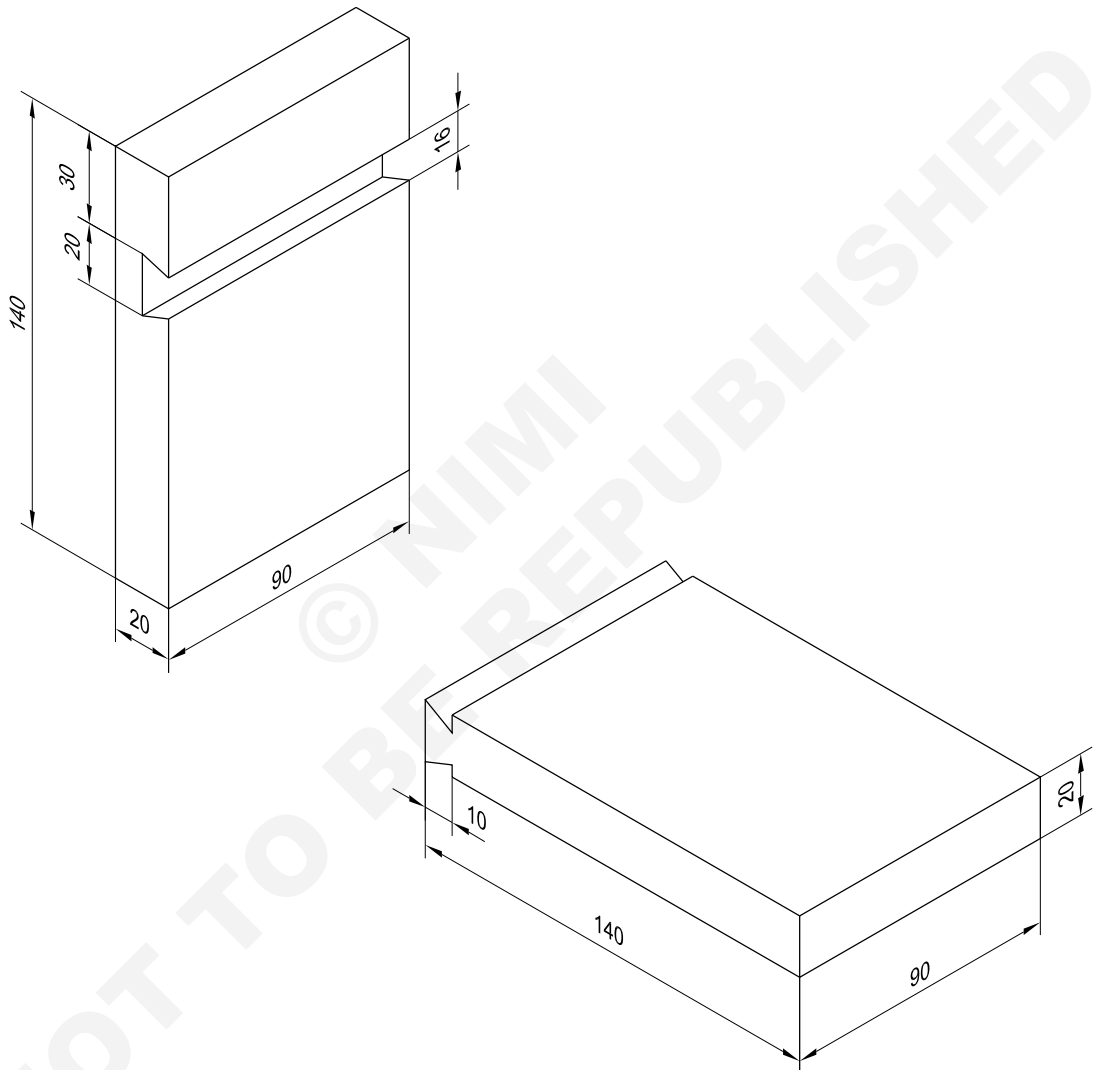


- Smooth the shoulder of pin and finishing with a firmer chisel.
- Assemble both the pieces together and finish the job. (Fig 6)
- Check the squareness of the job using try square. (Fig 6)



**Dovetail housing joint.**

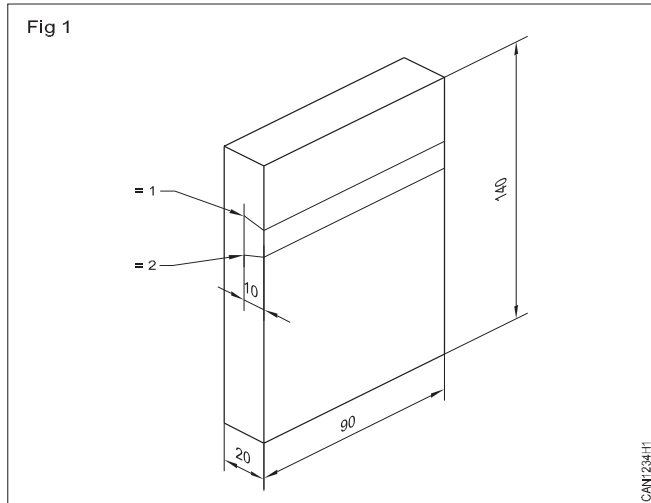
**Objective:** At the end of this exercise you shall be able to  
 • make a housing joint with double side dove tail joint.



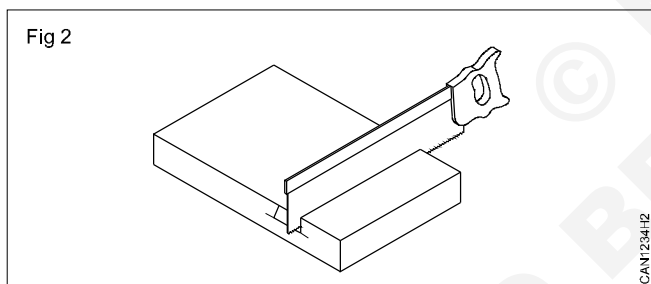
1	100 x 25 x 300mm		HARD WOOD			1.2.34
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DOVETAIL HOUSING JOINT</b>				TOLERANCE ±2 mm	TIME 3hrs
					CODE NO. CAN1234E1	

## Job Sequence

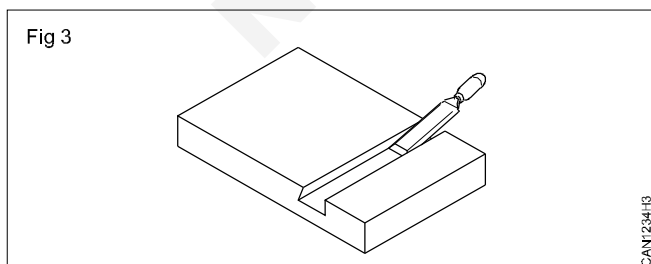
- Check the wooden piece for its size (100x25x300mm)
- Plane it to size (90x20x300mm) using jack plane.
- Hold it in the vice and cut it with a tenon saw into two pieces of size (90x20x140) to square.
- Mark the dovetail outline with the marking knife, folding rule and bevel square as per drawing. (Fig 1)



- With marking gauge scribe the 10mm line on the center of the edge side.
- Place the wood in the vice and with tenon saw cut the dovetail line down to the centre line. (Fig 2)

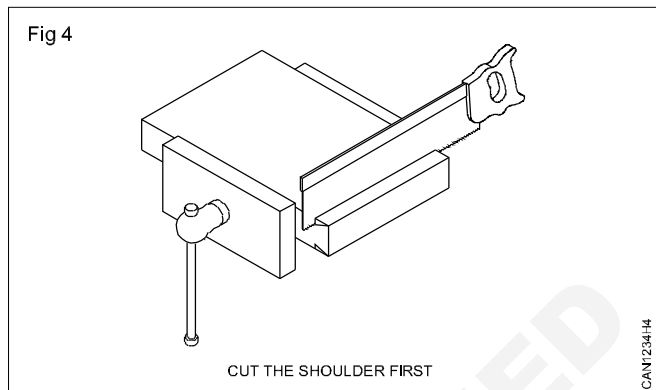


- Cut the straight line portion of the shoulder and then bevelled line. (Fig 2)
- Chisel out the excess wood using bevel edge chisel. (Fig3)
- Clean it with the same chisel and smooth the surface.
- Mark the dovetail shape on the pin piece with try square, knife and bevel square as per drawing.

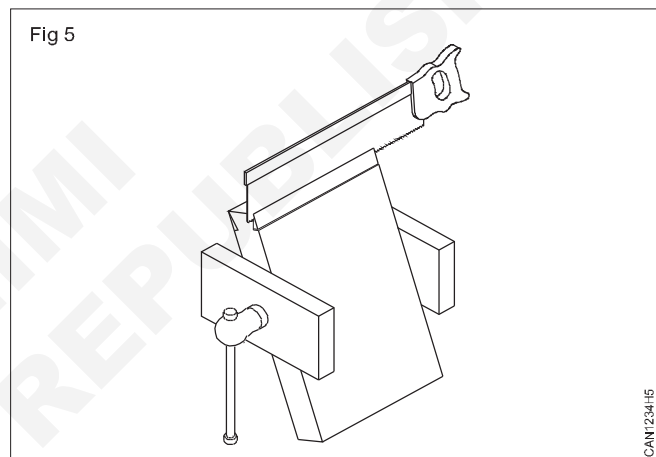


**The shoulder of the dovetail should not be more than one-quarter as deep as the thickness of the stock.**

- Mark cutting line on face and edges of the dovetail.
- Cut the dovetail pin with the Tenon saw. (Fig 4)
- Cut the bevelled line down to the shoulder. (Fig 5)

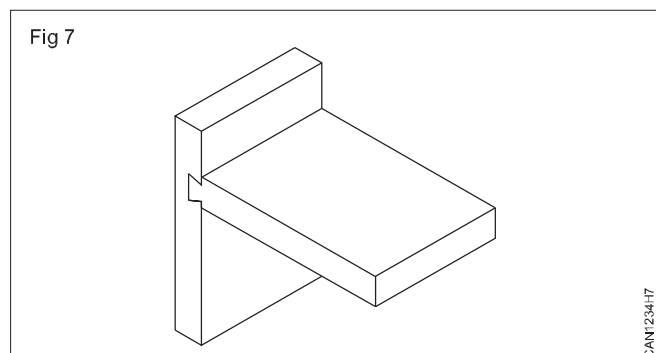
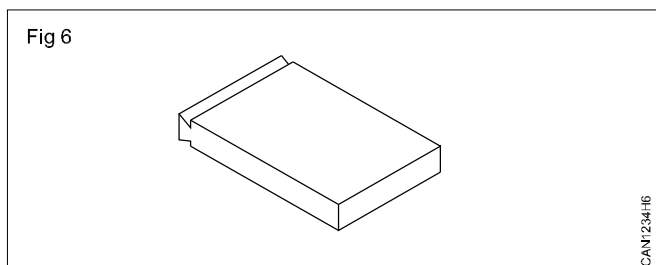


- Finish the corners and smoothen the surface using bevel edge chisel. (Fig 6)



- Assemble the pin piece into the housing piece. (Fig 7)

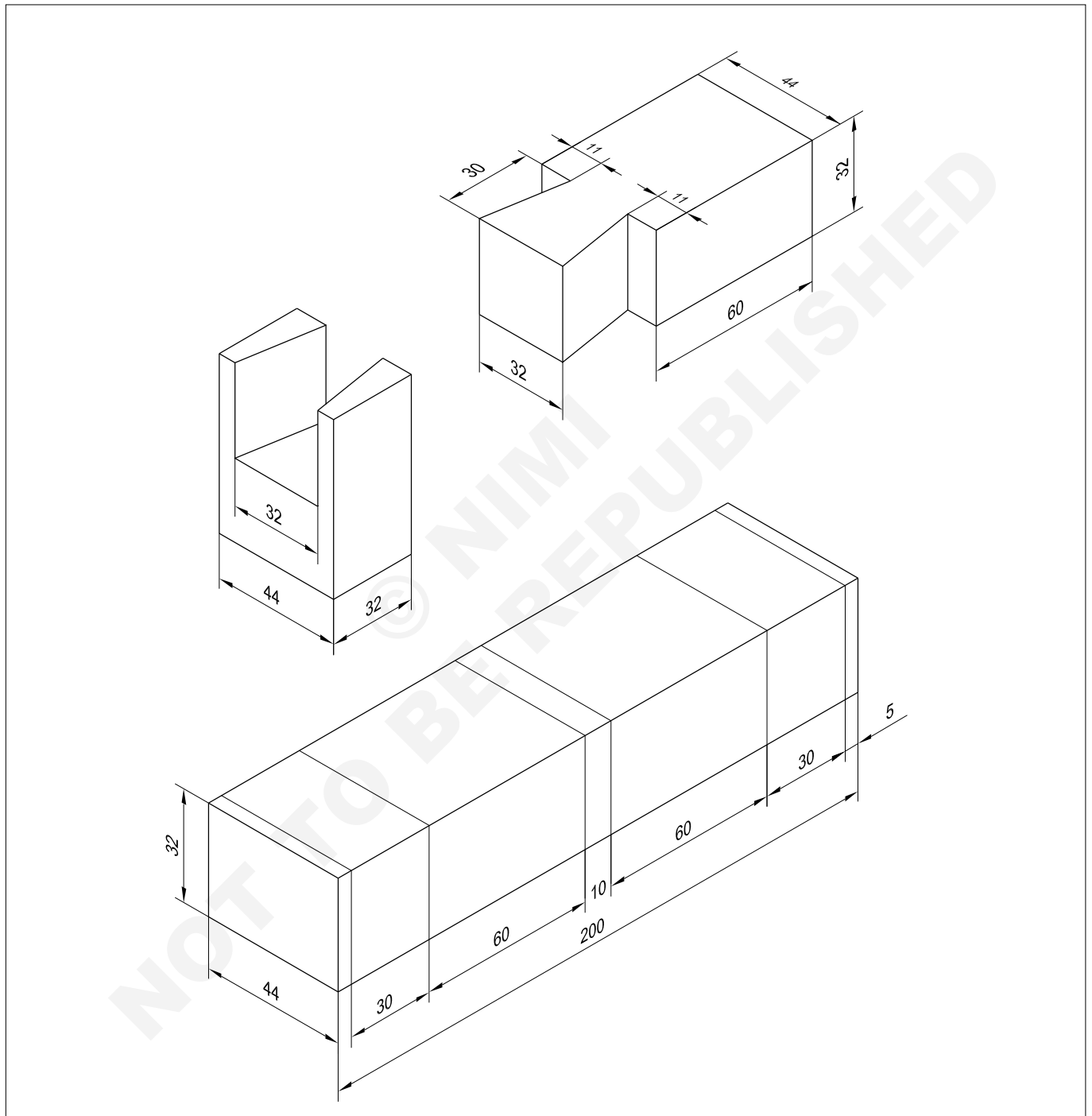
**If the housing is slightly tight pare the sides of the socket with chisel and then refit it.**



Single dovetail joint

Objectives: At the end of this exercise you shall be able to

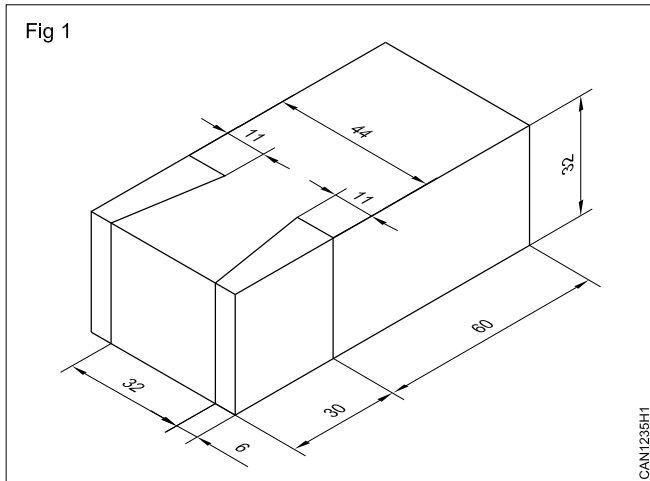
- make a dovetail pin and socket
- assemble and finish the dovetail joint.



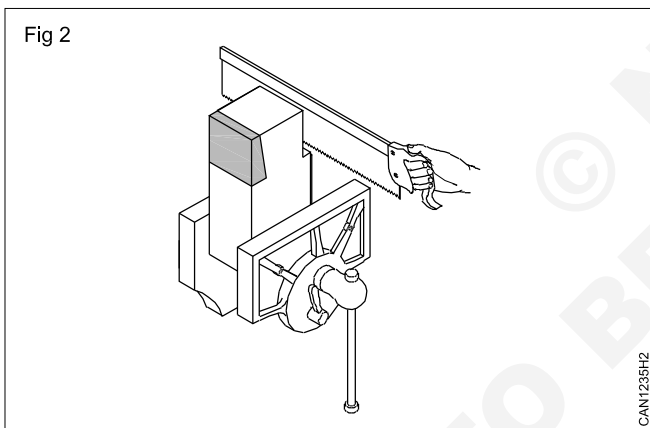
1	50x38x200		HARD WOOD			1.2.35
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>SINGLE DOVETAIL JOINT</b>				TOLERANCE ± 2 mm	TIME 3hrs
					CODE NO. CA20N1235E1	

## Job Sequence

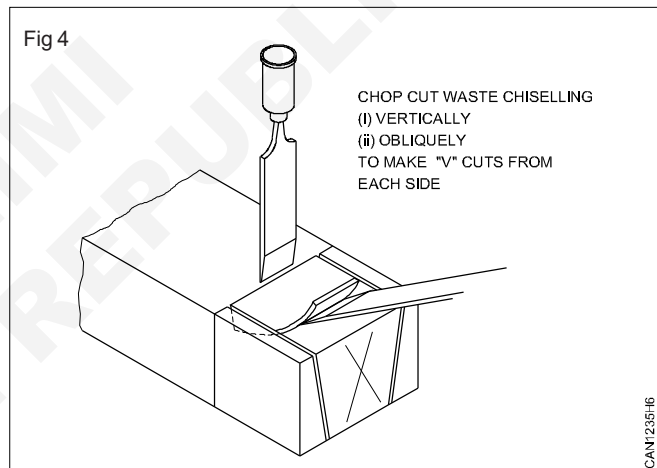
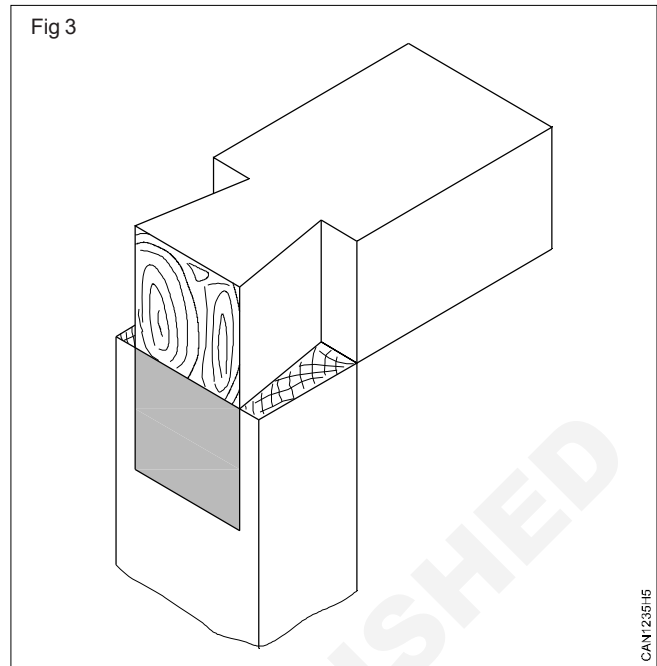
- Check the wooden piece and plane it to size as per the drawing using folding rule try square and jackplane
- Cut all the end wastes and cut it into two pieces of size to square 44 x 32 x 90 - 2 Nos with tenon saw.
- Mark the dovetail pin as per the drawing using proper hand tools (Fig 1)



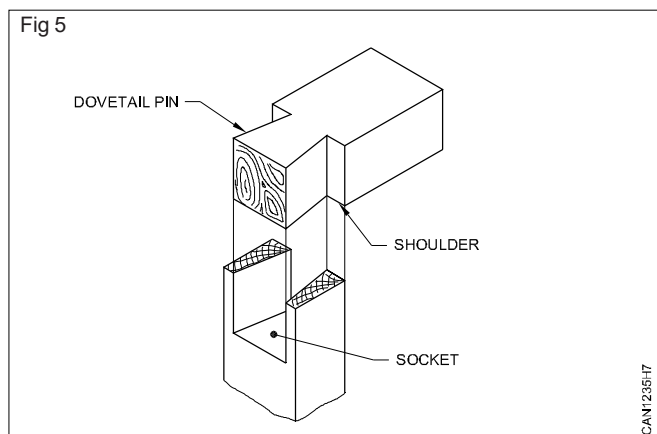
- Cut the shoulders of the dovetail pin using dovetail saw. (Fig 2)



- Cut on the shoulders line with dovetail saw carefully
- Finish the corners and walls of the dovetail pin using bevel edge chisel.
- Place the dovetail pin piece over the socket piece and mark the dimension of the socket. (Fig 3) Mark the measurement on dovetail socket piece as per drawing.
- Rip the sides of the socket sawing the waste side of the lines with dovetail saw.

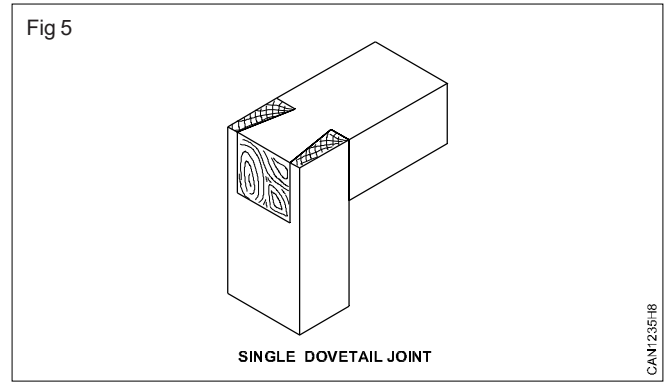


- Pare out the socket surface on waste side of lines. (Fig 4)
- Reverse the socket and chisel away the waste material from the other end.





- Finish the walls of socket and its corners using firmer chisel. (Fig 5)
- Assemble the socket piece and the pin piece together.(Fig6)
- Finish the single dovetail joint (Fig 6)



## Skill sequence

### Dove tail angle

**Objective:** This shall help you to

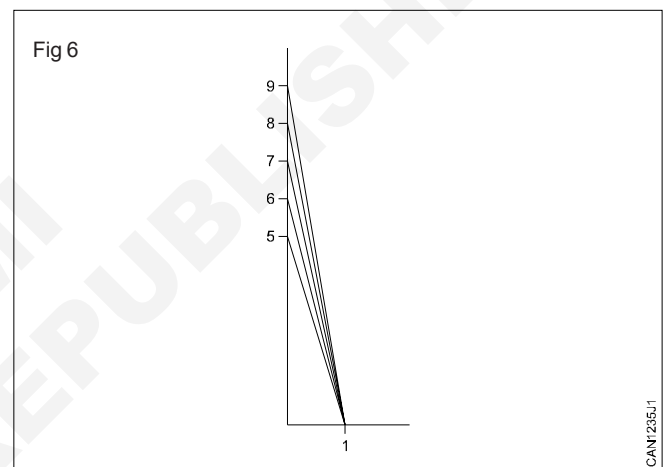
- choose the dove tail angle.

#### **Choosing the dovetail angle**

Draw a line 1cm on the edge of the board horizontally measure 5cm, 7cm 8cm and 9cm perpendicular to the 1cm horizontal line.

Connect the 1cm point to the perpendicular 5 to 9 points as shown.

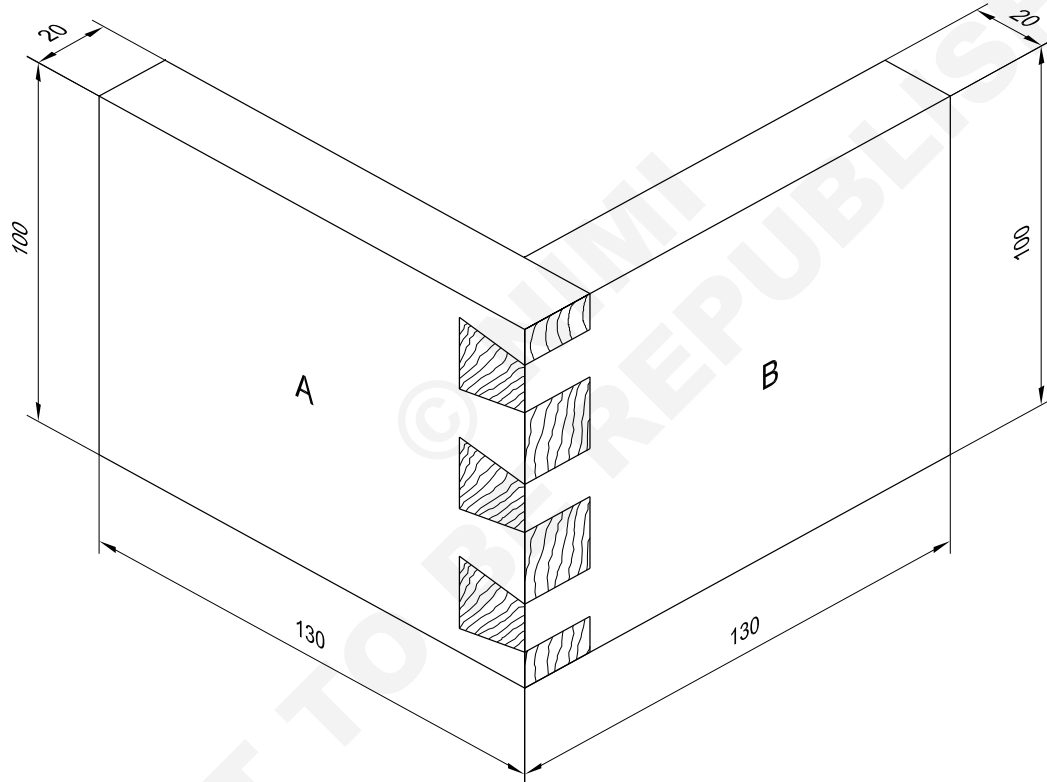
Choose any one of these angles as dovetail (Fig 1)



**Common dovetail joint**

**Objective:** At the end of this exercise you shall be able to

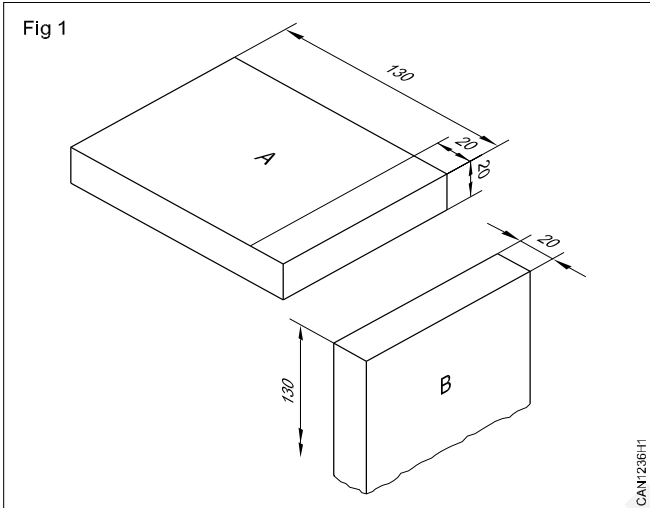
- make a common dovetail joint.



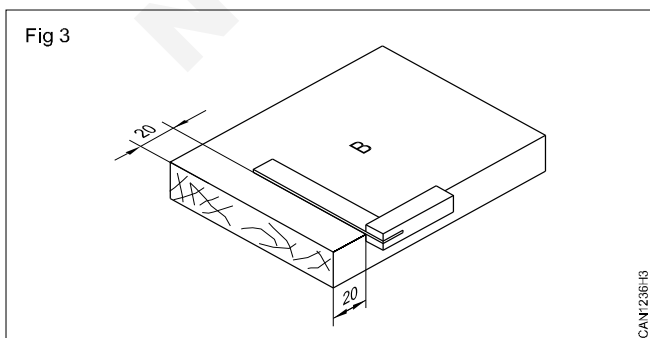
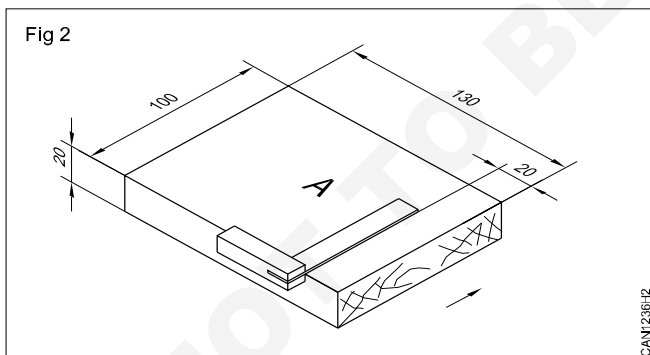
1	120x25x300mm		HARD WOOD			1.2.36
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>COMMON DOVETAIL JOINT</b>				TOLERANCE ± 2 mm	TIME 3hrs
					CODE NO. CA20N1236E1	

## Job Sequence

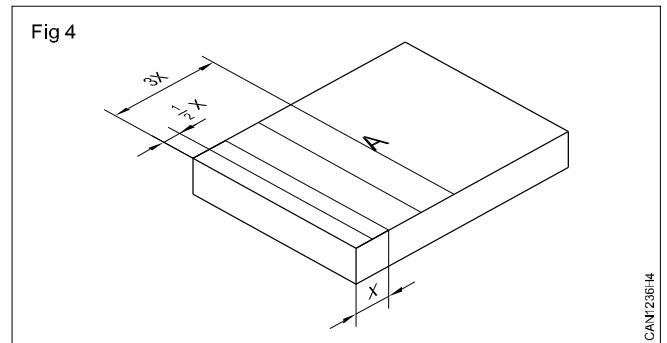
- Check the wooden piece and plane to size as per the drawing
- Cut it into two pieces of size 100x20x130mm using tenon saw
- Mark the thickness of one part is to be marked on the other part. (Fig 1) of the piece.
- Keep the stock of the try square against to the face edge mark the thickness of 20mm all around the first part.



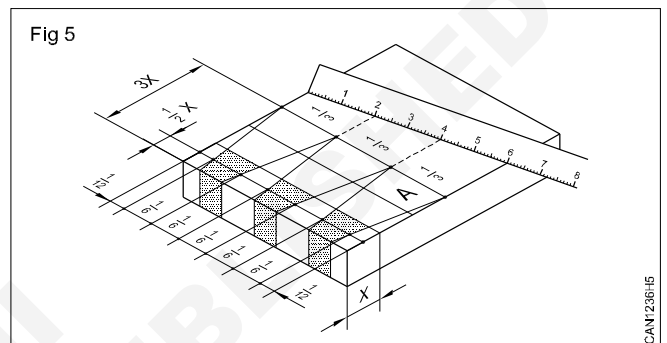
- Similarly mark the thickness of the first part on the second piece of piece with try square. (Fig 2&3)
- Use a try square to draw marking out lines at distances of half the thickness in the first part. Let the lines be marked all around the part. (Fig 4)
- Divide the line drawn at 3 times thickness into 3 equal parts.



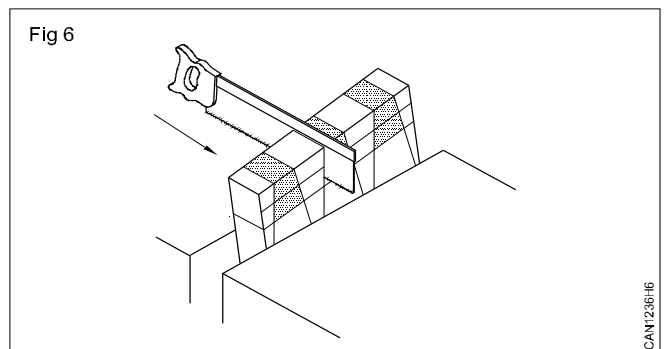
- Again divide this line into 6 equal parts starting and ending with a 1/12 part of distance. (Fig 5)



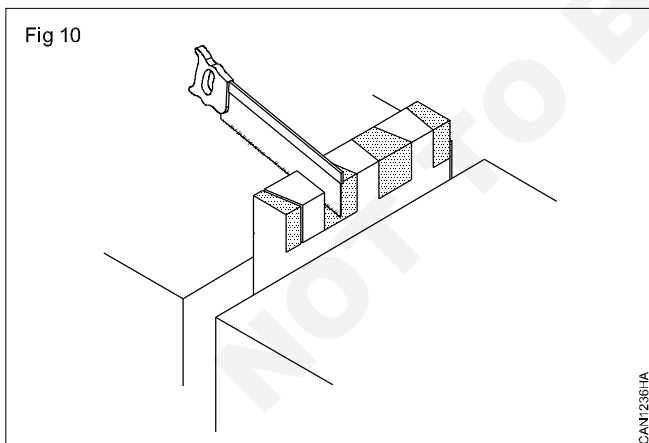
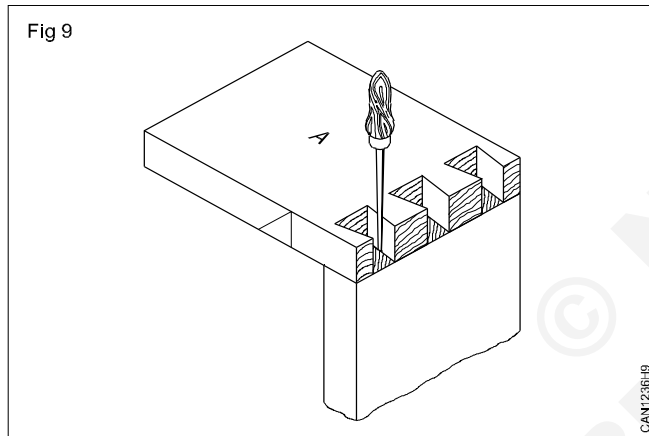
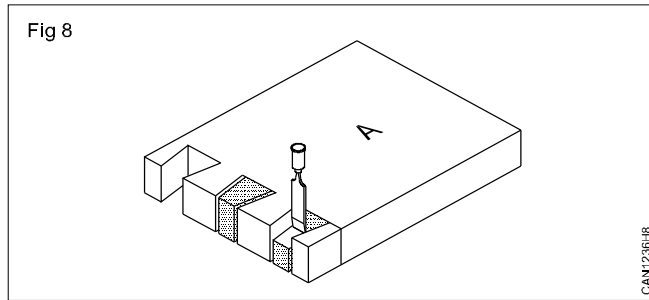
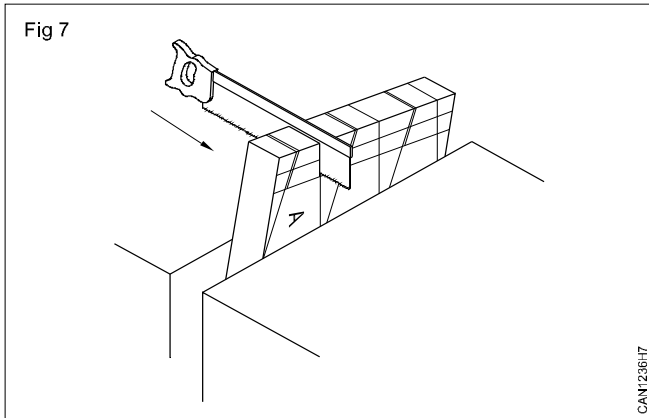
- The sloping lines are drawn with a pencil. Join the end and the line at a distance of 3 times thickness.



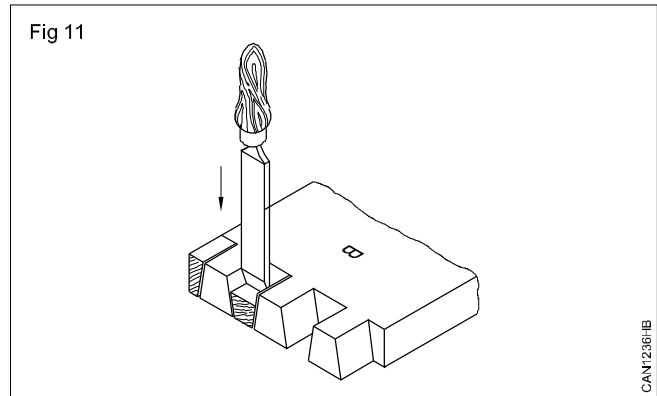
- Continue these lines on the end grains using a try square. Draw sloping lines at its back.
- Fix the piece vertically in the vice. Cut the walls of dovetail pin using dovetail saw. (Fig 6)
- Saw on the waste side of the marking out line. Saw perpendicularly to the sides of piece and upto the gauge line. (Fig 7)



- Chisel out the waste of dove tail pin with bevel edge chisel or firmer chisel. (Fig 8)
- Cut out small pieces of waste until gauge line is reached. Repeat the same procedure for the other dovetail pin also.
- When the pin member is ready make it rest on the socket piece end side, holding it in vice as shown in Fig 9.
- Hold the dovetail pin in the left hand and with right hand mark out the profile of the dovetail with a scriber on the socket piece.
- Hold it in the vice and with dovetail saw cut the walls of the dove tail sockets. (Fig 10)

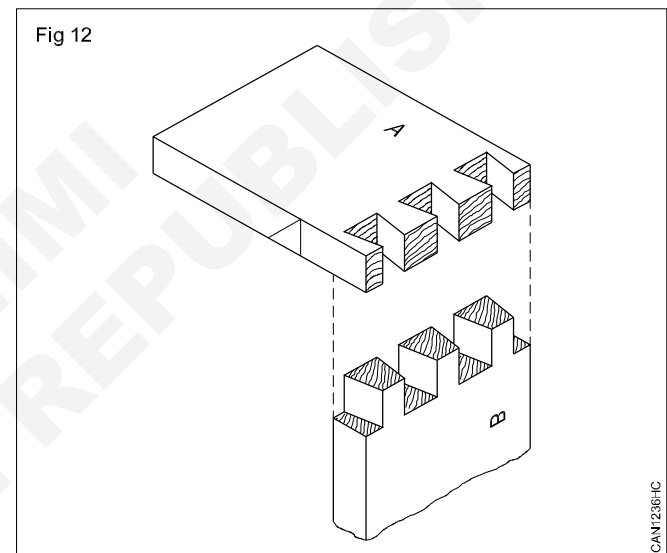


- Saw on the waste side of the line.
- Chisel the waste of dove-tail sockets carefully using firmer chisel. (Fig 11)
- Take care to see the side walls are not damaged. (Fig.11)
- Assemble the pin and socket pieces together properly.
- Check the squareness and flatness of the job.

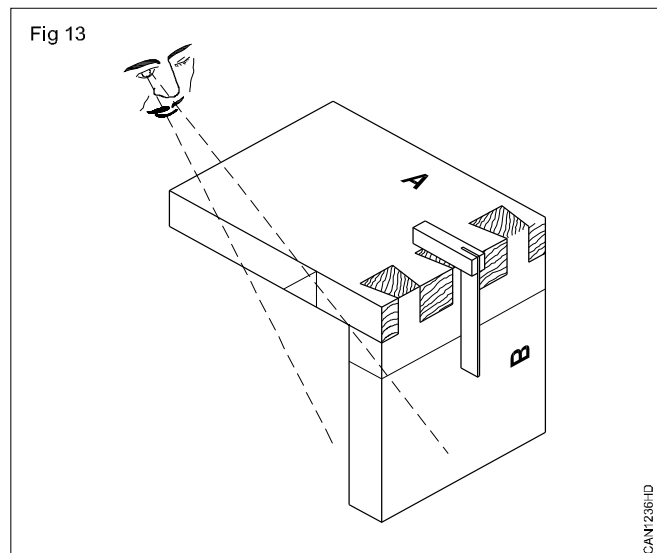


- Finish the job smoothly using smoothing plane.
- If the fit is tight trim it with a bevel edge chisel and remove the excess material.
- See that there is no “play” between the joints. (Fig 12)

**Play is the free movement between the two parts of the joint due to the fact that they do not fit properly.**



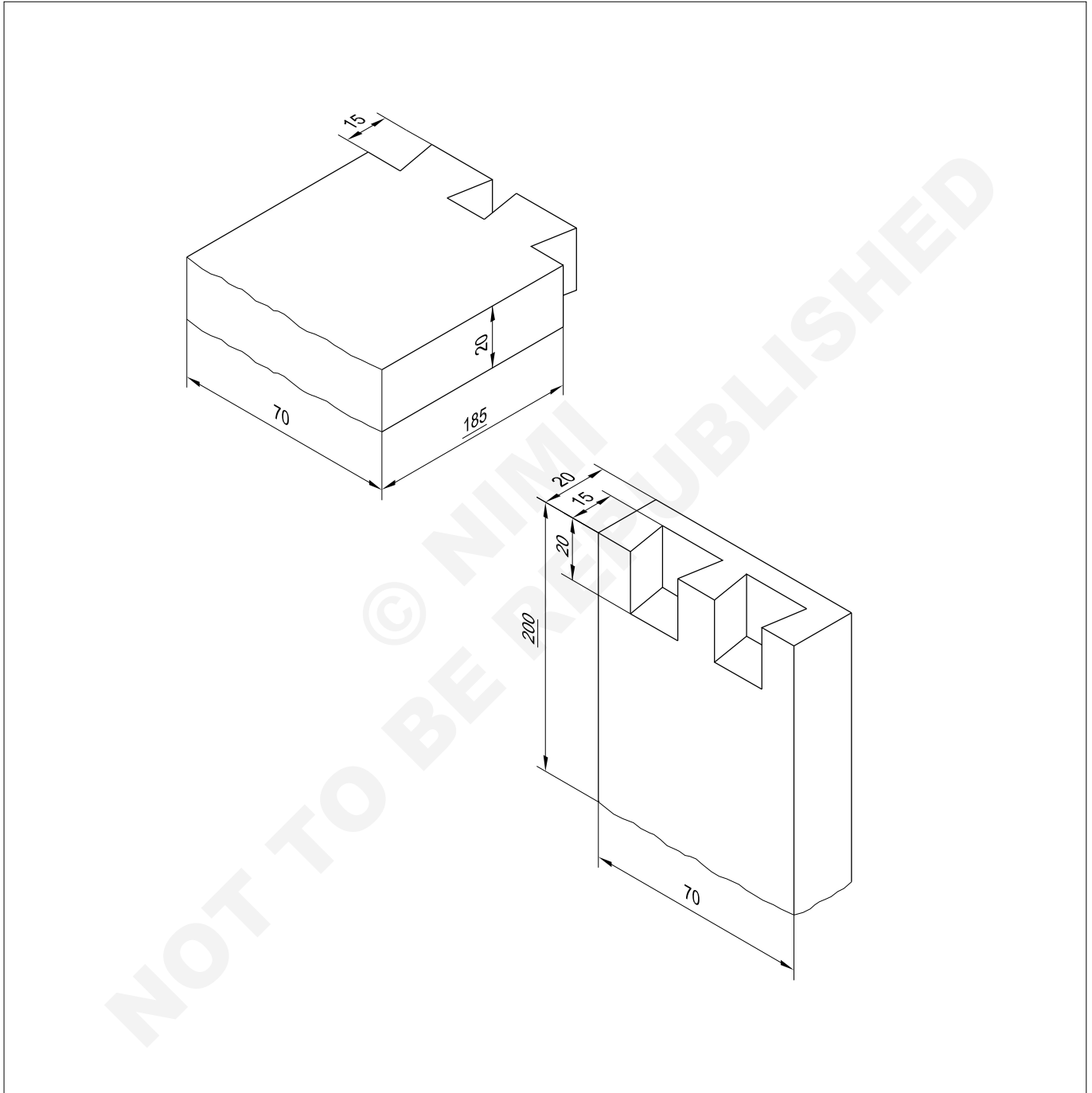
- Check the squareness of the job. Check the flatness of the edges. (Fig 13).
- After assembly the work piece should be planed smoothly.



Lapped dovetail joint

Objective: At the end of this exercise you shall be able to

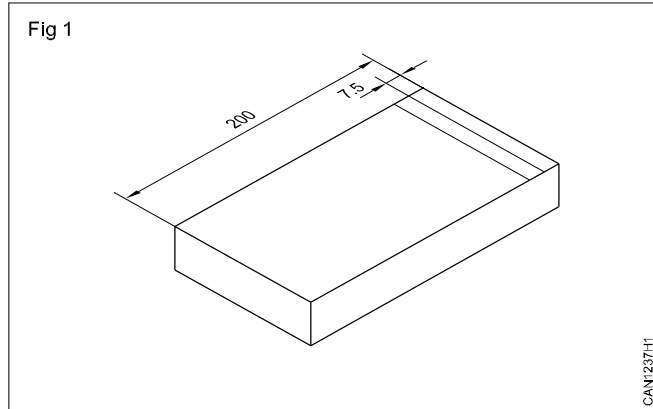
- make a lapped dovetail joint.



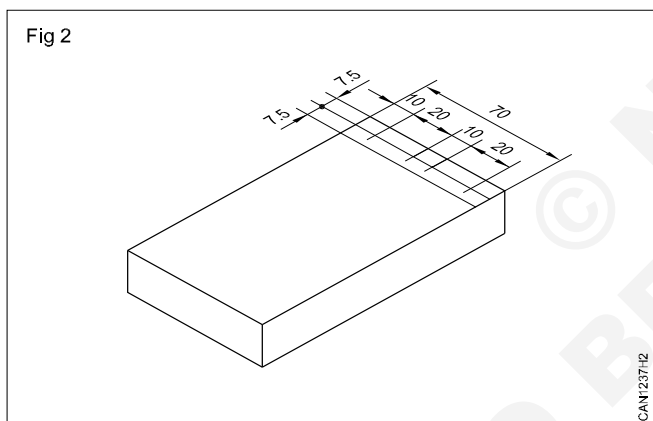
2	75 x 25 x 225mm		VEN TEAK WOOD			1.2.37
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:2	<b>LAPPED DOVE-TAIL JOINT</b>				TOLERANCE ±2.0 mm	TIME 3hrs
					CODE NO. CA20N1237E1	

## Job Sequence

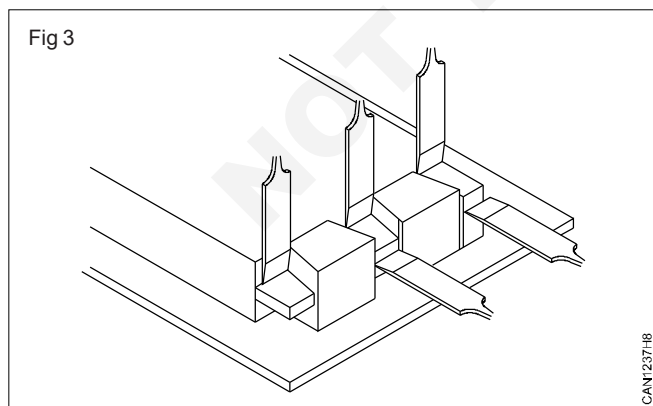
- Check the wooden pieces using folding rule
- Plane it to the required size of 70x20x225mm - 2 Nos. as per drawing
- Mark and cut the plank lengths of 200mm - 2 Nos. (Fig 1)



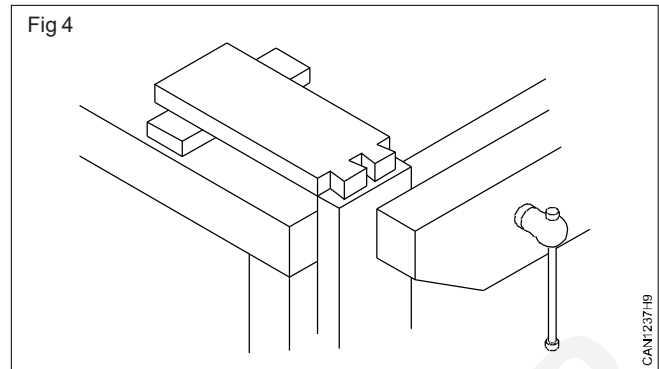
- Saw off the waste end and finish it to square.
- Mark the dove tail pin as per the drawing (Fig 2) Refer to Ex. No 1-2-36



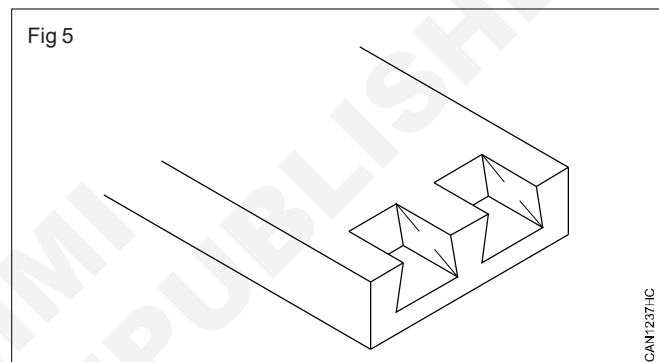
- Make the dovetail pin as per the drawing (Fig 3) refer No Ex no 1.2.36



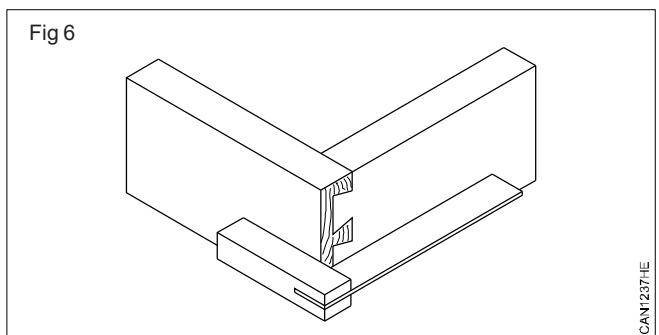
- Mark the doretail socket (Fig 4) as per the drawing refer Ex no 1.2.36



- Make the dove tail socket as per the draw in (Fig 5) refer to Ex no 1.2.36



- Assemble the pieces together properly (Fig 6)
- Check the joint for the squareness and evenness using try square (Fig 6)
- Finish with smoothing plane



Secret mitre dovetail joint

Objective: At the end of this exercise you shall be able to

- make a secret mitre dovetail joint.

2	100 x 25 x 300mm		VEN TEAK WOOD			1.2.38
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>SECRET MITRE DOVETAIL JOINT</b>				TOLERANCE ± 2 mm	TIME 3hrs
					CODE NO. CA20N1238E1	

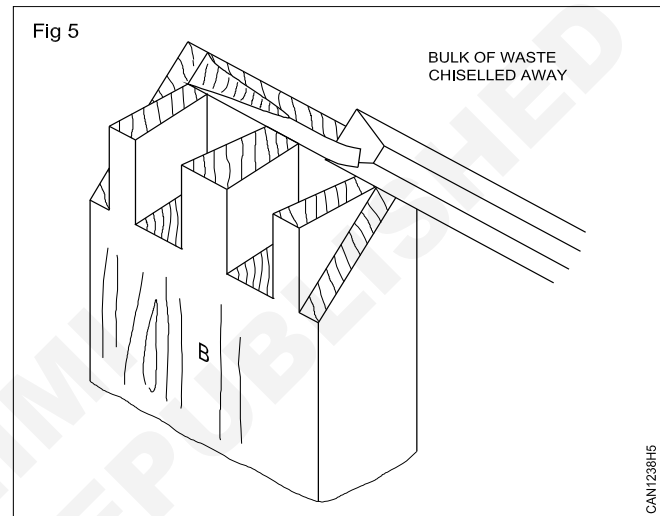
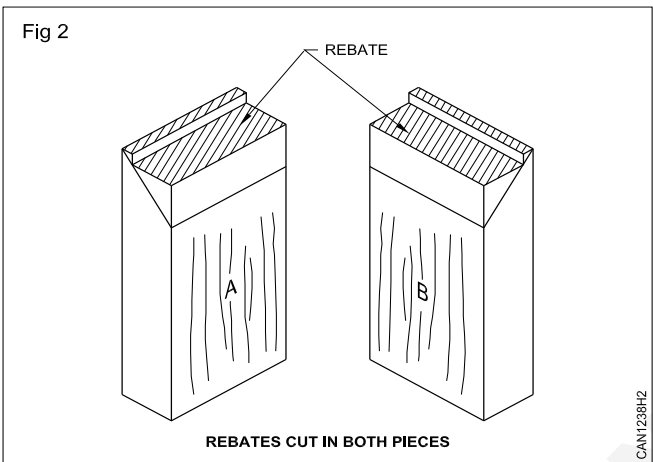
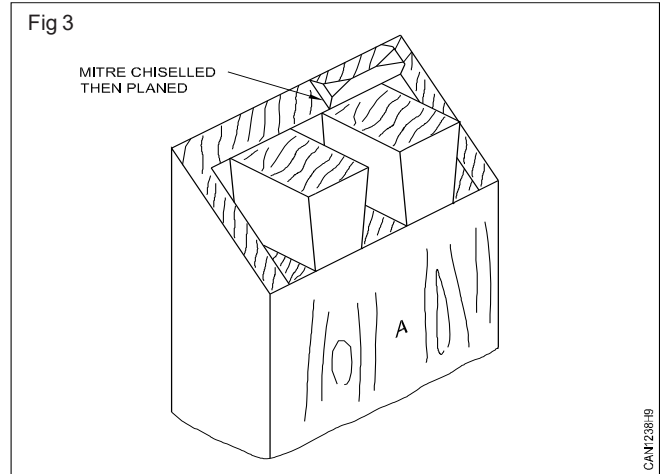
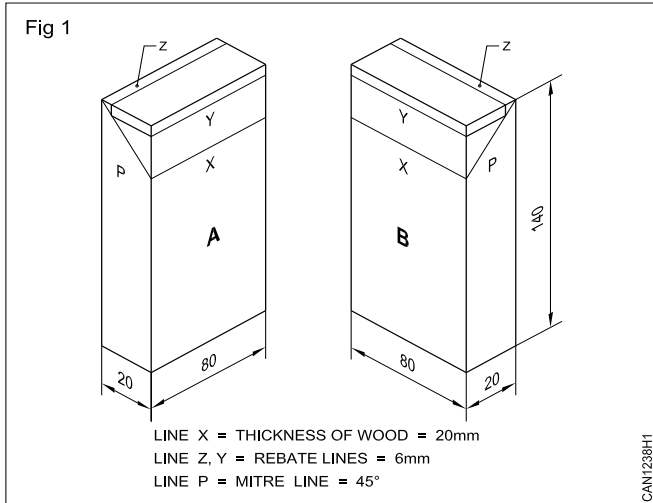
Job Sequence

- Check the wooden pieces with wooden rule.
- Plane it to size as per the drawing
- Finish both the pieces to the required size of 80 x 20 x 140 mm = 2 No (Fig 1)
- Mark a line on one end of the piece equal to the thickness of the job as per the drawing (Fig 1)

**While making this joint the pin parts must be cut first**

- To form a lap on both sides rebates have to be cut 6 mm.

- Mark the lines of the rebate as shown in Fig 1 using folding rule, try square and marking gauge.
- Mark the mitre line on the edges of the job. (Fig 1) using bevelsquare.
- Cut the rebate on both sides and finish it properly (Fig 2)
- Cut the pin part correctly and finish it properly
- Cut out the corner mitre on both sides and finish it properly. (Fig 3)
- Mark and make the socket part as per the drawing Fig 4 (Refer to Ex no 1.2.36)



- Finish socket piece neatly and properly.
- Assemble the pieces together by gently tapping it with mallet.

- Finish the joint as per the drawing.

## Skill sequence

### Dovil tail angle

**Objectives:** This shall help you to  
 • mark the dove tail angles.

#### Marking sequence

Draw 3 lines on the wooden piece ie  $\frac{1}{2} \times X$  and  $2X$  as shown in Fig 10 where X is the thickness of wood. (Fig 1)

Z is the width of plank .

Z should be divided into possible number of equal distances.

In this case  $Z = 80$

To get the no. divide  $Z/X = 80/24 = 3.33$

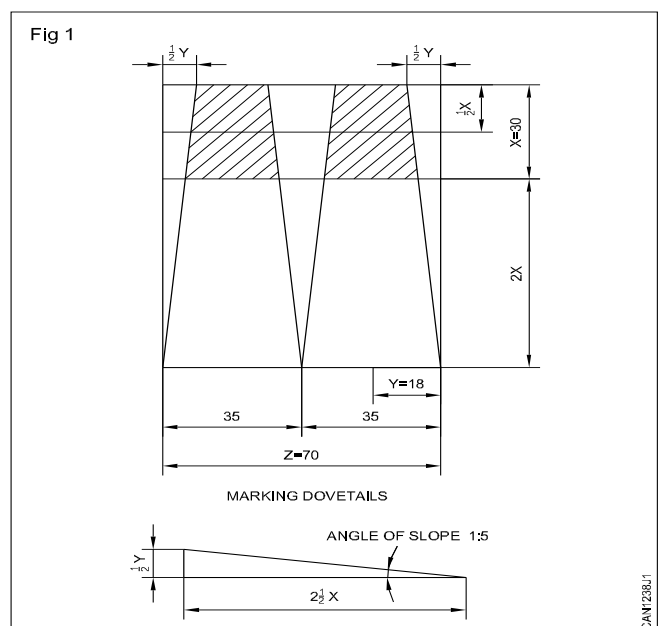
Round it off to nearer even number i.e 4.

Divide the width into four approximately equal parts which is Y here.

Join  $\frac{1}{2}Y$  distance at the top on both edges from the extreme points of 3 x distance.

Join the middle point i.e.  $2Y$  as shown.

Check the raw material for its size.

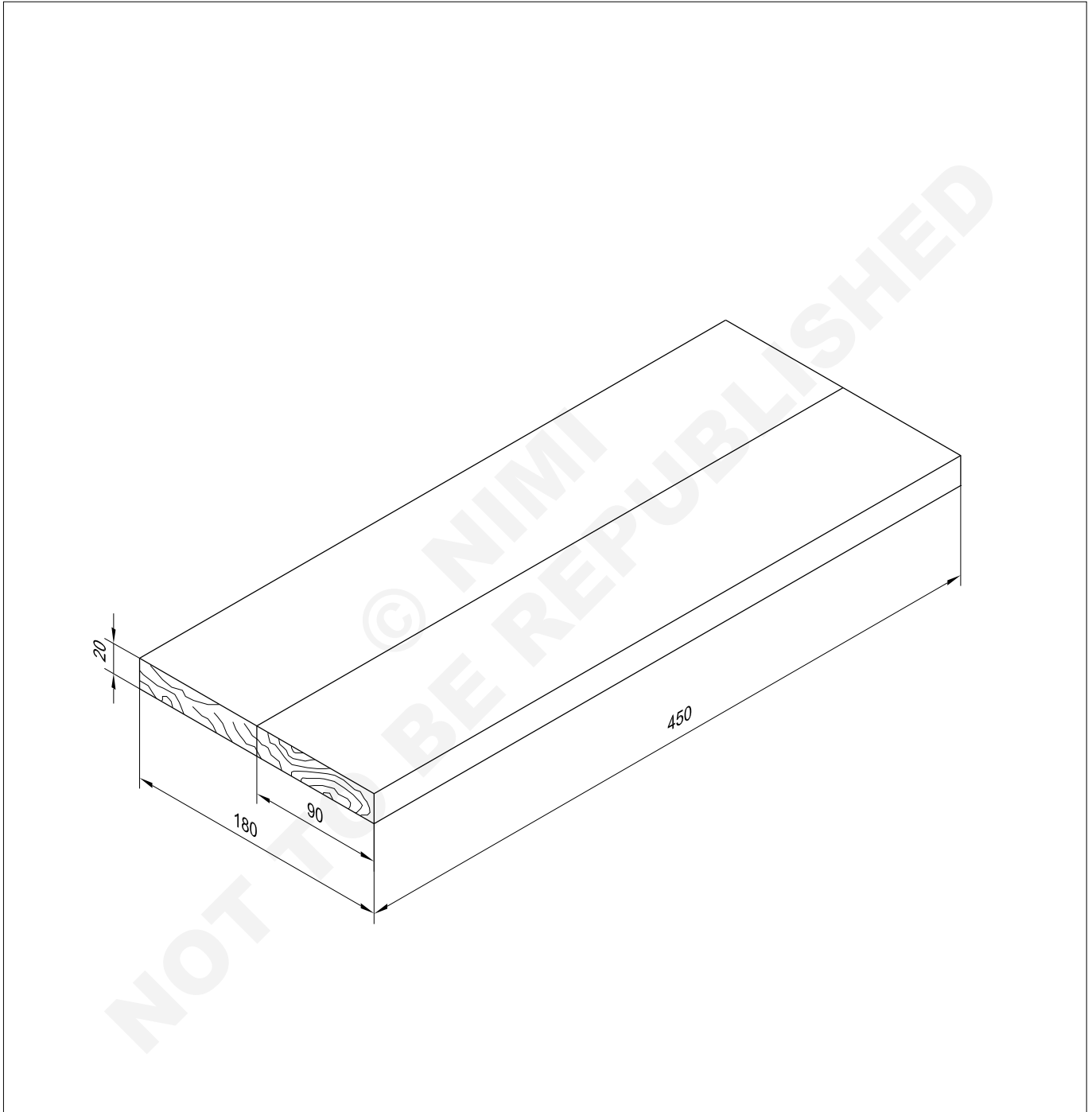




Simple butt joint

Objectives: At the end of this exercise you shall be able to

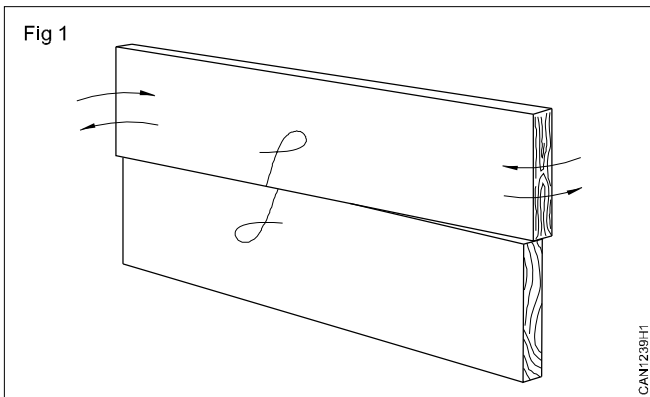
- make a simple butt joint.



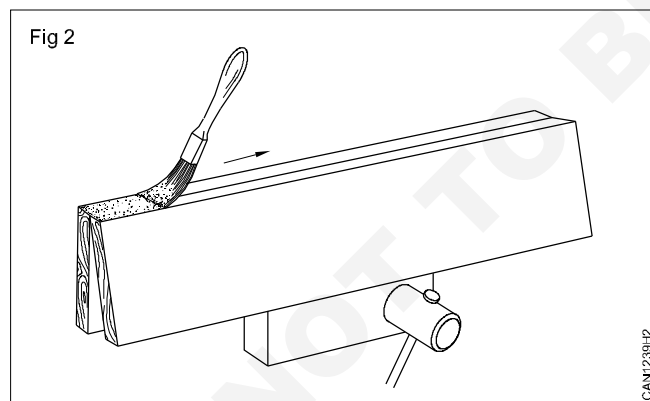
1	50grms		FEVICOL			
2	100 x 25 x 460mm		HARD WOOD			1.2.39
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>SIMPLE BUTT JOINT (BROADENING JOINTS -1)</b>				TOLERANCE ± 2 mm	TIME 2hrs
					CODE NO. CAN1239E1	

## Job Sequence

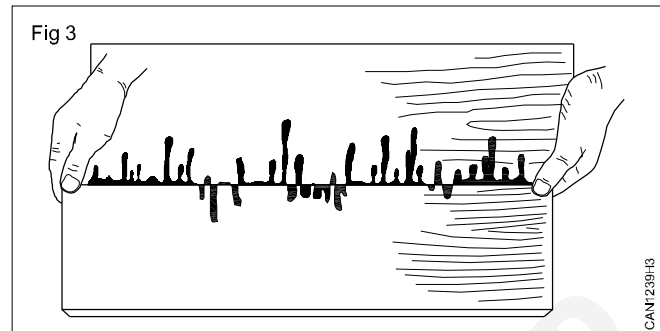
- Check the wooden pieces for its size using four fold wooden rule.
- Plane it to size of 90 x 15 x 450mm - 2 Nos using jack plane.
- Check its flatness, squareness and trueness of the face side and face edge using Try square and winding strip.
- Keep one piece over the other and check the alignment. (Fig 1)



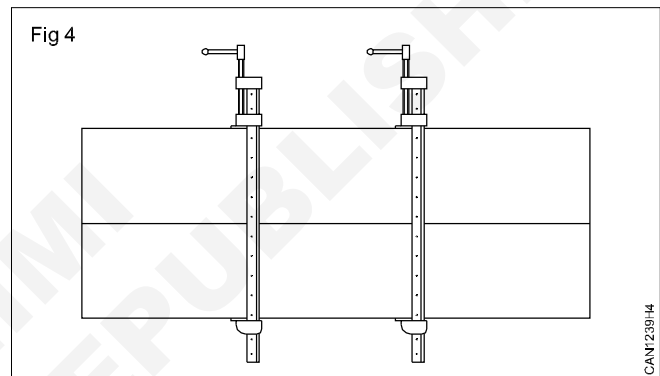
- Hold the straight edge on the back of the two pieces and check the flatness.
- If not square, plane the higher side of the part and finish it.
- Hold the two pieces in the vice keeping edge side upward and make parallel to each other.
- Apply fevicol on the face edges of both the plank uniformly. (Fig 2)



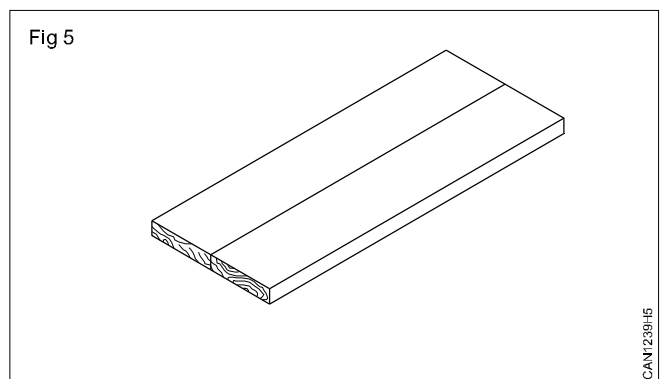
- Take the upper piece and put it on the bottom piece.
- Rub it three or four times to squeeze the fevicol into the grains. (Fig 3)



- Keep the two planks pressed in a 'T' clamp on both right and left sides. (Fig 4)



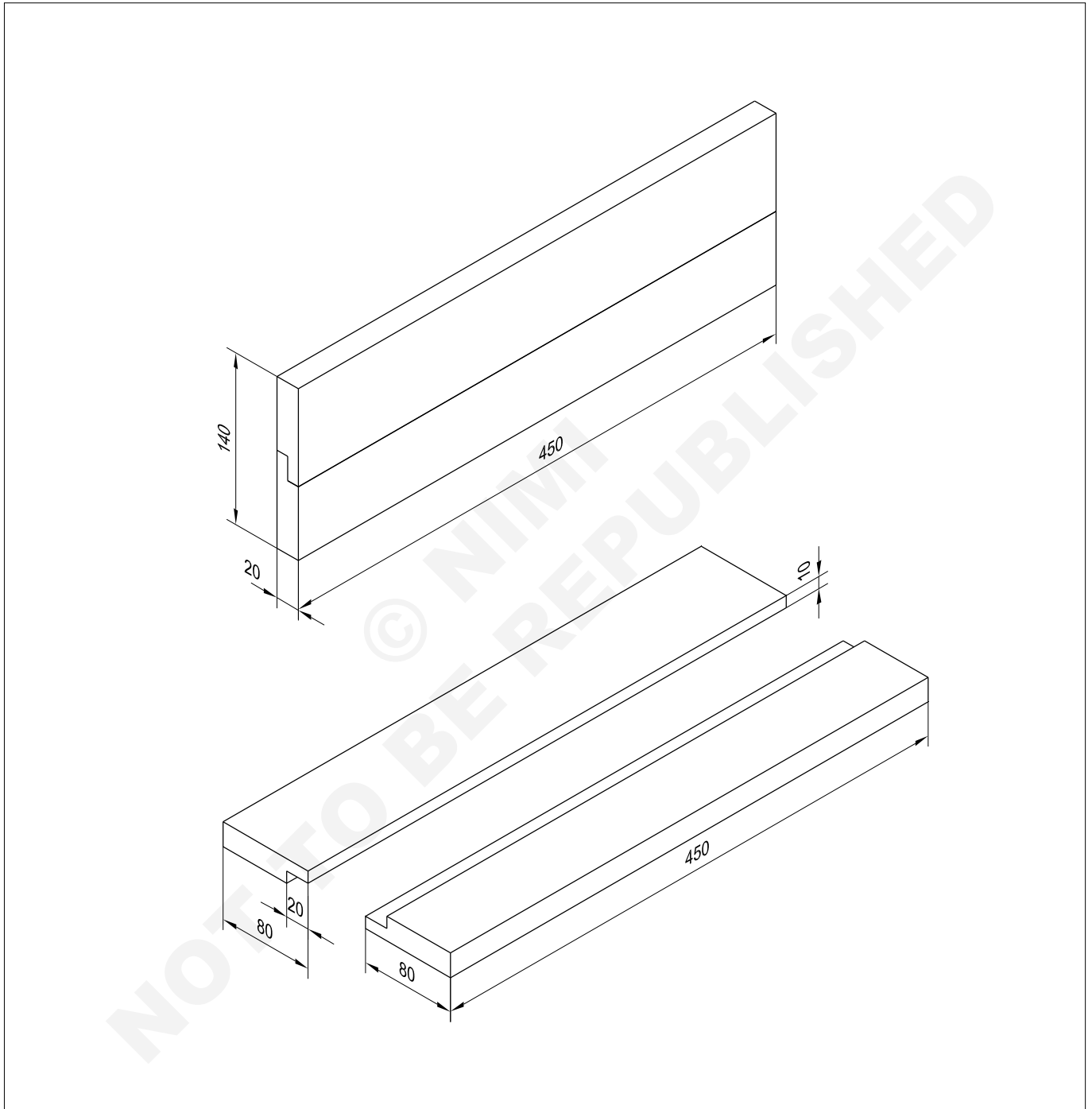
- Allow the fevicol to dry.
- Remove the 'T' clamp from plank.
- Finish the surface of the joint using the smoothing plane. (Fig 5)



**Rebate butt joint**

**Objective:** At the end of this exercise you shall be able to

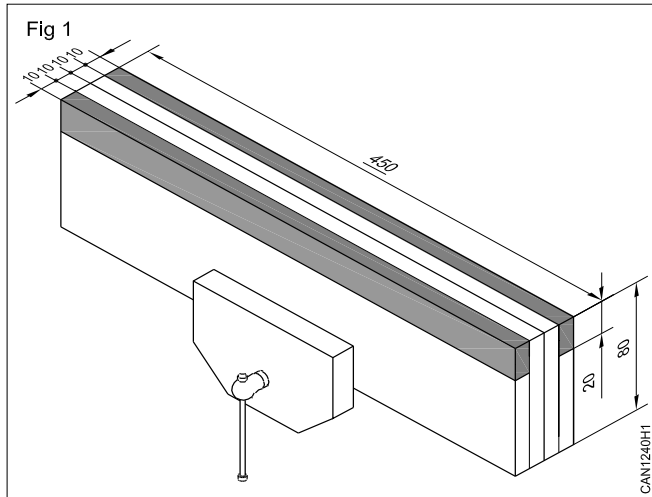
- make a rebate butt joint.



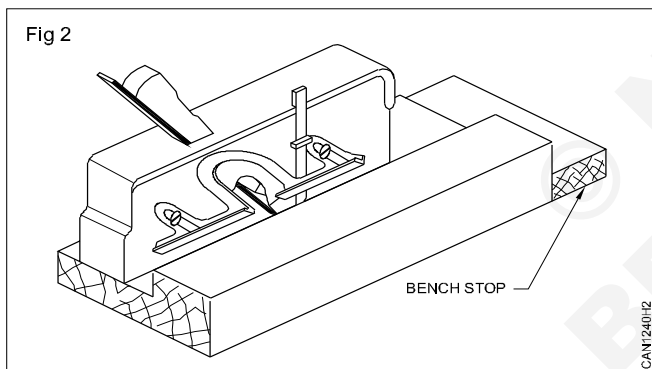
1	50grms		FEVICOL			
2	100 x 25 x 460		HARD WOOD			1.2.40
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>REBATE BUTT JOINT (BROADENING JOINTS - 2)</b>				TOLERANCE ± 2 mm	TIME 2hrs
					CODE NO. CA20N1240E1	

## Job Sequence

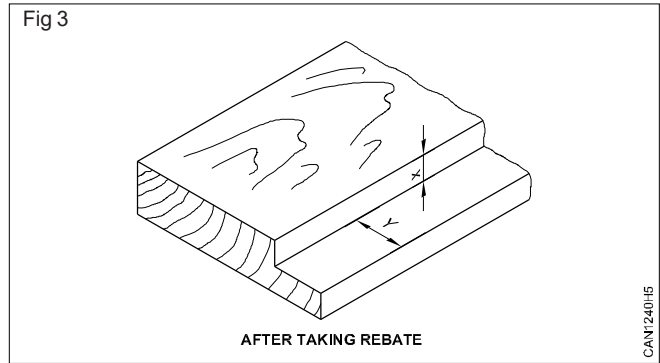
- Check the wooden pieces for its size
- Plane it to size of 80 × 20 × 450 - 2 No's using jack plane.
- Hold both the planks side by side in a carpenter's vice and marked as per the drawing (Fig 1)



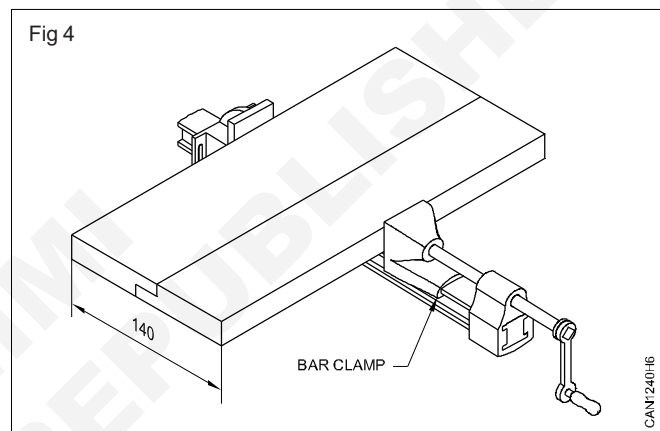
- Keep the marked plank against the bench stop on the work bench (Fig 2)



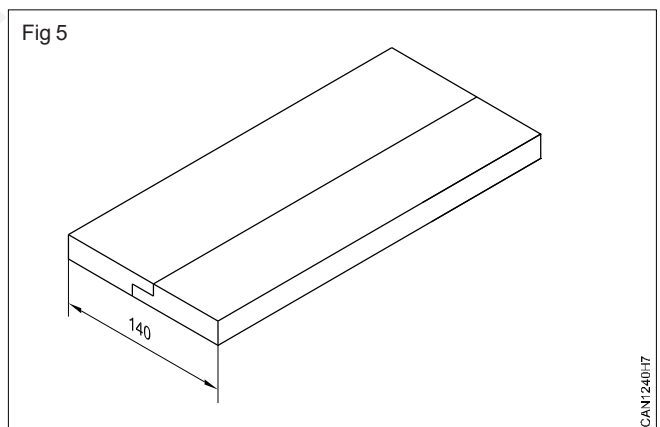
- Take a rebate plane of adjustable type and make the rebate on both pieces
- Check its squareness and flatness of the rebate with try square.(Fig 3)



- Keep both the planks together and check its alignment.
- Apply glue on the rebate part of both the planks and fix both the planks along its rebate. Just move to and fro to spread the glue evenly and clamping (Fig 4)



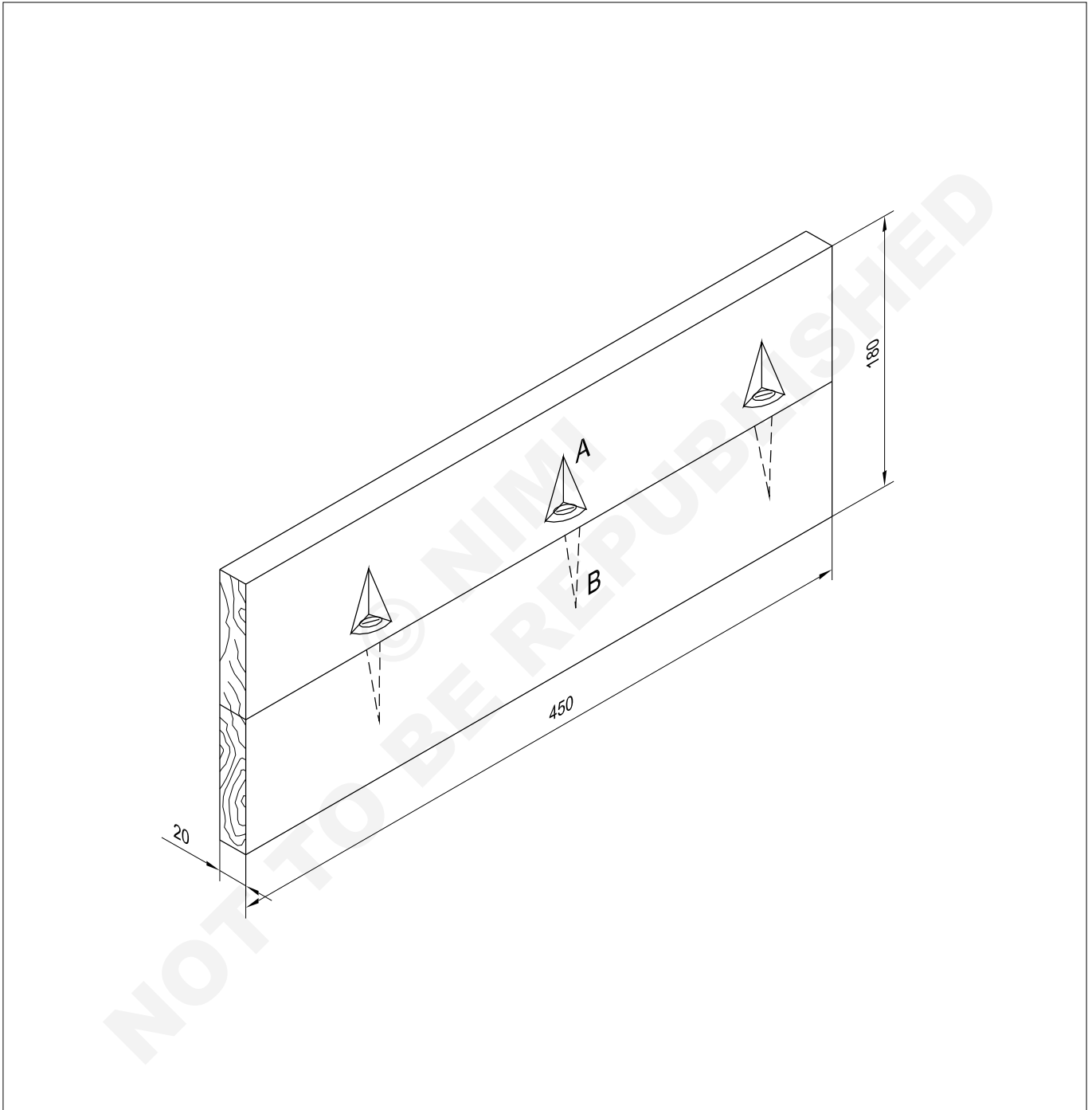
- Allow glue to dry. Remove the cramp, finish the joint using smoothing plane (Fig 5)



**Pocket screw butt joint**

**Objective:** At the end of this exercise you shall be able to

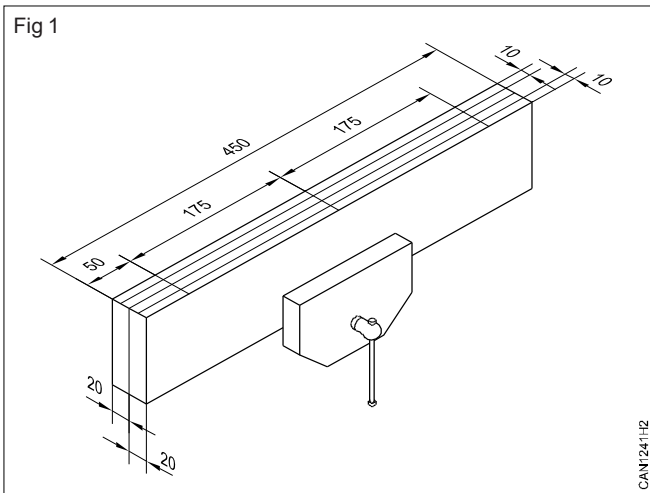
- make a pocket screw butt joint.



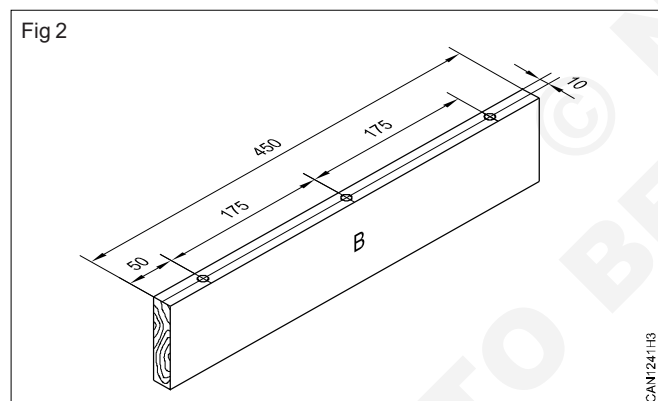
3	35 x 6		SCREWS			
2	100 x 25 x 460		HARD WOOD			1.2.41
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>POCKET SCREW BUTT JOINT (BROADENING JOINT - 3)</b>				TOLERANCE ± 2 mm	TIME 2hrs
					CODE NO. CA20N1241E1	

## Job Sequence

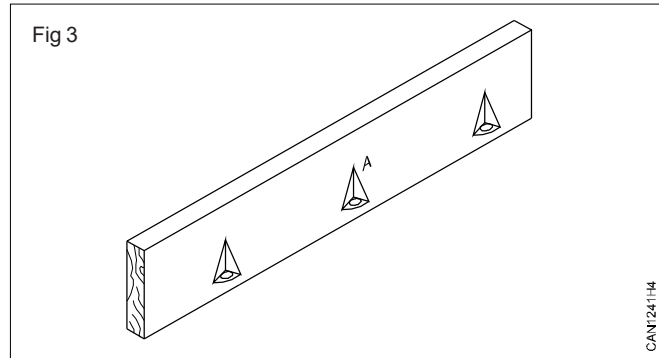
- Check the wooden pieces for its size
- Plane it to size of 90 x 20 x 450 -2 Nos using jack plane.
- Check the squareness of the face side and face edge using straight edge and try square.
- Mark the position of screw hole at the distances of 50, 225 and 400 mm by pencil marks. (Fig 1)



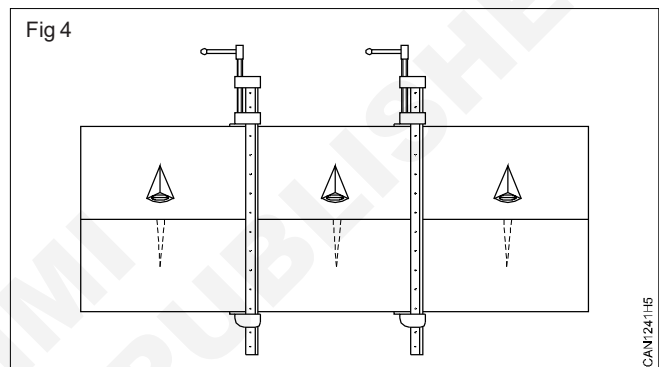
- Make 3 pilot holes of dia 2mm at 50,225 and 400mm with hand drill as shown in the sketch to a depth of 25 mm (plank B). (Fig 2)



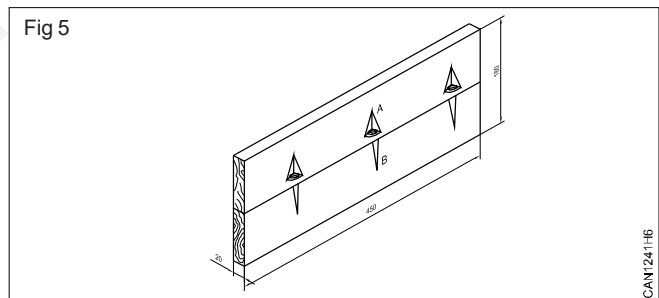
- Chop of the slot in triangular shape using firmer chisel and mallet upto the required thickness of screw plank (A) (Fig 3)



- Make a 3 pilot holes of 3mm dia for triangular slots.
- Apply fevical on the face edges of both planks uniformly.
- Clamp parts A and B at equal levels (Fig 4)



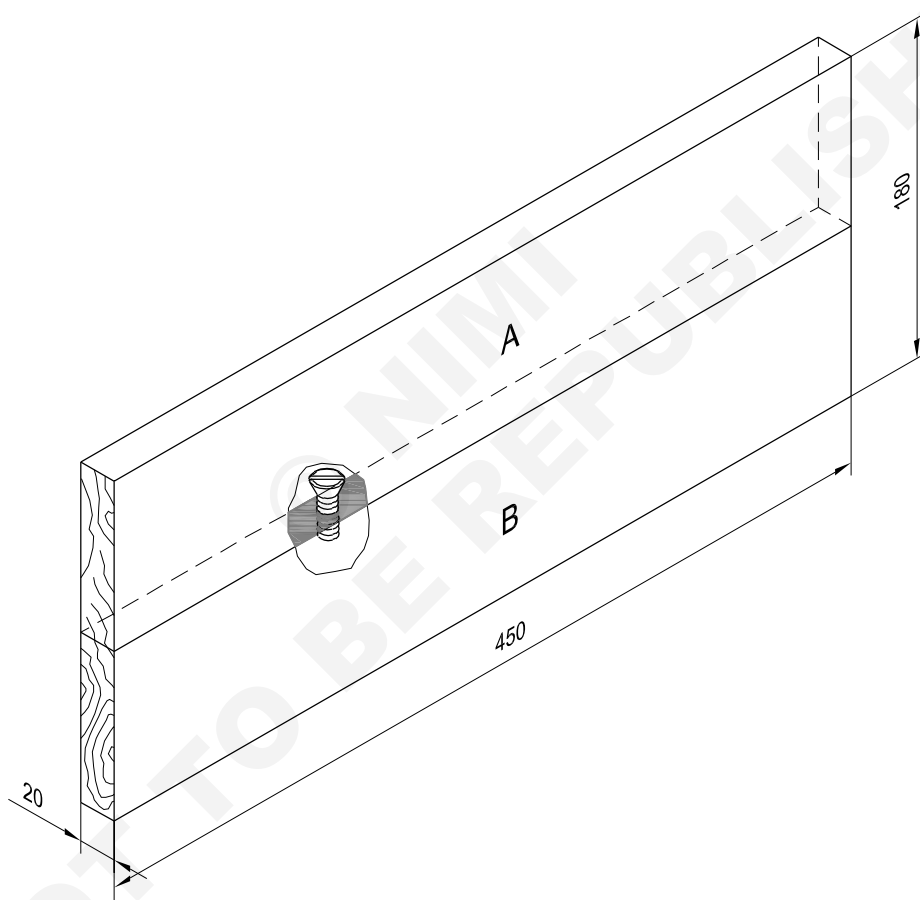
- Fix the 35 x 8 screw drive 60° in triangular slot shape it to a depth of 25mm on the B plank.
- Allow the fevicol to dry. Remove the clamp, finish the joint using smoothing plane (Fig 5)



Secret pocket screw butt joint

Objective: At the end of this exercise you shall be able to

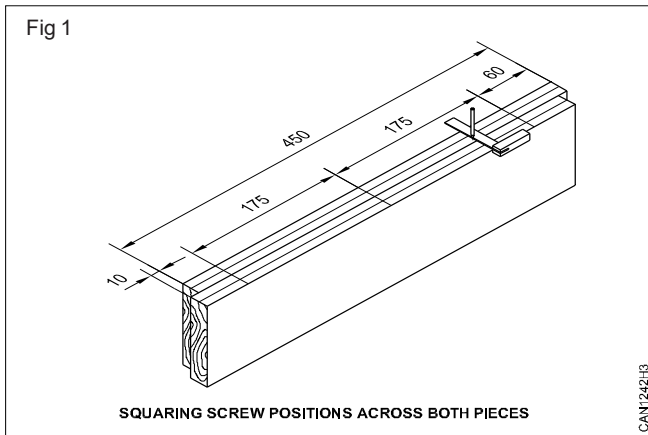
- make a secret pocket screw butt joint.



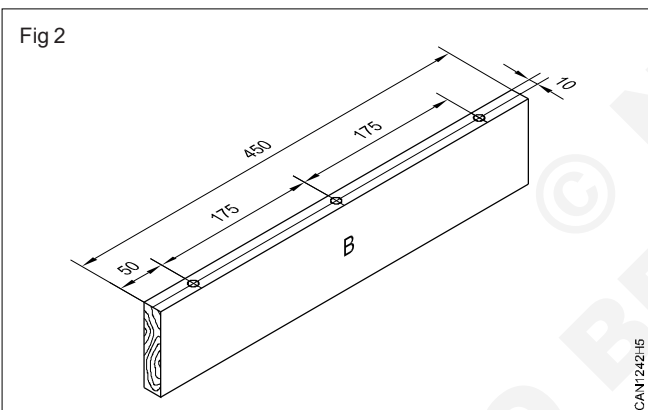
3	35 x 8		SCREWS			
2	100 x 25 x 460		HARD WOOD			1.2.42
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>SECRET POCKET SCREW BUTT JOINT (BROADENING JOINT - 4)</b>				TOLERANCE ± 2 mm	TIME 4hrs
					CODE NO. CA20N1242E1	

## Job Sequence

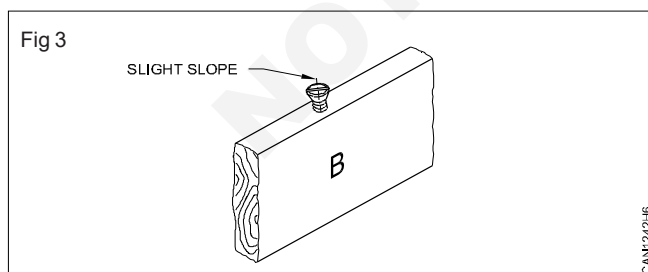
- Check the wooden pieces
- Plane it to size of 90 x 20 x 450 -2 Nos as per the drawing
- Mark the distances 50 mm, 225mm and 400 mm along the gauge line squaring the position of the screws across both pieces using try square and pencil. (Fig 1)



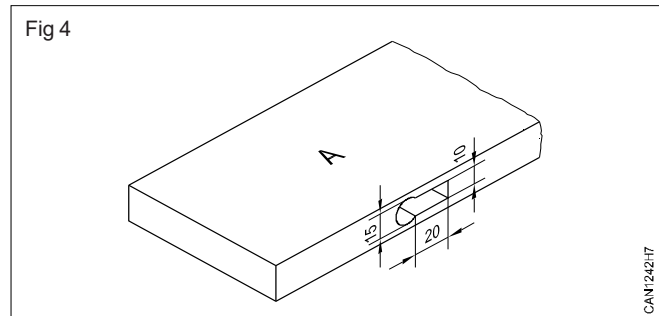
- Make 3 pilot holes of dia 2 mm at 50, 225 and 400 mm as shown in the sketch to a depth of 25 mm using ratchet brace.(Fig 2)



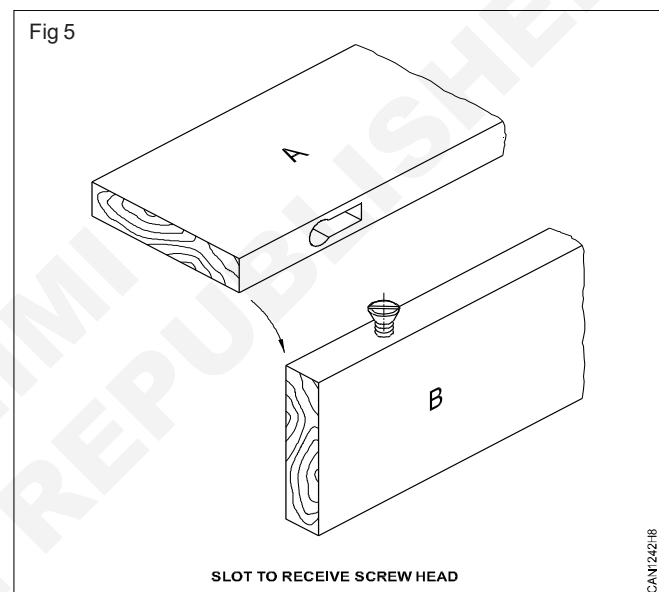
- Fix the 35 x 8 screws on pilot hole and drive it to a depth of 25 mm on the plank using screw driver (Fig 3).
- The projection of screw in plank B should be slightly less than the depth of hole in A.



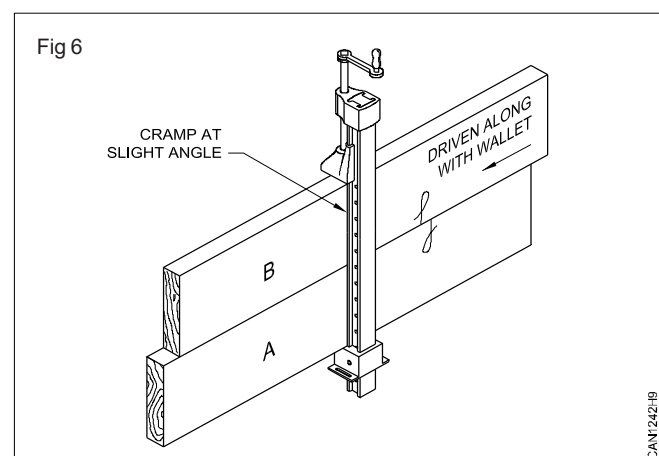
- Adjoining the hold mark for a slot of size 15x10x20 mm on the right side of the hole. (Fig 4)
- Chop of the slot wood layer by layer using firmer chisel upto the required thickness (thickness of screw).



- Assemble the plank so that the screw head of plank B enters the bore of plank A. (Fig 5).
- Clamp parts A and B at equal levels. Tap gently the part B to the left using 'T' - clamps.



- If both parts are in order, remove the clamp and finish the fitting. (Fig 6).
- Check the flatness of the plank using straight edge as per the drawing

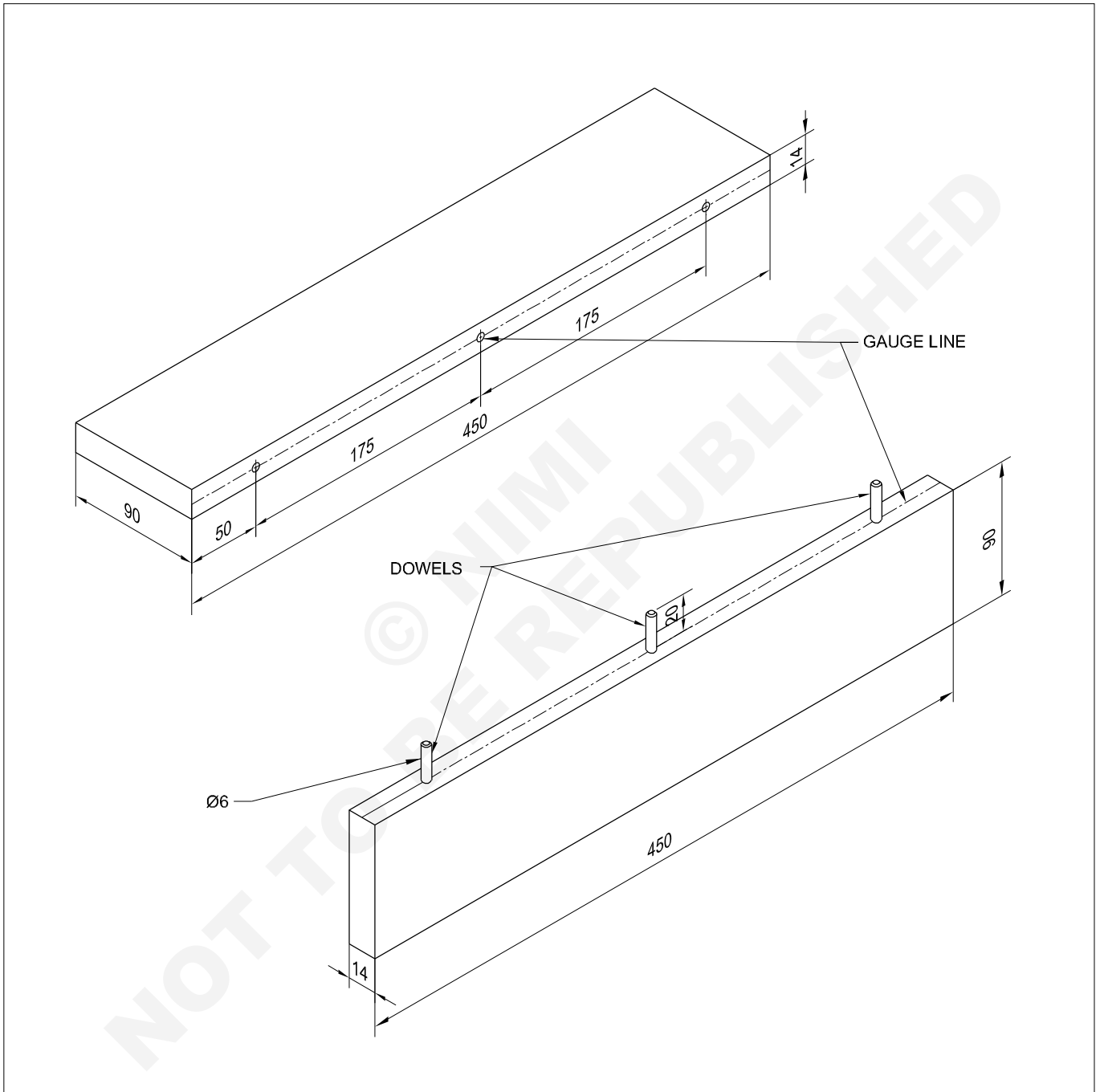




Glued butt joint with dowel

Objective: At the end of this exercise you shall be able to

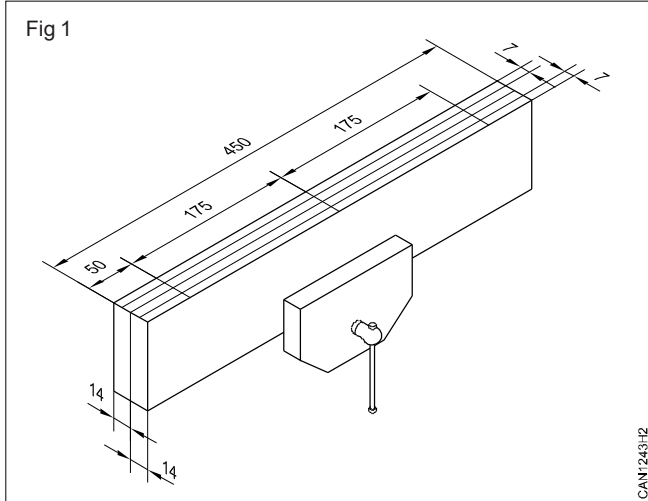
- make a glued butt with doweled joint.



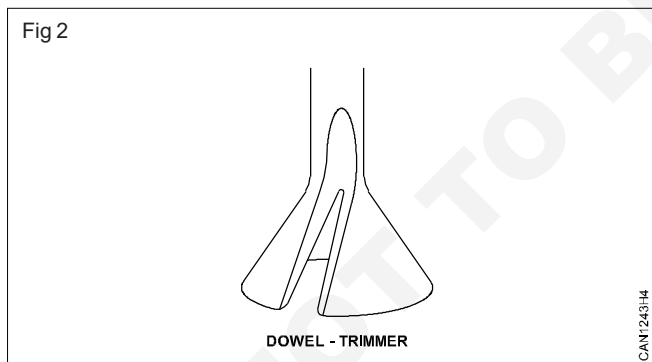
1	50grms		FEVICOL			
3	50 x Ø6mm		HARD WOOD			
2	100 x 15 x 450mm		HARD WOOD			1.2.43
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>GLUED BUTT JOINT WITH DOWEL (BROADENING JOINT - 5)</b>				TOLERANCE ±2 mm	TIME 2hrs
					CODE NO. CA20N1243E1	

## Job Sequence

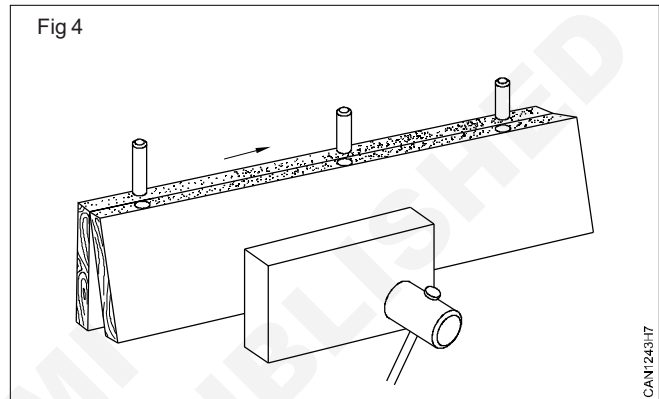
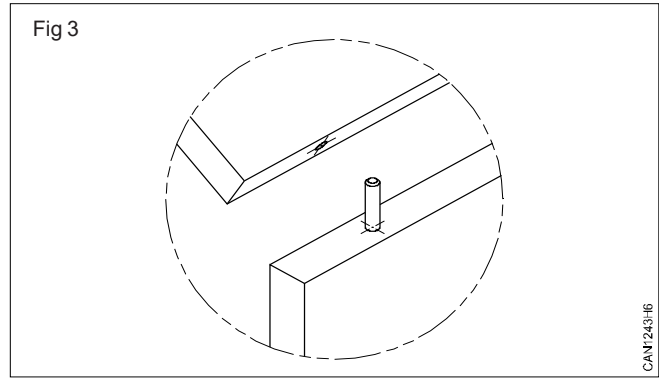
- Check the wooden pieces for its size
- Plane it to size of 90 × 14 × 450 -2 Nos using jack plane.
- Mark the position of dowel pins at the distances of 50,225 and 400 mm by pencil marks. (Fig 1)



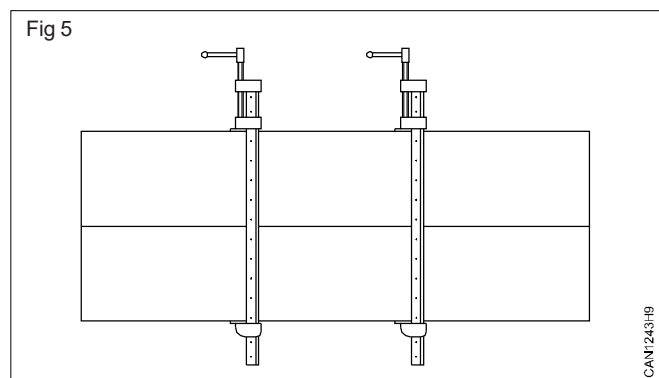
- Drill 5 mm dia hole upto the depth of 27mm at the three points marked on the face edge of both the plank.
- After drilling the holes of the plank, countersink slightly in order to take surplus glove
- Prepare the dowel pin as per drill hole
- Cut the dowel pin for a size of 50 mm in length and 6mm in dia.
- Slightly bevel the ends of dowel pins by the trimmer shown. (Fig 2)



- Before inserting the pins apply glues in the holes of the plank or the dowel is smeared with glue.
- Fix the plank in vice and insert all the three dowel pins in one plank upto a depth of 25 mm. (Fig 3)
- Apply the fevicol on the face edge of both plank uniformly. (Fig 4)



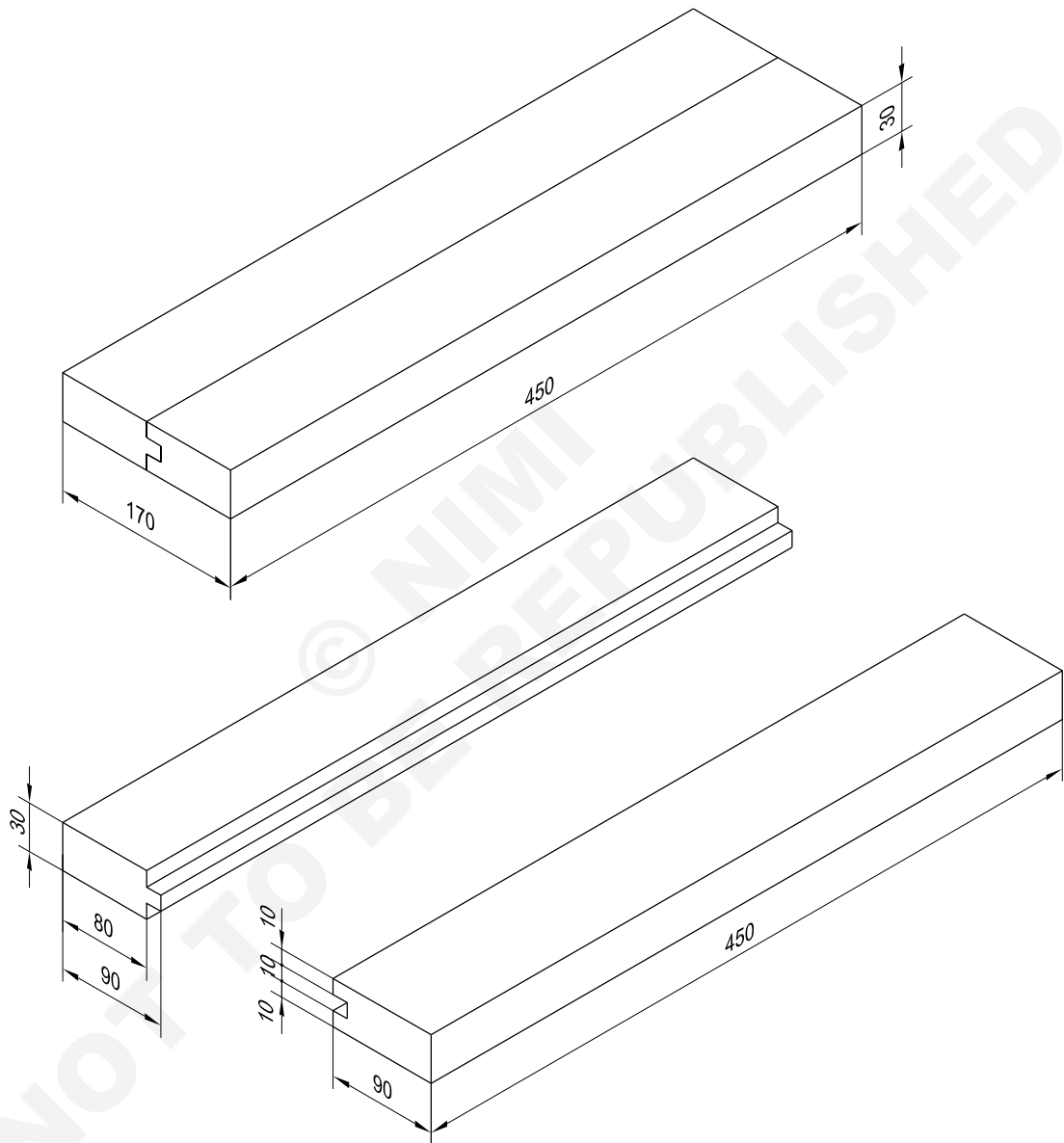
- Care should be taken to see that half the height of the dowel pin is upwards above surface of the face-edge.
- Slowly place the other plank so that the dowel pin of the first plank enters the dowel hole of second plank.
- Gently tap it and make a close fitting.
- Fix the 'T' clamp on the job and allow glue to dry. (Fig 5)
- Remove the 'T' clamp on the job and finish the joint using smoothing plane as per the drawing.



**Tongue and groove joint**

**Objective:** At the end of this exercise you shall be able to

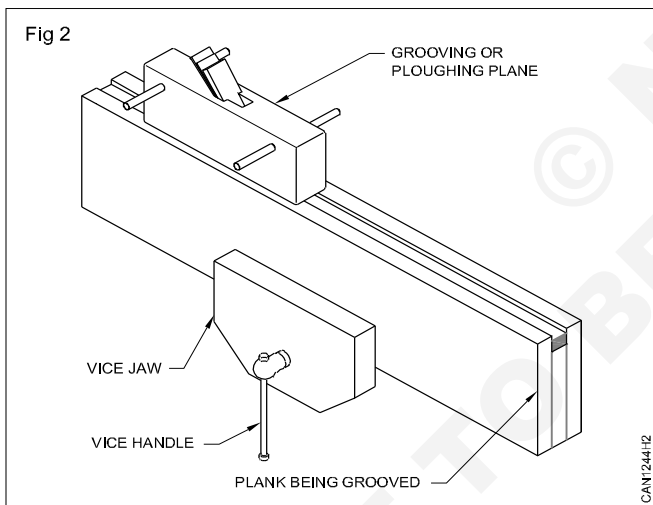
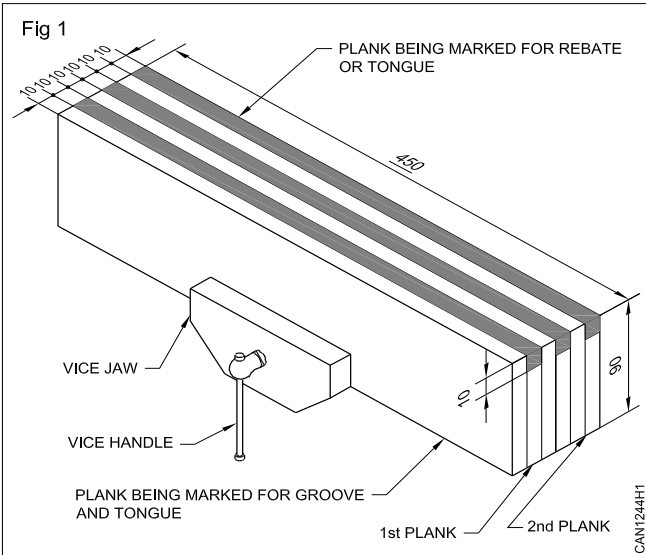
- make a tongue and groove joint.



1	50grms		FEVICOL			
2	100x35x460		HARD WOOD			1.2.44
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>TONGUE AND GROOVE JOINT (BROADENING JOINTS - 6)</b>				DEVIATIONS ± 2 MM	TIME 3hrs
					CODE NO. CA20N1244E1	

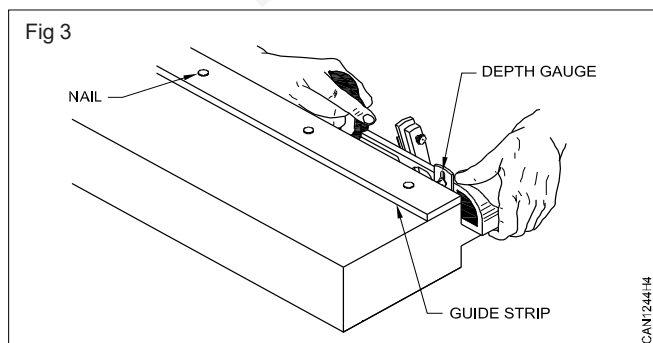
## Job Sequence

- Check the wooden pieces for its size
- Plane it to size of 90 x 30 x 450 - 2 Nos using Jack plane
- Mark the tongue and grove using folding rule try square and mortise gauge (Fig 1)
- Make the groove part using plough plane as per the drawing (Fig 2)



- Make the tongue part using rebate plane as per the drawing (Fig 3)

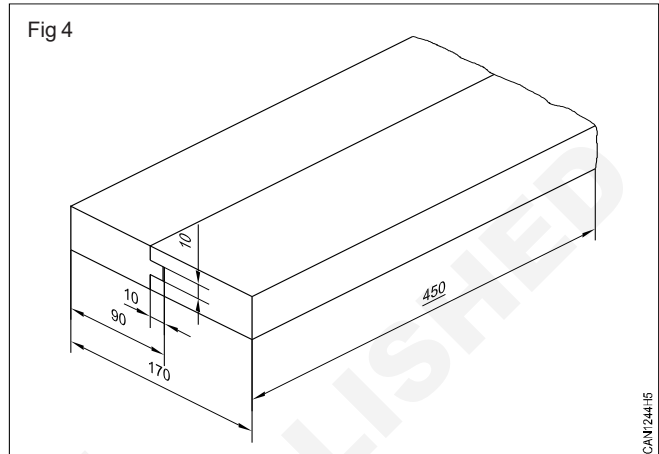
**The depth of the groove should be 1mm more than the width of the tongue.**



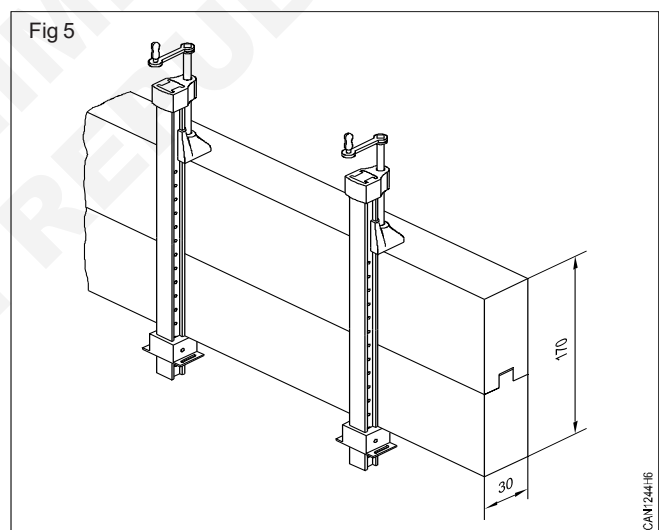
- The width of the tongue and groove should be 1/3 of thickness of the plank.
- When both the tongue part and groove part is ready, apply glue on the surfaces of tongue and groove parts.

**Apply glue uniformly with a brush.**

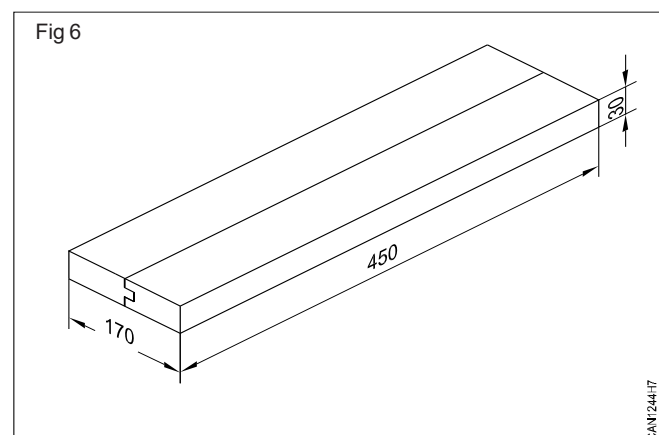
- Fix the tongue part by inserting tongue along the groove. (Fig 4)



- Check the alignment clamp it in a bar-clamp (Fig 5)



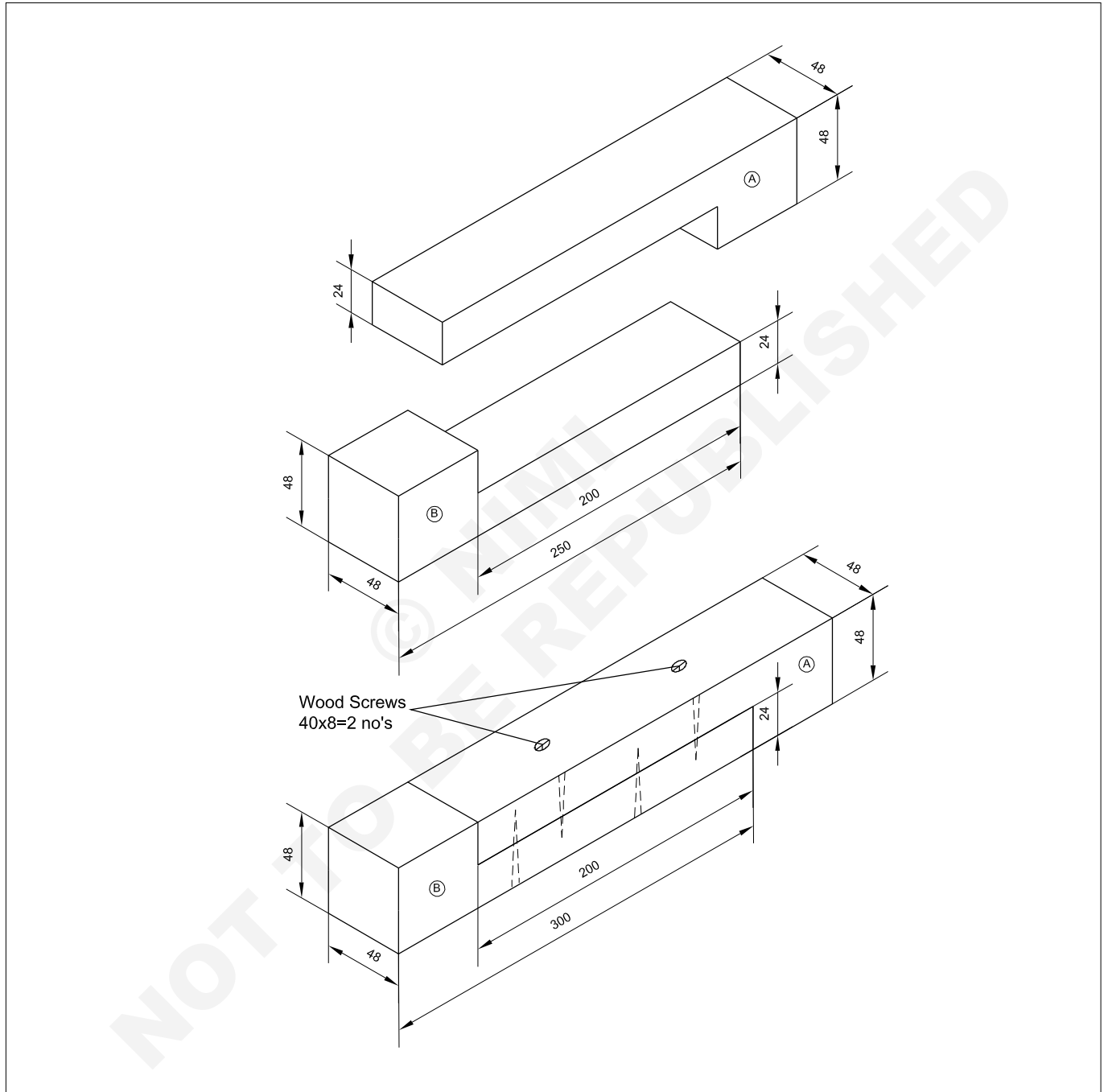
- Allow the glue to dry.
- Remove the bar clamp from the joint. Finish the joint using smoothing plane. (Fig 6)



End half lap joint.

Objective: At the end of this exercise you shall be able to

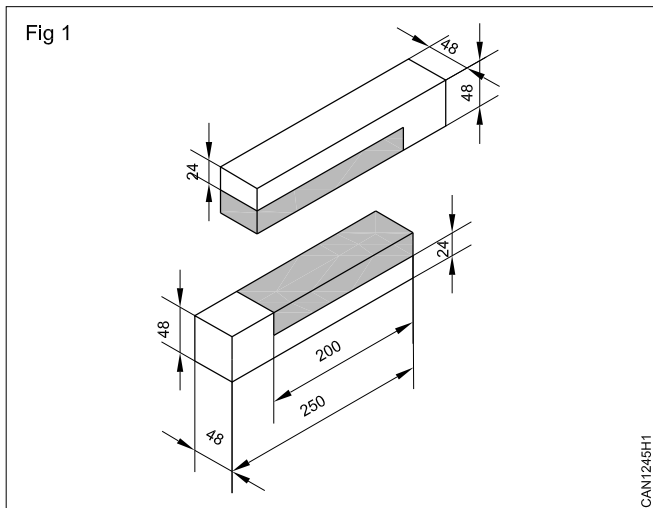
- make a end half lap joint.



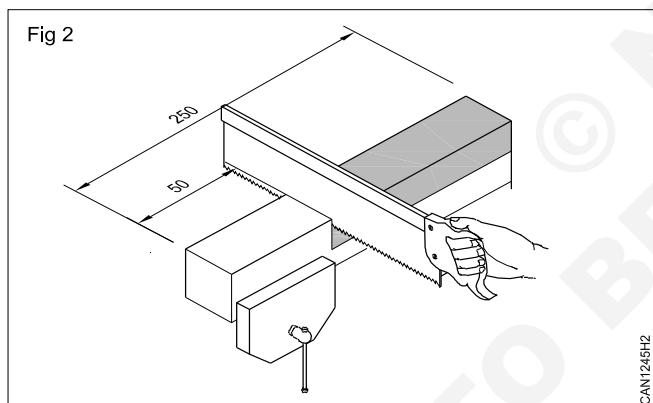
1	50grms		FEVICOL			
4	40x8mm		SCREWS			
2	50x50x260		HARD WOOD			1.2.45
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>END HALF LAP JOINT (LENGTHENING JOINT - 1)</b>				DEVIATIONS ± 2 MM	TIME 2hrs
					CODE NO. CAN1245E1	

## Job Sequence

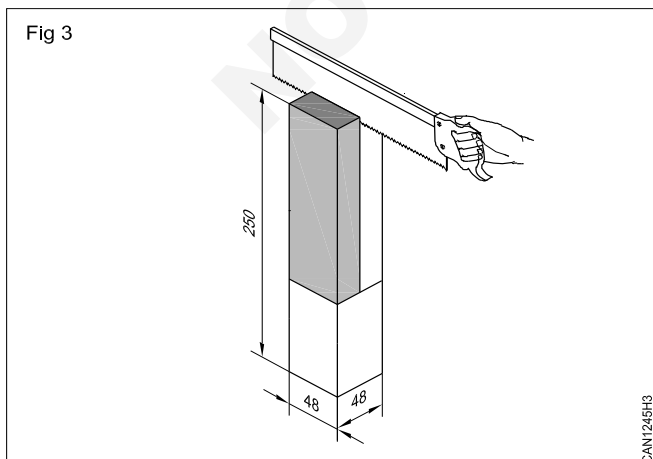
- Check the wooden pieces for its size
- Plane it to size of 48 × 48 × 250mm = 2 No's.
- Holding the stock of marking gauge against the face edge of the job, mark 24 mm line as shown in Fig 1.
- Keeping the stock of try square against face side mark 200mm (Fig 1)



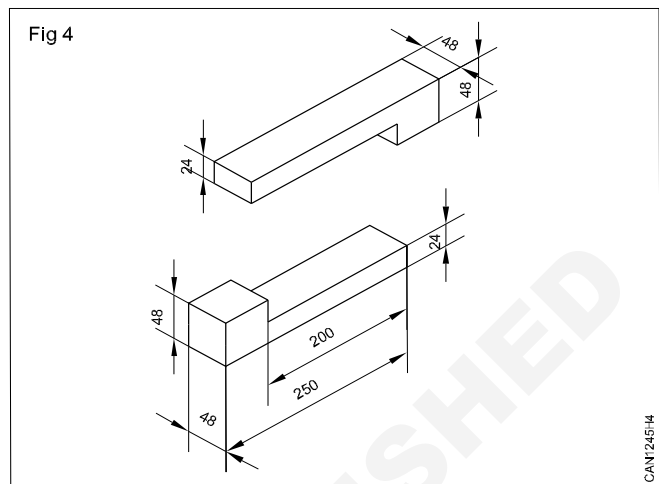
- Make a saw kerf first close to 24 mm line and 200 mm line from left using tenon saw. (Fig 2)



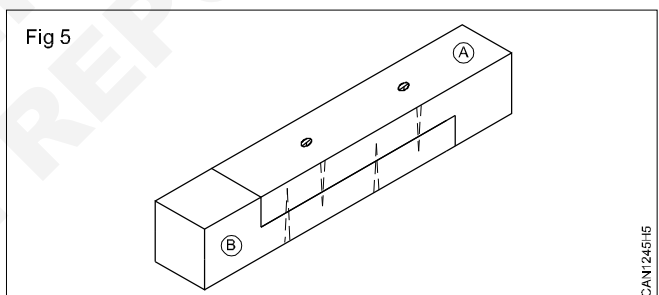
- Saw upto a depth of 24 mm
- Hold the job vertically and cut off the shaded portion using Hand saw/Tenon saw as shown in (Fig 3)



- Clean the surface of the saw-cut portion using firmer chisel.
- Repeat the same procedure for other piece
- Finish the edge using firmer chisel (Fig 4)



- Keep the piece on the work bench
- Mark the position of drill hole on the job using hand drill
- Drill 3mm holes on the marked lines with a hand drill and counter sink. (Fig 5)

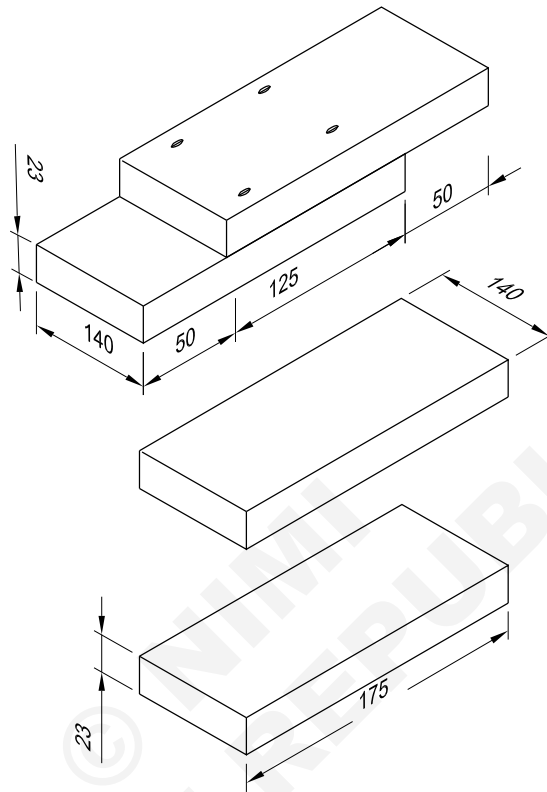


- Apply glue on half lap and shoulder surfaces of the blocks evenly with a brush.
- Keep A block over B block and move it front and back for the uniform spread for the glue.
- Clamp it if necessary using 'G' clamp.
- Fix 40x8mm screws drive it to a depth 40mm on both top and bottom surface.
- Allow the glue to dry. Remove the clamp.
- Finish the surfaces of the job using smoothing plane.(Fig 5)
- Check the squareness and flatness of the job

**End over lap joint**

**Objective:** At the end of this exercise you shall to able to

- make the end over lap joint.



**Job Sequence**

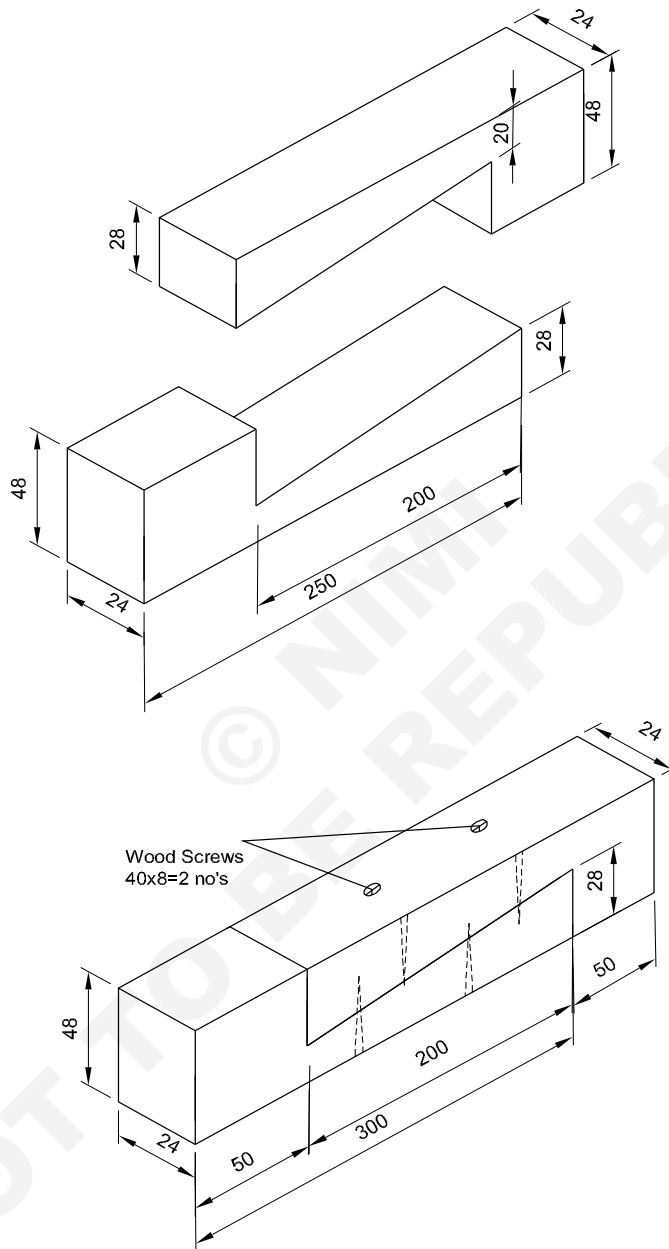
- Check the size of wooden piece of 150x25x360mm hard wood 1No. using four fold wooden rule.
- Plane it to size 140x23x360mm using jack plane.
- Cut into two pieces of size 140x23x175 using tenson saw.
- Finish the edge using firmer chisel.
- Mark the job as per drawing using try square.
- Keep the piece on the work bench.
- Mark the locations for the nails with marking awl.
- Repeat the same procedure on the other piece also.
- Apply glue on joining surface.
- Assemble both the pieces in place and tighten it using 'G clamp'.
- Drive the nail through the job using hammer.
- Similarly, drive the other nails on the job.
- Allow glue to dry, remove the G. clamp.
- Finish the joint using smoothing plane.

1	50grms		FEVICOL				
4	37mm		WIRE NAILS				
1	150X25X360		HARD WOOD			1.2.46	
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.	
SCALE 1:2		<b>END OVER LAP JOINT LENGTHENING JOINT - 2</b>				DEVIATIONS ± 2 MM	TIME 1hrs
						CODE NO. CA20N1246E1	

End bevel lap joint

Objective : At the end of this exercise you shall be able to

- make a end bevel lap joint.

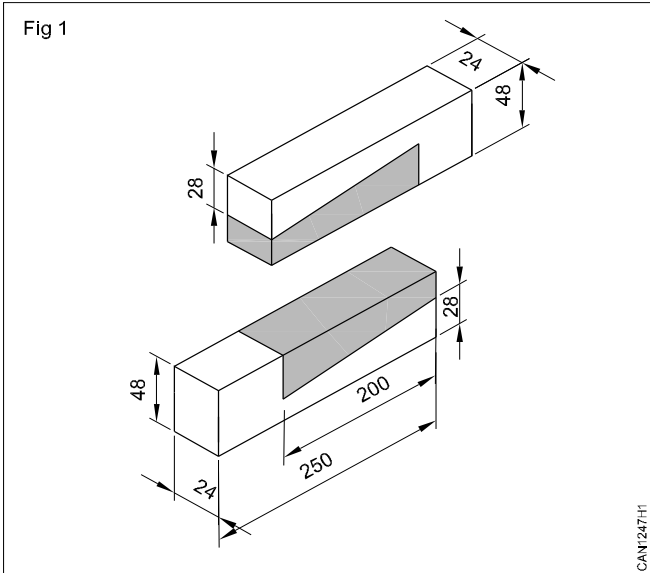


1	50grms		FEVICOL			
4	40x8		SCREWS			
1	50x25x270mm		HARD WOOD			1.2.47
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>END BEVEL LAP JOINT (LENGTHENING JOINT - 3)</b>				DEVIATIONS ± 2 MM	TIME .2hrs
					CODE NO. CAN1247E1	

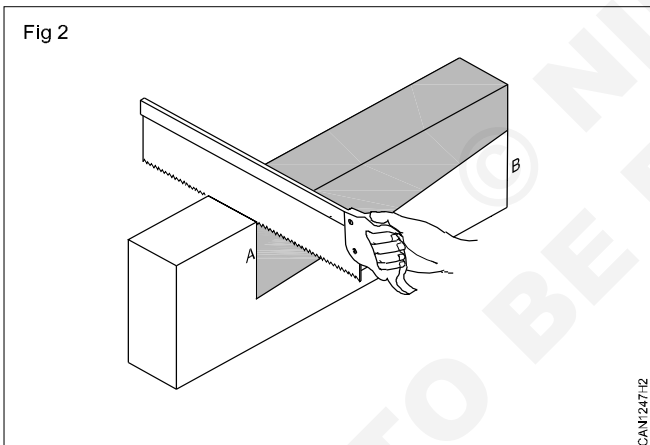


## Job Sequence

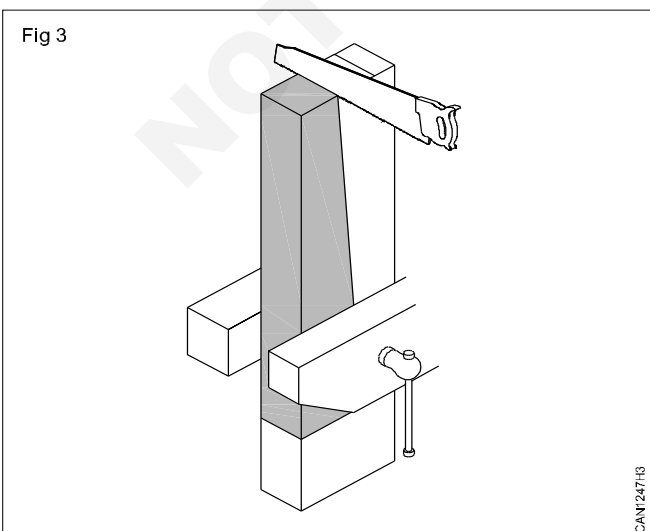
- Check the wooden piece for its size in wooden rule
- Plane it to size of 48x24x250mm = 2 Nos using jack plane
- Mark the job as per the drawing using try square and scribe. (Fig 1)



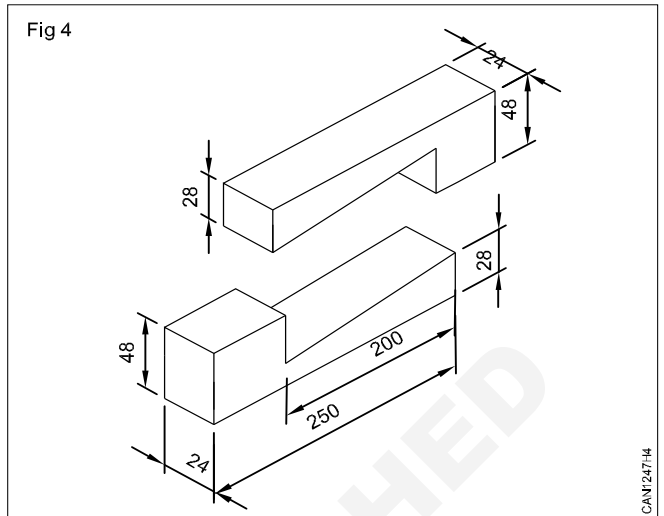
- Make saw cut across the line using tenon saw. (Fig 2)



- At the right end surface keep a hand saw and make an angular sawing on the line. (Fig 3)



- Use firmer chisel to smooth the saw-cut part and remove extra material. (Fig 4)



- Repeat the same procedure on the other piece also
- Finish the edge using firmer chisel.
- Mark the position of drill hole on the job.
- Drill 3mm holes on the marked lines with a hand drill and counter sink it.
- Apply glue on joining surfaces.
- Assemble both the pieces together and drive the screws on the counter sink holes on both top and bottom surfaces (Fig 5)
- Allow glue to dry
- Finish the joint using smoothing plane

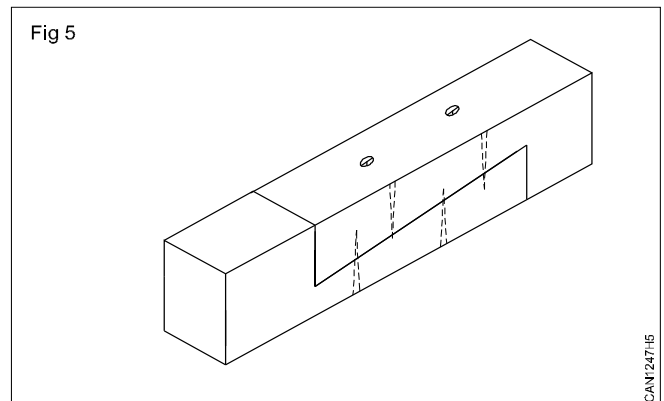
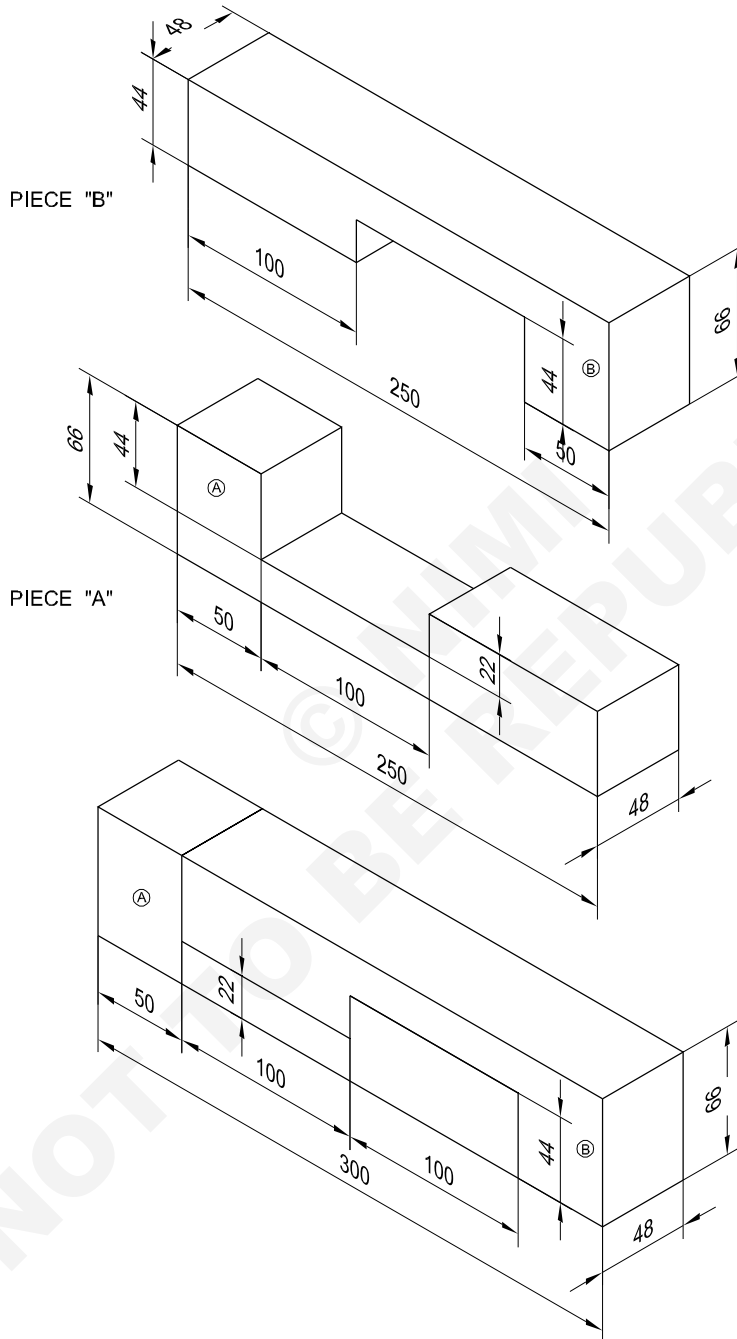


Table scarf joint

Objective: At the end of this exercise you shall be able to

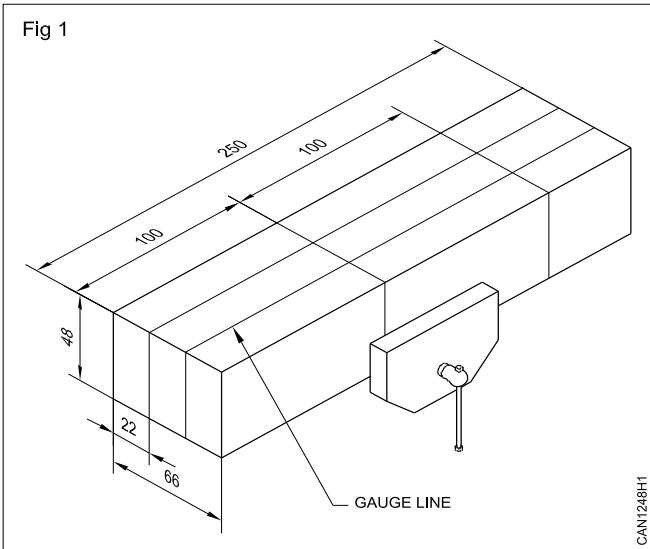
- make a table scarf joint.



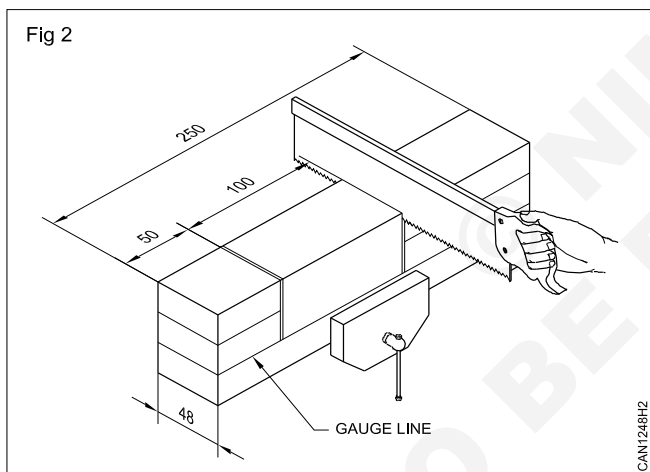
2	75 x 50 x 260mm		HARD WOOD			1.2.48
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>TABLE SCARF JOINT (LENGTHENING JOINT - 4)</b>				TOLERANCE ± 2 mm	TIME 3hrs
					CODE NO. CA20N1248E1	

## Job Sequence

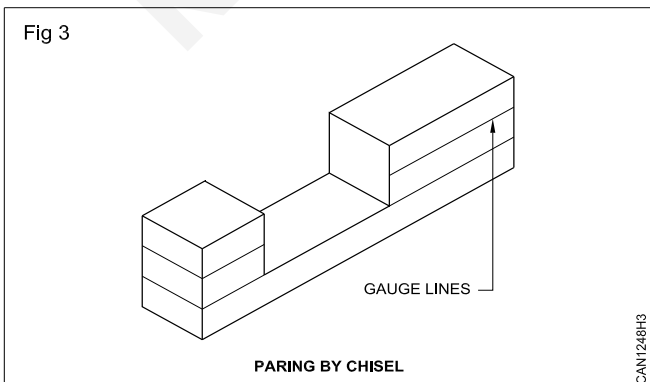
- Check the wooden pieces for its size.
- Plane it to size of 250 x 66 x 48 - 2 Nos.
- Mark the job as per the drawing (Fig 1)



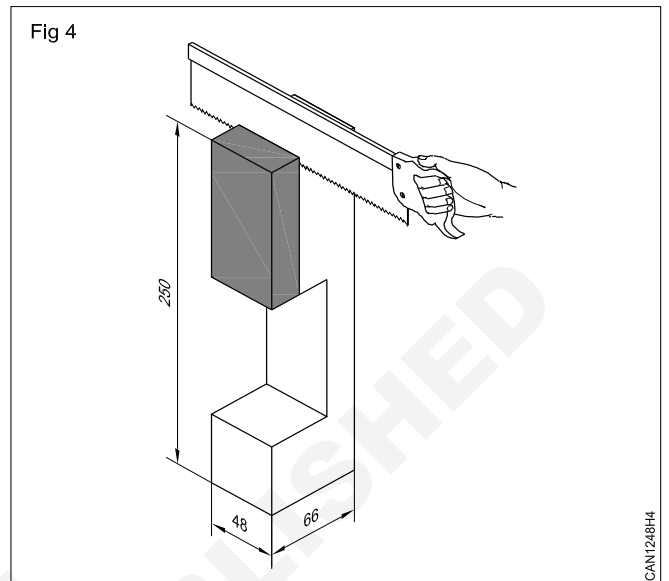
- Make a saw kerf first close to 50 mm line and 150 mm line from left using tenon saw. (Fig 2)



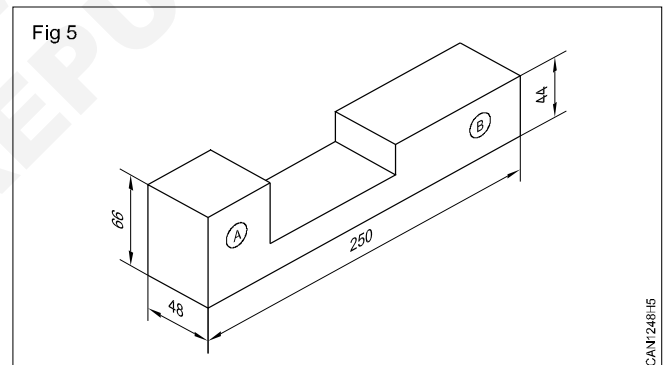
- Saw upto a depth of 44 mm on 50 mm line and 150 mm line.
- After middle part sawing Finishing the edge using firmer chisel
- Reverse the job and hold it in the vice and chop off the material from the other end to the middle with firmer chisel. (Fig 3)



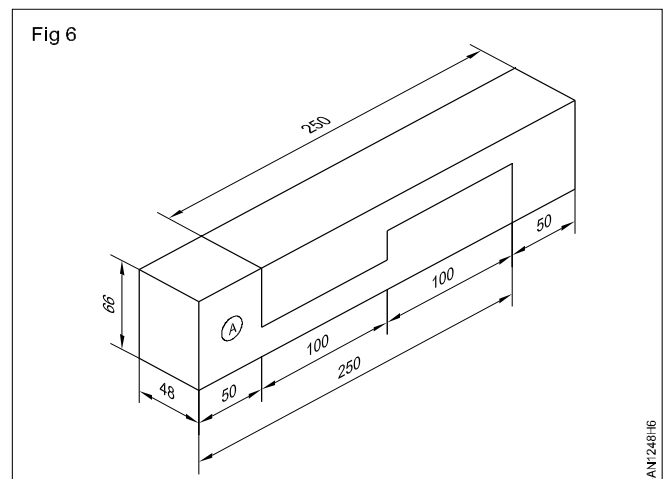
- Level the trench and shoulders walls part with the firmer chisel.
- Hold the job vertically and cut off the shaded portion using Hand saw/Tenon saw as shown in Fig 4.



- Clean the surface of the saw-cut portion using firmer chisel. (Fig 5) Repeat same procedure for other piece

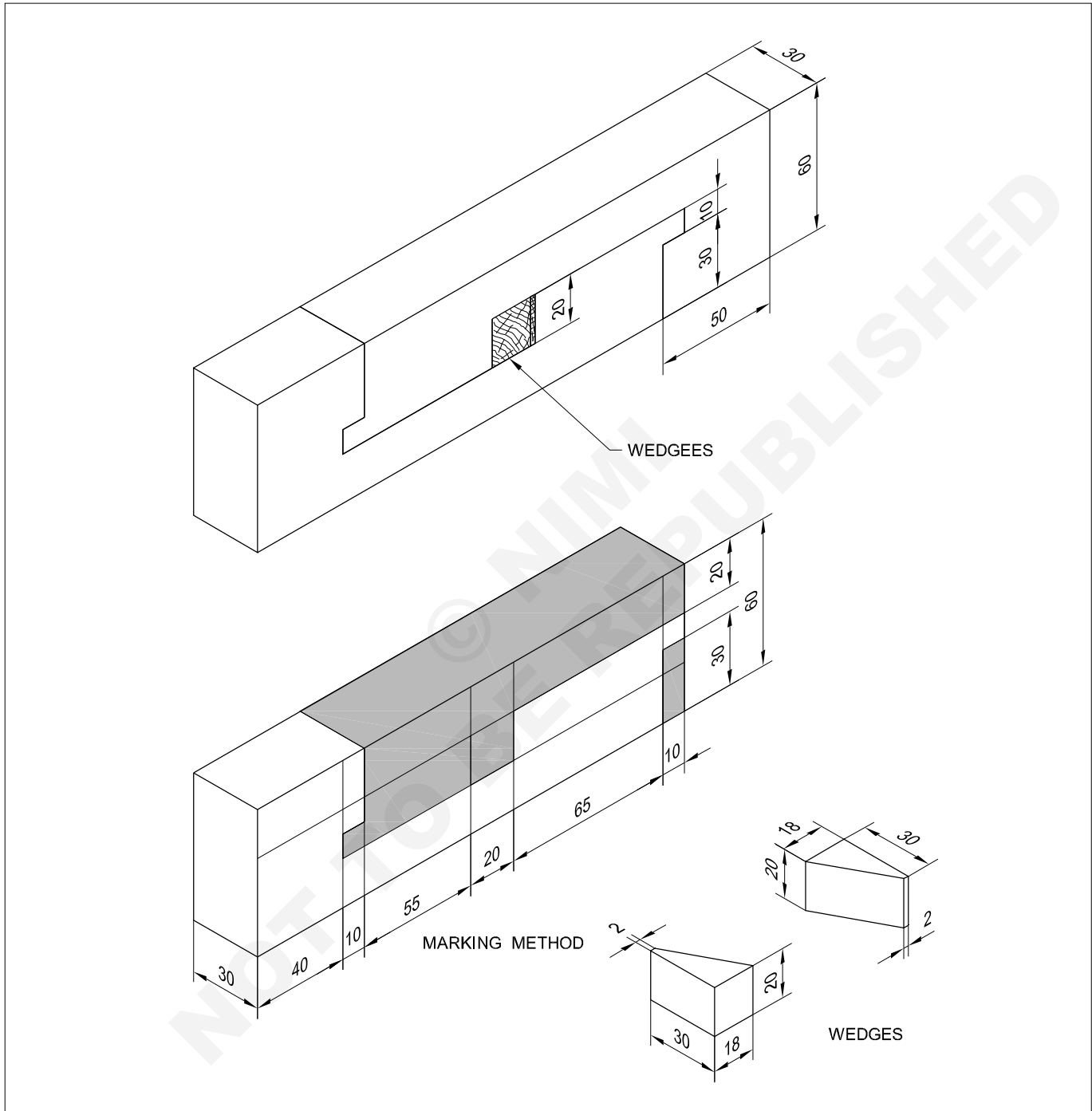


- Apply glue on both pieces trench and shoulder surfaces of the blocks evenly with a brush and clamp it
- Allow the glue to dry. Remove the clamp.
- Finish the surfaces of the job using smoothing plane. (Fig 6)



End table scarf joint with wedge

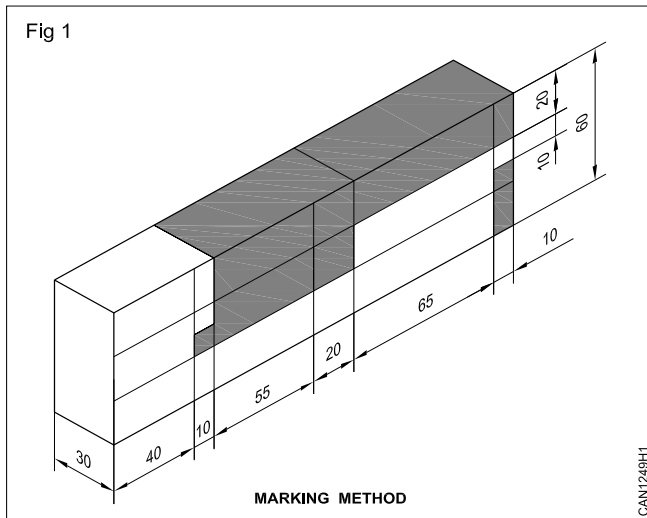
Objective: At the end of this exercise you shall be able to  
 • make a table scarf joint with wedges.



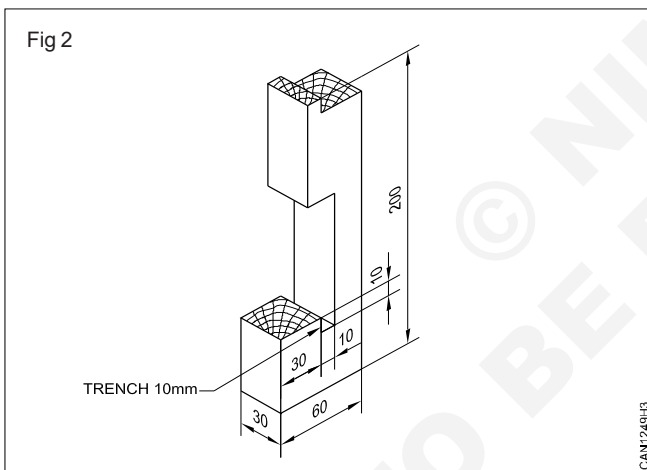
2	25 x 20 x 40	WEDGE	HARD WOOD			
2	65 x 38 x 210		HARD WOOD			1.2.49
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>END TABLE SCARF JOINT WITH WEDGE (LENGTHENING JOINT - 5)</b>				TOLERANCE ± 2 mm	TIME 3hrs
					CODE NO. CA20N1249E1	

## Job Sequence

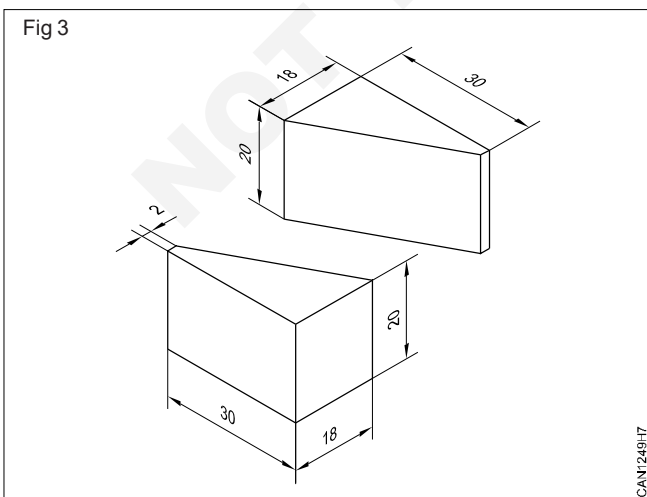
- Check the wooden pieces for its size
- Plane it to size of 60 x 30 x 200mm - 2 Nos using jack plane.
- Mark the table scarf pieces as per the drawing (Fig 1)



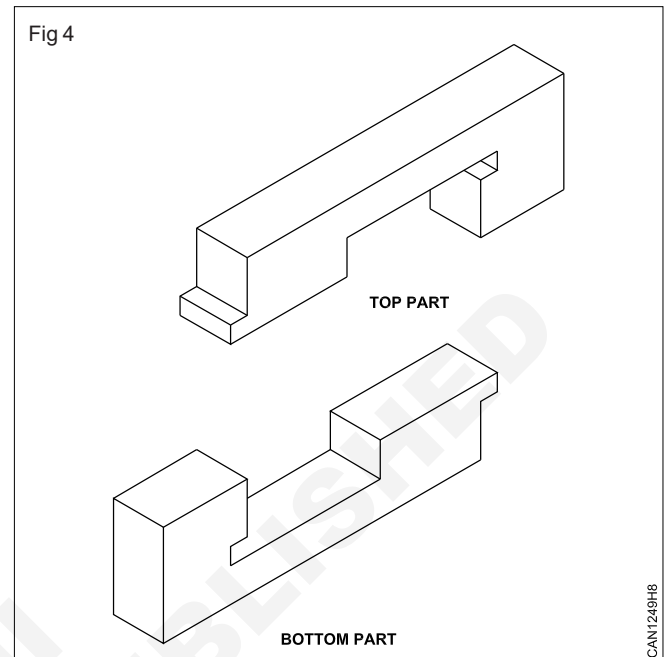
- Make the table scarf both pieces as per drawing (Fig 2) Refer to Ex.No 1.2.48



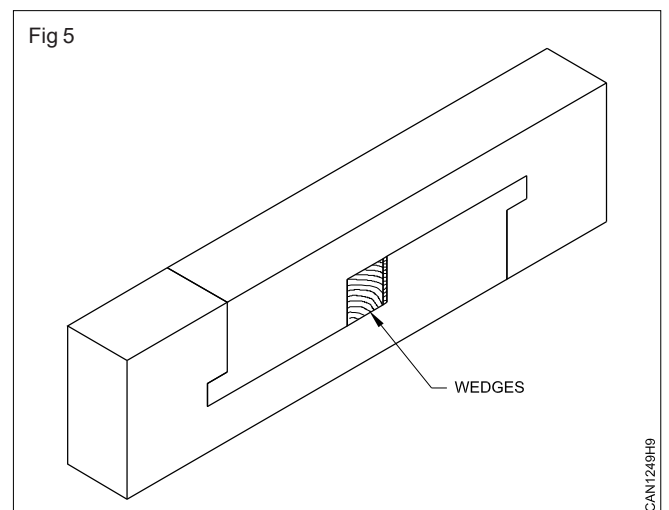
- Mark and make the wedges as per drawing. (Fig 3)



- Two part of the joint is ready.
- Apply glue on the bottom surfaces of the top part and the top surface of bottom part and assemble it.(Fig 4)

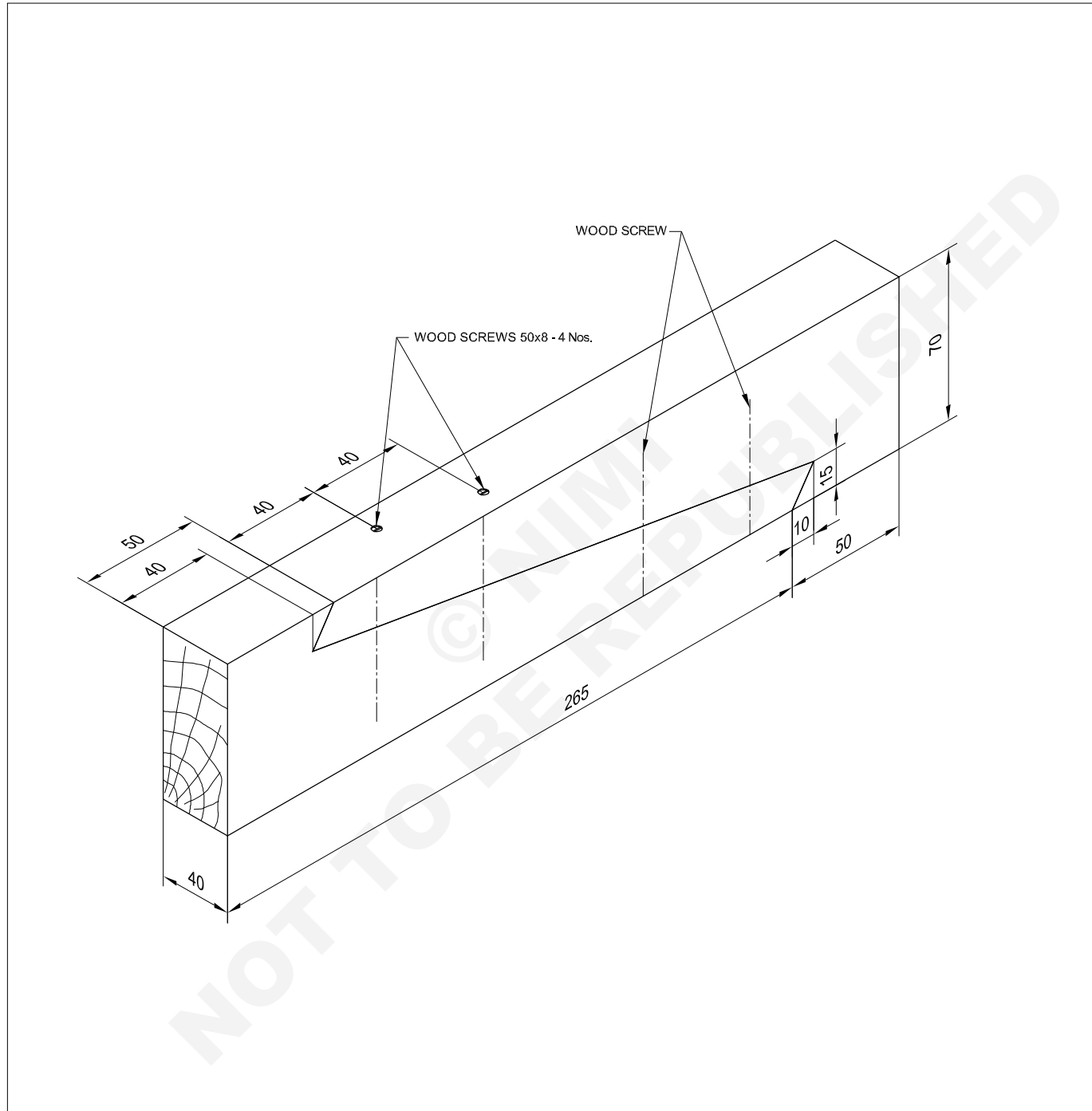


- Move the joint to and for the uniform spreading of glues.
- After assembling the two pieces, 20mm gap will be seen in the joint.
- Push the wedges in the gap. Push the 18mm width side of the wedge from face side and 2mm width side wedge from the back of the face side.
- Gently tap the wedge with a mallet and then level it to the surface.
- Allow the glue to dry. Finish the joint using smoothing plane. (Fig 5)



**Bevel scarf joint**

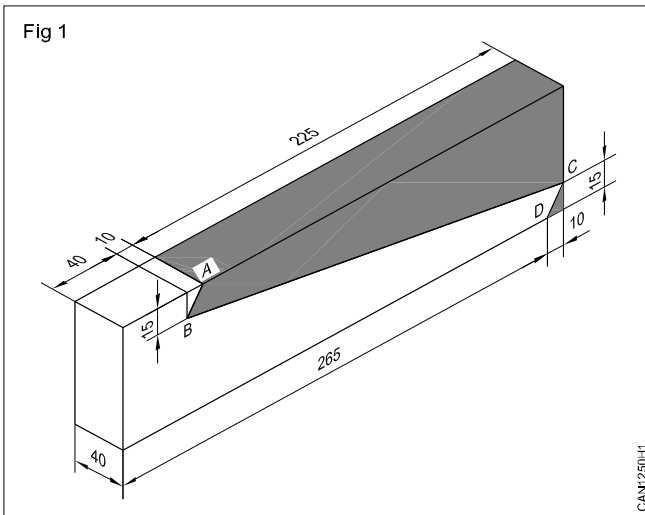
Objective: At the end of this exercise you shall be able to  
 • make a bevel scarf joint.



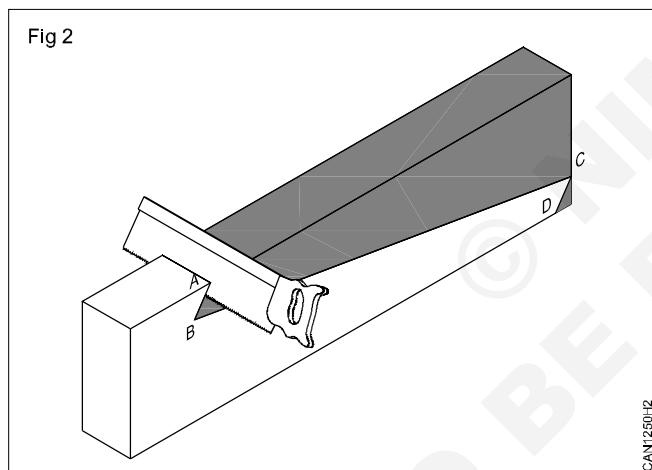
4	50x8		WOOD SCREWS			
2	75x50x300		TEAK WOOD			1.1.50
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>BEVEL SCARF JOINT (LENGTHENING JOINT - 6)</b>			TOLERANCE ± 2 mm	TIME 3hrs
					CODE NO. CA20N1250E1	

## Job Sequence

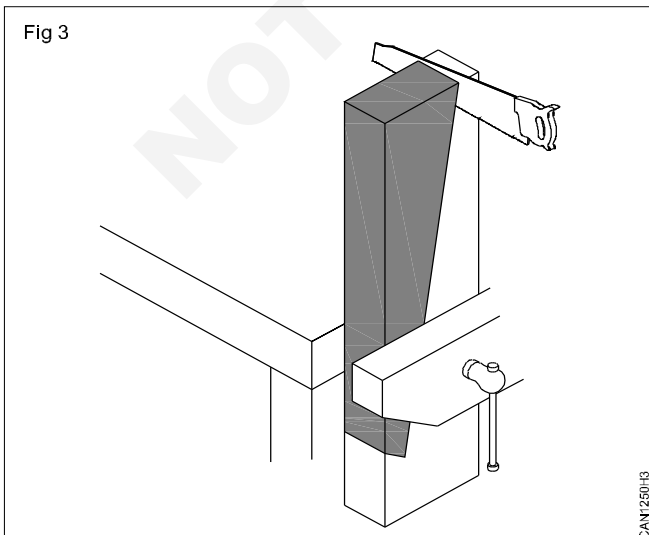
- Check the wooden pieces for its size.
- Plane it to size of 70 x 40 x 275mm - 2 Nos.
- Mark the job pieces as per drawing (Fig 1)



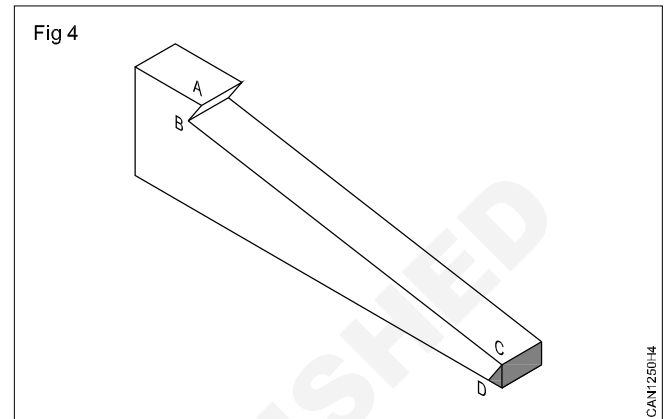
- Make inclined saw cut along the line AB using tenon saw. (Fig 2)



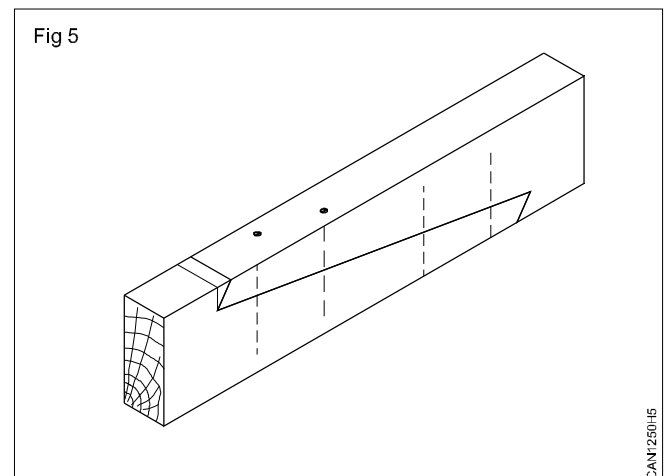
- Hold the job vertically so that right end comes upward.
- At the right end surface keep a hand saw and make an angular sawing on the line CB. (Fig 3)



- Remove the top portion of the piece sawn by the hand saw.
- Use firmer chisel to smooth the saw-cut part and remove extra material if any.
- Cut along line CD and remove waste portion using tenon saw. (Fig 4)



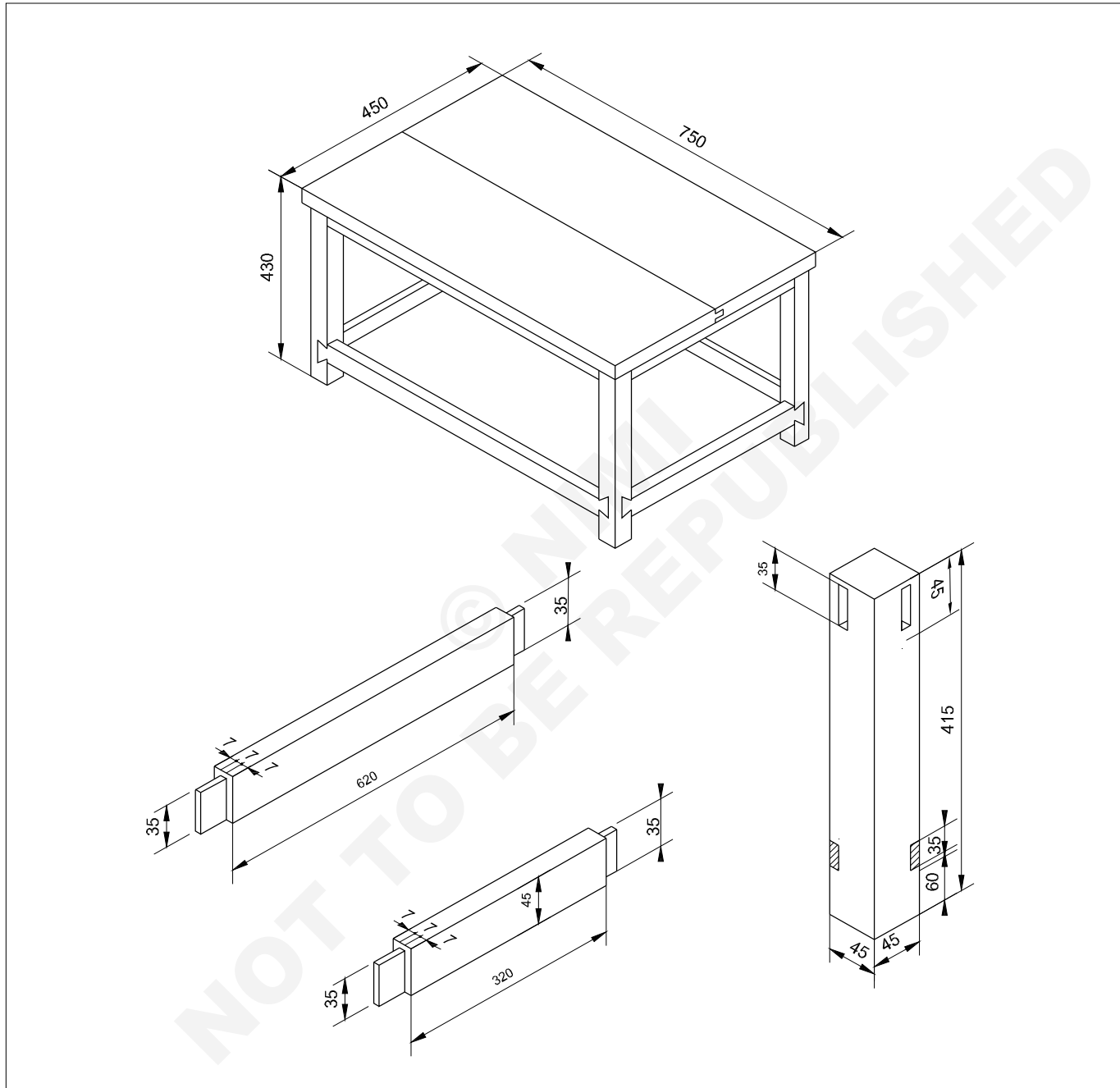
- Finish the edge using firmer chisel.
- Mark the position of drill hole on the job.
- Drill 3mm holes on the marked lines with a hand drill and counter sink it.
- Repeat the same procedure on the other piece also.
- Apply glue on joining surfaces.
- Assemble both the pieces together and drive the screws on the counter sunk holes on both top and bottom surfaces. (Fig 5)
- Allow glue to dry and finish the joint with smoothing plane (Fig 5)



**Make Tea table frame to lock four legs, top rails and bottom rails**

**Objectives :** At the end of this exercise you shall be able to

- make tea table legs
- make tea table top rails.

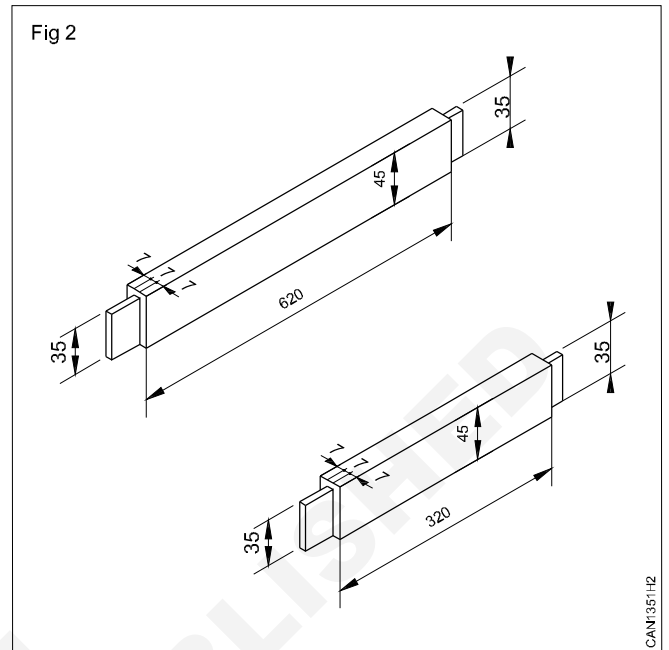
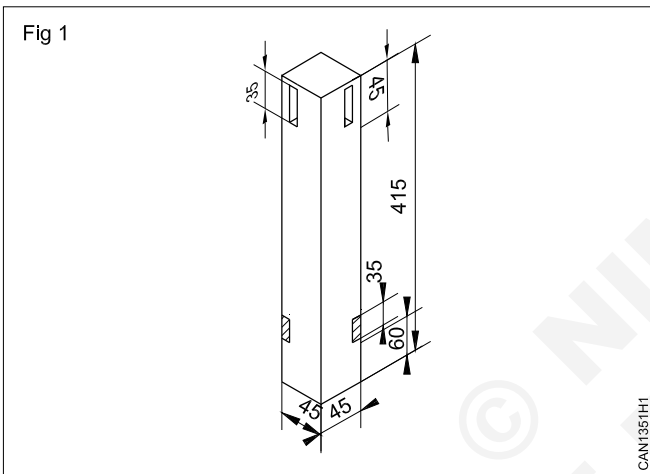


4	50x25x725		HARD WOOD			
4	50x50x450		HARD WOOD			
4	50x25x425		HARD WOOD			1.3.51
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>MAKE TEA TABLE FRAME TO LOCK FOUR LEGS, TOP RAILS AND BOTTOM RAILS</b>				TOLERANCE ± 2 mm	TIME 2hrs
					CODE NO. CA20N1351E1	

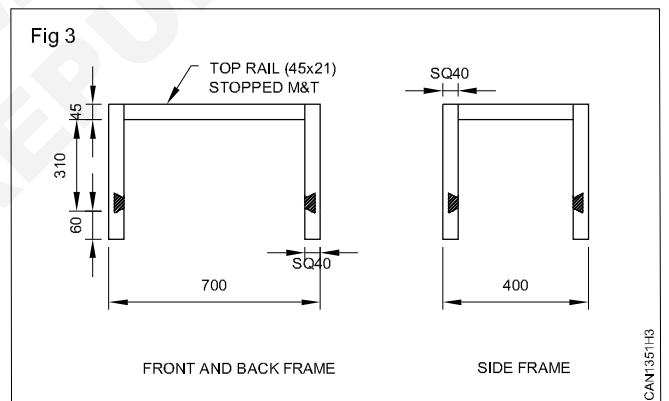


## Job Sequence

- Check the wooden pieces for its size with tap rule.  
Hard wood 50 x 50 x 450mm (legs) - 4 Nos.  
Hard wood 50 x 25 x 725 (rails) - 4 Nos.  
Hard wood 50 x 25 x 425 (rails) - 4 Nos.
- Plane all the work pieces to the required width and thickness to square as per drawing.  
40 x 40 x 415 (Legs) - 4 Nos  
45 x 21 x 690 (Front and back rails) - 4 Nos  
45 x 21 x 390mm (Side rails) - 4 Nos
- Check the width and thickness of pieces as per the drawing using folding rule.
- Mark and make the stopped mortise on the top part of the four legs as per the drawing. (Fig 1)
- Mark and make the stopped tenon on both the ends of top rail pieces as per the drawing. (Fig 2)



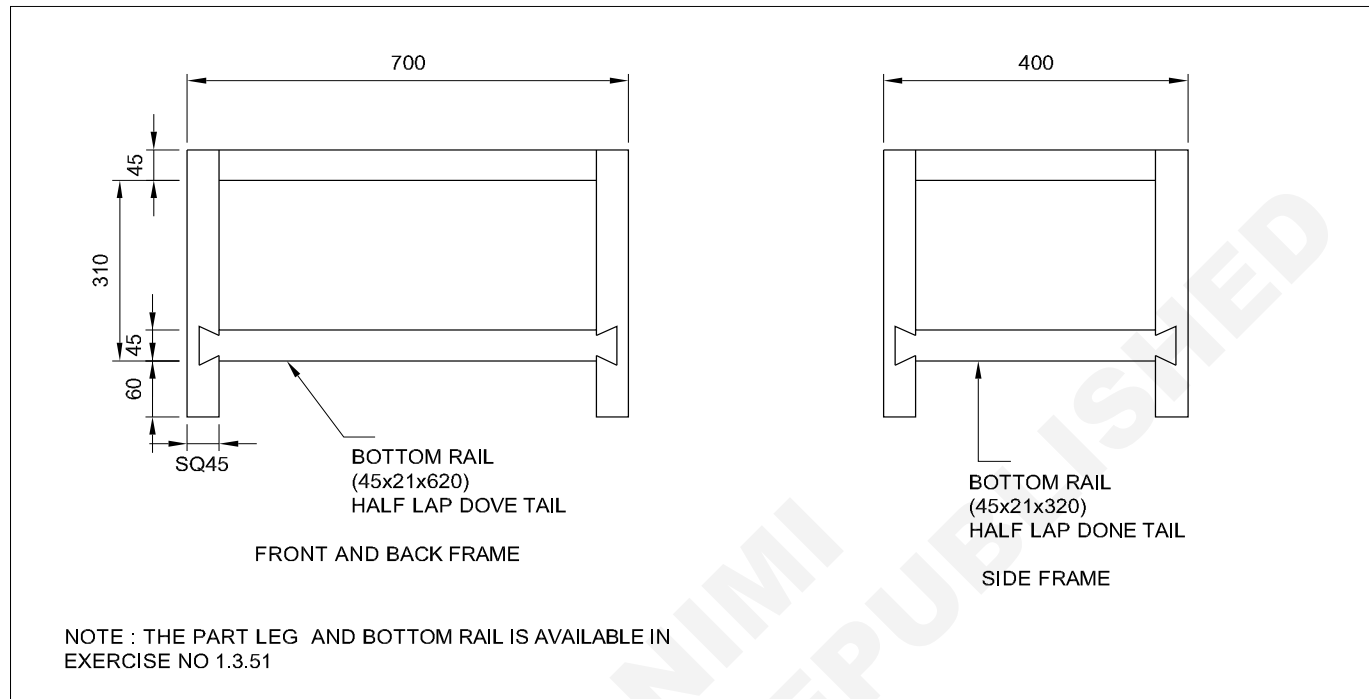
- Assemble the pieces together as shown in (Fig 3).



**Half lap dovetail joint on tea table bottom rails**

**Objectives:** At the end of this exercise you shall be able to

- make a half lap dovetail pin and socket
- assemble the bottom rails.

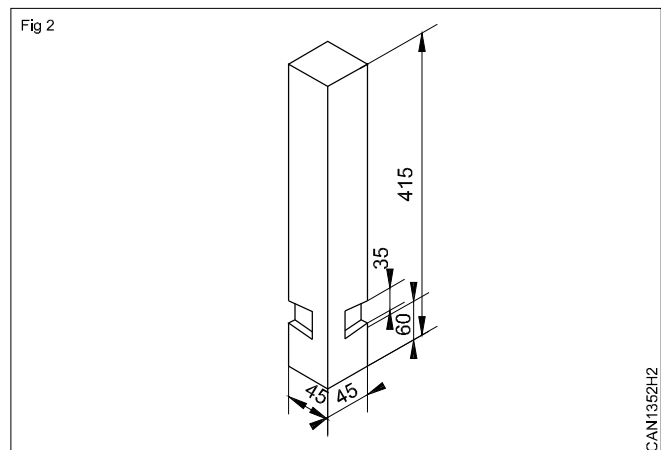
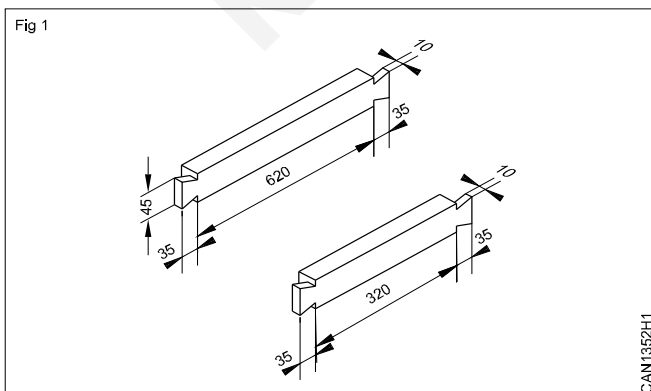


NOTE : THE PART LEG AND BOTTOM RAIL IS AVAILABLE IN EXERCISE NO 1.3.51

		1.3.51		1		1.3.52
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>MAKE TEA TABLE BOTTOM RAIL</b>				TOLERANCE ± 2 mm	TIME 2hrs
					CODE NO. CA20N1352E1	

**Job Sequence**

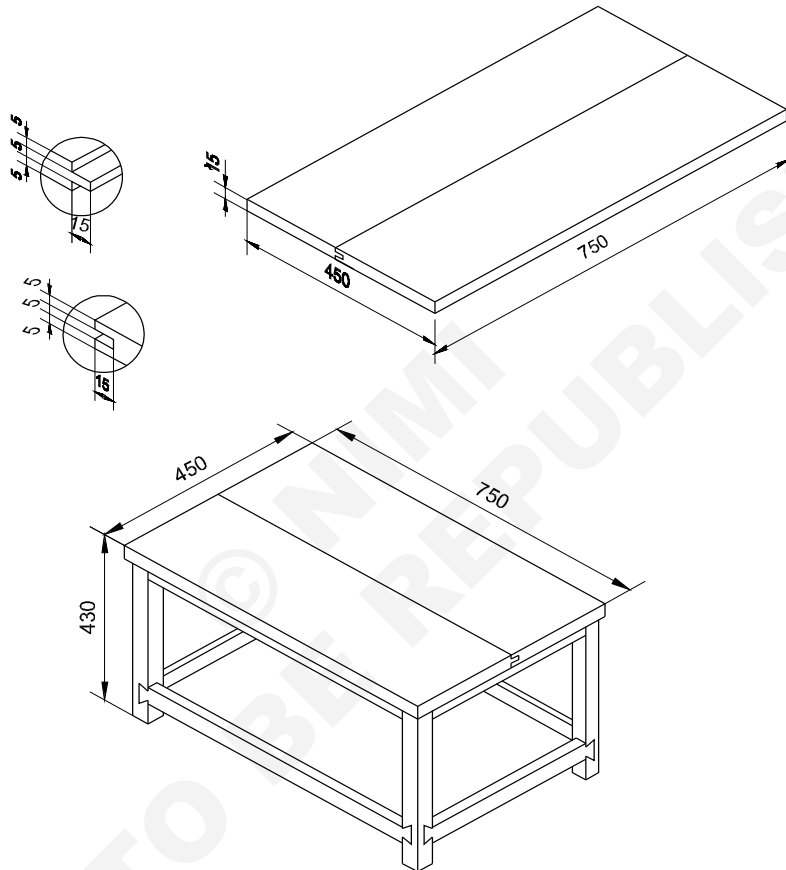
- Check the bottom rails for required length, width and thickness to make half lap dovetail joint.  
 45 x 21 x 690mm - 2 No's  
 45 x 21 x 390mm - 2 No's
- Mark and make half lap dovetail pin on both the end of bottom rails as per drawing. (Fig 1)
- Mark and make the half lap dovetail socket on bottom four legs as per the drawing. (Fig 2)
- Assemble the frame pieces together properly as per drawing.



**Tongue and groove joint on tea table top and assembly**

**Objectives:** At the end of this exercise you shall be able to

- make a tongue and groove joint on top plank
- prepare the wooden peg
- assemble the tea table frame
- fix the top plank on tea table frame.

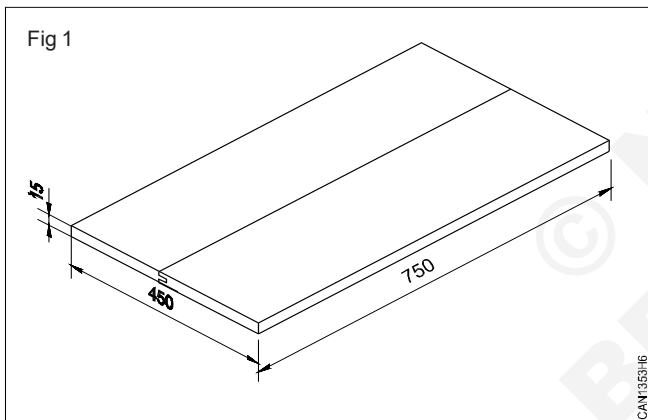


NOTE : THE PART OF THE LEG, TOP RAIL AND BOTTOM RAIL IS AVAILAIBLE IN EX.NO 1.3.51 & 1.3.52

2	NO,60,100		SAND PAPER			
14	30x8		WOOD SCREW			
1	100grms		FEVICOL			
24	12 x 12 x 60		HARD WOOD			
2	250x20x770	1.3.51 & 1.3.52	HARD WOOD	1		1.3.53
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX.NO
SCALE NTS		<b>TONGUE AND GROOVE JOINT ON TEA TABLE TOP AND ASSEMBLY</b>			DEVIATION-	TIME. 2hrs
					CODE NO. CA20N1353E1	

## Job Sequence

- Check the wooden pieces for its size using folding rule.
- Plane the pieces to the required width and thickness to square as per the drawing.  
225x15x770mm - 1 No.  
240x15x770mm - 1 No.
- Mark and make the tongue and groove joint for total length of tea table top as per the drawing. Refer Ex No 1.2.44  
225x15x750mm - 1 No.  
240x15x750mm - 1 No.
- When both the tongue part and groove part is ready, apply glue on the surfaces of tongue and groove parts as per drawing
- Fix the tongue part by inserting tongue along the groove and check the alignment (Fig 1)
- If the alignment is proper, clamp it in a bar-clamp. Refer Ex No 1.2.44
- Allow the glue to dry.



- Remove the bar clamp from the plank. Finish the tea table plank using smoothing plank. (Fig 1)
- Check the tea table top plank its size 450x15x750mm using folding rule.
- Mark the drill hole position (Point) on centre of all the mortices, on four legs of tea table.
- Prepare the wooden pegs as required.

- Set the bar clamp to suit the tea table frame.
- Provide the waste piece on both the sides of the frame.
- Apply the fevicol evenly on mortises and tenon surface on one side of the frame pieces.
- Assemble the side frame pieces together properly.
- Place the side frame on the bar clamp and tighten it.
- Mark the drill hole on marked points of drill hole.
- Apply fevicol on the surface of wooden peg.
- Insert and drive the wooden peg through the drilled hole cut off the projected wooden pegs.
- Repeat the same procedure for the other side frame.
- Apply the glue on top and bottom of other two side rails (Tenon) and mortices, dovetail socket and pins.
- Assemble both the glued side frame together properly
- Place the bar clamp on the frame assembly.
- Tighten the bar clamp.
- Make the drill hole on marked points.
- Apply glue on the surface of wooden peg.
- insert and drive the wooden peg through the drilled hole properly.
- Cut off the projected wooden pegs.
- Repeat the same procedure for assembling drilling and fixing the wooden peg on the other side frame.
- Mark the frame measurements on top plank.
- Mark the measurements on plank top plank to make a drill hole for fixing the screws.
- Make the drill hole on the marked points.
- Counter sunk the drill hole on top surface of the top plank.
- Drive the screws through the drilled hole till it is seated below the surface level.
- Cover the drilled surface using putty.
- Smooth all the surfaces of the tea table using sand paper.
- Finish the tea table.

## Skill sequence

### wooden peg

---

**Objective:** This shall help you to

- **prepare the wooden peg.**
- 

#### **Prepare the wooden peg**

Select the wooden pieces with uniform and straight grains.

Cut the wooden pieces into 12 x 12 x 60mm length - 16 Nos. (Fig 1)

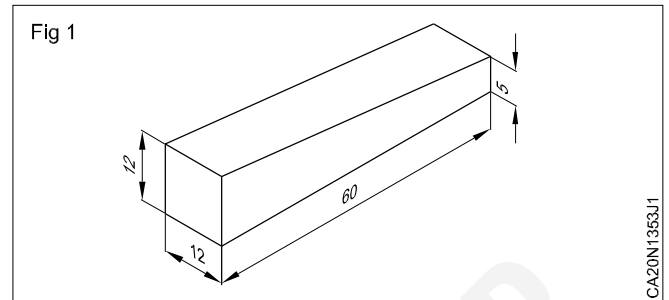
Place the wooden peg on bench hook.

Taper the peg on one side using firmer chisel.

Turn the peg and place the tapered surface down to the bench hook. (Fig 1)

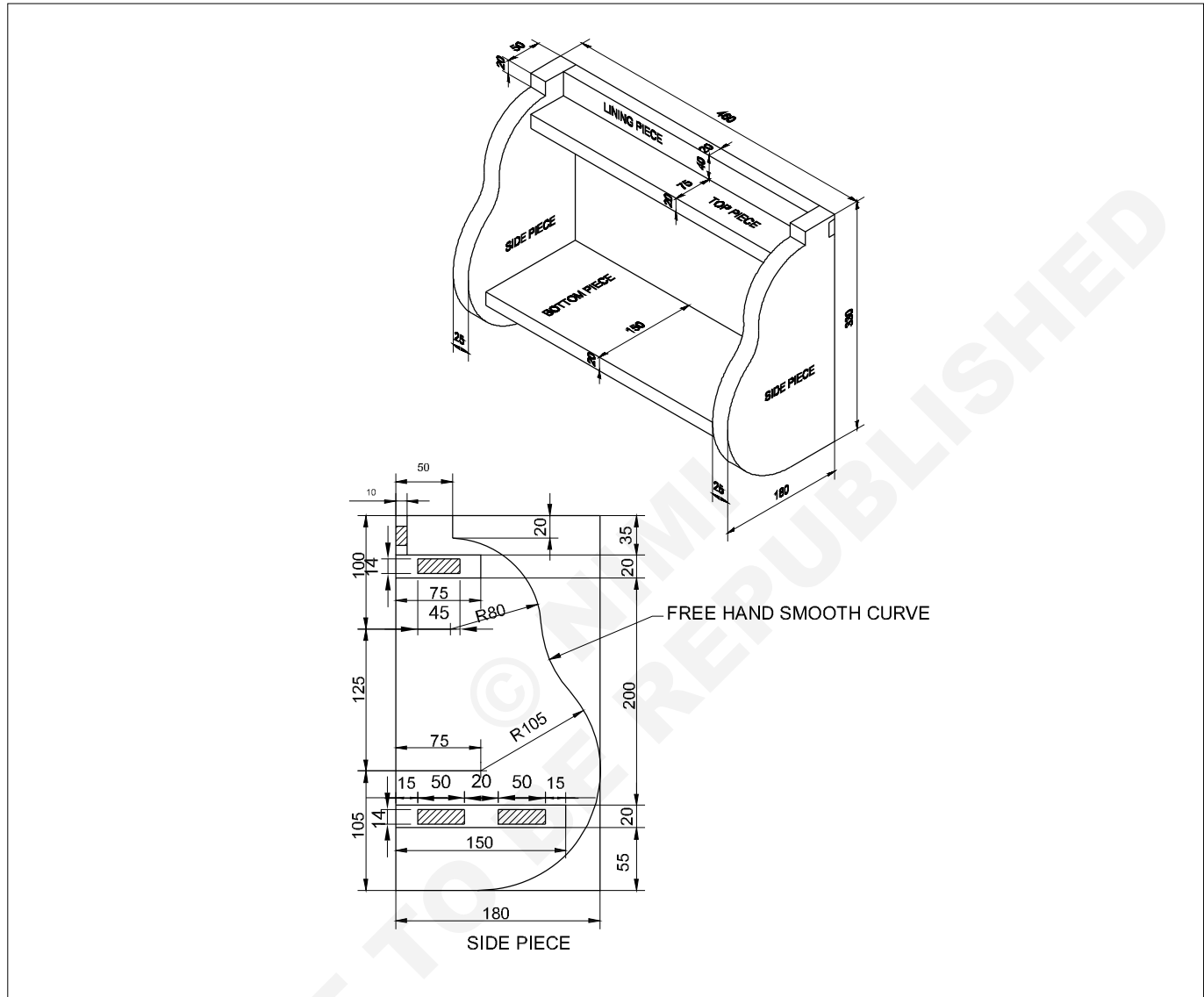
Taper the other side of page using firmer chisel (Fig 1)

Repeat the same procedure on other two sides. (Fig 1)



Make a small wall bracket frame

Objective: At the end of this exercise you shall be able to  
• mark and make the small wall bracket frame.

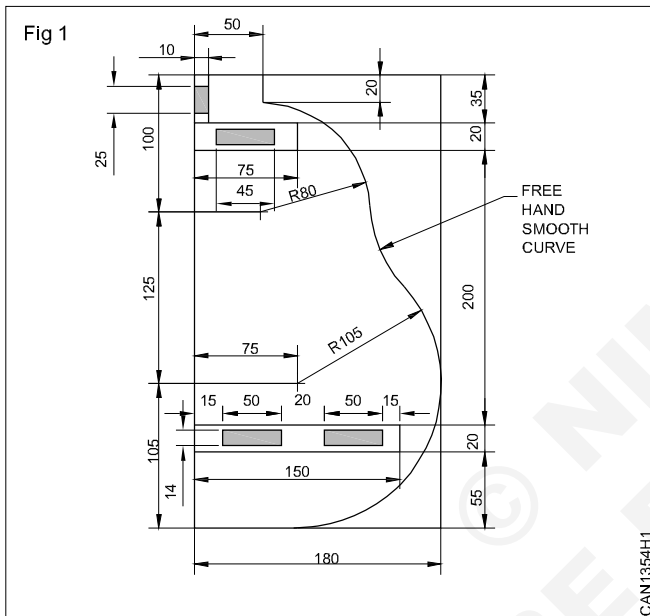


1	225x435x6mm	-	PLY WOOD			
1	175x25x500	-	HARD WOOD			
1	100x25x500	-	HARD WOOD			
1	50x25x500	-	HARD WOOD			
2	200x30x400	-	HARD WOOD	2		1.3.54
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX.NO
SCALE NTS	<b>MAKE A SMALL WALL BRACKET FRAME</b>				DEVIATION±	TIME. 3hrs
					CODE NO. CA20N1354E1	

# Job Sequence

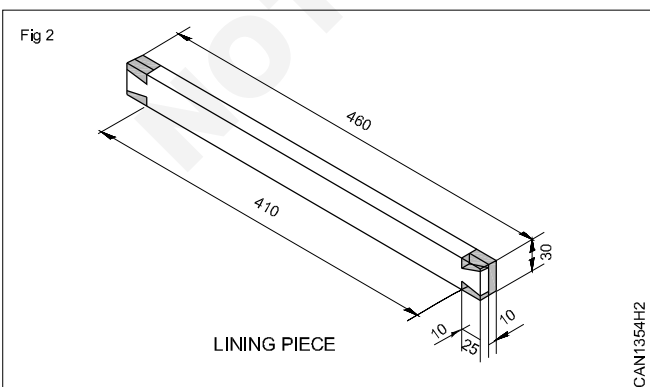
## Side pieces

- Check the work pieces, for the required measurements. side pieces 200 x 30 x 400 - 2 No's using folding rule.
- Plane the pieces to the required width and thickness using jack plane. Size 180x25x330mm = 2 No's
- Mark the dimensions on the surface of the side pieces, the profile as per drawing. (Fig 1)
- Set the wing compass and mark the convex lines on the surface of the side pieces as per drawings. (Fig 1)
- Adjust the wing compass and mark the concave line on the surface of the job to get continuation with marked convex lines as per drawing. (Fig 1)



## Lining piece

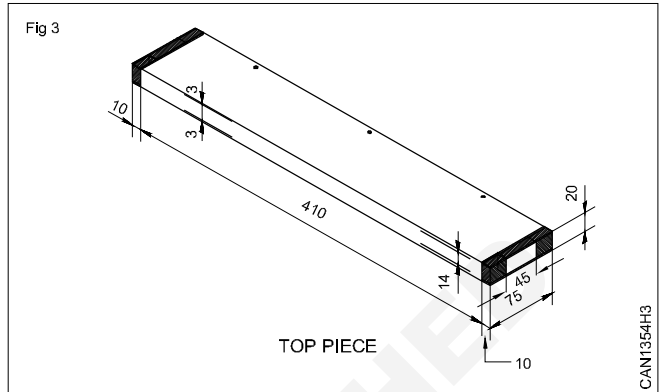
- Check the work piece for the required measurements 50 x 25 x 500 - 1 No.
- Plane the piece to the size 35x20x460mm = 1 No.
- Mark the dimensions of the lining piece profile as per drawing. (Fig 2)



## Top piece

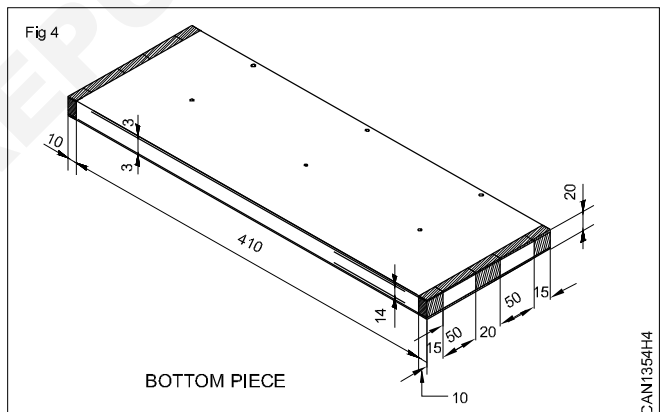
- Check the work piece for the required measurements. 100 x 25 x 500 = 1 No

- Plane the piece to the required size 75x20x430mm.
- Mark the dimension of the top piece profile as per drawing. (Fig 3)



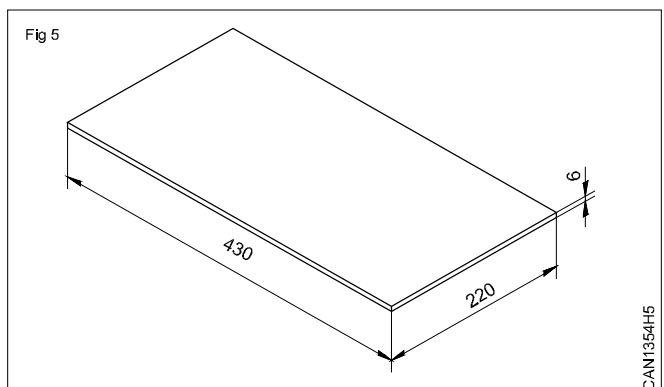
## Bottom piece

- Check the work piece for the required measurements 175 x 25 x 500 = 1 No
- Plane the piece to the required size 150x20x430.
- Mark the dimensions of the bottom piece profile as per drawing. (Fig 4)



## Back piece

- Check the work piece for the required measurements.
- Prepare 430x 220x6mm ply wood as per dimension of the table for fixing on the back side of the frame. (Fig 5)



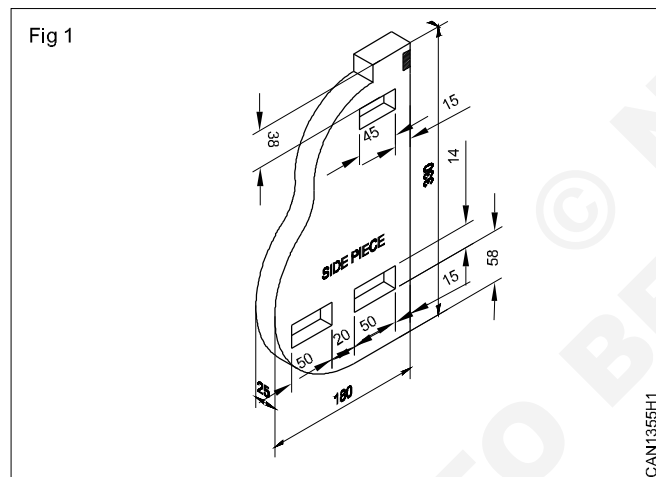
**Stopped tenon & mortise joint on small wall bracket frame to set the shelves**

**Objective:** At the end of this exercise you shall be able to  
 • make a stopped tenon and mortise.

**Job Sequence**

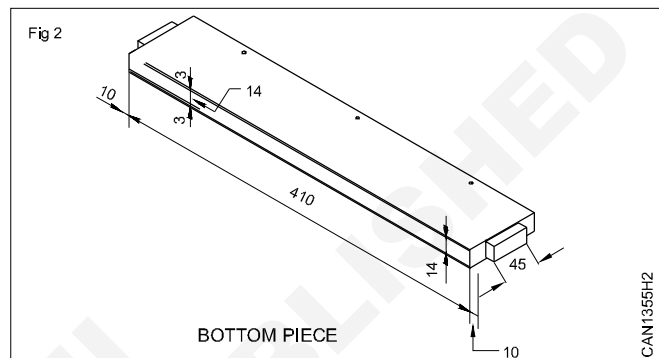
**Side pieces**

- Mark all the work pieces to the required size as per the drawing
- Mark and make a stopped mortise on side piece as per drawing. (Fig 1)
- Hold the side piece on the vice.
- Select the compass saw
- Set the saw on marked line
- Start sawing slowly with the compass saw make the concave and convex surface on side. piece as per drawing. (Fig 1)
- Repeat the same procedure for the other side piece.



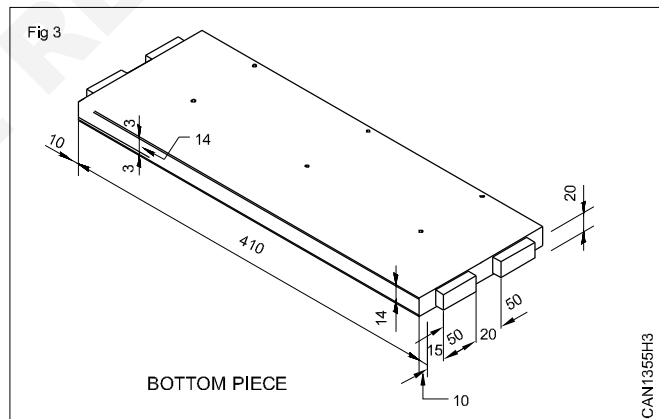
**Top piece**

- Mark and make the stopped tenon as per the drawing. (Fig 2)



**Bottom piece**

- Mark and make the stopped tenon as per the drawing. (Fig 3)
- Check the stopped mortise and tenon surface.

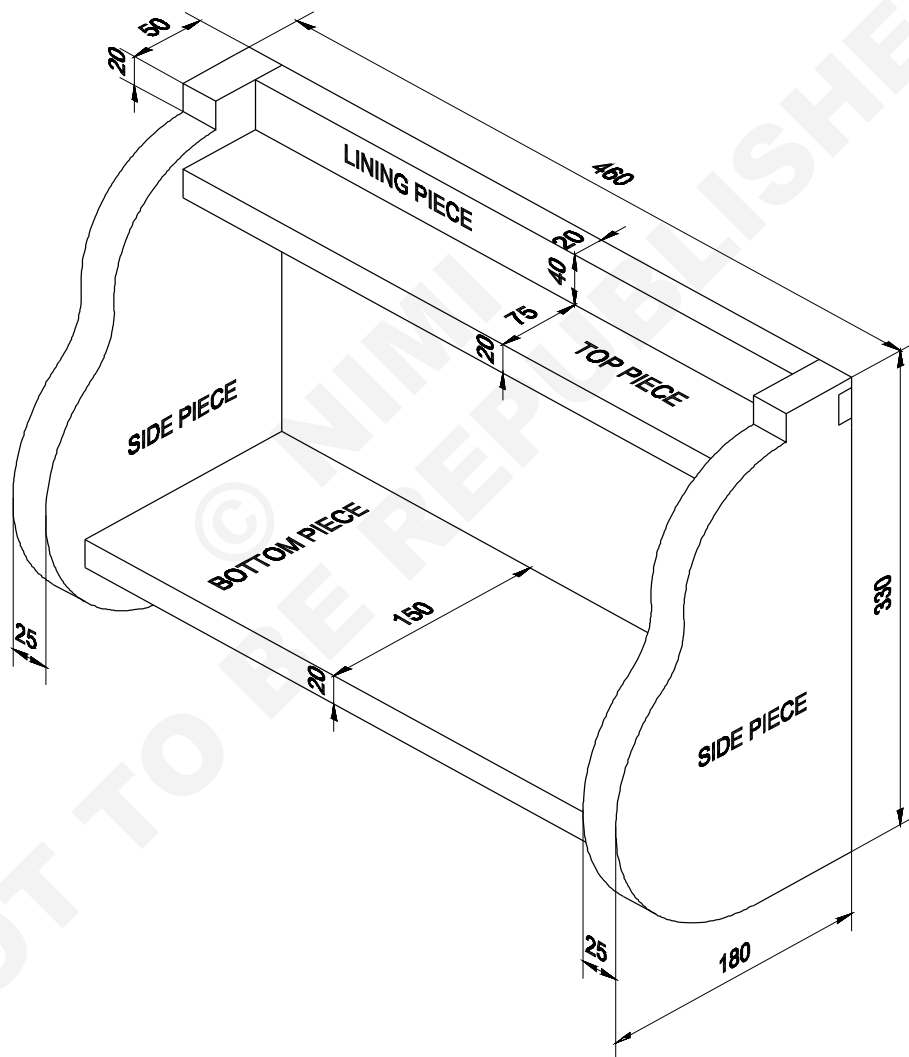




**Make shelves by six pieces with single half lap dovetail joint and assemble with small wall bracket**

**Objectives :** At the end of this exercise you shall be able to

- make the half lap dovetail
- make the rebate
- assemble and finish the wall bracket.

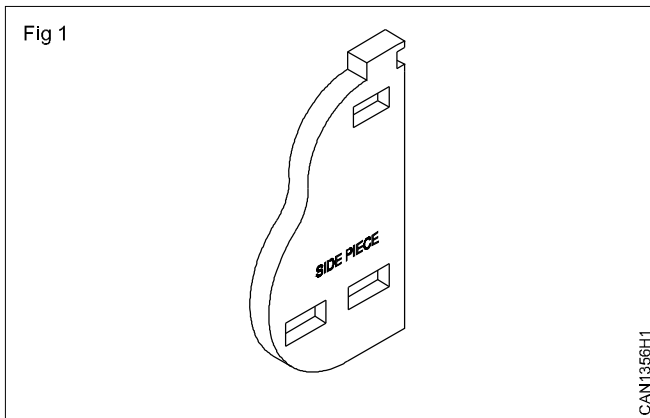


NOTE : THE PART OF THE WALL BRACKET IS AVAILABLE IN EX.NO. 1.3.54 & 1.3.55

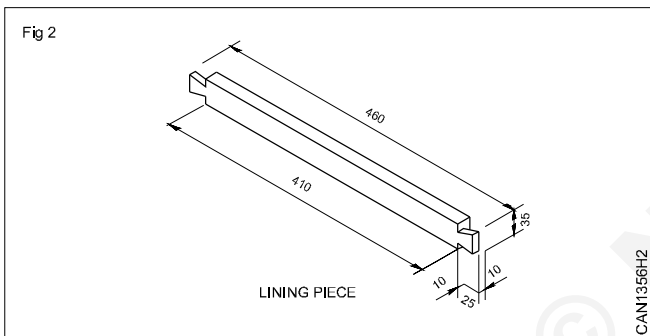
NO.OFF	STOCK SIZE	1.3.54 & 1.3.55 SEMI-PRODUCT	HARD WOOD MATERIAL	2 PROJECT NO.	PART NO.	1.3.56 EX.NO.
SCALE NTS	<b>MAKE SHELVES BY SIX PIECES AND ASSEMBLE WITH SMALL WALL BRACKET</b>				DEVIATIONS ± 1	TIME 3hrs
					CODE NO. CA20N1356E1	

## Job Sequence

- Mark and make the single half lap dovetail socket on the side pieces top as per the drawing. (Fig 1)
- Mark and make single half lap dovetail pin of the lining piece per the drawing. (Fig 2)

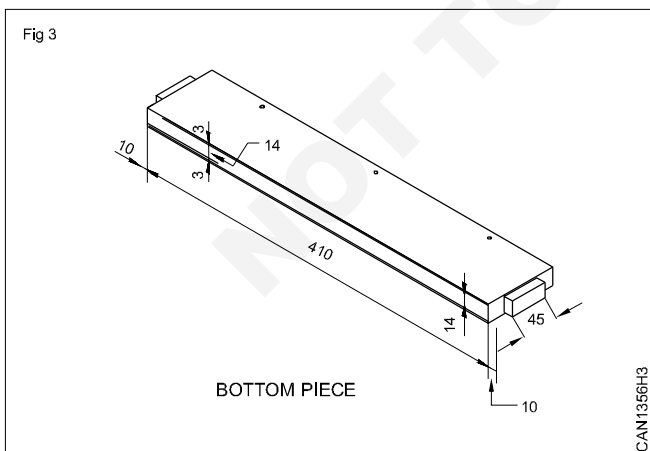


- Mark and make a rebate on back side of the frame pieces to fix the back piece

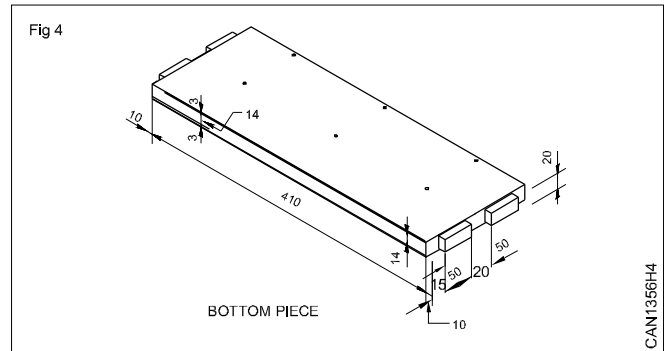


### Assembling and finishing

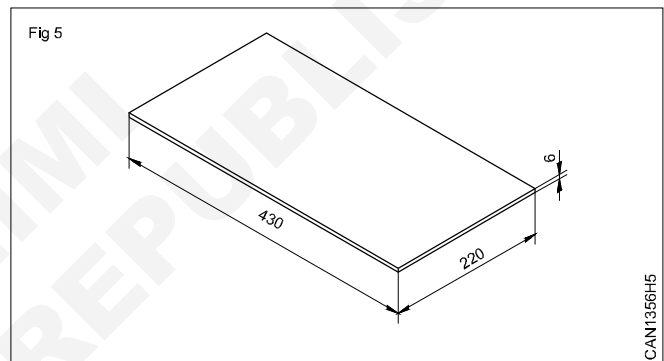
- Apply the glue on the shelves by six pieces on the surface stopped mortise, tenon and single half lap dovetail socket and pin using brush. (Fig 3 & 4)
- Assemble the pieces together using mallet/hammer. (Fig 1,2,3 & 4)



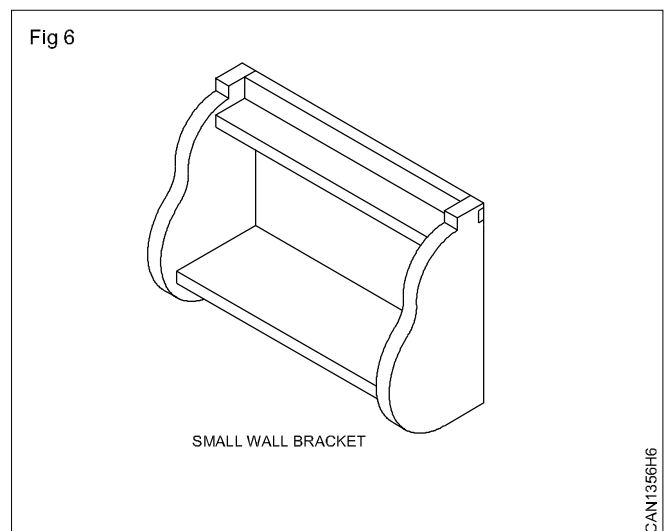
- Place the wall bracket over bar clamp and tighten it
- Drill a hole on the marked point of the drill hole using per table power drilling machine.
- Screw the side together using 35mm screw.



- Drive the screws so that screw head should sit properly in the counter sink holes.
- Screw the lining piece on top of the side pieces with 35 mm screw using screw driver.
- Fix the 6mm ply wood on rebate surface of the frame using 20 mm wire nail. (Fig 5)
- Check the squareness of the job.



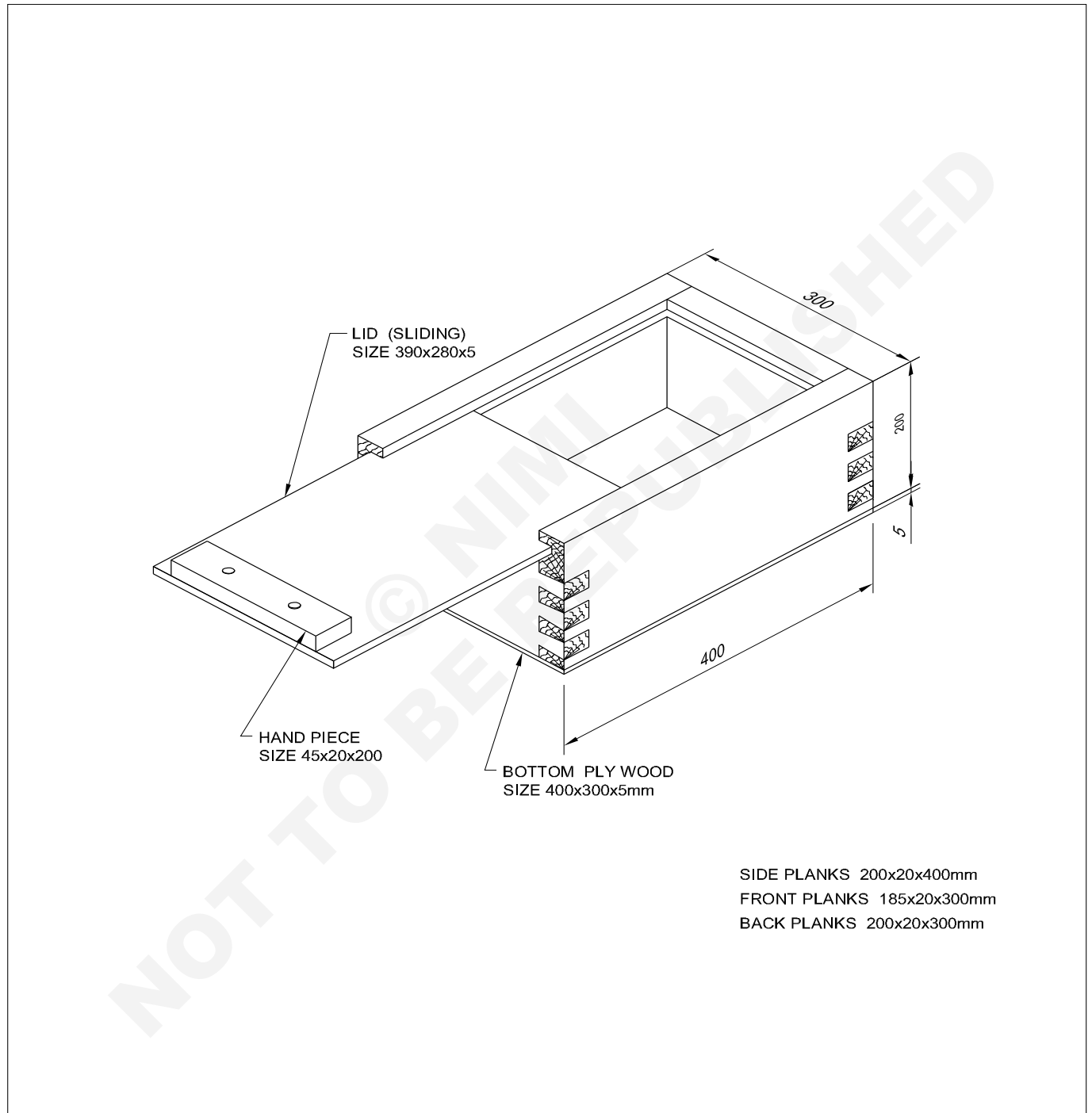
- Smooth the surface of the wall bracket using sand paper No 60, 120, 150
- Finish the small wall bracket. (Fig 6)



**Make a four side of chalk box tray with common dovetail joint**

**Objectives :** At the end of this exercise you shall be able to

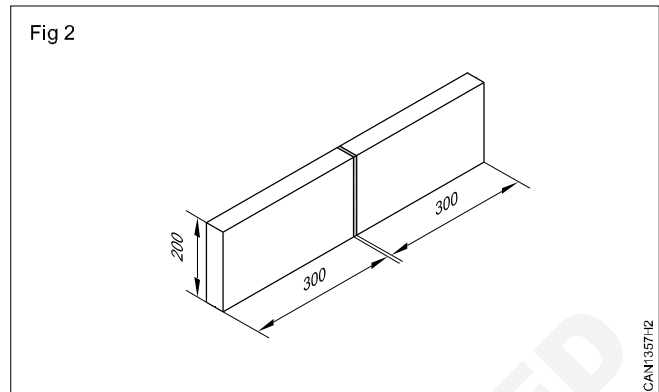
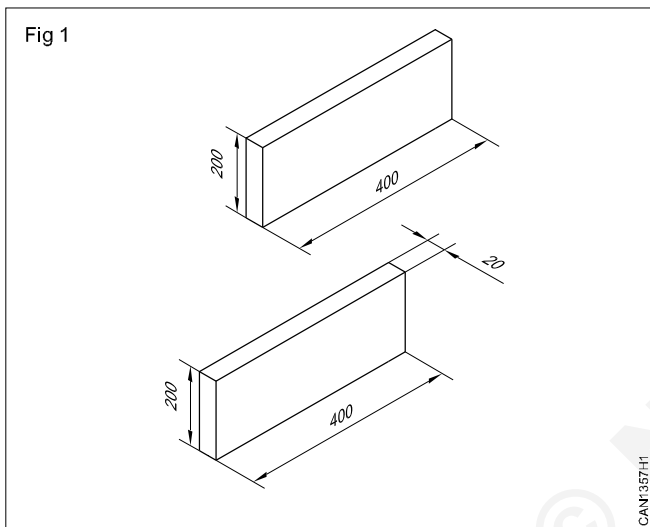
- make a four side of the chalk box
- mark a common dovetail joint.



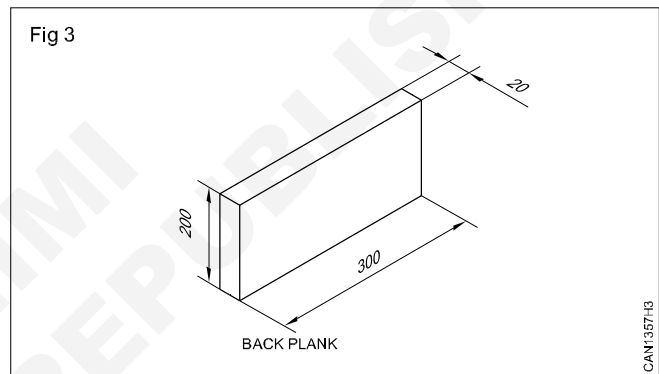
1	210x25x310mm		HARD WOOD			
2	210x25x410mm		HARD WOOD	3		1.3.57
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO	PART NO.	EX. NO.
SCALE NTS	MAKE A FOUR SIDE OF CHALK BOX WITH COMMON DOVETAIL JOINT				TOLERANCE ± 0.5 mm	TIME 3hrs
					CODE NO. CA20N1357E1	

## Job Sequence

- Check the wooden pieces for its size using folding rule.  
210 x 25 x 410mm = 2 No's  
210 x 25 x 610mm = 1 No.
- Plane the material to size using jack plane.  
200 x 20 x 470mm = 2 No's  
200 x 20 x 610mm = 1 No.
- Mark the measurements of side pieces 400mm, 400mm and square the edges and smoothen it using firmer chisel. (Fig 1)
- Mark the measurements of front and back piece to the length 300mm, 300mm with cutting allowance. (Fig 2)

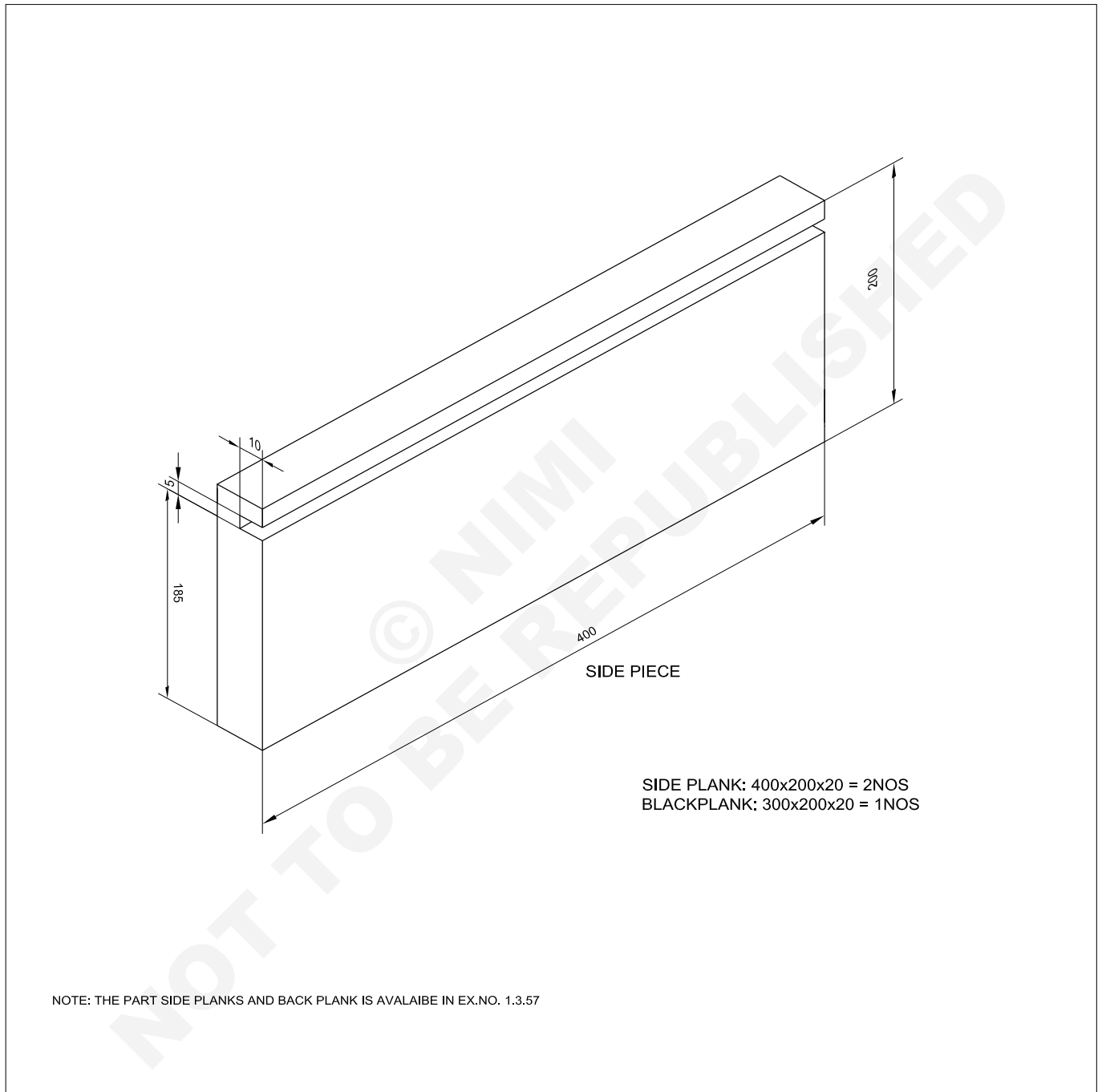


- Make one plank of size 185x20x300 = 1 No for front side. (Fig 3)



**Make grooves on three sides of the chalk box tray**

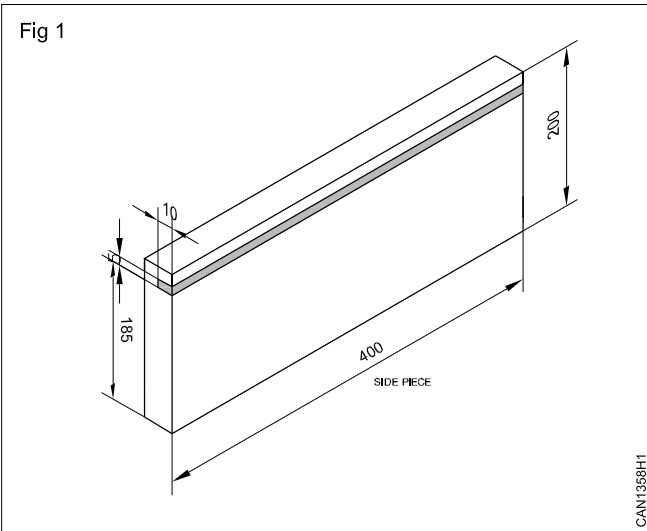
**Objective:** At the end of this exercise you shall be able to  
 • make the grooves.



1		EX.NO 1.3.57	HARD WOOD	3		1.3.58
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>GROOVE ON THREE SIDES OF CHALK BOX TRAY</b>				TOLERANCE ± 2.0 mm	TIME 2hrs
					CODE NO. CAN1358E1	

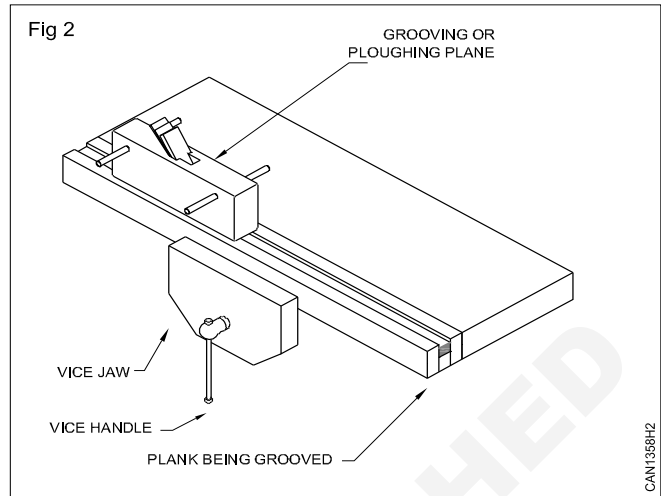
## Job Sequence

- Check the three plane wood using folding rule
  - 200 x 20 x 400 = 2 Nos side plank
  - 200 x 20 x 300 = 1 No back plank
- Mark the grooves in three pieces using wooden rule and marking gauge as per the drawing. (Fig 1)

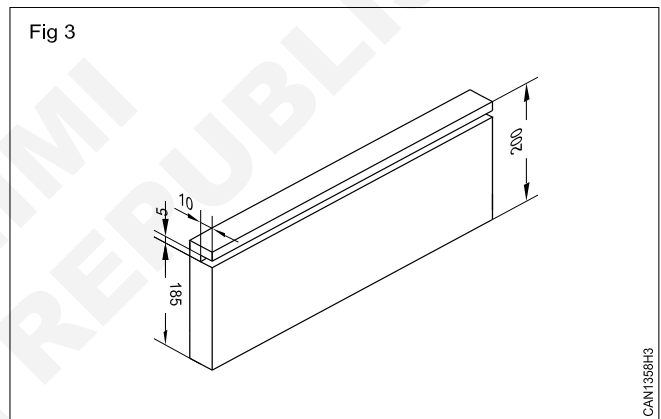


- Set the grooving plane to a width of 5mm and to a depth of 10mm.
- Hold the plank in the vice (Fig 2)
- Keep the grooving plane with its fences bearing against the face side of the plank
- Move the plane along the grain. (Fig 2)
- Plane it till required depth.

- Repeat the same procedure for the other two pieces.
- Remove the wood shavings.



- Finish the grooves in three pieces of chalk box (Fig 3)



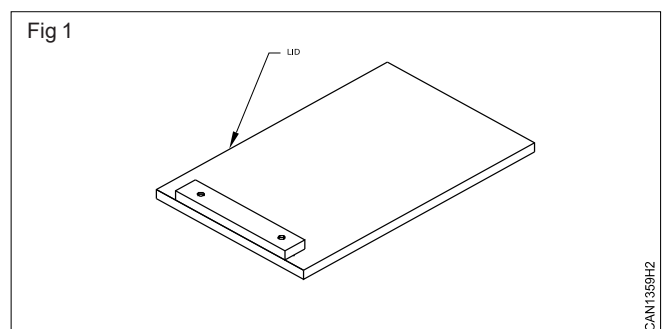
**Make the lid with handle for chalk box**

**Objective:** At the end of this exercise you shall be able to  
• make the lid with handle.

1	50grms		FEVICOL			
2	35x8		WOOD SCREWS			
1	50x25x210		TEAK WOOD			
1	400x300x5mm		PLY WOOD	3		1.3.59
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO	PART NO.	EX. NO.
SCALE NTS		<b>MAKE THE LID WITH HANDLE FOR CHALK BOX</b>			TOLERANCE ± 2.0 mm	TIME 2hrs
					CODE NO. CAN1359E1	

**Job Sequence**

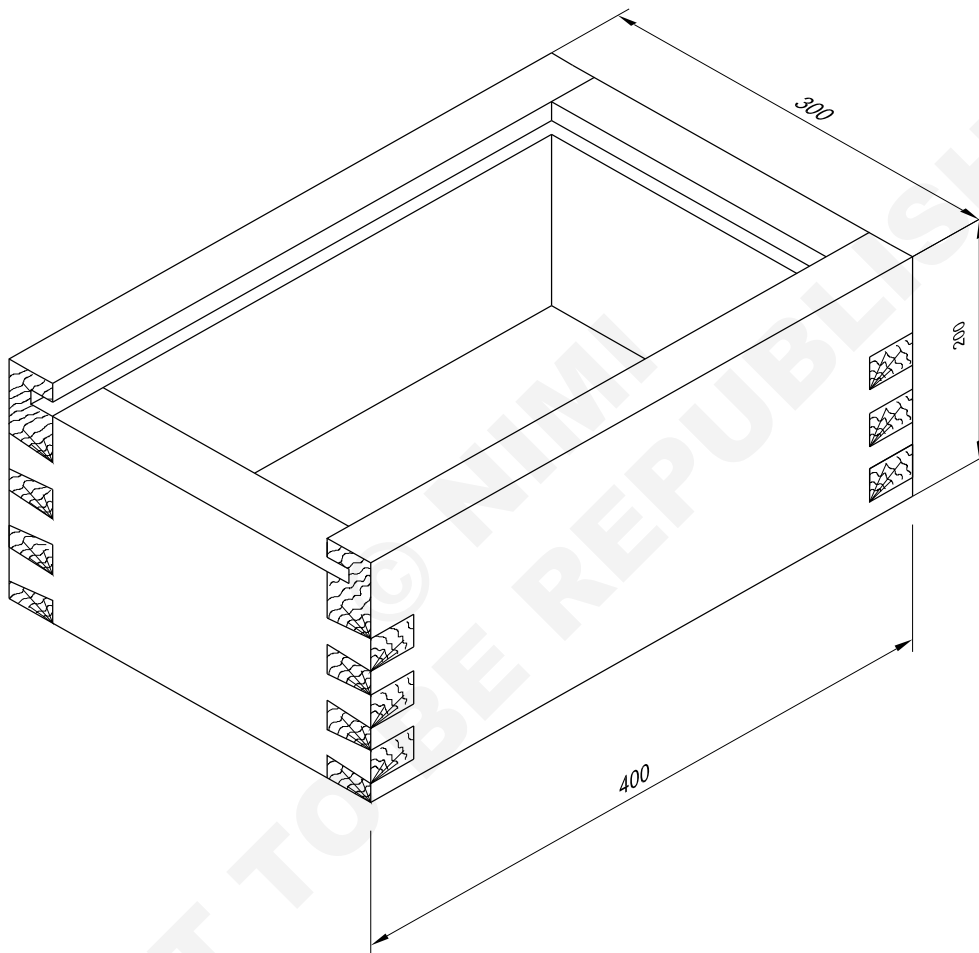
- Check the wooden pieces for its size.
  - Plywood 400 × 300 × 5mm - 1 No.
  - Teakwood 50 × 25 × 210mm - 1 No
- Plane the ply wood size of 390 × 270 × 5mm for the lid.
- Plane the teak wood reaper of size of the 45 × 20 × 210mm
- Take the teakwood reaper cut it to a length of 200mm for the handle piece.
- Mark and make a drill hole for the handle piece. (Fig 1)
- Apply fevicol on the plywood lid of size 390 × 280 × 5mm in the front edge only.
- Affix the handle reaper 45 × 10 × 200mm as shown in the sketch 1 and drive the screw using the screw driver on lid. (Fig 1)
- Check the squareness of the lid and handle.
- Smooth the surface of the lid using sand paper. (Fig 1)



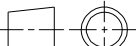
**Make a common dovetail joint apply to lock four sides of chalk box tray**

**Objectives :** At the end of this exercise you shall be able to

- make a common dovetail joint
- assemble four side of chalk box.



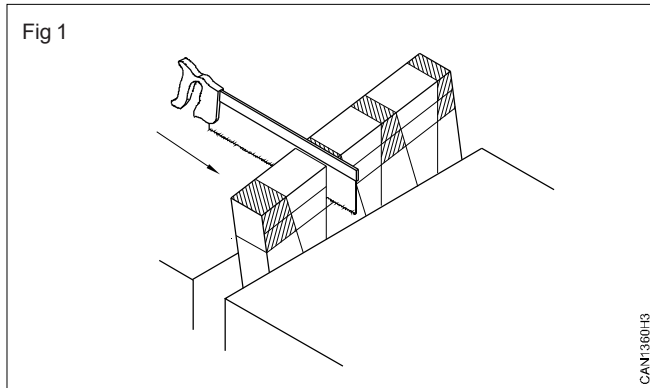
NOTE : THE PART SIDE PLANKS, FRONT PLANKS AND BACK PLANKS IS AVAILABLE IN EXERCISE NO.1.3.57 & 1.3.58

		EX.NO. 1.3.57&1.3.58		3		1.3.60
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO	PART NO.	EX. NO.
SCALE NTS	<b>MAKE A COMMON DOVETAIL JOINT APPLY TO LOCK FOUR SIDES OF CHALK BOX TRAY</b>				TOLERANCE± 2.0 mm	TIME 2hrs
					CODE NO. CA20N1360E1	

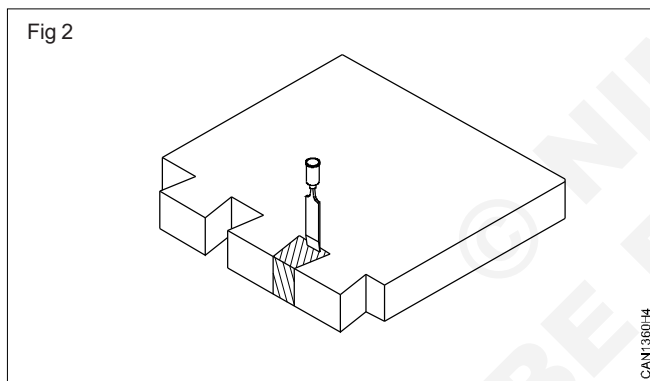


## Job Sequence

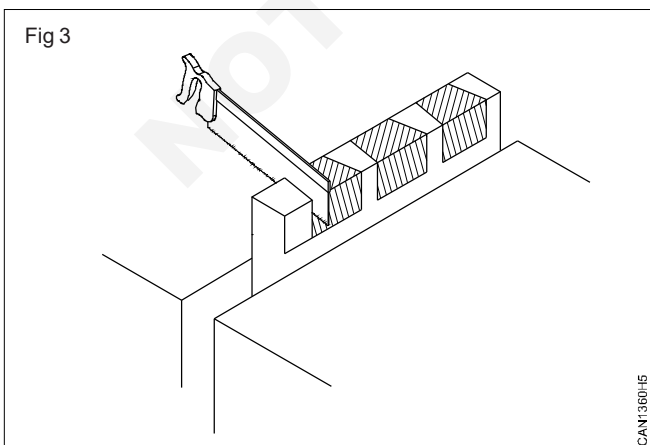
- Check the dimension for the four plank pieces.
- Mark the common dovetail pin and socket for the four plank pieces as per the drawing (Refer Ex No 1.2.36)
- Mark the waste areas using pencil.
- Fix the piece vertically in the vice, cut the walls of dove tail pin using dove tail saw. (Fig 1)



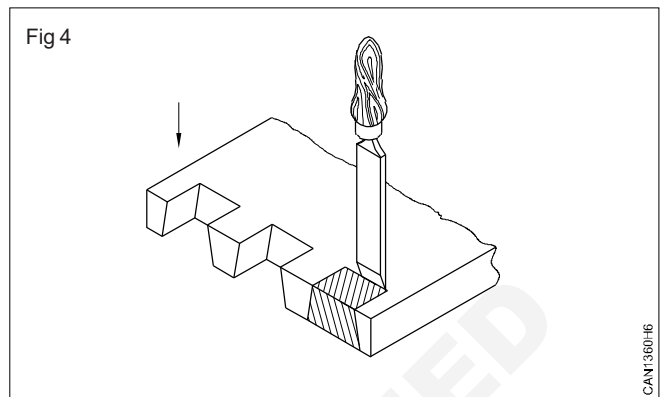
- Chisel out the waste of dove tail pin with bevel edge chisel. (Fig 2)



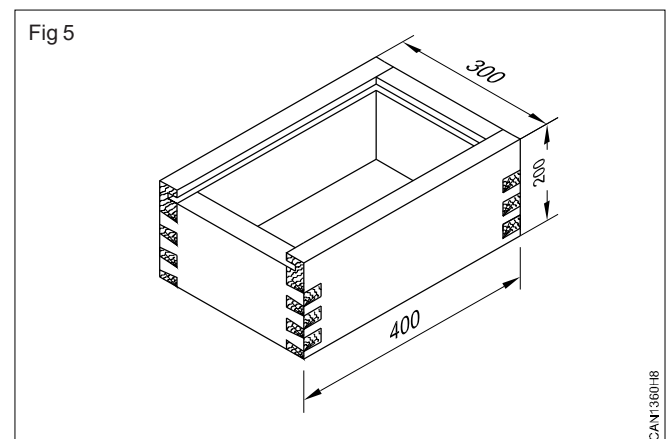
- Finish the surface and smoothen the walls.
- Repeat the same procedure for making the dovetail pin of all other edges of chalk box tray.
- Hold it in vice and with dovetail saw cut the walls of the dove tail sockets. (Fig 3)



- Saw on the waste side of the line
- Chisel the waste of dovetail sockets carefully using firmer chisel. (Fig 4)

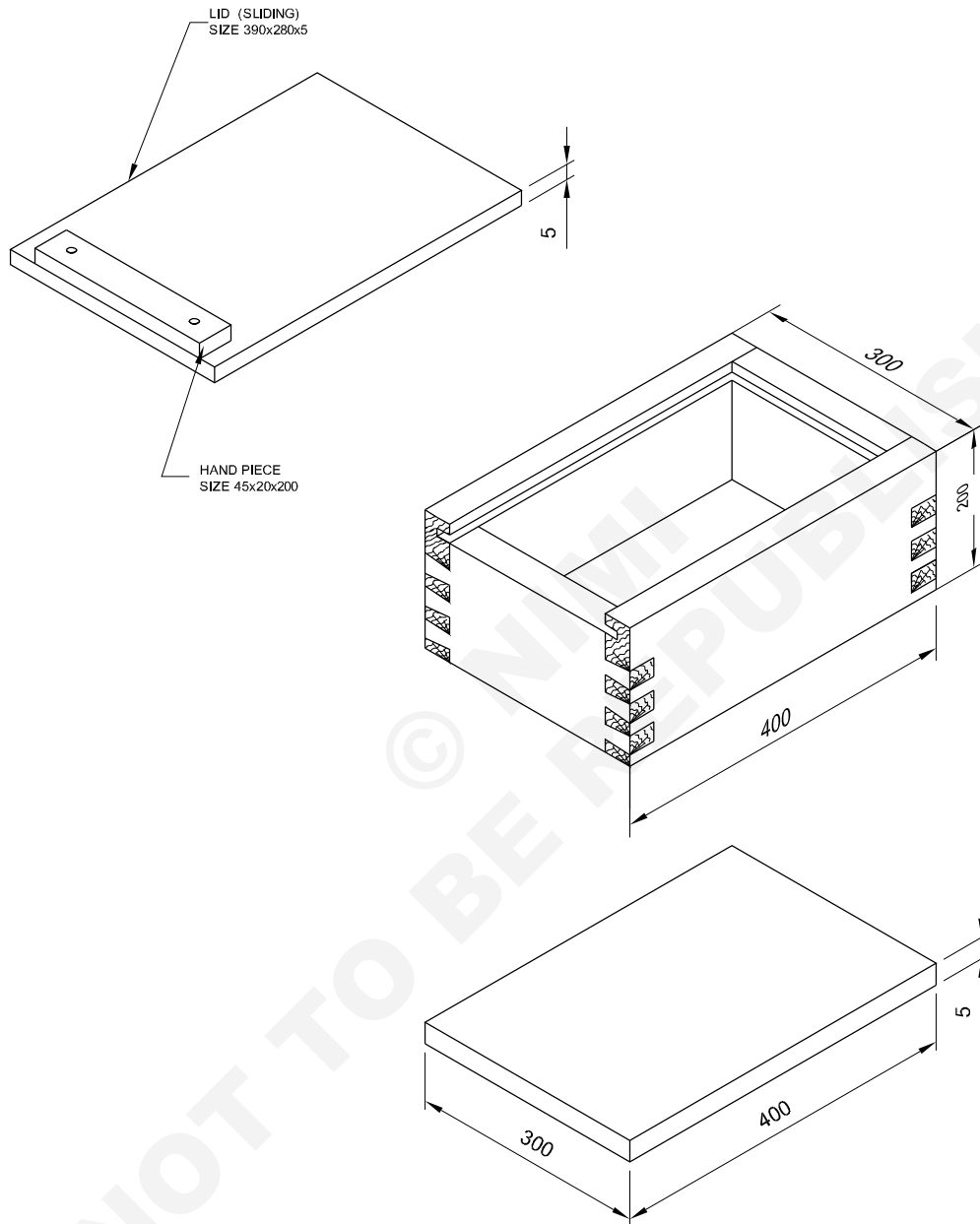


- Repeat the same procedure for making the dovetail socket of all other edges of chalk box tray.
- Assemble the common dovetail pin and socket for four plank pieces
- Mark the nail point on the chalk box tray using marking awl.
- Select the nail as per the required size.
- Apply fevicol on the dovetail pin and socket surface of the four planks and assemble
- Check the squareness of the chalk box tray.
- Place the tray on the bar clamp with wooden support pieces and tighten it.
- Insert and drive the nails in the marked nail point using ball pein hammer on four side of chalk box tray.
- Allow the glue to dry, remove the bar clamp and finish with smoothing plane in chalk box (Fig 5)



**Make a base for chalk box and assemble**

**Objective :** At the end of this exercise you shall be able to  
 • **fix the bottom plank of chalk box.**

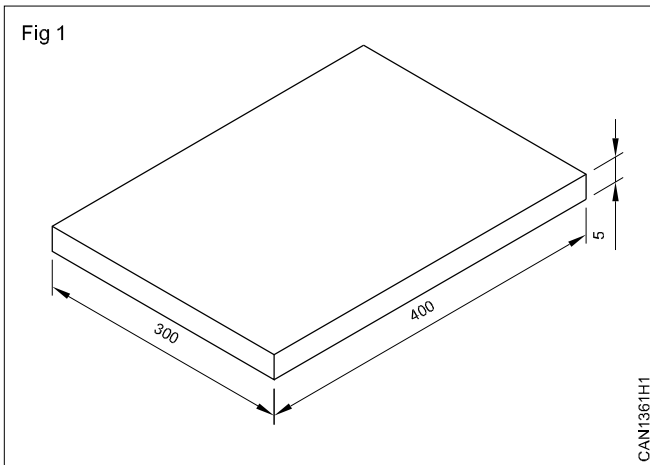


NOTE : THE PART OF THE CHALK BOX TRAY AND LID IS AVAILABLE IN EX.NO. 1.3.59 & 1.3.60

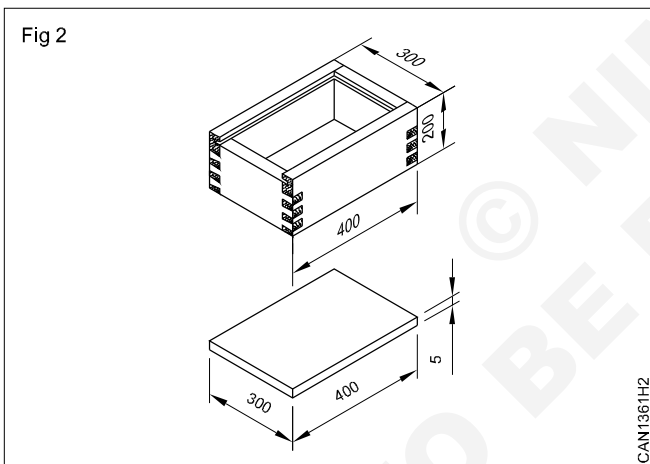
1	410x310x5mm	EX.NO. 1.3.59 & 1.3.60 ←	PLY WOOD	3		1.3.61
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO	PART NO.	EX. NO.
SCALE NTS	<b>MAKE A BASE FOR CHALK BOX AND ASSEMBLE</b>				TOLERANCE ± 2.0 mm	TIME 2hrs
					CODE NO. CA20N1361E1	

## Job Sequence

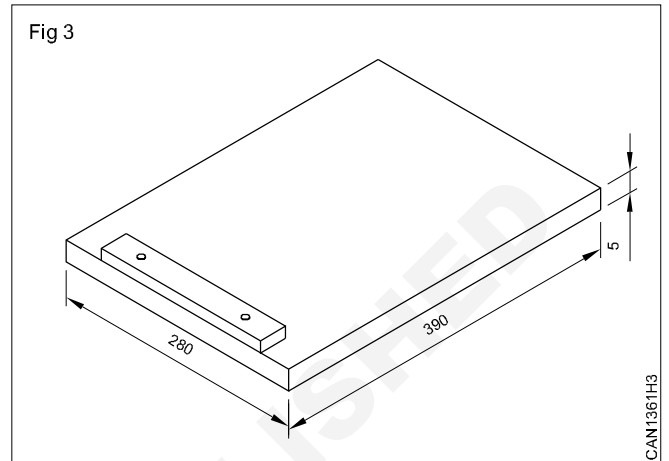
- Check the bottom plywood piece for its size
- Plane the ply wood edge to the size 400x300x5mm. (Fig 1)



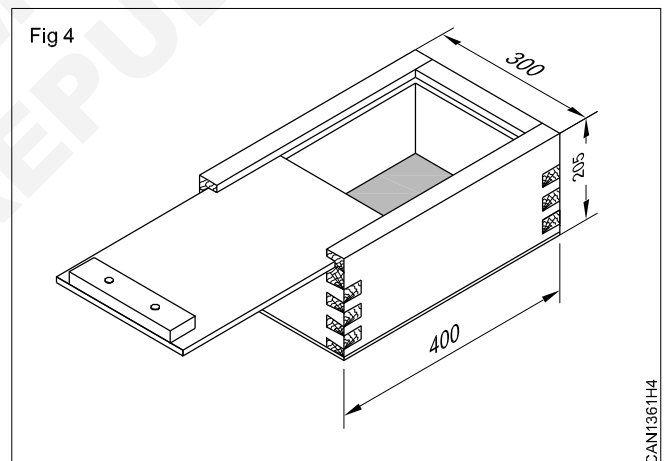
- Mark the tray measurement on the base plywood.
- Mark the measurement for nailing.
- Apply fevicol on bottom surface of chalk box tray properly. (Fig 2)



- Affix the plywood of size 400x300x5 on the bottom side of the chalk box tray and nail it properly.
- Smoothen all the surface of the chalk box tray with smoothing plane.
- Insert the top plank (lid) in provided grooves of the chalk box tray. (Fig 4)



- Smooth all the surface of the chalk box using sand paper. (Fig 4)

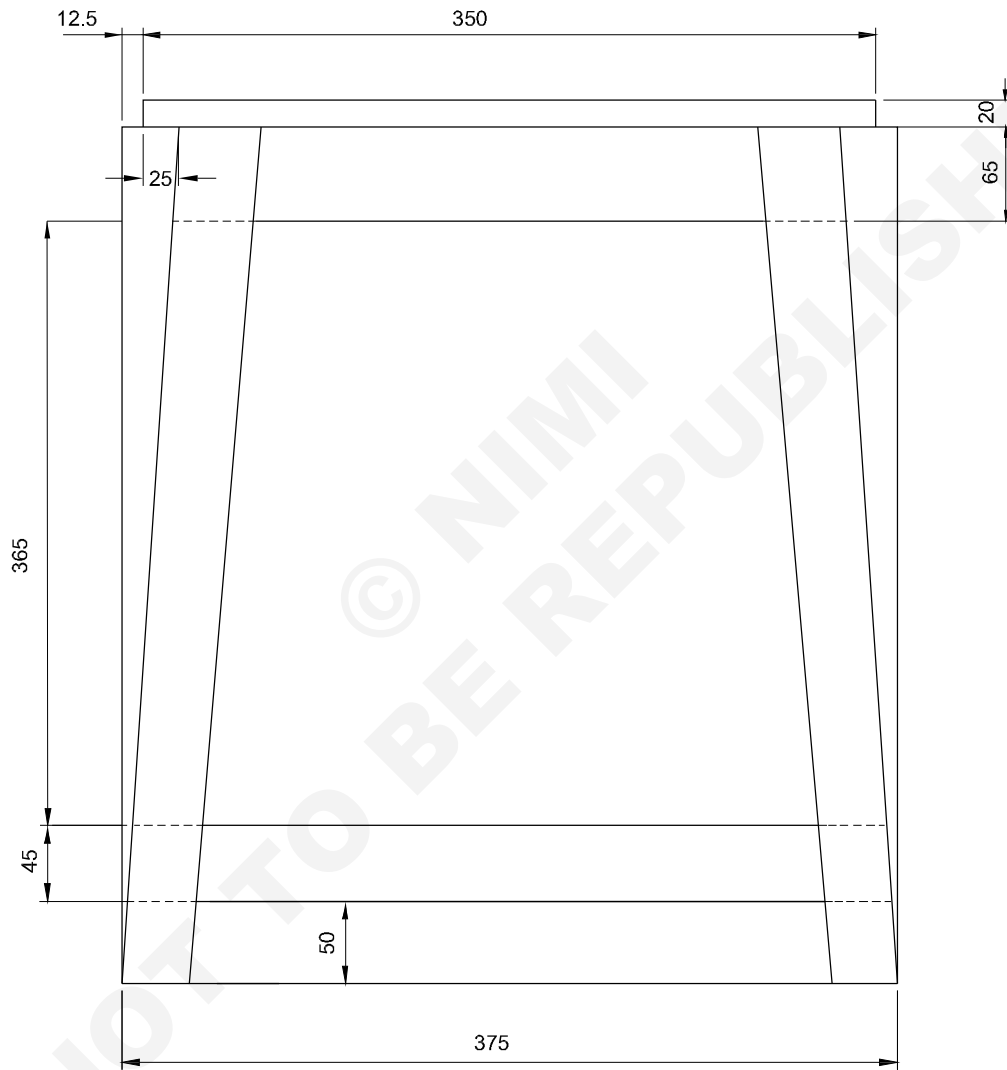


- Finish the chalk box.

**Layout of stool and make cutting list**

**Objectives:** At the end of this exercise you shall be able to

- make the layout for a small stool
- prepare the cutting list for a standard height taper legged stool.



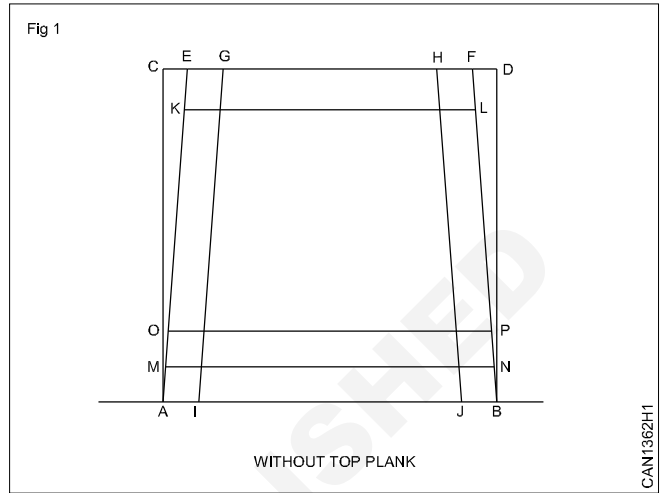
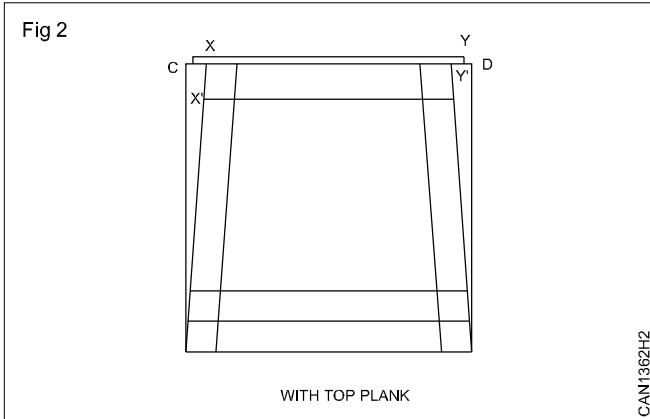
1	50 ISF 10-60	-	Fe310	4	4	1.3.62
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX.NO.
SCALE NTS					DEVIATION ±0.06	TIME 3hrs
<p><b>LAYOUT OF STOOL AND MAKE CUTTING LIST</b></p>					CODE NO. CA20N1362E1	

# Job Sequence

## TASK 1 : Layout of stool

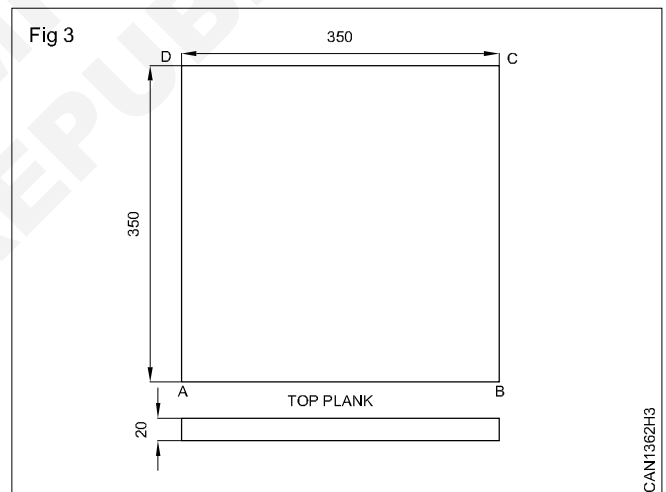
- Draw AB 375mm horizontal line (Fig 1)
- Draw perpendicular line 325mm at the point A and B. (Fig 1)
- Mark AC 545mm, CD 425mm (Fig 1)
- Join C and D (Fig 1)

- Draw parallel line X-Y 350mm at a distance of 12.5mm from CD (Fig. 2)
- Join X1 and Y1 (Fig 2)



- Mark CE, DF 37.5mm.
- Join AE and BF
- Draw parallel line I.G at a distance of 45mm from A-E
- Draw parallel line JH at a distance of 45mm from B-F.
- Draw parallel line K-L at a distance of 65mm from E-F
- Draw the parallel line M-N and O.P at a distance of 45mm from A-B.

- Draw a square ABCD = 350mm size (Fig. 3)

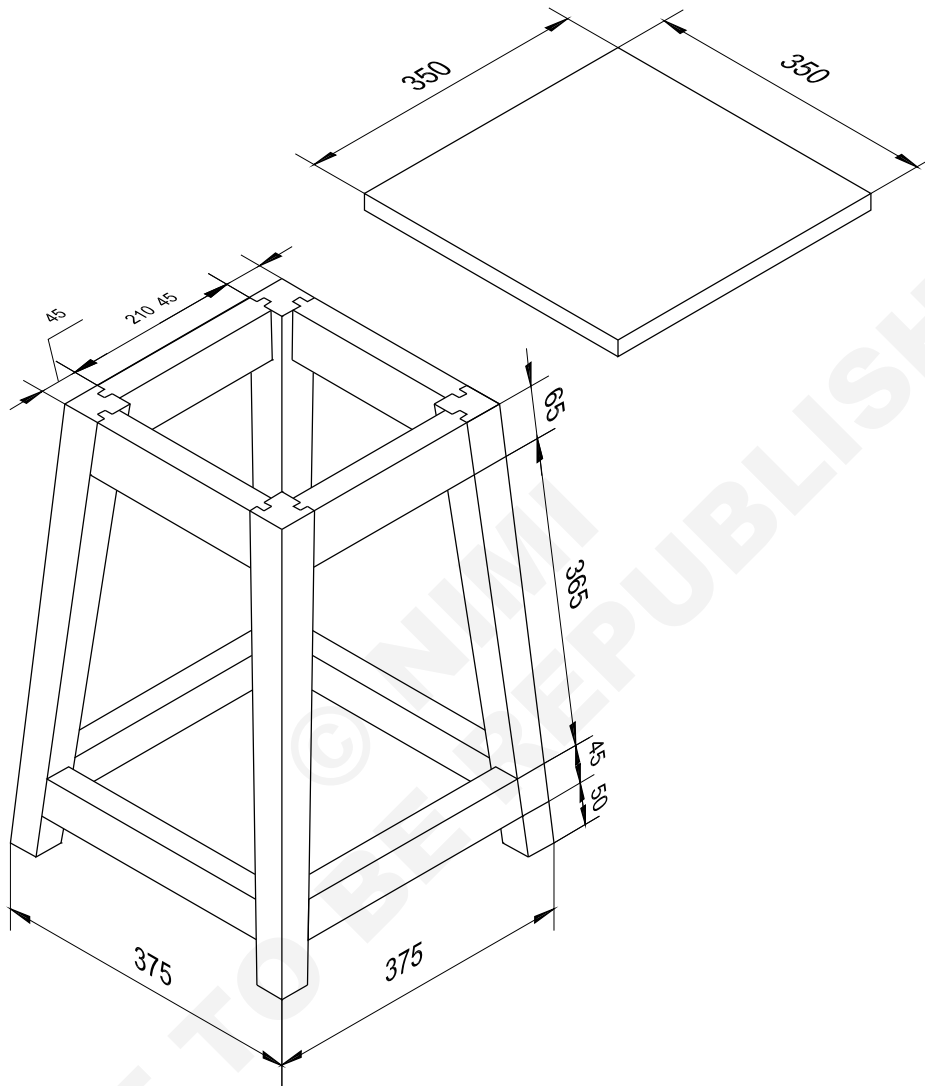


## TASK 2: Prepare the cutting list for standard height taper ledged stool 1 No.

- Teak wood
- 50x50x550mm - 4 No's, for leg.
- 75x25x250mm - 4 No's, top nails
- 50x25x400mm - 4 No's - bottom nails
- 375x375x25mm - 1 No - Top plank
- Wood screws 35x6 - 8 No's
- Fevicol - 250 gms
- Ready made putty - as read
- Sand paper No 10 and 12 each - 1 No.

Prepare standard height taper legged stool

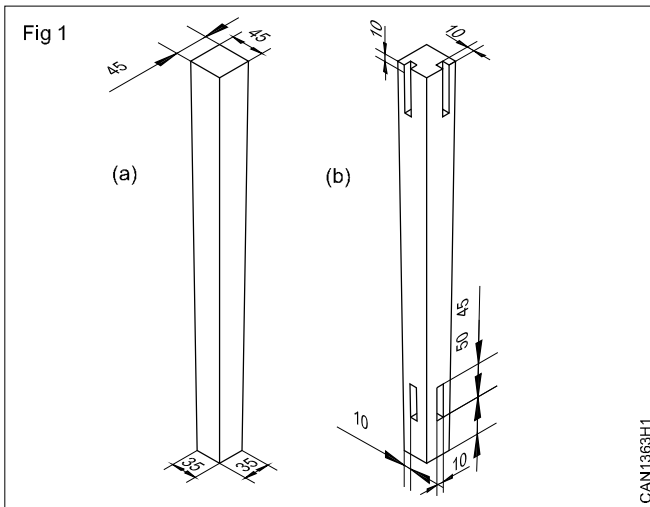
**Objective:** At the end of this exercise you shall be able to  
• make the standard height taper legged stool.



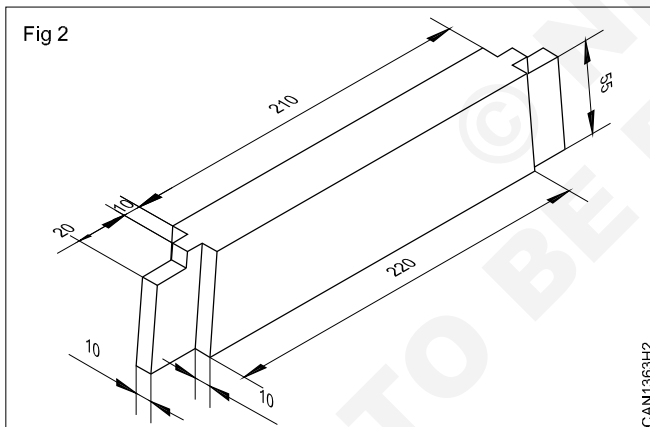
8	35x6		WOOD SCREWS			
24	12x12x60mm		TEAK WOOD			
1	250grms		FEVICOL			
1	375x375x25mm		TEAK WOOD			
4	50x25x400mm		TEAK WOOD			
4	75x25x250mm		TEAK WOOD			
4	50x50x550mm		TEAK WOOD	4		1.3.63
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX.NO.
SCALE 1:1		<b>MAKE STANDARD HEIGHT TAPER LEGGED STOOL</b>			DEVIATION ±0.06	TIME 3hrs
					CODE NO. CA20N1363E1	

## Job Sequence

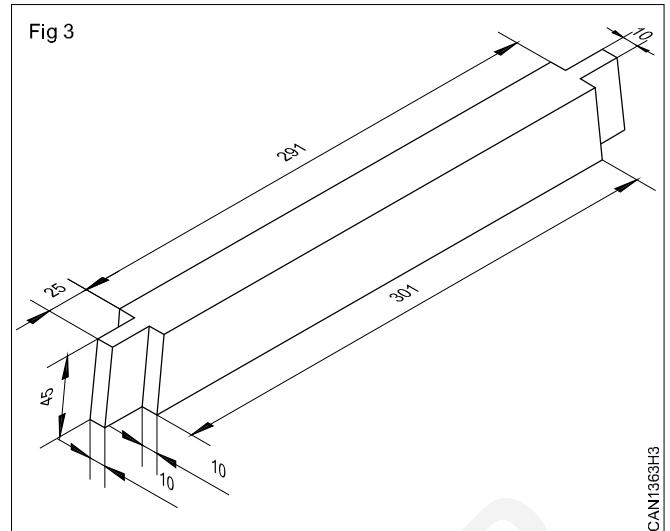
- Plane all the work pieces to the required width and thickness to square as per the drawing.
- Mark and make the total length of four legs as per the drawing. (Fig 1)



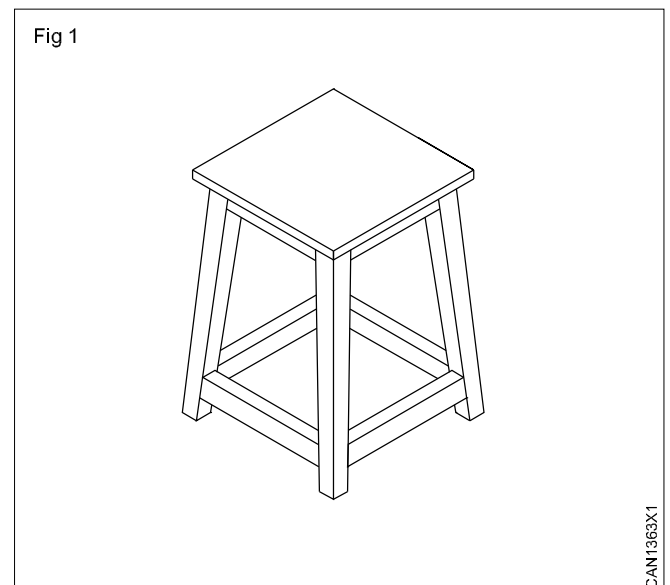
- Mark and make the haunched mortice on top part of four legs. refer to Ex no 1.2.27 (Fig 1)
- Mark and make the haunched tenon on both the ends of top rails refer Ex no 1.2.27 (Fig 2)



- Mark and make the stop mortice of bottom legs as per the given measurements. (Fig 1)
- Mark and make the taper on four legs as per given measurements. (Fig 1)
- Mark and make the blind tenon on both the ends of bottom rails. (Fig 3)
- Mark the drill hole position (point) on centre of all the mortices on four legs of a stool.
- Prepare the wooden pegs as required.
- Set the bar clamp to suit the tapered legged stool frame.
- Provide the waste piece on both the sides of the frame.
- Apply the fevicol evenly on mortice and tenon surface on one side of the frame pieces.



- Assemble the side frame pieces together properly.
- Place the side frame on the bar clamp and tighten it.
- Mark the drill hole on marked points of drill hole.
- Apply fevicol on the surface of wooden peg.
- Insert and drive the wooden peg through the drilled hole. Cut off the projected wooden pegs.
- Repeat the same procedure for the all other side frames.
- Mark and make the top plane as per drawing.
- Assemble the stool frame with top plank together properly using G clamp
- Mark and make drill hole on top plank for fixing the screws.
- Counter sunk the drill hole on top surface of plank
- Drive the screws through the drilled hole till it seated below the surface level.
- Cover the drilled surface using putty.
- Smoothen all the surfaces of the stool using sand paper Finish the stool as per drawing (Fig 4)



**Demonstrate application of adhesive**

**Objective:** At the end of this exercise you shall be able to  
• **demonstrate the application of adhesives.**

**Job Sequence**

**Instructor shall display and demonstrate to the students regarding the different types of adhesives and their applications.**

- Trainees will note down all the displayed adhesive.
- Record them in table 1.
- Get it checked by the instructor.

**Table 1**

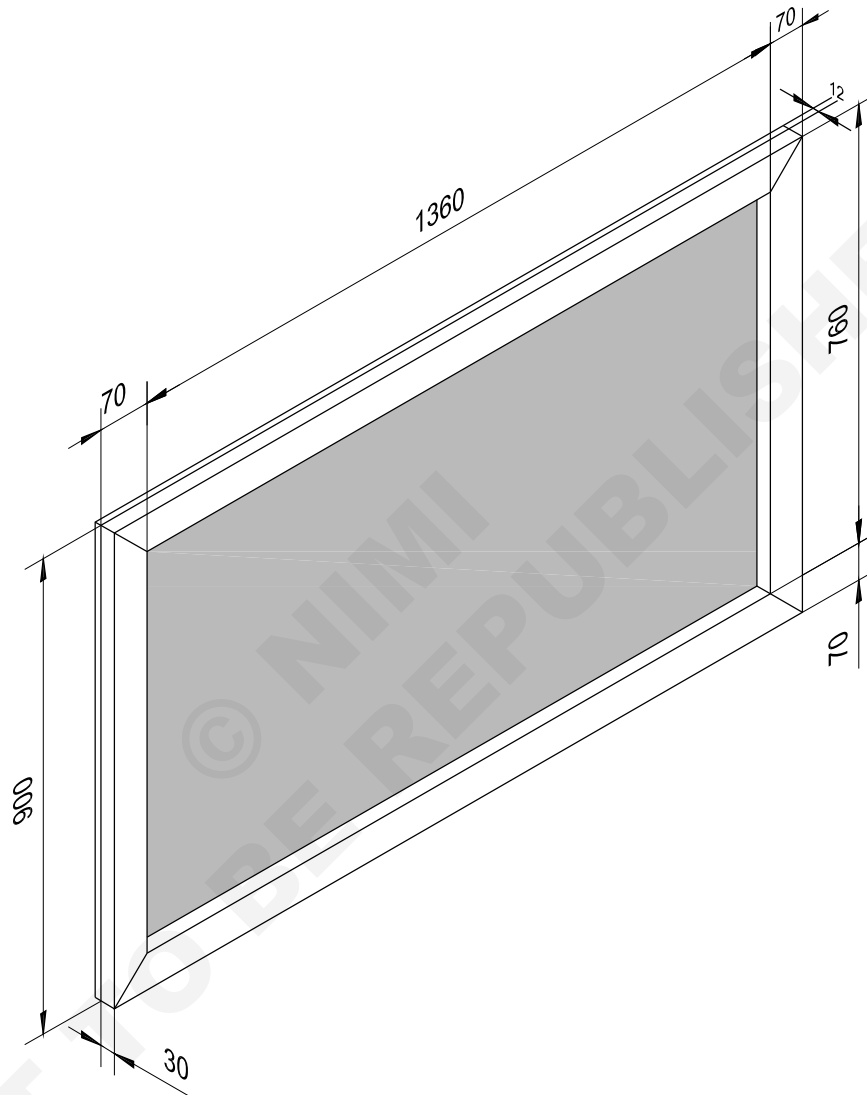
**Identify the type of application**

<b>Sl. No</b>	<b>Type of adhesives</b>	<b>Applications</b>
1	Animal	
2	Casin	
3	Resin	
4	Vegetable	
5	Blood albumen	



**Layout and making a notice board**

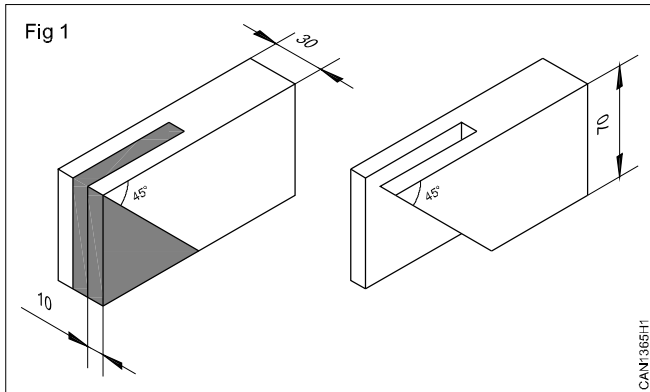
**Objective:** At the end of this exercise you shall be able to  
 • **make a notice board.**



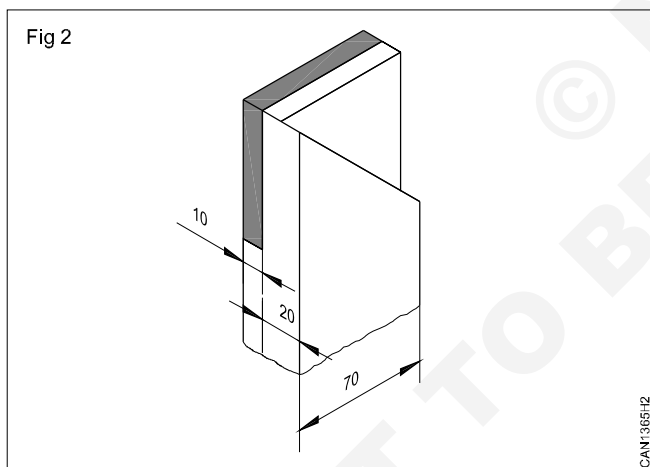
250gm			FEVICOL			
100gm	1"		WIRE NAIL			
2	NO.100 & 120		SAND PAPER			
1	1500x900		FELT CLOTH			
1	1500x910x12mm		PLY WOOD			
2	75x35x1500		HARD WOOD			
2	75x35x910		HARD WOOD	5		1.3.65
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:10		<b>LAYOUT AND MAKING FOR NOTICE BOARD</b>			TOLERANCE ±2.0 mm	TIME 3hrs
					CODE NO. CA20N1365E1	

## Job Sequence

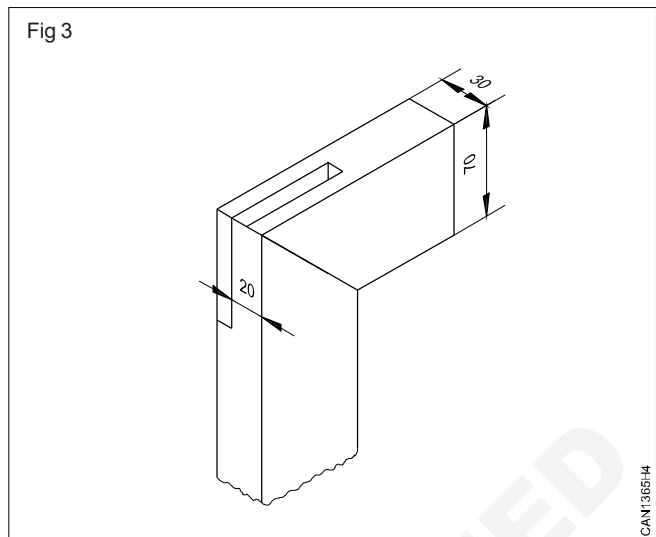
- Plane the wooden pieces to square as per the dimension given in drawing.
- Mark and make the total length of top and bottom pieces.
- Mark and make the mitre bridge joint (Socket part) on both the ends of top and bottom pieces (Fig. 1)



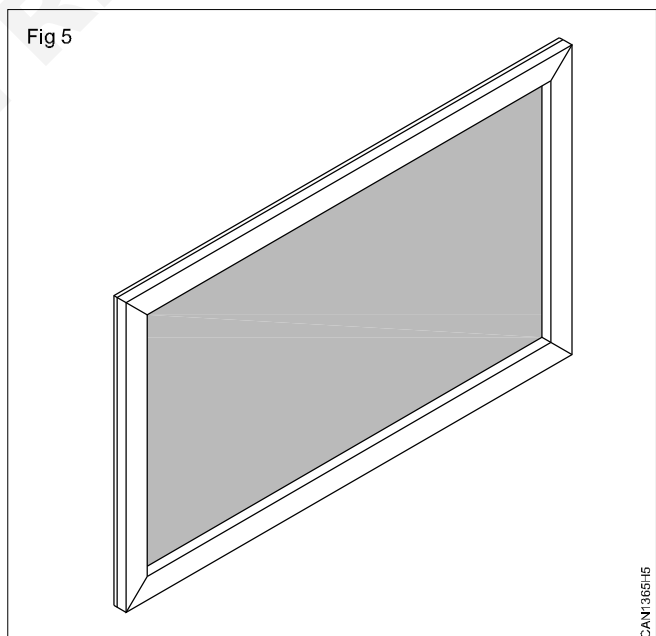
- Mark and make the total length of both the side pieces.
- Mark and make the mitre bridge joint (pin part) on both the ends of side pieces. (Fig. 2)
- Prepare the dowel pin as required refer to Ex. No 1.3.53
- Mark the drill hole position on the middle of the joint. (Socket part)



- Set the bar clamp at the required distance.
- Apply glue on all the pin and socket part of the joint
- Assemble the piece together. (Fig 4)
- Place the assembled frame in between the jaws of bar clamp and tighter together properly
- Tighten the bar clamp.
- Make 6mm drill bit the marked point refer to Ex no 1.1.13 for drilling.
- Apply favicol on the surface of wooden peg.
- Insert and drive the wooden peg on the drilled hole.
- Repeat the same procedure for other three come of joints.



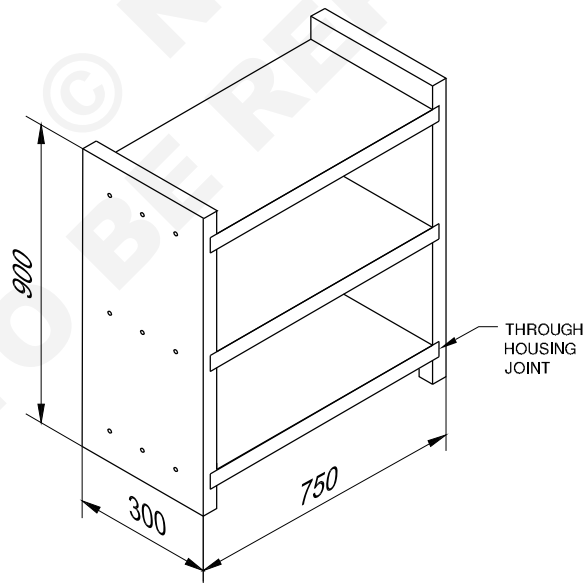
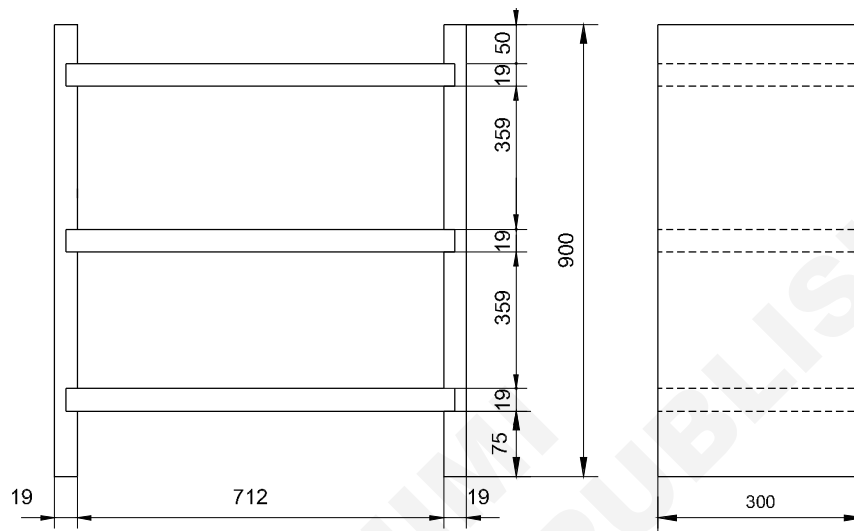
- Check the squareness of the frame.
- Smooth the surface of the frame using sand paper.
- Cut the felt cloth as per the plywood size.
- Paste the felt cloth over the plywood.
- Position the plywood on back side of the frame.
- Join both the frame and plywood by nailing through the plywood.
- Smooth all the surface using smoothing plane
- Apply sand paper all over the surface of notice board and smoothen it as per drawing



Make a small rack with layout

Objectives: At the end of this exercise you shall be able to

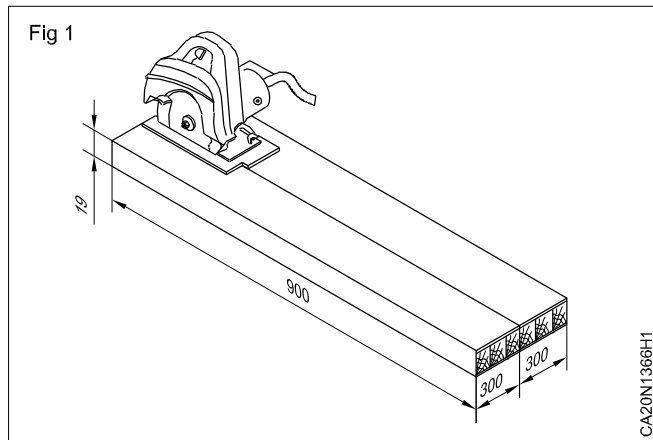
- prepare the layout for a small rack
- prepare the plank
- Assemble and finish the small rack



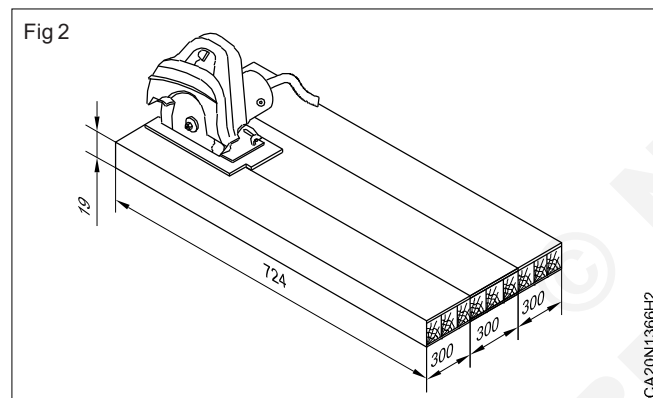
1	100gms		WIRE NAIL			
1	150gms		FEVICOL			
1	915x19x900mm		PLAY WOOD			
1	610x19x910mm		PLAY WOOD			1.3.66
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>MAKE A SMALL RACK</b>			DEVIATIONS ±1	TIME 2hrs
					CODE NO. CA20N1366E1	

## Job Sequence

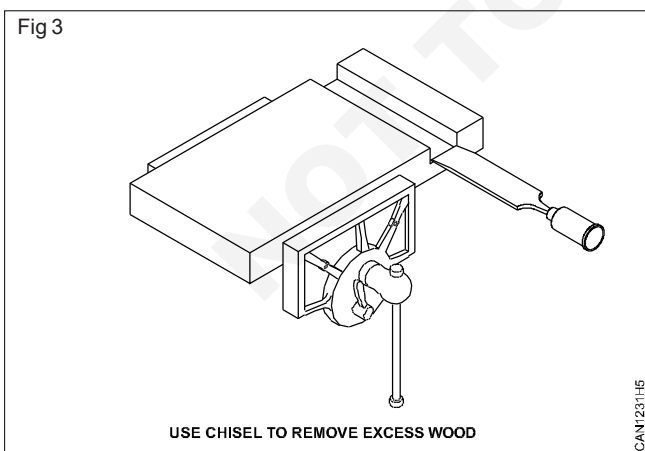
- Check the raw material size as per the drawing
- Mark and make the total length and width of two side pieces using portable power circular saw as per drawing. 900x19x300 - 2 No's. (Fig 1)



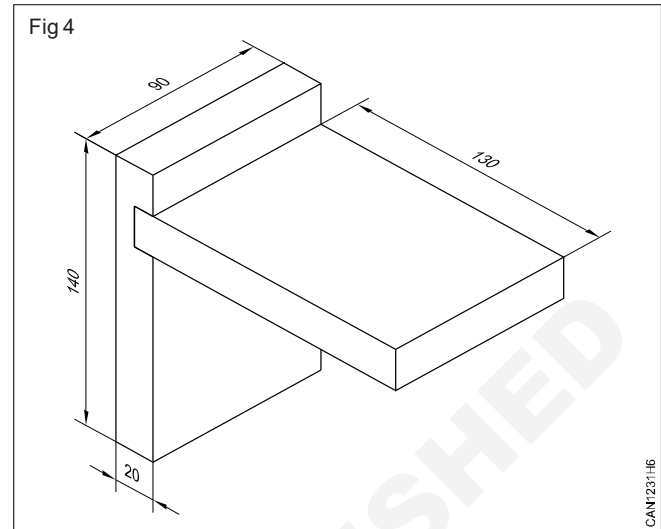
- Mark and make the total length and width of three shelf plank using portable power circular saw as per drawing Refer Ex no 1.1.10. 300x19x724 = 3 No's (Fig 2)



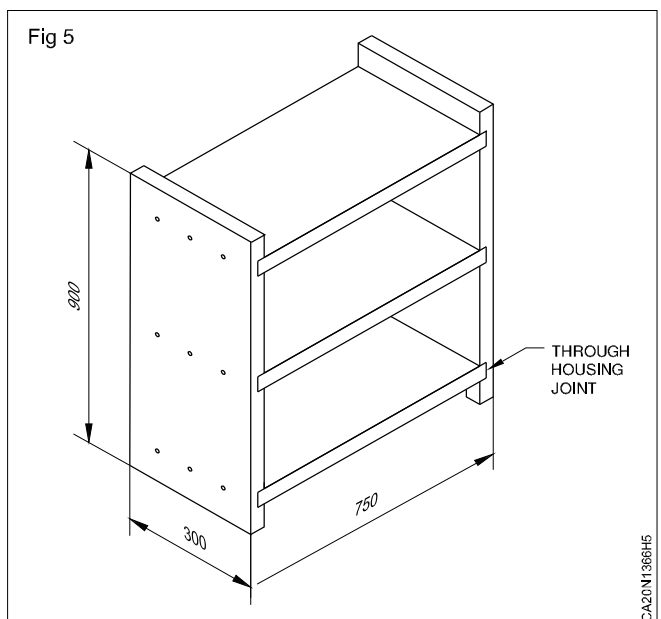
- Mark and make the trenches on side pieces as per drawing (Fig 3) Refer Ex no 1.2.31



- Plan the all plank edges as per dimension given in drawing
- Check all through housing joint (Fig 4)



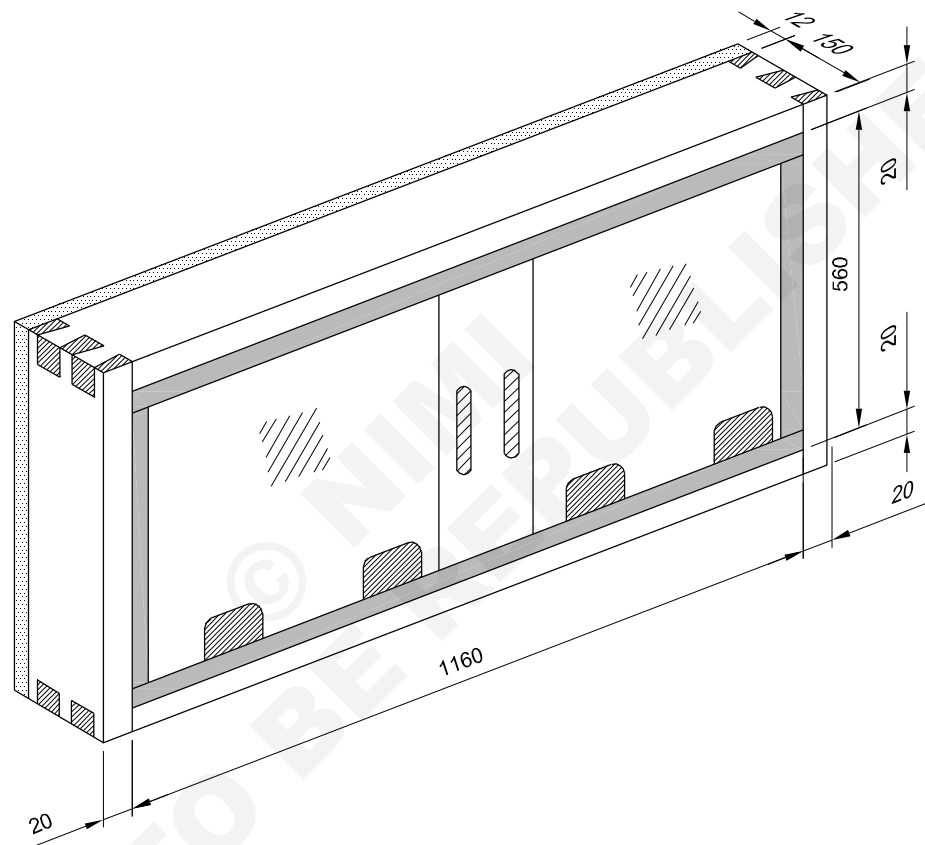
- Prepare the nail as required
- Set the bar clamp to assemble the rack
- Apply the glue on trenches surface of the side plank
- Assemble the side plank and self plank to make the rack and mark the drill hole point on the middle of the trenches (Fig 5)
- Place the rack frame on the bar clamp with wooden support pieces and tighten it
- Make the pilot hole on the marked points of the trenches
- Insert and drive the wire nails in the all pilot hole using claw hammer
- Allow the glue to dry
- Finish the rack using sand paper all over the surface of the rack (Fig 5)



**Make a frame structure with the block board**

**Objectives :** At the end of this exercise you shall be able to

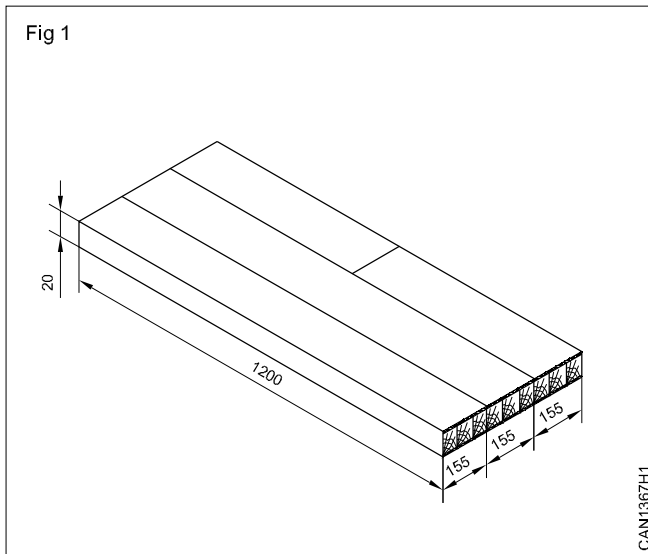
- saw with portable power circular saw machine
- make a common dovetail joint
- assemble and finish a frame.



1	150gm		FEVICOL			
1	1200x470x20mm		BLOCK BOARD			
1	1200x600x12mm		PLYWOOD			
8	45x8		WOOD SCREW			1.3.67
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>MAKE FRAME STRUCTURE WITH BLOCK BOARD</b>				TOLERANCE ± 2 mm	TIME 8hrs
					CODE NO. CA20N1367E1	

## Job Sequence

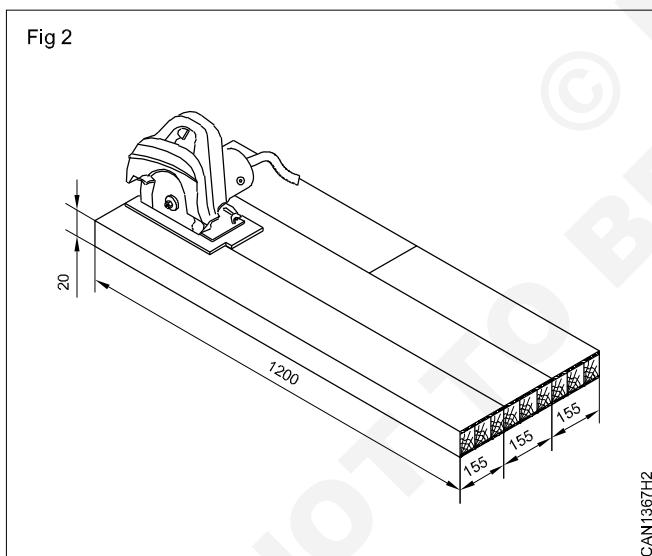
- Check the block board for its size using folding rule.
- Mark as per the drawing using straight edge and try square and pencil. (Fig 1)



- Make the total length of the all four side pieces as per drawing using portable power circular saw (Fig 2) Refer to Ex no 1.1.10

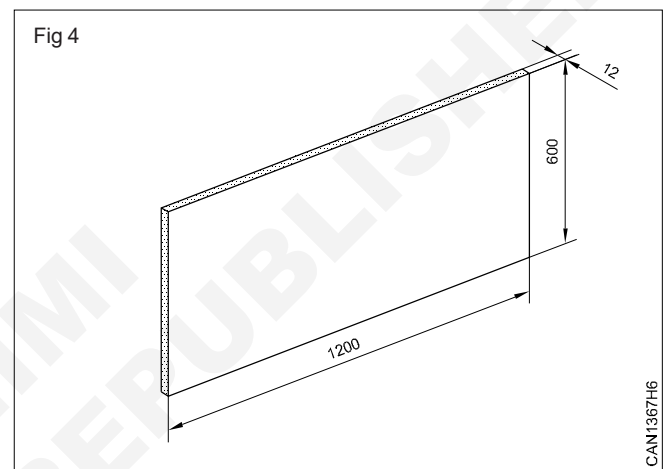
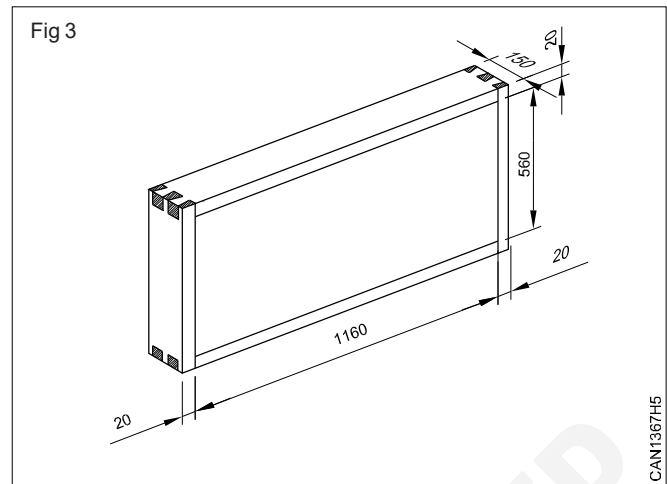
150x19x1200mm - 2 No's

150x19x600mm - 2 No's



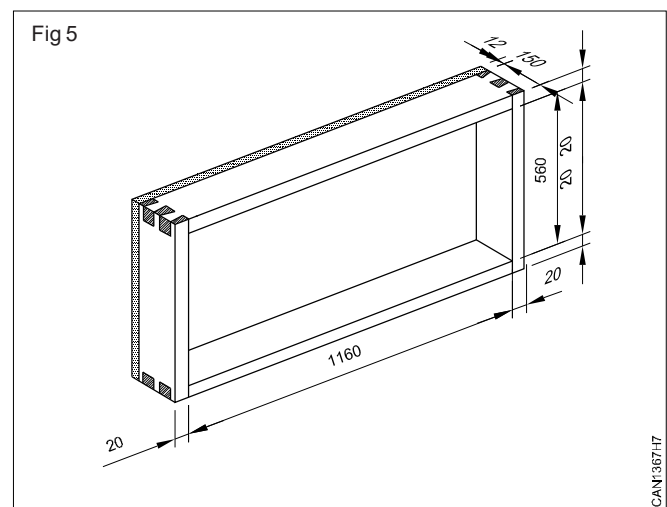
- Mark and make the common dove tail joint (pin and socket part) on both end of top, bottom and side pieces. Refer to Ex no 1.2.36
- Assemble the frame by nailing and finishing together properly (Fig 3) Refer Ex no 1.3.60
- Prepare the plywood board as per the measurements given in the back side of the frame. (Fig 4)

1200x600x12mm



- Position the plywood on back side of the frame. (Fig 5)
- Join both the frame with plywood by nailing through with hammer.
- Smooth all the surface using smoothing plane.
- Apply sand paper all over the surface on frame (Fig 5)

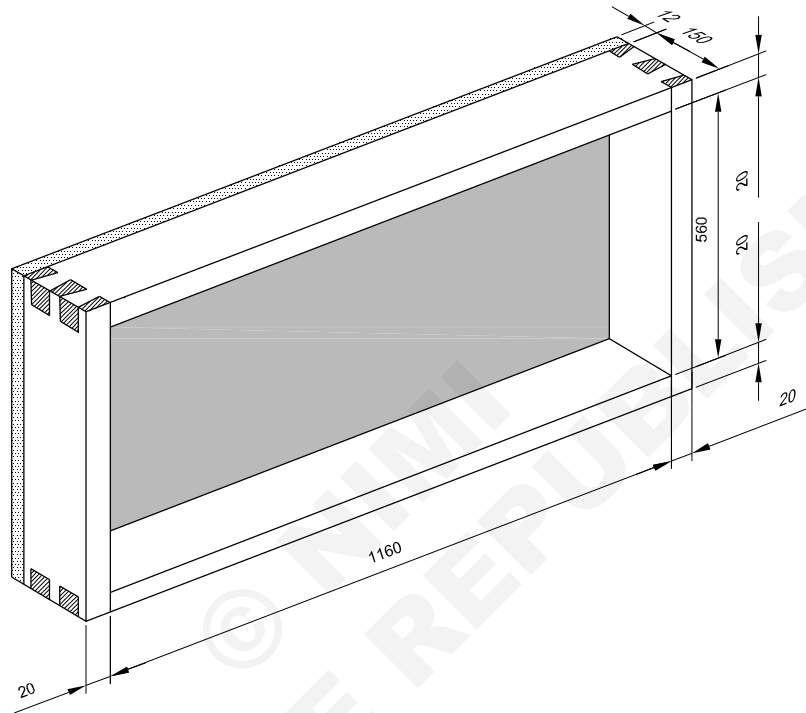
Check the required size of length and width.



**Painting on frame with block board**

**Objectives:** At the end of this exercise you shall be able to

- prepare the surface for painting
- apply the paint.



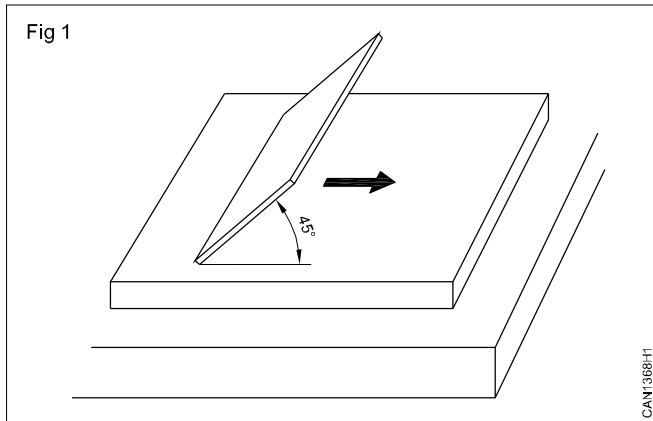
NOTE : THE FRAME WITH BLOCK BOARD IS AVAILABLE IN EX.NO. 1.3.67

10	NO 36, 50, 80, 100 & 120		SAND PAPER			
1	500ml		PAINT			
1	50cm		WHITE COTTON CLOTH			
1	1000ml		WOOD PRIMER			
1	250gm		COTTON WASTE			
	200ml		FILLER			
1	150gm		PUTTY			
1		EX.NO 1.3.67 ←	COCK AND RUBBER BLOCK	7		1.3.68
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.

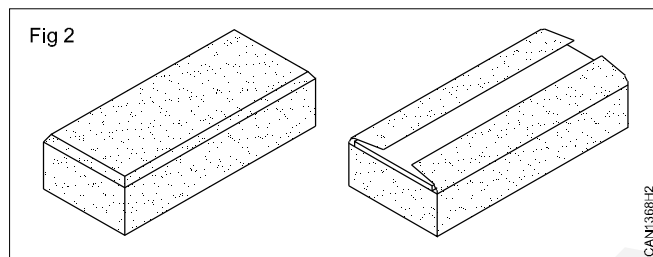
SCALE NTS	<b>PAINTING ON FRAME WITH BLOCK BOARD</b>	TOLERANCE ± 2 mm	TIME 8hrs
		CODE NO. CAN1368E1	

## Job Sequence

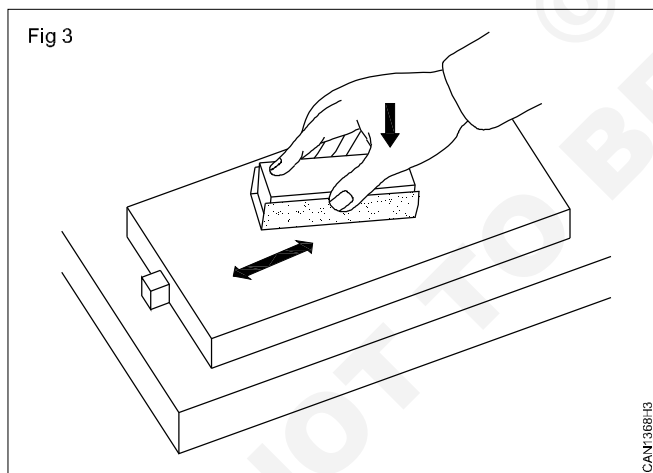
- Rub the surface of the frame using wet cloth before scraping
- Scrap all surface of the frame with block board (Fig 1).



- Take a cork or rubber block and fold the sand paper around the block. (Fig 2)

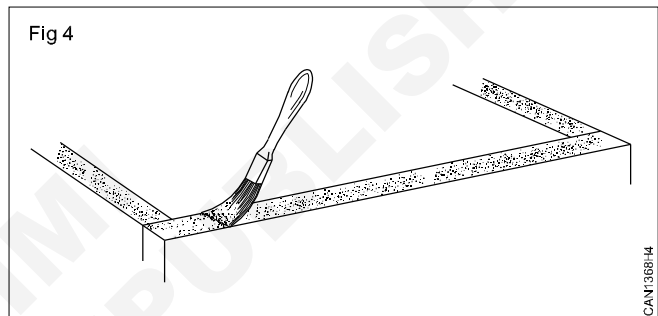


- Sand all the surface of the frame with block board using No 36, 50 sand paper for rough finishing. (Fig 3)

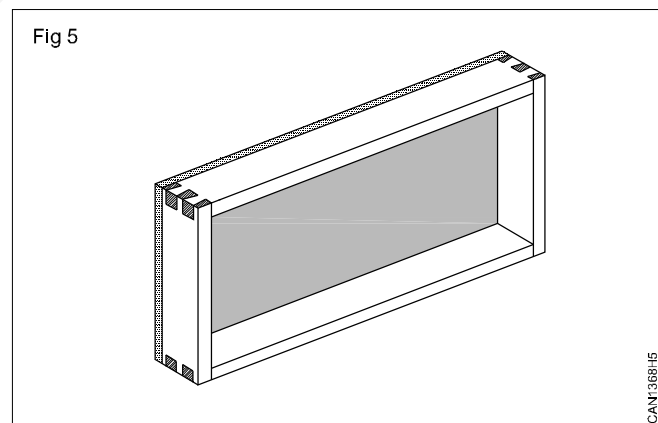


- Repeat the same procedure using sand paper No. 80, 100 for fine finishing.

- Apply the wood primer for first coat using brush.
- Apply wood filler using cotton waste on the finished surface of the frame with block board.
- Sand again wood using No. 120 sand paper to get the smooth surface.
- Apply first coat primer which acts as a filler and absorption well into the pores of wood
- Brush the primer well into the pores of wood
- After priming, fill up the nailed holes, cracks etc, with putty made by mixing whiting, with linseed oil to a thick paste, with matching colour
- Allow over night to dry and using No. 120 sand paper it for a fine surface.
- Give a first coat of paint (Fig 4)



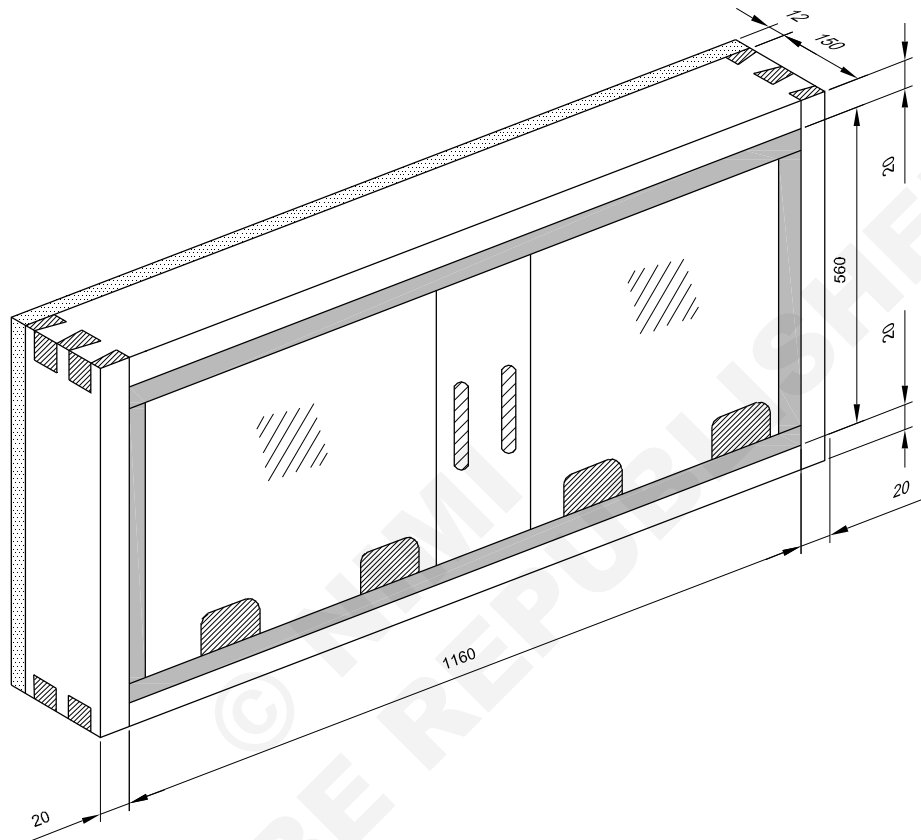
- Allow it to dry for 48 hours.
- Finish coat is applied straight from the tin if brushed.
- Finish the painting even and uniform and shall have no brush marks. (Fig 5)





**Setting the glass on required location of the frame**

**Objective:** At the end of this exercise you shall be able to  
 • set the glass on the frame.



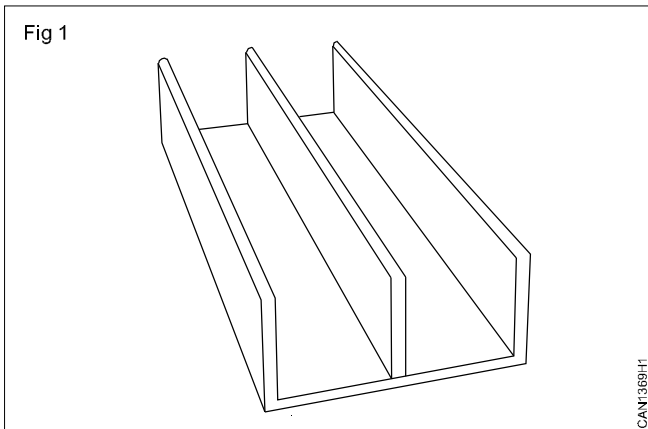
NOTE: THE FRAME WITH BLOCK BOARD IS AVAILABLE IN EX.NO 1.3.68

2			HANDLE STICKER			
1	50grm		FEVICOL			
18	12mm		PANNEL PIN			
1	25x12x6m		ALUMINIUM 'E' CHANNEL			
1	1200x600x6mm		SLIDING GLASS DOOR WHEEL			
1	1850x900x6mm	EX.NO.1.3.68 ←	GLASS	7		1.3.69
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>SETTING THE GLASS ON REQUIRED LOCATION OF THE FRAME WITH BLOCK BOARD</b>				TOLERANCE ± 2 mm	TIME 3hrs
					CODE NO. CA20N1369E1	

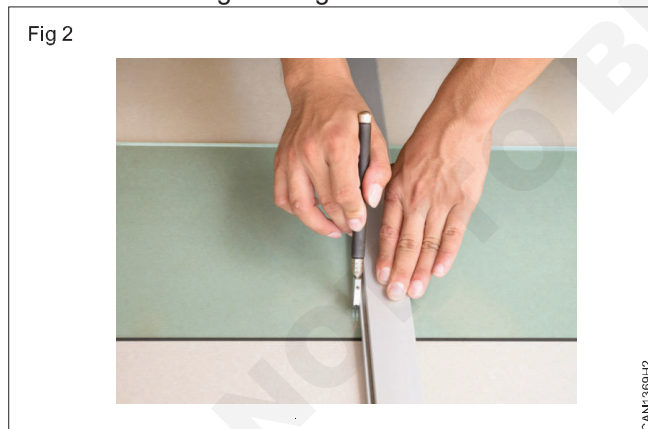
## Job Sequence

### Setting the glass

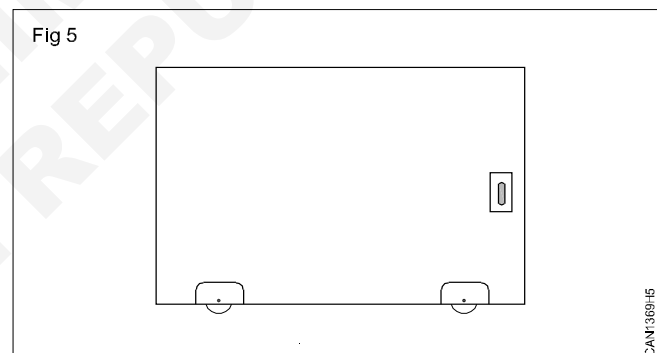
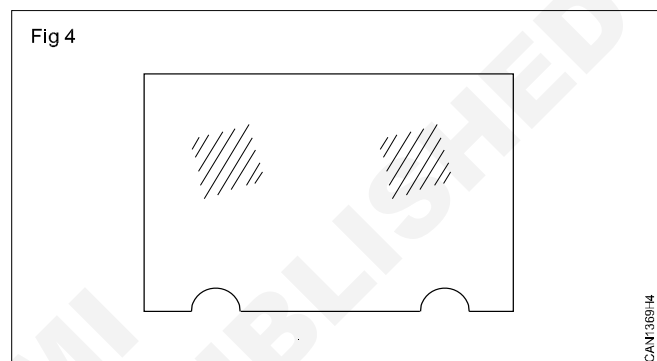
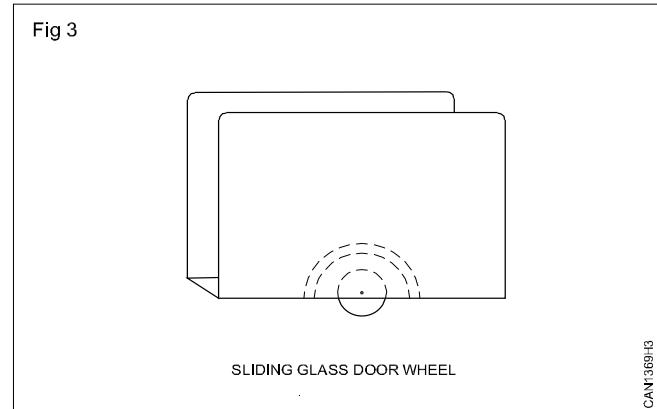
- Check the aluminium 'e' channel for required size. (Fig 1)



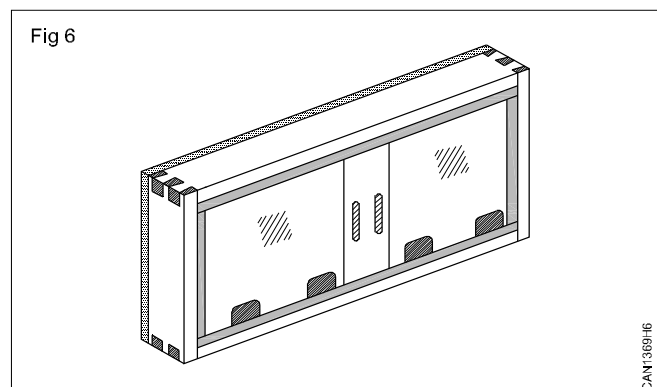
- Mark and cut the 'e' channel as per the frame dimension.
- Smoothen the 'e' channel edges using flat file.
- Mark the nail position in aluminium - 'e' channel.
- Punch the marked point of the nail in aluminium 'e' channel using centre punch.
- Place the 'e' channel on the frame top and bottom and to assemble drive the nail using hammer and nail punch.
- Check the glass for required size as per the frame.
- Cut the glass as per the inside the aluminium "e" channel groove for required size with door wheel allowance using glass cutter. (Fig 2)
- Smoothen the glass edges with oil stone.



- Select the glass door wheel. (Fig 3)
  - Mark and cut wheel curve using glass cutter. (Fig 4)
  - Fix the door wheel on glass curved places. (Fig 5)
  - Fix the handle sticker in position of glass. (Fig 5)
- Repeat the same procedure for the other glass door.
- Place the glass door at the bottom of 'e' channel grooves.



- Fix the top side e-channel. Insert the glass door with bottom e-channel and check for free rolling. Then screw the bottom e-channel.
- Drive the nail on the bottom of 'e' channel using tacks hammer and nail punch.
- Finish the setting glass on required location of the frame. (Fig 6)



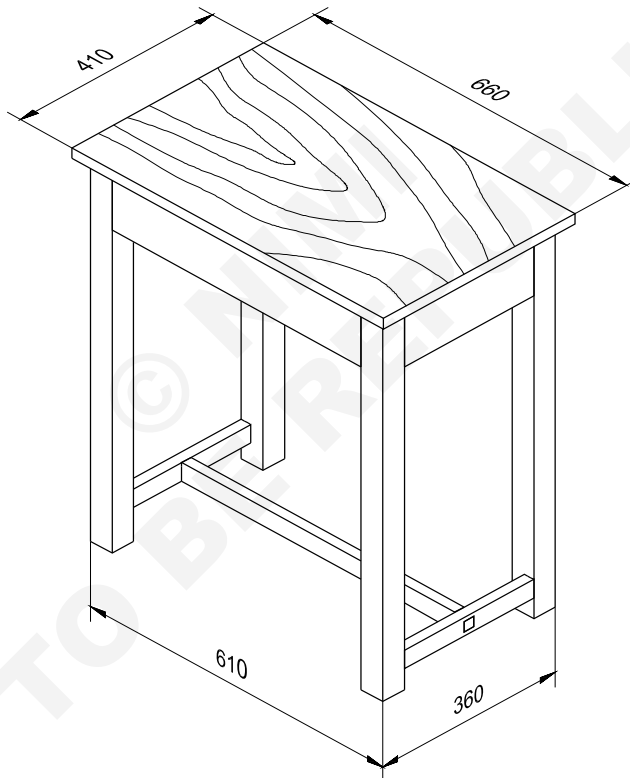
**Make a small table and small box**

**Objectives:** At the end of this exercise you shall be able to

- make a small table
- make a small box.

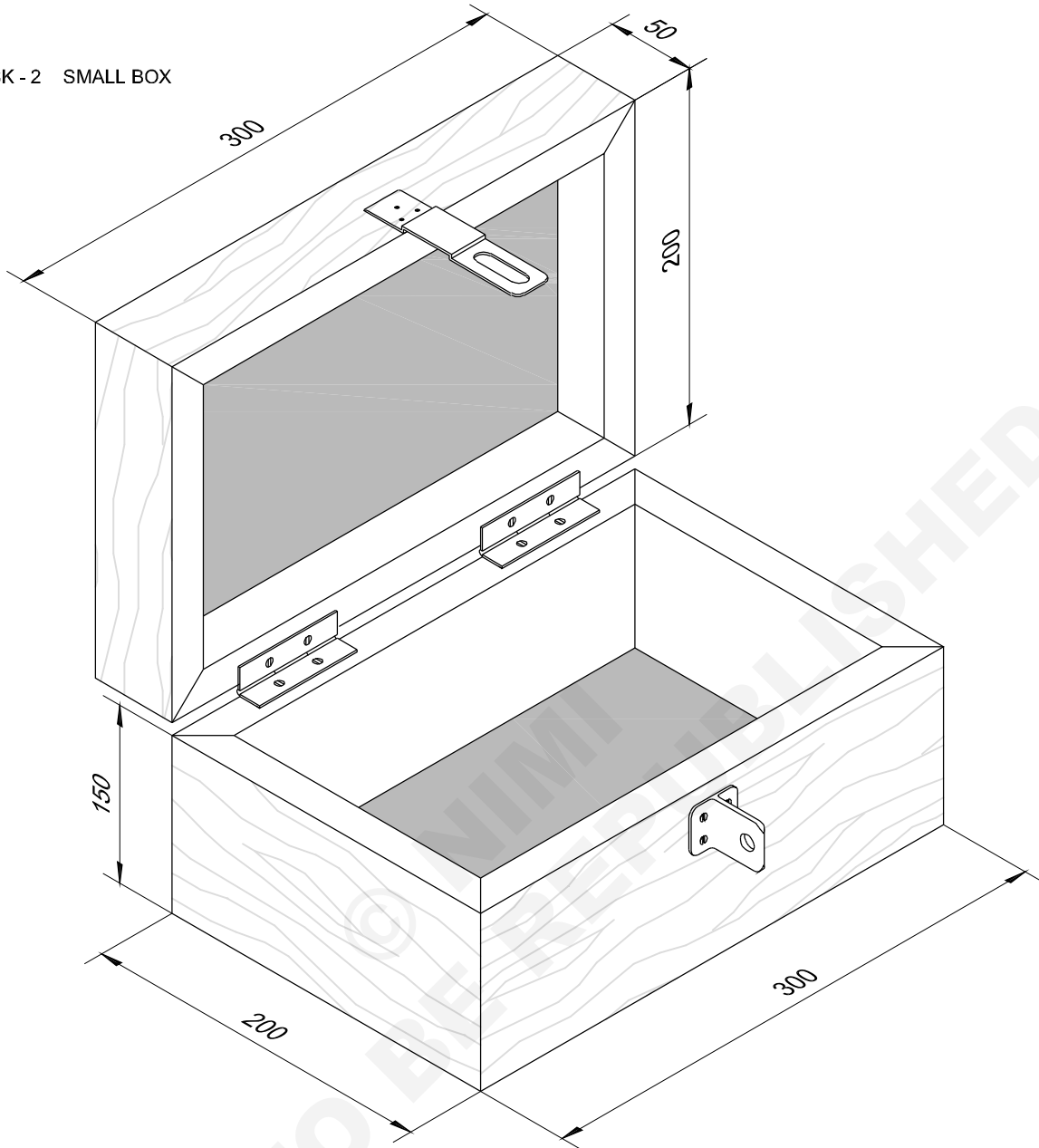
TASK - 1

MAKE A SMALL TABLE



-	-	-	-	7 & 8	-	1.3.70
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>MAKE A SMALL TABLE</b>				DEVIATIONS ±	TIME 17hrs
					CODE NO. CA20N1370E1	

TASK - 2 SMALL BOX



1	-	-	HASP AND STAPLE	-	-	
1ROLL	-	-	GUM STRIP	-	-	
12	25x6	-	WOOD SCREW	-	-	
2	2"	-	HINGES	-	-	
100gm	2"	-	WIRE NAIL	-	-	
-	1Kg	-	FEVICOL	-	-	
1	310x210x1mm	-	SUN MICA	-	-	
1	900x600x20	-	PLYWOOD	8	-	1.3.70
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<p align="center"><b>MAKE A SMALL BOX WITH SUN MICA TOP</b></p>			DEVIATIONS ±	TIME 17hrs
					CODE NO. CA20N1370E2	

# Job Sequence

## TASK 1: Make a small table

- Check all the wooden pieces of table as per the required size.

700 X 425 X 20 - 1 No (Plywood) (Top piece)

50 x 50 x 780 - 4 Nos.

120 x 25 x 360 - 2 Nos.

120 x 25 x 610 - 2 Nos.

50 x 25 x 360 - 2 Nos.

50 x 25 x 610 - 1 No.

- Plane all the work pieces of table to the required width and thickness as per the measurements in the drawing.

Legs - 45 x 45 x 730 = 4 Nos.

Top Side rail - 115 x 20 x 340 = 2 Nos.

Top Front and Back rail - 115 x 20 x 590 = 2 No.

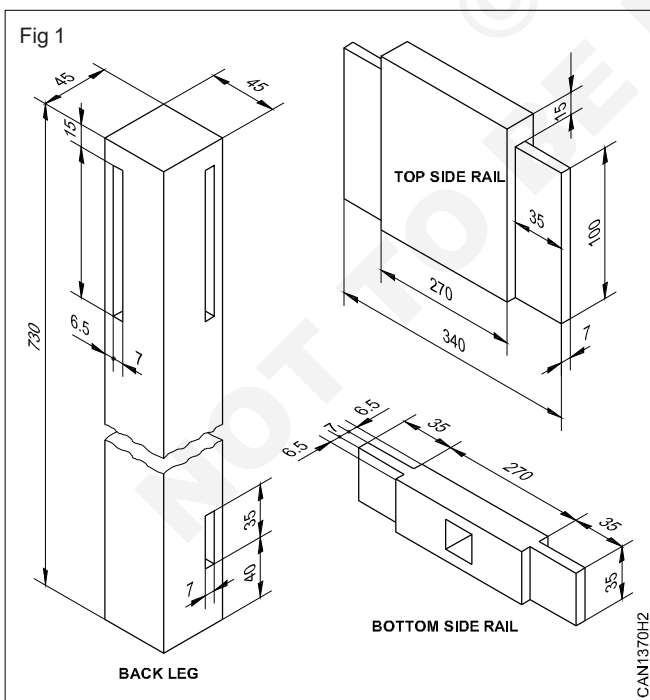
### Bottom rails

Side rails - 35x20x240 = 2 Nos.

Foot rest rail - 35x20x550 = 1 Nos.

### Legs

- Mark and make the total length of table legs as per the measurements in the drawing 45 x 45 x 730 = 4 No's
- Mark and make the haunched mortise on top of the all legs for fixing all top rail as per the drawing. (Fig 1)



- Mark and make the blind mortise on bottom of the all legs as per the measurements in the drawing. (Fig 1)

### Top side rails

- Mark and make the total length of all top rails as per the dimensions in the drawing. (Fig 1)
- Mark and make the haunched tenon on both the end of the top rails as per the dimensions in the drawing. (Fig 1).

### Bottom side rails

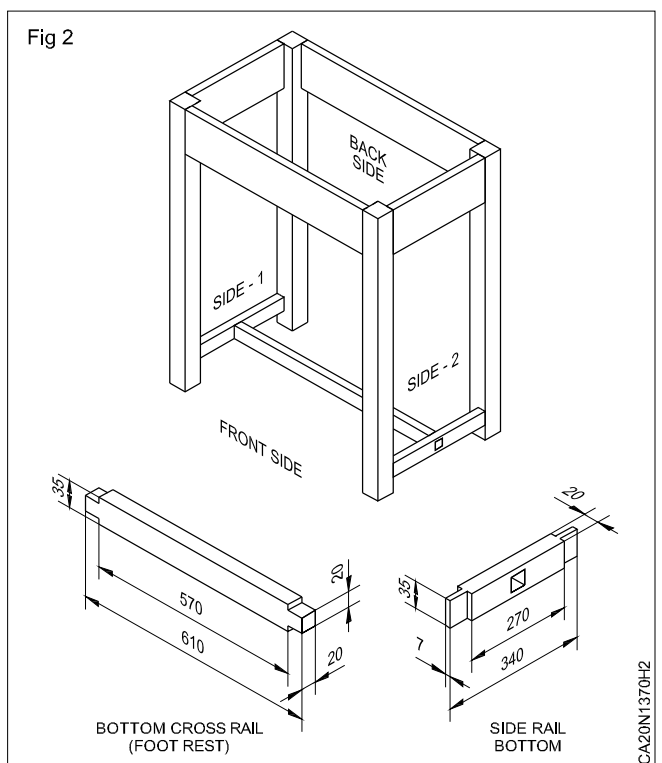
- Mark and make the total length of bottom side rails as per the drawing. (Fig 2)
- Mark and make the blind tenon on both the ends of the bottom side rails as per the measurements in the drawing. (Fig 2)

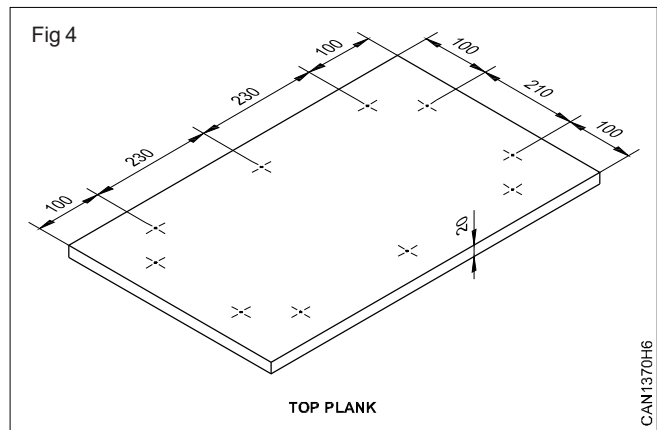
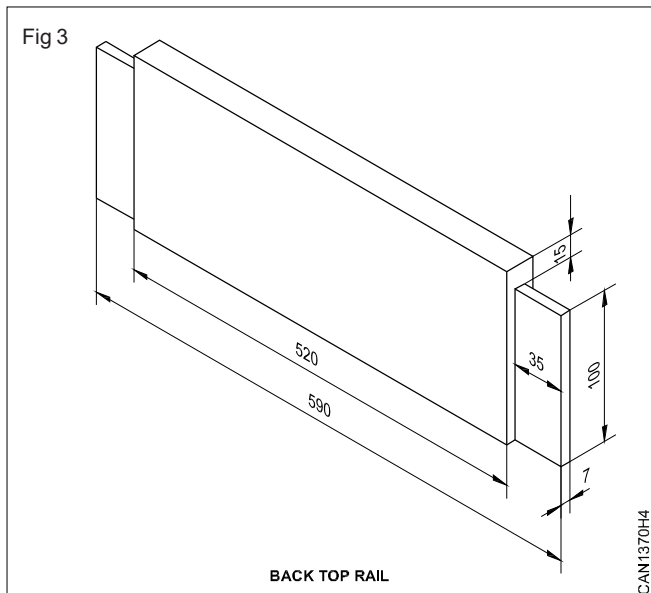
### Front and Back top rail (Fig 3)

- Mark and make the total length of front and back top rails as per the drawing. (Fig 3)
- Mark and make the haunched tenon on both the ends of the back and front top rails as per the dimensions in the drawing. (Fig 3)

### Bottom cross rail (foot rest)

- Mark and make the total length of bottom cross rail (foot rest) as per the drawing. (Fig 3)
- Mark and make the tenon on both the ends of the bottom cross rail as per the dimensions in the drawing. (Fig 2)





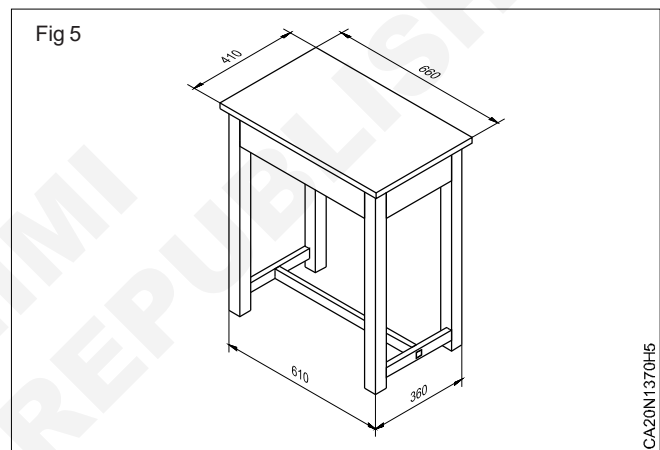
- Repeat the same procedure for joining rails also. Refer Ex. No 1.3.63
- Drive the suitable wood screws in the hole connecting the top plywood, and finish the table with sand paper (Fig 5)

### Top plank (plywood) (Fig 4)

- Mark and make the total length and width of plywood as per the measurements 410x20x660mm in the drawing.

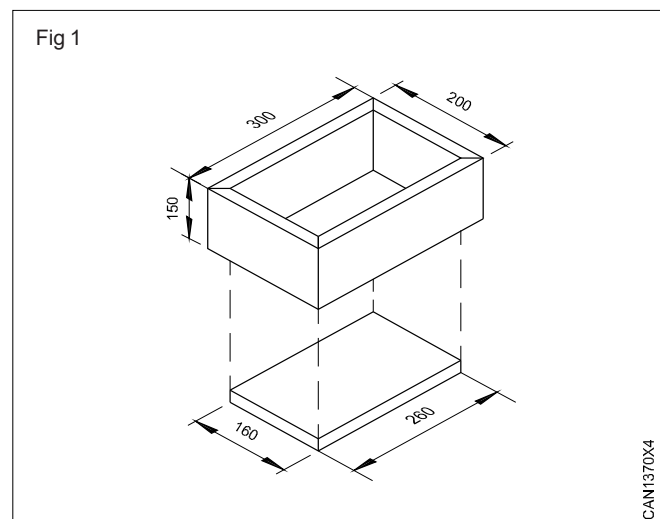
### Assembling of small table

- Apply the glue on mortise of the all leg and the tenon of all rails uniformly using the brush.
- Assemble the legs and rails together with their respective mortises and tenons parts.
- Place the frame over the bar cramp and tighten it.
- Make a 6 mm drill hole on centre of the joints properly.
- Apply the glue on wooden pegs and drive the wooden pegs through the drilled hole.

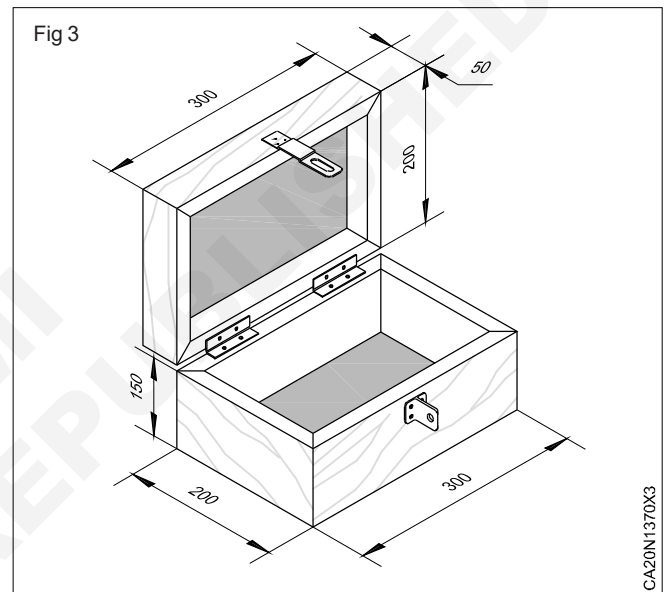
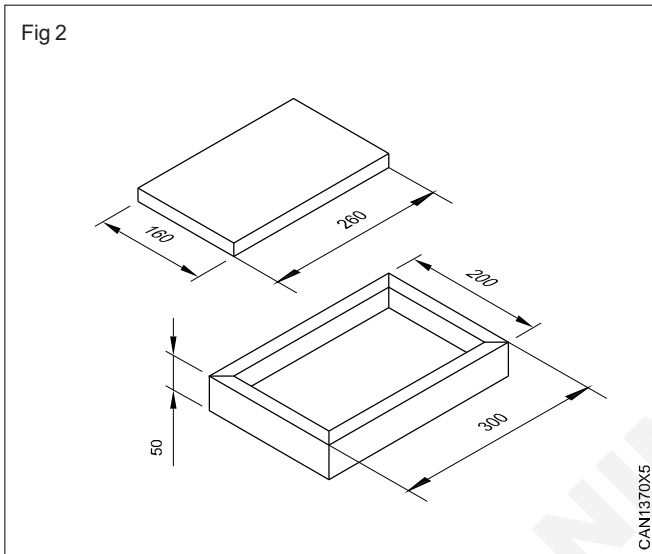


## TASK 2 : Make a small box

- Mark and cut the plywood pieces as per the dimension given in the drawing (with sawing and planing allowances)
- Plane all the bottom frame with bottom piece to square as per the dimension given in drawing.
- Mark and make a secret dovetail joint for the bottom frame. (Fig 1, Refer Ex No 1.2.38)
- Assemble the bottom frame using fevicol, wire nail and hammer. (Fig 1)
- Check the squareness of the bottom frame.
- Prepare the bottom piece of the bottom frame as per the given dimensions. (Fig 1)
- Fix the bottom piece with bottom frame using glue and wire nail. (Fig 1)
- Prepare and fix the sun mica on front back and sides of frame using fevicol and gum strip.

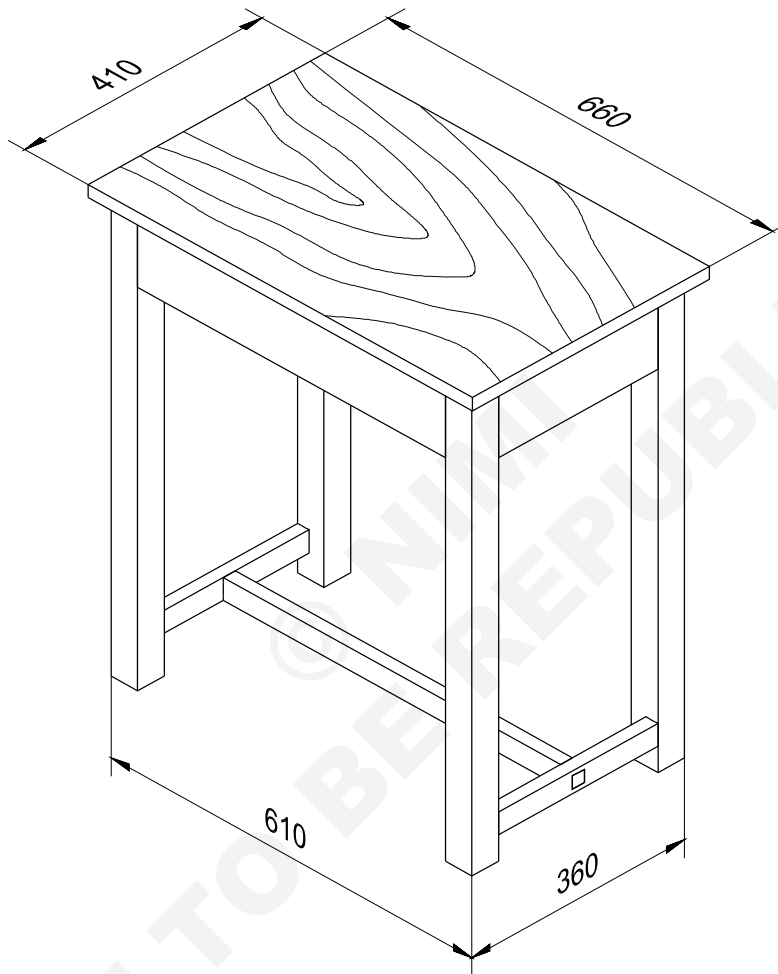


- Allow the glue to dry. Plane the excess sunmica using smoothing plane.
- Prepare and fix the wooden reaper on the top edge of bottom frame.
- Repeat the same procedure to prepare the top frame (lid) with sunmica surface as per the dimension given in drawing. (Fig 2)
- Align the bottom frame and top frame (lid) properly.
- Mark the position of the hinge on the top frame (lid). (Fig 3)
- Form the recess for fixing the hinges on top frame (lid).
- Fix the hinges on the recess of top frame properly. (Fig 3)
- Mark the position of hinges on bottom frame using top frame (lid). (Fig 3)
- Make the recess for fixing the hinges on bottom frame.
- Set the hinges on the recess of bottom frame properly (Fig 3)
- Fix the screw through the screw holes.
- Check the alignment of the box. (Fig. 3)
- Check the free movements of top frame (lid) with the bottom frame and fix the pad lock (Fig 3)
- Finish the box. (Fig 3)



Use the sunmica and paste it on top of the table

**Objective:** At the end of this exercise you shall be able to  
 • paste the sunmica on small table top.



NOTE : IT IS SMALL TABLE IS AVAILABLE IN EX.NO 1.3.70

	1 ROLL	-	GUM STRIP	-	-	
	250gm	-	FEVICOL	-	-	
1	700x450x1mm	EX.NO 1.3.70 ←	SUN MICA	8	-	1.3.71
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>PASTE THE SUN MICA ON SMALL TABLE TOP</b>				DEVIATIONS ±	TIME 5hrs
					CODE NO. CA20N1371E1	



## Job Sequence

- 1 Prepare the sunmica for sides and top with planning allowance.

**Side: Front and back**

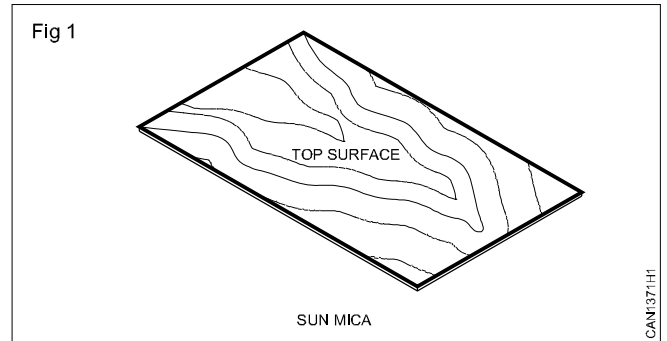
664x24x1mm - 2 Nos.

**Left and right**

414x24x1mm - 2 Nos.

**Top :** 668x418x1mm - 1 No.

- 2 Fix the sunmica on front side and opposite side of the plywood using fevicol and gum strip. (Fig 1)
- 3 Allow the glue to dry.
- 4 Plane the excess sunmica using smoothing plane carefully.
- 5 Fix the sunmica left and right sides of the plywood using fevicol and gum strip. (Fig 1)
- 6 Allow some time to become hard.
- 7 Plane the excess sunmica using smoothing plane carefully.

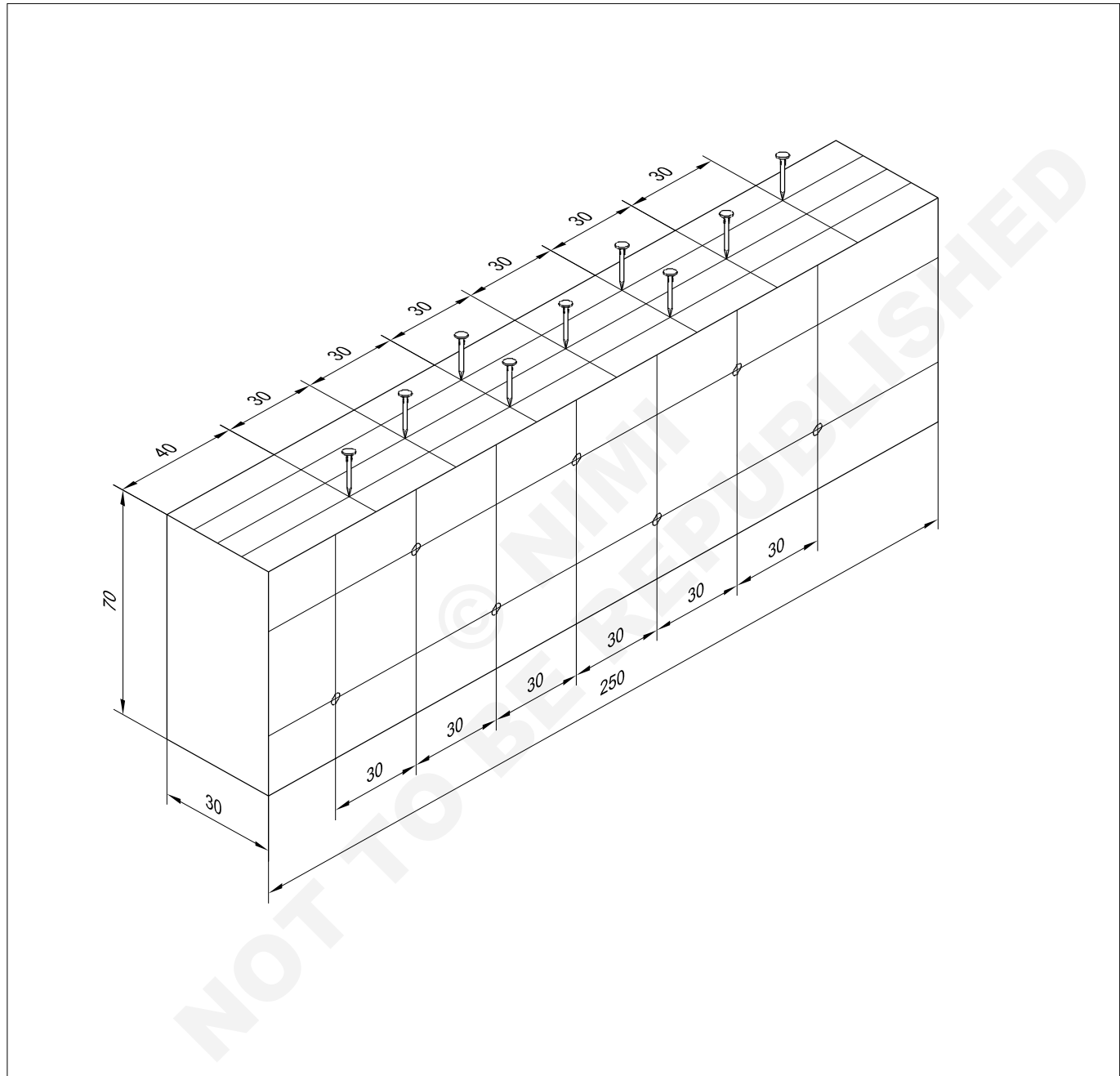


- 8 Fix the sunmica on top surface of plywood using fevicol and gum strip allow the glue for drying.
- 9 Plane excess sunmica using smoothing plane carefully.
- 10 Finish the small table top as per drawing

**Demonstrate on nailing practice**

**Objectives :** At the end of this exercise you shall be able to

- drive the nails in the wood
- use of selected nail for the table and small box.

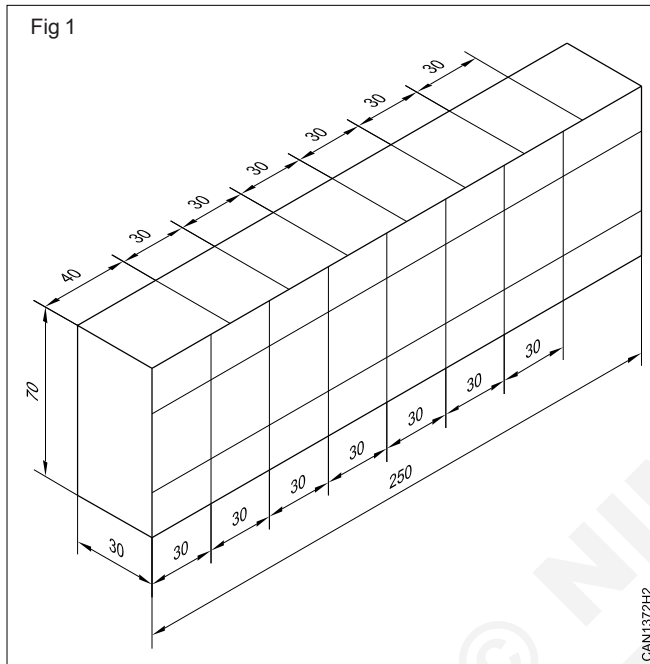


7	45 x 2.4		WIRE NAIL			
9	50 x 2.4		WIRE NAIL			
1	75 x 38 x 250		HARD WOOD			1.3.72
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATION ON NAILING</b>				TOLERANCE ± 2 mm	TIME 12hrs
					CODE NO. CAN1372E1	

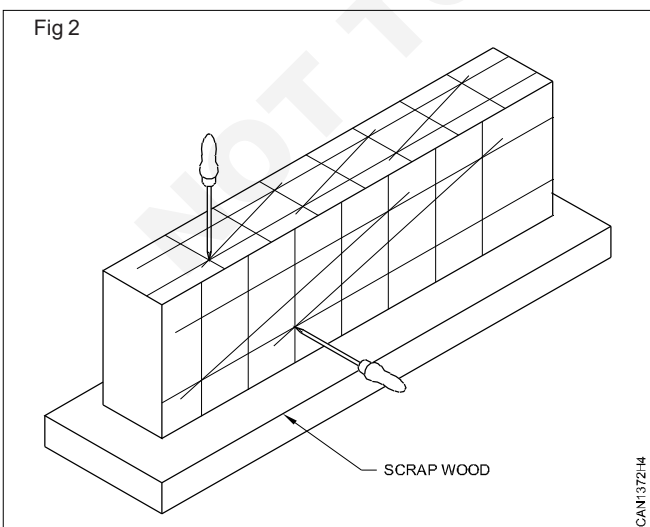
## Job Sequence

**Instructors shall display and demonstrate to the student regarding the nailing and use of selected nail for the table and small box**

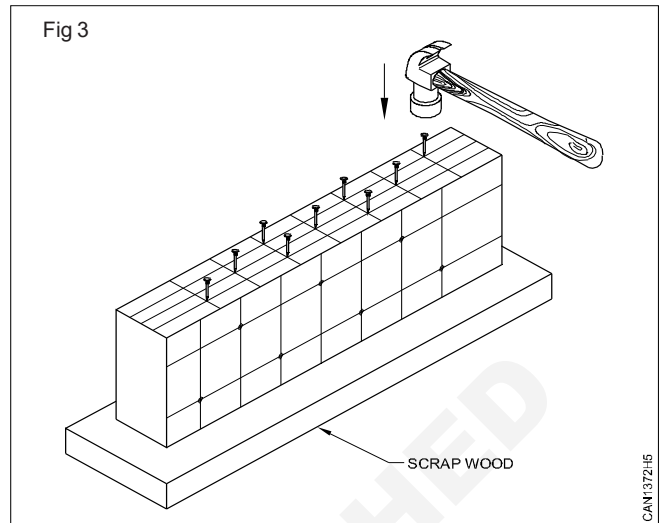
- Check the plane wooden piece for its size =70x30x250mm (Fig 1)
- On the width side, mark out divisions of 30, 30, 30, 30, 30, 30, and 40mm as shown in the figure. (Fig 1)
- Mark out on one edge divisions of 30mm. (Fig 1)



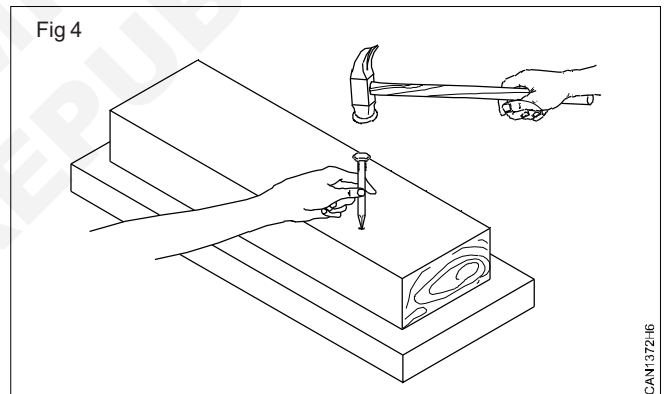
- Gauge two lines on the width side at 20mm from the edges using marking gauge
- Gauge in the directions as shown. (Fig 2)
- Gauge two lines on the edge side 10 MM from the sides and in the directions shown.
- Draw diagonals with the aid of a try square. (Fig 2)



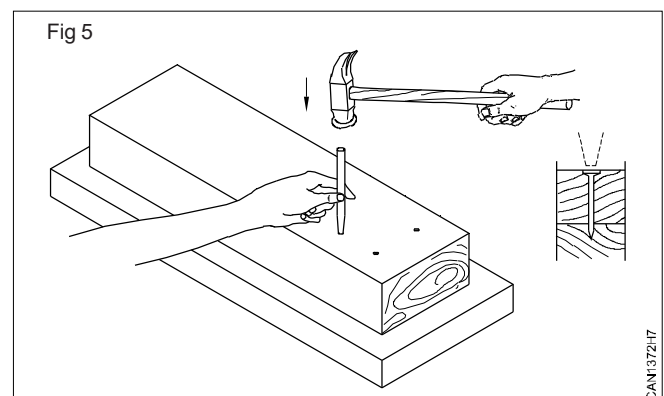
- Mark the locations for the nails with marking awl. (Fig 3)



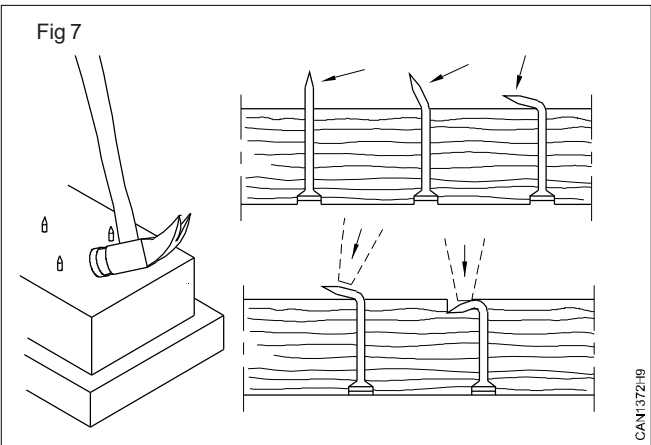
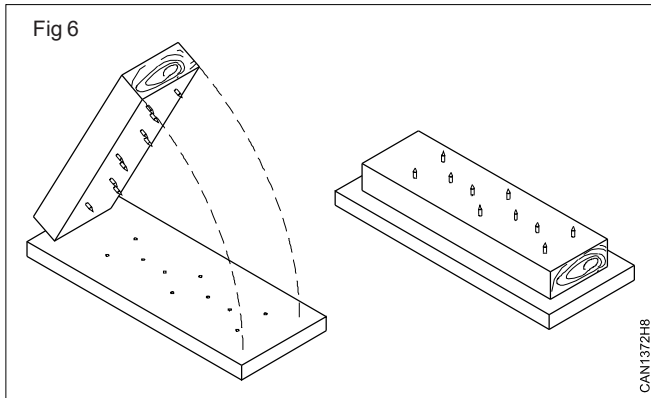
- Place the work piece on a piece of scrap wood
- Drive the nails through the wood as deep as possible, leaving the heads of the nails about one mm projection. (Fig 4)



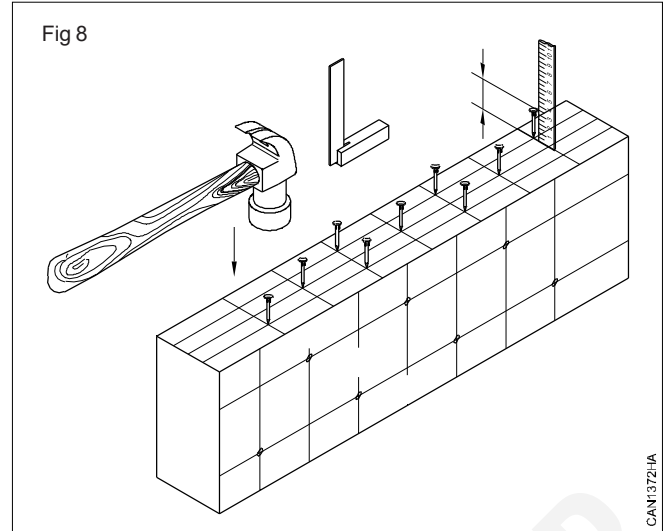
- Hold the hammer as shown near the end of the handle. (Fig 5)



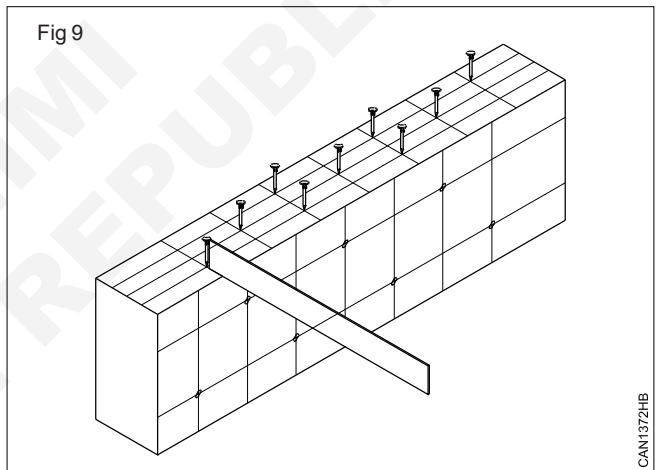
- Use the nail punch and drive the nails hitting the heads square. (Fig 6)
- The nail heads should be just below the wood surface  $\pm 1$  mm deep. (Fig 7)
- Remove the work piece from the scrap piece. (Fig 7)



- Reverse it and place it on the scrap piece.
- Hold the work piece down with the left hand.
- Drive with hammer on the nail point so that it bends sideways with the grains. (Fig 8)
- Use the nail punch to drive the point below the surface.
- Drive the 2" nails in the edge. Start with the row which should remain projecting for 10 mm above the wood surface. (Fig 9)
- Check with try square for 90°. (Fig 8)



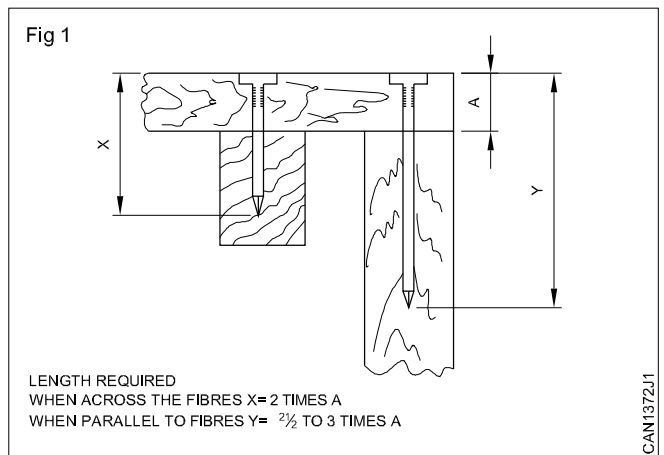
- After lowest row the nails for the middle row are driven and after that last row.
- Check if all nails are in their proper position clenched in the prescribed direction and are in straight rows.
- Check, with a ruler, the projection of the nails lengthwise and diagonally. (Fig 9).



## TASK 2 : Select the nail for the table and box

Select the nail length according to (Fig1) to provide sufficient shank in the bottom piece.

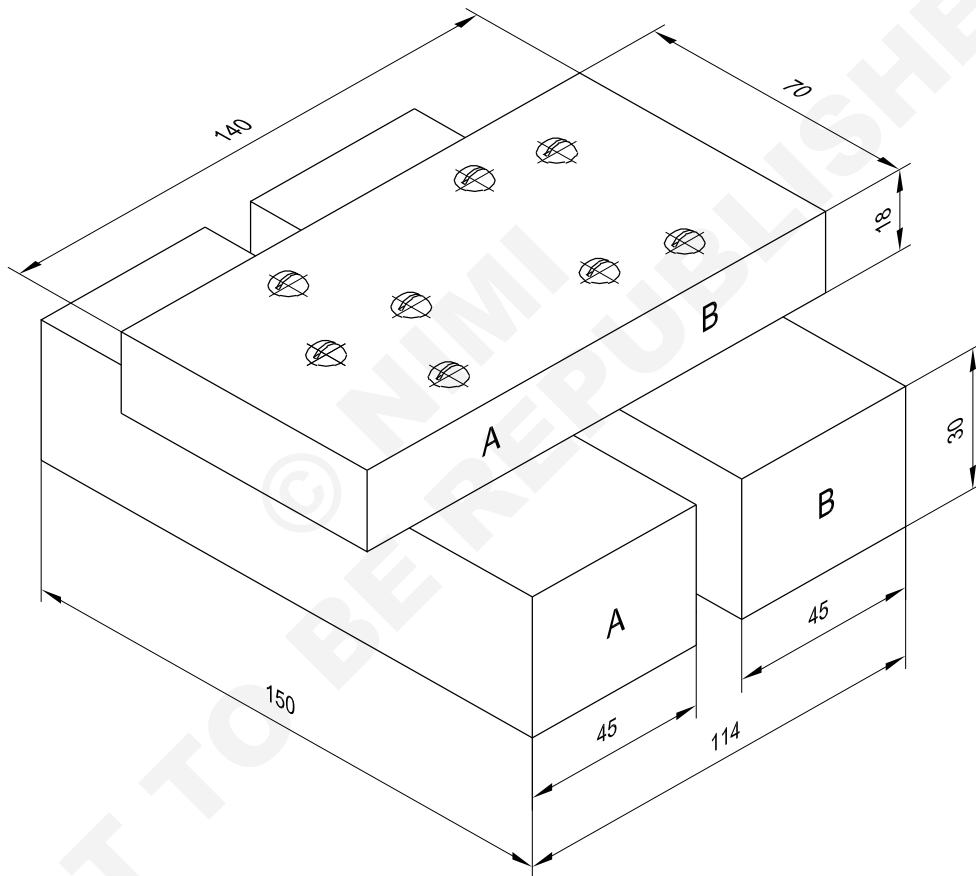
**Thicker gauge nails are generally used in hard wood whereas thinner gauge nails are used in softwood**



**Demonstrate on screwing on job**

**Objectives:** At the end of this exercise you shall be able to

- drive the screws in wood
- use of selected screws for the table and small box.

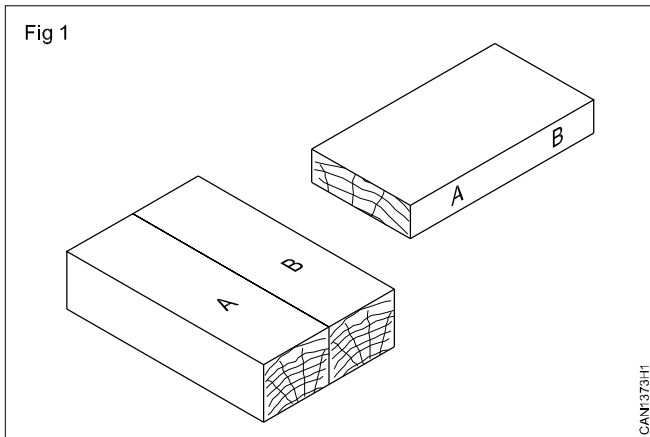


8	50 x 8		WOOD SCREWS			
1	75 x 22 x 140		SOFT (SILVER) WOOD			
2	50 x 38 x 150		SOFT (SILVER) WOOD			1.3.73
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATION ON SCREWING</b>				TOLERANCE ± 2 mm	TIME 8hrs
					CODE NO. CAN1373E1	

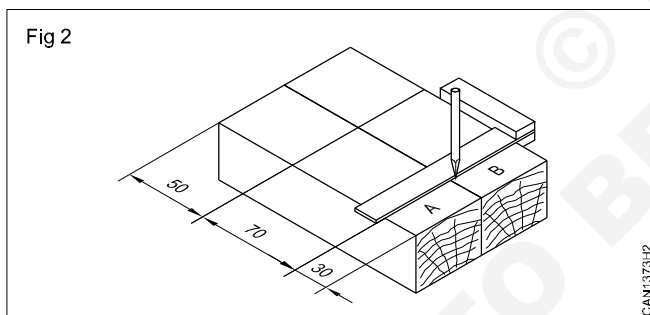
# Job Sequence

**Instructors shall display and demonstrate to the student regarding the screwing practice and use of selected screw for the table and small box**

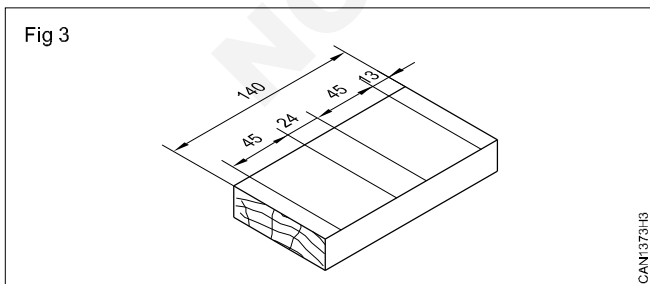
- 1 Check the wooden pieces for its size.
- 2 Plane it to size of 45 x 30 x 150 - 2 Nos. and 70 x 18 x 140 - 1 No. and check its squareness and trueness.
- 3 Mark letter A on 1st piece, B on 2nd piece and AB on 3rd piece as shown in figure 1.



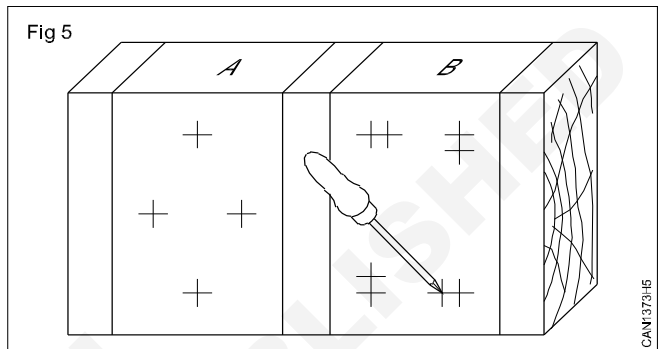
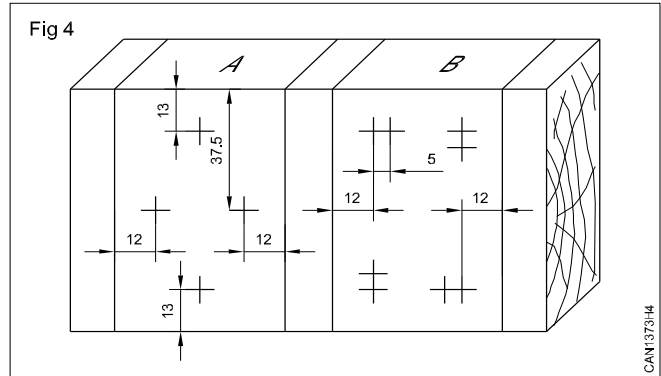
- 4 Keep the pieces A and B together and mark out 50 x 70 x 30mm as per drawing. (Fig 2).
- 5 Square the lines simultaneously as shown in Fig 2.



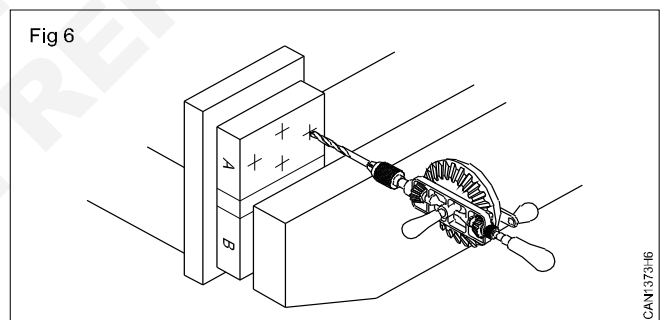
- 6 On the piece AB, mark the lines 13, 45, 24, 45 and 13mm. (Fig 3)
- 7 Square these join lines across the top broad side and two edges as shown. (Fig 3)



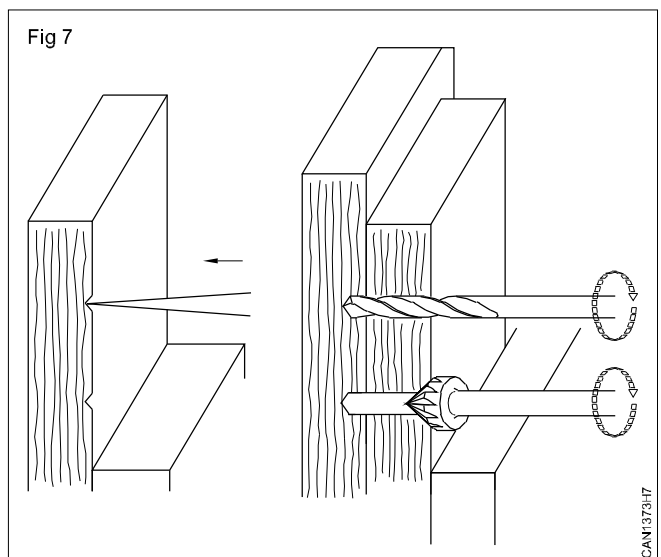
- 8 Mark out the locations for the screw holes. (Fig 4)
- 9 The holes are positioned in the shape of a cross near A.
- 10 The holes are situated in the corners of a rectangle with an offset of 5mm in clockwise direction near 'B'. (Fig 5)



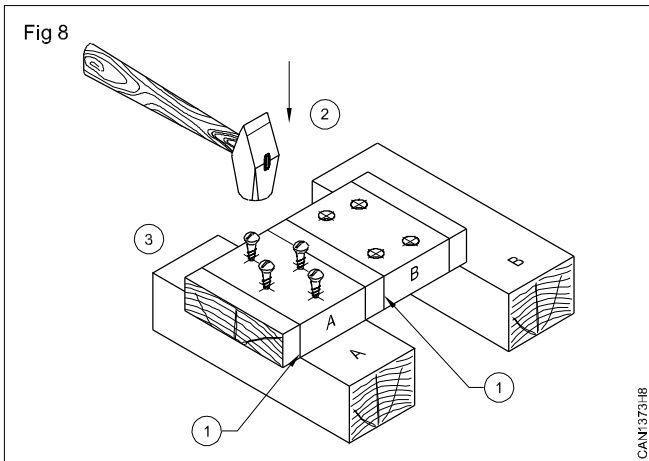
- 11 Mark the position of each hole with marking awl. (Fig 5)
- 12 The marking awl should have sharp point.
- 13 Hold the work piece in the vice as shown in (Fig 6).



- 14 Select a proper drill bit. The size should be same as the shank of the screws. (Fig 7)



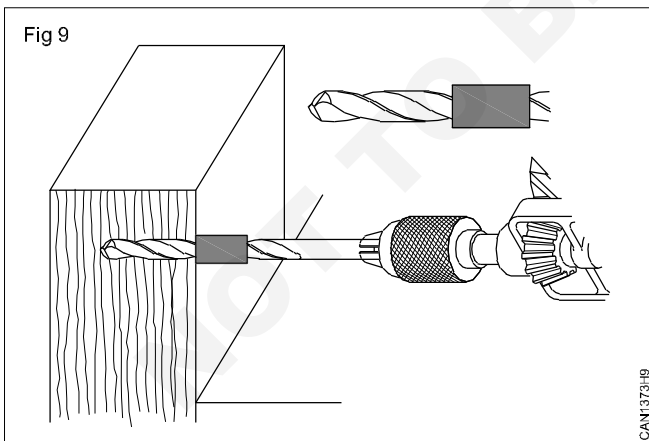
- 15 Make use of a scrap wood for the backing up.
- 16 The procedure consists of
  - 1 Making with marking awl
  - 2 Dent made by marking awl
  - 3 Supporting by a scrap wood
  - 4 Drilling of shank hole
  - 5 Countersinking so that the screw head will be flush.
- 17 Place the broad piece AB on the piece A so that the marks coincide. (Fig 8)



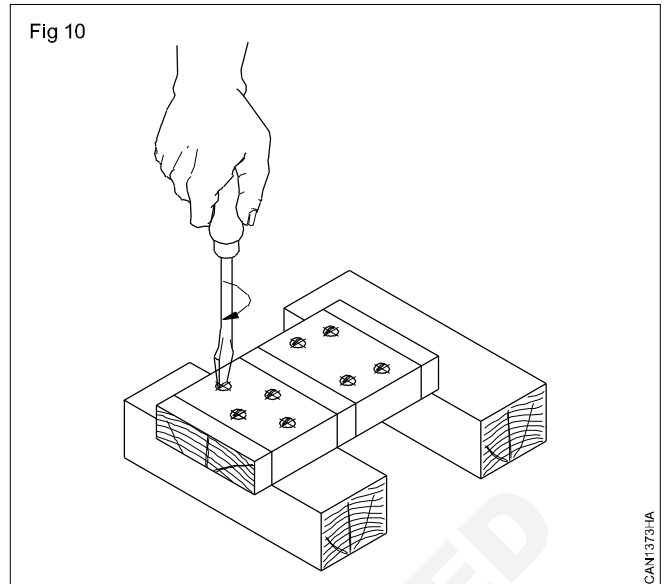
- 18 Use piece B as support.
- 19 Insert four screws.
- 20 Tap the screws carefully with hammer so that the screw points the dent piece A. (Fig 8)

**Take care not to damage the screw heads.**

- 21 For drilling a pilot hole in piece use a drill bit of one half the thickness of the shank hole. (Fig 9)

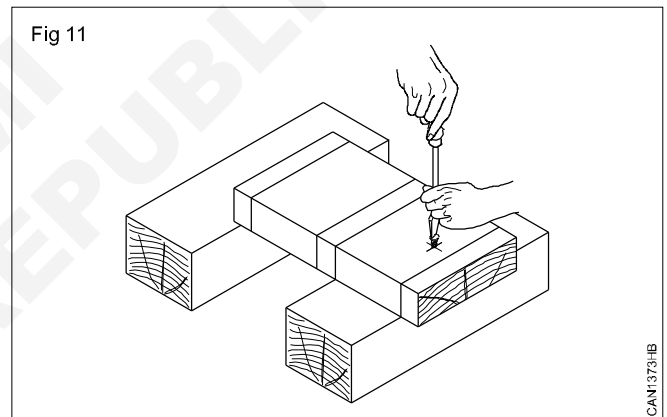


- 22 To control the depth of a pilot hole stick a piece of sticking tape round the bit.
- 23 Repeat the whole drilling procedure for piece B.
- 24 Insert the 8 screws and drive these into the wood. Use the proper screw driver. (Fig 10)

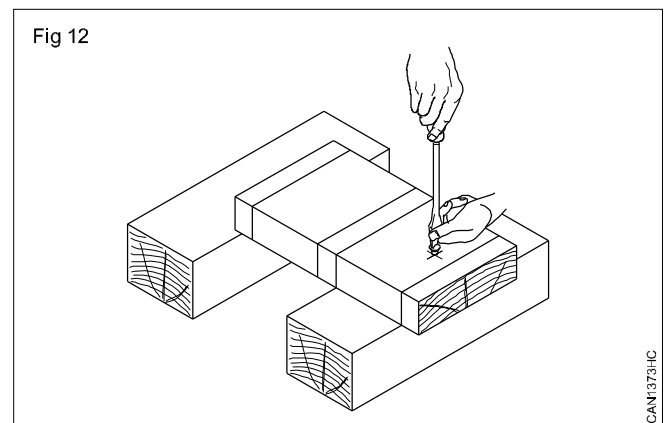


#### Using the screw driver

- 25 Grasp the handle firmly in your right hand with your palm resting on the end of the handle. The thumb and fore finger extend along the handle. (Fig 11)



- 26 While the right hand changed grips to turn the handle the left hand steadies the tool and keeps it in the slot. The method of using a screw driver is shown in Fig 12.

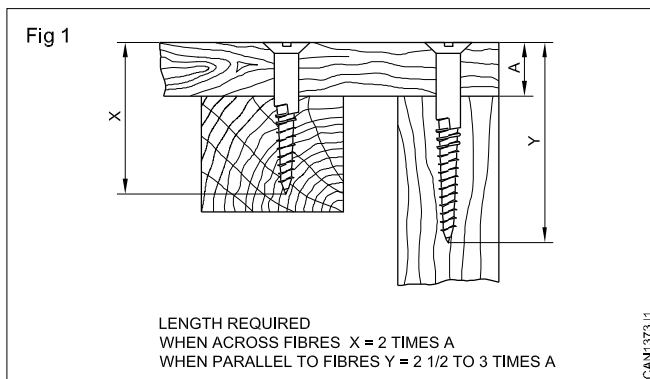


## Skill sequence

**Objective:** This shall be able to

- select the suitable size and type of screws and screwdriver according to the job.

Select the screw length according to Fig 1 to provide sufficient number of thread in the bottom piece.



Thicker gauge screws are generally used in soft wood, whereas thinner gauge screws are used in hardwood like teak wood.

Fig 2 shows the different size of screws in numbers.

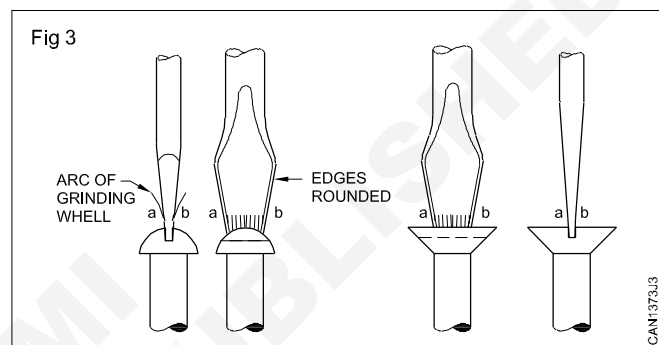
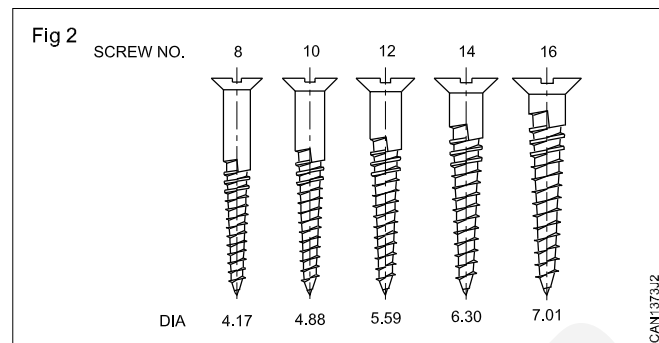
For light screwing, a screw drive with a smaller length and a short width of tip is used, depending upon the size of the screw.

For more hard work, a screwdriver with a slightly larger blade has to be used.

For heavy duty work, where more leverage is required, larger size screwdrivers are used.

The screwdriver depends upon the size of the screw, such that the tip of the screwdriver fits in the head slot of the screws.

The tip of the screwdriver blade should neither be wider nor thicker, nor smaller and thinner than the head of the screw, (Fig 3)



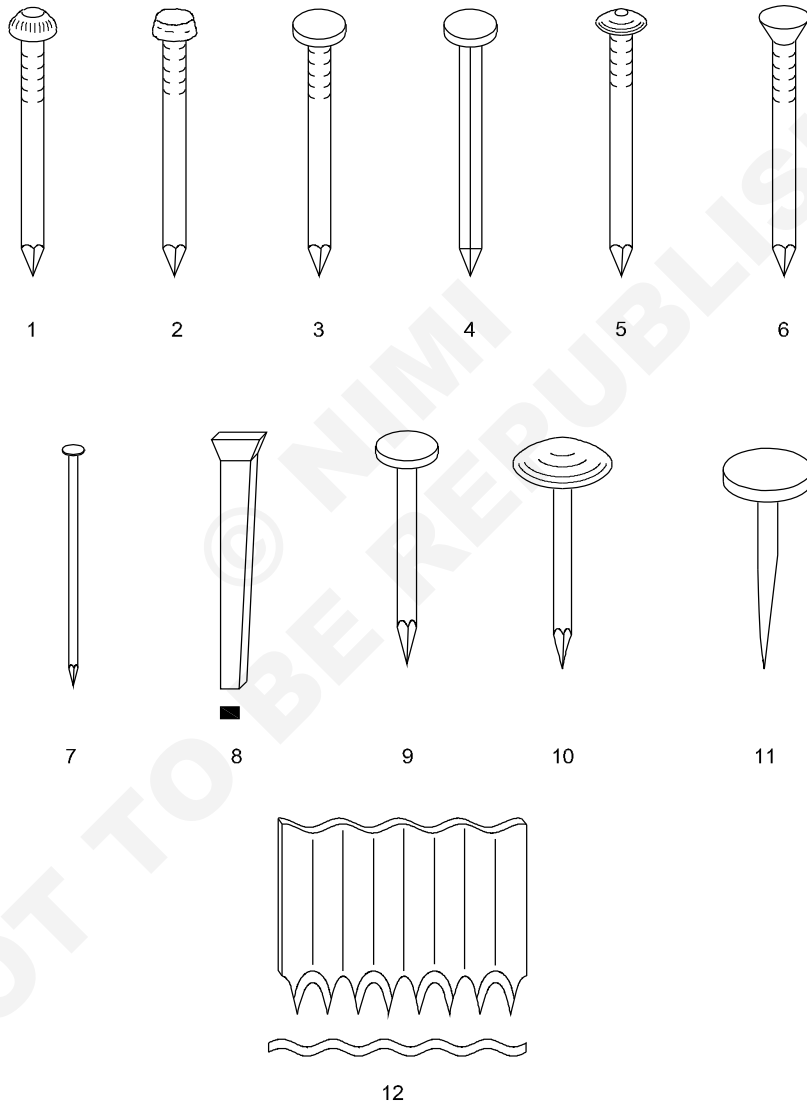


**Application of different types of nails and screws**

**Objectives :** At the end of this exercise you shall be able to

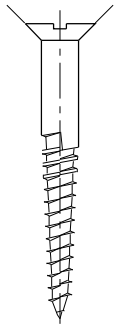
- identify the different types of nails
- application of the nails
- identify the different types of screws
- application of the screws.

TASK - 1



						1.3.74
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>APPLICATION OF THE DIFFERENT TYPES OF NAILS</b>				TOLERANCE ± 2 mm	TIME 6hrs
					CODE NO. CA20N1374E1	

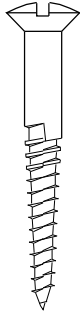
TASK - 2



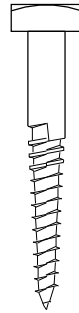
1



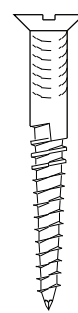
2



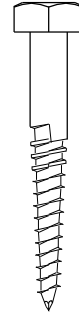
3



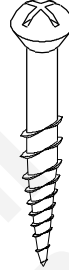
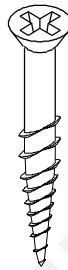
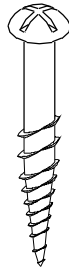
4



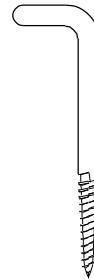
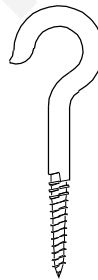
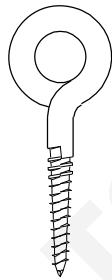
5



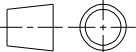
6



7



8

						1.3.74
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>APPLICATION OF THE DIFFERENT TYPES OF SCREWS</b>				TOLERANCE	TIME
					CODE NO. CAN1374E2	

## Job Sequence

Instructor shall display all the nails and screws in the section and brief their names and application of the each nails and screws.

- Trainees will note down all the displayed nail and wood screws.
- Record them in table 1 and 2.
- Get it checked by the instructor.

### TASK 1 : Identify the nails

Table 1

Fig No.	Name of the nails	Applications
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

### TASK 2 : Identify the screws

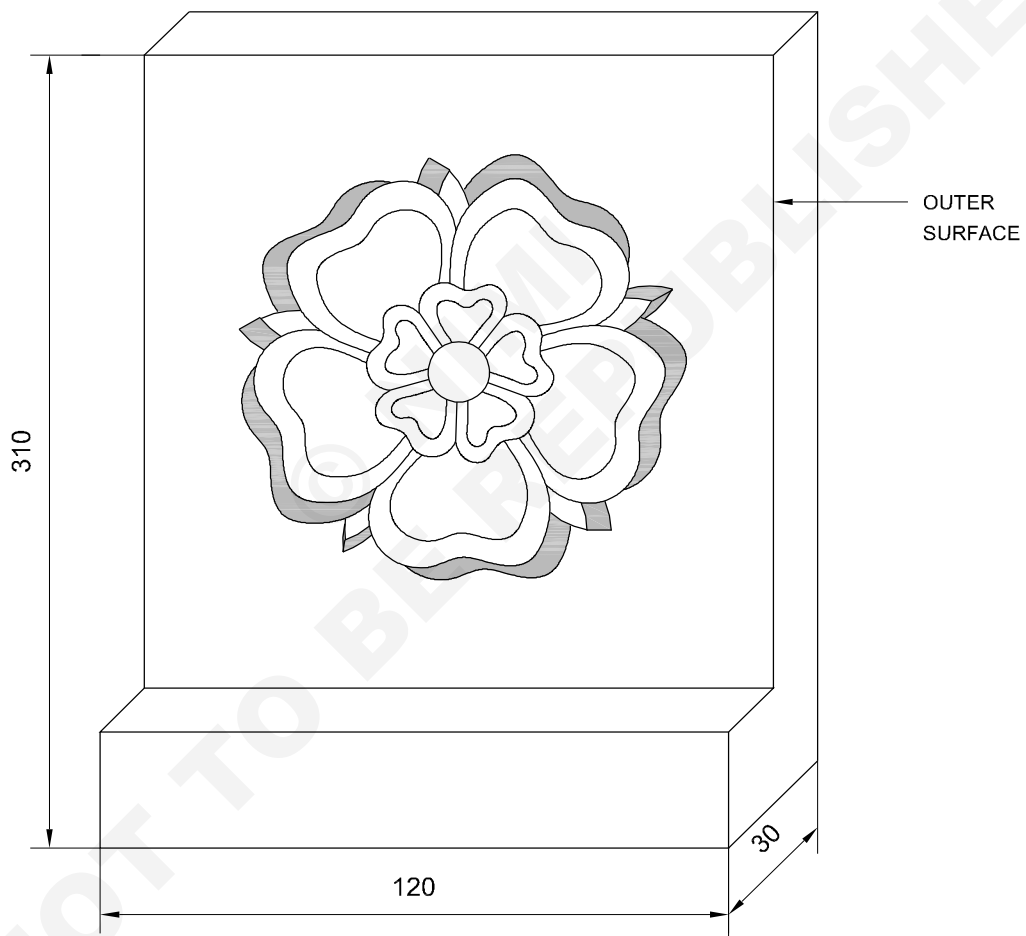
Fig No.	Name of the screws	Applications
1		
2		
3		
4		
5		
6		
7		
8		

**Demonstrate wood carving**

**Objectives :** At the end of this exercise you shall be able to

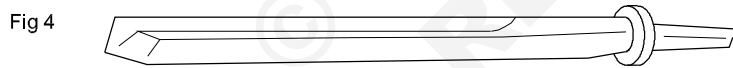
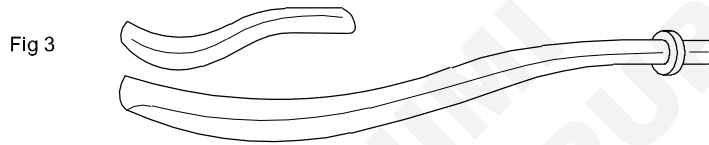
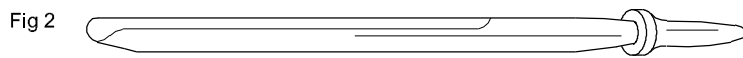
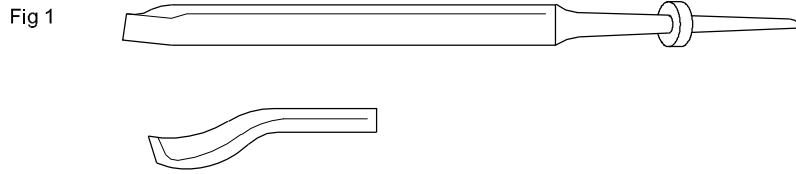
- demonstrate the wood carving
- mark the wood carving design
- make a wood carving
- demonstrate the wood carving chisel
- perform sharpening of the carving chisel.

TASK - 1

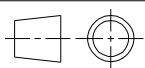


1	130x40x320		TEAK WOOD			1.4.75
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>DEMONSTRATE WOOD CARVING</b>				DEVIATIONS ± 0.06	TIME 25hrs
					CODE NO. CAN1475E1	

TASK - 2



NOT TO BE PUBLISHED

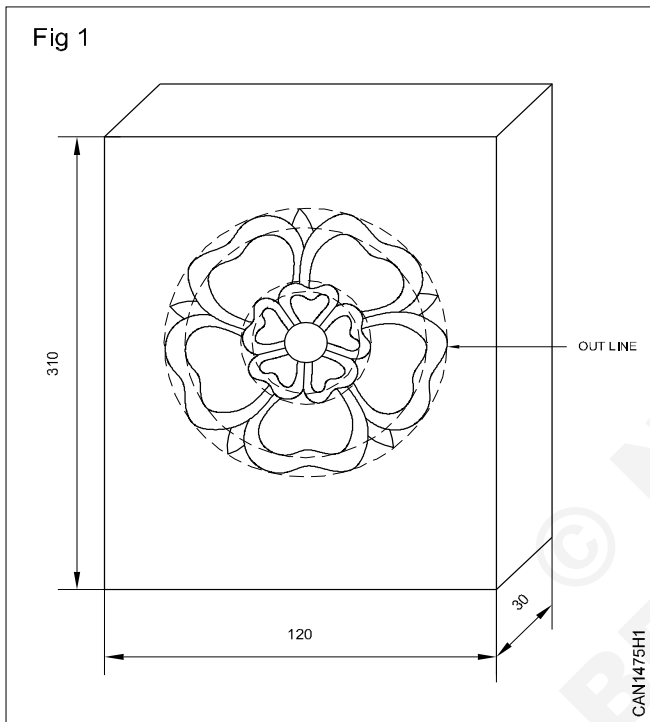
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>DEMONSTRATE WOOD CARVING TOOLS</b>				DEVIATIONS	TIME
					CODE NO. CAN1475E2	

## Job Sequence

Instructor shall display and demonstrate to the students recording the wood carving, wood carving tools and sharpen the carving chisels brief their names and uses.

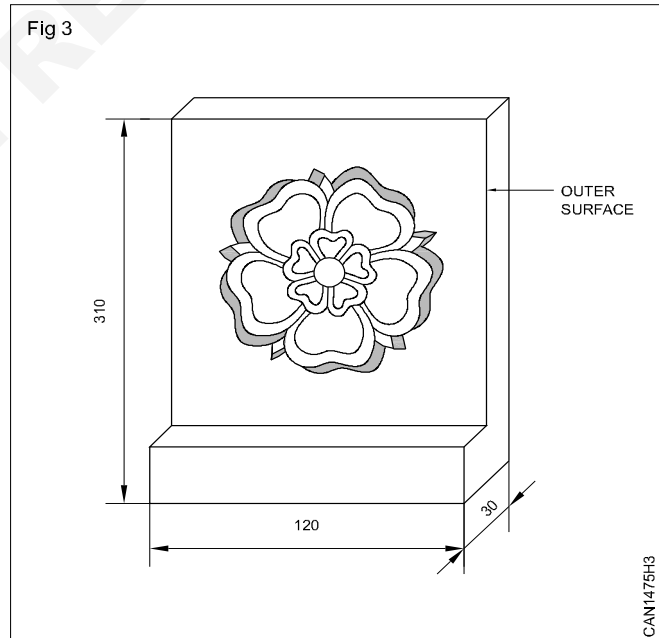
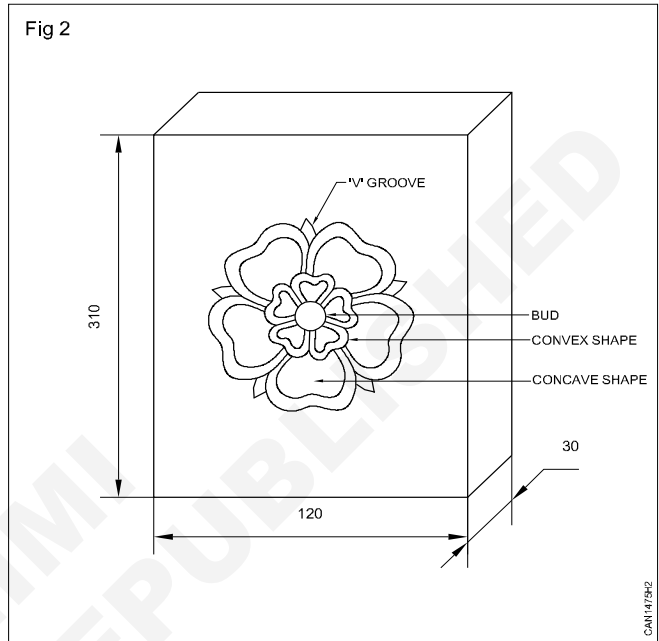
### TASK 1 : Wood carving

- Plane the work piece to square as per the dimension given in drawing. 120 x 30 x 310mm (Fig 1)
- Mark the out line of rose floral design on the work piece with wing compass (Fig. 1)
- Form the impression of rose floral design on marked out line using round nose chisel (Fig. 1)



- Shape the centre portion of floral design (bud) using flat chisel (Fig. 2)
- Separate the floral design by forming grooves on marked line using 'V' shaped chisel (Fig. 2)
- Form the outside shape (Convex) on inner (small) floral design using flat chisel (Fig. 2)
- Form the inside shape (concave) on inner (small) floral design using gouge chisel (Fig. 2)
- Make the out side shape (convex) on outer (bigger) floral design using flat chisel (Fig. 3)
- Make the inside shape (Concave) on outer (bigger) floral design using gouge chisel (Fig. 3)
- Remove the waste portion on all around the outer surface of floral design (Fig. 4)
- Smooth the inside and outside shape of floral design using NO 100 sand paper.
- Finish the rose floral design using No.120 sand paper.

- Repeat the same procedure to prepare the other rose floral design.



- **Always keep your hand behind the carving chisel**
- **When carving keep your fingers in such a position, they will not cut if the knife slips.**
- **Always keeps the knife sharp.**

- Finish the carving

**TASK 2 : Identify the carving chisels**

**Table 1**

Fig No.	Name of the carving tools	Uses
1		
2		
3		
4		
5		

- Trainees will note down all the displayed chisels, name and uses
- Record it in table 1.
- Get it checked by the instructor.

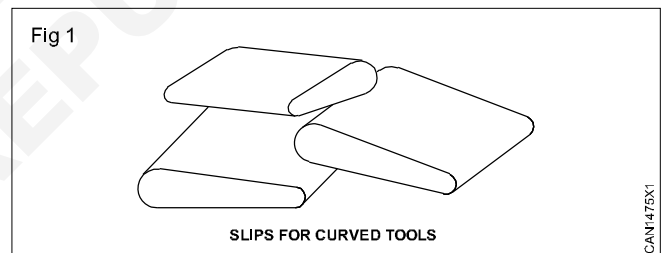
**Skill sequence**

**Carving chisel sharpening**

**Objective:** This shall help you to  
 • **sharpen the carving chisel.**

**Sharpening a carving chisel**

- Select the slip stone (Fig 1)
- Wet the surface of the stone with oil.
- Lay the cutting bevel on the surface
- Place the chisel blade until the cutting edge is parallel on the stone
- Hold the chisel at the oil stone.
- Move the chisel back ward and forward on full length and width of the stone.
- Until a burr is formed on the other side the chisel.



The burr can be felt by rubbing lightly with a firiger tip  
 Turn the chisel over and keeping it perfectly flat on the stone, rub from side to side until the burr disappears

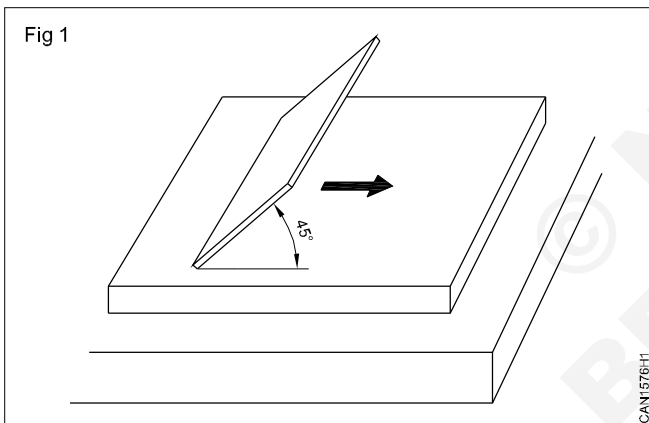
## Prepare surface for painting

**Objectives:** At the end of this exercise you shall be able to

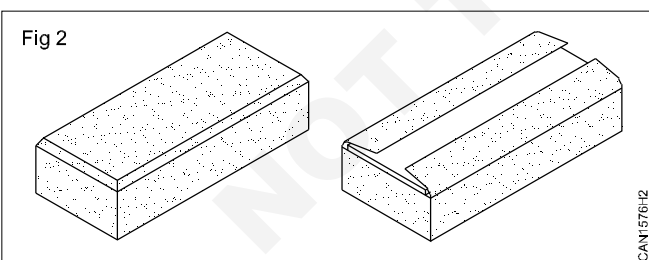
- scrap the surface
- sand the surface
- apply wood filler on the gaps.

### Job Sequence

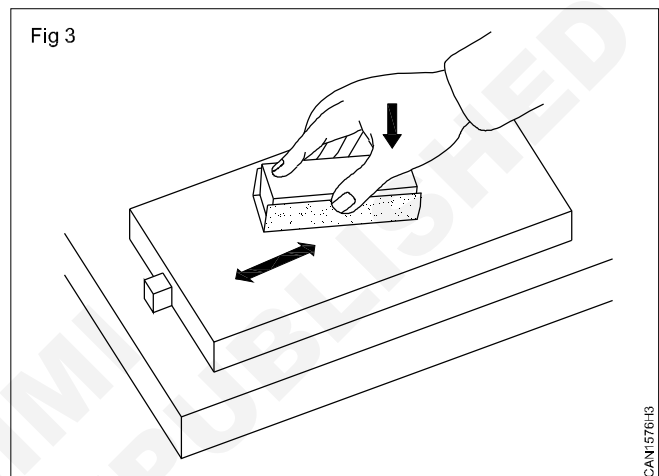
- Rub the surface of the frame using wet cloth before smooth planing.
- Select the smoothing plain for planing.
- The nail and screws head should be just below the wooden surface for planing.
- Set the gap between cap iron and cutting iron as 0.5mm in smoothing plain.
- Planing from along the grains surface
- Scrap the wood surface along the grain with scraper. (Fig 1)



- Take a cork or rubber block and fold the sand paper around the block (Fig 2)

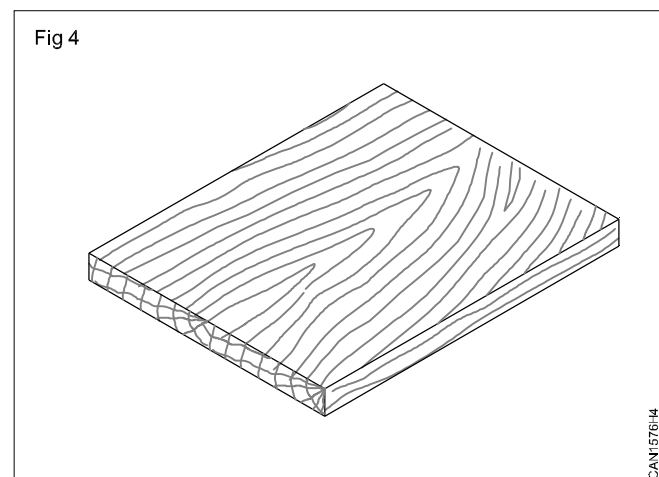


- Sand all the surface using No 36,50 sand paper for rough finishing (Fig 3)



- Repeat the same procedure using sand paper No 80 and 100 for fine finishing.
- Apply the wood primer using brush for first coat.
- Apply wooden putty to cover the screw heads and all other gap if any.
- Sand again using No. 120 sand paper to get the smooth surface.
- Finish the primer second coat (or) Tough coat of primer. (Fig 4)

**Do not use thick primer**





**Apply the paint**

**Objectives :** At the end of this exercise you shall be able to

- **apply wood putty on the gaps**
- **sand the surface**
- **paint the surface.**



1	500ml		PAIN			
1	50grm		PUTTY			
1	250ml		PRIMER			1.5.77
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>APPLY THE PAINT</b>			TOLERANCE ±2.0 mm	TIME 3hrs
					CODE NO. CAN1577E1	

**Job Sequence**

- Check the prepared surface for painting
- Clean all the surfaces of the job using dusting brush.
- Apply first coat of primer which acts as a filler and absorption well into the pores of wood.
- Brush the primer well into the pores of wood.
- After priming, fill up the nailed holes, cracks etc, with putty made by mixing whiting, with linseed oil to a thick paste, with matching colour
- Allow over night to dry and use No.120 sand paper to get a fine surface
- Give a first coat of paint.
- Allow it to dry for 48 hours.
- Finishing coat is applied straight from the tin if brushed as per the drawing.

**Brush**

**Apply readily available paint by first brushing diagonally both ways and then to it as long the grain for fine finish.**

**When brushes are not in use keep them in a solvent which is a thinner for the finish being applied**

**Add paint with turpentine so that the brush will move smoothly.**

**Avoid painting of wet surface, raining season and winter period.**

- Finish the painting even and uniform and without any brush marks.

- **Do not use very old paint.**
- **Use proper brush only.**
- **Do not paint on humid condition.**

**Prepare surface for varnishing by smoothing plane**

**Objective:** At the end of this exercise you shall be able to  
• **prepare the surface for varnishing.**

**Job Sequence**

- Set the smoothing plane for planing
- Place the job on the work broch and using with bonch stop
- The nail and screw should be just below the wooden surface for varnishing.
- Set the gap between cap iron and cutting iron as 2mm in the smoothing plane
- The cutting edge is sharpened slightly oval across the cutting iron
- The edge of the cutting iron placed 0.001mm extended from the base of the smoothing plane
- Start planning from one end to other end.
- Apply the pressure evenly.
- Plane along the grain (Fig 1)
- Adjust the plane to make finishing cuts to remove the scallops left by initial cuts.
- Initial cuts should be wide about 3/4 of the width of two-inch - wide blade
- The thickness of the shaving should be in the range of 0.005 thick (Fig 1)
- Now you are ready with smoothing plane to make finishing cuts.
- For finishing cuts setup 1/2" wide shaving should come from the middle of the blade and it should be transparent 0.001" to 0.002" thick
- Go over the entire surface twice laterally between cuts by only 1/2". At this point the surface will be incredibly smooth.
- You can actually look at the surface at an oblique angle see a reflection in the wooden surface.
- Finish wooden surface for varnishing. (Fig 2)

Fig 1



Fig 2



## **Smoothing plane on knotty and interlocked cross grained**

**Objective:** At the end of this exercise you shall be able to

- **perform planing on knotty and interlocked cross grains.**

### **Job Sequence**

- Set the smoothing plane for planing
- Place the job on the work bench using holding device
- Set the gap between cap iron and cutting iron as 1mm in the smoothing plane
- The cutting edge is sharpened slightly oval across the cutting iron
- The edge of the cutting iron placed 0.001mm extended from the base of the smoothing plane
- Start planing diagonally on the interlocked grain. (Fig1)
- Apply less pressure for painting.
- Planing the knot to use smoothing plane gives short stroke. (Fig 2)
- Readjust the smoothing plane to make finishing touch.
- Repeat the same procedure until you get the fine glossy finish.

Fig 1



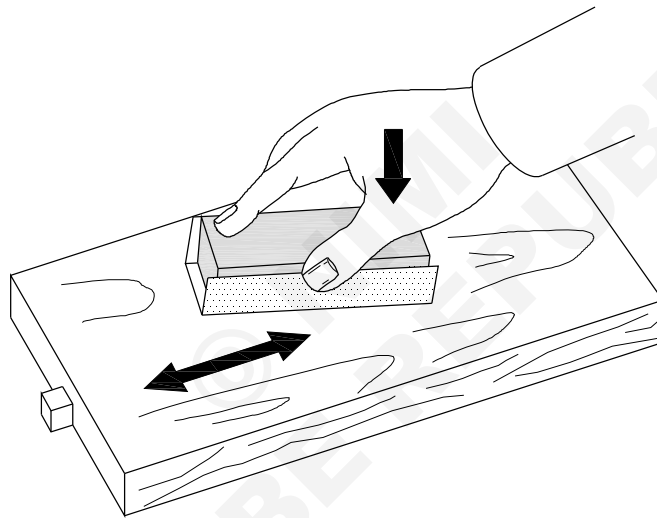
Fig 2



**Smoothen surface by scraping with sand paper**

**Objectives:** At the end of this exercise you shall be able to

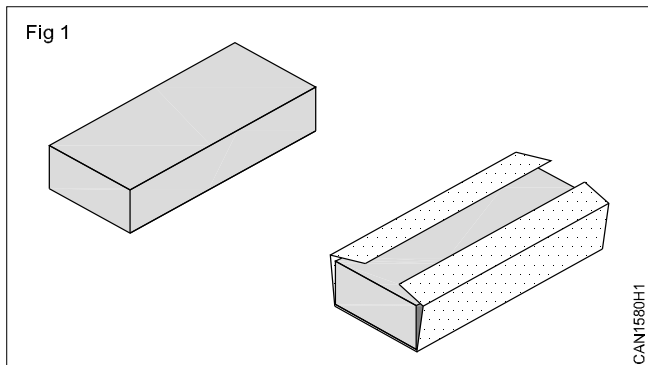
- scrap a surface with a scrapper.
- sand a surface with a sand paper.



1	100gm		PUTTY			
1	1m		WHITE COTTON CLOTH			
1	250gm		COTTON WASTE			
2	NO, 80		DISK SAND PAPER			
8	NO, 36,50,100 &120		SAND PAPER			1.5.80
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>SMOOTHEN SURFACE BY SCRAPPING WITH SAND PAPER</b>				DEVIATIONS ± 0.06	TIME 3hrs
					CODE NO. CA20N1580E1	

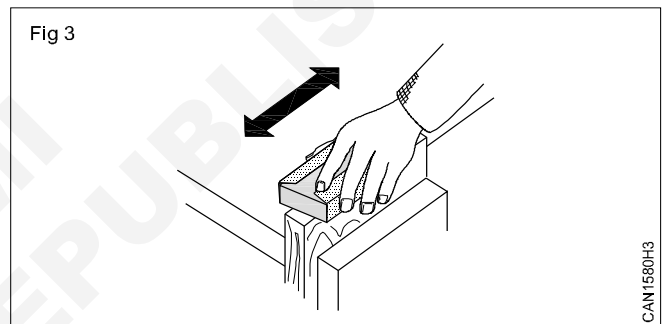
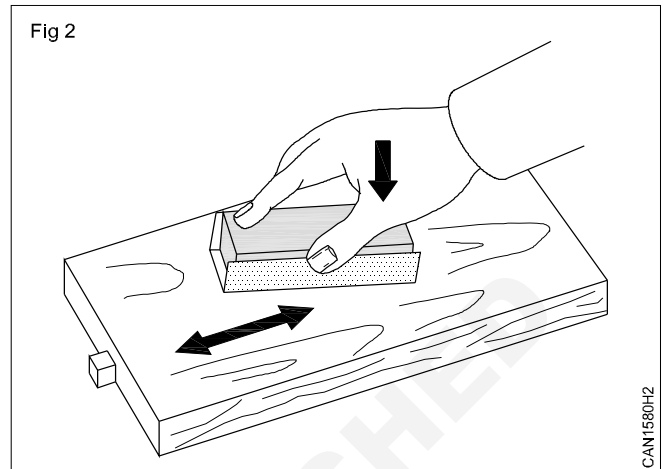
## Job Sequence

- Rub the surface of the plank and the top with a dry cloth.
- Take cork or rubber block and fold the sand paper around the block. (Fig 1)
- Sand the rounded edges, by cupping the sand paper in the hand.
- Move the sand paper in the direction of the grain.



- Start with coarse abrasive sand paper No 36, 50 for rough finish. (Fig 2)
- Use thin medium sand paper (80-100) for smoothing the surface. (Fig 3)
- Then use fine sand paper 100 - 120 for smoothing the surface. Use little pressure and move the block to and for in the direction of grain. Remove the dust caused while sanding by blowing or wiping it away.

**Avoid circular movement or sanding across the grain. This will injure the wood fibers.**



## Skill sequence

**Objective:** This shall help you to

- sanding with portable power disk sander machine.

Select the portable disk sander machine

Fix the disk sand paper No:80 in part of the disk on sander machine

Start the machine

Move the disk sander in the direction of the grain

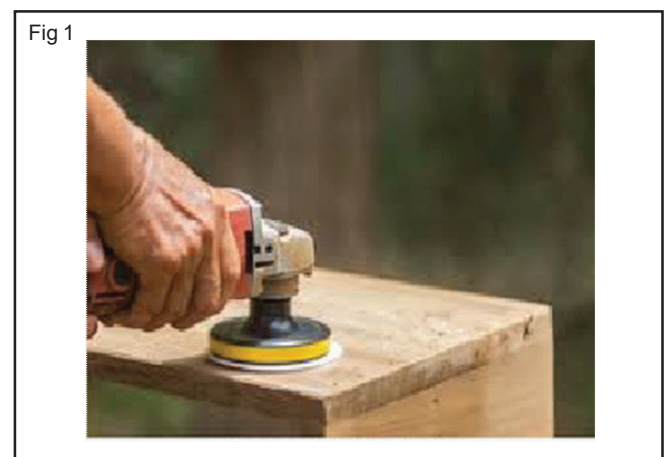
Use little pressure

Move the disk sander evenly (Fig 1).

Sand the surface for rough finish.

Sand again using the disk sand paper No 120. to get fine glossy finish surface.

Finish the wooden surface.



**Varnish on finished surface**

**Objective :** At the end of this exercise you shall be able to  
 • **varnish on finished surface.**



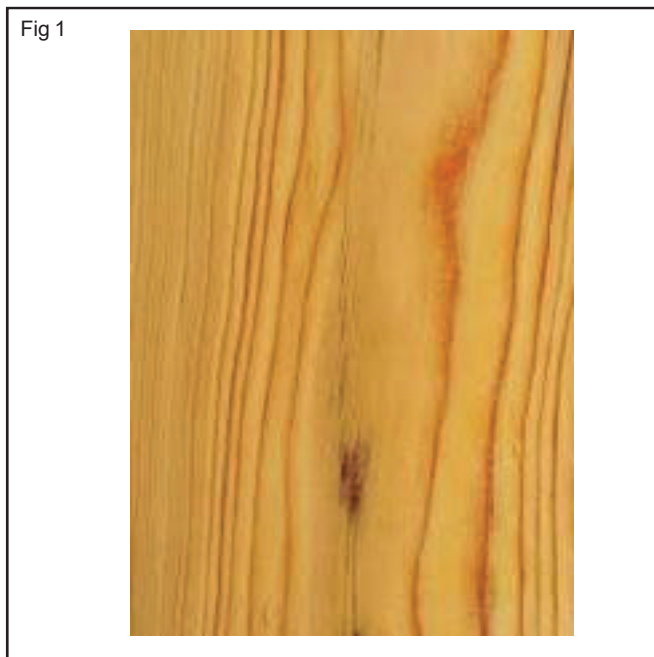
	1 m		COTTON CLOTH			
1	1 litres		VARNISH			1.5.81
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>VARNISH ON FINISHED SURFACE</b>				DEVIATIONS ± 0.06	TIME 4hrs
					CODE NO. CAN1581E1	

**Job Sequence**

- Clean all the surface of the job using dusting brush.
- Rub the surface using wet cloth before varnish. (Fig 1)
- Prepare the brush.
- Dip the brush with varnish.
- Apply the varnish using the brush in all over the surface uniformly.

- The finished surface should present to look like fine glossy surface. (Fig 1)

**Surface should be rubbed down after each coat with fire sand paper except final coat.**



**Avoid forming some or air bubbles**

- Allow the first and second coat of varnish to dry.
- Apply the varnish with full brush evenly with short light strokes.
- Apply the varnish vertical should be crossed and re-crossed and then loid off lightly.
- It should be completed with upward brushing so that varnish could set flow down and eliminate brush marks.
- Apply the varnish horizontally in every direction with light quick strokes.
- It should be finished in one definite direction so that it could set without showing brush marks.
- Apply the varnish final coat

**Cleaning of furniture surface**

**Objectives :** At the end of this exercise you shall be able to

- **scrap the furniture surface**
- **sand the furniture surface**
- **apply the filler on the gaps.**



1	100grms		COTTON WASTE				
1	100grms		FILLER				
1	50cm		COTTON CLOTH				
8	NO,30,50,100 & 120		SAND PAPER			1.5.82	
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.	
SCALE 1:1		<b>CLEANING OF FURNITURE SURFACE</b>			DEVIATIONS ± 0.06		TIME 2hrs
					CODE NO. CA20N1582E1		

**Job Sequence**

- Rub the furniture surface with a dry cloth.
- Scrap the surface using scraper. (Fig 1)

Fig 1



- Take a cork or rubber block and fold the sand paper around the block. (Refer the Ex. No. 1.5.76)

- Sand all the furniture surface using No 36. and 50 sand paper, for rough finish. (Refer the Ex. No. 1.5.76)
- Move the sandpaper in the direction of the grain
- Repeat the same sanding process using the sand paper No 80 and 100 for fine finishing.
- Apply wooden putty to cover screw, nail heads and all other gaps if any.
- Sand again using No.120 sand paper to get the smooth surface. As per the drawing
- Apply wood filler using cotton waste on the finished surface of the furniture.


**Filler should be of the same colour of the wood**

- Remove the extra filler dust using fresh fine cotton waste.
- Sand again using the sand paper No: 120
- Finish the furniture surface to fine glossy finish.

Application of french polish

Objective: At the end of this exercise you shall be able to  
• apply the french polish.



1	250grms		COTTON WASTE			
1	1m		FRENCH POLISH			
1	50cm		COTTON CLOTH			
1			SMALL COTTON ROLL			1.5.83
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>APPLICATION OF FRENCH POLISH</b>				DEVIATIONS ± 0.06	TIME 5hrs
					CODE NO. CA20N1583E1	



## Job Sequence

**Instructor shall display and application of french polish to the students regarding the use of french polish.**

- Clean all the finishing surface using dry cloth.
- Prepare the polishing pad by using cotton and cotton clothes. (Fig 1)

Fig 1

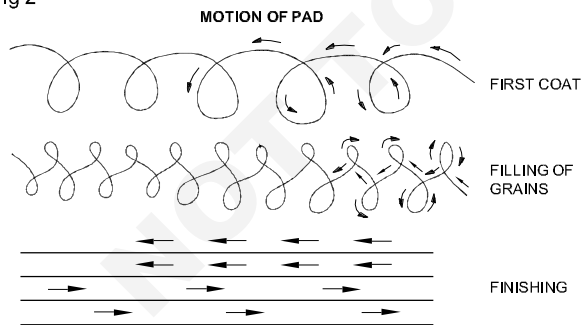


CAN1583H1

**Do not polish rough surfaces.**

- Apply a coat of wood filler on the surface with a piece of rag and allow it to dry.
- Clean the surface with dusting brush to remove the excess filler.
- Hold the pad in right hand and dip it in polish, apply first coat on all wooden surface. (Fig 2)
- Apply few drops of coconut oil on the surface and rub the surface.
- When the first coat is dry, apply second coat in circular motion. (Fig 2)

Fig 2



CAN1583H2

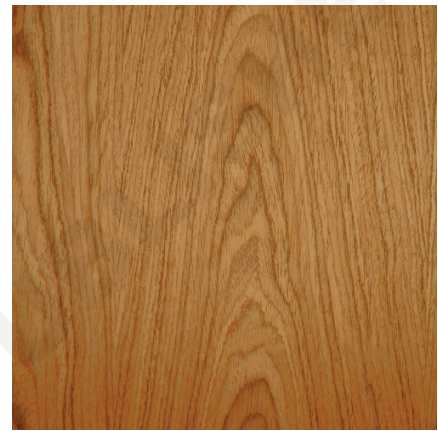
**Do not apply a new coat of polish when the previous one is wet.**

- Repeat the same procedure till surface of the grains are filled.
- When grains are filled, dip the pad with polish and squeeze the polish with slight pressure.
- Squeeze all the polish from the pad, and rub the pad all over the surface to obtain fine glossy finish. (Fig 3)

**Do not use wet pad for finishing.**

**Do not stop the rubbing process in between.**

Fig 3



**Application of wax polish**

**Objectives:** At the end of this exercise you shall be able to

- application of wax polish
- apply the wax polish.



**Job Sequence**

**Instructor shall display and application of wax polish to the students regarding the use of wax polish.**

- Smooth the surface of the job using smoothing plane
- Scrap from all the surfaces using sharpened scraper. Refer Ex no 1.5.76
- Smoothen all the surfaces using No 100 sand paper. (Fig 1) Refer Ex no 1.5.76
- Damp the surface of the job to raise the grain.
- Fill the gaps with filler material.
- Stain the surface using stain solution.
- Smooth the surface again using No 120 sand paper
- Apply several coats of wax on the surface of the job. as per the drawing.
- Rub the surface with even pressure using co-conut fibre.
- Allow the wax polish to dry.
- Remove the excess wax using pure cotton cloth.
- Repeat the same procedure using coconut fibre until you set fine glossy finish.
- Finish the surface of the job cleaning with fine white cotton cloth.
- Finish the wax polish in wooden surface. as per the drawing.

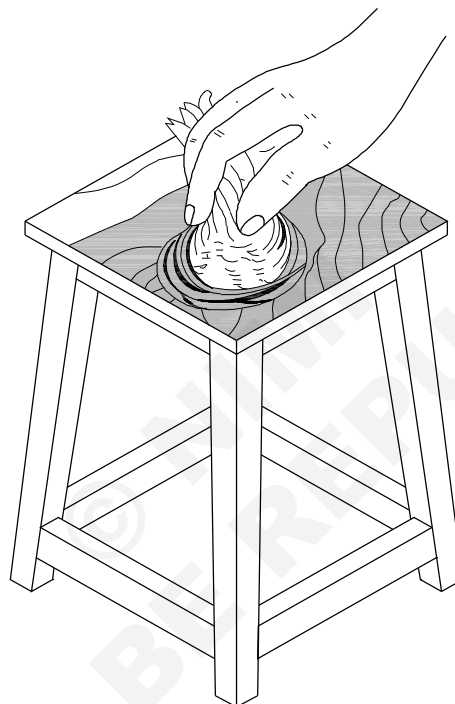
1	250ml		STAIN			
2	NO,100 &120		SAND PAPER			
1	250grms		COCONUT FIBRE			
1	250grms		WAX POLISH			
1	50cm		COTTON CLOTH			
1	100grms		FILLER			1.5.84
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.

SCALE 1:1	<b>APPLICATION OF WAX POLISH</b>	DEVIATIONS ± 0.06	TIME 5hrs
		CODE NO. CA20N1584E1	

**Remove the old polish and re-polish the old furniture**

**Objectives:** At the end of this exercise you shall be able to

- **scrap the surfaces old furniture**
- **smooth the surfaces old furniture**
- **polish the surfaces old furniture.**

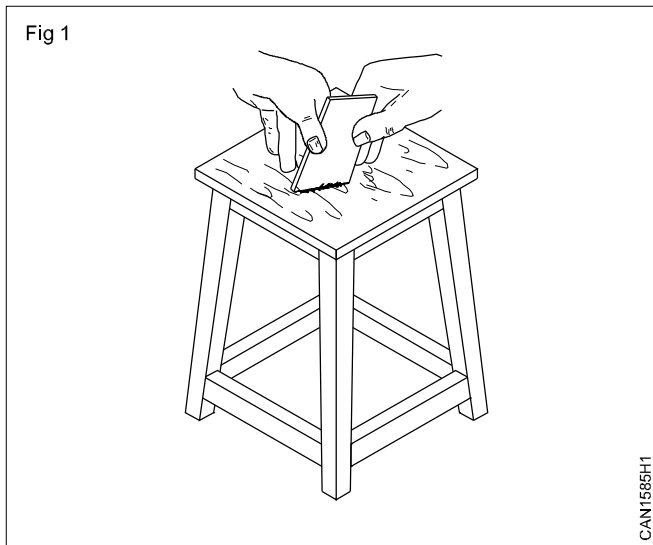


1	250ml		STAIN			
6	NO,50, 100 &120		SAND PAPER			
1	150grms		PUTTY			
1	1litres		FRENCH POLISH			
1	50cm		COTTON CLOTH			
1			SMALL COTTON ROLL			1.5.85
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.

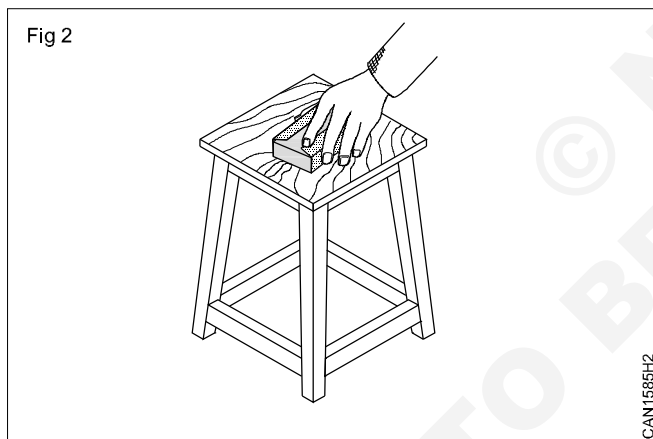
SCALE 1:1	<b>REMOVE THE OLD POLISH AND RE-POLISH THE OLD FURNITURE</b>	DEVIATIONS ± 0.06	TIME 5hrs
		CODE NO. CAN1585E1	

## Job Sequence

- Clean all the surfaces of the furniture using dry cloth.
- Scrap and remove the polish from all the surfaces of the furniture using sharpened scraper. (Fig 1)

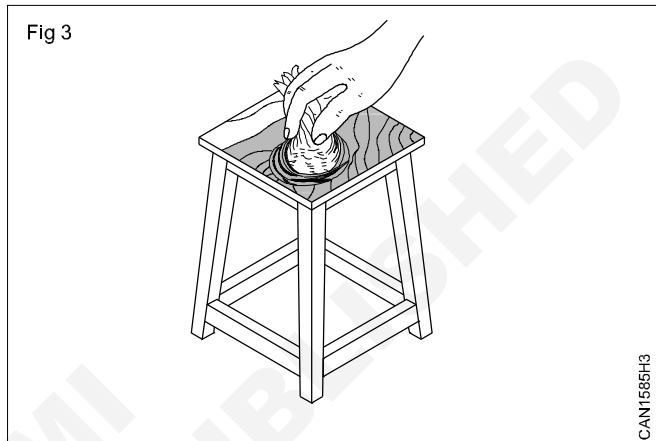


- Smooth all the surfaces of the furniture using smoothing plane.
- Sand all the surfaces of the furniture using rough sand paper (No.50). (Fig 2)

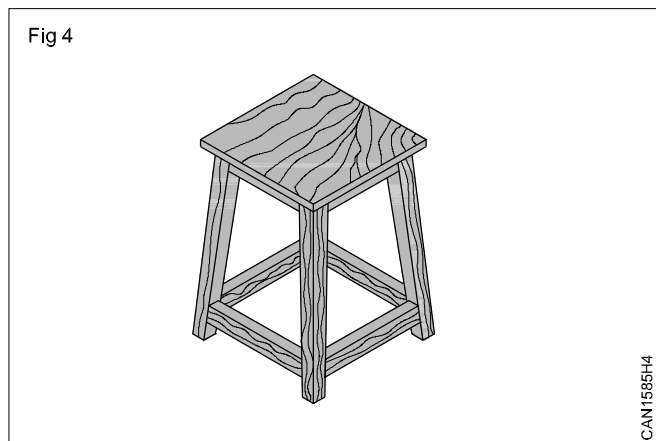


- Repeat the same procedure to smooth all the surfaces of the furniture using No.100 sand paper.
- Apply putty to cover the gaps on the surfaces of the furniture.
- Sand again using No.120 sand paper to get the smooth surface. (Fig 2)

- Apply suitable colour stain on all over the surface of the furniture.
- Remove the extra filler dust using cotton waste.
- Prepare the pure cotton pad covering with gada cloth for polishing.
- Dip the pad with polish and squeeze the polish with light pressure.
- Apply the polish using the cotton pad on all over the surface of the furniture uniformly. (Fig 3)



- Allow the first coat of polish to dry.
- Apply the second coat in circular motion after the first coat is dry.
- Continue the procedure till the surface of the grains are filled.
- Repeat the same procedure until you get the fine glossy finish. (Fig 4)



**Prepare an estimation of wooden furniture**

**Objectives :** At the end of this exercise you shall be able to

- estimate the materials required for student chair
- estimate the materials required for table with drawer.

**Job Sequence**

**TASK 1 : Estimate the materials required for a student chair as per drawing (Fig 1)**

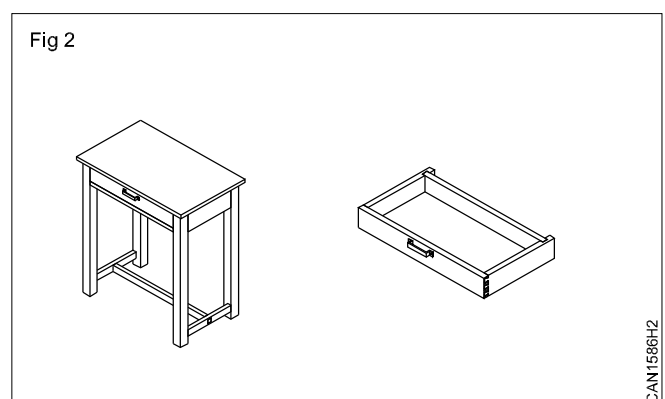
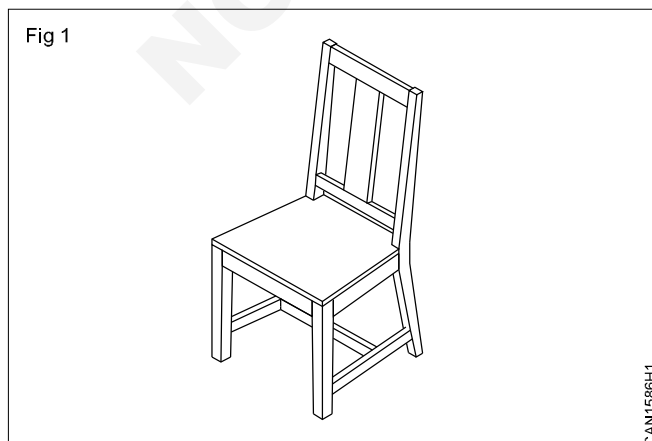
Sl: No.	Utilization to the job	W	T	L	No. of pieces
1	Back leg	100	40	1050	2 Nos.
2	Front leg	50	50	450	2 Nos.
3	Back rest top rail	75	25	450	1 No.
4	Back rest middle rail	50	25	450	1 No.
5	Back rest vertical rail	30	20	450	2 Nos.
6	Back rest vertical	75	20	450	1 No.
7	Seat front rail	50	30	450	1 No.
8	Seat side rail	50	30	450	2 Nos.
9	Bottom rail	25	20	450	2 Nos.
10	Bottom cross rail	25	20	450	1 No.
11	Seat back rail	50	30	450	1 No.
12	Seat plank	250	20	450	2 Nos.

SI No	Name of the material	Quantity
1	Sand paper No.50, 80* 120	each 2 Nos.
2	Putty	100 grams
3	Wood filler	250 grams.
4	Cotton waste white	250 grams
5	Small roll of cotton pad	250 grams
6	White cotton cloth	1/2 metre
7	French polish	1 liter
8	Bowl	1 No.
9	Colour powder	200 grams
10	Coconut oil	100 grams

**TASK 2 : Estimate the materials required for a small table with drawer as per drawing (Fig 2)**

Sl: No.	Utilization to the job	W	T	L	No. of pieces
1	Leg	50	50	750	4 Nos.
2	Drawer top rail	50	25	900	2 Nos.
3	Back rail top	150	25	900	1 No.
4	Side rail	150	25	600	2 Nos.
5	Foot rest	50	25	900	1 No.
6	Bottom cross rail	50	25	600	1 No.
7	Drawer side rail	50	25	600	2 Nos.
8	Drawer front plank	100	25	900	1 No.
9	Sliding rail (drawer)	25	25	600	2 Nos.
10	Drawer side plank	100	20	600	2 Nos.
11	Drawer back plank	100	20	900	1 No.
12	Table top plank	200	25	900	2 Nos.
13	Drawer bottom plywood	900	650	6mm	1 No.

SI No	Name of the material	Quantity
1	Sand paper No.50, 80 * 120	each 2 Nos.
2	Putty	200 grams
3	Filler	500 grams
4	White cotton waste	500 grams
5	Small roll of cotton pad	250 grams
6	White cotton cloth	1/2 metre
7	French polish	1 liter
8	Bowl	1 No.
9	Colour powder	250 grams
10	Coconut oil	100 grams
11	Handle	1 No

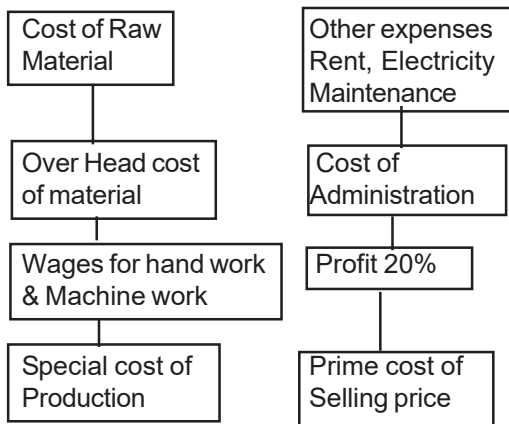


## Skill Sequence

### Estimate the material for student table with drawer

**Objective :** At the end of this exercise shall be able to

- estimate the material.



Example: Prime cost estimation for preparing student table with drawer.

#### Raw material for table (Dimensions in metres)

Sl. No	W	T	L	No of Pieces	Volume m <sup>3</sup>
1	0.05 ×	0.05 ×	0.75	4 Nos.	0.0075
2	0.05 ×	0.025 ×	0.9	2 Nos.	0.00225
3	0.15 ×	0.025 ×	0.9	1 No.	0.003375
4	0.15 ×	0.025 ×	0.6	2 Nos.	0.0045
5	0.05 ×	0.025 ×	0.9	1 No.	0.001125
6	0.05 ×	0.025 ×	0.6	1 No.	0.00075
7	0.05 ×	0.025 ×	0.6	2 Nos.	0.0015
8	0.1 ×	0.025 ×	0.9	1 No.	0.00225
9	0.025 ×	0.025 ×	0.6	2 Nos.	0.00075
10	0.1 ×	0.020 ×	0.6	2 Nos.	0.0024
11	0.1 ×	0.020 ×	0.9	1 No.	0.0018
12	0.2 ×	0.025 ×	0.9	2 Nos.	0.009
Total Volume					0.0372 m <sup>3</sup>

#### Cost of Raw material

The total comes to = 0.0372 cubic metre  
 Teak wood rate/ cubic metre = Rs. 45000/-(approx)  
 For 0.0372 m<sup>3</sup> = 0.0372 × 45000  
 = Rounded to Rs. 1675/-  
**= Rs. 1675/-**

#### Detail estimate

Cost of Raw material = Rs.1675.00  
 Plywood material cost = Rs. 280.00  
 Over head cost @ = Rs.170.00  
 Wages for carpenter for  
 3 days 8 hrs/day 24 hrs = Rs.750.00  
 Special cost of waxing,  
 Polishing etc = Rs.500.00  
 Other cost rent &  
 Electricity = Rs.150.00  
 Administrative cost = Rs.100.00  
 Rs. 3695.00  
 Profit @ 20% = Rs. 725.00  
Rs.4350.00

**Prime cost of selling = Rs. 4350/-**

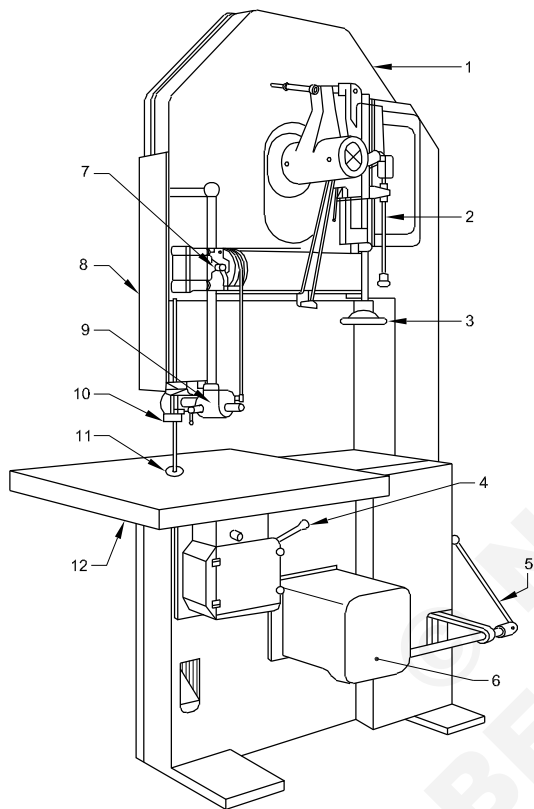
**Estimation of the prime cost approximately.**

**Demonstrate the band saw machine with different parts and their functions**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate the band saw machine
- identify the parts of band saw machine
- functions of band saw machine.

Fig 1



**Job Sequence**

**Instructor shall display and demonstrate all the parts of band saw machine and their functions to the students.**

- Trainees will note down all the parts and their function of band saw machine.
- Record it in table 1.
- Get it checked by the instructor.

**Table 1**

**Identification of parts and their functions**

Parts No.	Name of Parts	Functions
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

**DEMONSTRATE BAND SAW MACHINE WITH DIFFERENT PARTS AND THEIR FUNCTIONS**

CAN2187H1

**Demonstrate the safety precautions with operational techniques (Band saw machine)**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate to the safety precautions while using band saw machine
- demonstrate to the operational techniques of band saw machine.

Band saw machine illustration shown in Ex.No:2.01.87

**Job Sequence**

Instructor shall display and demonstrate all the safety precautions of band saw machine and their operational techniques to the students.

- Trainees will note down all the displayed safety precautions and operational techniques

Table 1

**Safety precautions and operational techniques**

Sl.No	Operational techniques	Safety precautions
1	Ripping	<ul style="list-style-type: none"><li>• Remove scraps from table and floor.</li><li>• Guards are in position and secure.</li><li>• Check the blade positioned between the jaws.</li><li>• Saw guide adjust the 5mm sequence above the thickness of the work.</li></ul>
2	Cross cutting	<ul style="list-style-type: none"><li>• Allow the saw to attain full speed before commencing to saw.</li><li>• Keep fingers at least 75mm away from the blade.</li><li>• Use a push stick for small work.</li></ul>
3	Curve cutting	<ul style="list-style-type: none"><li>• Avoid backing out of curved cuts.</li><li>• Do not saw cylindrical work.</li></ul>
4	Bevelling	<ul style="list-style-type: none"><li>• Tilt the table at the desired angle before commencing to saw.</li></ul>
5	Chamfering	<ul style="list-style-type: none"><li>• Switch off to make any adjustments.</li><li>• Give your undivided attention to the job of sawing.</li></ul>



## Remove and refit band saw blades

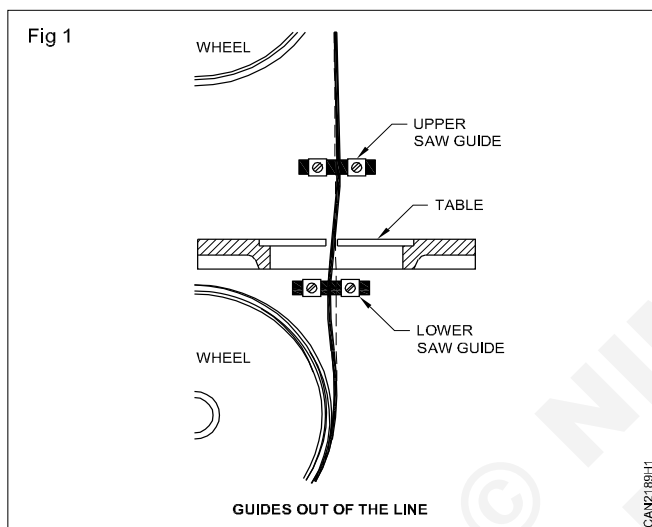
**Objectives:** At the end of this exercise you shall be able to

- remove the band saw blade in machine
- refit the band saw blade in machine.

### Job Sequence

#### Remove the band saw blade

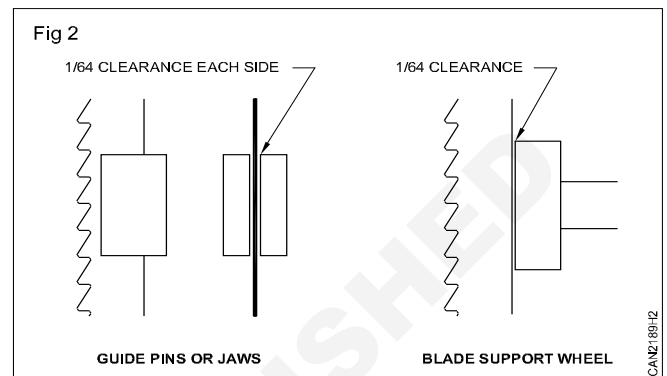
- Disconnect the unit from power.
- Open the top and bottom wheel guard.
- Clean out any excessive saw dust or chips.



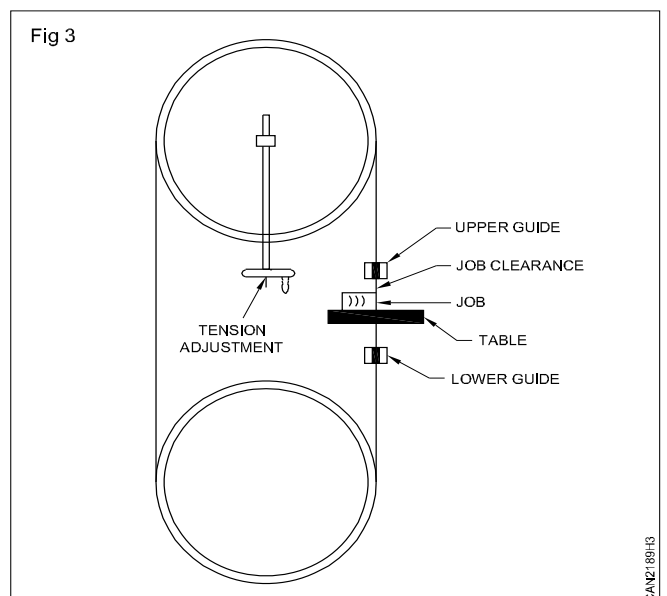
- Loose the upper and lower saw guide assemblies. (Fig 1)
- Remove upper guide (jaws) and lower guide (jaws).
- Loose the blade tension locate the tension adjustment.
- Remove upper guide (jaws) and lower guide (jaws).
- Remove the band saw blade safely out of the way.

#### Refit the band saw blade

- Installing the new band saw blade slide the blade through the slot in the saw table.
- Place the blade on the upper, lower wheels.
- Centre the table over the centre of each two wheels.
- Front side of the blade teeth should be pointing down towards the blade. (Fig 2)
- Raise the top wheel to apply tension keep turn the tightening knob.
- Bring the saw guides forward. (Fig 2)
- Front edges of the jaws even or slightly back of the teeth gullet. (Fig 2)



- Blade should run evenly between the jaws about 1 mm clearance on each side. (Fig 2)
- Lock the guide assemblies in position.
- Move the blade support wheel forward on each guide assembly.
- Blade support wheel 1mm away from the back edge of the blade.
- With the blade properly tensioned and tracking on the centre of the tires.
- Lock them in position.
- Rotate the wheels by hand.
- Check all the adjustment and clearance. (Fig 3)
- Close the top and bottom wheel guard.



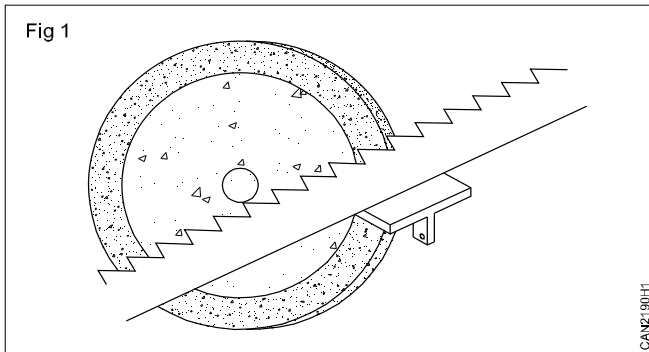
## Grinding and setting operation of band saw blades

**Objectives:** At the end of this exercise you shall be able to

- grind the band saw blade
- perform teeth setting of band saw blade.

### Job Sequence

#### Grinding the band saw blade (Fig 1)



- Check the grinding wheel.
- Adjust the tool rest 2 mm closer to the wheel.
- Protect your eyes with goggles.
- Switch on the grinder machine.
- Hold the band saw blade parallel to the grinding wheel edge.
- Rest the width of the blade on the tool rest.
- Allow the teeth point to touch the grinding wheel.
- Keep the pressure as minimum as possible to prevent excessive heating of the cutting edge.
- Continue pushing the band saw blade teeth are grind.
- Move the band saw blade evenly across the grinding wheel to get required sharpness.
- Switch off the grinder.
- Remove the band saw blade.

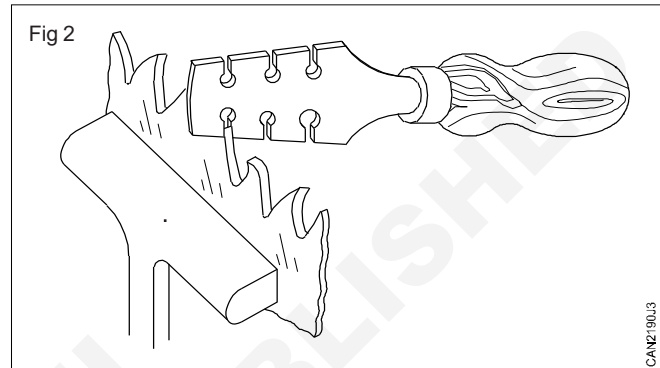
#### Precaution

- **Never touch the wheel while rotating**
- **Avoid burning of the blade**
- **Never allow the blade to become blue**
- **Only the face of the wheel and not the sides.**

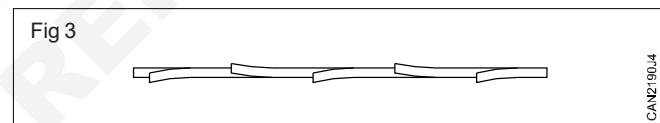
#### Teeth setting using notched saw set

- Fix the band saw blade on work bench saw vice
- Select suitable notched saw set

- Set the teeth using notched saw set. (Fig 2)



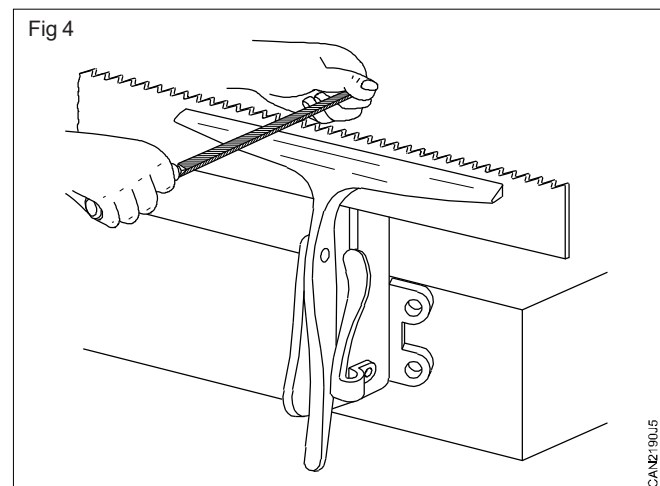
- Setting operation consist of bending over the teeth alternately to one side and then to the opposite side 1/2 times thickness of the blade.(Fig 3)



- Hold the file square to the blade.

#### Re shaping

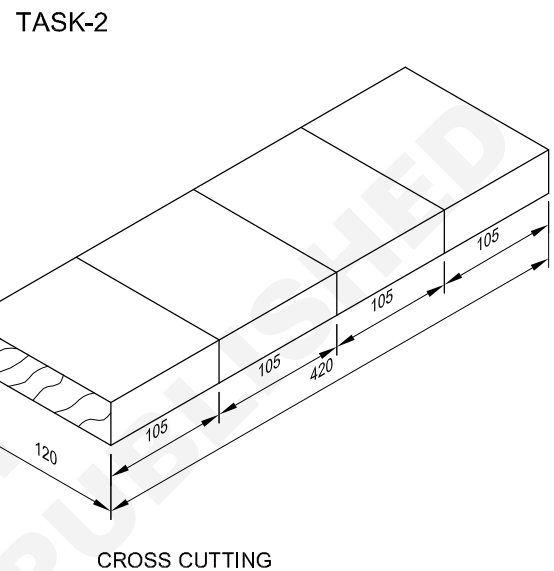
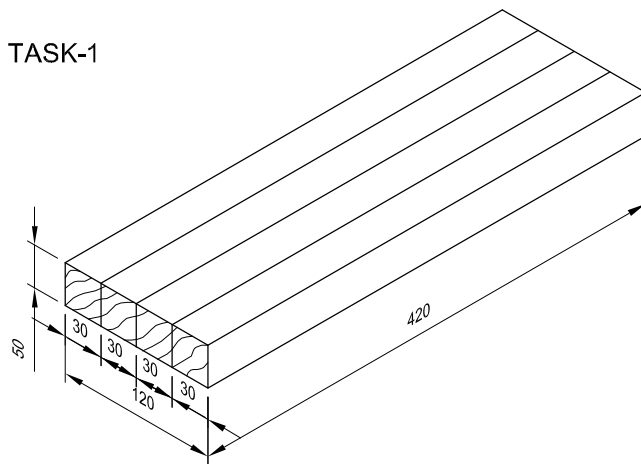
- Filing is done by holding right hand on the handle and left hand at the tip of the file. (Fig 4)
- Finishing the teeth setting



**Ripping and cross cutting operation on band saw machine**

**Objectives:** At the end of this exercise you shall be able to

- perform sawing for the ripping
- perform sawing for the cross cutting.



**Job Sequence**

**Sawing for the ripping**

- Mark the job as per drawing. Using foot rule pencil marking gauge and try square.
- Draw three parallel lines on the job at a distance of 30mm width wise using foot rule and carpenter pencil.
- Select the band saw blade as required size.
- Set the blade on band saw wheel (upper and lower).
- Check the tension of the saw blade.(Fig 1)
- Adjust the saw guide post to 20 mm above the job for clearance.

- Set the ripping fence at the distance of 30mm from the blade. (Fig 2) Stock must be held flat on the table against the ripping fence.

**Wheel guards must be closed before switching on the machine.**

**Saw blade must be properly adjusted before turning on the machine.**

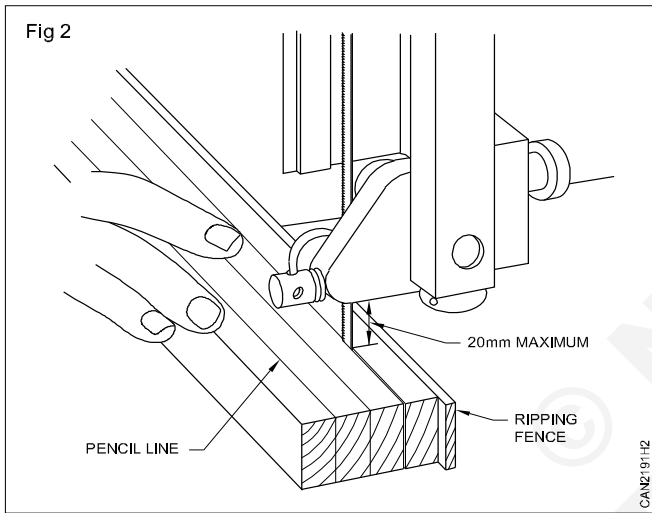
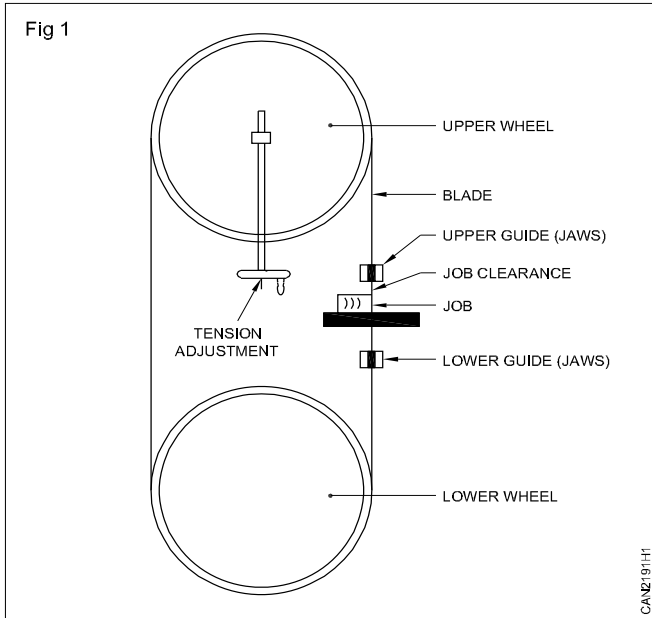
- Switch on the machine.

**Allow the saw blade to reach full speed before starting to feed the job.**

- Start sawing slowly with even pressure.

**Stock must be held flat on the table**

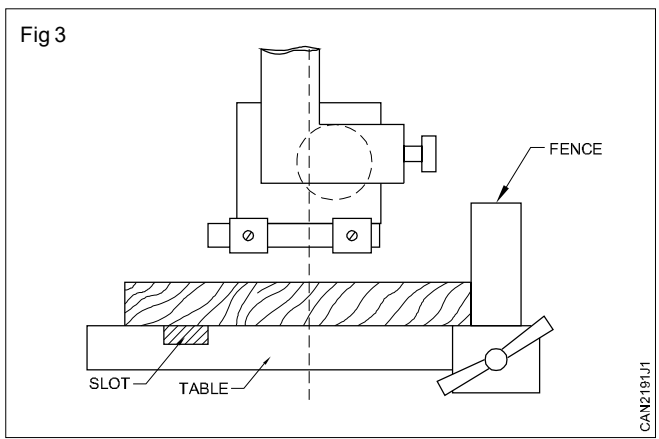
2	120X50X420 mm		HARD WOOD			1.6.91
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>RIPPING AND CROSS CUTTING OPERATION ON BAND SAW MACHINE</b>				TOLERANCE ±2.0 mm	TIME 5h
					CODE NO. CA20N1691E1	



- Saw the stock along the marked pencil line.
- Feed the stock slowly with the support of a push stick.
- Repeat the same procedure for all other (marked lines) pieces also.

**Sawing for the cross cutting**

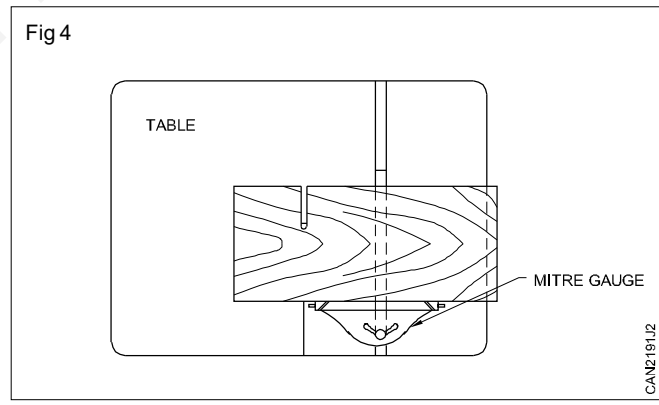
- Mark the job as per drawing. Using foot rule and try square.
- Draw three cross line on the job at a distance of 105mm length using foot rule and carpenter pencil.
- Check the tension of the saw blade.
- Adjust the saw guide post to 20mm above the job for clearance.



- Set the ripping fence at the distance of 105mm from the blade. (Fig 3) Stock must be held flat on the against the ripping fence.
- Set the mitre gauge at the table slot.
- Hold job at the mitre gauge. (Fig 4).

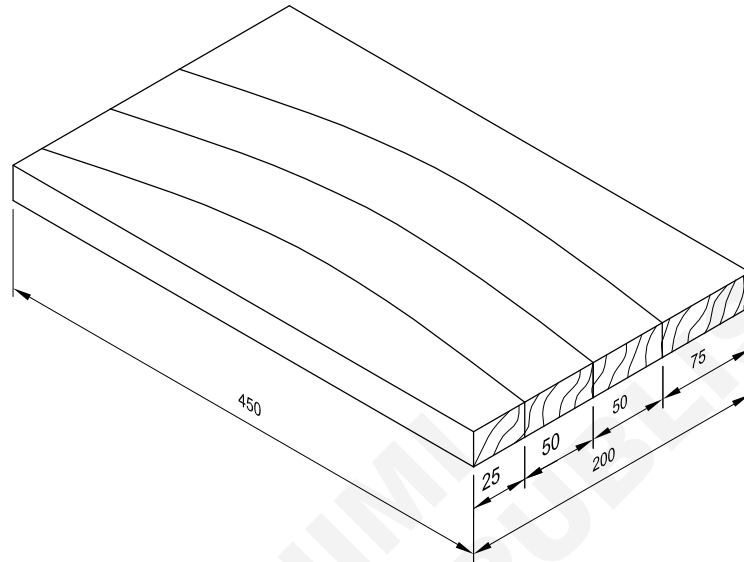
**Avoid uneven setting of the saw blade teeth. Keep fingers atleast 75 mm away from the blade.**

- Switch on the machine.
- Start sawing slowly with even pressure.
- Saw the stock across the marked pencil line.
- Feed the stock slowly.
- Repeat the same procedure for all other marked lines.
- Switch off the machine.



**Curve cutting by using band saw machine**

**Objective:** At the end of this exercise you shall be able to  
 • do curve cutting the wooden piece.



1	200 X 25 X 450 mm		SOFT WOOD			1.6.92
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>CURVE CUTTING BY BAND SAW MACHINE</b>				TOLERANCE $\pm 2.0$ mm	TIME 4h
					CODE NO. CA20N1692E1	

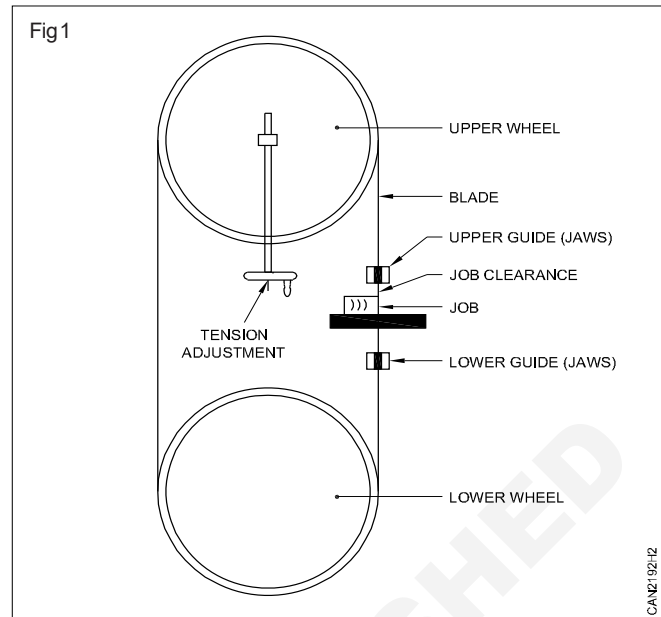
## Job Sequence

- Draw the curve lines on the job at a distance of 25, 50, 50 and 75 mm width wise using foot rule and carpenter pencil as per the drawing.
- Transfer the measurement from the steel rule to the using trammel for the required curves.
- Select the band saw blade properly required for curve cutting.
- Set the blade on band saw upper and lower wheel. (Fig 1)
- Check the tension of the saw blade. (Fig 1)
- Adjust the saw guide post to 20 mm above the job for clearance.
- Remove the ripping fence and mitre gauge.
- Place the job in work table.
- Switch on the machine.
- Start sawing slowly with even pressure.
- Pushing stock forward to make the cut.

**Do not back out of a curved cut while the saw is running.**

**Job jamming in a cut suddenly stop the switch.**

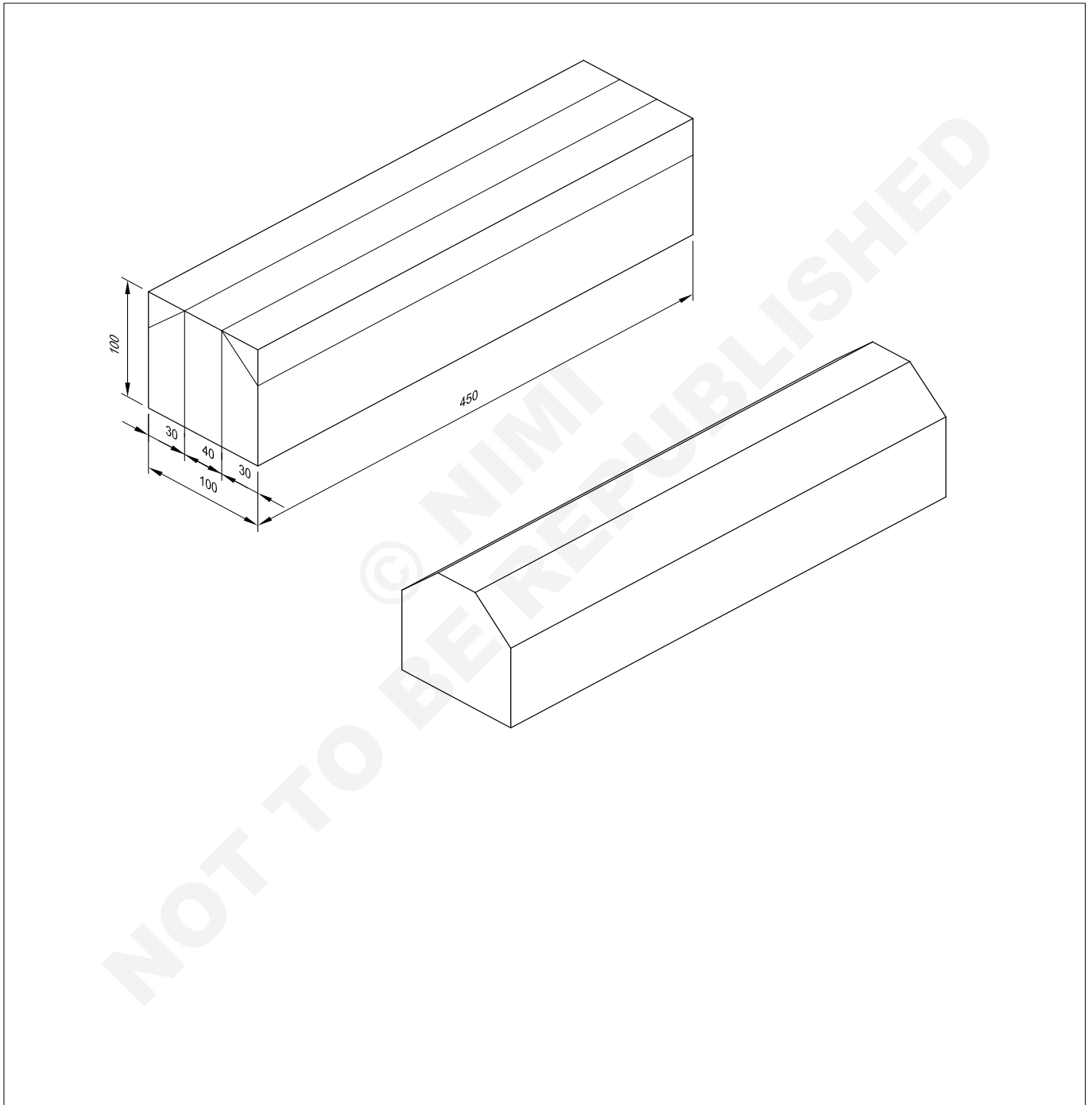
- Saw the stock along the marked curved line. as per the drawing.
- Repeat the same procedure for all other marked curved lines and finish the job.



**Bevelling operation by band saw machine**

**Objectives::** At the end of this exercise you shall be able to

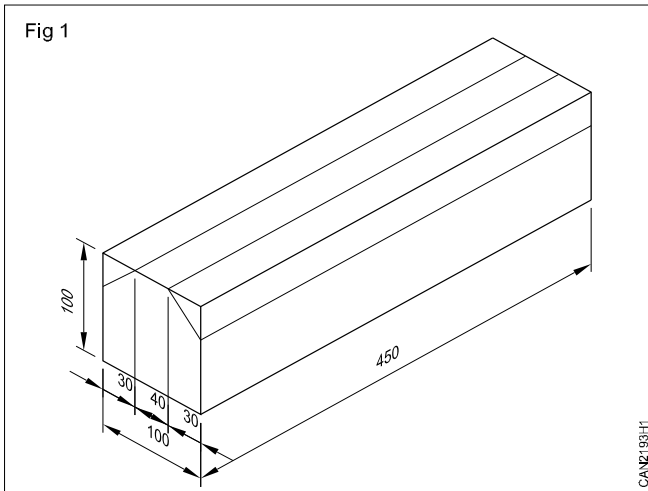
- **set the band saw machine table**
- **set the ripping fence**
- **perform sawing for the bevelling.**



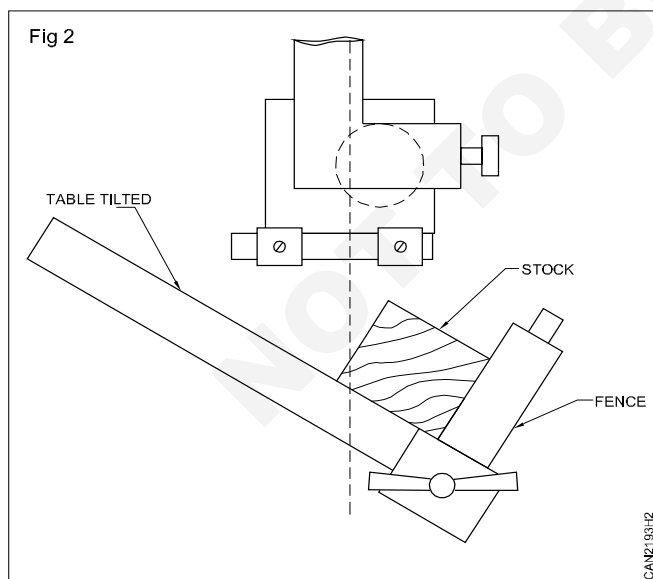
1	100 x 100 x 450 mm		SOFT WOOD			1.6.93
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>BEVELLING OPERATION BY BAND SAW MACHINE</b>				TOLERANCE $\pm 2.0$ mm	TIME 5h
					CODE NO. CA20N1693E1	

## Job Sequence

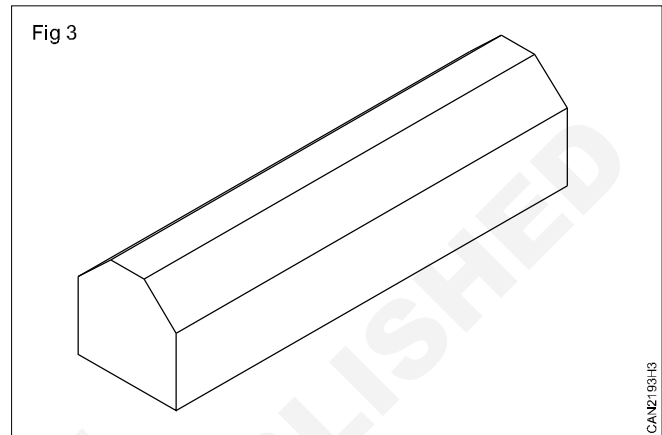
- Mark the job as per drawing.
- Draw the bevelling line on the job length wise using foot rule, try square, marking gauge, pencil and bevel square. (Fig 1)



- Select the band saw blade properly required bevelling operation.
- Set the band saw blade upper and lower wheel.
- Raise the upper wheel using tenon adjustment.
- Check the alignment of blade in wheels.
- Set the band saw table tilting required angle. (Fig 2)
- Set the ripping fence from the blade required distance. (Fig 2)
- Stock must be held against the ripping fence. (Fig 2)



- Switch on the machine.
- Pushing stock forward as you make the cut.
- Sawing stock the bevelling marked line.
- Repeat same procedure for other bevelling marked line also.
- Finishing the job. (Fig 3)



- Switch off the machine.

**Switch off to make any adjustments.**

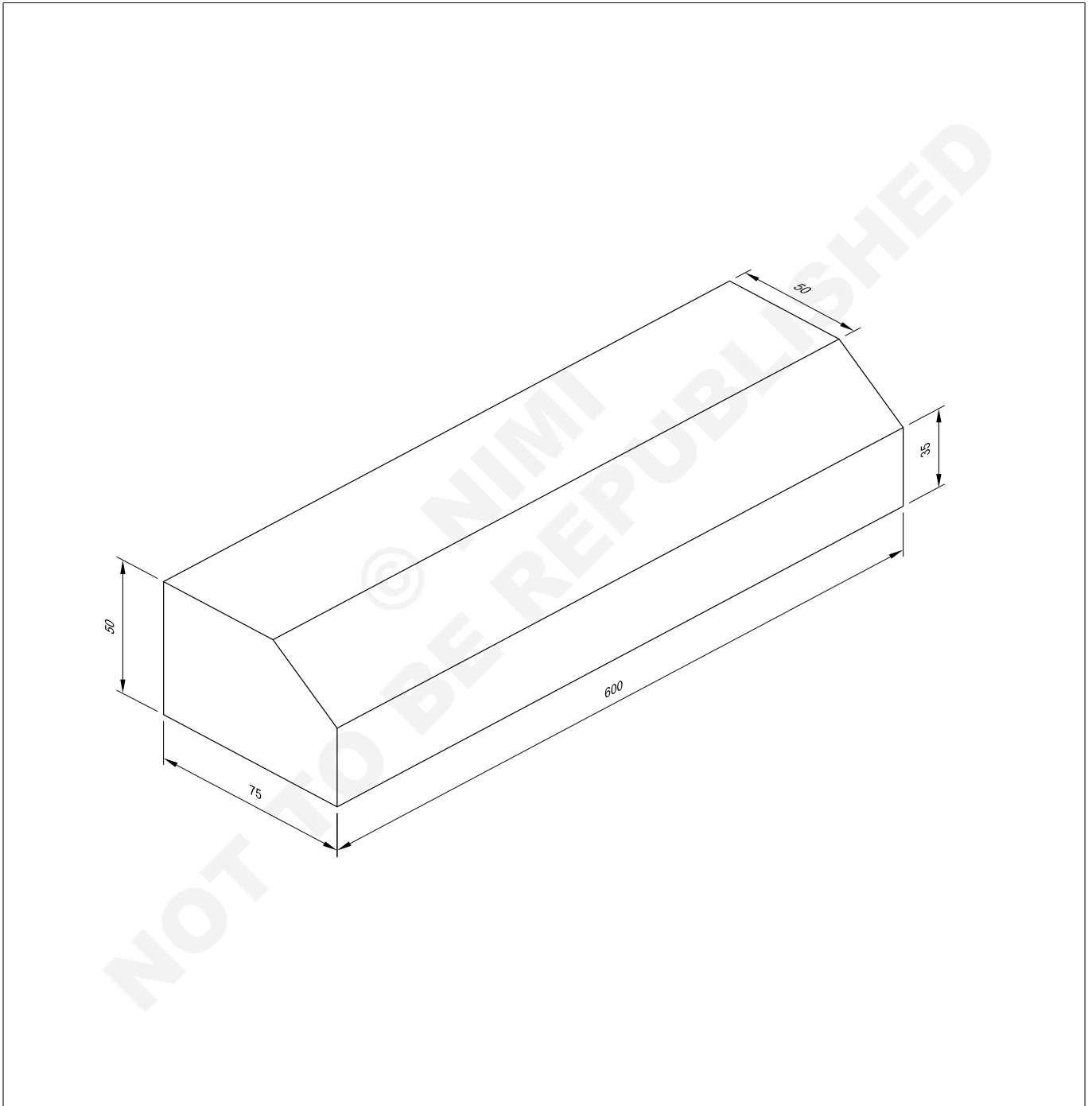
**Give your undivided attention to the job of sawing.**

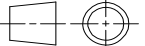


**Chamfering operation by band saw machine**

**Objectives:** At the end of this exercise you shall be able to

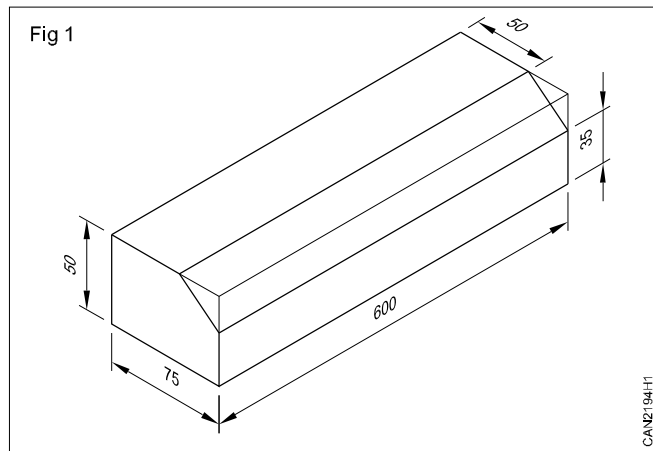
- set the band saw machine table
- set the band saw fence
- do the sawing for chamfering.



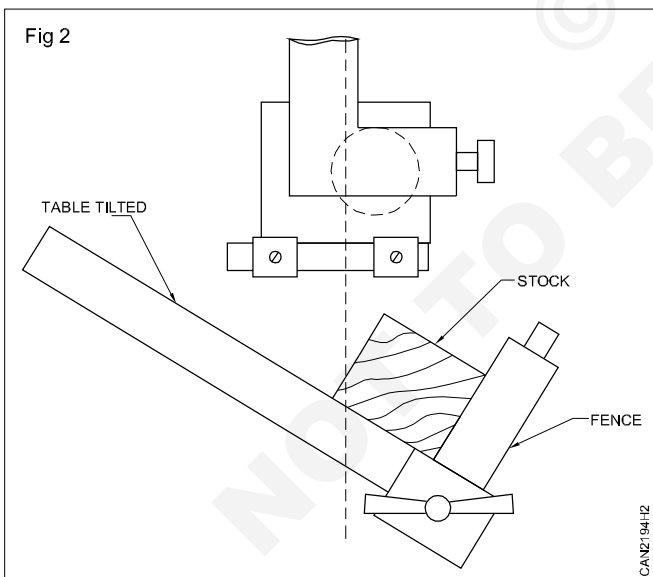
1	75X50X600 mm		SOFT WOOD			1.6.94
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>CHAMFERING OPERATION BY BAND SAW MACHINE</b>				TOLERANCE ±2.0 mm	TIME 5h
					CODE NO. CAN2194E1	

## Job Sequence

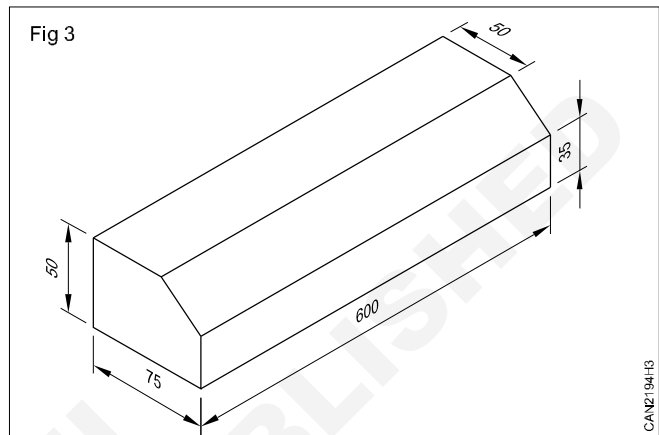
- Check the raw material using foot rule.
- Mark the chamfering line on the job using foot rule, Pencil and bevel square. (Fig 1)



- Select the blade as properly required chamfering operation.
- Set the blade upper and lower wheel.
- Check the alignment of the saw blade
- Set the saw table tilting required chamfering angle. (Fig 2)
- Set the ripping fence from the saw blade required distance. (Fig 2)



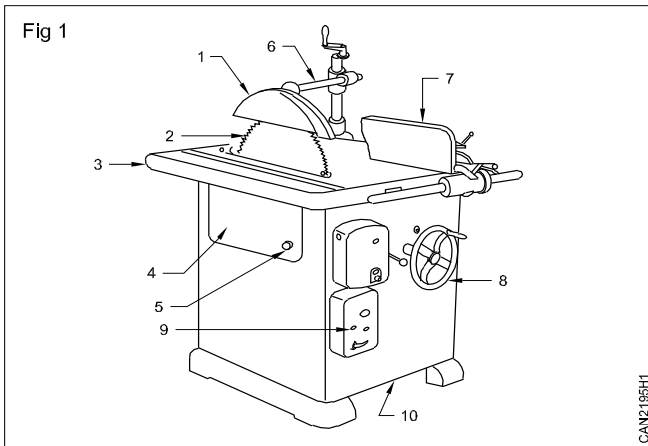
- Adjust the saw guide post above the job for clearance.
- Switch on the machine.
- Start sawing slowly with even pressure.
- Saw the stock along the chamfering line.
- Finish the chamfering cut. (Fig 3)
- Switch off the machine.



**Demonstrate circular saw machine parts and their operational techniques with safety precaution**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate circular saw machine its parts and their operational techniques
- demonstrate the safety precautions to followed while working circular saw machine.



- Record it in table 1.
- Get it checked by the instructor.

**Table 1**

Parts No.	Name of parts
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

**Job Sequence**

**Instructor shall display and demonstrate the circular saw machine along with parts, operational techniques and safety precaution to followed the student.**

- Trainees will note down all the parts name of circular saw machine and their operational techniques with safety precautions.

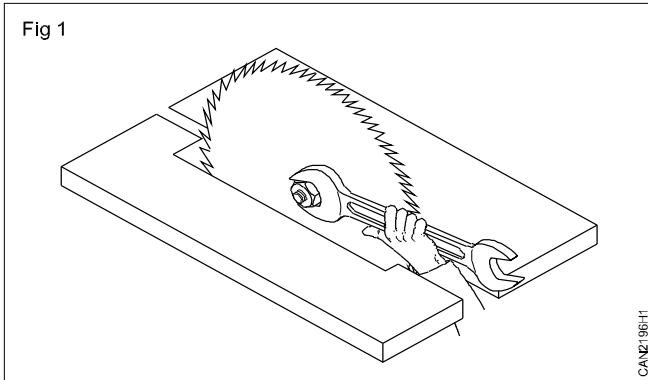
**Safety precautions and operational techniques**

Sl.No	Operational techniques	Safety precautions
1	Ripping	<ul style="list-style-type: none"> <li>• Blade is properly fitted and tightened to the arbor.</li> <li>• Never stand directly in line with the blade.</li> <li>• Use saws which are properly sharpened.</li> </ul>
2	Cross cutting	<ul style="list-style-type: none"> <li>• Make sure the guard and splitter are firmly secured in the correct position.</li> <li>• Do not use the fence as a stop when cross cutting.</li> <li>• Always use flat stock for sawing.</li> </ul>
3	Rebating	<ul style="list-style-type: none"> <li>• Guard has to be removed for this operation.</li> <li>• Table adjusted to required depth of cut.</li> </ul>
4	Grooving	<ul style="list-style-type: none"> <li>• Avoid loose knots, warps and nail materials.</li> <li>• Do not reach post the blade.</li> <li>• Switch off the machine to make any adjustment.</li> </ul>
5	Miter cutting	<ul style="list-style-type: none"> <li>• While using the saw keep fingers atleast 100 mm away from blade.</li> <li>• Use correct saw blade for the job.</li> <li>• Never saw free hand on circular saw machine.</li> </ul>

## Remove and refit of circular saw machine blade

**Objectives:** At the end of this exercise you shall be able to

- remove the blade in circular saw machine
- refit the blade in circular saw machine.



- Locate the blade plate on the table loosen and remove these screws in order to remove the plate.
- Clean out any excessive saw dust or chips.
- Place a small block of wood against the blade to prevent blade from accidentally turning.
- Located and remove arbor nut and washer from the blade by turning the nut counter clock wise (Towards you) with a spanner. (Fig 1)

**Remove the blade and set a side out the way while you work.**

### Job Sequence

#### TASK 1: Remove the circular saw blade

- Disconnect the power of the machine.

#### TASK 2: Refit the blade in circular saw machine

- Select the blade for the application. (Fig 1)



**Hold the blade safely with the small block of wood.**

- Proper size and shape of arbor hole.
- Installing the new circular saw blade place on the arbor.
- Teeth of the blade positioned toward the front of the table saw.

- Place the washer and nut in place and secure the blade in place by tightening the nut. By tarring it clockwise. (away from you)
- Check the blade in position.
- Reinstall the blade plate by lightening the screws that secure the plate to the top of the table.
- Reconnect the power in machine.
- Turn the saw on and run the blade to determine if the blade is correctly installed and running true.

## Grinding and setting the circular saw machine blade

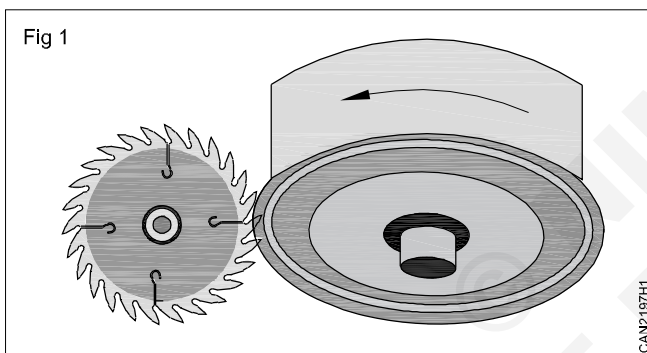
**Objective:** At the end of this exercise you shall be able to

- perform grinding and setting the circular saw blade.

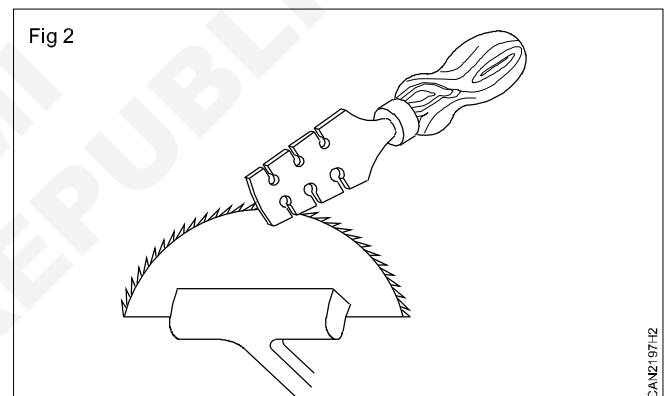
### Job Sequence

#### Grinding and setting circular saw machine blade.

- Select the grinding wheel.
- Installing the grinding wheel in place of spindle on grinding machine.
- Adjust the tool rest 2 mm closer to the grinding wheel..
- Hold the circular saw blade in tool rest.
- Protect your eyes with goggles.
- Allow the teeth to touch the grinding wheel. (Fig 1)
- Move the circular saw blade evenly the grinding to get required sharpness.
- Switch off the grinder machine.
- Remove the circular saw blade.
- Fix the blade on work bench vice using wooden support pieces.
- Set the teeth using notched saw set. (Fig 2)



- Keep the pressure as minimum as possible to prevent excessive heating of the cutting edge.
- Continue pushing the circular saw blade teeth angle grind. (Fig 1)



- Setting operation consist of bending over the teeth alternately to one side and then to the opposite side.

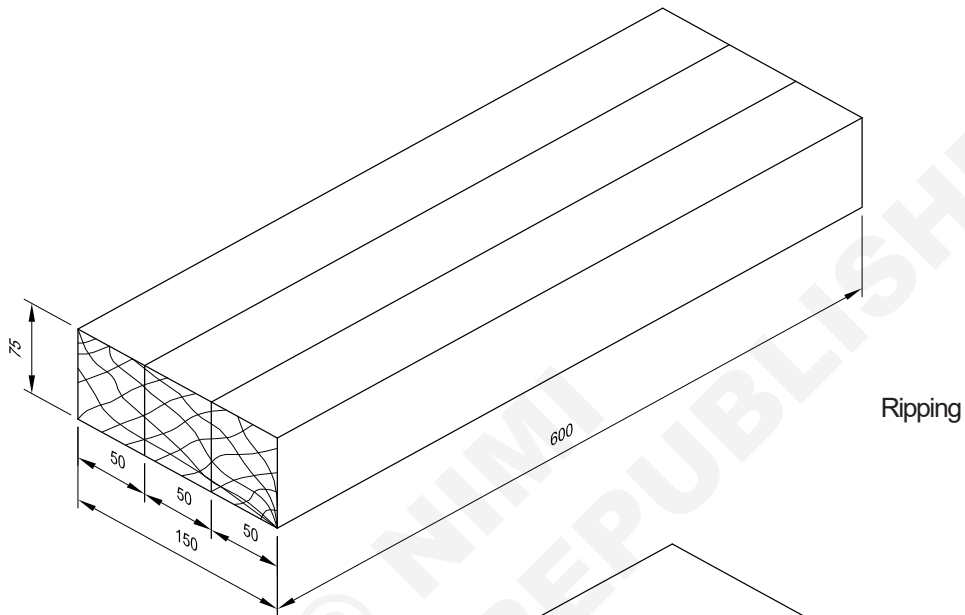
**1 ½ times thickness of the blade setting.**

Ripping and cross cutting by using circular saw machine

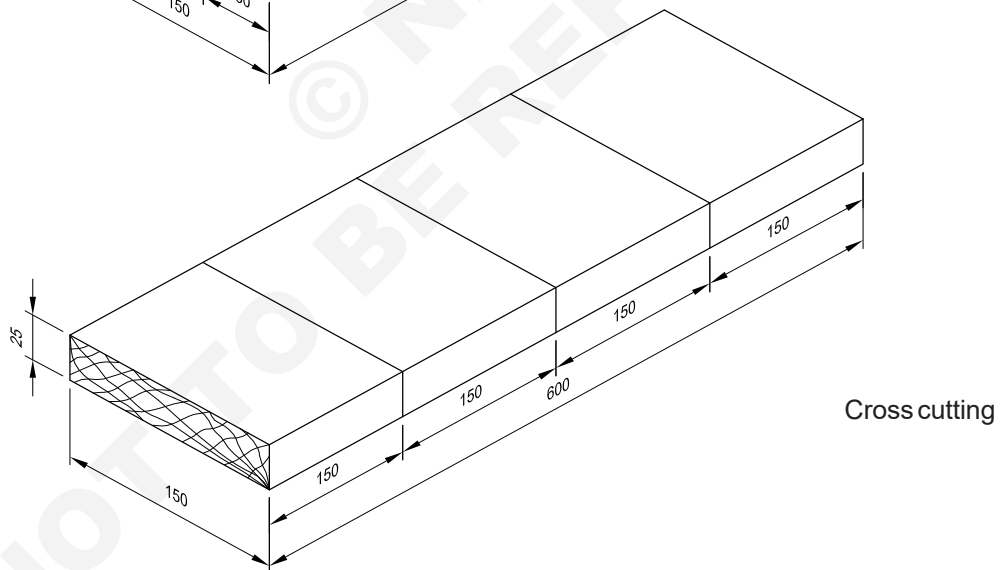
Objectives: At the end of this exercise you shall be able to

- saw for the ripping
- perform cutting for the cross section.

TASK 1



TASK 2



1	150 x 75 x 600 mm		HARD WOOD			
1	150 x 25 x 600 mm		HARD WOOD			1.6.98
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>RIPPING AND CROSS CUTTING BY CIRCULAR SAW MACHINE</b>				TOLERANCE ±2.0 mm	TIME 4h
					CODE NO. CA20N1698E1	

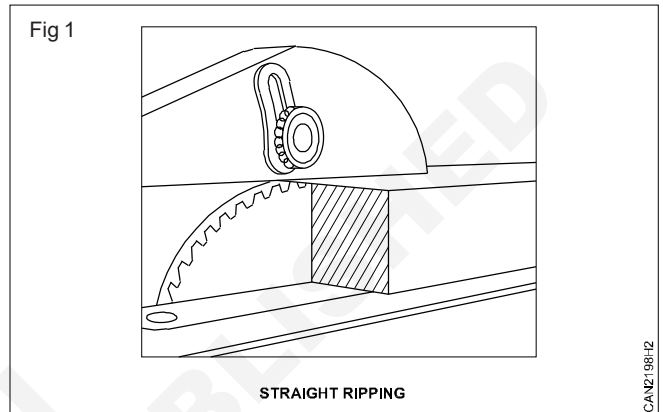
## Job Sequence

### TASK 1: Sawing for the ripping

- Mark the job as per drawing.
- Draw two parallel lines on the job at a distance of 50 mm width wise using steel rule and carpenter pencil as per drawing
- Select the circular saw blade as required size
- Set the blade on circular saw arbor.
- Check the position of the saw blade.(Fig 1)
- Adjust the saw guard to 20 mm above the job for clearance. Using extension rod.
- Set the fence at the distance of 50mm from the blade. Stock must be held flat on the table against the fence. (Fig 1)

**Check to see that the blade runs free.**  
**Teeth should project 8 mm above the top of the work**

- Switch on the machine.
- Keeping the stock pressed against the fence.
- Slowly push it with an even pressure through the saw.
- Saw the stock along the marked pencil line.
- Feed the stock slowly with the support of a push stick.
- Repeat the saw procedure for all other marked pencil line pieces also.



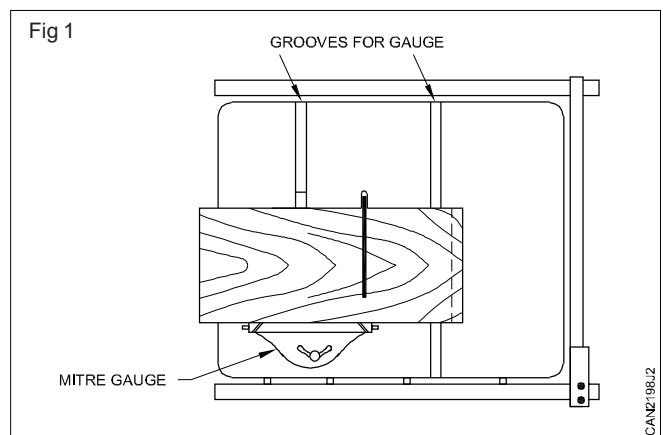
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### TASK 2: Cutting for the cross section

- Mark the job as per drawing.
- Draw three cross lines on the job at a distance of 150 mm width wise using steel rule, try square and carpenter pencil as per drawing
- Check the position of the saw blade.
- Adjust the saw guard to 20 mm above the job for clearance.
- Remove the fence in table.
- Set the mitre gauge to table slot support and push the work through the work. (Fig 1)
- Switch on the machine.
- Start sawing slowly with even pressure. (Fig 1)
- Saw the stock along the blade pencil line.
- Feed the stock slowly.
- Repeat the same procedure for all other marked pencil line pieces also.

**Never allow the hands to be in front or above the blade.**

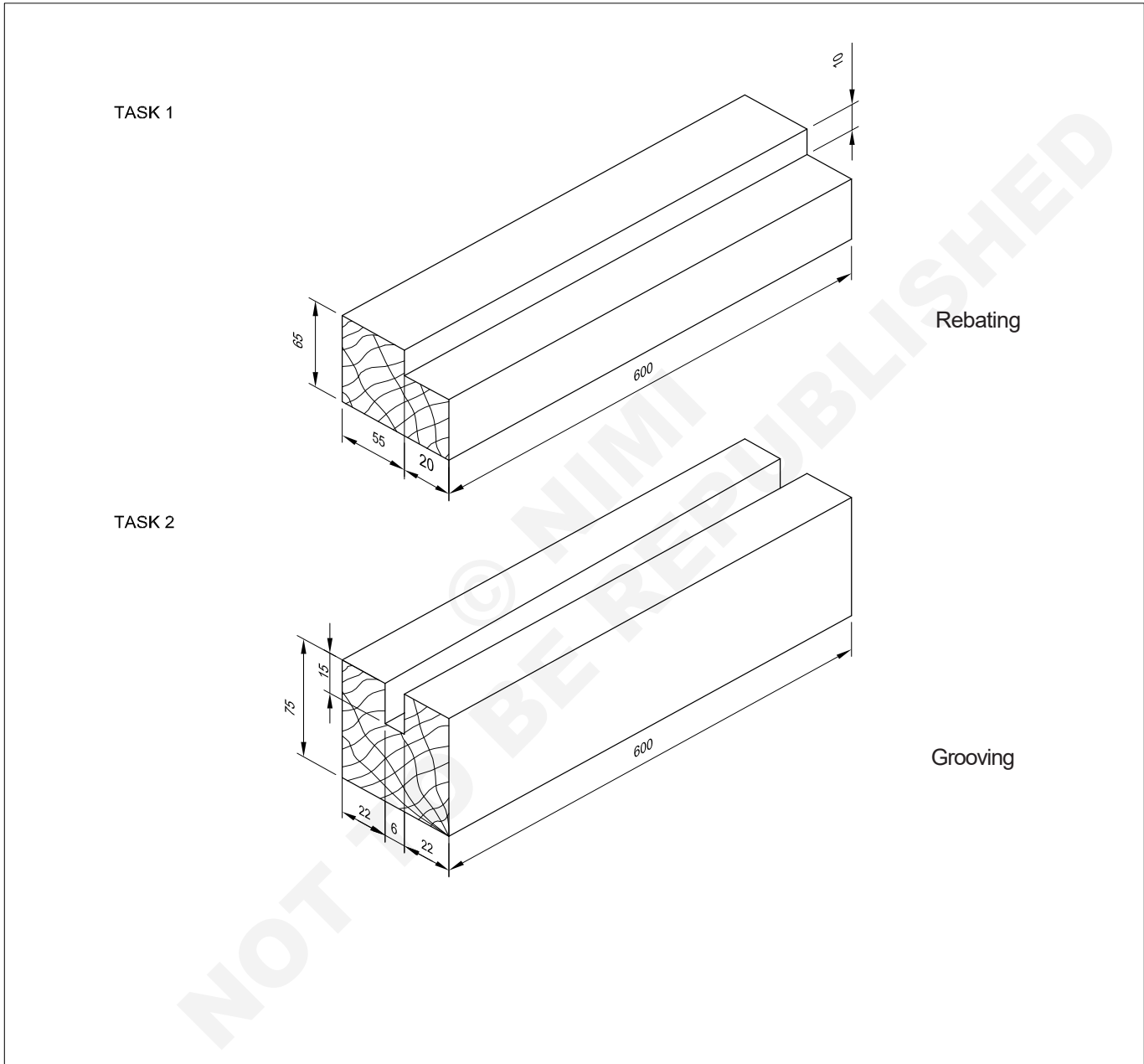
**Adjust the fence and mitre gauge so that the stock will not bind in the blade.**



Rebating and grooving operation by circular saw machine

Objectives: At the end of this exercise you shall be able to

- make the rebating on the plank
- make the grooving on the plank.



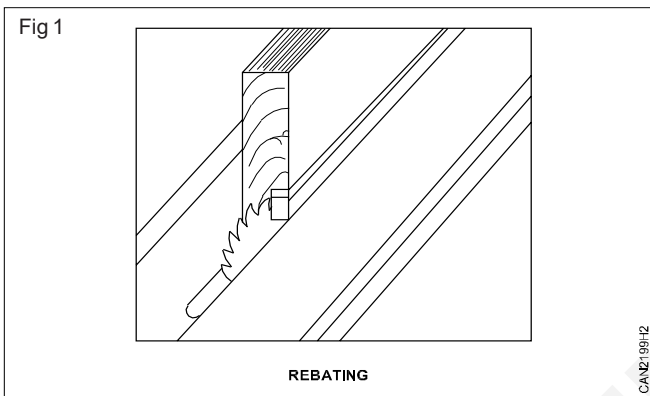
1	75 x 65 x 600 mm		SOFT WOOD			
1	75 x 50 x 600 mm		SOFT WOOD			1.6.99
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>REBATING AND GROOVING OPERATION BY CIRCULAR SAW MACHINE</b>				TOLERANCE ±2.0 mm	TIME 4h
					CODE NO. CA20N1699E1	



# Job Sequence

## TASK 1: Sawing for rebating

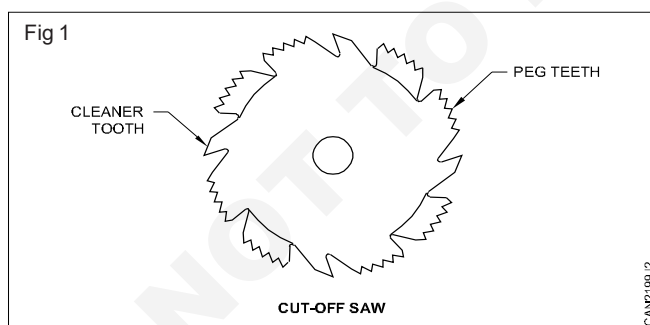
- Check the planed plank for required length, width and thickness to make rebating.
- Mark the dimension of rebating on plank using marking gauge and steel rule as per drawing.
- Set the saw blade at a distance of 20mm above the table to cut depth of rebating.
- Check the required measurement keeping the plank against the fence and saw blade by rotating the saw blade by hand.



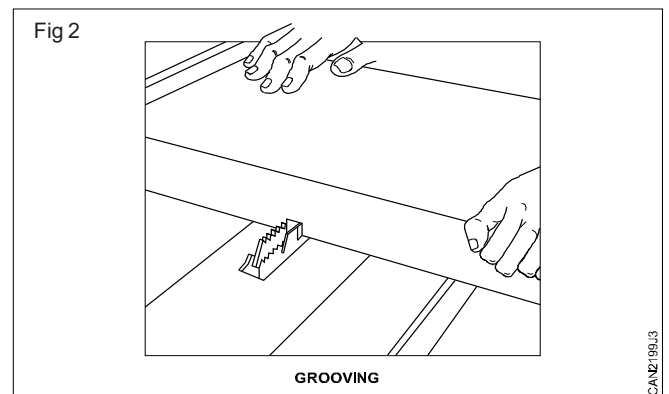
- Switch on the machine. Keep the plank vertically on the table against the saw blade.
- Push the plank gently with even pressure against the saw blade facing with fence. (Fig 1)
- Switch off the machine.
- Set the fence at a distance of 10 mm from the saw blade to cut the shoulder portion of rebating.
- Set the saw blade at a distance of 10 mm above the table.
- Keep the plank flat on the table against the saw blade.
- Check the measurements before cutting.
- Switch on the machine.
- Move the plank gently with even pressure against the saw blade facing with fence.
- Switch off the machine after work.
- Remove the waste portion of the rebating.
- Check the rebating as per drawing.

## TASK 2: Sawing for grooving

- Check the planed plank for required length, width and thickness to make groove as per drawing
- Mark the dimension of groove on plank using mortise gauge and steel rule as per drawing.
- Select the saw blade. (Fig 1)



- Move the plank against the saw blade and facing with fence slowly and evenly for first groove cut. (Fig 2)



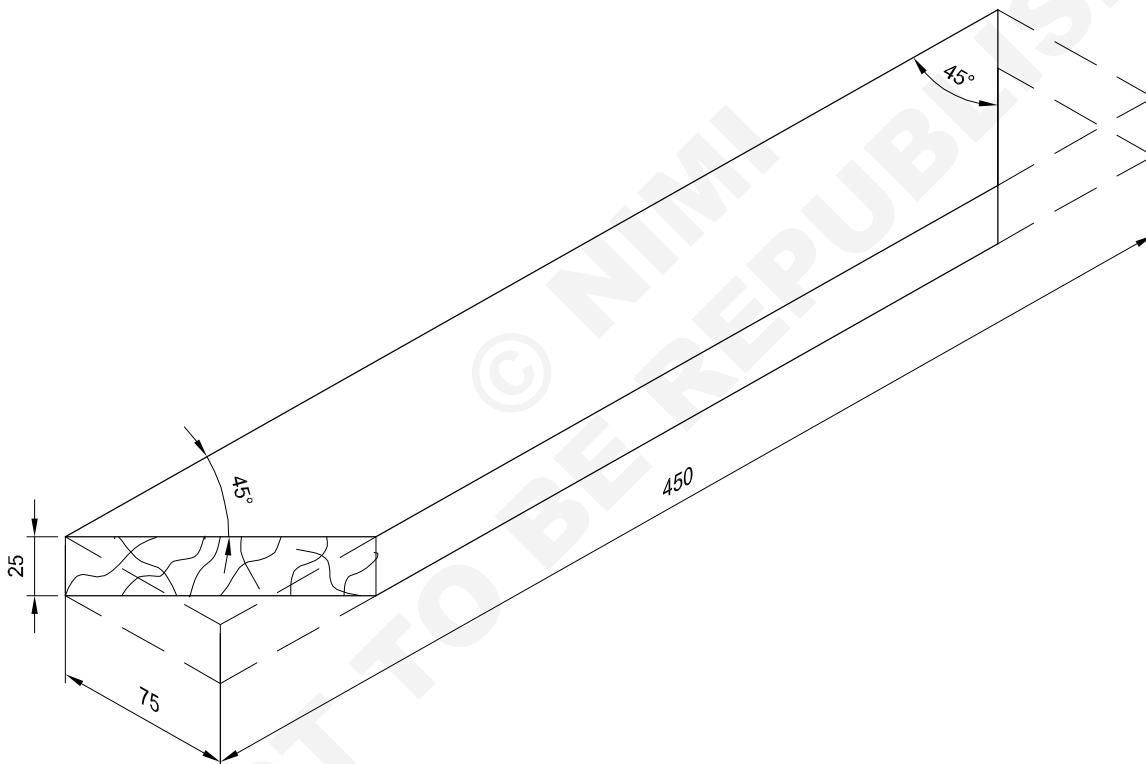
- Set the saw fence to the required distance of 22 mm from the saw blade.
- Set the saw blade at distance of 15 mm above the table.
- Check the measurements.
- Switch on the machine.
- Keep the plank vertically on the table against the blade.

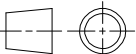
- Switch off the machine.
- Adjust the saw fence to 25mm distance from saw blade for second cut. Switch on the machine.
- **Switch off main power to change blade.**
- **Do not allow scrap to accumulate on the table.**
- Push the plank gently with even pressure against the saw blade facing with the fence.
- Switch off the machine after work.
- Finish the grooving operation as per drawing.

Mitering operation by circular saw machine

**Objective:** At the end of this exercise you shall be able to

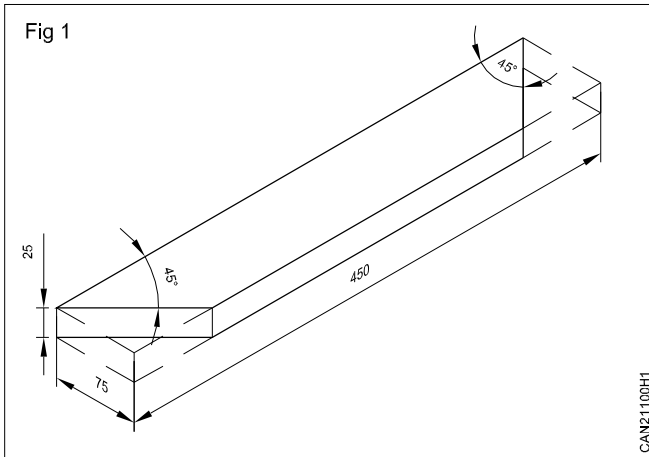
- make the mitering on the plank.



1	75 x 25 x 450 mm		HARD WOOD			1.6.100
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>MITER OPERATION BY CIRCULAR SAW MACHINE</b>				TOLERANCE ±2.0 mm	TIME 2h
					CODE NO. CA20N16100E1	

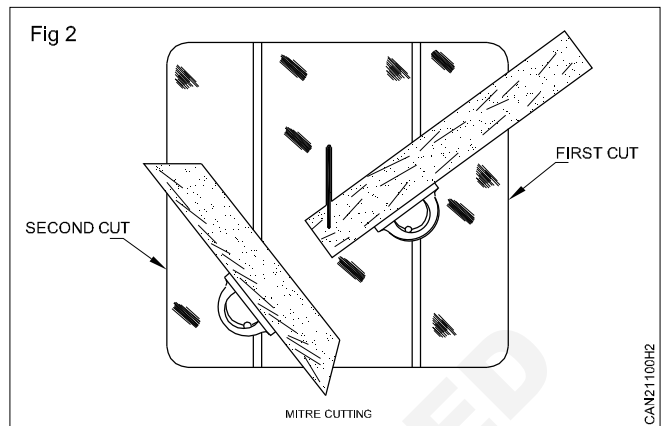
## Job Sequence

- Check the planed plank for required length, width and thickness to make mitering.
- Mark the job as per drawing using steel rule, mitre gauge, carpenter pencil. (Fig 1)



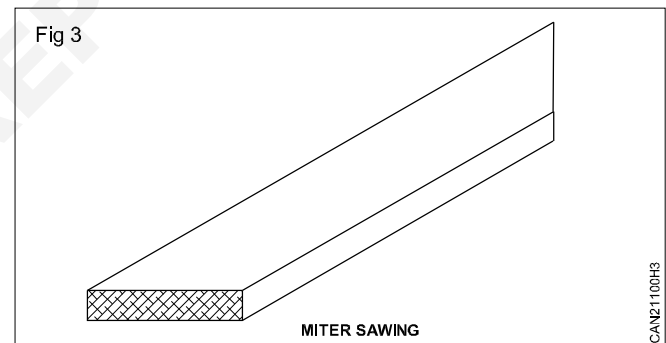
- Select the circular saw blade in mitre cutting work.
- Set the blade on circular saw arbor using spanner.
- Check the position of the saw blade.
- Adjust the saw guard to 30 mm above the job for clearance.
- Remove the fence.
- Set the mitre gauge in table slot in 45° angle. (Fig 2)
- Switch on the machine.
- Hold the stock in mitre gauge.
- Pushing the mitre gauge forward as you make the cut.
- Sawing stock slowly with even pressure to make mitre.

- Repeat the same procedure for other end to make mitre cutting. (Fig 2)



**Saw guard should never be set higher than level with the top of the teeth.  
Should be short and properly set the blade.**

- Switch off the machine after work.
- Finish the mitre cutting operations. (Fig 3)
- Check the mitering as per drawing. (Fig 3)



**Demonstrate portable power circular saw machine with different parts and their functions**

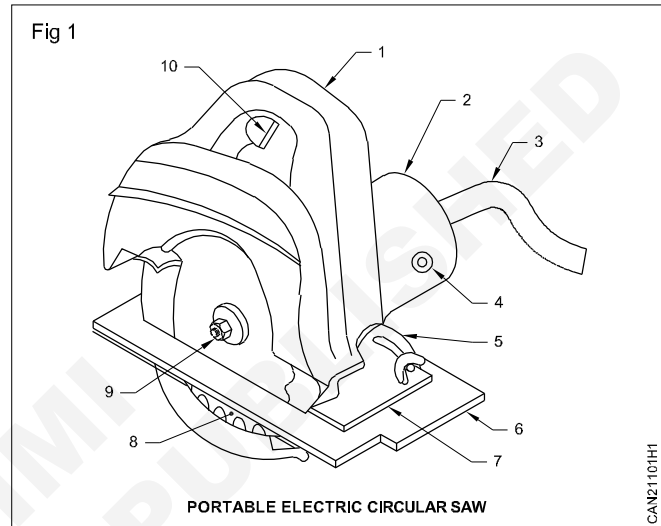
**Objectives:** At the end of this exercise you shall be able to

- demonstrate the portable power circular saw machine and parts
- demonstrate the portable power circular saw machine functions.

**Job Sequence**

**Instructor shall display and demonstrate all the parts of portable power circular saw machine and their functions to the students.**

- Trainees will note down all the parts of portable power circular saw machine and their functions.
- Record it in table 1.
- Get it checked by instructor.



**Table 1**

**Identification of portable power circular saw machine parts and their functions**

Sl. No.	Name of Parts	Functions
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

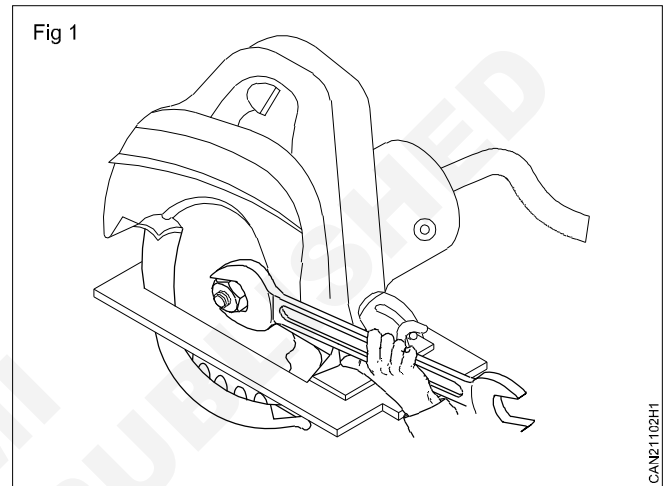
**Remove and refit of portable power circular saw machine blade**

- Objectives:** At the end of this exercise you shall be able to
- remove the blade in portable power circular saw machine
  - refit the blade in portable power circular saw machine.

**Job Sequence**

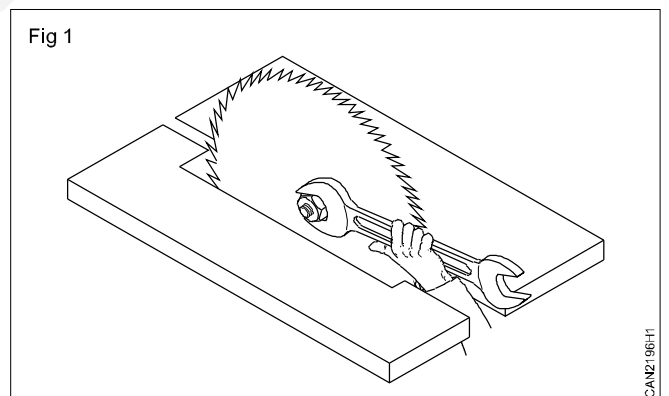
**TASK 1: Remove the portable power circular saw machine blade**

- Disconnect power the machine.
- Move the support of the cutting guide.
- Place a small block wood against the blade teeth to prevent form accidentally turning.
- Located and remove arbor nut and washer form the blade by turning the nut counter clockwise with a spanner. (Fig 1)
- Remove the blade in the machine.



**TASK 2: Refit the portable power circular saw machine blade**

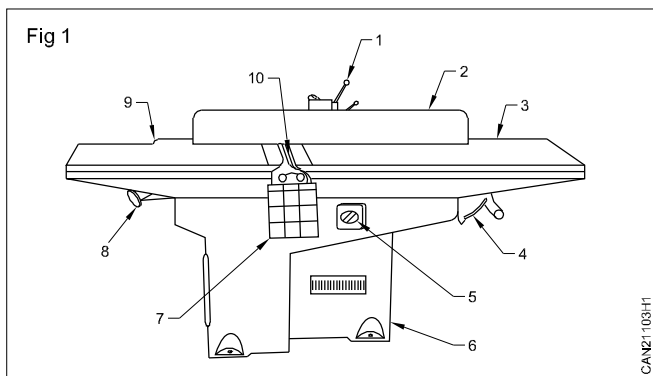
- Select blade for the application.
- Check the proper size shape in arbor hole.
- Place the new blade on the arbor.
- Teeth of the blade positioned towards the front.
- Place the washer and nut in place and secure the blade in place by tightening nut by turning it clockwise. (Fig2)
- Check the all adjustment.



**Demonstrate jointer/surface planer machine, its parts and their operational techniques and safety precautions**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate for jointer/surface planer machine parts and their operational techniques
- demonstrate safety precautions to followed while working jointer/surface planer machine.



**Table 1**

**Identification surface planer of parts name**

Parts No.	Name of parts
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

**Job Sequence**

**Instructor shall display and demonstrate the jointer/surface planer machine along with parts; operational techniques and safety precautions to followed the student**

- Trainees will note down all the parts name of jointer/ surface planer machine and their operational techniques with safety precautions.
- Record it in table 1.
- Get it checked by the instructor.

**Operational techniques and safety precautions for surface planer**

SL.No	Operational Technique	Safety precautions
1	Surface planning	<ul style="list-style-type: none"> <li>• Check that the floor is clear of scraps.</li> <li>• Check sharpness and security of cutting blade.</li> <li>• Do not warped (or) twisted board.</li> <li>• Do not allow fingers with in 100mm of cutter.</li> <li>• Adjust front blade only for depth of cut.</li> </ul>
2	Face edge Planning	<ul style="list-style-type: none"> <li>• Never plane stock of varying thickness at the same time.</li> <li>• Feed the stock slowly and evenly.</li> <li>• Never bend down to look in to a planer while it is running.</li> </ul>
3	Chamfering	<ul style="list-style-type: none"> <li>• Make sure the guard is in place and cut.</li> <li>• Do not plane stock less than 9mm thick.</li> </ul>
4	Bevelling	<ul style="list-style-type: none"> <li>• Cupped stock should be placed hollow side down on the tables.</li> <li>• Too much down pressure on warped thin stock.</li> </ul>

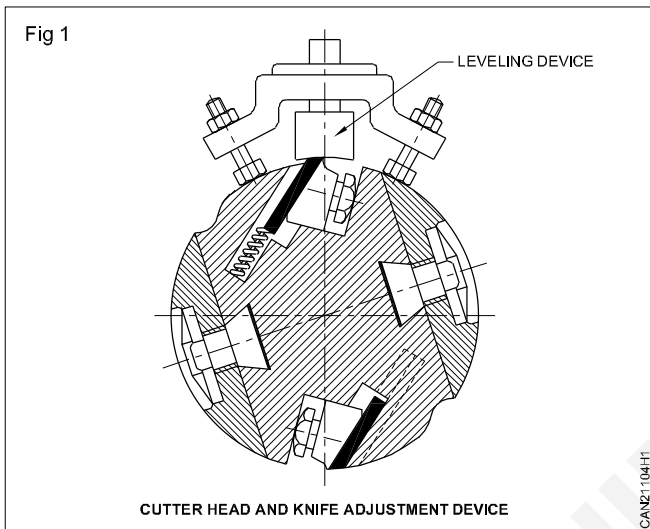
## Remove and refit of cutter of planing machine

**Objectives:** At the end of this exercise you shall be able to

- remove the planing machine cutter
- refit the planing machine cutter.

### Job Sequence

#### Remove the planer machine cutter (Fig 1)

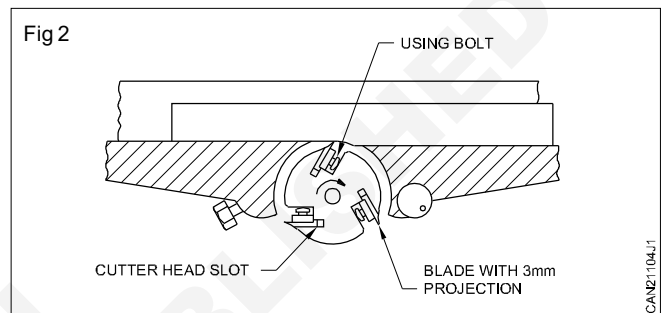


- Disconnect the unit from power.
- Remove the fence in table.
- Lock for cutter head.
- Adjust the rear and front table turn freely cutter.
- Clean the dust in blade slots.
- Located and remove bolt using spanner.
- Remove the cutter in slot.
- Repeat the same process for the other cutters.

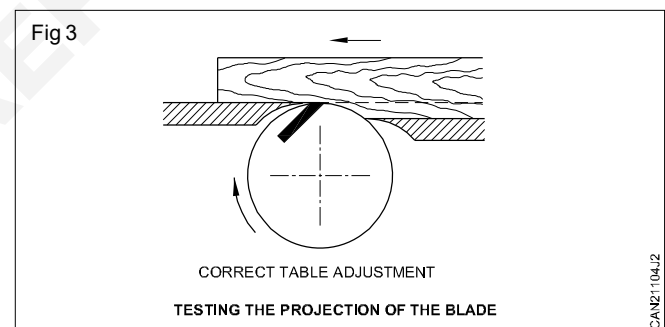
**Apply lubricant to the wedge locking screws so they turn freely.**

#### Refit the planer blades/cutters

- Place the new blade in the slot of the cutter head. (Fig2)



- Set the blade with 3mm projection outside from the cutter head and parallel to the cutter head using cutter lock bar. (Fig 3)



- Check the projection of the cutter using straight edge.
- Tight the blade on the cutter head with bolt using spanner.
- Repeat the same process for the other cutters.
- Test the projection of the blade with straight edges by rotating the cutter head.

## Grinding and sharpening operation the cutter of planing machine

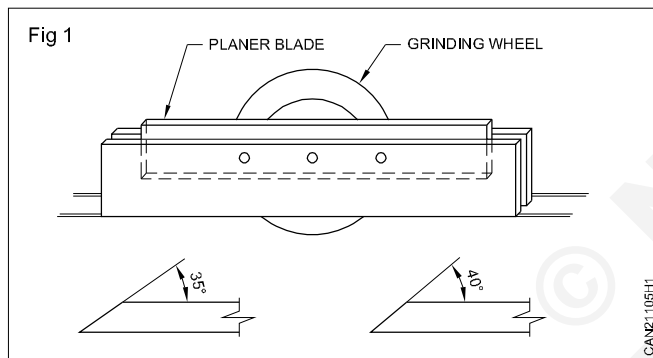
**Objectives:** At the end of this exercise you shall be able to

- grind the planer cutter
- sharpen of planer cutter.

### Job Sequence

#### Grinding of planer cutter

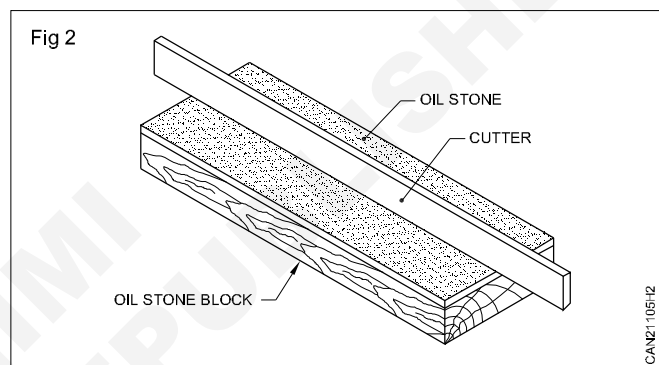
- Open the jaws of the grinding machine to insert the cutter.
- Insert the cutter in between the jaws of the grinding machine.
- Set the cutter evenly projecting from the jaws of the grinding machine.
- The projection of the cutter should be 5 mm to from the jaws of the grinding machine. (Fig 1)



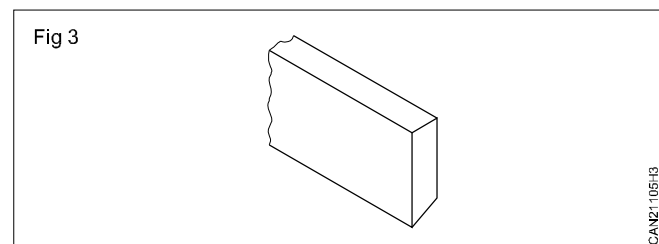
- Tight the cutter with jaws of the grinding machine properly.
- Set the angle of jaws to 30° for grinding the cutter.
- Adjust the cutter against the grinding wheel for grinding.
- Switch on the machine.
- Move the cutter to and from against the grinding wheel uniformly by hand.
- Continue the grinding till the required angle of cutter is obtained.

#### Sharpening of planer cutter

- Keep the oil stone with oil stone block on work bench stop.
- Place the grounded edge of the blade on the surface of the oil stone. (Fig 2)



- Use proper recommended lubrication oil while sharpening.
- Move the cutter to and from with even pressure on the oil stone till to form a burr. Keep the cutter flat on the oil stone and rub it till to remove the burr.
- Continue the sharpening procedure till you get fine cutting edge. (Fig 3)

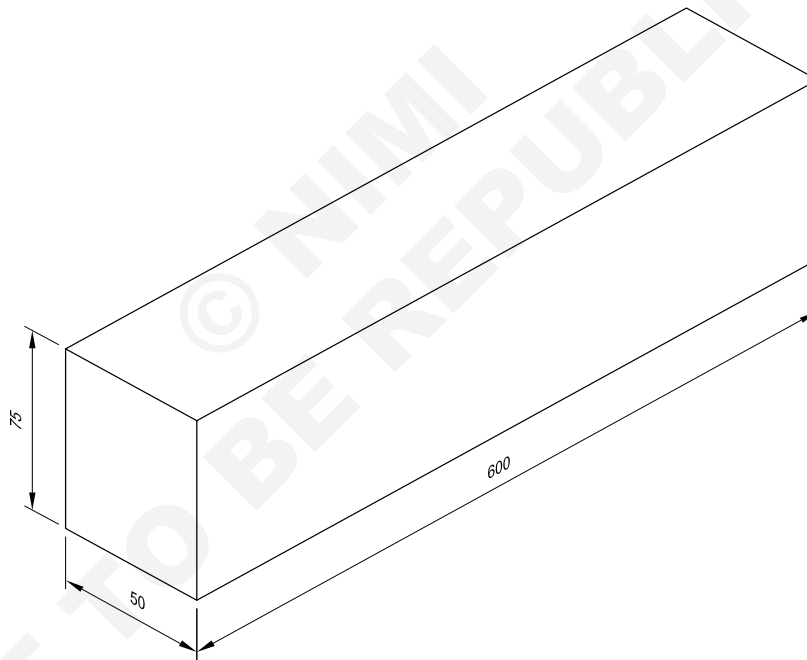




**Surface planing operation on hard wood by surface planing machine**

**Objectives:** At the end of this exercise you shall be able to

- sharp the planer blade
- set the planer blade
- set the fence
- surface planing the hard wood.



1	80 x 55 x600 mm		HARD WOOD			1.6.106
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>SURFACE PLANING BY SURFACE PLANING MACHINE</b>				TOLERANCE ±2.0 mm	TIME 6h
					CODE NO. CA20N16106E1	

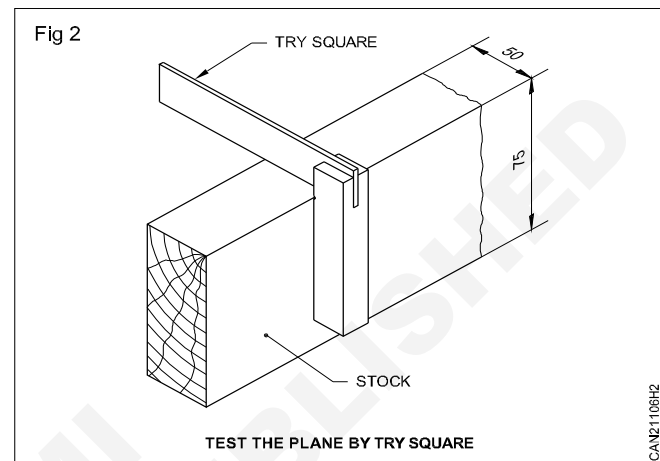
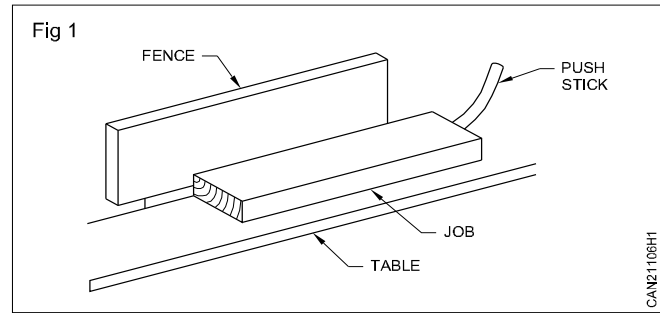
## Job Sequence

- Sharp the planer blade using oil stone.
- Set the planer blade in the cutter head using spanner.
- Set the fence 80 mm away from right side end of the table of an angle of 90° and clamp it. Switch on the machine.
- Plane the face side or surface stock by push stick with fence and moving against the blade. (Fig 1)
- Set the fence 50 mm away from right side end of the table of an angle of 90° and clamp it. Plane the face edge of the stock by push stick with fence and moving against the blade.
- Feed the job against the cutter head for planing required face side (or) surface and face edge.
- Check the face edge, face side of planed wooden pieces using try square and steel rule. (Fig 2)

**Do not plane stock less than 250 mm long.**

**Feed the stock slowly and evenly.**

- Finish the surface planing as per the drawing.



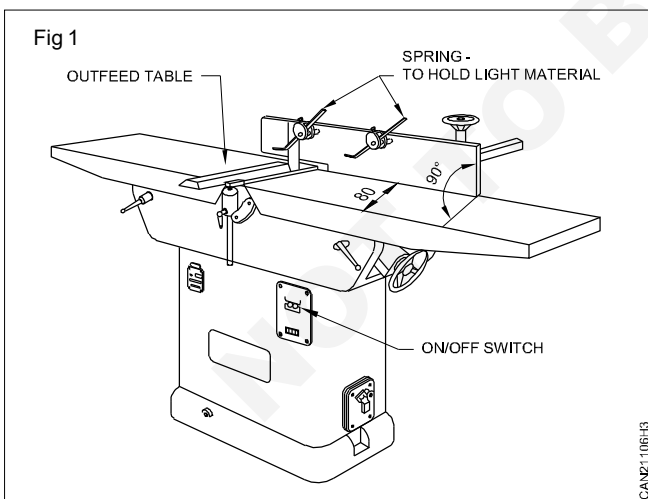
## Skill sequence

### Setting the fence on surface planer machine

**Objective:** This shall help you to

- perform setting the fence on planer machine.

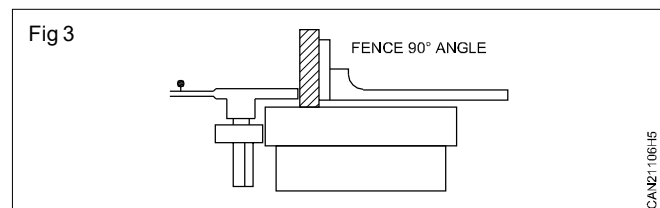
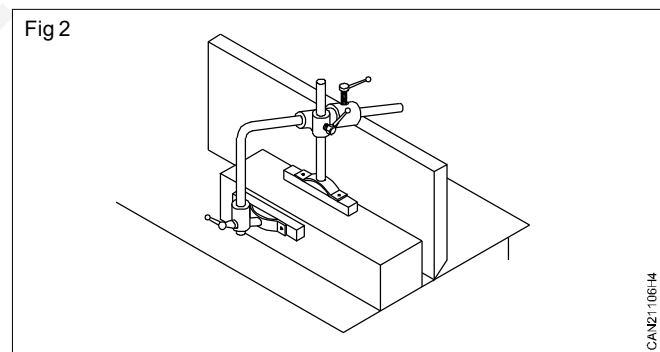
Place the fence above the table. (Fig 1)



Adjust fence 80 mm away from right side end on the table to plane the job. (Fig 2)

Set the fence at 90° angle on the table by tightening the adjustment handle and clamp it. (Fig 3)

Test the 90° angle of fence using try square.



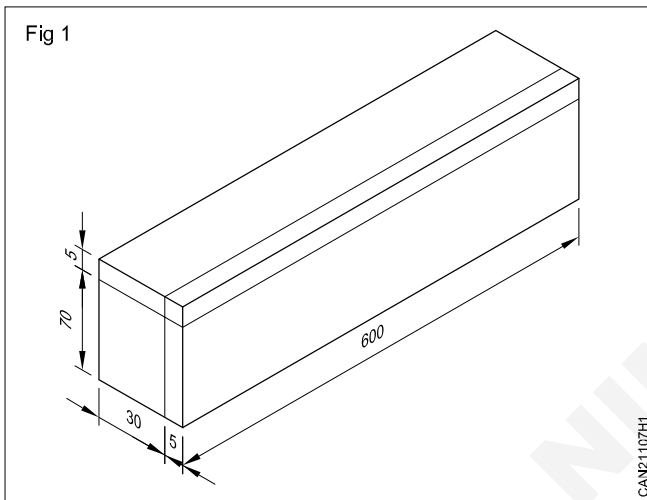
## Thickness planing operation on hard wood by thickness planing machine

**Objective:** At the end of this exercise you shall be able to

- plane the wooden piece to thickness planing machine.

### Job Sequence

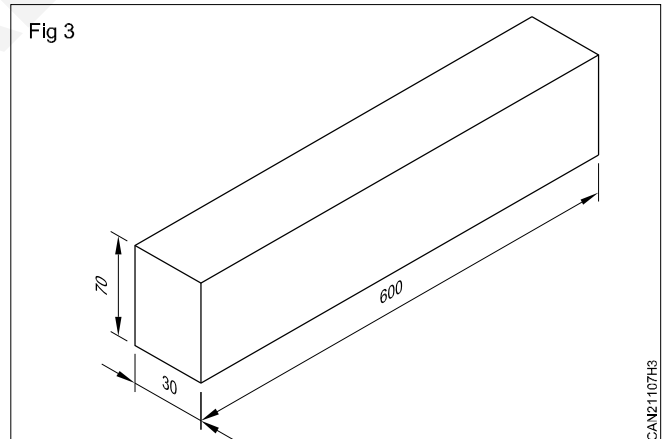
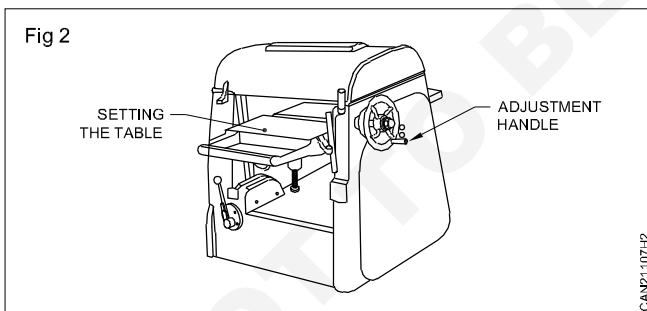
- Sharp the planer blade using oil stone.
- Set the planer blade in the cutter head using spanner.
- Planning wood piece is available in Ex.No.2.1.106 required size of 75 x 35 x 600mm. (Fig 1)



- Feed the job against cutter head of the planning required 30 mm thickness.
- Check the required thickness 30 mm of the job using steel rule.
- Switch off the machine.
- Set the lower table 70 mm height using adjustment hand wheel.
- Switch on the machine.
- Feed the job against the cutter head for planning required 70 mm width.
- Switch OFF the machine.
- Check the required width 70 mm of the job using steel rule.

**Switch off and allow the blades to stop rotating before making any adjustments.**

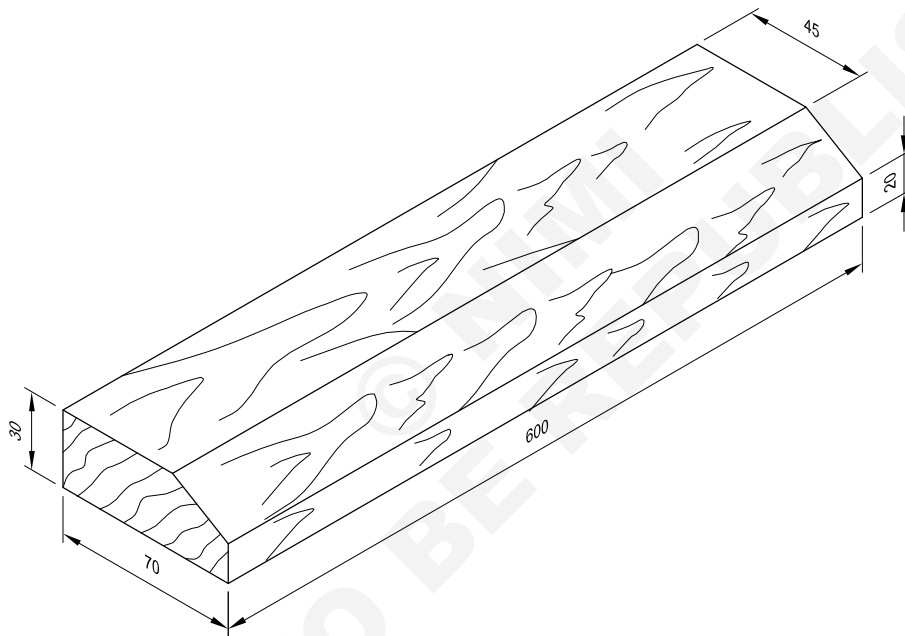
- Set the lower table 30 mm height using adjustment hand wheel. (Fig 2)
- Switch ON the machine.



**Chamfering operation by surface planing machine**

**Objectives:** At the end of this exercise you shall be able to

- set the fence for chamfering
- set the table for chamfering operation
- plane a wooden piece to chamfering.



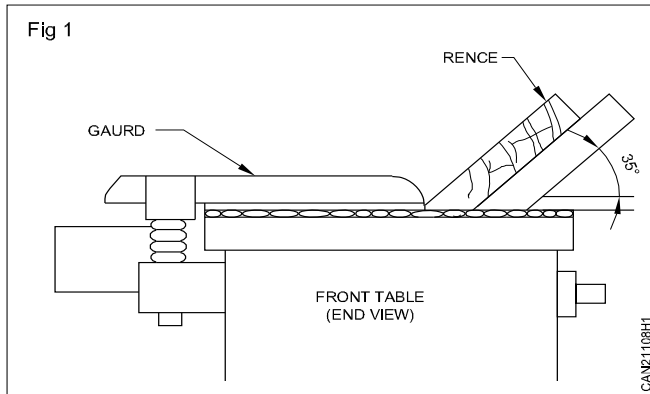
**Note: The planing wood is available in exercise No.2.1.107**

NOTE: THE PLANNING WOOD IS AVAILABLE IN EXERCISE NO.1.6.107

1	-	2-1-107	-			1.6.108
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>CHAMFERING OPERATION BY SURFACE PLANING MACHINE</b>			TOLERANCE $\pm 2.0$ mm	TIME 6h
					CODE NO. CA20N16108E1	

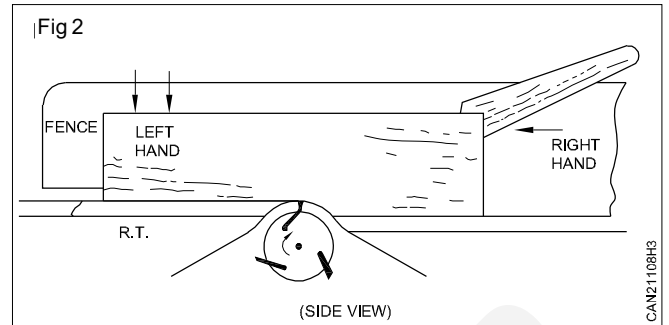
## Job Sequence

- Check the planed wood for required size using foot rule.
- Mark the dimension of chamfering as per drawing using foot rule, marking gauge.
- Set the planer blade in the cutter head to make chamfering operation.
- Set the front table and rear table.
- Set the fence at 35° for supporting work when planning chamfering. (Fig 1)

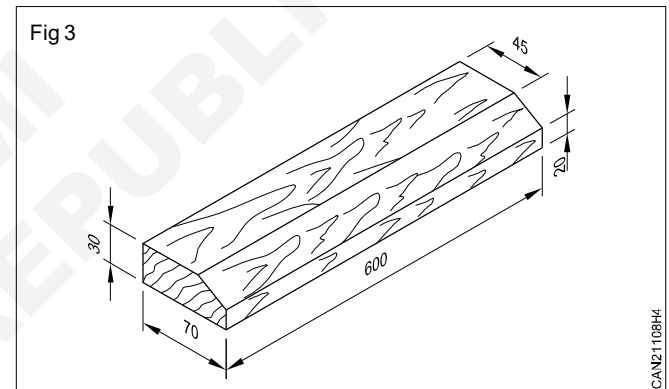


- Set the fence at required distance.
- Place the wooden piece on the table.
- Check the required measurements against the fence keeping the plank against the fence and planer blade.
- Switch on the machine.

- Plane the chamfering side by moving the wood piece against the cutter head using push stick by hand. (Fig 2)



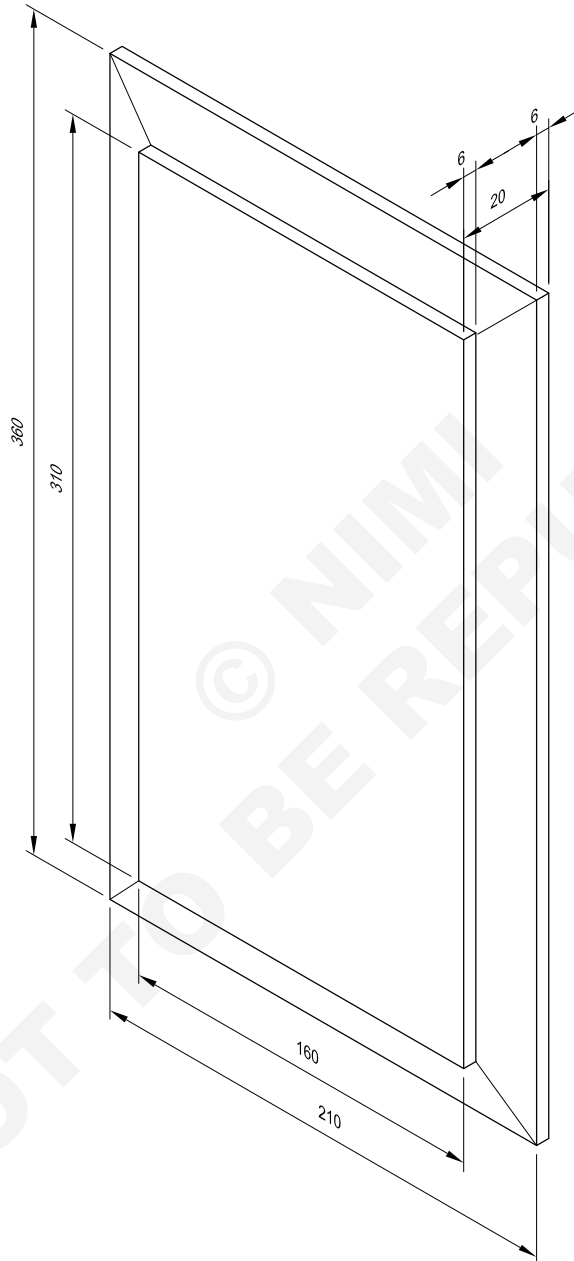
- Repeat the same procedure to chamfering the wooden piece to the required size as per drawing.
- Stop the machine and check the chamfering with bevel square.
- Finish the chamfering planning operation. (Fig 3)



Edge bevelling operation on hard wood by planing machine

Objectives: At the end of this exercise you shall be able to

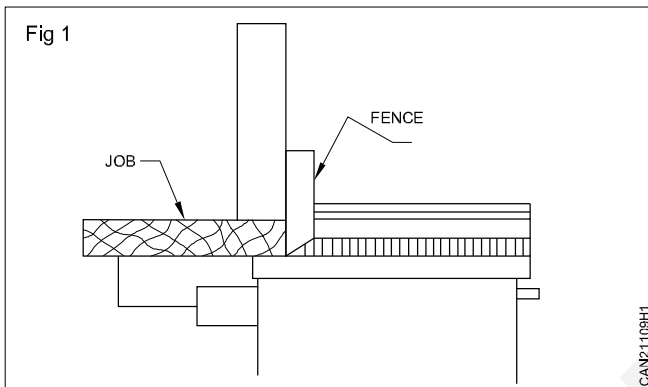
- set the fence and table for edge bevelling
- perform edge bevelling a wooden piece.



1	210 x 20 x 360		HARD WOOD			1.6.109
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>EDGE BEVELLING OPERATION ON HARD WOOD BY PLANING MACHINE</b>				TOLERANCE ±2.0 mm	TIME 5h
					CODE NO. CA20N16109E1	

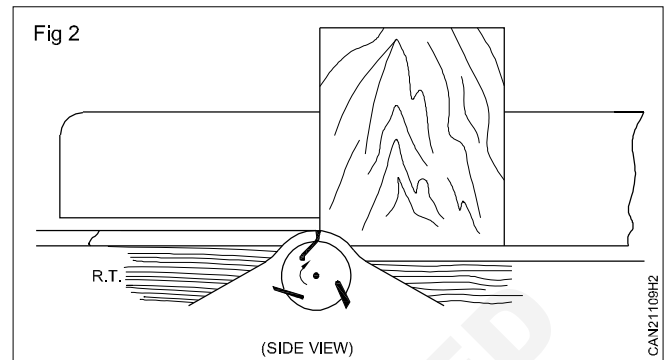
## Job Sequence

- Check the planed wood for required size using foot rule as per drawing.
- Mark the dimension of edge planning as per drawing using, foot rule, marking gauge and try square.
- Set the planer blade, in the cutter head to make edge bevelling operation.
- Set the front table and rear table to make edge bevelling.
- Set the fence at 90° for supporting work when edge bevel planning. (Fig 1)



- Set the fence at required distance.
- Place the wooden piece on the table. Keeping plank against the fence and planer blade.

- Switch on the machine
- Plane the edge side bevelling by moving the wooden plank against the cutter head. (Fig 2)



- Repeat the same procedure to other edges bevel planning.
- Stop the machine and check the dimension with foot rule and bevel square.
- Finish the edge bevelling operation as per drawing.

**Demonstrate pedestal grinding machine its parts and their operational techniques with safety precautions**

**Objectives:** At the end of this exercise you shall be able to

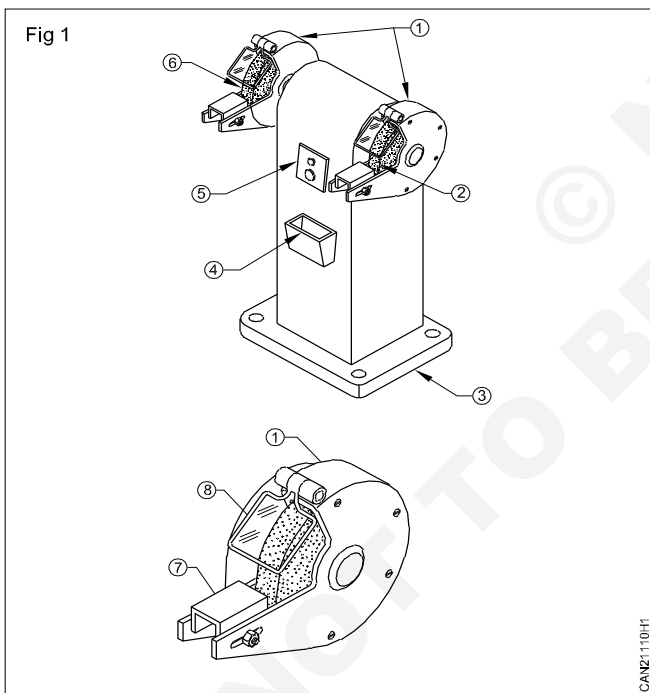
- demonstrate pedestal grinding machine its parts and their operational techniques
- demonstrate the safety precaution to be followed while working pedestal grinding machine.

**Job Sequence**

**Demonstrate pedestal grinding machine parts**

**Instructor shall display and demonstrate the pedestal grinding machine along with parts, operational techniques and safety precaution to be followed by the student**

- Trainees will note down all the parts name of pedestal grinding machine and their operational techniques with safety precaution.
- Record it in table 1.
- Get it checked by the instructor.



**Table 1**

Identification of Parts			
Parts No.	Name of the parts	Parts No.	Name of the parts
1		5	
2		6	
3		7	
4		8	

**Pedestal grinding machine operation technique and safety precautions**

- Clean the pedestal grinding machine thoroughly.
- Check the grinding machine ON/OFF switch in its proper position.
- Rotate and check the grinding wheels by hand without applying electric power.
- Switch ON the grinding machine standing aside and allow it to run the grinding wheels a little while freely.
- Hold the grinding tool in hand.
- Support the tool on work rest / tool rest.
- Touch the tool on grinding wheel face and grind it by applying light pressure.
- Grind the tool both sides to the required angle and sharpness.
- After grinding 'Switch off' the machine and allow it to stop.
- Clean the grinding machine thoroughly without dust particles.

**Note:** For rough grinding, grind it in rough wheel, and for fine grinding grind it in fine wheel.

**Safety precautions for pedestal grinding machine**

- Use coolant to minimize the heat while grinding.
- Use personal protective equipment like safety goggles, hand gloves, safety shoes while grinding.
- Grinding wheels should be covered with proper guards before grinding.
- Do not grind the work tool on the side of the grinding wheel. If you grind the work/tools on the side of the grinding wheel, changes are there to get cracked or broken and also injury to the operator and others.
- Perform the grinding operations very carefully while grinding. Otherwise the operator will get injured and others.



**Demonstrate off hand grinding operation as per requirement of the trade**

**Objectives:** At the end of this exercise you shall be able to

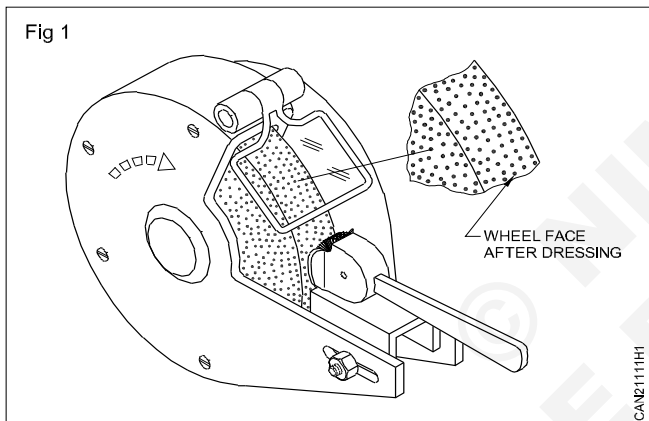
- demonstrate off hand grinding operation
- grind the firmer chisel.

**Job Sequence**

**Instructor shall display and demonstrate to the student regarding the hand grinding operation.**

**Hand grinding operation**

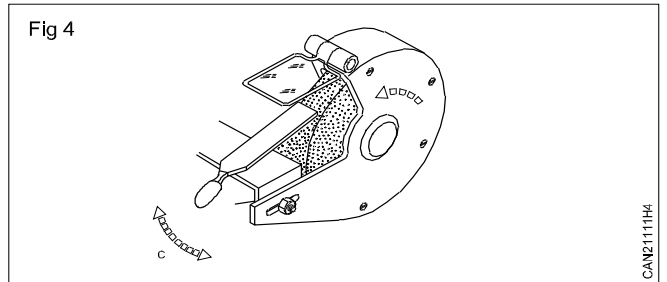
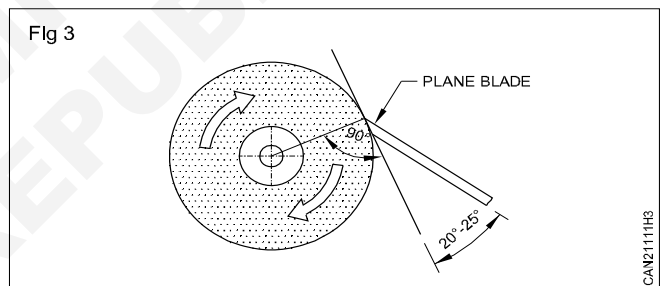
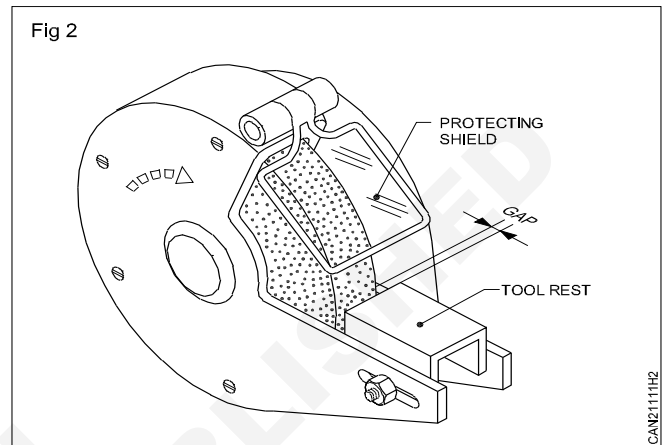
- Before grinding : Check the grinding wheel by, sliding the finger tip across the grinding wheel to detect glazing.
- (In case of glazing, dress the wheel) For dressing use silicon carbide sticks and seek the help of the instructor. (Fig 1)



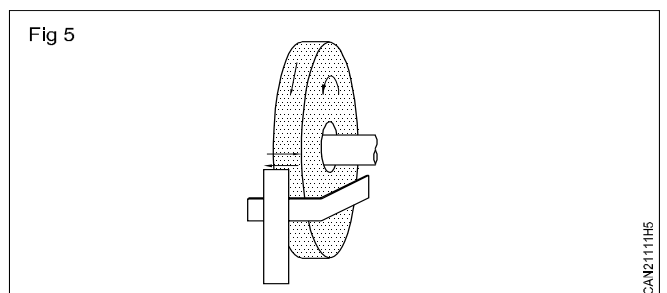
- Visually check for cracks.
- Switch on the grinder, stand by the side of the wheel for safety, and see whether the wheel runs 'true' and has no excessive vibration. In case of excessive vibration, truing is necessary. Ask the instructor for advice.
- Ensure that there is enough coolant in the container.
- Protect your eyes with goggles or lower the protecting shield near the tool rest. (Fig 2)
- Adjust the tool rest 2 mm closer to the wheel, if necessary. (Fig 2)

**During grinding:** Take a blunt chisel for re-grinding. Wood chisels will become blunt due to use. For efficient chiseling, chisels are to be re-sharpened regularly.

- Do not use cotton waste or other material for holding the chisel while grinding. Use only the face of the wheel and not the sides. Switch on the grinder.
- Hold the chisel edge parallel to the wheel surface; the body of the chisel must be at an angle of 20° to 25° (Fig 3)
- Rest the body of the chisel on the tool rest and allow the point to touch the wheel. (Fig 4)



- Keep the pressure as minimum as possible to prevent excessive heating of the cutting edge, (avoid blue colour, i.e. annealing effect). (Fig 5)
- Dip the chisel in the coolant as and when it is required so as to avoid overheating.
- Repeat the grinding on the side of the cutting edge.
- Check the grinding angle with a bevel protractor.

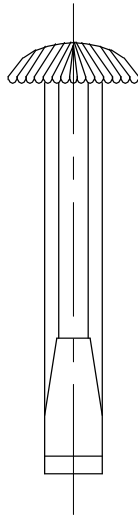


**Grinding for mushroom head chisel, chisel cutting edge, drill bit and check correctness**

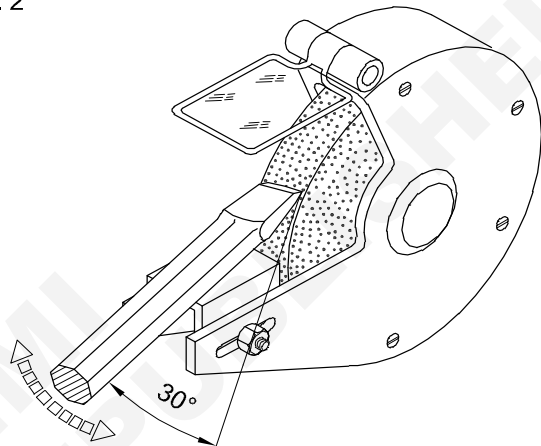
**Objectives:** At the end of this exercise you shall be able to

- grind the chisel mushroom head
- grind the chisel cutting edge
- grind the drill bit.
- check the correctness.

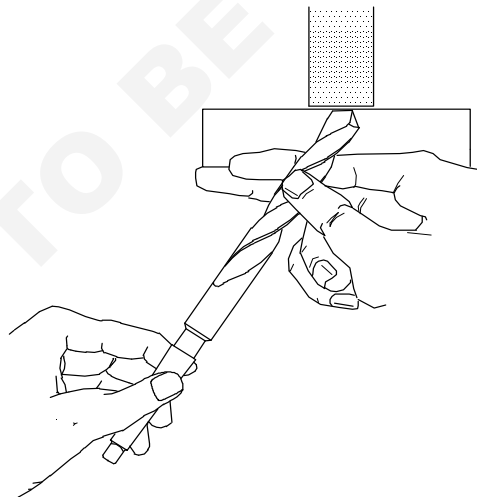
TASK : 1



TASK : 2



TASK : 3



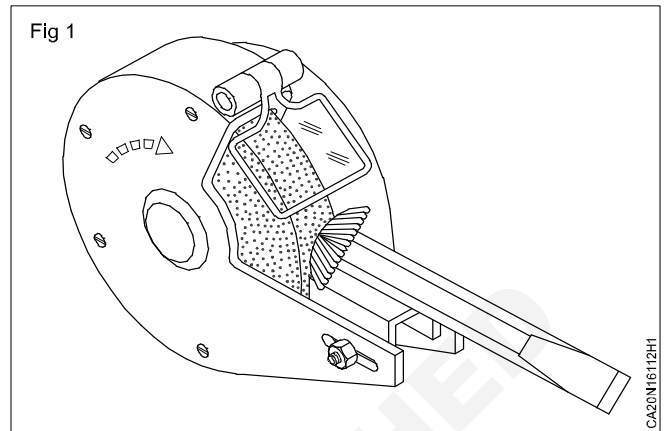
2	25 mm		FLAT CHISEL			
1	12 mm		DRILL BIT			1.6.112
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>GRINDING FOR MUSHROOM HEAD CHISEL, CHISEL CUTTING EDGE AND DRILL BIT</b>				TOLERANCE ±2.0 mm	TIME 12h
					CODE NO. CA20N16112E1	

# Job Sequence

## TASK 1: Grinding the chisel mushroom head

- Select the grinding wheel.
- Check the grinding wheel for cracks.
- Ensure that there is enough coolant in the container.
- Protect your eyes with goggles or lower the protecting shield near the tool rest..
- Adjust the tool rest 2 mm closer to the wheel if necessary.
- Switch on the grinder
- Hold the mushroom head chisel across the wheel surface.
- Rest the body of the chisel on the tool rest and allow the head to touch the wheel surface.
- Keep the pressure evenly and slowly.
- Rotate the chisel head grinding the mushroom head. (Fig 1)

- Repeat the grinding cleaned mushroom head of the chisel.

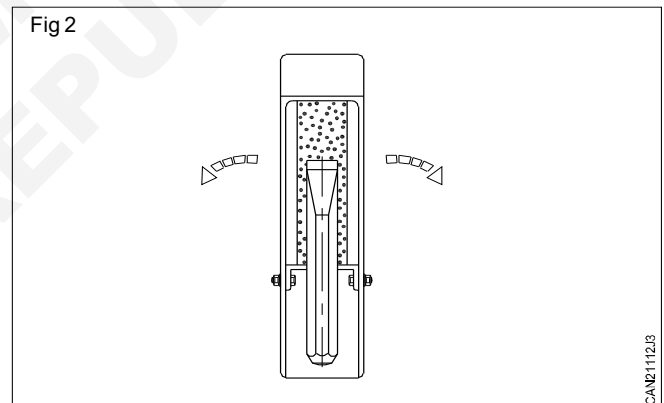
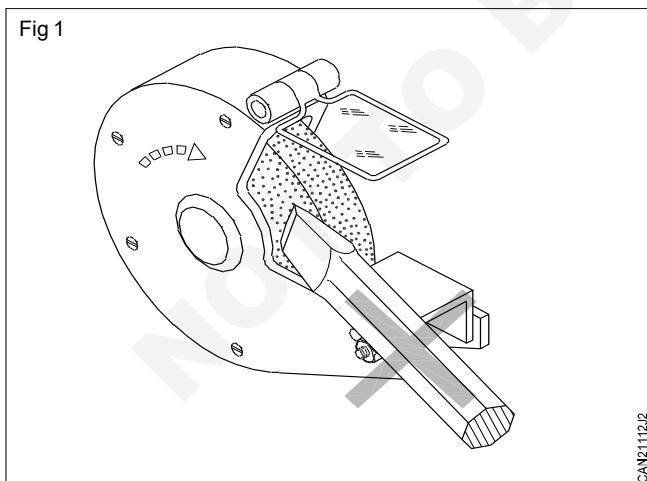


## TASK 2: Grinding of flat chisel

### Before grinding

- Check the grinding wheel by
- Sliding the finger tip across the grinding wheel to detect glazing.
- Visually check for crack.
- Ensure that there is enough coolant in the container.
- Protect your eyes with goggles or lower the protecting shield near the tool rest. (Fig 1)
- Adjust the tool rest 2 mm closer to the wheel, if necessary. (Fig 1)

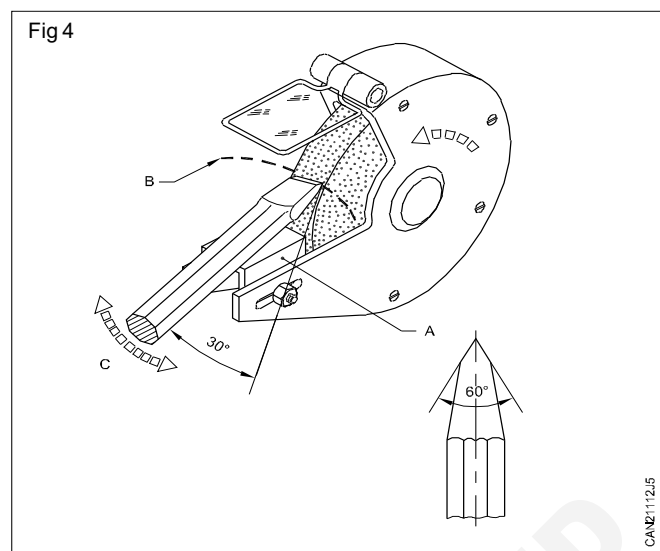
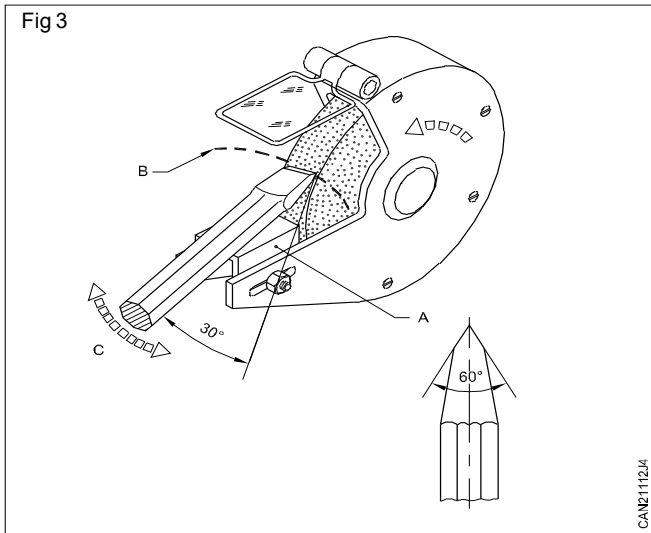
- Use only the face of the wheel and not the sides. (Fig 2)



### During grinding

- Take a blunt chisel for re-grinding chisels will become blunt due to use. For efficient chipping, chisels are to be re-sharpened regularly.
- Do not use cotton waste or other material for holding the chisel while grinding.

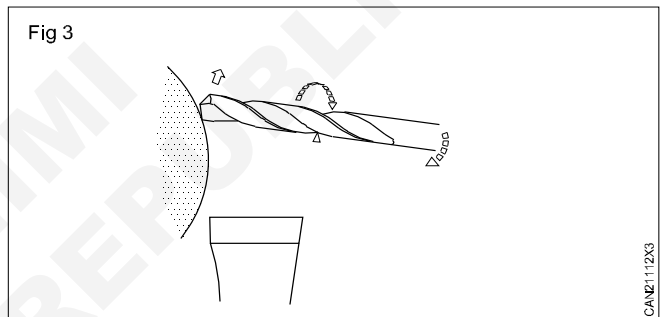
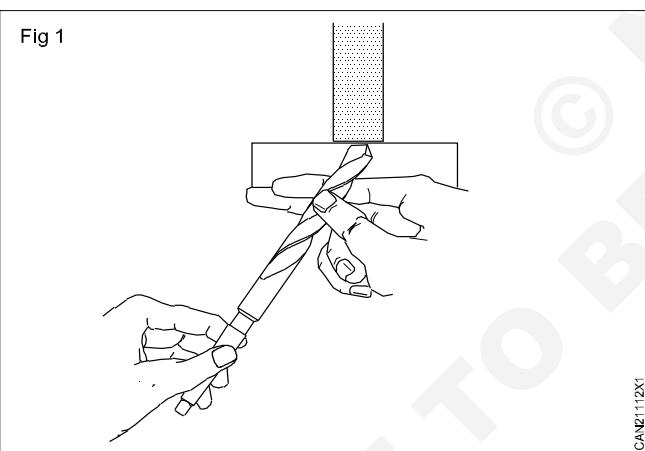
- Switch on the grinder.
- Hold the chisel edge parallel to the wheel surface; the body of the chisel must be at an angle of 30° in such a way as to get 60° wedge angle.
- Rest the body of the chisel on the tool rest (A) Fig 5 and allow the point to touch the wheel. (Figs 3 & 4)
- Keep the pressure as minimum as possible to prevent excessive heating of the cutting edge. (Avoid blue colours i.e., annealing effect.)
- Rock the point on both sides in as to provide convexity at the cutting edge. (Fig 4 ) See the arrows 'C'
- Dip the chisel in the coolant as and when it is required so as to avoid overheating.
- Repeat the grinding on the opposite side of the cutting edge.
- Check the wedge angle with a bevel protractor.



### TASK 3: Grinding a twist drill bit and check cutting edge

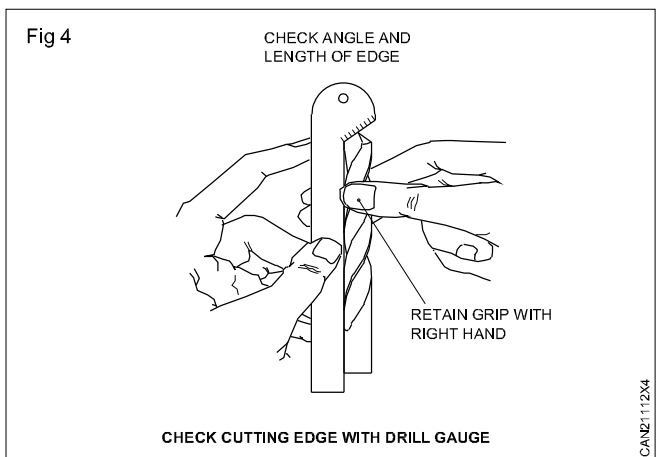
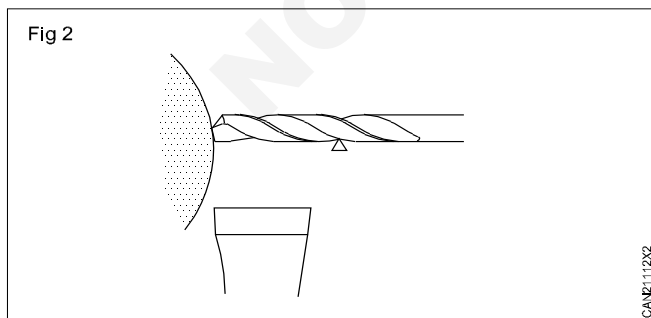
- Before grinding, check for loading, glazing, and trueness of wheels and cracks.
- Dress and true the wheel, if necessary.
- Switch on the grinding machine.
- The drill bit is held behind the point with the thumb and index finger of the left hand, shank with the thumb and index finger of the right hand. (Fig 1)

- Swing the shank of the drill slightly downward and towards the left. (Fig 3)



- The hand near the point should be pivoted lightly on the tool rest for easy manipulation. (Fig 2)

- Repeat the operation for the other lip.
- Dip the tool in a coolant frequently.
- Finish the clearance angle from 9° to 12° and check the angle with a drill gauge. (Fig 4)
- Check the lip length and maintain both sides equal.
- Reduce the web thickness at dead centre.
- Deburr the cutting edge by an oilstone.

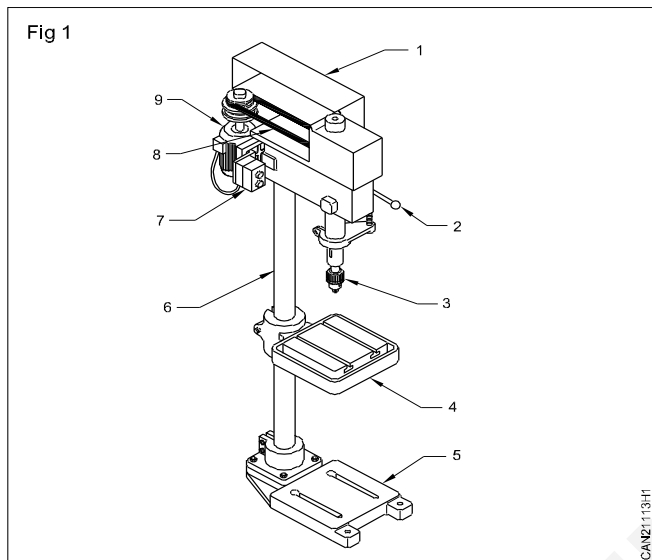


- Lightly press the drill with an angle of 59° against the grinding wheel, and at the same time, the drill shank is moved up and down to get the lip clearance angle of 8° to 12°.

**Demonstrate pedestal drilling machine parts, operational techniques and safety precautions**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate pedestal drilling machine parts and operational techniques
- demonstrate the safety precautions to be followed while working on a pedestal drilling machine.



- Record it in table 1.
- Get it checked by the instructor.

**Table 1**  
**Identification of parts (Fig 1)**

Parts No.	Name of parts
1	
2	
3	
4	
5	
6	
7	
8	
9	

**Job Sequence**

**Instructor shall display and demonstrate the pedestal drilling machine along with parts, operational techniques and safety precautions to be followed by the student.**

- Trainees will note down all the parts name of pedestal drilling machine and their operational techniques with safety precautions.

**Skill sequence**

**Pedestal drilling machine operational techniques and safety precautions**

**Objectives:** This shall help you to

- know the operational techniques while working on a pedestal drilling machine
- know the safety precautions while working on a drilling machine.

**Pedestal drilling machine operation and shaping**

Drilling, Chamfering, Boring deep hole, Counter sinking and Pivot hole

Never make any adjustments while the machine is operating.

Never clean away chips with your hand use a brush.

Keep all loose clothing away from turning tools.

Make sure that the cutting tools are running straight before starting the operation.

Never place tools or equipment on the drilling tables.

Keep all guards in place while operating.

Ease up on the feed as the drill breaks through the work to avoid damaged tools or workpieces.

Remove all chuck keys and wrenches before operating.

Always wear eye protection while operating any drilling machines.

Switch off power when not in use.

Clean and oil the machine after finishing the work.

The work piece and the drill should be rigidly held.

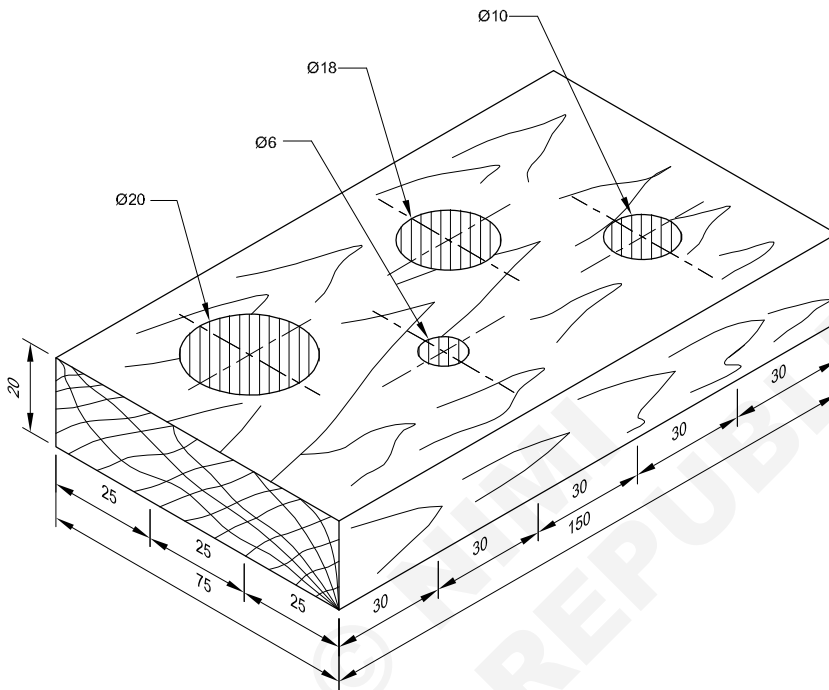
Select proper cutting speed according to material.

Ensure that the spindle head and table is locked properly.

**Different sizes of drill hole on wood**

**Objectives:** At the end of this exercise you shall be able to

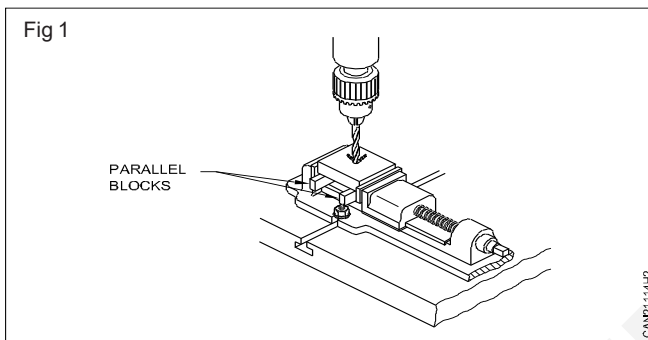
- drill through holes using pedestal drilling machine
- operate safety the pedestal drilling machine.



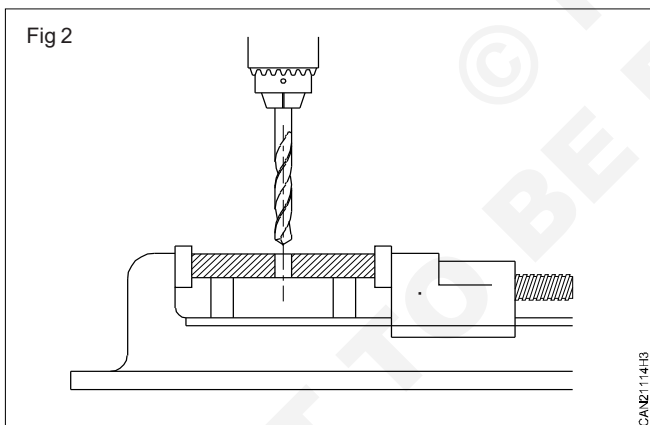
1	75 x 20 x 150 mm		HARD WOOD			1.6.114
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DIFFERENT SIZES OF DRILL HOLE ON WOOD</b>				TOLERANCE ±2.0 mm	TIME 10h
					CODE NO. CA20N16114E1	

## Job Sequence

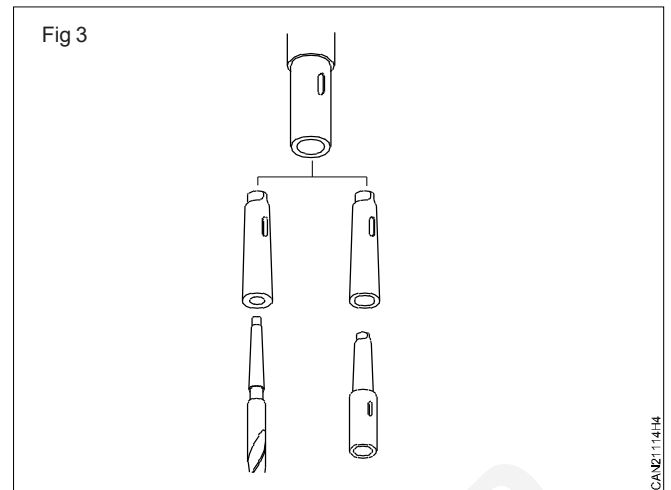
- Check the size of the given raw material.
- Plane and finish the given material to size 75 x 20 x 150 mm
- Mark and locate the centers for the holes to be drilling using steel rule, try square, marking gauge and pencil. as per drawing
- Centre punch the located drill centre.
- Mount the job in a machine vice using parallels and clamp if securely in the drill press table.
- Set the work table in such a manner that drill can be fixed and removed without disturbing the vice or table. (Fig 1)



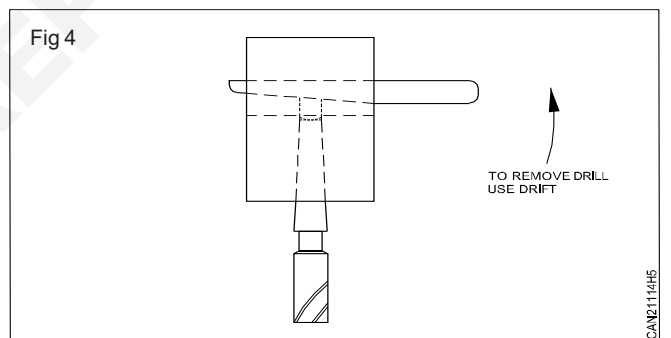
- Fix a  $\phi 6$  mm twisted drill bit on the chuck in a drilling machine. (Fig 2)



- Set the spindle speed of the drilling machine.
- Switch on the drilling machine.
- Drilling the hole with uniform feed.
- Release the drill frequently from the hole
- Switch off the machine
- Remove  $\phi 6$  mm twisted drill bit and fix the  $\phi 10$  mm twisted drill bit in a check.
- Repeat the same procedure to drill to the  $\phi 10$  mm size
- Switch off the machine.
- Fix the  $\phi 20$  mm taper shank drill bit on the spindle in a drilling machine. (Fig 3)



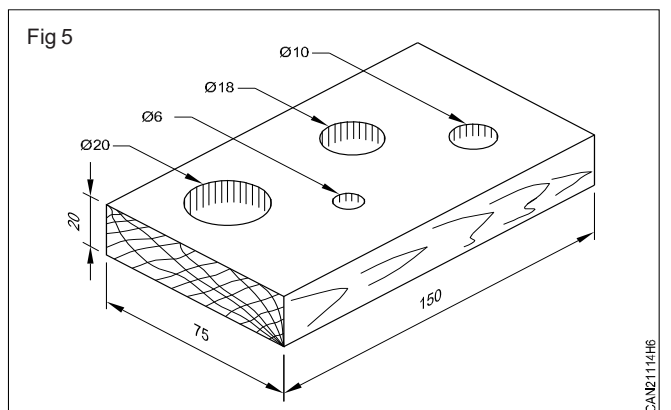
- Repeat the same procedure to drill to the 20 mm size.
- Switch off the machine.
- Remove the 20mm taper shank drill bit using drill drift.
- Fix the  $\phi 18$  mm taper shank drill bit using spindle in a socket (or) sleeve the tang portion should align in the slot. (Fig 3)
- Repeat the same procedure to drill to the 18 mm size.
- Switch off the machine.
- Remove the 18mm taper shank drill bit using drill drift. (Fig 4)



- Clean the machine using a brush.

**While removing the drill from the socket sleeves don't allow it to fall on the table or jobs.**

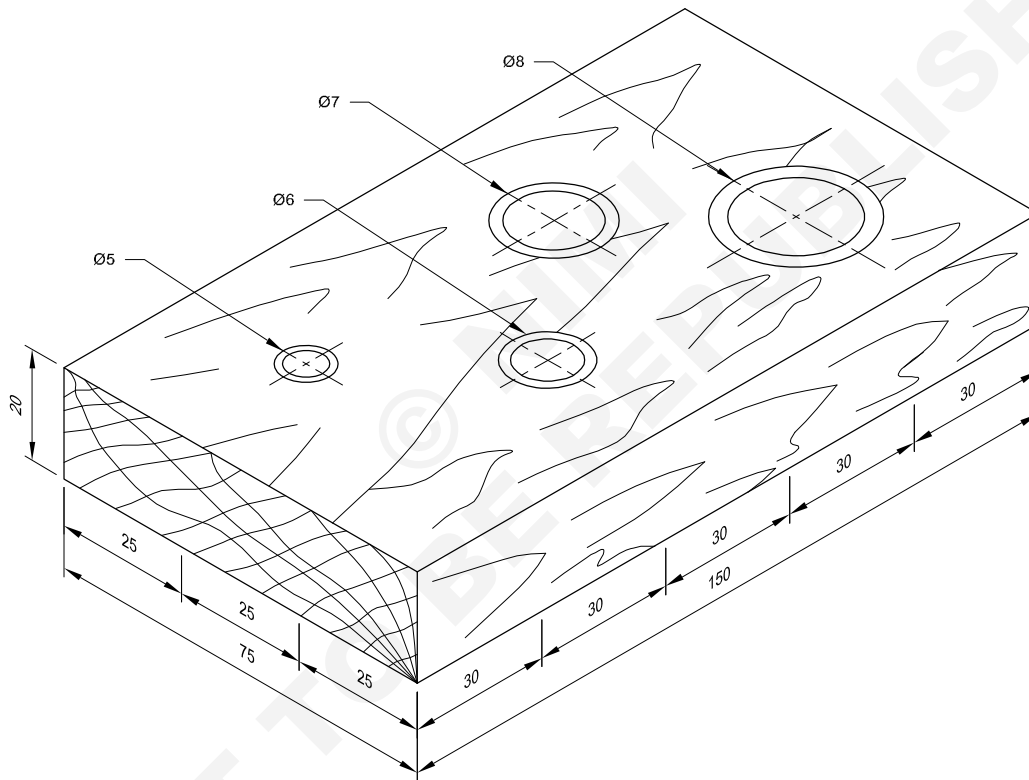
- Finish different sizes of drill hole. (Fig 5)



Use of counter sinking bit on job

Objectives: At the end of this exercise you shall be able to

- drill through holes using drilling machine
- countersink in drilled hole.

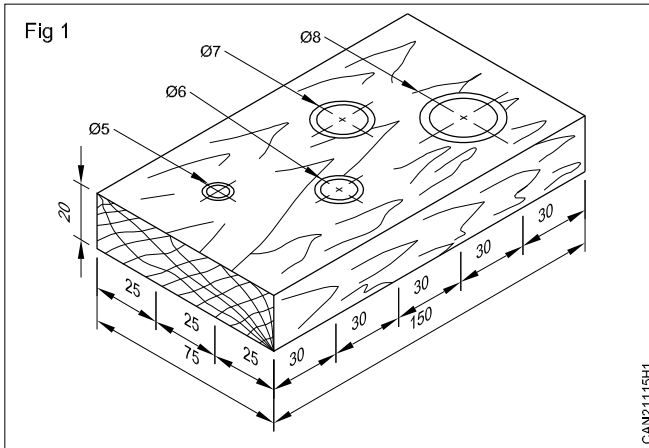


1	80 x 25 x 150 mm		HARD WOOD			1.6.115
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>USE OF COUNTER SINKING BIT ON JOB</b>				TOLERANCE ±2.0 mm	TIME 7h
					CODE NO. CA20N16115E1	

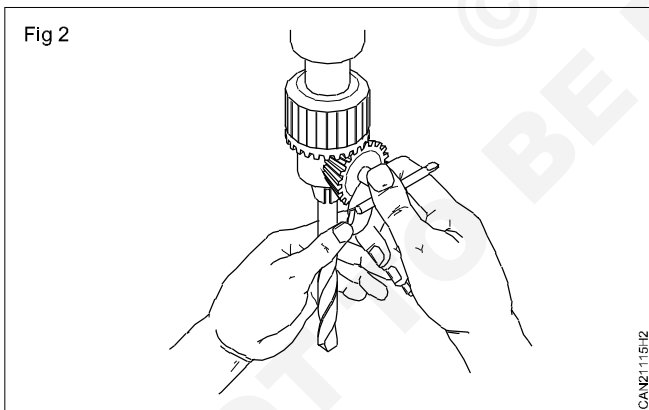


## Job Sequence

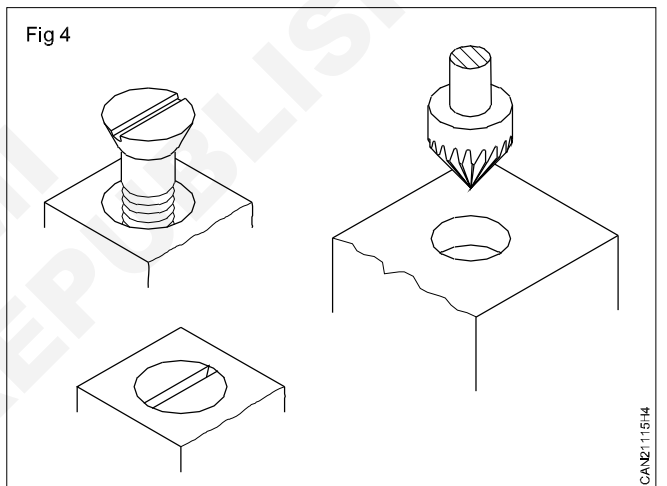
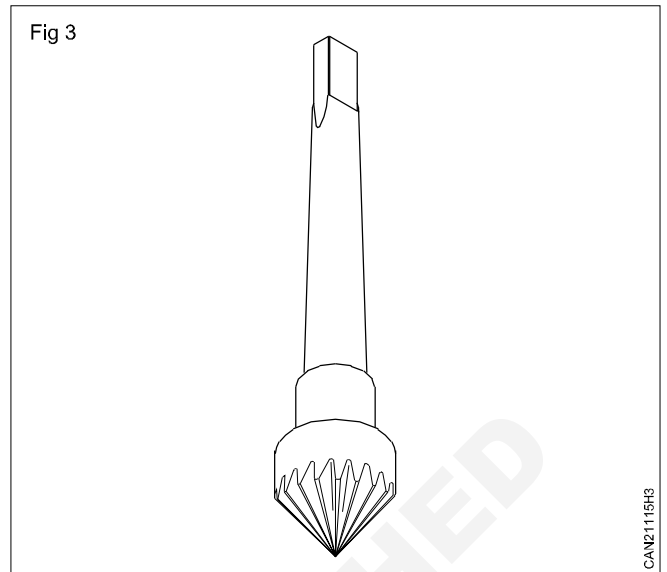
- Check the raw material for the size. 80 x 25 x 150 mm
- Plane and finish the given material to size: 75 x 20 x 150 mm. Using jack plane.
- Mark and locate the centers for the drill holes using steel rule, try square, marking gauge and pencil. (Fig 1)



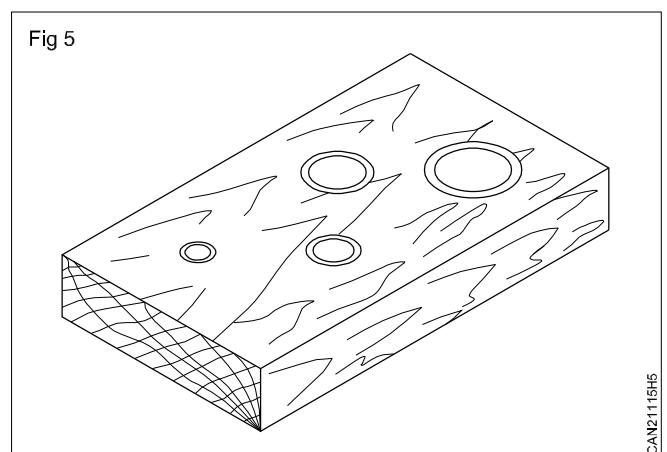
- Centre punch the located drill centers.
- Mount the job in a machine vice using parallels and clamp if securely in the drill press table.
- Set the work table in such manner that drill can be fixed and removed without disturbing the vice or table.
- Fix 5 mm drill bit on the check using chuck key. (Fig 2)



- Switch on the drilling machine.
- Drill the hole with uniform feed.
- Release the drill frequently from the hole.
- Switch off the machine.
- Remove the drill bit and fix the counter sink tool bit in drilling machine. (Fig 3)
- Counter sink the drilling hole 90° the required depth
- Similarly, repeat the same procedure for drilling 6 mm, 7 mm, and 8 mm, and counter sink the drilling holes to 90° to fix countersink screens. (Fig 4)



- Finish the countersink operation. (Fig 5)



## Demonstrate care and maintenance on pedestal drilling machine

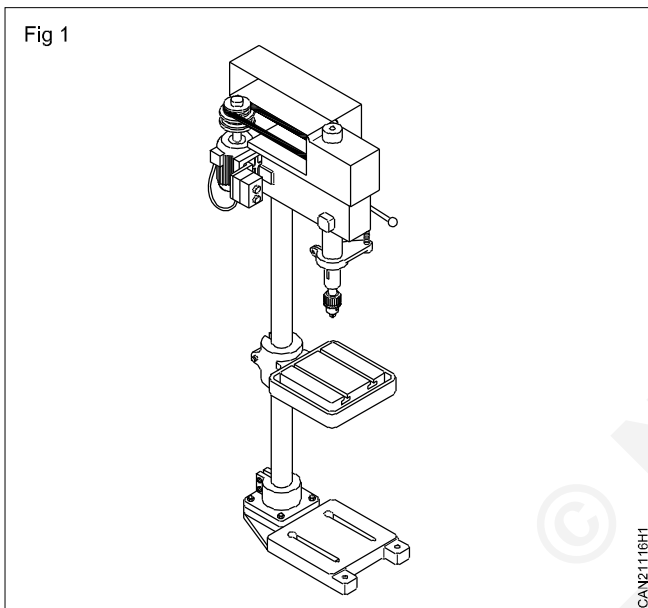
**Objective:** At the end of this exercise you shall be able to

- demonstrate care and maintenance while working on pedestal drilling machine.

### Job Sequence

Instructor shall display and demonstrate the pedestal drilling machine care and maintenance to followed the student

#### Care and maintenance (Fig 1)

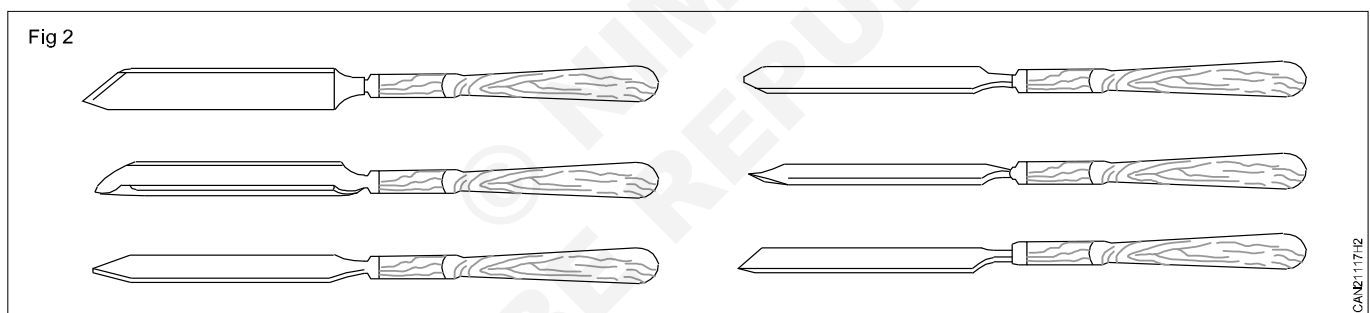
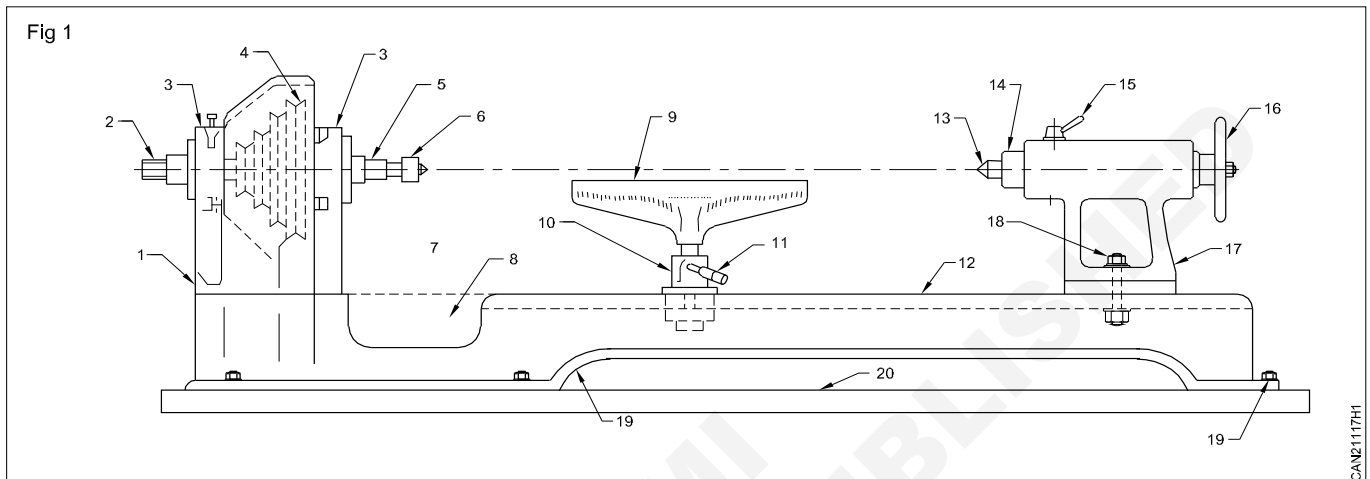


- The work piece and the drill should be rigidly held.
- Switch off power when not in use
- Use the drill drift for removing the drills, chucks or sockets
- Use a minimum number of socket and sleeves to make for the spindle bore size.
- Clean and oil the machine after use.
- Stop the machine to remove the swarf.
- Use a brush to clean the chips and swarf.
- While using cutting fluid (or) lubricant directly from the machine.
- Check the job for proper clamping
- Use proper feeds and depth of cuts
- Do not take any measurement while the machine is in running condition.

**Demonstrate wood turning lathe parts, turning chisels sets with operational technique and safety precautions**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate wood turning lathe parts and their operational techniques
- demonstrate wood turning chisel and its name
- demonstrate the safety precautions to be followed while working wood turning lathe.



**Job Sequence**

**Instructor shall display and demonstrate the wood turning lathe along with parts and chisels sets, with operational technique and safety precaution to followed the student.**

- Trainees will note down all the parts name of wood turning lathe, chisels name and their operational techniques and safety precautions
- Record it in table 1 and 2
- Get it checked by the instructor.

**Table 1**  
**Identification of wood turning lathe parts**

Parts No.	Name of parts
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Parts No.	Name of parts
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

**Table 2**

**Identification of wood turning chisel name**

Fig 2	Name of chisel
1	
2	
3	
4	
5	
6	

## Skill sequence

### **Operational technique and safety precautions on working wood turning lathe**

**Objectives:** This shall help you to

- **operational techniques the wood turning lathe**
- **safety precautions while working with the wood turning lathe.**

Sl.No.	Operational techniques		
1	Plan turning	5	Internal turning
2	Taper turning	6	Face plate turning
3	Drilling	7	Concave and convex turning
4	Boring	8	Sanding and polishing

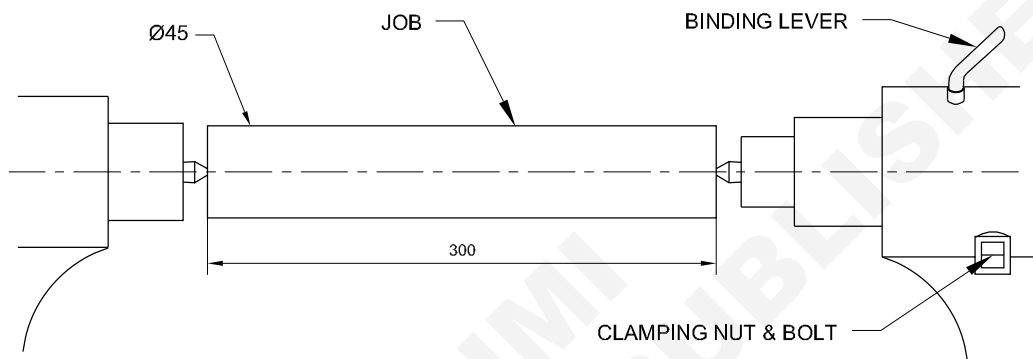
#### **Safety precautions on wood turning lathe**

- Wear tight fitting apron tied at the back.
- Wear an eye shield or goggles.
- Remove scraps from around the machine especially from the floor.
- Keep the tool rest close the work.
- See that the chisel are correctly sharpened and good condition .
- Turn the work by hand to see that it revolves clear of the tool rest.
- Rough turning for slow speed.
- Increase the speed for smooth turning.
- Apply the wax or grease dead centre end of wood.
- Check guards are in position and secure.
- Avoid knot, split wood be turned.
- Select turning speed carefully.
- Do not attempt to stop the lathe by rasping the job.
- Screw face plate on tightly by hand.
- While working give your full attention to the job don't talk to others.
- Do not lean over the revolving work.
- Never leave the lathe running while searching for tools etc.
- Switch off the lathe remove the job and clean down the lathe and oiling and grease.

**Remove the job and refit/set the job on wood turning lathe**

**Objectives:** At the end of this exercise you shall be able to

- remove and set the job between centers from turning lathe
- set the job between centers for turning.



**Job Sequence**

**Remove the job between centers**

- Loose the binding lever from the tail stock.
- Rotate the spindle feed wheel by right hand anti-clock wise to loose the tail stock spindle and hold the job by left hand
- Remove the finishing job by live centre from the head stock

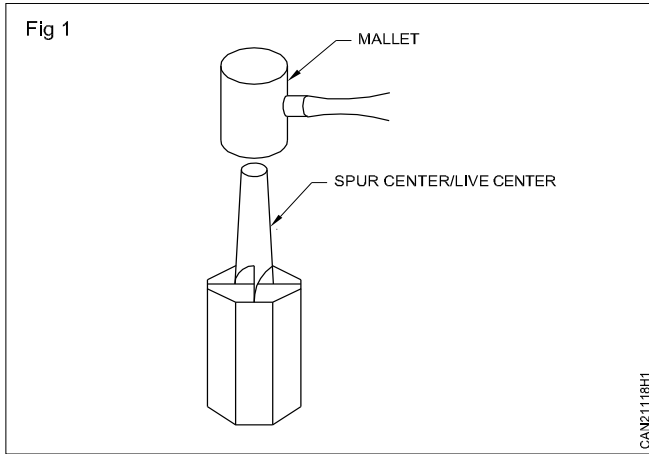
**Setting the job for turning.**

**Refit/Set the job between centres.**

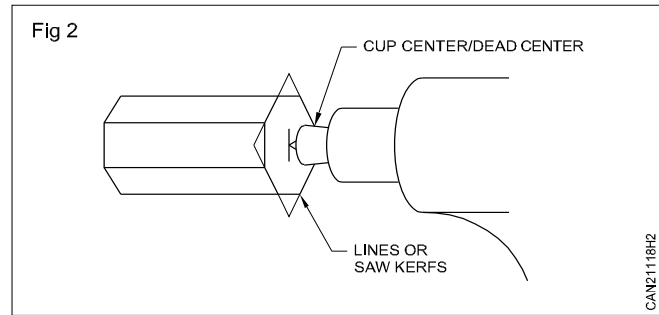
- Remove the live centre from the head stock.
- Drive the live centre at one end where the shallow cuts are made by using mallet. (Fig 1)

- Without removing the job from the live centre, fix the live centre with head stock spindle and hold the job in hand.
- Fix the dead centre in the stock spindle.
- Use wax in the hole bored on the other end of the stock.
- Slide the tail stock over the bed near to the job.
- Fix the tail stock over the bed using clamp / nut and bolt.
- Move the dead centre inside the marked point by rotating tail stock hand wheel.
- Turn the tail stock hand wheel until the dead centre exerts pressure against the job. (Fig 2)

1	50 x 55 x 300 mm		TEAK WOOD			2.1.118
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>REMOVE THE JOB AND REFIT / SET THE JOB ON WOOD TURNING LATHE</b>				TOLERANCE ±2.0 mm	TIME 4h
					CODE NO. CAN21118E1	



- Clamp the tailstock, with tailstock spindle clamp or binding lever. (Fig 3)
- Turn the stock by hand to see that it clears the tool rest.



## grinding and sharpening the turning chisel.

### Grinding

Adjust the tool rest of the grinder to the required angle

Place the blade over the tool rest and move the chisel evenly across the wheel to get required angle of about 40°  
Grinding the chisel both side or face side

Grinding bevels should be even and straight

Grinding should be honed at the same angle.

### Skill sequence

## Prepare the job for turning

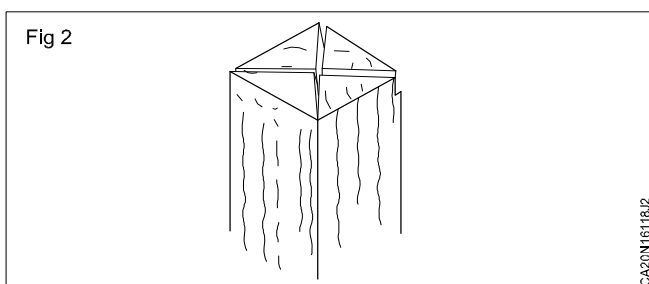
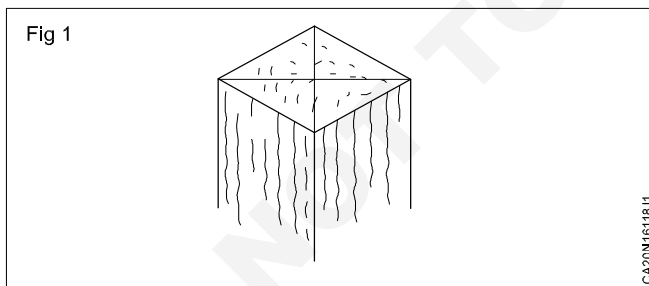
**Objective:** This shall help you to

- mark on the job to hold in between the centres for turning.

### Marking

Draw the diagonals on both the ends of the job to locate the exact centre. (Figs 1, 2 & 3)

Make a shallow saw cut on one end and punch a small hole on the other end of the job using tenon saw and punch. (Fig 2)



### Sharpening

Wet the surface of the fine slip oilstone with oil.

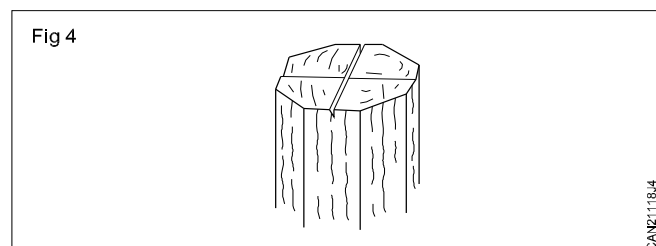
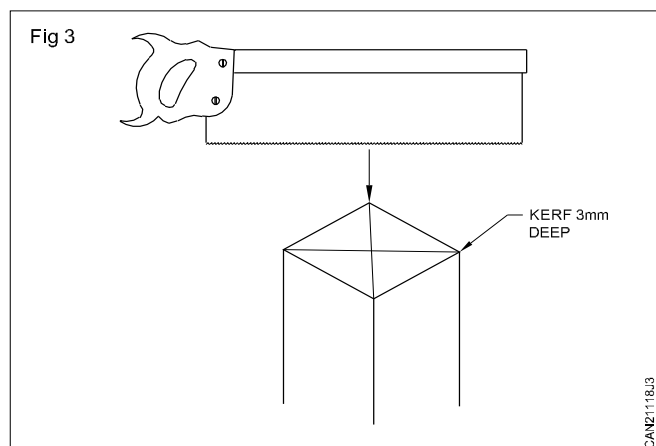
Lay the cutting bevel on the surface

Place the blade lightly rub each grinding bevel.

**Do not separate honing bevel.**

Remove the sharp corners of the job for rough turning. (Fig 4)

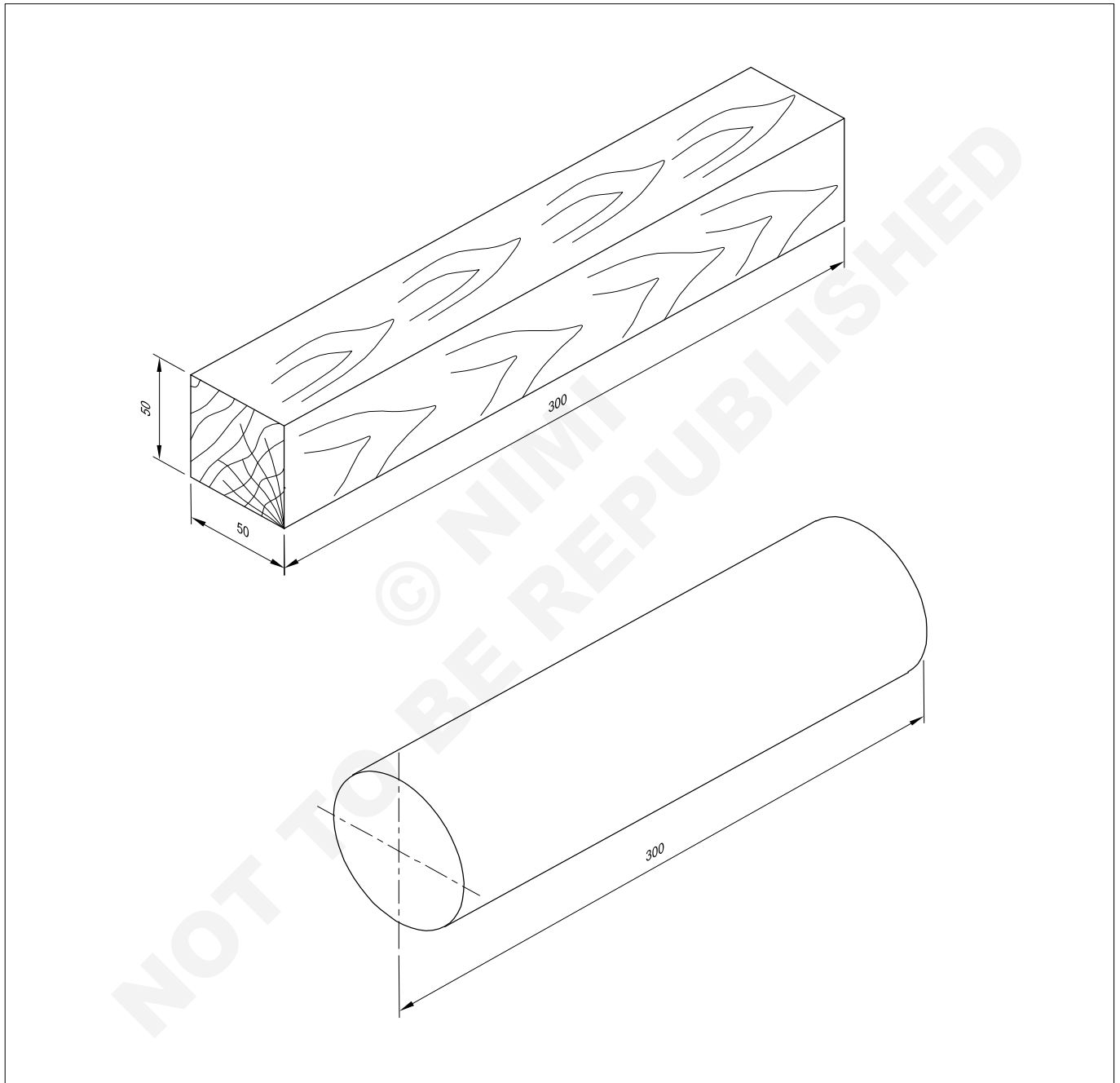
**Wood with knots and splits should not be used for turning.**



**Plain turning by wood turning lathe**

Objectives: At the end of this exercise you shall be able to

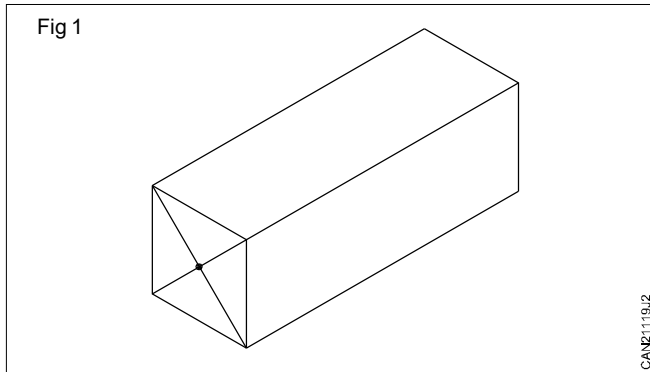
- mark the job for turning
- set the job between centers for turning
- turn the wooden piece to plain.



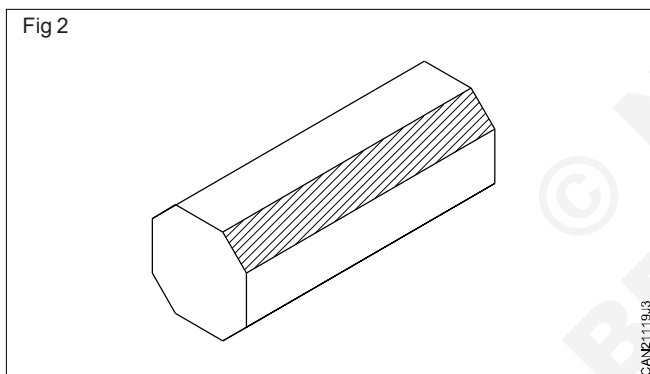
1	50 x 50 x 300 mm		SOFT WOOD			1.6.119
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>PLAIN TURNING OPERATION ON SOFT WOOD BY WOOD TURNING LATHE</b>				TOLERANCE $\pm 2.0$ mm	TIME 4h
					CODE NO. CA20N16119E1	

## Job Sequence

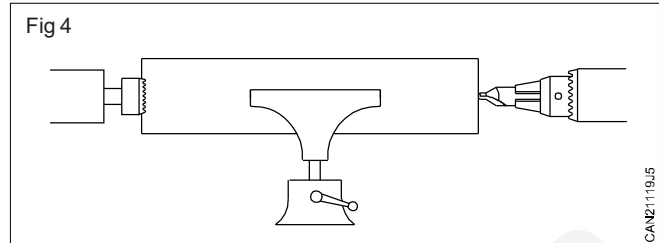
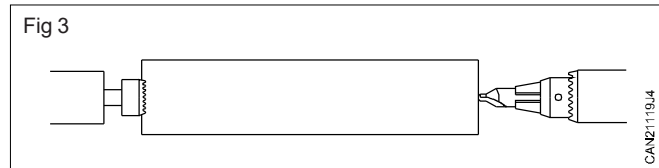
- Check the work piece for required size with steel rule 50 x 50 x 300 mm (as per dimensions) as per drawing
- Draw the diagonals on the both ends of the stock to locate the exact centre using steel rule, scribe and try square. (Fig 1)



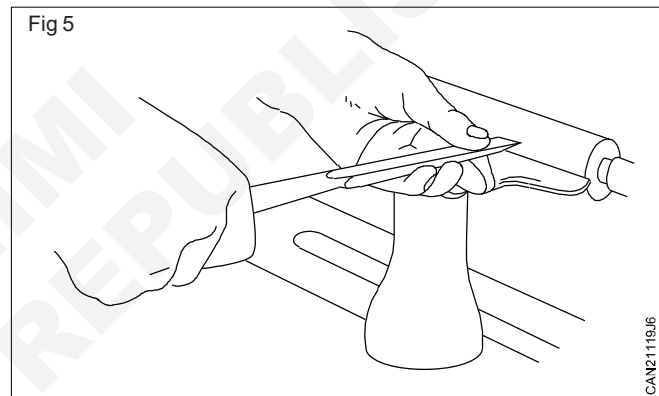
- Make shallow saw cut along the diagonal on one end of the stock by using tenon saw.
- On the other end punch a small hole on the centre.
- Remove the sharp corners of the job using plane. (Fig 2)



- Drive the live centre into the end on which the diagonals were sawn.
- Without removing the stock place the live centre in the head stock spindle.
- Fix the dead centre in the tail stock spindle.
- Use wax or grease in the hole bored on the other end of the stock.
- Slide in the tail stock over the bed using clamp /nut and bolt.
- Rotate the tail stock hand wheel until the dead centre enters hole of the job. (Fig 3)
- Set the tool rest 3 mm away from the stock. (Fig 4)



- Set the spindle of the lathe at the lowest
- Switch ON the machine.
- Plane the gauge chisel on tool rest. Using left hand thumb over the gauge chisel blade and keep the right hand on the chisel handle. (Fig 5)



- Move the gauge chisel parallel to the lathe axis carefully along the tool rest for turning.
- Turn the job from square to round using gauge chisel through out its length from left to right leaving in cylindrical gauge for finishing.
- Increase the speed for smooth turning. Read just the tool-rest near to the job for smooth turning. Finish the job to the required dimension, using the flat. Skew chisel.
- Check the outside diameter of the work using outside caliper as per drawing
- Sanding is done using sand paper No:80 and finish with sandpaper No:120.as per drawing

**All the turning tools should be sharpened correctly**

**Avoid work pieces with note, splits, etc.**



**Drilling, boring and taper turning operation**

**Objectives:** At the end of this exercise you shall be able to

- drill the job in wood turning lathe
- perform bore operation in the lathe
- turn taper surface on the job.

**TASK-1**

**DRILLING**

**TASK-2**

**BORING**

**TASK-3**

**TAPER TURNING**

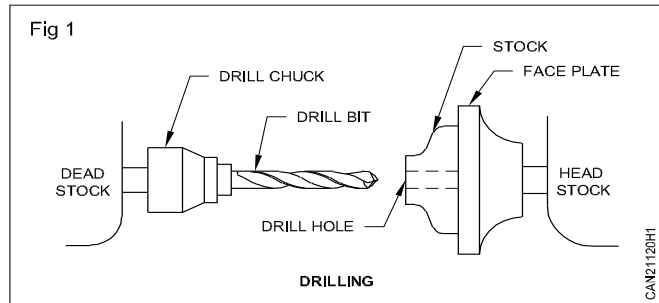
1	Ø130 x 35 mm		TEAK WOOD				
1	45 x 45 x 460 mm		TEAK WOOD			2.1.120	
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.	
SCALE NTS		<b>DRILLING, BORING AND TAPER TURNING WOOD BY WOOD TURNING LATHE</b>				TOLERANCE ±2.0 mm	TIME 5h
						CODE NO. CAN211120E1	

## Job Sequence

### TASK 1: Drill the job on the lathe

- Check the raw material size  $\phi 130 \times 35$  mm.
- Fix the face plate on the head stock properly
- Fix the job on the face place using wood screws tightly
- Fix the sleeve with  $\phi 10$  mm dia drill bit on tail stock spindle.
- Adjust the tail stock near to the stock and clamp it, using bolt and nut with the bed
- Switch on the machine move the drill bit slowly using even pressure.
- Rotate the hand wheel until to get through hole in the stock (Fig 1)
- Remove the drill bit from the stock.

- Check the measurement using in side calliper.

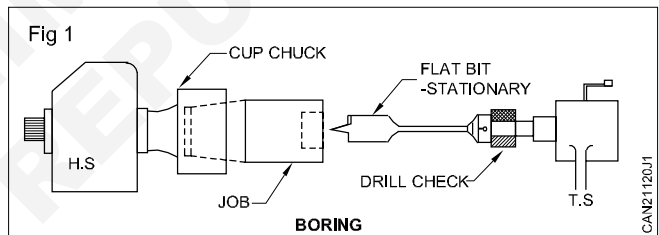


- Switch off the machine.
- Move the tail stock and remove the sleeve from it.
- Finish the job using sand paper.

### TASK 2: Boring in the wood working lathe

- Fix the  $\phi 20$  boring bit on the tail stock spindle
- Fix the Task 1: 10 mm dia, drill the job with head stock face plate
- Switch on the machine boring bit rotates in slow speed. Using even move the pressure
- Rotate the hand wheel until slide tail stock and to get through boring in the stock.
- Switch off the machine remove the boring bit from the stock.
- Move the tail stock and remove the boring bit from it.

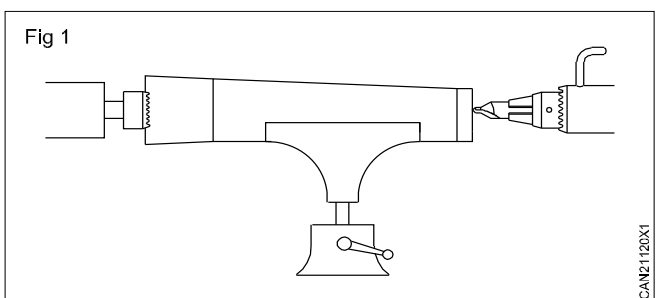
- Finish the job using sand paper.
- Check the measurement using in side caliper (Fig 1)



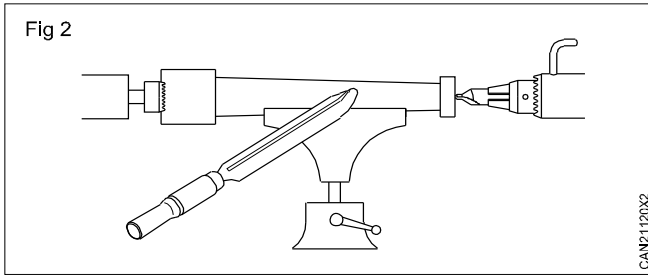
### TASK 3: Taper turning operation

#### Turning the taper surface on the job

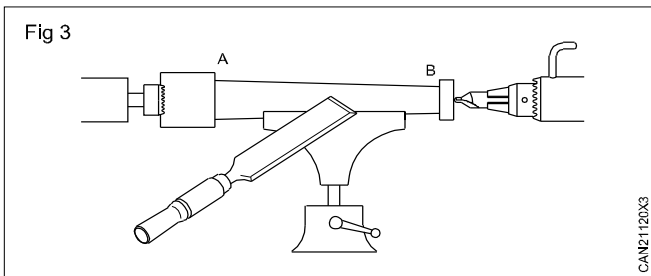
- Check the raw material size  $45 \times 45 \times 400$  mm.
- Fix the job between the centres
- Adjust the tool rest level with the centre of the job for turning.
- Set the tool rest 3 mm away from the job. Clamp the tool rest in proper position. (Fig 1)
- Revolve the stock by hand to check the tightness of the job and make sure that the stock has sufficient clearance with tool rest. (Fig 1)
- Set the spindle speed of the lathe at the lowest speed, then switch on the motor.
- Leave 65 mm on the left side and start turning.



- Place the gouge chisel on tool rest using left hand thumb over the gouge chisel blade and keep the right hand on the chisel handle.
- Move the gouge chisel parallel to the lathe axis carefully along the tool rest for turning. (Fig 2)
- Continue this operation using gouge chisel until the job becomes in cylindrical shape.



- On the turned cylindrical surface mark the length of taper 300 mm from left side.
- Reduce the dia of the job from left to right along its length 300 mm.
- Finish the taper surface using flat or skew chisel maintaining major dia 40 mm and minor dia 25 mm. (Fig3)



- Check the major dia 40 mm and minor dia 25 mm using outside caliper.
- Reduce the dia of waste portion of the job on right side to 365 mm.

## Skill sequence

### Sanding with sand paper

**Objective:** This shall help you to

- finish the job using sand paper.

#### **Sanding**

#### **Finishing the job using sand paper**

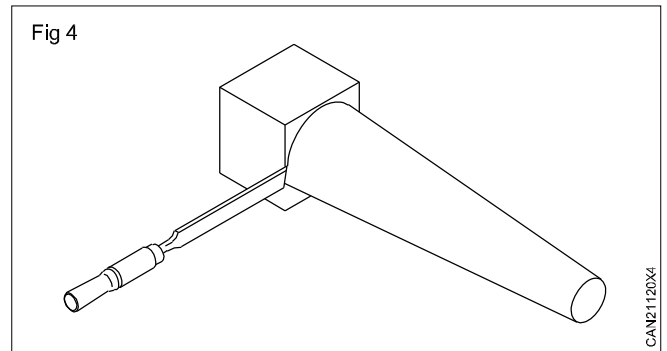
Remove the tool rest from the bed for sanding the job.

Take a bit of sand paper number 80 for rough sanding the job, switch on the machine.

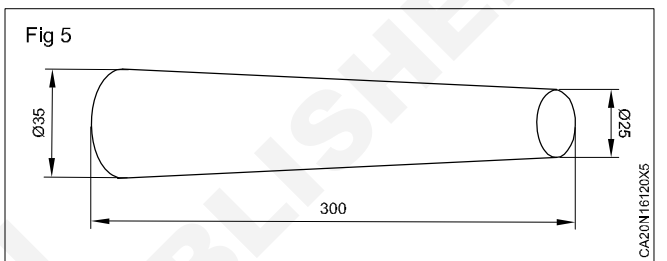
Hold the sand paper by hand and press along the grain of the job for rough sanding.

Take a bit of sand paper number 120 for smooth sanding the job.

- Reduce the dia of waste portion of job on left side.
- Chamfer the end of major dia and minor dia using skew chisel. (Fig 4)



- Sanding with sand paper No.80 and No.120.
- Finishing taper turning operation. (Fig 5)



Hold the sand paper by hand and press along the grain of the job for smooth surface.

Remove the job from lathe.

Cut off the waste portion of job on right and left side using tenon saw.

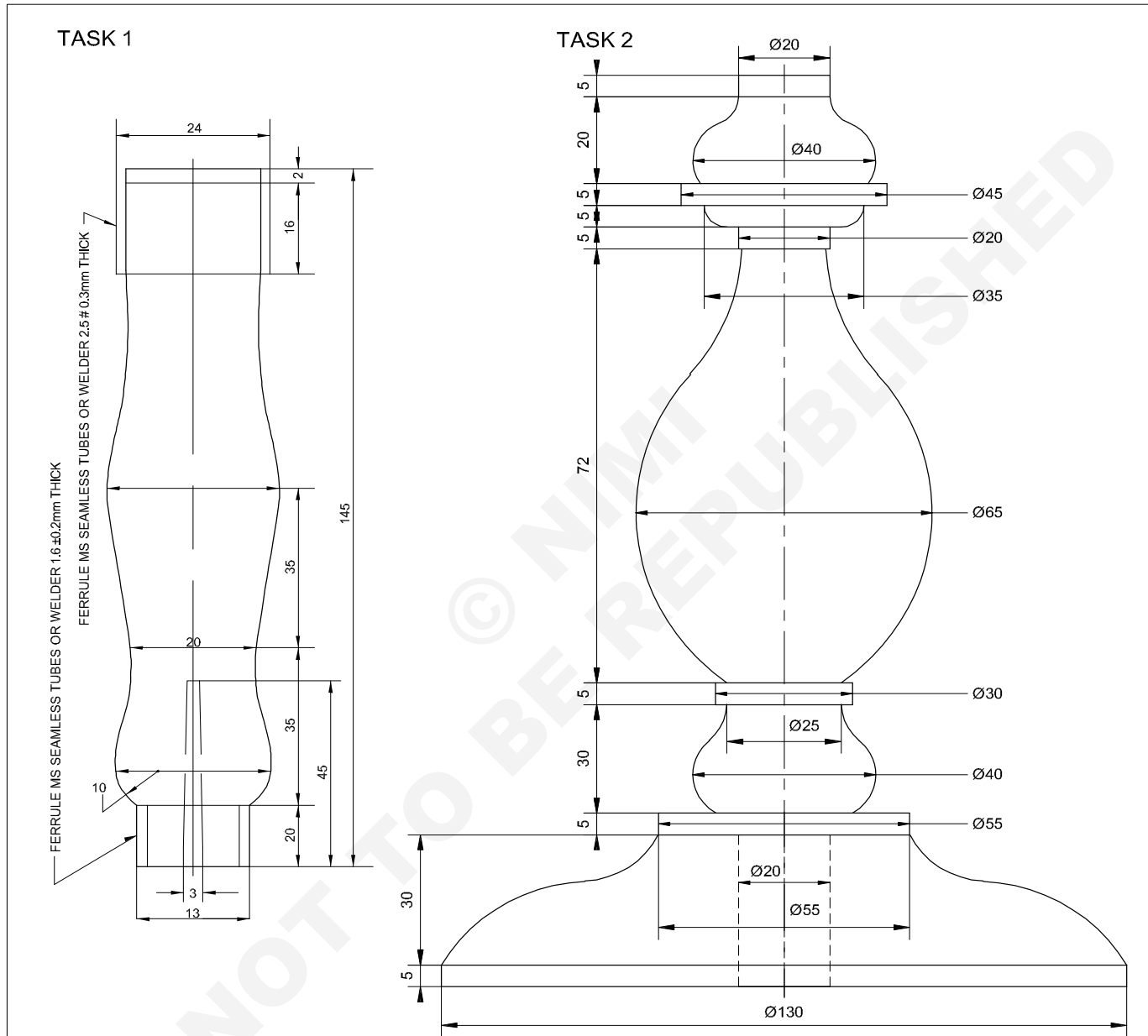
#### **Safety precautions**

**Wear goggles to protect your eyes when roughing out work.**

Make chisel handle, table lamp stand on wood turning lathe

Objectives: At the end of this exercise you shall be able to

- set the job between centers
- turn the chisel handle
- turn the table lamp stand top.



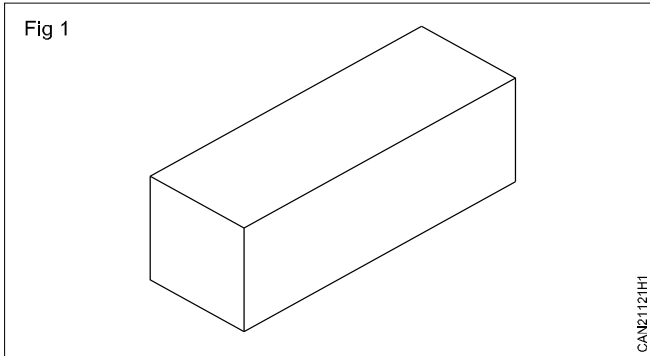
1	Ø140 x 45 mm		TEAK WOOD			
2	No: 80,120		SAND PAPER			
1	90 x 90 x 260 mm		TEAK WOOD			
1	50 x 50 x 200 mm	-	TEAK WOOD	-	-	1.6.121
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.

SCALE 1:1	<b>MAKE CHISEL HANDLE, TABLE LAMP STAND ON WOOD TURNING LATHE</b>	TOLERANCE ±0.1 mm	TIME 5h
		CODE NO. CA20N16121E1	

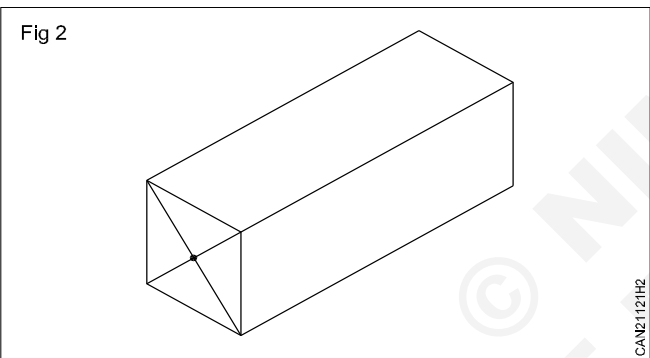
# Job Sequence

## TASK 1: Turn a chisel handle

- Check the material for the required size of 50 x 50 x 200: 1 No. with a folding rule.
- Plane the stock as per the given dimensions, using jack plane. (Fig 1)



- Draw the diagonals on both the ends of the stock to locate the centres, using try square and scriber. (Fig2)



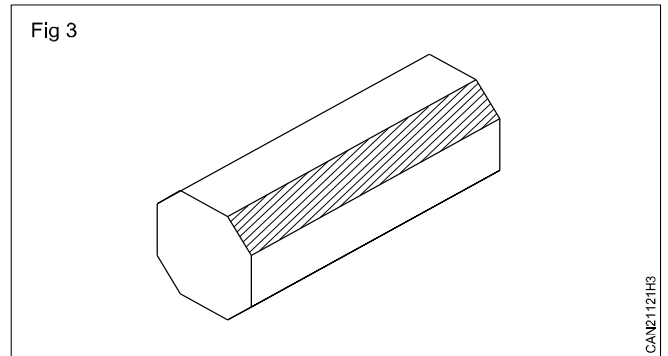
- Remove the roughly corners of the job. (Fig 3)
- Remove the live centre from the lathe.
- Drive the live center on one end of the diagonals of the stock and place it in the head stock spindle.

**Do not drive the stock on to the live centre, while it is in the lathe, because the blows will injure the bearings.**

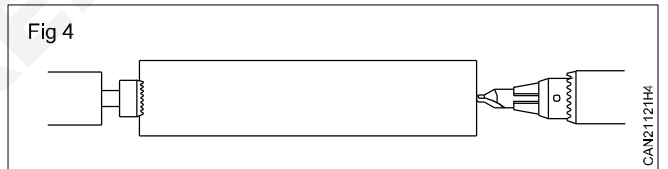
- Clamp the tail stock in position and turn its hand wheel so that the dead centre exerts pressure against the stock.
- Put a few drop of oil or apply the wax into the dead centre.
- Clamp the dead centre with the tail stock spindle clamp.

## TASK 2: Lamp stand top

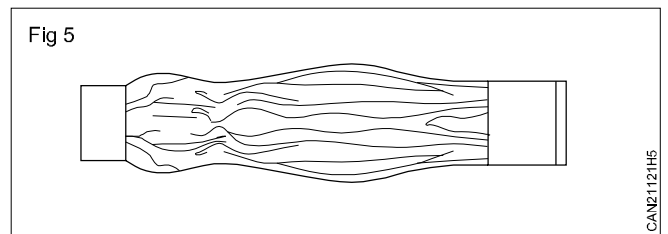
- Check the work piece for required size 90 x 90 x 260 1No. Using steel rule



- Adjust the tool rest to the height of the centre and 3mm away from the stock.
- Check the set up once again and switch on the lathe.
- Use the gouge chisel for shaping as per drawing of stock.
- Roll the gouge towards the right and left till the stock is turned to the required shape.
- Switch off the machine to see if the stock is nearly in required shape and size.
- Make the concave surface using the round nose chisel as per the required shape and size and make the convex surface using the skew chisel as per the required shape and size (Fig 4).



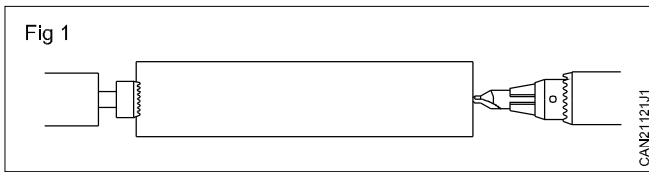
- Join both the surfaces using round nose chisel. (Fig 5) Finish the surfaces using flat chisel.
- Remove the tool rest from the lathe.
- Finish the chisel handle using sand paper.
- Remove the turned chisel handle from the lathe. (Fig 5)



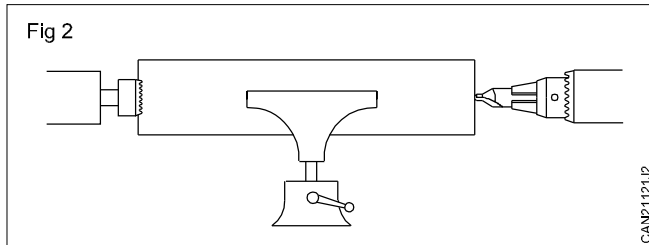
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- Mark the centres on both ends of the job. Make a shallow saw cut on one end and punch a small hole on the other end of the job.

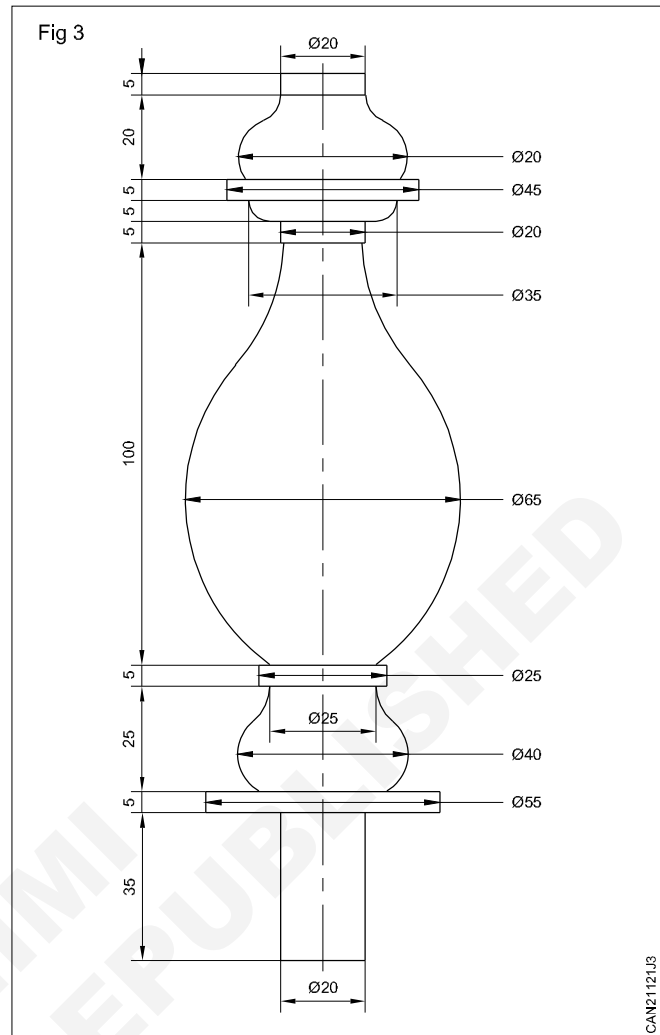
- Remove the roughly corners of the job.
- Set the job firmly between centres (Live centre and dead centre) (Fig 1)



- Set the tool post near to the job. (Fig 2)



- Grease or wax the point of dead centre.
- Set the tool rest 3mm below the centre and close to the job as far as possible for rough turning.
- Set the machine for slow speed to make rough cut.
- Switch on the machine. Turn the job from square to round using gouge chisel through out its length from left to right leaving some portion for finishing.
- Increase the speed for smooth turning. Read just the tool-rest near to the job for smooth turning. Finish the job to the required dimension, using the flat, skew chisel.
- Mark the dimensions on the job as per drawing using skew chisel. (Fig 3)
- Form convex surface as per dimensions using skew chisel. (Fig 3)
- Form the concave surface as per dimensions using round nose chisel. Fig 3)
- Form the beads and steps using flat or skew chisel. (Fig 3)
- Make the tenon with 35 mm length and 20 mm dia using flat chisel. (Fig 3)



- Check the diameter of the job using outside caliper.
- Remove the tool rest from the lathe.
- Check the diameter of the job using outside caliper.
- Finish the job using sand paper.No.80 and No.120.
- Make a deep cut on waste portion of the job using parting chisel.
- Remove the job from lathe.
- Separate the waste portion using tenon saw.

## Skill sequence

### Turning concave and convex surface

**Objective:** This shall help you to

- turn concave and convex surface on the job.

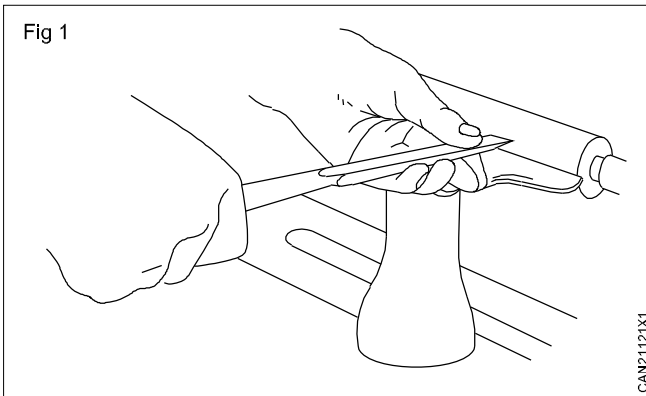
#### Concave and convex turning

Clamp the tool rest firmly in position.

Rotate the stock by hand to make sure that the clearance between stock and tool rest.

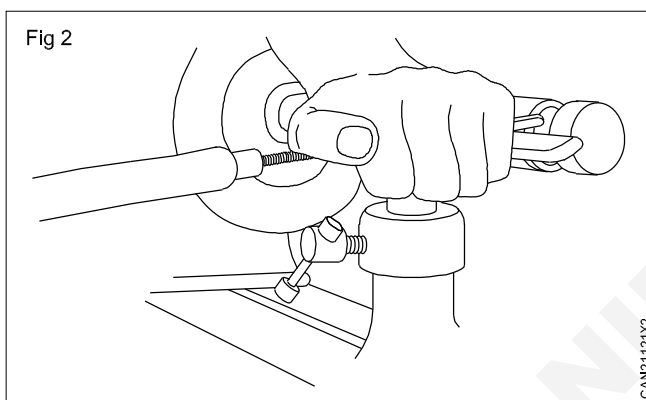
Check the set up once again and then switch on the machine.

Use the gouge chisel for rounding the stock. (Fig 1)



Hold the handle of the chisel with the right hand and the blade at a distance of 25mm from cutting edge with the left-hand. (Fig 1)

Have the palm of the left hand in contact with the tool rest to act as a guide for the tool. (Fig 2)



Roll the gouge little towards the right begin the cut from dead centre pushing the gouge towards right.

Make several cuts in the same direction until the stock becomes round.

Move the gouge towards the left and pull in to the right.

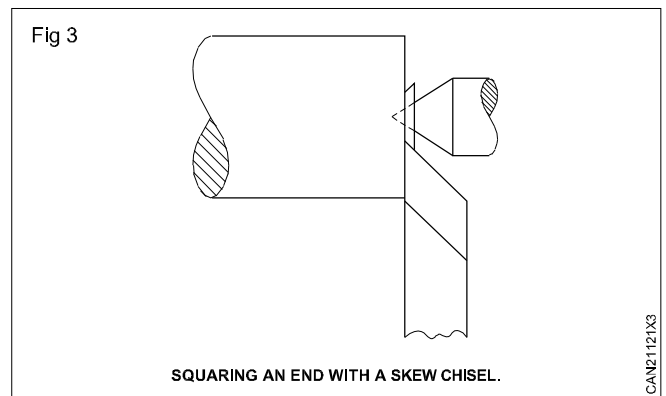
Move the tool from one end of the stock to the other until a uniform surface is produced.

Stop the lathe to see if the stock is fully round.

Move the tool rest closer to the work piece. Increase the speed for smooth turning.

Finish the stock with smooth surface using flat/skew chisel.

Square the end of the stock on the dead centre using parting or skew chisel. (Fig 3)



SQUARING AN END WITH A SKEW CHISEL.

Mark all dimension and the total length of the stock from squared surface as per drawing using skew chisel.

Form the different shoulder cuts according to the dimensions given in the drawing using parting chisel.

Hold the chisel perfectly flat on the tool rest, start concave cutting with centre of the bevel and move the chisel gradually work down at the bottom of the cuts using round nose chisel.

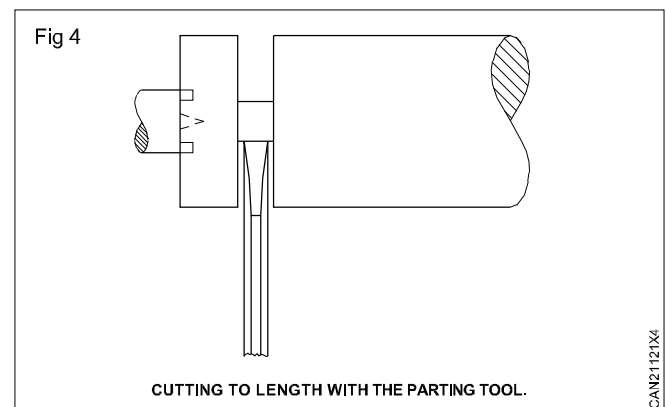
Hold the chisel perfectly flat on the tool rest start the convex cuts from the middle of the stock and by the tip of chisel cutting down using skew chisel to right and left side and join the surfaces together to finish the stock using round nose chisel.

Turn all the beads using a skew chisel.

Reduce the dimension of tenon using round nose chisel.

Finish the tenon surface using flat chisel as per drawing.

Make a deep cut on waste portion the stock using parting chisel. (Fig 4)

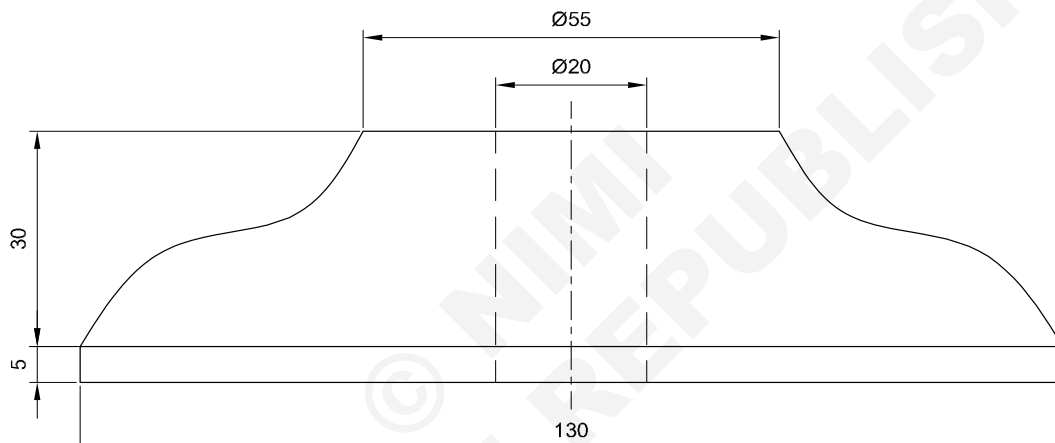


CUTTING TO LENGTH WITH THE PARTING TOOL.

Internal turning operation for lamp stand base using face plate and lamp stand assembling

Objectives: At the end of this exercise you shall be able to

- fix the job on face plate
- do internal turn the job on face plate.



Note: It is lamp stand top is available in Ex.No.2.1.121

NOTE: IT IS LAMP STAND TOP IS AVAILABLE IN EX NO: 1-6-121

1	50 mm		WIRE NAIL			
1	150 cm		WHITE COTTON CLOTH			
1	100 ml		FRENCH POLISH			
1	NO: 100 and 120		SAND PAPER			
1	50 gms		FEVI-COIL	2	2	1.6.122
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>INTERNAL TURNING OPERATION FOR LAMP STAND BASE USING FACE PLATE AND LAMP STAND ASSEMBLING</b>			TOLERANCE $\pm 2.0$ mm	TIME 3h
					CODE NO. CA20N16122E1	

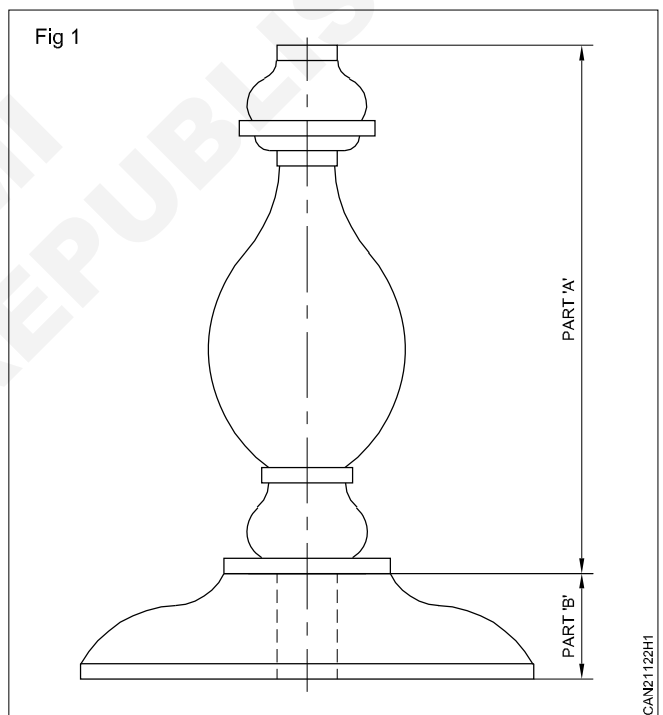


## Job Sequence

- Check the work piece for required size of dia 140 x 145 – 1 No.
- Plane the face side of the stock flat and smooth to fix with the face plate.
- Mark the centre on both sides of the stock.
- Set the wing compass for 75 mm radius and draw the circle on the stock little larger than the finished dimension. (R.65 mm)
- Cut the stock on band saw machine leaving turning allowance.
- Place the face plate on the stock (on planed surface) and fasten it with screws.
- Mount the face plate on the lathe spindle (live spindle until it is tight against shoulder).
- Place the tool rest parallel to be turned and little below the centre.
- Turn the stock to the required thickness using round.. nose chisel and skew chisel.
- Mark the dimensions on the job using divider and steel rule.
- Form the internal surface for concave and convex surface using round nose chisel and skew chisel.
- Switch off the machine and check their measurements.
- Remove the tool rest from the bed.
- Fix the drill chuck with  $\phi 20$  mm drill bit on tail stock spindle.
- Adjust the tail stock near to the stock and clamp it using bolt and nut on the lathe bed.
- Switch on the machine.
- Move the drill bit (tail stock) slowly even pressure using adjustment hand wheel to get through hole in the stock.
- Switch off the machine.
- Remove the drill chuck from tail stock spindle.
- Keep the tail stock away from head stock for sanding.
- Finish the job using sand paper.

## **Assembling**

- Apply fevicol lamp stand tenon surface and lamp stand base drill surface using the brush.
- Assemble both pieces together using wire rail.
- Fix the lamp stand between centres.
- Switch on the machine.
- Same the lamp stand using sand paper No.100 and 120.
- Apply polish all over the surface of the lamp stand.
- Allow the stock polish to dry.
- Apply a thin coat of polish using cotton pad and allow it to dry.
- Switch off the machine.
- Remove the polished lamp stand from lathe. (Fig 1)



## Skill sequence

### **Setting the job on face plate**

**Objective:** This shall help you to

- **fix the job on face plate.**

#### **Fixing the top on face plate**

Check the work piece for the required size of dia 140 x 45mm.

Plane the face side of the stock flat and smooth to fix with the face plate.

Mark the centre on both sides of the stock.

Draw a circle  $\phi 140$  mm on the stock (little larger than the finished size) dimension of  $\phi 130$  mm using wing compass. Size the stock using band saw machine leaving turning allowance.

Mark a circle equal to the diameter of the face plate on the centre of the job to centre the face plate accurately.

Place the face plate on the marked circle, fasten it with screws.

Mount the face plate on the lathe spindle (live centre) until it is tight against shoulder.

Place a leather or cardboard washer on the live spindle to prevent the face plate from jamming against the shoulder of the live spindle.

## Turning the lamps stand face on face plate

**Objective:** This shall help you to

- turn the job on face plate.

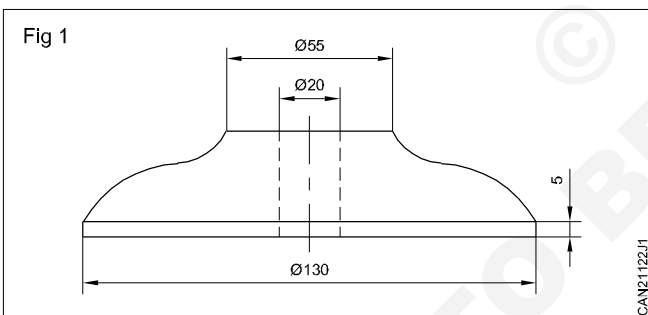
Place the tool parallel to the disc to be turned a little below this centre.

Hold the round nose chisel perfectly flat on the tool rest and start turning from the centre of the stock and move the chisel slowly with even pressure towards the left end of the stock.

Reduce the thickness leaving finishing allowance using round nose chisel.

Adjust the tool rest near to the stock.

Hold the skew chisel perfectly flat on the tool rest and start turning from the centre of the stock, and move the chisel slowly with even pressure towards the left end of the stock and finish the required thickness of the stock 35mm. (Fig 1)



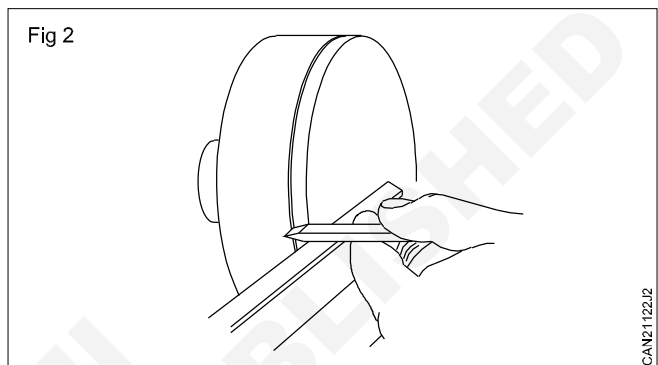
Switch off the machine. Check the thickness using steel rule.

Test the flatness of surface using try square. (Fig 2)

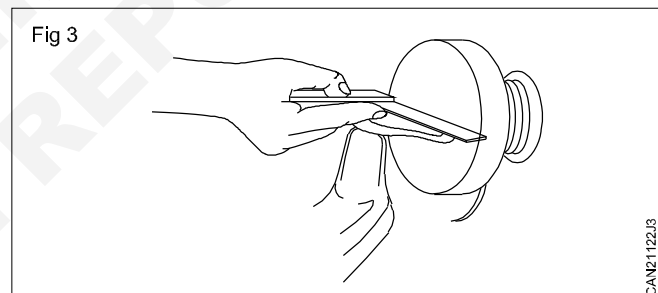
Switch on the machine. Set the wing compass for 65mm (Radius).

Switch on the machine. Place the wing compass one leg at centre of the stock, the other leg on the tool rest, and gradually bring its point in contact with the revolving stock.

Hold the skew chisel perfectly flat on the tool rest and and at right angles to the stock.



Take several light cuts gradually and finish the required size (dia) using skew chisel. (Fig 3)



Switch off the machine. Check the required diameter of the stock using outside calliper.

Set the wing compass 27.5 mm (Radius) and draw a circle on the stock.

Switch on the machine. Hold the round nose chisel perfectly flat on the tool rest start concave cutting on the face side of job and move the chisel gradually down at the bottom of the stock.

Hold the skew chisel start convex cuts from the bottom of the stock and join the concave and convex surface using round nose chisel.

Remove the tool rest from the bed.

Finish the job using sand paper.

## Lamp stand assemble

**Objective:** This shall help you to

- **assemble the job together.**

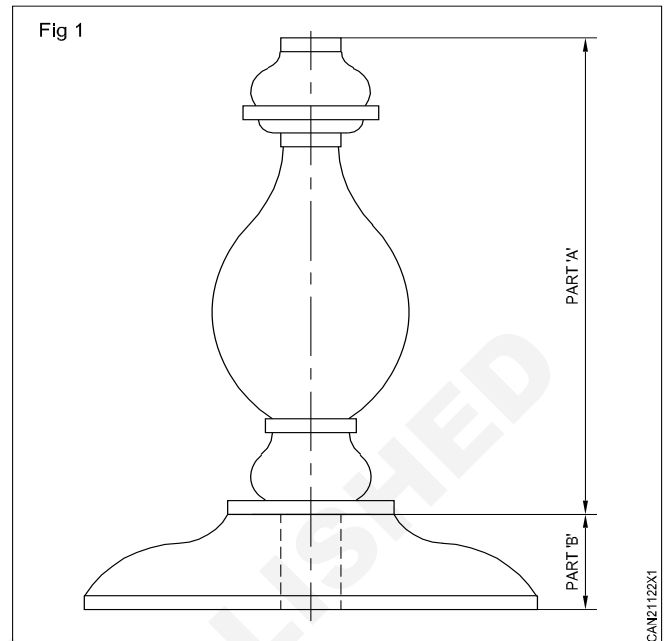
### Assembling

Apply glue on both surfaces of pin (tenon) and drilled hole (mortise) of lamp stand using the brush.(Fig1)  
Set the top piece with base piece by pressing down.

Nail both the pieces together using 50mm wire nail form bottom of the lamp stand. (Fig 1)

Check the vertical position of the assembled lamp stand using plumb bob.

Allow the glued surface to become hardened.



## Polishing on lamp stand

**Objective:** This shall help you to

- **finish the job with polish.**

### Polishing

Fix the lamp stand between centres.

Move the tool rest outwards from the lathe, switch on the machine.

Begin sanding with No: 100 for rough sanding.

Move the sand paper quickly with even pressure all over the surface while the stock is revolving.

For beads and shoulders use a narrow strip of sand paper held between the thumb and fore fingers with both hands.

Do not leave any scratches on the surface of the job.

Continue this sanding procedure with No: 120 sand paper until the surface of lamp stand to become very smooth and free from scratches.

Apply stain all over the surface and allow it to dry.

Run the lathe for a short while to dry the stain more rapidly.

Rub the stained surface lightly with a ball of wool.

Apply a thin coat of thin polish using a cotton pad and allow it to dry.

Rub a few drops of oil on the turned stock for uniform distribution of polish throughout the surface.

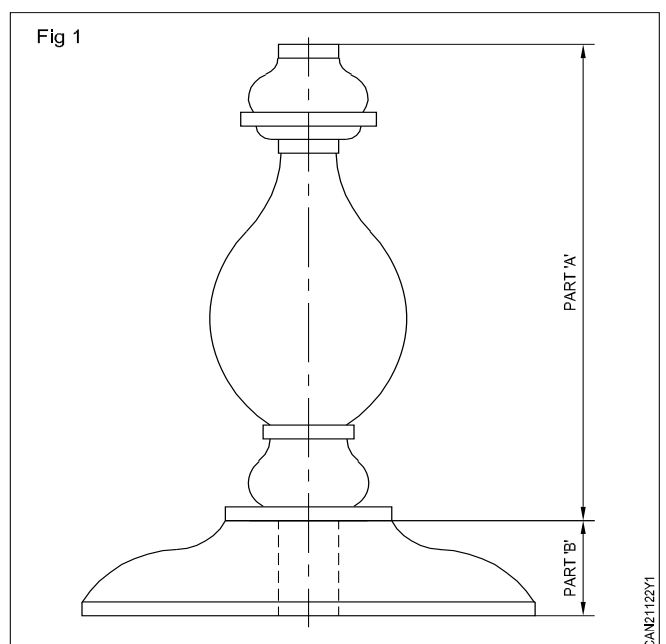
Run the lathe at its lowest speed, hold the ends of the pad firmly with both hands and move it slowly and continuously with even pressure on all over the surface of the lamp stand.

Allow the stock to dry.

**To keep the pad moist and soft, apply a little alcohol on it and keep it in a tight fitting lid. After each successive coat add a little more alcohol to the mixture.**

Increase the drying time between successive coatings.

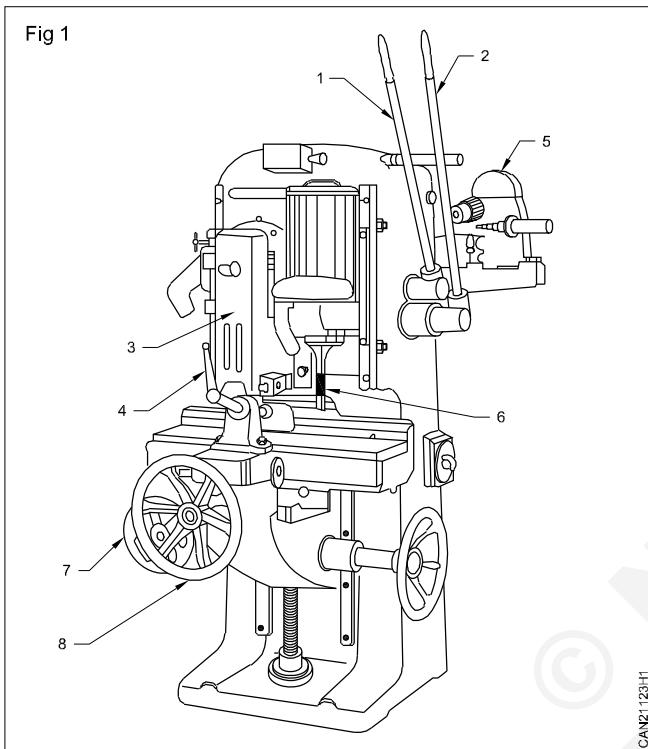
Continue the same procedure until to get glossy surface of the stock. (Fig 1)



**Demonstrate working of mortise machine parts, operational techniques and safety precaution**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate the mortise machine parts
- demonstrate the mortise machine operational techniques
- demonstrate mortise machine safety precautions.



**Job Sequence**

Instructor shall display and demonstrate the mortising machine for chain and chisel mortise brief the parts names, operational techniques and safety precautions to followed by students.

- Trainees will note down all the parts name of machines and their operational techniques and safety precautions.
- Record it in table 1.
- Get it checked by the instructor.

**Table 1**

**Identification of mortise machine parts name (Fig 1)**

Parts No.	Name of Parts	Remarks
1		
2		
3		
4		
5		
6		
7		
8		

## Skill sequence

### Tenoning machine operational techniques and safety precautions

**Objective:** This shall help you to

- **operational techniques and safety precautions while working tenoning machine.**

#### Tenoning machine

SI.No.	Operational Techniques	Safety Precautions
1	Tenoning	<ul style="list-style-type: none"><li>• Wear safety gloves</li><li>• Switch off to make any adjustments</li><li>• Switch off and disconnect power when fitting cutters or attachments</li><li>• Use sharp cutters they work better</li><li>• Last longer and reduce motor load</li><li>• To avoid over loading the motor cut wide tenon</li></ul>
2	Rebating	<ul style="list-style-type: none"><li>• Cutters properly set in the cutter block</li><li>• Move the work evenly</li><li>• Never bend down to lock into tenoning while it is running</li><li>• Make sure the guard is in place and tight</li></ul>

### Mortise machine operational techniques and safety precautions

**Objective:** This shall help you to

- **operational techniques and safety precautions while working, mortise machine.**

SI.No.	Operational Techniques	Safety Precautions
1	Mortising	<ul style="list-style-type: none"><li>• Wear safety gloves</li><li>• Make all adjustments with the power off</li><li>• Adjust the auger bit so that it extends 1/16" to 1/8" beyond the end of the chisel</li><li>• If you are attempting to chisel completely through the stock, place a wood pad beneath the stock so the chisel will not damage the table</li><li>• Do not use this machine unless you have been trained in its safe use and operation</li></ul>
2	Grooving	<ul style="list-style-type: none"><li>• Secure guards over chains</li><li>• Only use handles provided to control tools</li><li>• Timber must be securely clamped</li><li>• Keep the area around mortises clear of slip and trip hazards</li><li>• Lock out all power supplies before maintenance and cleaning</li></ul>

## Adjustable along with feed and job holding by mortise machine

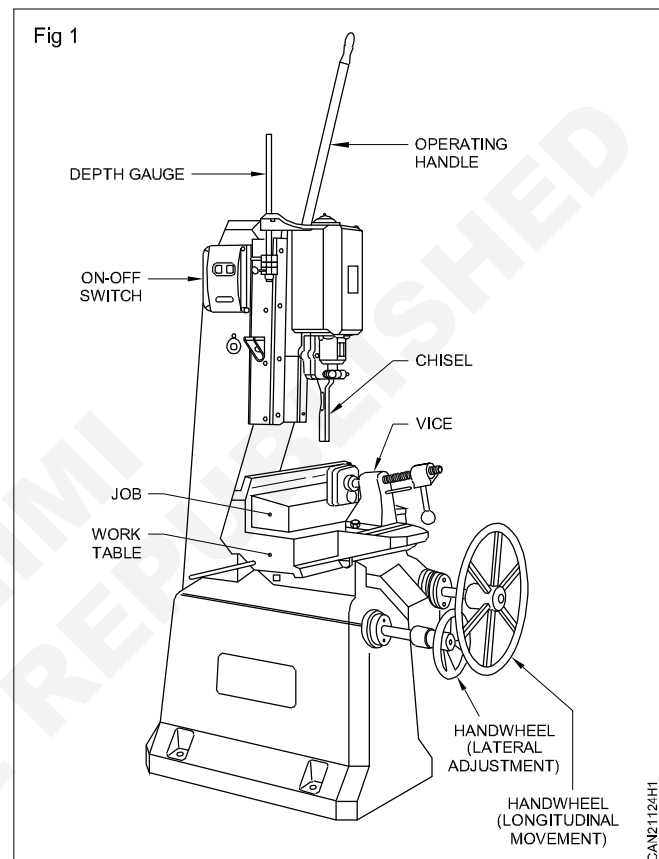
**Objective:** At the end of this exercise you shall be able to

- hold the job on the mortise machine table.

### Job Sequence

#### Holding the job on the table of the machine.

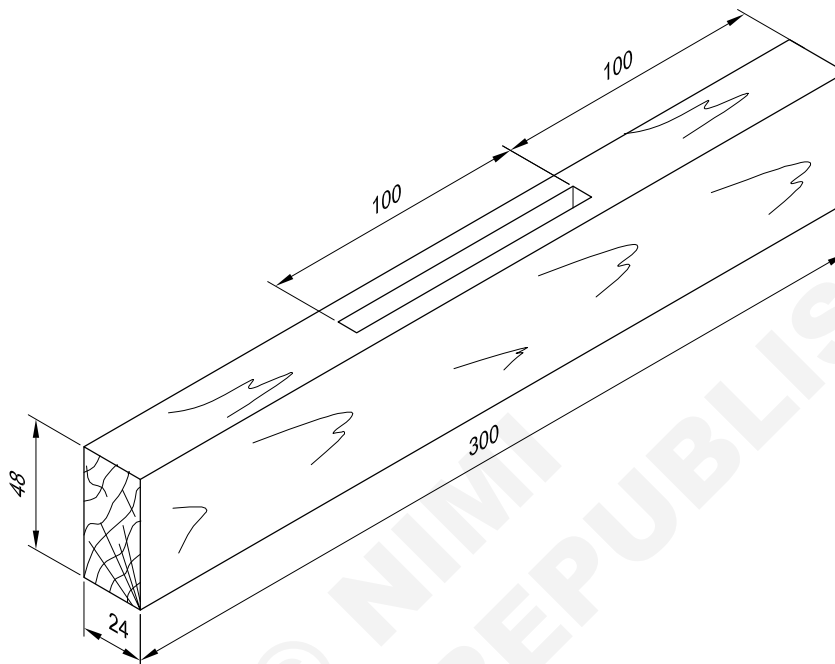
- Place the job on the table against the fence for mortising.
- Set the job in correct position on the table vice to form the mortise. (Fig 1)
- Set the chisel exactly parallel with the mortise gauge lines.
- Clamp the job properly to the table vice against the fence to make the mortise.
- Set the depth gauge required depth of mortise. (Fig 1)
- Select the chisel and auger bit to make mortise.
- Adjust table along with feed using hand wheel.



### Mortising operation on chisel mortiser

Objectives: At the end of this exercise you shall be able to

- mark the mortise on the job
- set the hollow mortise chisel
- make the mortise on the job.



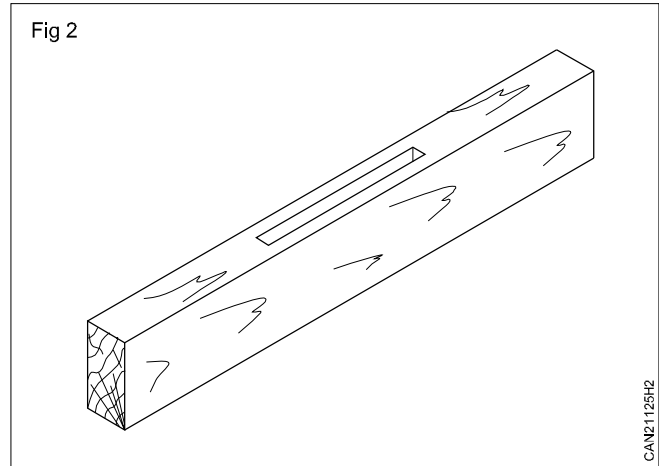
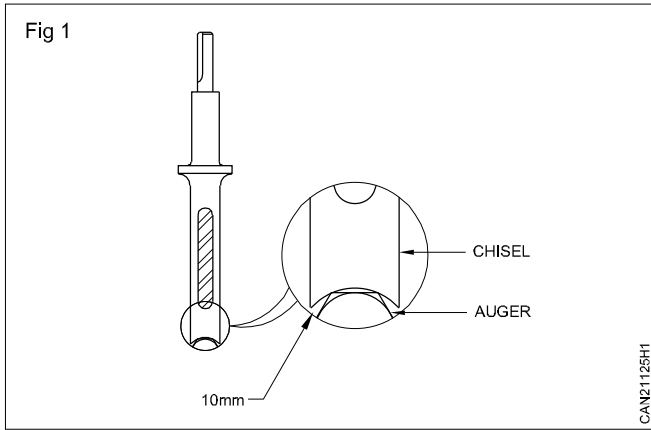
#### Job Sequence

- Check the raw material box 300 x 50 x 25 mm - 1 No.
- Plane the job to required size of 300 x 48 x 24 mm.
- Mark the mortise on the job face edge using mortise gauge try square and steel rule as per drawing.
- Select the 7 mm auger bit and 10 mm hollow chisel to set on the machine for mortise. (Fig 1)
- Set the hollow mortise chisel on chisel head of the mortising machine and set 48 mm depth using adjustment depth gauge.
- Set the job on table of the machine of vice at the required position for mortising.
- Switch on the machine.
- Press the chisel head using operating handle on one end of the mortise.
- Lift the chisel and move the job for some distance according to the width of the chisel
- Press the chisel head to make the mortise
- Continue the procedure to obtain the required width and depth of mortise
- Finish the mortise operation.
- Switch OFF the machine.

**Do not give excess feed.**

- Remove the job from machine table. (Fig 2)

1	300 x 50 x 25 mm		HARD WOOD			1.6.122
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>MORTISING ON CHISEL MORTISE MACHINE</b>				TOLERANCE ±2.0 mm	TIME 5h
					CODE NO. CA20N16122E1	



## Skill sequence

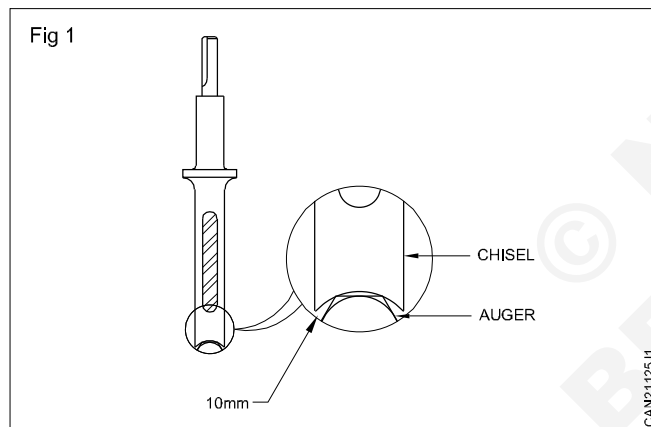
### Setting of hollow mortise chisel

**Objective:** This shall help you to

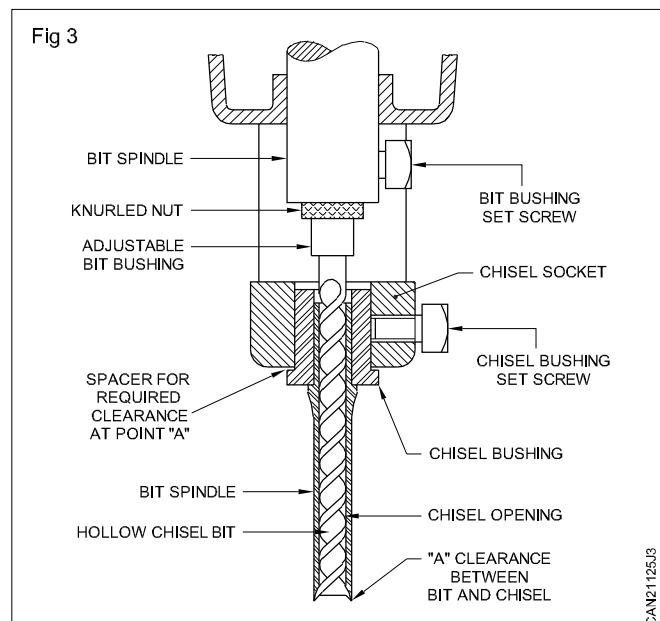
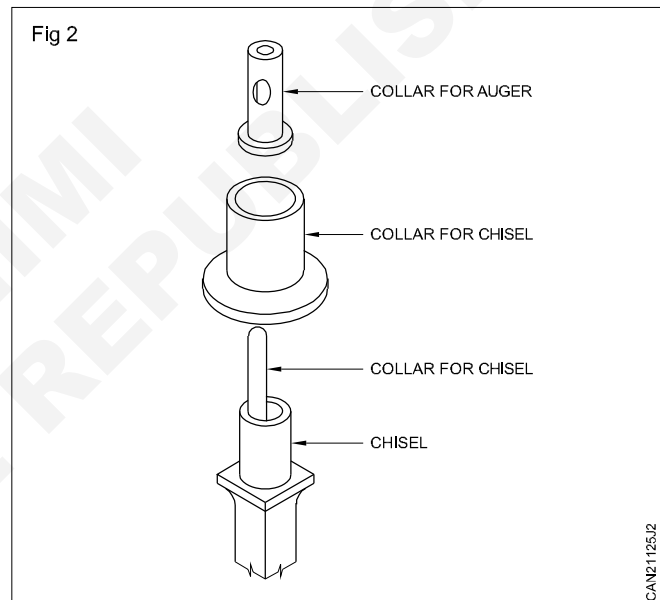
- set the hollow mortise chisel.

#### Setting the hollow mortise chisel

- Select 7 mm auger bit and 10 mm hollow mortise chisel for mortising as per drawing. (Fig 1)



- Set the auger bit in hollow mortise chisel by pushing them together by hand.
- Bush the chisel in the respective collars. (Fig 2)
- Place the collars on spindle of the mortising machine. Tight the collar on spindle the machine using set screw.
- Set the depth gauge to 48 mm.
- Check depth of the mortise, on a waste piece of wood. (Fig 3)

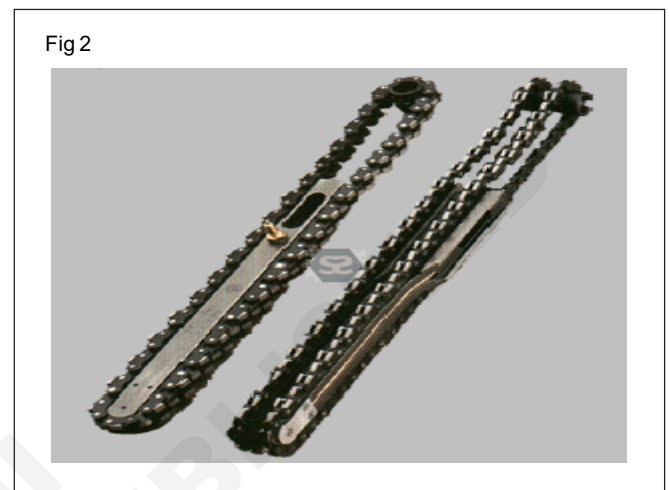
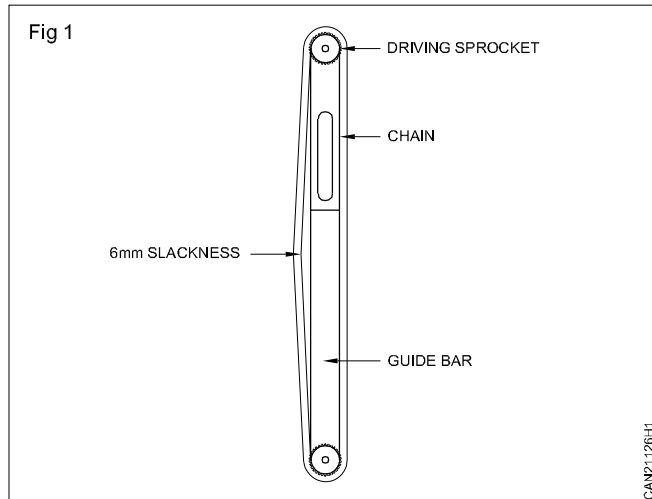




## Remove and refit of chain & sprocket wheel with the machine

**Objectives:** At the end of this exercise you shall be able to

- **remove chain for sprocket wheel**
- **refit the chain for sprocket wheel**
- **set the sprocket wheel on machine.**



## Job Sequence

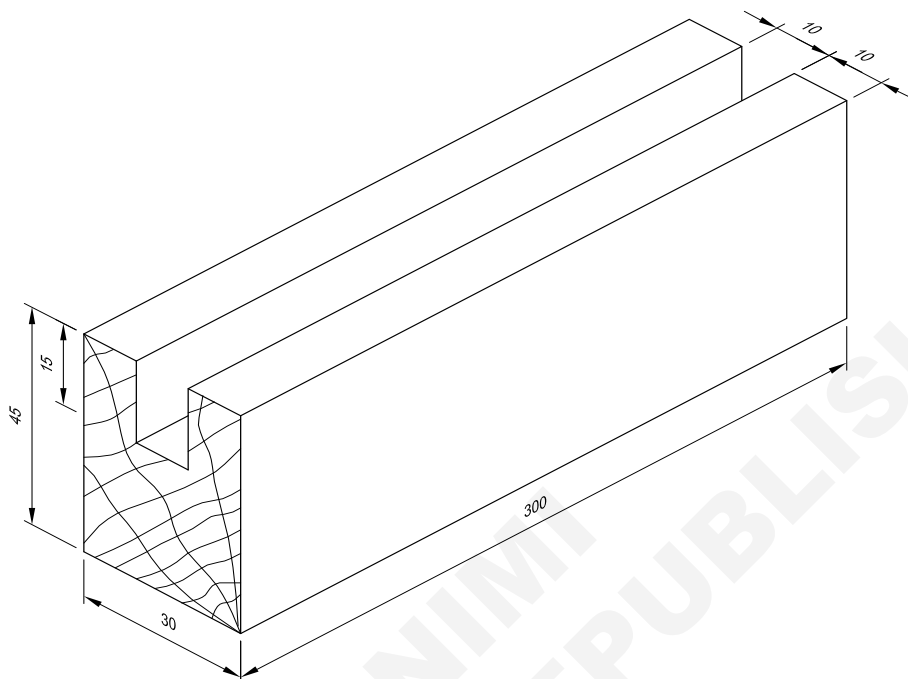
- Loosen the fitted nuts of the sprocket wheel and guide bar using spanner.
- Dismantle chain assembly and sprocket wheel out of the machine.
- Clean it, using brush.
- Remove chain from sprocket wheel assembly by adjusting guide bar.
- Sharpen chain teeth if required.
- Re-assemble the chain to the sprocket wheel.
- Tight the chain by adjusting guide.
- Chain must revolve so that the cutting edges descent into the work.
- Use only the sprocket wheel and guide bar for the mortise required.
- Keep the chain adjusted 80 mm that it can be pulled away up to 6mm (Slackness) To attain correct tension.
- Fix assembling to the machine by means of nuts using spanner.
- Oiling is done whenever required.

**Do not over fight the chain**

**Fix the chain 80 mm that cutting edges descent the work.**

**Make groove of the face edge by mortise machine**

**Objective:** At the end of this exercise you shall be able to  
 • mark and make a groove on the face edge.

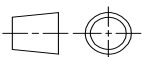


**Job Sequence**

- Check the raw material size 50 x 35 x 300 mm - 1 No.
- Plane the material to the required size as per drawing 45 x 30 x 200 mm.
- Mark the groove on face edge as per dimensions on the job.
- Set the work piece on the work table of the machine at the required position for grooving help vice properly.
- Select and fix the chain pitch 22 mm for large depth 6 mm to 22 mm wide and 38 mm to 75 mm long.
- Table is adjusted 20 mm that the chain is just over the marked lines.
- Switch on the machine.
- Press the operating lever downwards gently to start cutting groove.
- Move the job for some distance. According to the length hand wheel properly.
- Continue this procedure to obtain the required width and length of groove.
- To correct the depth, set the depth gauge to the required depth.
- To finish bottom of groove a finish cut is made through out the length.
- Switch off the machine.
- Remove the job and clean the machine properly.

**Do not give excess feed.  
Lubricate chain assembly frequently.**

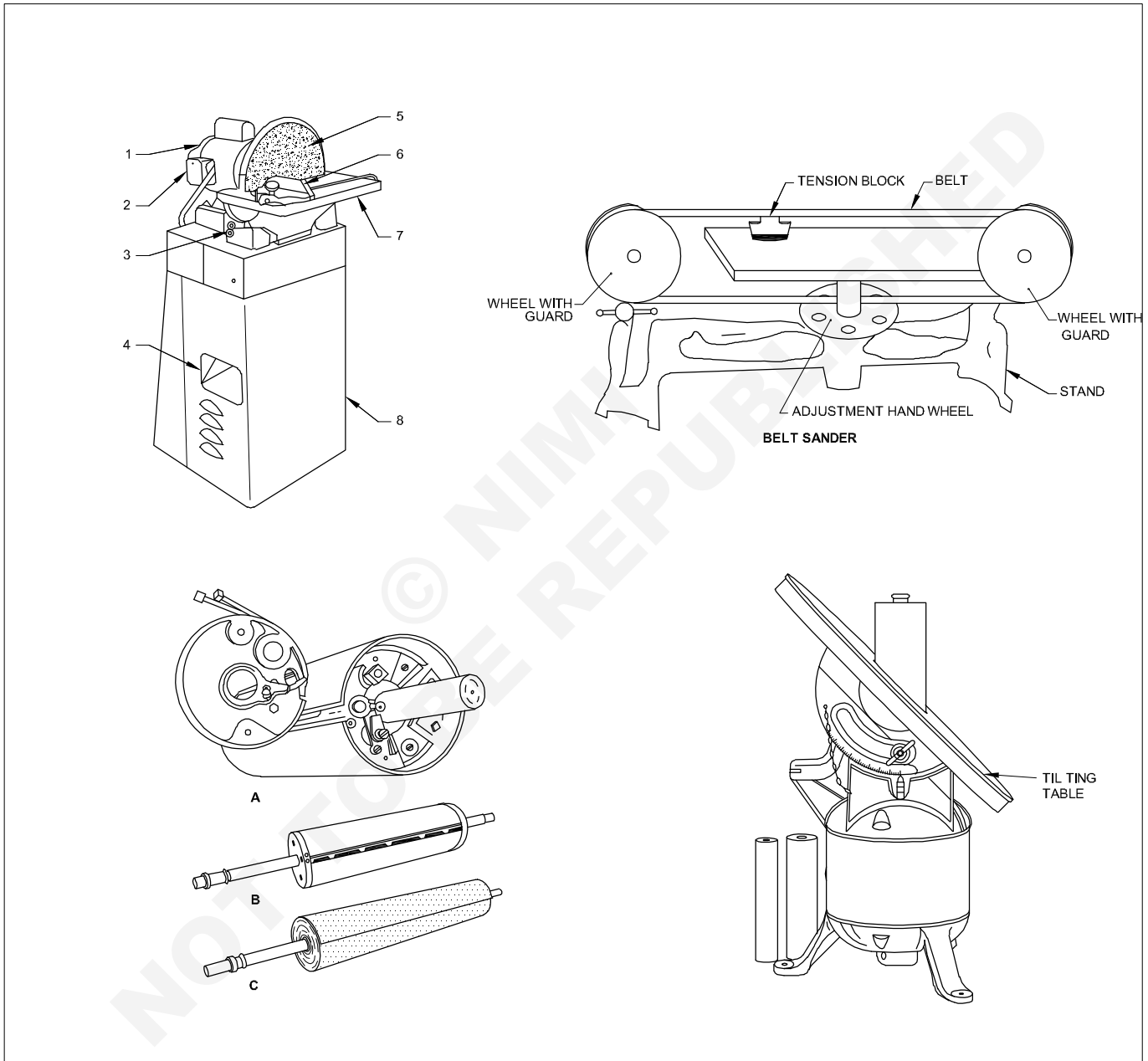
- Finishing the grooving as per drawing

1	50 x 35 x 300 mm		SOFT WOOD			1.6.127
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>MAKE A GROOVE ON THE FACE EDGE OF THE JOB BY MORTISE MACHINE</b>				TOLERANCE ±2.0 mm	TIME 6h
					CODE NO. CA20N16127E1	

**Demonstrate the different sanding machine its parts, operational techniques and safety precaution**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate the different sanding machines parts and their operational techniques
- demonstrate the safety precaution to the followed while working sanding machine.



1	-		-			1.6.128
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>DEMONSTRATE WORKING OF DIFFERENT TYPES SANDING MACHINE PARTS AND THEIR OPERATIONAL TECHNIQUES AND SAFETY PRECAUTION</b>				TOLERANCE $\pm 2.0$ mm	TIME 10hrs
					CODE NO. CAN16128E1	

## Job Sequence

**Instructor shall display and demonstrate the different type sanding machine along with parts, operational techniques and safety precaution to followed the student.**

- Trainees will note down all the parts name, different types sanding machine name and their operational techniques with safety precaution.
- Record it in table 1 and 2.
- Get it checked by the instructor.

**Table 1**

**Identification of parts name**

Fig No. 1	Name of parts
1	
2	
3	
4	
5	
6	
7	
8	

**Table 2**

**Identification of sanding machine name**

Fig. No. 1	Name of machine
1	
2	
3	
4	

## Skill sequence

### **Sanding machine operational techniques and safety precaution**

**Objectives:** This shall help you to

- **different types of sanding operation**
- **sanding machine safety.**

#### **Sanding operation technique**

Edge sanding (Straight and convex)

Horizontal sanding

Vertical sanding

Irregular sanding

Flat sanding

#### **Safety precautions**

Do not sand work that has excess glue or nailed surface.

Wear goggles or eye shield

Do not sand small piece, they may become trapped between the disc and table

Be sure that the belt or disk is correctly mounted.

The belt must be tracked in the centre of the drums and plates.

Use personal protective using meets live, safety goggles, hand gloves and safety mask while sanding.

Do not operate the disk sander if the abrasive paper is in loose condition.

Check the guards and table adjustment are in the correct position and securely locked in place.

Use the table, fence and guides to control the position of the work when ever possible.

When sanding the end grain of narrow pieces on the belt sander always support the work against the table.

Sand only on the side of the disk sander that is moving down towards the table.

Sand only clean new wood.

Move the work along the surface only.

## Sanding operation using sanding machine

**Objectives:** At the end of this exercise you shall be able to

- sand the convex surface with a disk sanding machine
- sand the edge surface with a belt sanding machine
- sand for irregular surface with a spindle sanding machine.

### Job Sequence

#### TASK 1: Convex sanding

- Check the wooden piece for its size 50 x 25 x 300 mm using folding rule.

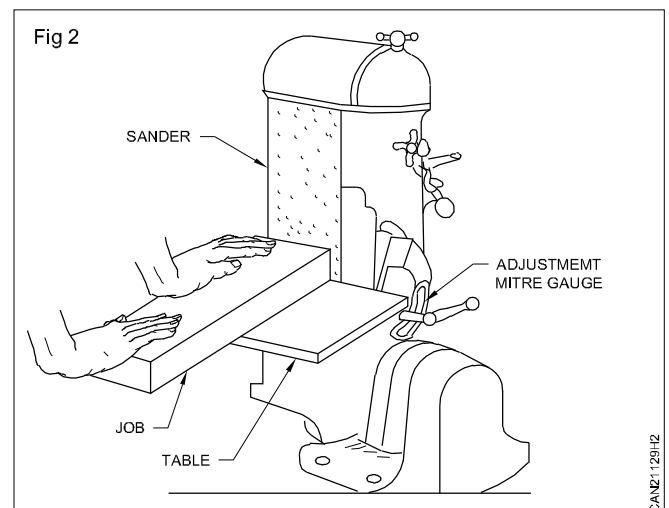


- Set the sanding disk in the machine.
- Switch on the machine.
- Work piece placed on the table and move towards revolving disc slowly. (Fig 1)
- Disc is covered with either garnet or aluminium oxide paper.
- When the work is in contact with the disc sanding starts.
- Sanding continued till the required are is a sanded well
- Switch off the machine and clean the machine.

**Mostly edge sanding is done on the table dia ranged from 250 mm to 600 mm**

#### TASK 2: Edge sanding

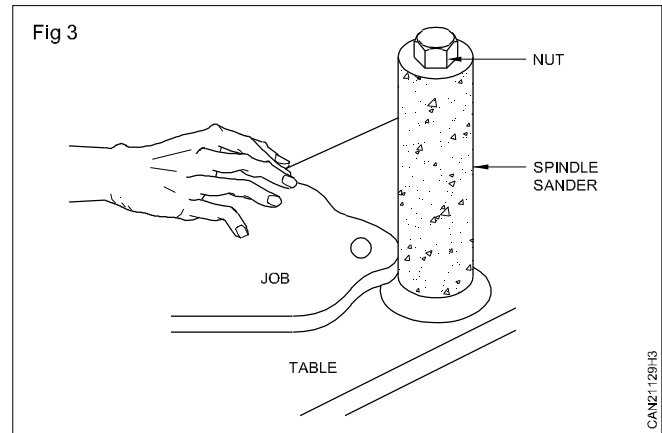
- Check the work piece size 75 x 25 x 300 mm.
- Switch on the machine.
- Place the work on table. (Fig 2)
- Towards the rotating push it sanding belt
- As the work proceeds the remaining sanding belt finish the sanding work
- Switch off the belt sanding machine and clean the machine with brush.
- Finish the edge sanding.



### TASK 3: Irregular shape curve sanding

- Check the work piece. Size 100 x 20 x 300 mm.
- Switch on the spindle sanding machine.
- Place the work is on table and all the irregular shape curves are sanding properly. (Fig 3)
- The table can be adjust at angle for 90°.
- Finish irregular shape sanding.
- Switch off the spindle sanding machine and clean the machine with brush.

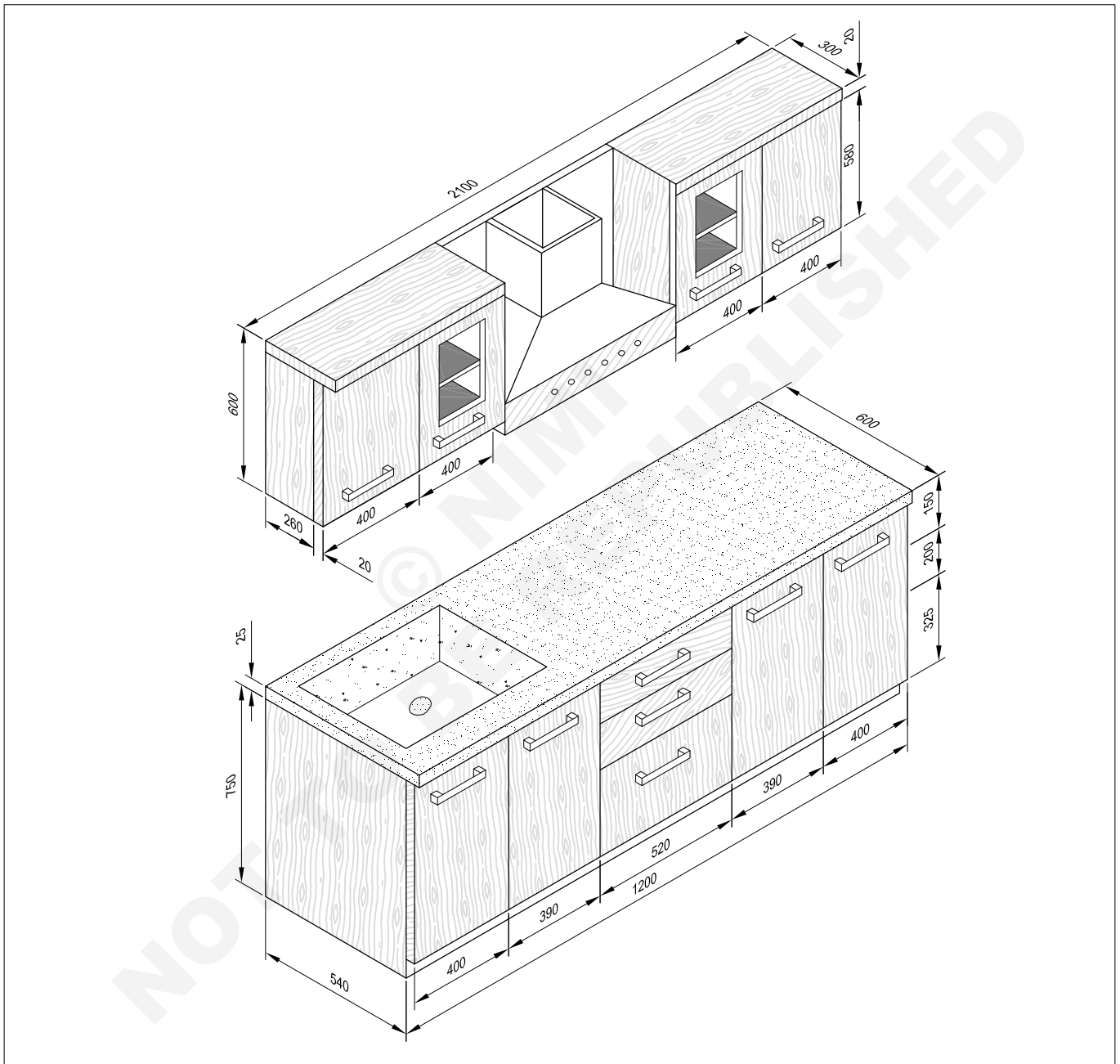
**Check the guards table adjustment are in correct position and securely locked in place.**



**Demonstrate the modular kitchen cabinet, operational technique and working safety precautions**

**Objective:** At the end of this exercise you shall be able to

- demonstrate the modular kitchen cabinet and their operational techniques
- demonstrate the safety precautions while working on modular kitchen cabinet



						1.7.130
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1					DEVIATIONS ± 0.1	
<p align="center"><b>DEMONSTRATE THE MODULAR KITCHEN CABINET</b></p>					TIME : 09 HRS	
					CODE NO. CA20N17130E1	

## Job Sequence

**Instructor may arrange a youtube video display or arrange for a site visit and demonstrate the modular kitchen cabinet, operational techniques and safety precautions to be followed by the trainees**

- Trainees will note down all the displayed operational techniques and safety precautions.
- Record it in your note book
- Get it checked by the instructor

### **Operational techniques and safety precautions**

SI No	Operational techniques	Safety precautions
1	Material selection	Do not use warped (or) twisted board Avoid knot split board Check the laying of sunmica on one side properly
2	Prepare the material (sawing)	Blade is properly fitted to the arbor in portable power saw Allow the saw to attain full speed before commencing of saw Switch off to make any adjustment
3	Assembling	Select proper drill speed according to material Ensure that all board is assembled properly Screw board on tightly by electric screwdriver
4	Baskets and cold rolled steel hinges	Check cabinet door are in position and secure Select prepare a suitable basket and hinges before fixing Assemble the baskets together to their respective fitment places
5	Granite laying	Check the granite size before laying Apply the aralidite for uniformity of thickness
6	Finishing	Check the sunmica dimensions before bonding Sunmica to be pasted dry board when applied fevicol (S.R) in dry condition Plane the excess sunmica carefully



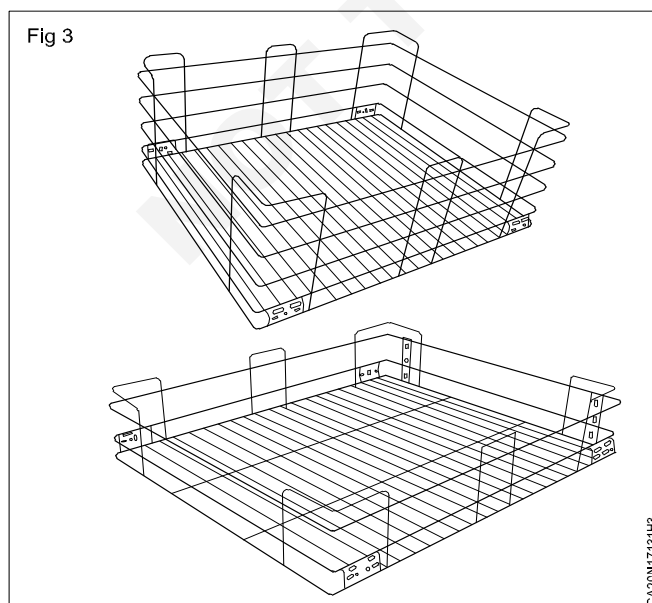
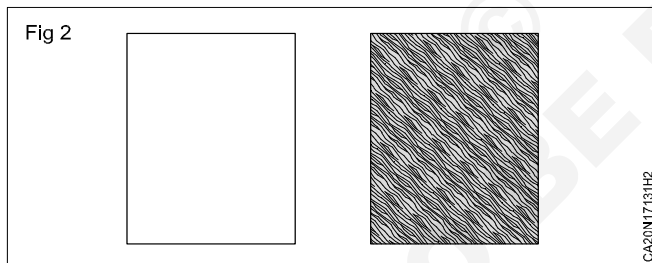
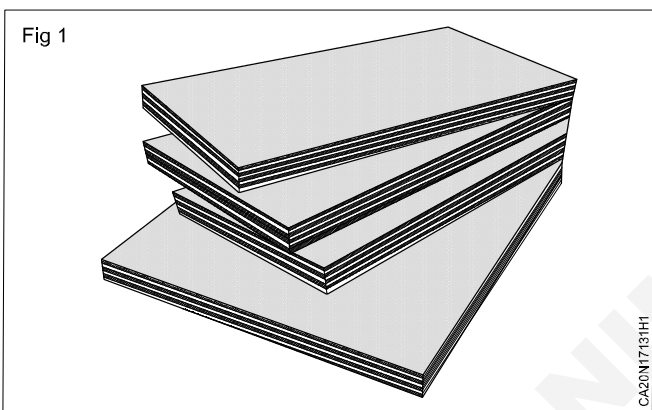
**Plan for making desired moduler kitchen cabinet**

**Objective:** At the end of this exercise you shall be able to

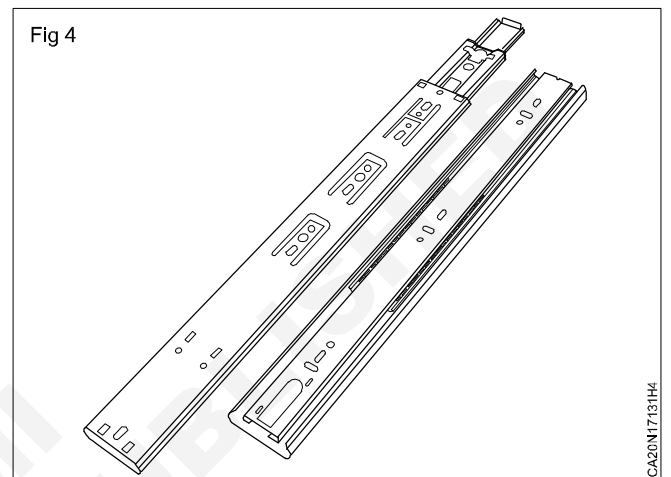
- **Determine the work by studying the drawing**

**Job Sequence**

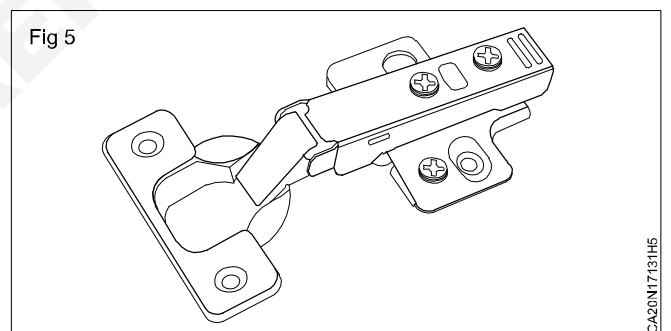
- For drawing refer Ex No 1.7.30
- Must have a good understanding of the details mentioned in the drawing
- Calculate the plywood required size (Fig 1)
- Determine the required sunmica for interior and exterior of cabinet (Fig 2)



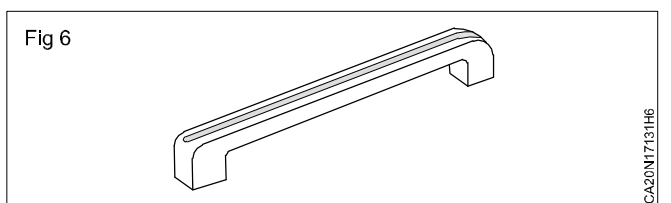
- Accurate calculation of cabinet basket (Fig 3) and sliding rail (Fig 4)



- Choose the appropriate shape and size of hinge to suit the cabinet (Fig 5)

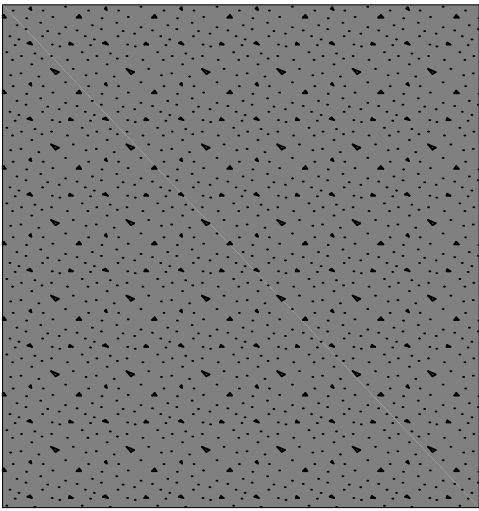


- Cut the plywood to size according to number given
- Choose the suitable handle for the cabinet (Fig 6)



- Determine the best suited side before firing the hinges
- Similarly choose the handle side
- Mark and cut to fix the sink as per drawing
- Note the size and colour of the granite (Fig 7)

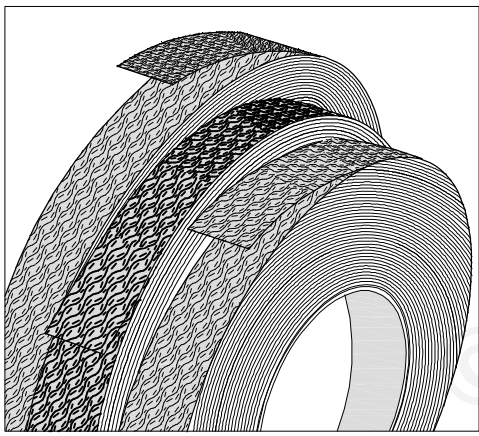
Fig 7



CA20N17131H7

- Calculate the required fevical and other adhesives
- Calculate the required banding edge tape (Fig 8)

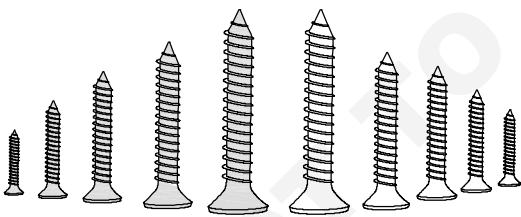
Fig 8



CA20N17131H8

- Note the size, type and number of screws (Fig 9)

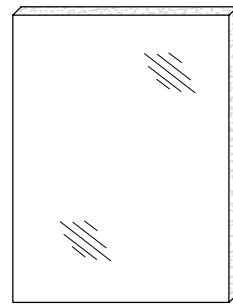
Fig 9



CA20N17131H9

- Calculate the required glass size as per drawing (Fig 10)

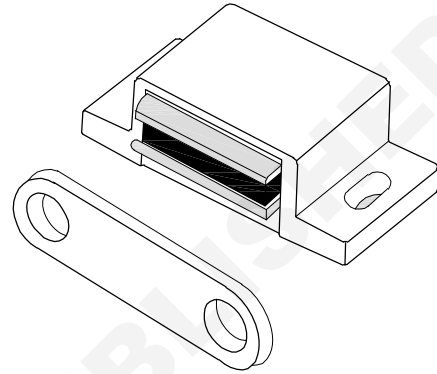
Fig 10



CA20N17131HA

- Note the size and number of magnetic cabinet catch (Fig 11)

Fig 11

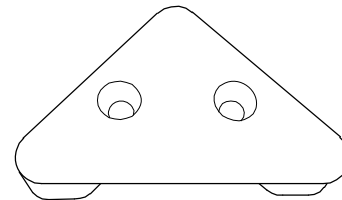


CA20N17131HB

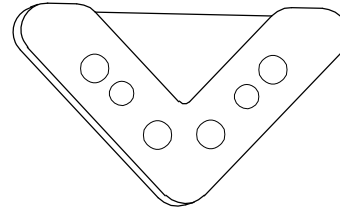
- Choose the suitable glass corner holder (Fig 12)
- Determine the best suited side before fining the sink

Fig 12

GLASS CORNER



NP



CA20N17131HC

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**Select proper material and tool for making kitchen cabinet**

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**Objectives:** At the end of this exercise you shall be able to

- **Select proper material for making kitchen cabinet**
  - **Select the proper tool for making kitchen cabinet**
- 

**Job Sequence**

**Kitchen wall unit cabinet required material**

- For drawing refer refer Ex No 1.7.130

**19 mm thickness plywood**

- Back pieces = 2100 x 600 mm - 1 No
- Top piece = 800 x 300 mm - 2 No
- Bottom piece = 800 x 240 mm - 2 No
- Door piece = 600 x 1600 mm - 1 No
- Middle piece = 1600 x 300 mm - 1 No
- Vertical piece = 1200 x 600 mm - 1 No

**Half white sunmica 0.8 mm thick**

- Back piece = 2110 x 610 mm - 1 No
- Top piece = 810 x 310 mm - 2 No
- Bottom piece = 810 x 310 mm - 1 No
- Door piece = 410 x 610 mm - 4 No
- Middle piece = 810 x 250 mm - 4 No's
- Vertical piece = 1210 x 610 mm - 1 No

**Colour sunmica - 1 mm thick**

- Top piece = 310 x 1810 mm - 1 No
- Bottom piece - 310 x 1810 mm - 1 No
- Door piece = 610 x 1810 mm - 1 No
- Vertical piee = 610 x 1210 mm - 1 No
- Back piece front middle part = 610 x 510 mm - 1 No
- Door White glass = 480 x 310 x 5mm - 2 Nos

**Kitchen base unit cabinet required material**

- For drawing refer Ex No 1.7.130

**19 mm thickness plywood**

- Back piece = 2100 x 750 mm - 1 No
- Top piece = 2100 x 575 mm - 1 No
- Bottom piece horizontal = 2060 x 520 mm - 1 No
- Bottom Vertical piece = 2060 x 76 mm - 1 No
- Door piece = 1600 x 670 mm - 1 No
- Side vertical piece = 750 x 600 mm - 2 No
- Middle vertical piece = 635 x 520 mm - 3 No's

- Middle horizontal piece = 1200 x 600 mm - 1 No
- Basket piece = 700 x 600 mm - 1 No
- **Half white sunmica 0.8 mm thick**
- Back piece = 2110 x 750 mm - 1 No
- Top horizontal piece = 2110 x 610 mm - 1 No
- Bottom horizontal piece = 2110 x 610 mm - 1 No
- Door basket piece = 2110 x 750 mm - 1 No
- Side vertical piece = 1210 x 750 mm - 1 No
- Middle vertical piece both side = 1510 x 610 mm - 1 No

**Colour sunmica 1 mm thick**

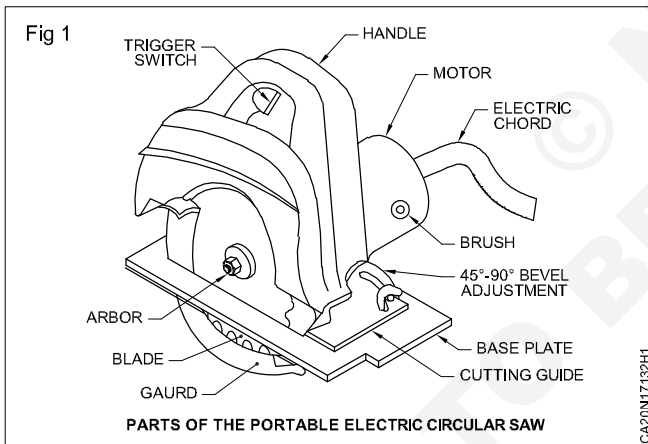
- Top horizontal piece = 2110 x 610 mm - 1 No
- Bottom vertical piece = 2110 x 110 mm - 1 No
- Door, baske piece = 2110 x 750 mm - 1 No
- Side vertical piece = 1510 x 610 mm - 1 No
- Granite stone front edge make half round with sink cutting and gas hose hole cutting as per drawing
- Size = 2100 x 600 x 25 mm - 1 No

**Hardware**

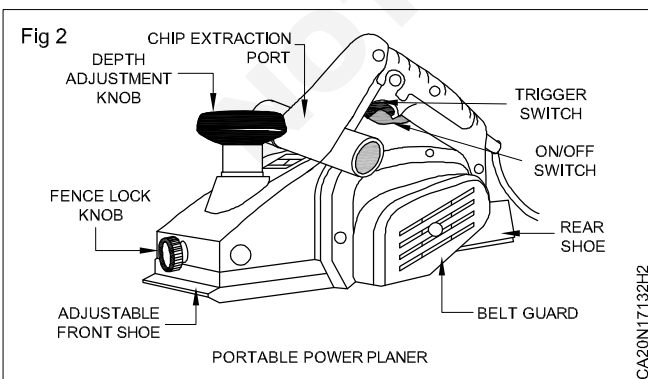
- Fevical S.R = 8 kgs
- Fevical S.H = 1 kg
- Fevicol heatx - 1 kg
- Handle with screw 150 mm = 11 No's
- Full over lay, frame less cabinet hinge with screwer = 16 No
- Magnetic door catch with screws = 54mm - 8 No's
- Basket 1 set = 3 No's
- glass corner fitting = 8 No's
- Edge banding tape = 30 Meter
- Phillips flat head screw 60x5 = 213 oxes
- Aroaldite adhesives = 1 kg
- Sliding rail 450 mm - 3 set

## Required tools and machines

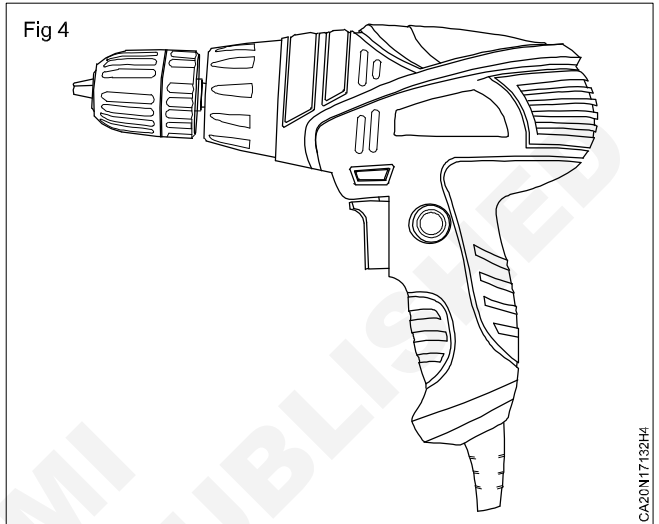
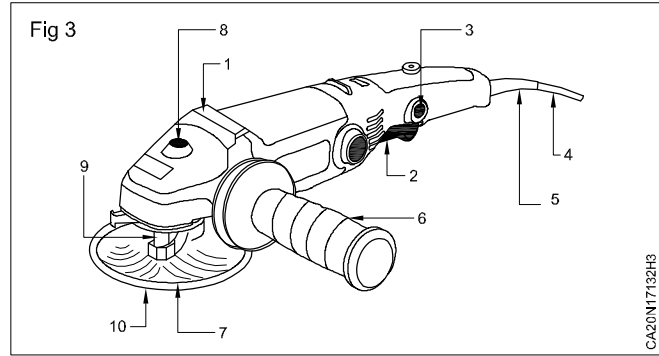
- Steel tape rule 3 meters = 1 No
- Try square 200 mm - 1 No
- Wooden try square 600 mm - 1 No
- Firmerchisel 30,50 mm - each 1 No
- T bar clamps - 1800 mm - 1 No
- 'C' clamp 150 mm - 1 No
- Straight edge 200 mm - 1 No
- Marking gauge - 1 No
- Hand saw 750 mm - 1 No
- Claw hammer - 1 No
- Ballpein hammer - 1 No
- Pincer - 1 No
- Slim taper file 150 mm - 1 No
- Centre punch - 5 mm - 1 No
- Mallet - 1 No
- Oil stone 150 x 50 x 25 mm - 1 No
- Screw driver 300 mm - 1 No
- Oil can - 1 No
- Portable power circular saw - 1 No (Fig 1)



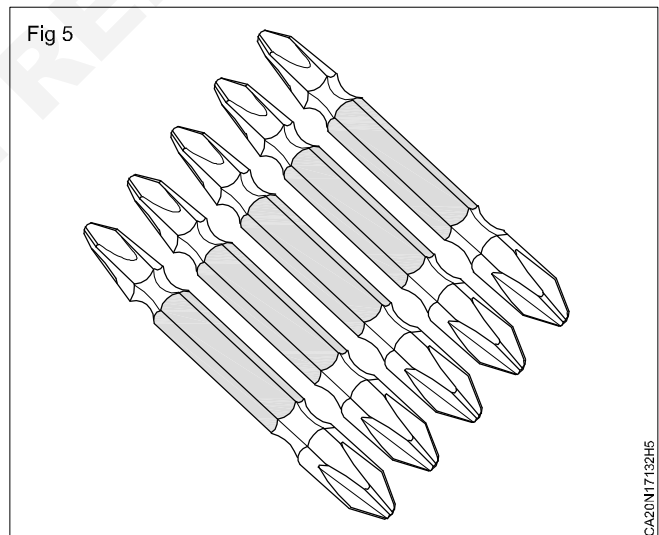
- Portable power planer - 1 No (Fig 2)



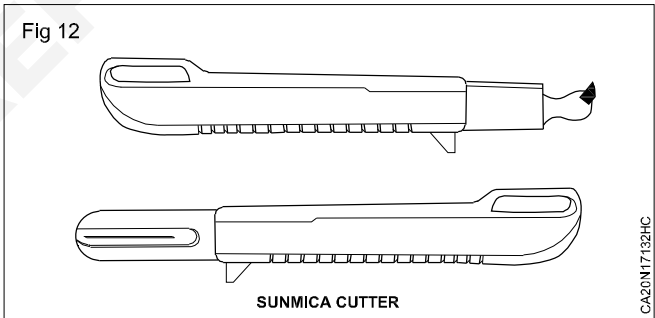
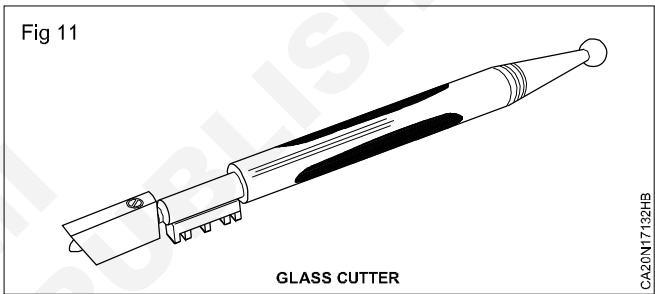
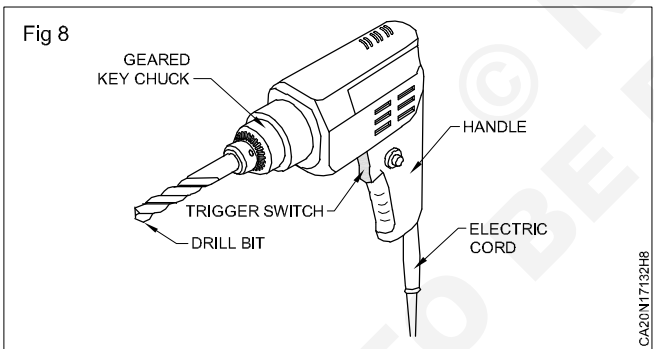
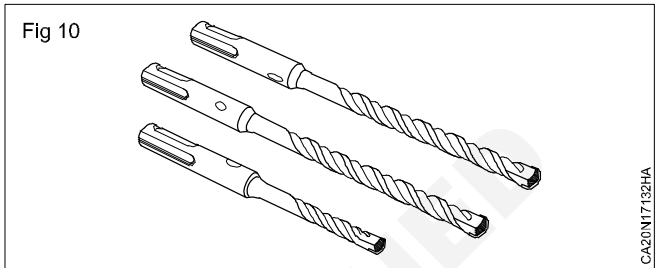
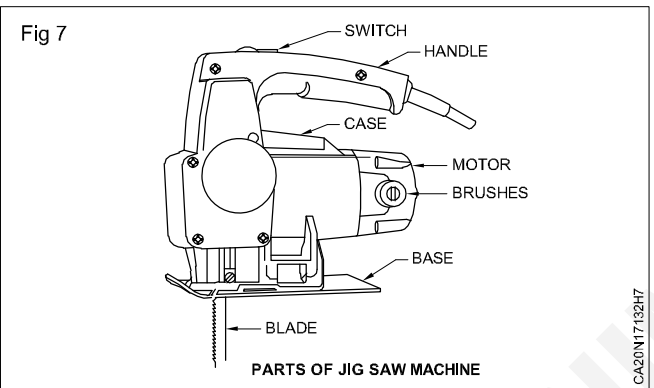
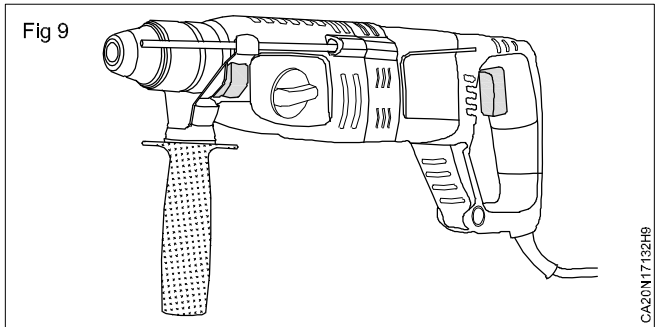
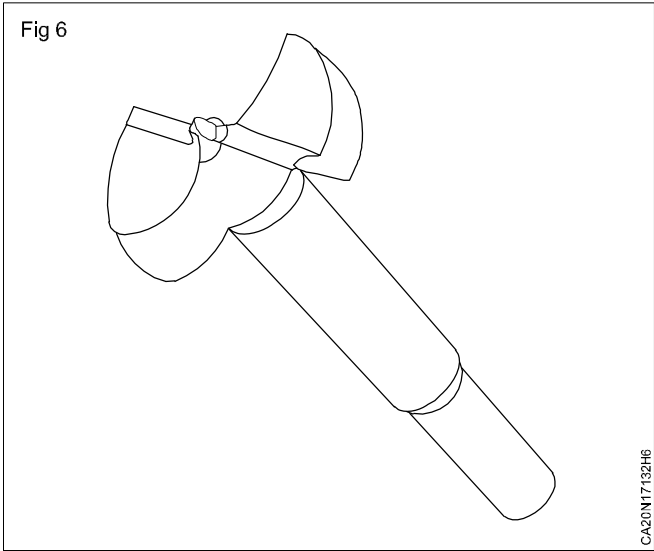
- Portable power disc sander - 1 No (Fig 3)
- Portable electric screw driver (Fig 4)



- Phillips screwdriver drill bit - PH5 x 65 mm - 5 No's (Fig 5)



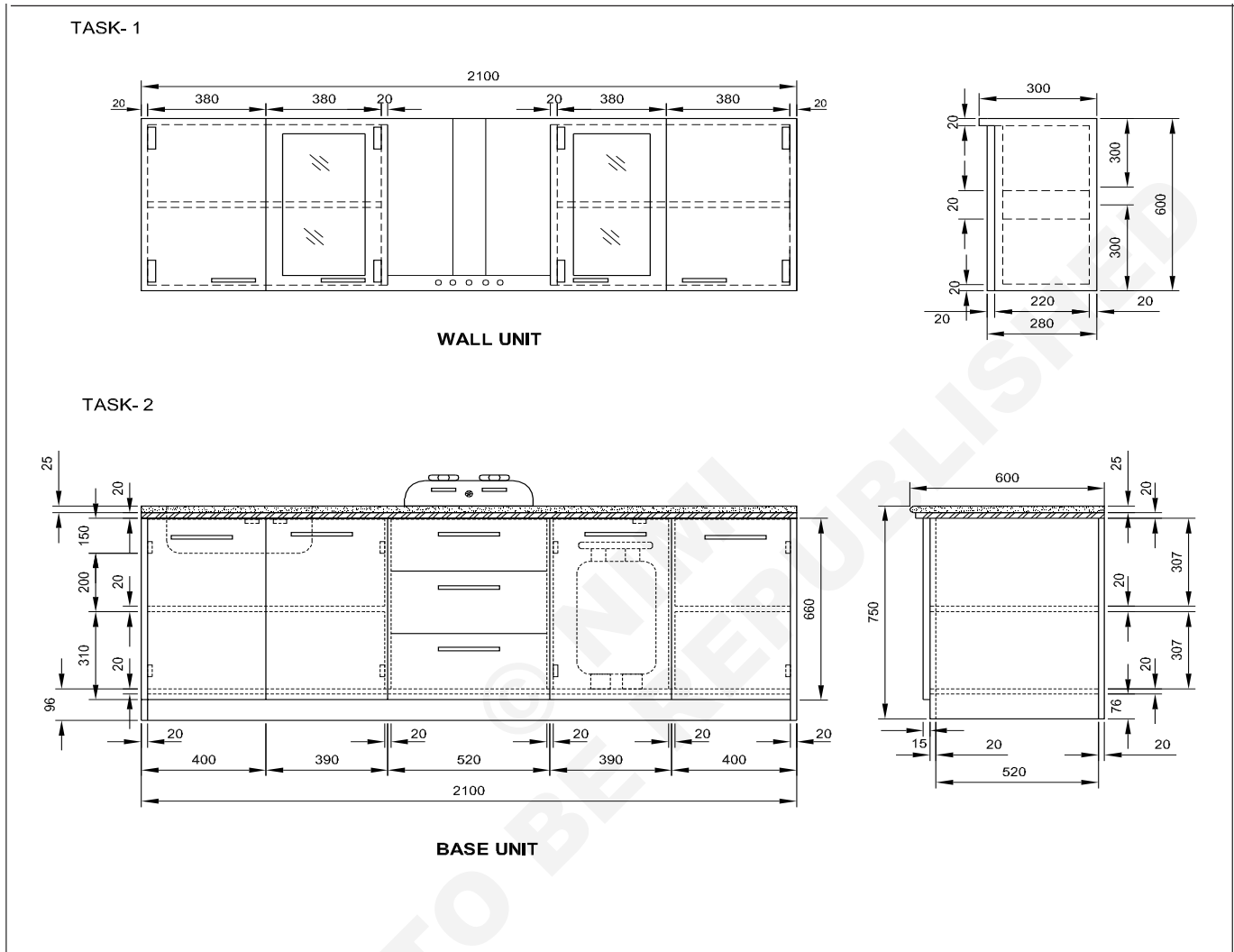
- Concealed woodhinge boring hole drill bit 35 mm - 1 No (Fig 6)
- Portable electric jig saw - 1 No (Fig 7)
- Portable electric drill light duty (Fig 8)
- Portable power rotary hammer drill machine (Fig 9) - 1 No
- Rotary hammer drill bit - 3 No (Fig 10)
- Sunmica cutter - 1 No (Fig 11)
- Glass cutter - 1 No (Fig 12)



**Prepare layout for kitchen cabinet structure**

**Objectives:** At the end of this exercise you shall be able to

- prepare the layout for kitchen wall unit
- Prepare the layout for kitchen base unit



						1.7.133
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1					DEVIATIONS ± 0.1	TIME : 09 HRS
<b>LAYOUT OF KITCHEN CABINET STRUCTURE</b>						CODE NO. CA20N17133E1

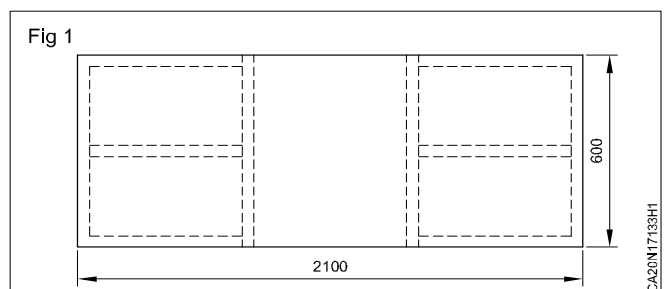
**Job Sequence**

**TASK 1: Layout kitchen cabinet wall unit**

**Back piece**

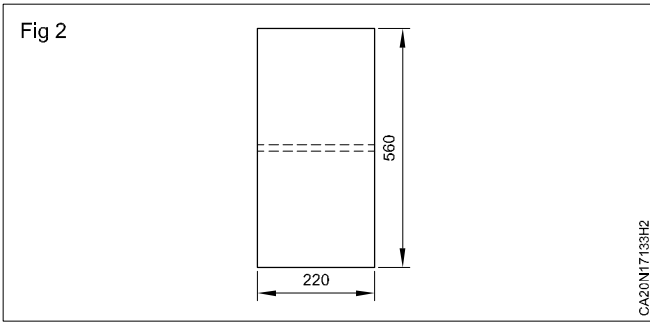
Layout the back piece of cabinet considering the sawing edge planning and sunmica bonding allowances as per drawing (Fig 1)

2100 x 600 mm = 1 No



### Side vertical piece

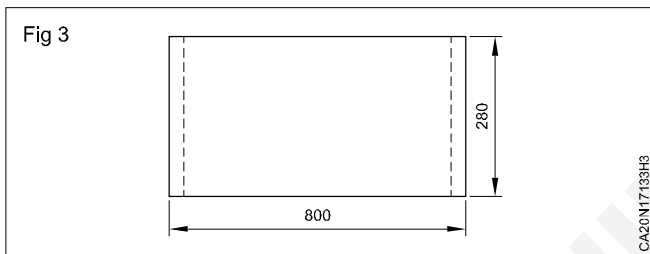
Layout the vertical pieces of cabinet considering the sawing edge planing sunmica bonding and edge bonding tape bonding allowances (Fig 2)



220 x 560 mm = 4 No's

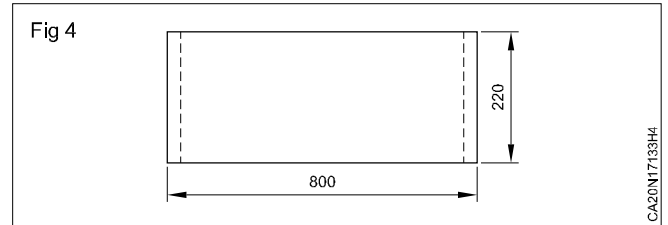
### Top horizontal piece

Layout top piece of cabinet considering the sawing, planing, sunmica bonding and edge bonding tape bonding allowances (Fig 3) 280 x 800 mm = 2 No's



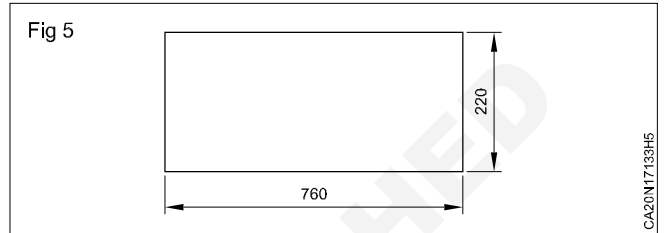
### Bottom horizontal piece

Layout the bottom horizontal pieces of cabinet considering the sawing, planing sunmica bonding and edge bonding tape bonding allowances (Fig 4) 220 x 800 mm = 2 No's



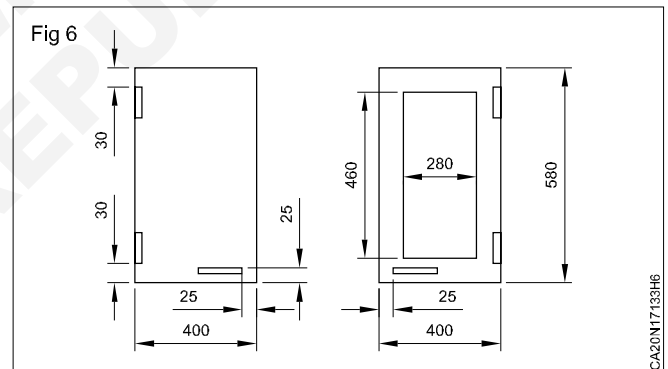
### Middle horizontal piece

Layout the middle horizontal pieces of cabinet considering the sawing, planing, sunmica bonding and, edge bonding tape bonding allowances. as per drawing (Fig 5) 220 x 760 mm = 2 No's



### Door piece

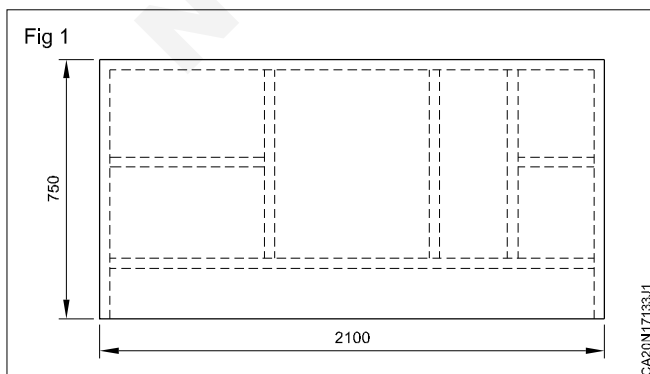
Layout the door pieces of a cabinet considering the sawing, edge planing sunmica bonding and edge bonding tape bonding allowances as per drawing (Fig 6) 400 x 580 mm = 4 Nos



## TASK 2: Layout kitchen cabinet base unit

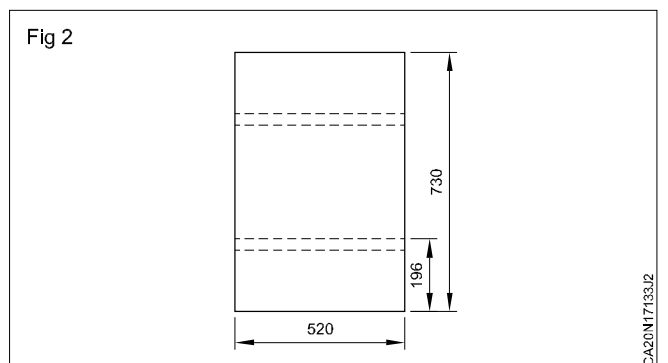
### Back piece

Layout the back piece of a cabinet considering the sawing, planing, and sunmica bonding allowance as per drawing (Fig 1) 750 x 2100 mm = 1 No



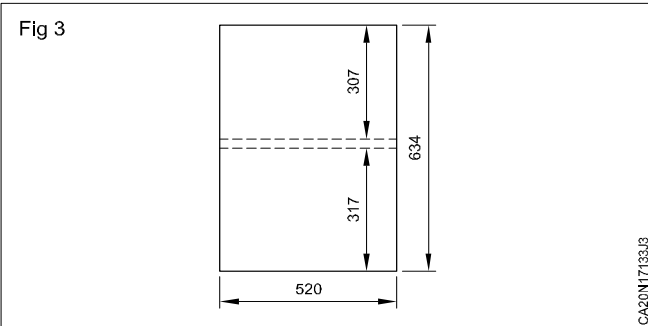
### Side vertical piece

Layout the side vertical pieces of a cabinet considering the sawing edge planing, sunmica bonding, and edge bonding tape bonding as per drawing (Fig 2) 520 x 730 mm = 2 No's



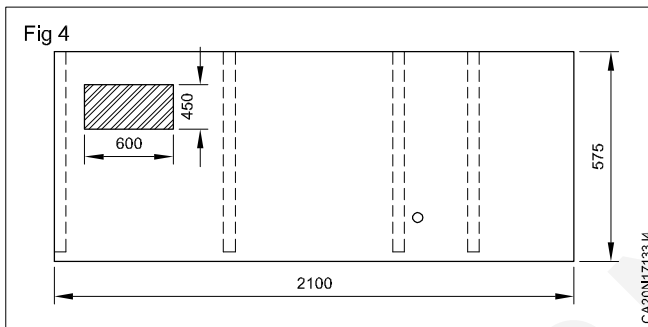
### Middle vertical piece

Layout the Middle vertical pieces of a cabinet considering the sawing edge planing, sunmica bonding and edge bonding tape bonding allowances as per drawing (Fig 3) 520 x 19 x 634 mm = 3 No's



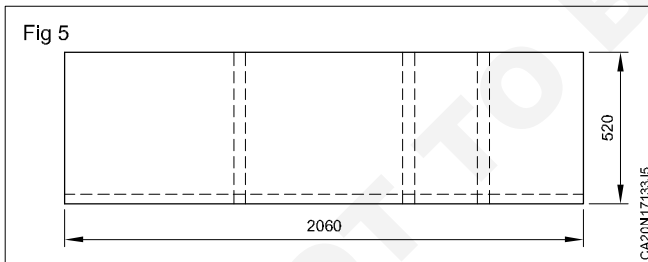
### Top horizontal piece

Layout the top horizontal piece of cabinet considering the sawing edge planing sunmica bonding and edge bonding tape bonding allowances as per drawing (Fig 4) 575 x 19 x 2100 mm - 1 No



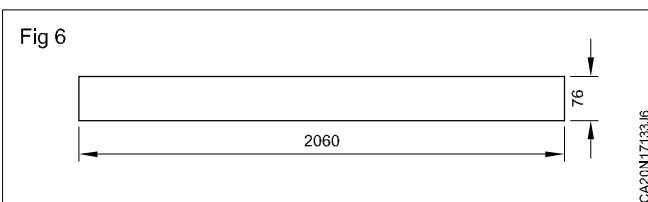
### Bottom horizontal piece

Layout the bottom horizontal piece of a cabinet considering the sawing edge planing, sunmica bonding and edge bonding tape bonding allowances as per drawing (Fig 5) 520 x 19 x 2060 mm - 1 No



### Bottom vertical piece

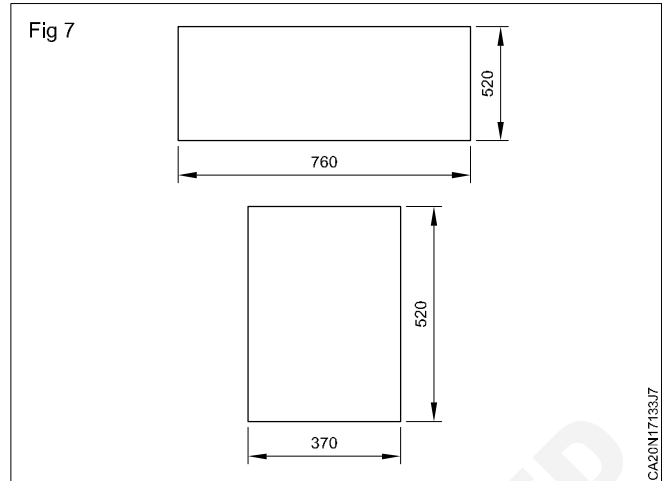
Layout the bottom vertical piece of cabinet considering the sawing, edge planing, and sunmica bonding allowances as per drawing (Fig 6) 2060 x 19 x 76 mm - 1 No



### Middle horizontal piece

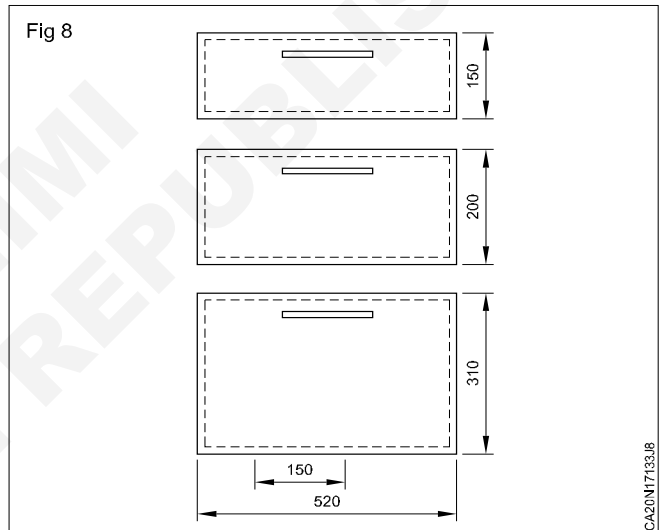
Layout the middle horizontal pieces of cabinet considering the sawing, edge planing, sunmic bonding and edge

bonding tape bonding allowances as per drawing (Fig 7) 520 x 760 x 19 mm - 1 No, 520 x 370 x 19 mm - 1 No



### Basket piece

Layout the basket pieces of a cabinet considering the sawing, edge planing, sunmica bonding and edge bonding tape bonding allowances as per drawing (Fig 8)

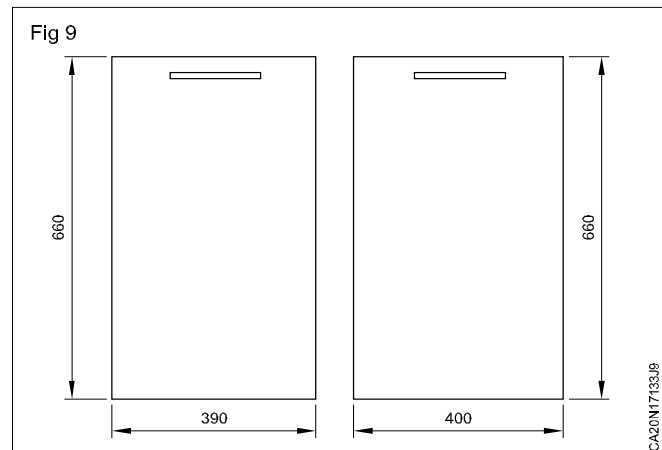


### Door piece

Layout the door pieces of a cabinet considering the sawing edge planing sunmica bonding and edge bonding tape bonding allowances as per drawing (Fig 9)

390 x 660 mm = 2 No's

400 x 660 mm = 2 No's



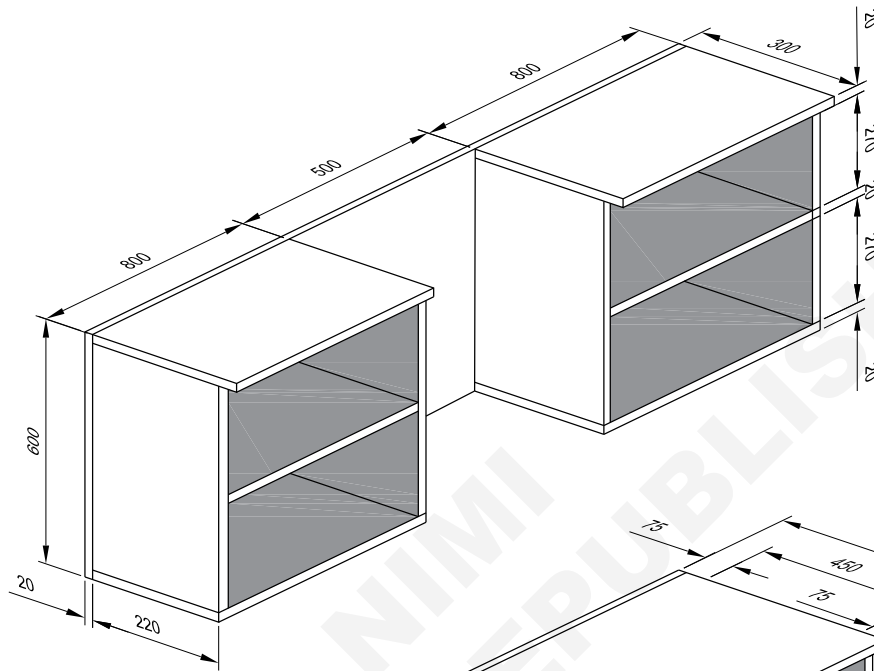


**Make the material as per cabinet layout and check the dimensions**

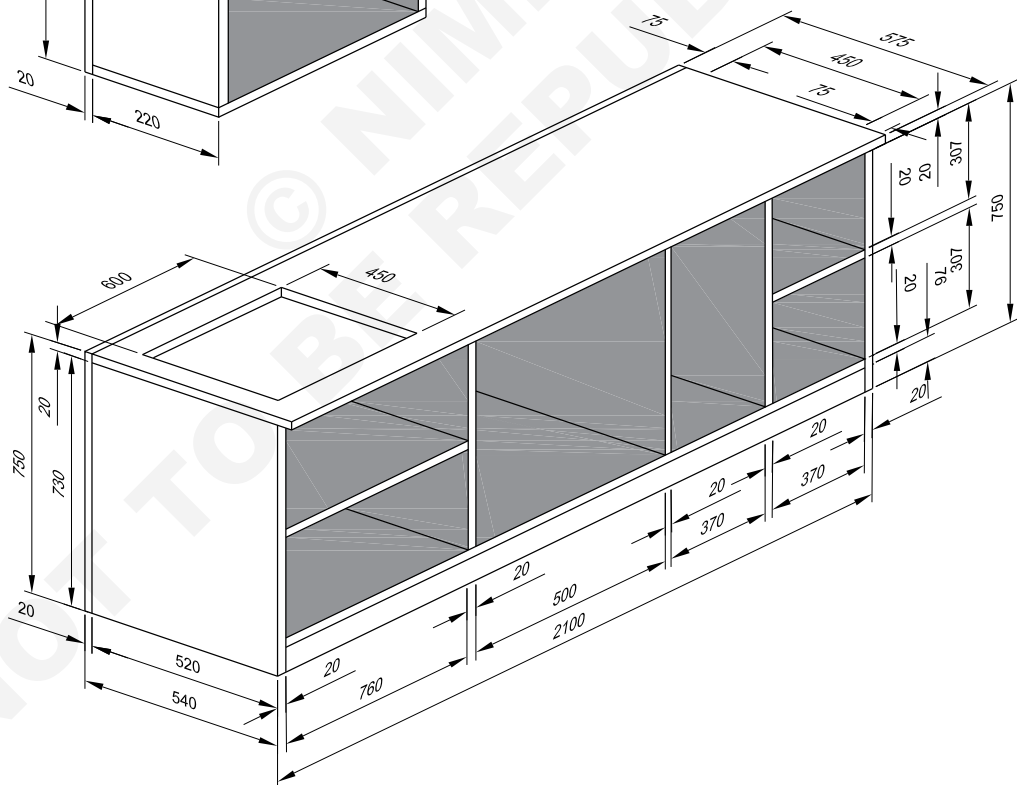
**Objective:** At the end of this exercise you shall be able to

- mark and make the material as per drawing
- Check the dimensions

TASK 1



TASK 1



NOTE : THE MATERIAL IS AVAILABLE IN EX.NO:1-7-132

1	ISR Ø7x60	-	Fe310	-	-	1.7.132
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>MAKE THE MATERIAL AS PER CABINET LAYOUT</b>				TOLERANCE : - ±0.5mm	TIME : 9Hrs
					CODE NO. CA20N17135E1	

# Job Sequence

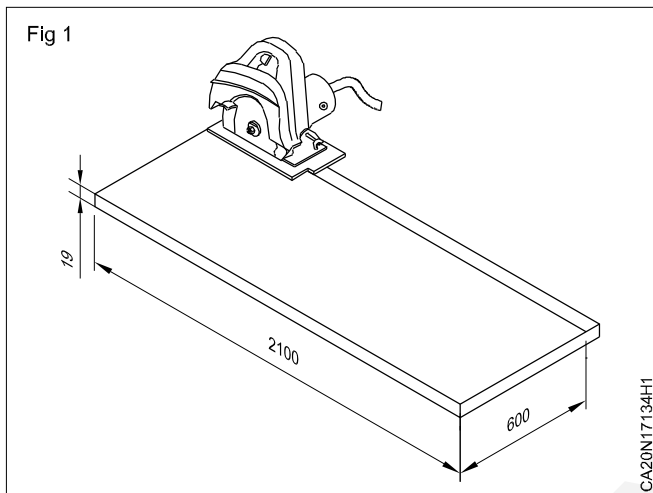
## TASK 1: Kitchen wall unit cabinet material

- For layout refer Ex No 1.7.133
- Required material available in Ex No 1.7.132
- Check the raw material size as per dimensions.

### Pack horizontal piece

- Mark and make the total length and width of plywood back horizontal piece of the wall roof cabinet as per drawing. using portable power circular saw and portable power dish sander (Fig 1)

2100 x 600 x 19 mm - 1 No



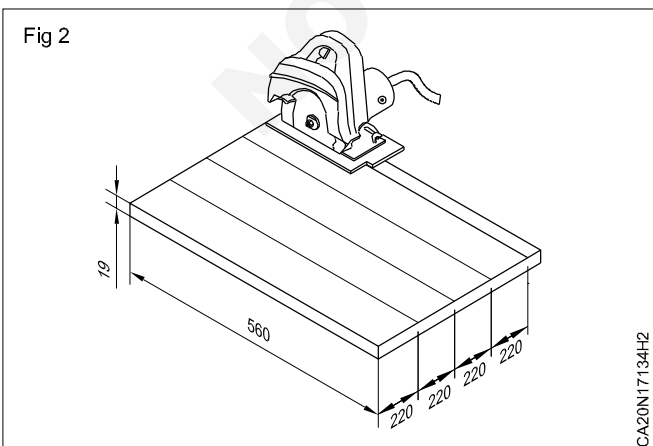
- Mark and make the total length and width of the half white sunmica using sunmica cutter.

2105 x 605 mm - 1 No

- Bond the half white sunmica on inside surface of the back vertical piece using fevicol (SR)
- Allow the fevical to dry
- Plane the excess sunmica edge using portable power planner.

### Side Vertical piece

- Mark and make the total length and width of the using portable power circular saw side vertical pieces as per drawing (Fig 2)

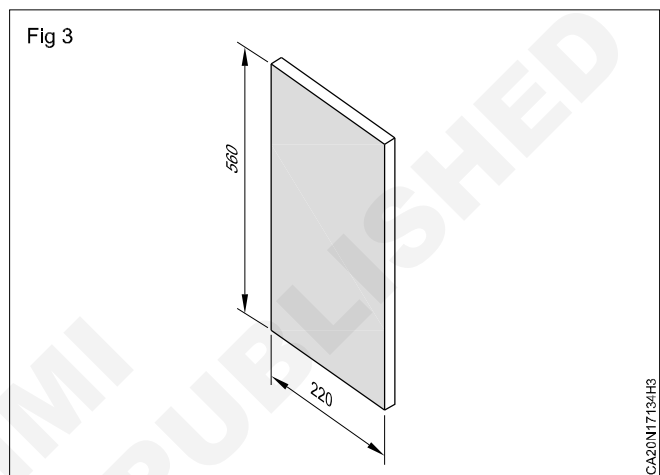


220 x 560 x 19 mm = 4 No's

- Mark and make the total length and width of the half white sunmica as per drawing

225 x 565 mm = 4 No's

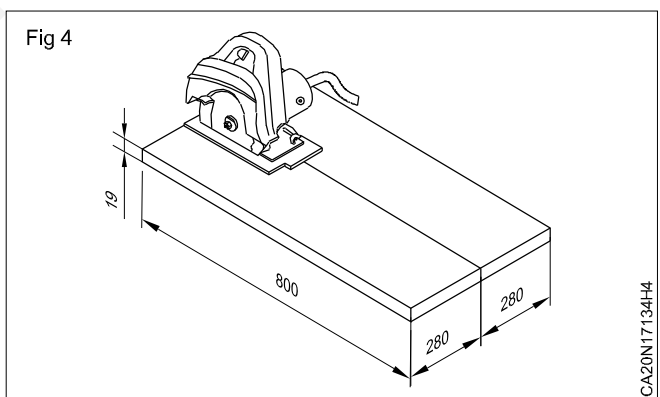
- Bond the sunmica on inside surface of the vertical side pieces using fevical SR
- Allow the fevical to dry
- Plane the excess sunmica edge using power planner and check the dimension (Fig 3)



### Top horizontal piece

- Mark and make the total length and width of the plywood top pieces of the wall unit cabinet as per drawing (Fig4)

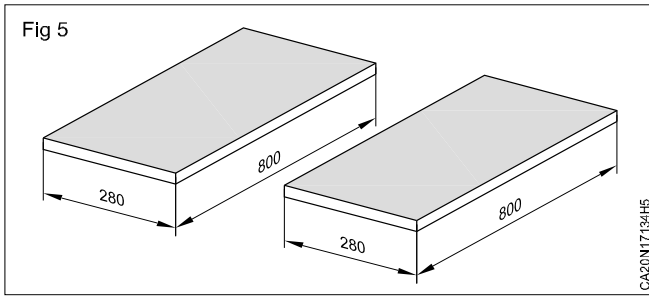
280 x 800 x 19 mm = 2 No's



- Mark and make the total length and width of the half white sunmica as per drawing

285 x 6805 mm = 2 No's

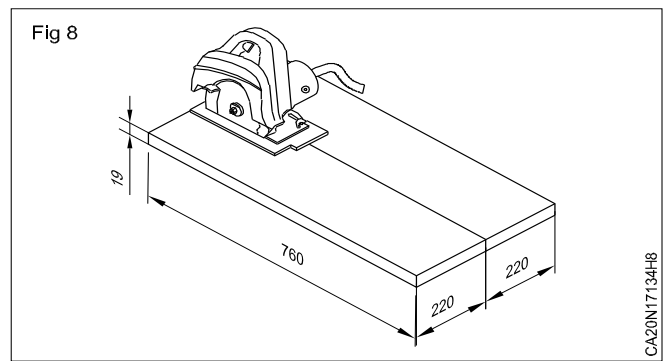
- Bond the half white sunmica on inside surface of the top piece using fevicol SR
- Allow the fevicol to dry
- Plane the excess sunmica using edge Portable power planner and check the dimension (Fig 5)



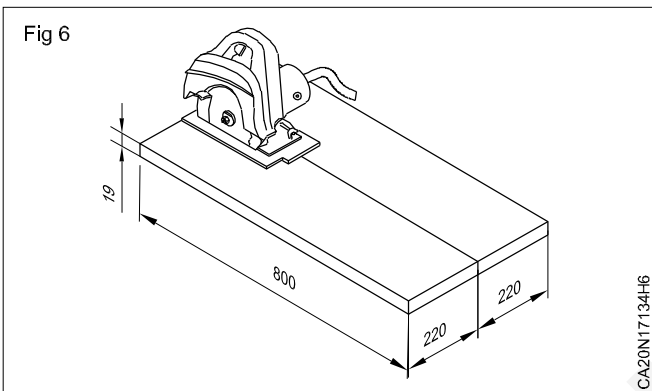
**Bottom horizontal piece**

Mark and make the total length and width of the bottom horizontal pieces of the wall unit cabinet as per drawing (Fig 6)

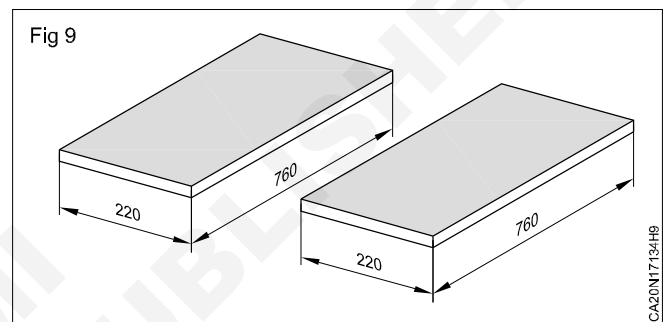
- 220 x 800 mm = 2 No's



- Bond the half white sunmica in both surface of the middle horizontal pieces using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica edge using power planner and check the dimension (Fig 9)

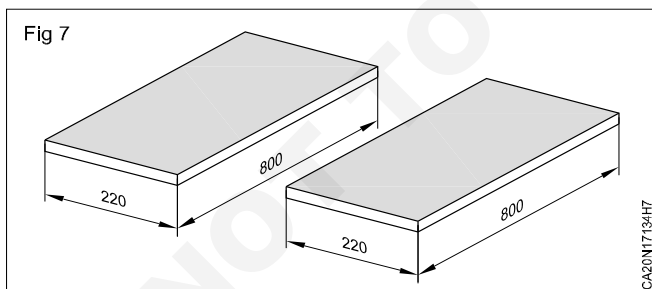


- Mark and make the total length and width of the half white sunmica size as per drawing
- 225 x 805 mm = 2 No's
- Bond the half white sunmica on inside surface of the bottom pieces using fevicol (S.R)
- Allow the fevicol to dry
- Plane the excess sunmica edge using power planner and check the dimension (Fig 7)



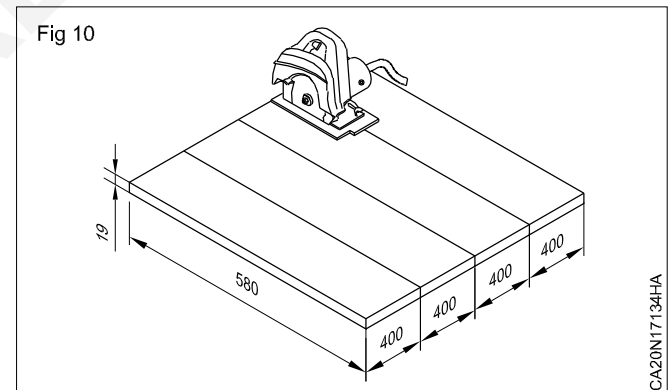
**Door piece**

- Mark and make the total length and width of the door pieces of wall unit cabinet as per drawing (Fig 10)

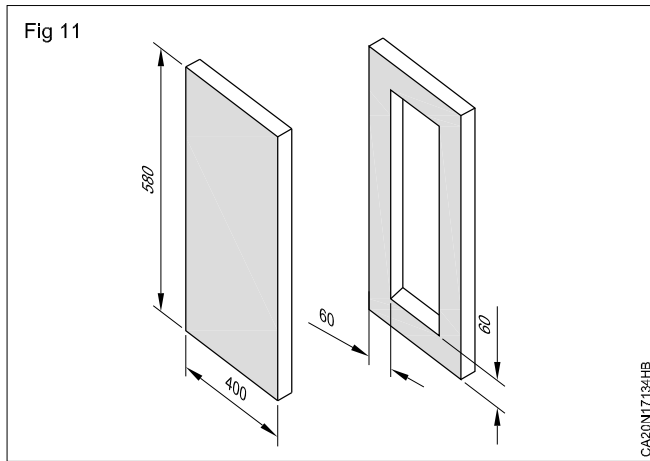


**Middle horizontal piece**

- Mark and make the total length and width of the middle horizontal pieces of the wall unit cabinet as per drawing (Fig 8)
- 220 x 760 x 19 mm = 2 No's
- Mark and make the total length and width of the half white sunmica both sides
- 225 x 765 mm = 4 No's



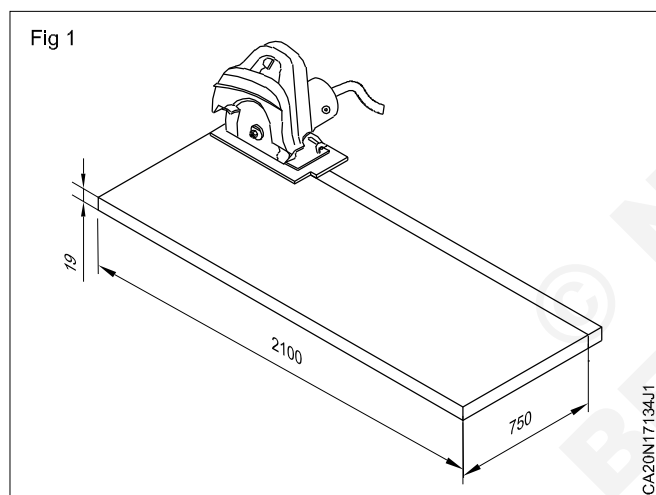
- 400 x 580 x 19 mm = 4 No's
- Mark and make the total length and width of the cutting in glass as per dimensions using portable power jig saw machine and portable power circular saw in 2 No's of door pieces (Fig 11)
- Mark and make the total length and width of the half white sunmica as per drawing
- 405 x 585 mm - 4 No's
- Bond the half white sunmica inside surface of the door pieces using fevicol S.R
- Allow the fevicol to dry.
- Plane the excess sunmica edge using power planner and check the dimension.



## TASK 2: Kitchen base unit cabinet material

### Back horizontal piece

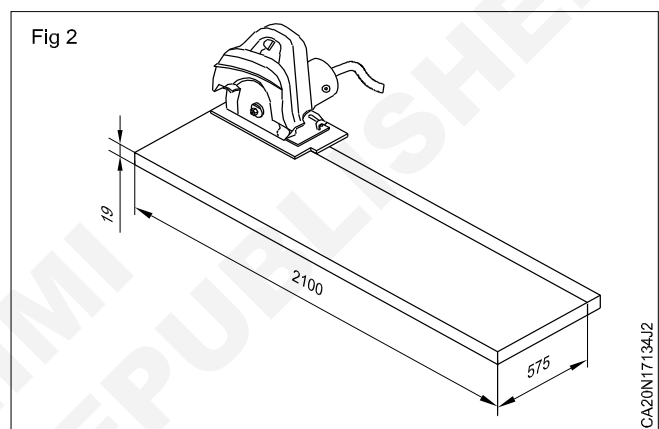
- Mark and make the total length and width of back side horizontal piece of the kitchen base unit cabinet as per drawing. Using portable power circular saw machine (Fig 1) 2100 x 750 x 19 mm - 1 No



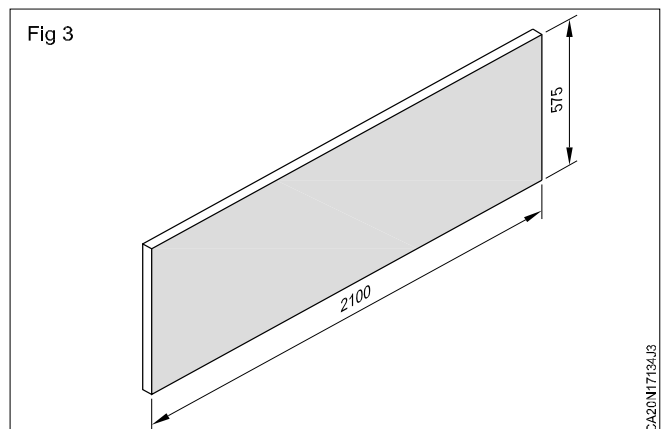
- Mark and make the total length and width of the half white sunmica using sunmica cutter as per drawing
- 755 x 2105 mm - 1 No
- Bond the half white sunmica on inside surface of the back horizontal piece using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica edge using portable power planner and check the dimension as per drawing.

### Top horizontal piece

- Mark and make the total length and width of the top horizontal piece of the kitchen base unit cabinet as per drawing (Fig 2)
- 575 x 2100 mm x 19 mm - 1 No
- Mark and make the total length and width of the half white sunmica as per drawing

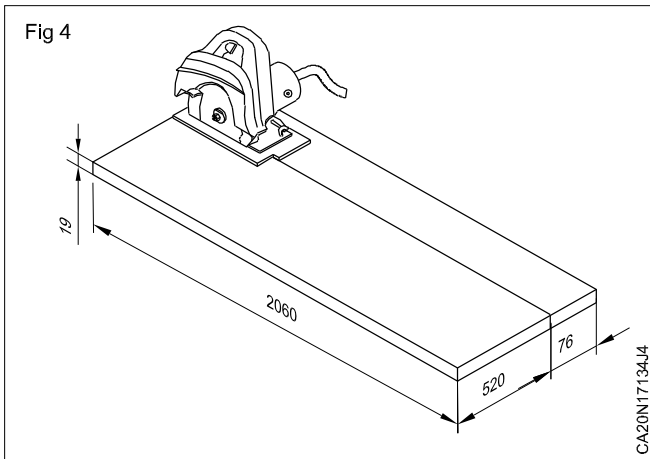


- 580 x 2105 mm - 1 No
- Bond the half white sunmica in inside surface of the top horizontal piece using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica edge using power planner and check the dimensions (Fig 3)

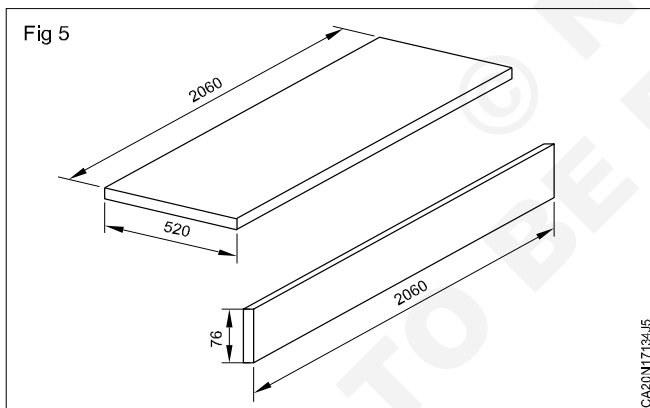


### Bottom horizontal and vertical piece

- Mark and make the total length and width of the bottom horizontal and vertical piece as per drawing. Using power circular saw (Fig 4)

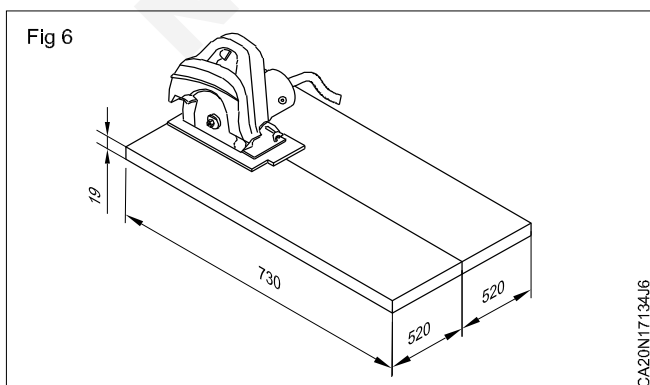


- 540 x 2060 mm - 1 No. - Horizontal piece
- 76 x 2060 mm - 1 No. Vertical piece
- Mark and make total length and width of the half white sunmica as per drawing
- 545 x 2065 mm - 1 No
- 100 x 2065 mm - 1 No
- Bond the half white sunmica on inside surface of the bottom horizontal piece using fevicol SR.
- Allow the fevicol to dry
- Plane the excess sunmica edge using portable power planner and check the dimensions (Fig 5)

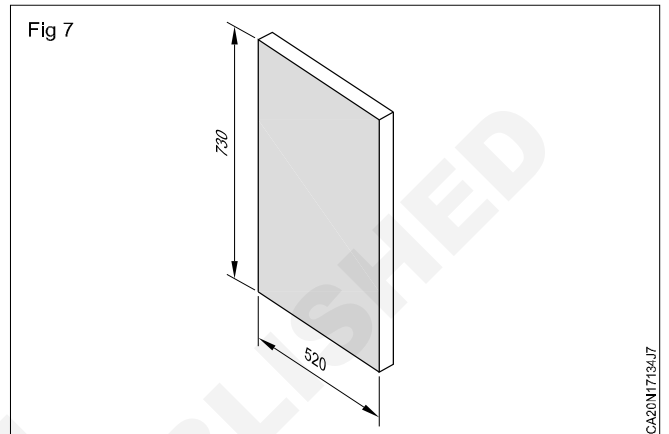


#### Side vertical piece (plank)

- Mark and make the total length and width of the side vertical piece of the kitchen base unit cabinet as per drawing (Fig 6)

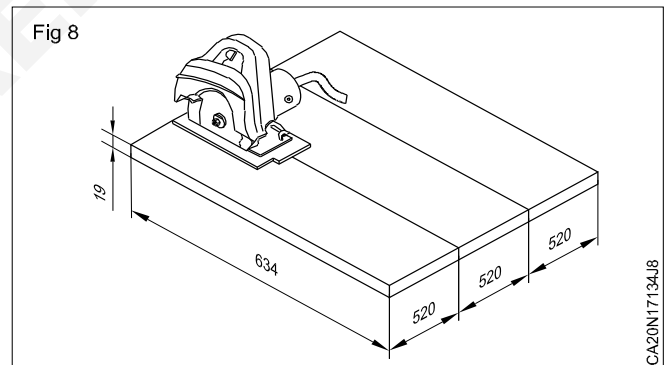


- 730 x 520 mm = 2 No
- Mark and make the total length and width of the half white sunmica as per drawing
- 735 x 525 mm - 2 No
- Bond the sunmica inside surface of the side vertical pieces using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica using power planner and check the dimensions (Fig 7)



#### Middle vertical piece (Plank)

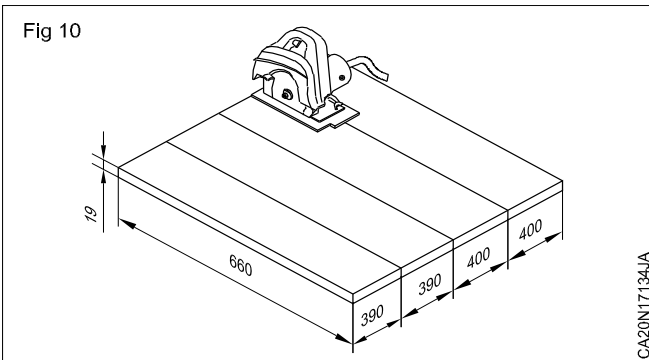
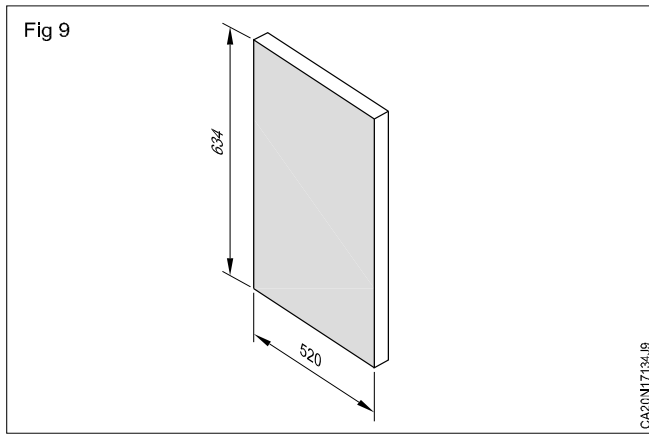
- Mark and make the total length and width of the middle vertical piece of the kitchen base unit cabinet as per drawing (Fig 8)



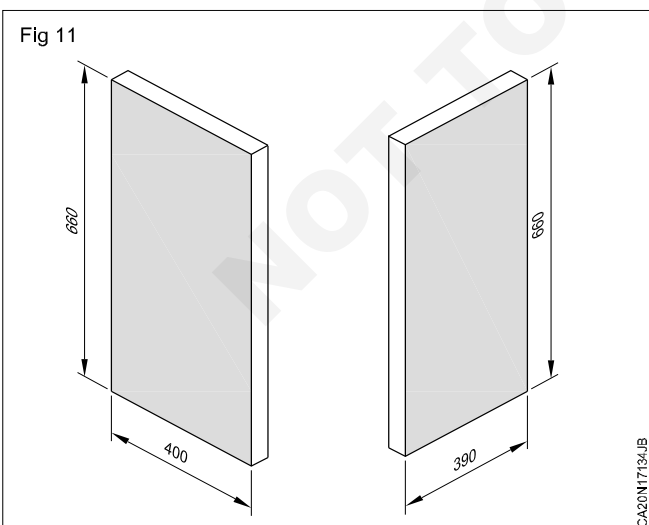
- 520 x 634 mm = 3 No's
- Mark and make the total length and width of the half white sunmica both side as per drawing
- 525 x 640 mm = 6 No's
- Bond the half white sunmica in both side surface of the middle vertical piece using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica using power planner and check the dimensions (Fig 9)

#### Door piece (Plank)

- Mark and make the total length and width of the door pieces of the kitchen cabinet as per drawing (Fig 10)
- 400 x 660 x 19 mm = 2 No's

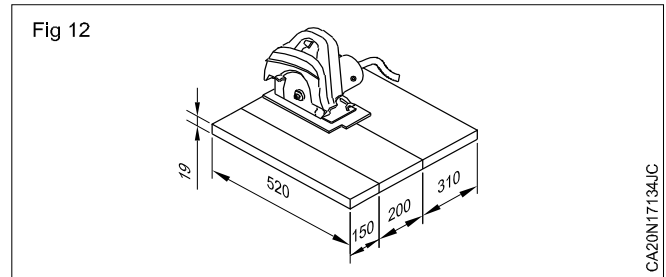


- 390 x 660 x 19 mm = 2 No's
- Mark and make the the total length and width of the half white sunmica as per drawing
- 405 x 665 mm = 2 No's
- 395 x 665 mm = 2 No's
- Bond the half white sunmica on inside surface of the door pieces using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica edge using powe planner and check the dimensions. (Fig 11)

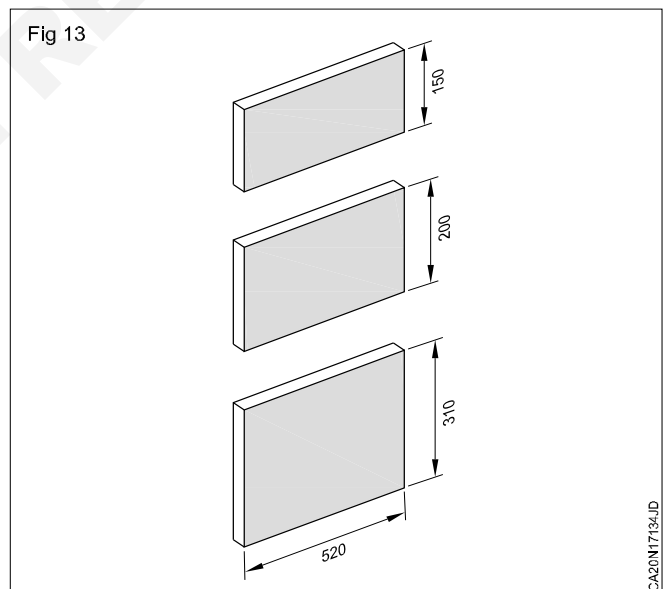


### Basket front piece (Plank)

- Mark and make the total length and width of the basket front piece of the kitchen cabinet as per drawing (Fig 12)



- 150 x 520 x 19 mm - 1 No
- 200 x 520 x 19 mm - 1 NO
- 310 x 520 x 19 mm - 1 No
- Mark and make the total length and width of the half white sunmica as per drawing
- 155 x 525 mm - 1 No
- 205 x 525 mm - 1 No
- 315 x 525 mm - 1 No
- Bond the half white sunmica on inside surface of the basket front pieces using fevicol S.R
- Allow the fevicol to dry.
- Plane the excess sunmica edge using power planner and check the dimensions. (Fig 13)

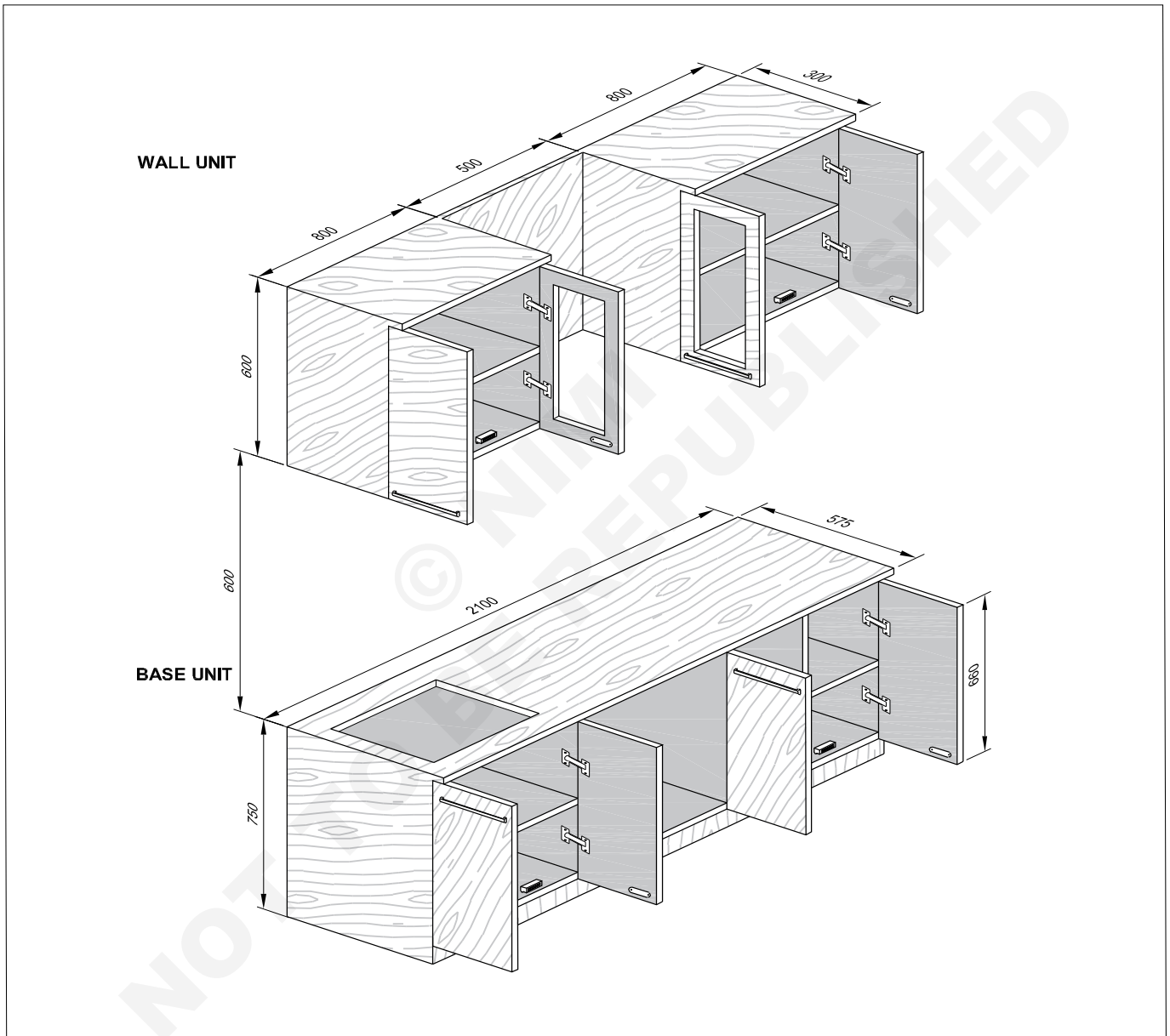


**Method of sawing using portable power circular saw machine refer Ex. No. 1.1.10**

Structuring the kitchen cabinet and finally finishing with sunmica and hardware

Objectives: At the end of this exercise you shall be able to

- Set and assemble the cabinet frame
- Bonding of the sunmica
- Fixing the hardware on the cabinet



1	-	-	-	-	-	1.7.135
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>STRUCTURING THE MODULER KITCHEN CABINET AND FINISHING</b>				TOLERANCE : - ±0.5mm	TIME : 9Hrs
					CODE NO. CA20N17135E1	

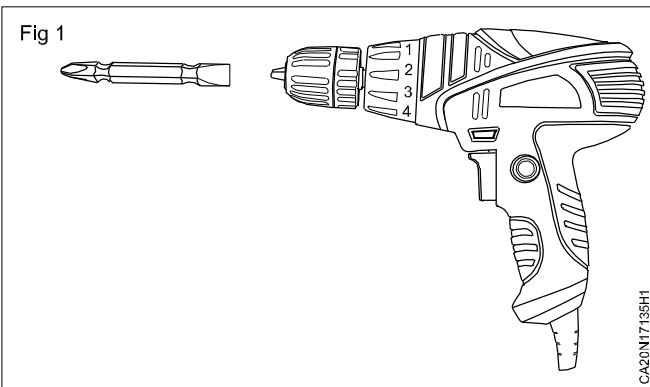
## Job sequence

### Kitchen cabinet wall unit frame

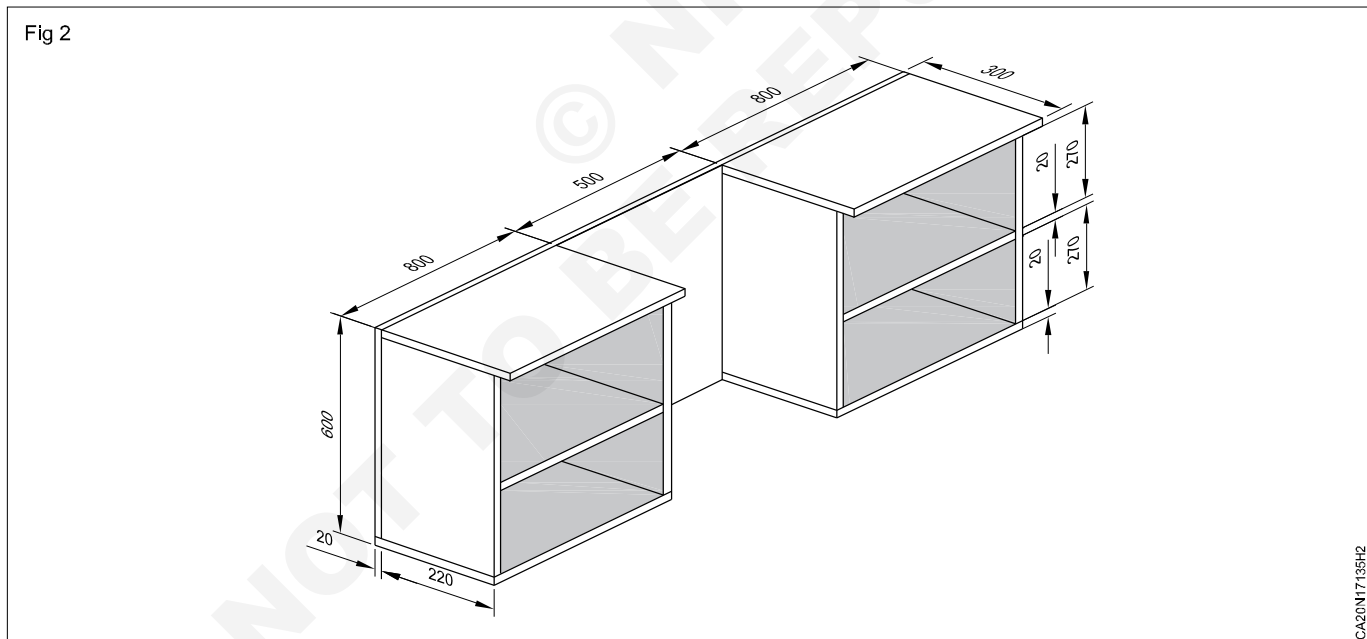
- Required material available in EX No 1.7.132 and 1.7.134

#### Assembling the cabinet wall unit frame

- Check the side vertical pieces top horizontal piece, bottom horizontal piece, and horizontal middle pieces of the cabinet to the required measurement before assembling
- Prepare the electric screwdriver on screwing (Fig 1)
- Set the bar clamp to assemble the top and bottom of the left side frame.



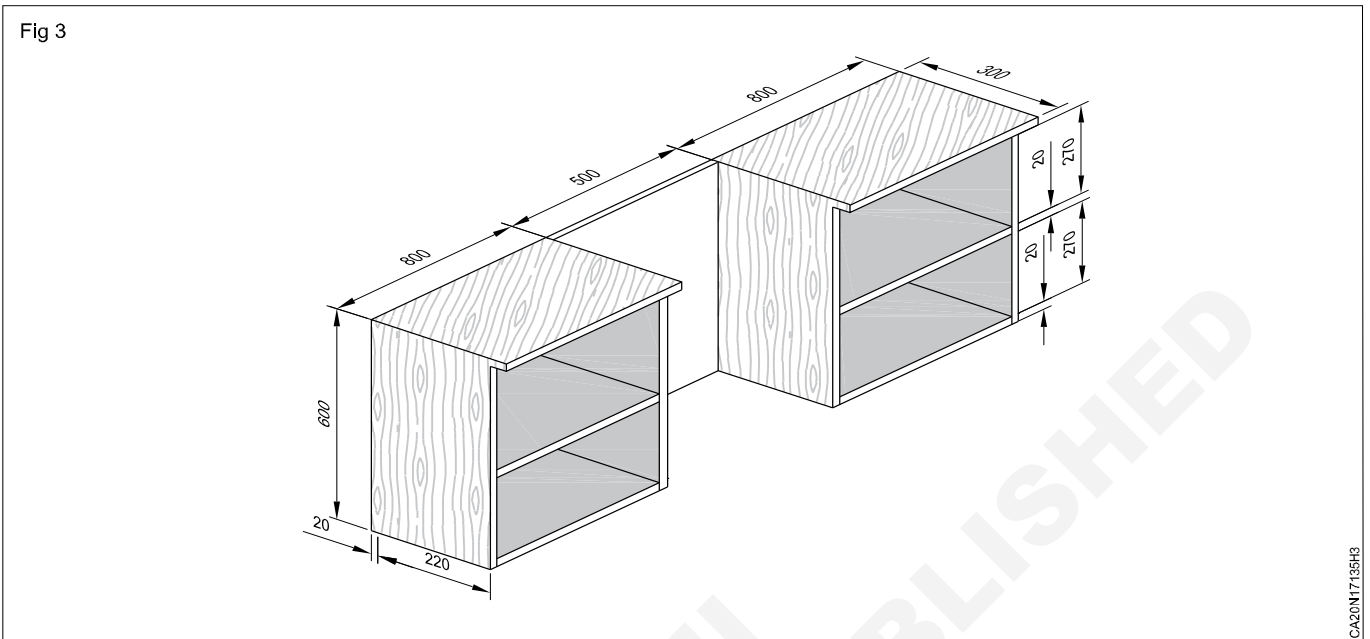
- Apply the fevicol on side vertical pieces edge surface
- Assemble the top, bottom and side vertical pieces to make a left side frame and mark the drill hole point on the middle of the edge.
- Place on the bar clamp with wooden support pieces and tighten it
- Make the pilot hole on the marked points of the edge
- Insert and drive the phillips flat head screws using electric screw driver
- Repeat the same procedure to assemble the middle horizontal pieces and check the squareness of the left side frame
- Repeat the same procedure to assemble the right side frame and check the squareness of the frame
- Check the back piece of the cabinet to the required measurements before assembling
- Position the plywood back side of the left side frame as per drawing
- Mark the drill hold point on the middle of the all edges
- Apply fevicol on the frame back side edge surface



- Make the pilot hole on the marked points of the edges
- Insert and drive the phillips flat head screws using electric screwdriver as per drawing ( Fig 2)
- Repeat same procedure to fix the right side frame as per drawing. (Fig 2)
- Smooth all the surface using portable power disksander
- Check the squareness of the wall unit cabinet frame (Fig 2)
- Mark and make total length and width of the colour sunmica of the cabinet wall unit frame top, bottom, vertical sides and middle of the back piece front side as per drawing (Fig 1)
- 802 x 302 mm = Top pieces - 2 No's
- 802 x 242 mm = Bottom pieces - 2 No's
- 242 x 602 mm = Vertical sides - 4 No's
- 502 x 602 mm = Back front middle - 1 No

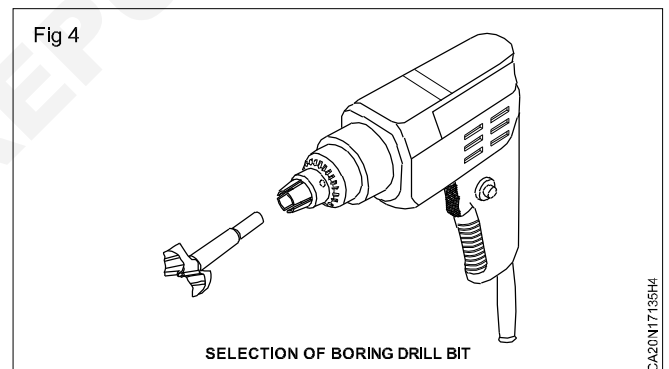


- Bonding the colour sunmica on face side of the top, bottom, vertical sides and back middle using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica using portable power planner
- Bonding the edge bonding tape on wall unit cabinet frame on all front edges using fevicol heatx
- Shave the excess edge tape using firmer chisel and check the dimensions (Fig 3)



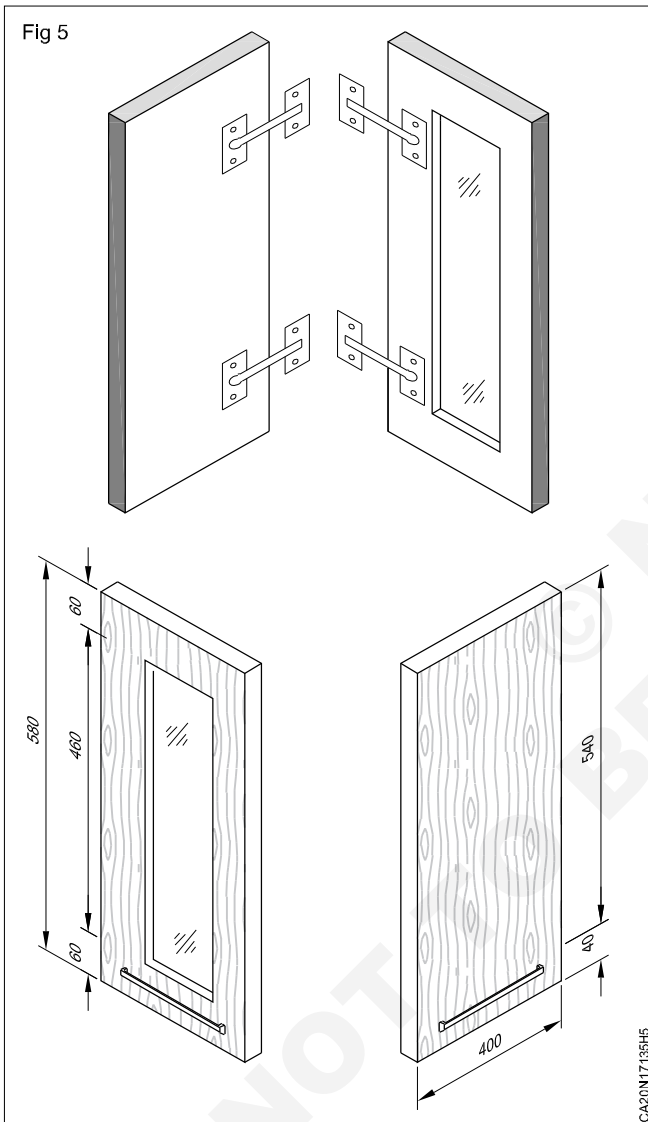
### Door finishing

- Check the dimension of the wall unit cabinet door pieces as per drawing
- Mark and make the total height and width of the colour sunmica of the door pieces as per drawing
- 402 x 582 mm = 4 No's
- Bond the colour sunmica on face side surface of the 2 No "s of door pieces using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica using portable power planner.
- Repeat same procedure bond the colour in mica one face side surface of the glass door - 2 No's
- Remove the sunmica covering the glass finishing open cut out
- Filing the excess sunmica width hand file and finish glass doors
- Bond the edge banding tape on doors all edges using fevicol heatx
- Shave the excess edge banding tape using firmer chisel
- Mark the position of the hinge on the door inside as per drawing
- Select and set the hinge boring drill bit in portable power drill machine on dooring (Fig 4)



- Make the hinge boring on the marked points of the door
- Press the hinge in place once the recess base is completely flat (Fig 5)
- Make a pilot hole through the hinge hole to fix the screw
- Insert and drive the suitable screws in all holes using electric screw driver
- Repeat the same procedure for fixing other all hinges also
- Mark the position of the handle on the door fronside as per drawing (Fig 5)
- Make the hole through the handle hole to fix the screw
- Set the handle on the door front side
- Fix the screw through the screw holes
- Check the handle shake
- Repeat the same procedure for fixing the other handles

- Check the glass size = 300 x 480 mm = 2 No's
- Mark the position of the glass on the door inside as per drawing
- Mark the position of the glass corner holder hole to fix the screw
- Set the glass and corner holder door inside four corner
- Fix the screw through the screw hole
- Repeat same procedure for fixing other all glass and glass corner holder also
- Check the alignment of glass as per drawing (Fig 5)



#### Door fixing in wall unit cabinet

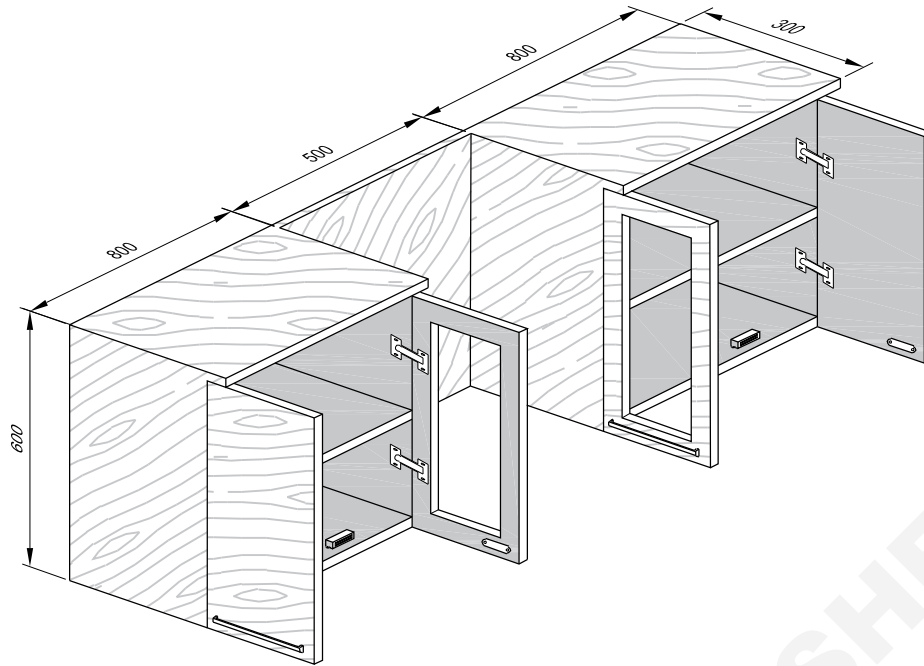
- Mark the hinge position on cabinet frame after making the cabinet door as per drawing
- Transfer the cabinet door hinge position on inside of the cabinet frame
- Mark a recess on cabinet frame to fix the hinge as explained earlier
- Lay the cabinet door in position to the cabinet frame for hinging

- Screw the hinge to the cabinet frame using screw in the centre of each leaf after making the pilot hole
- Check the alignment of the cabinet leaf
- Insert suitable screws in all holes. After making pilot holes
- Check one again the fitting of cabinet door as per drawing
- Repeat same procedure for fixing other cabinet door as per drawing
- Mark the position of the magnetic door catch on the cabinet frame as per drawing
- Make the pilot hole through the magnetic catch hole to fix the screw
- Set the magnetic catch on the cabinet frame top and bottom in position
- Fix the screw through the hole and check the catch as per drawing
- Repeat same procedure for fixing other all magnetic catch and check the catch (Fig 6)
- Check once again the fitting handle glass, and magnetic catch. (Fig 6)
- Check the free movement of cabinet doors.
- Finish the modular kitchen wall unit cabinet with dusting brush (Fig 6)

#### Kitchen cabinet frame base unit

- Assembling the kitchen cabinet frame base unit
- Check the side, middle vertical pieces top bottom and horizontal pieces and horizontal middle pieces of the cabinet to the required measurement before assembling
- Prepare the electric screwdriver on screwing
- Prepare the portable power drill machine on drilling
- Set the bar clamp to assemble the top and bottom of the frame
- Apply the fevicol on side vertical pieces one edge surface and bottom edge surface
- Assemble the top bottom and side, middle vertical pieces to make a frame and mark the drill hole point on the middle of the edge
- Place on the bar clamp width wooden support pieces and tighten it
- Make the pilot hole on the marked points of the edge
- Insert and drive the phillips flat head screws using electric screw driver
- Repeat the same procedure to assemble the middle horizontal pieces and bottom vertical piece
- Check the squareness of the cabinet frame as per drawing
- Check the back piece of the cabinet to the required measurements before assembling

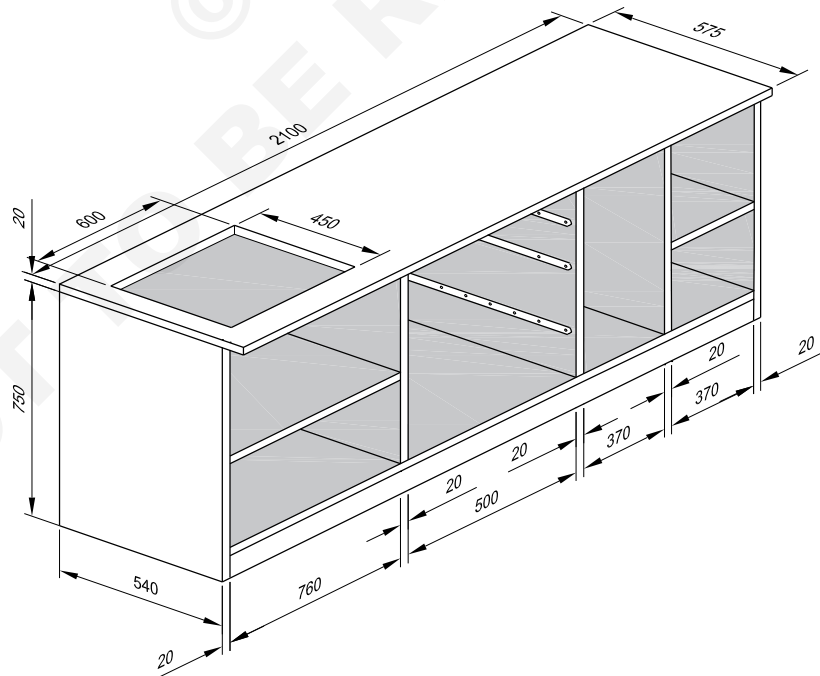
Fig 6



CA20N17135H6

- Position the plywood back side of the frame
- Mark the drill hole point on the middle of the all edges.
- Apply fevicol on the frame back side edge surface
- Make the pilot hole on the marked points of the edge
- Insert and drive the phillips flat head screws using electric screw driver
- Mark and make the total length and width of the top piece cutting in sink as per dimensions using portable power circular saw and portable jig machine
- Smooth all the surface using portable power disc sander.
- Check the squareness of the cabinet frame (Fig 7)

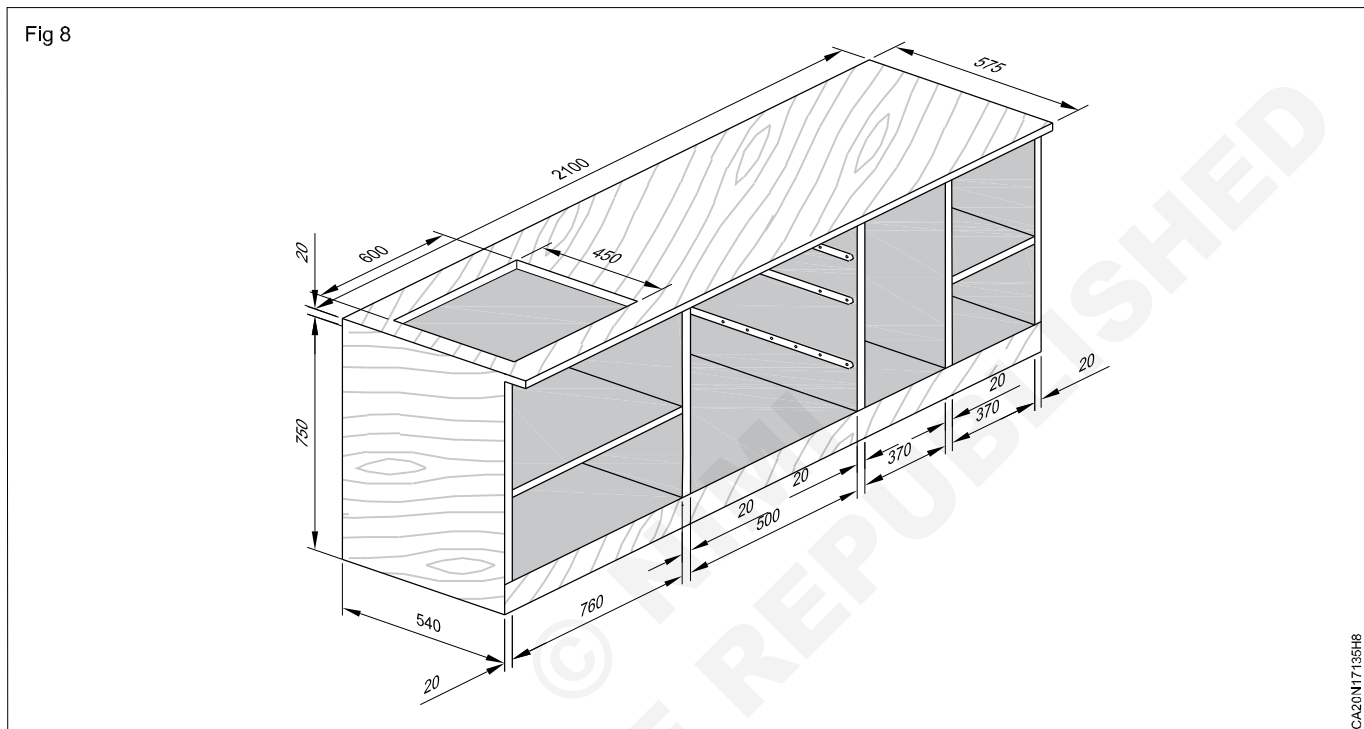
Fig 7



CA20N17135H7

- Mark and make total length and width of the colour sunmica of the cabinet frame top horizontal piece, side vertical pieces and bottom vertical pieces as per drawing (Fig 8)
- 602 x 2100 mm = Top piece - 1 No
- 100 x 2100 mm = Bottom vertical piece - 1 No
- 752 x 542 mm = Side vertical pieces - 2 No's
- Bond the colour sunmica on face side of the top, bottom vertical sides using fevicol S.R
- Allow the fevicol to dry.

- Plane the excess sunmica using portable power planner
- Remove the sunmica covering the sink fitting open cut out
- Filing the excess sunmica width half round file and finish the sink cutting as per drawing
- Bond the edge bonding tape on kitchen cabinet fram on all front edges as per drawing.
- Shave the excess edge tape using firmer chisel (Fig 8)
- Check the dimension as per drawing in base unit cabinet. (Fig 8)



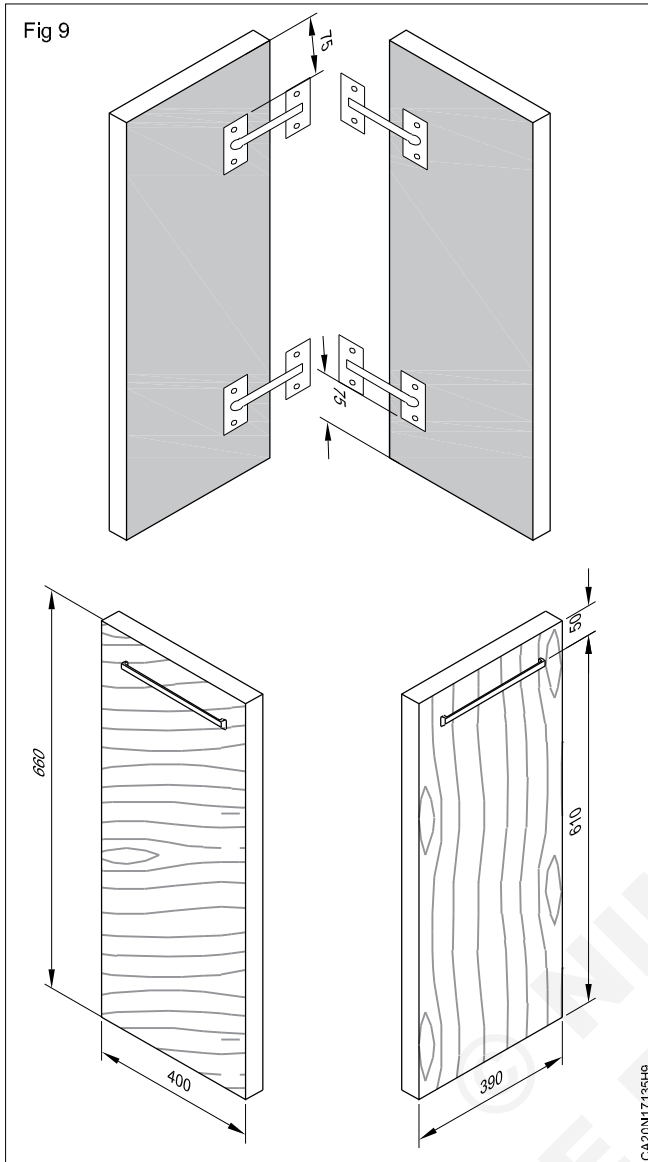
### Door finishing (Fig 9)

- Check the dimensions of the kitchen cabinet door pieces as per drawing
- Mark and make the total height and width of the colour sunmica of the door pieces as per drawing
- 405 x 665 mm = 2 No's, 395 x 665 mm = 2 No's
- Bond the colour sunmica on face side surface of the door pieces using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica using portable power planner
- Mark the position of the hinge on the door inside as per drawing.
- Select and set the hinge boring drill bit in portable power drill machining on dooring
- Make the hinge boring on the marked points of the door
- Press the hinge in place once the recess bas is completely flat
- Make a pilot hole through the hinge hole to fix the screw

- Insert and drive the suitable screws in all holes using electric screwdriver
- Repeat the same procedure for fixing other doors all hinges also
- Mark the position of the handle on the door front side as per drawing
- Make the hole through the handle hole to fix the screw
- Set the handle on the door face side
- Fix the screw through the screw holes
- Repeat the same procedure for fixing the other handles
- Check the handle shake

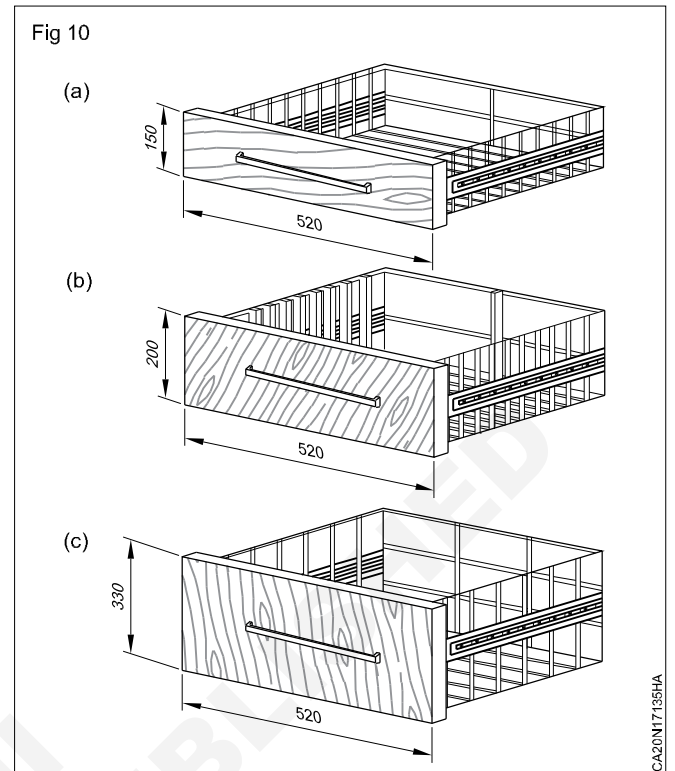
### Basket finishing (Fig 10)

- Check the dimensions of the kitchen cabinet basket front pieces as per drawing
- Mark and make the total height and width of the colour sunmica of the basket pieces as per drawing



- 525 x 155 mm - 1 No
- 525 x 205 mm - 1 No
- 525 x 335 mm - 1 No
- Bond the colour sunmica on face side surface of the basket pieces using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica using portable power disk sander
- Bond the edge banding tape on basket piece edges using fevicol heatex
- Share the excess edge tape using firmer chisel
- Mark the position of the basket on the basket pieces inside as per drawing (Fig 10)
- Mark the basket hole on the marked points of the pieces to fix the screw
- Set the basket on the basket piece inside
- Fix the screw through the screw holes
- Check the basket shake

- Repeat the same procedure for fixing the other baskets (Fig 10)

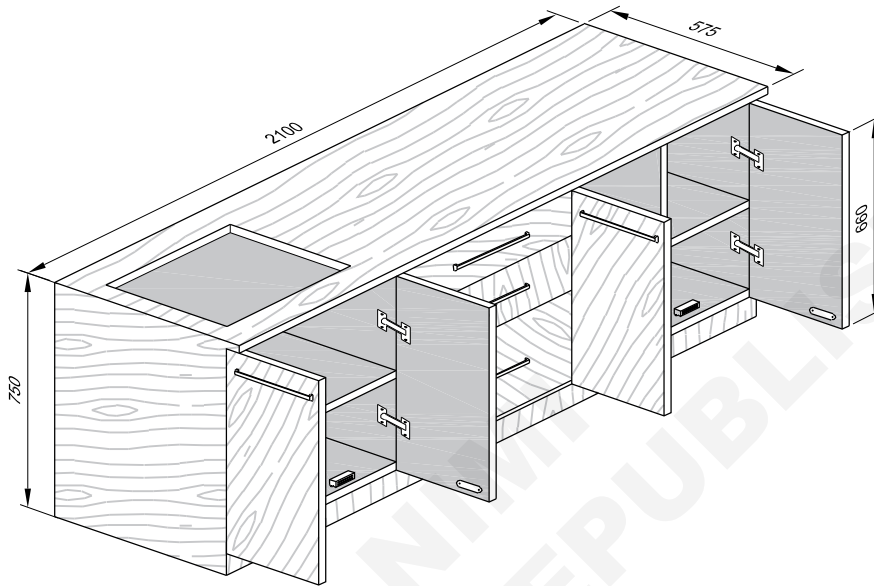


#### Door and basket fixing and cabinet finishing

- Mark the hinge position on cabinet frame after making the cabinet door as per drawing
- Transfer the cabinet door hinge position on inside of the cabinet frame
- Mark a recess on cabinet frame to fix the hinge as explained earlier
- Lay the cabinet door in position to the cabinet frame for hinging
- Screw the hinge to the cabinet frame screw in the centre of each of after making the pilot hole
- Check the alignment of the cabinet leaf
- Insert suitable screws in all after making pilot holes
- Check one again the fitting of cabinet door as per drawing
- Repeat same procedure for fixing other cabinet door as per drawing
- Mark the position of the magnetic door catch on the cabinet frame as per drawing
- Make the pilot hole through the magnetic catch hole to fix the screw
- Set the magnetic catch on the cabinet frame top in position
- Fix the screw through the hole and check the catch as per drawing

- Repeat same procedure for fixing other all magnetic catch and check the catch
- Check once again the fitting handle and, magnetic catch
- Check the free movement of cabinet doors
- Mark the position of the basket sliding rail on the cabinet frame and basket as per drawing
- Make the pilot hole through the sliding rail hole to fix the screw
- Set the sliding rail on the basket and cabinet frame middle vertical piece inside in position as per drawing
- Fix the screw through the hole and check the position
- Repeat same procedure for fixing other all basket sliding rail for cabinet frame and basket (Figs 8 & 10)
- Insert the basket in cabinet frame sliding rail
- Check the free movement of cabinet baskets
- Finish the modular kitchen. cabinet base unit with dusting brush (Fig 11)

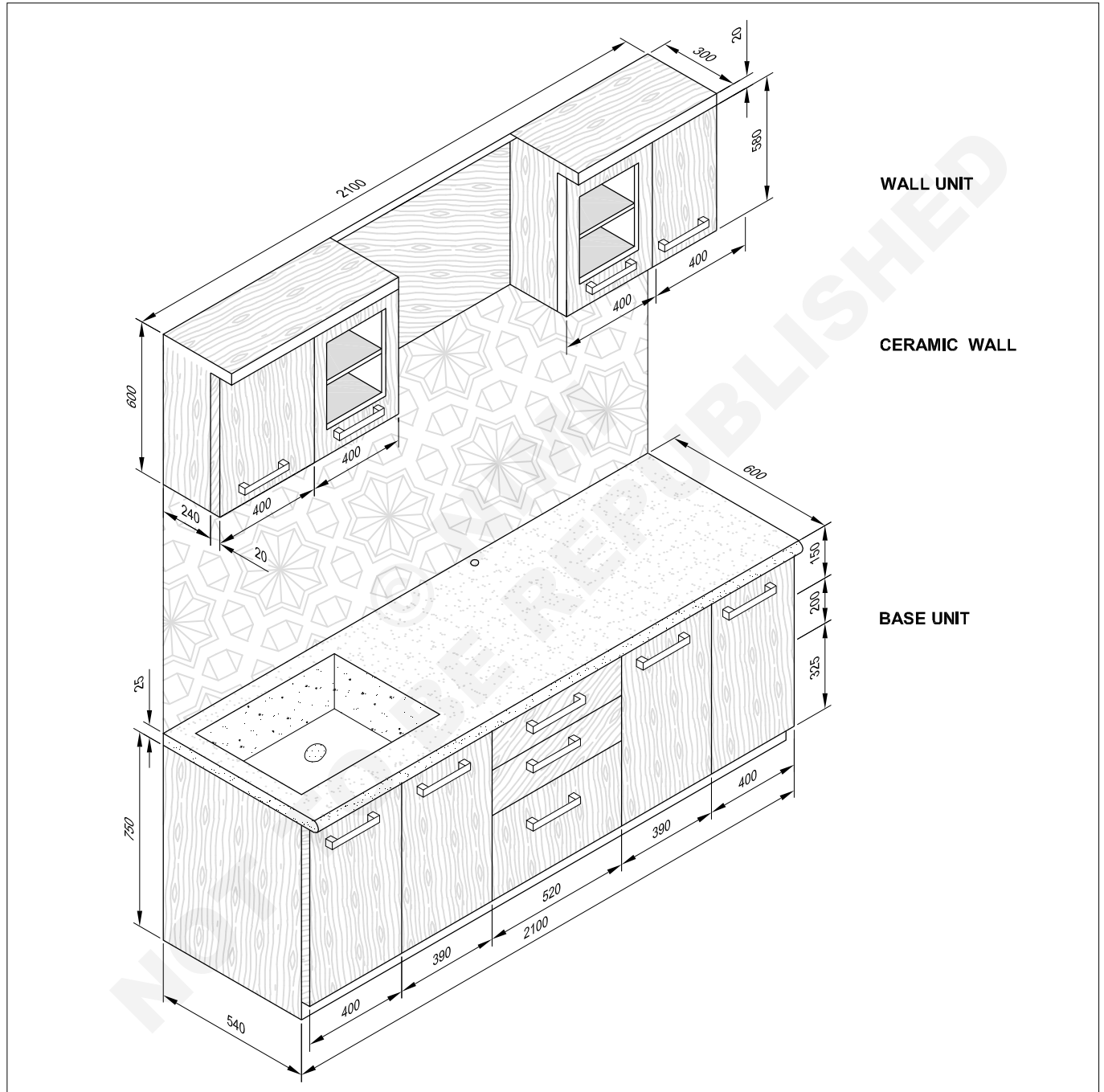
Fig 11



**Check for accuracy and finishing of moduler kitchen cabinet**

**Objective:** At the end of this exercise you shall be able to

- Check the accuracy for cabinet
- finish of the cabinet



						1.7.136
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>CHECK FOR ACCURACY AND FINISHING OF KITCHEN CABINET</b>				DEVIATIONS ± 0.1	TIME : 09 HRS
					CODE NO. CA20N17136E1	

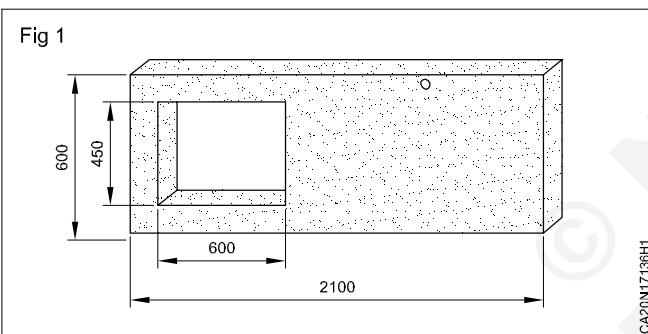
## Job sequence

### Check the wall unit and base unit cabinet size

- Check the length, width and height of the cabinet wall unit as per drawing
- Check the door alignment of the wall unit cabinet
- Check the door closing gap in wall unit
- Check one again the fitting glass in door
- Check the magnetic catch in wall unit
- Check the length, width and height of the cabinet base unit as per drawing
- Check the door closing gap in base unit
- Check the sliding rail movement in basket
- Check the magnetic catch in base unit

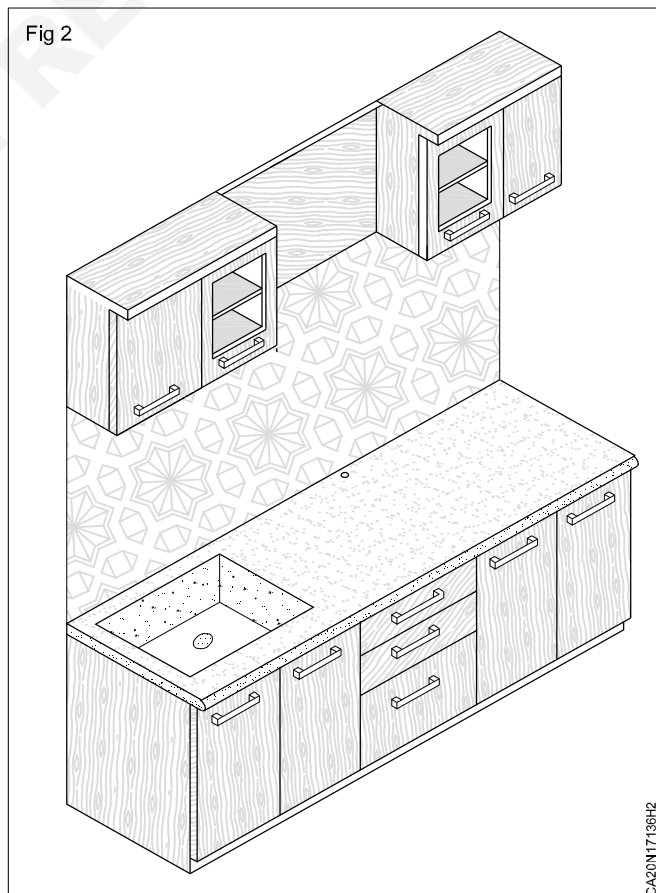
### Finishing of the cabinet in wall unit and base unit

- Check the granite size as per drawing
- Place the granite square on base unit top and check granite sink cutting and the hole for gas. tube insertion properly in position (Fig 1)



- Remove granite apply the aroidite adhesives on top of base unit unifromly
- Place the granite on top of in properly
- Allow the adhesives to dry
- Clean the granite with damp. Cloth and finish it
- Mark the borders of the cabinet on the wall to fix the cabinet base unit considering level, centre etc. Keeping the cabinet base unit on wall temporarily and check remove it.
- Select the size of the drill bit, fix in drilling machine and keep it read to drill.
- Make drill to the required number of through holes on cabinet base unit backside to mount it on the wall
- Place the hole drilled cabinet base unit in position as marked on the wall and mark the hole centres and remove it.
- Select the hammer drill bit fix it in portable power hammer drilling machine

- Make drill the holes to required depth on marked centres on wall.
- Prepare the wooden peg to fix the cabinet in the wall as per requirement
- Insert the wooden peg tightly inside the drilled holes on with ballpein hammer
- Remove the projected pegs drill pilot holes to insert screws and hold the cabinet base unit
- Lay the cabinet base unit place it on wall as marked in position. With respect to level, hole centres
- Insert the screws tighten and hold the cabinet base unit in place with help of power screwdriver. at lower speed to screw it.
- Check the alignment of the cabinet base unit.
- Place the cabinet wall unit 600 mm above the base unit granite top considering level, centre, orientation with respect to base unit etc. Mark the wall on the cabinet borders on the wall to fix the cabinet and remove it.
- Repeat the drilling, screwing fixing procedure followed in base unit fixing
- Finally check for firmness
- Clean the wall unit and base unit with damp cloth and finish it Fig 2

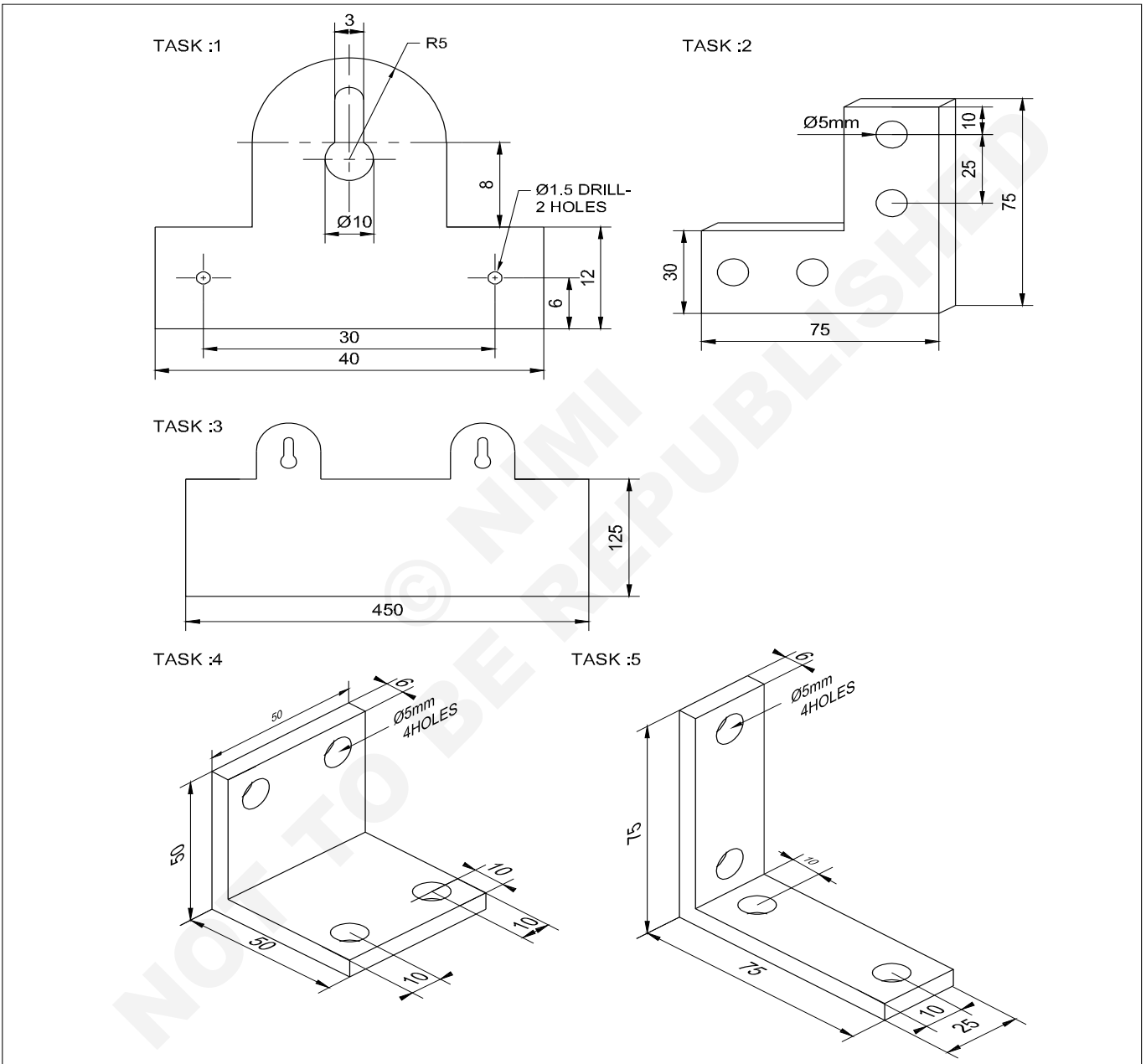




**Mark and make hanging plate, corner plate, name plate, corner clamp and angle plate**

**Objectives:** At the end of this exercise you shall be able to

- mark and make hanging plate and corner plate
- mark and make name plate, corner clamp and angle plate.



1	25x3x150		Fe310				
1	50x3x60		Fe310				
1	175x3x450		Fe310				
1	75x75x3		Fe310				
1	35x3x45	-	Fe310	-	-	1.8.137	
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.	
SCALE 1:1					DEVIATIONS ±0.01 mm		TIME 14hrs
					<b>MAKE HANGING PLATE,CORNER PLATE,NAME PLATE, CORNER CLAMP AND ANGLE PLATE</b>		CODE NO. CA20N18137E1

## Job Sequence

### TASK 1: Hanging plate

- 1 Check the raw material for its size using steel rule.
- 2 File the surfaces and edges using flat file.
- 3 File the other edges flat and square to one another.
- 4 Apply copper sulphate solution on the surface and allow it to dry.
- 5 Layout the lines as per drawing on the flat.
- 6 Punch the centres of the all drill holes.
- 7 Cut off the marked line by hacksawing.
- 8 Drill two holes of dia 1.5 mm with centres 30 mm apart.
- 9 Countersink both the holes with suitable bits.
- 10 Drill centre hole of dia 10 mm in the centre.
- 11 Chain drill 3 holes of dia 3 mm portion for parting of excess material from inside.
- 12 Separate the inside material using a chisel.
- 13 File the inside slot as per drawing.
- 14 File and finish the other sides.
- 15 File the curved surface and finish it using a half round file.
- 16 File and finish hanging also all sides as per sizes within  $\pm 0.5$  mm.

---

### TASK 2: Corner plate

- 1 Check the raw material for its size using steel rule.
- 2 File the surfaces and edges using flat file.
- 3 File the other edges flatly and square to one another.
- 4 Apply copper sulphate solution on the surface and allow it to dry.
- 5 Layout the lines as per drawing on the flat.
- 6 Punch the centres of the all drill holes.
- 7 Cut off the marked lines by hacksawing and filing.
- 8 Drill four holes of dia 5 mm with centres.
- 9 Countersink both the holes with suitable bits.
- 10 File the outside as per drawing.
- 11 File and finish the other sides using flat file.
- 12 File and finish corner plate all sides as per sizes within  $\pm 0.5$  mm.

---

### TASK 3: Name plate

- 1 Check the raw material for its size with steel rule.
- 2 File the surfaces and edges with flat file.
- 3 File the other edges flatly and square to one another.
- 4 Apply solution on the surface and allow it to dry.
- 5 Layout the lines as per drawing on the flat.
- 6 Punch the centres of the all drill holes.
- 7 Cut off the marked lines by hacksawing.
- 8 Drill center two hole of dia 5 mm in the centre.
- 9 Chain drill 3 holes of dia 3 mm for portion of excess material from inside.
- 10 Separate the inside material using a chisel.
- 11 File the inside two slot as per drawing.
- 12 File and finish the other sides.
- 13 File the two curved surface and finish it using a half round file.
- 14 File and finish name plate all sides as per sizes within  $\pm 0.5$  mm.

---

### TASK 4: Corner Clamp

- 1 Check the raw material for its size using steel rule.
  - 2 File the surfaces and edges using flat rule.
  - 3 File the other edges flatly and square to one another.
  - 4 Apply copper sulphate solution on the surface and allow it to dry.
  - 5 Layout the lines as per drawing on the flat.
  - 6 Punch the centres of the all drill holes.
  - 7 Cut off the marked lines by hacksawing.
  - 8 Drill center hole of dia 5 mm in the centre.
  - 9 File the outside as per drawing.
  - 10 File and finish the other sides.
  - 11 File and finish corner clamp all sides as per sizes within  $\pm 0.5$  mm.
-

## TASK 5: Angle plate

- 1 Check the raw material for its size using steel rule.
- 2 File the surfaces and edges using flat rule.
- 3 File the other edges flatly and square to one another.
- 4 Apply solution on the surface and allow it to dry.
- 5 Layout the lines as per drawing on the flat.
- 6 Punch the centres of the drill holes.
- 7 Cut off the marked lines by hacksawing.
- 8 Drill center four hole of dia 5 mm in the centre.
- 9 File the outside as per drawing.
- 10 File and finish the other sides.
- 11 File and finish angle plate all sides as per sizes within  $\pm 0.5$  mm.

## Skill Sequence

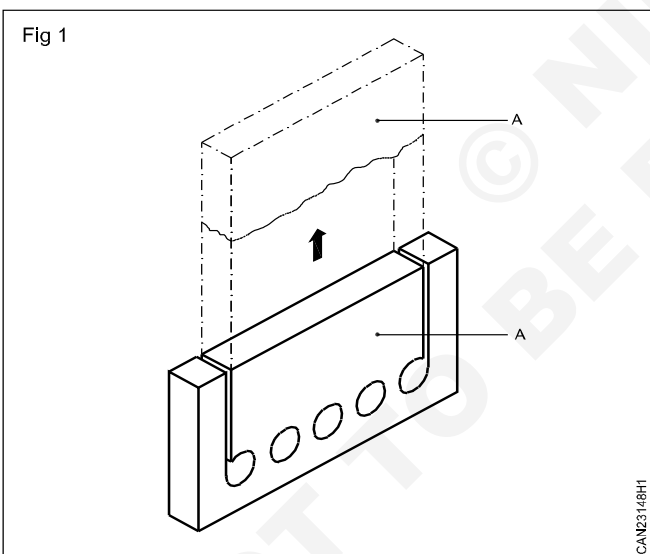
### Parting off by chain drilling

**Objective:** This shall help you to  
• **part off metal by chain drilling.**

The shape of certain job features is such that metals are to be cut in places which are inaccessible for hacksawing by hand.

While there are many methods for doing this, the most common method adopted in bench fitting is to chain drill in such places and hacksaw other sides, if possible.

After chain drilling and hacksawing the other sides, a chisel is used to part off the metal A. (Fig 1)



If the workpiece is not thick enough, parting with an ordinary flat chisel will cause distortion to the workpiece.

The best method is to use a PUNCHING CHISEL or WEB CHISEL to remove the metal web between the drilled holes.

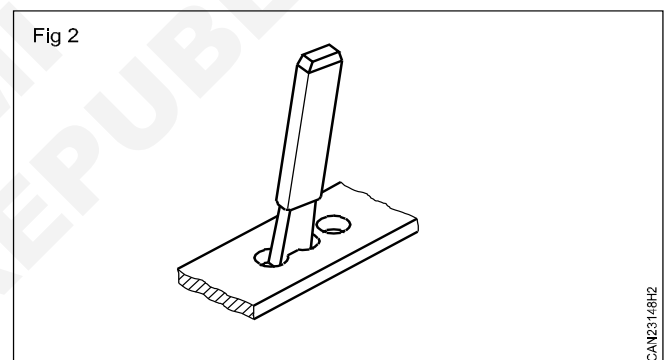
If the web thickness is kept too small, a slight inaccuracy in drilling will draw the drill to the hole already drilled and cause damage to the drill.

For easier parting off, select suitable hole size to permit the chisel to enter and leave minimum material for filing.

**Cutting with a web chisel will produce sharp cutting edges. Handle the work pieces carefully.**

The web chisel (punching chisel) has a double cutting edge and this reduces the possibility of distortion to work pieces.

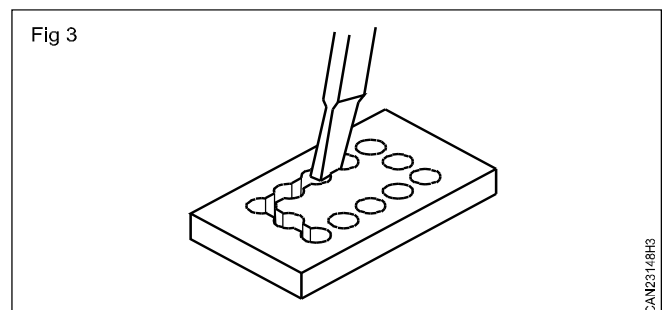
While cutting the web, the chisel is kept at an angle. (Fig 2)



Remove only thin chips of equal thickness.

Thick workpieces need cutting with a web chisel from both sides.

While marking for chain drilling, place the location of drill centres in such a way that the web is not too thick. (Fig 3)



About 1 mm thick web is convenient for drilling and separating with a chisel.

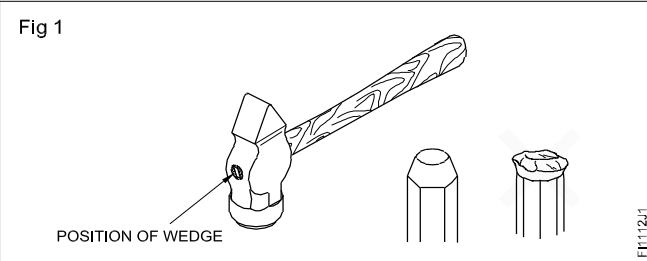
If the web thickness is kept too small, a slight inaccuracy in drilling will draw the drill to the hole already drilled and cause damage to the drill. For easier parting off, select the suitable hole size to permit the chisel to enter and leave minimum material for filing.

# Chipping using flat chisel

**Objective:** This shall help you to

- chip metal pieces.

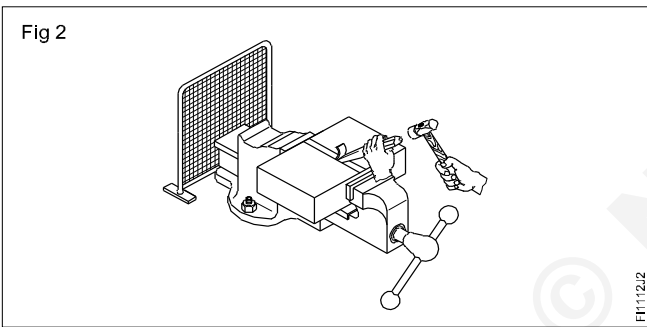
**Before commencing chipping:** Select a mushroom-free chisel and choose a hammer with a well secured handle. (Fig 1)



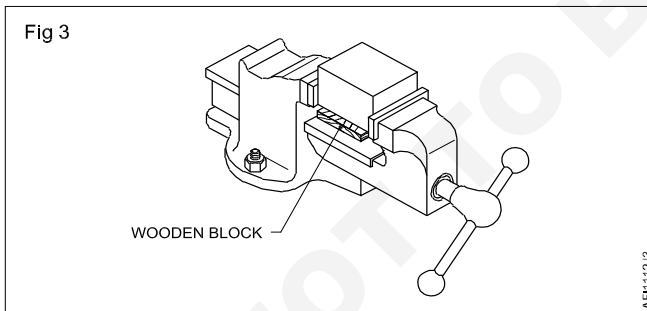
Wipe off oily substances, if any, from the face of the hammer.

Wear safety goggles.

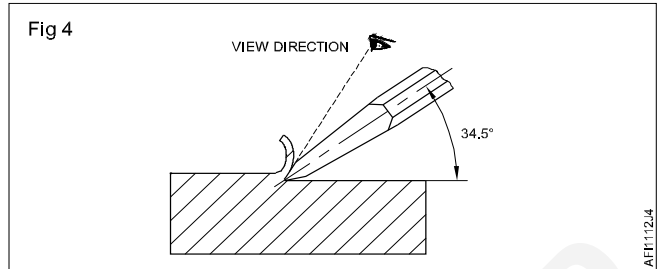
Install the chipping screen. (Fig 2)



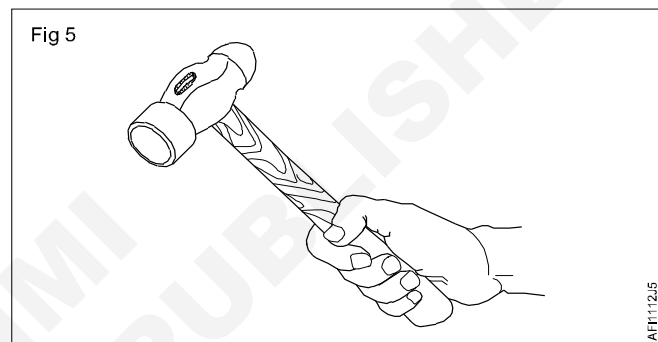
**Chipping process:** Hold the work in a vice. If necessary, support the work on a wooden block. (Fig 3)



Position the chisel at an angle  $34.5^\circ$  to cut the metal in uniform thickness. (Fig. 4)

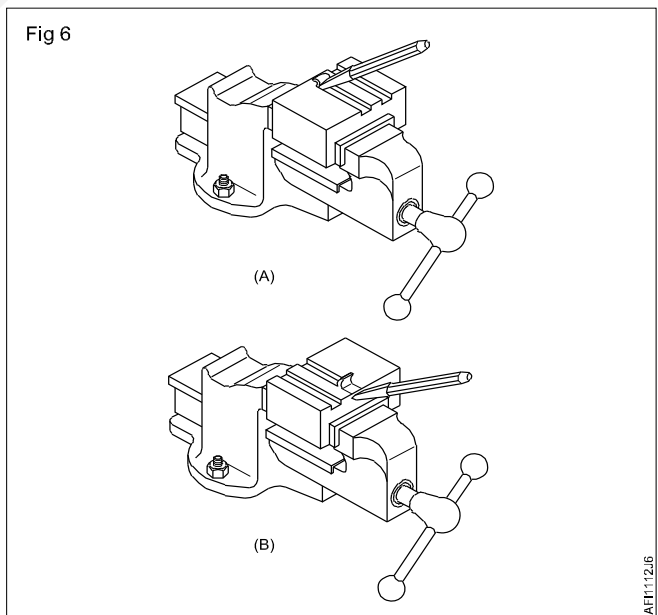


Hold the hammer at the end of the handle for maximum leverage. (Fig 5)



Hammer the head of the chisel by looking at the point of the chisel. (Fig. 4)

Stop chipping before the end of the surface; otherwise the edge of the job will break off. To prevent this, chip the end of the job from the opposite direction. (Figs 6A & B)



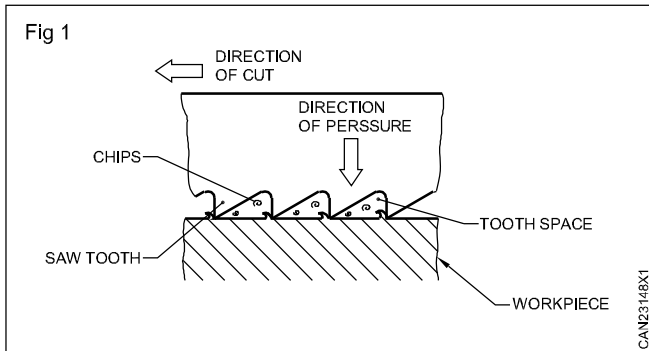
# Hacksawing

**Objectives:** This shall help you to

- fix hacksaw blades maintaining correct tension and direction
- cut metal pieces with a hacksaw.

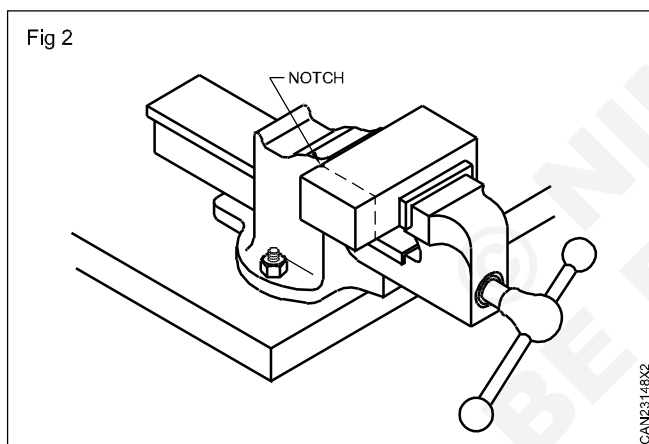
## Fixing of hacksaw blades

Keep the teeth of the hacksaw blade point in the direction of the cut and away from the handle. (Fig 1)



Keep the blade should be held straight and correctly tensioned before starting.

Make a small notch while starting the cut. (Fig 2)

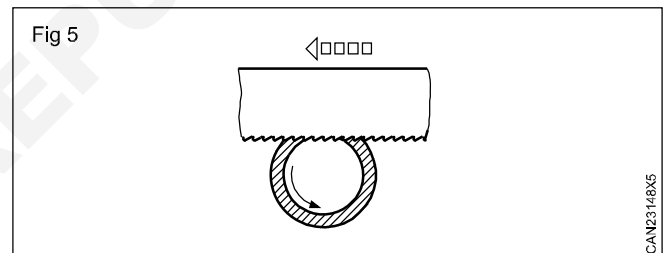
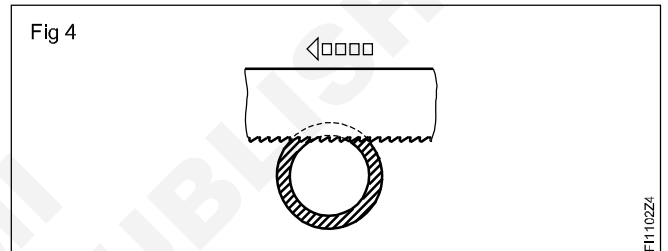
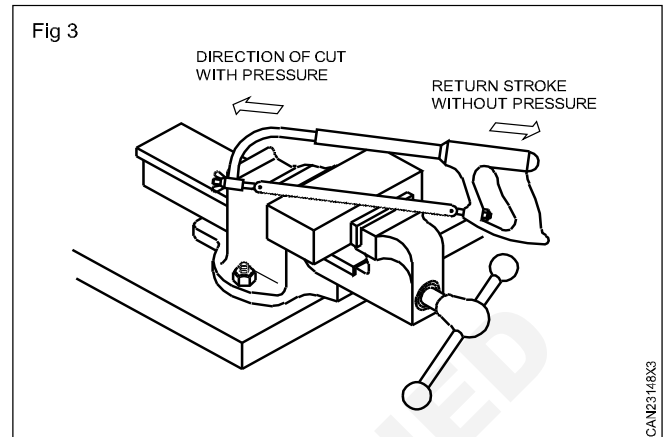


Study the cutting movement and use the full length of the blade.

Apply pressure only during the forward stroke. (Fig 3)

Cut atleast two to three teeth in contact with the work. Select a fine pitch blade for thin work. (Fig 4)

Turn and change position of the pipe while hacksawing. (Fig 5)



**Normally, a coolant is not necessary while hacksawing. Do not move the blade too fast. While finishing a cut slow down to avoid breakage of blade and injury to yourself and other.**

## Filing flat surface

**Objective:** This shall help you to

- file flat.

Check the height of the bench vice. (Fig 1) If the height is more, use a platform and if it is less, select and use another work bench.

Hold the job in the bench vice with projection of 5 to 10 mm from the top of the vice jaw.

Select flat files of various grades and length according to the

- Size of the job
- Quantity of metal to be removed.

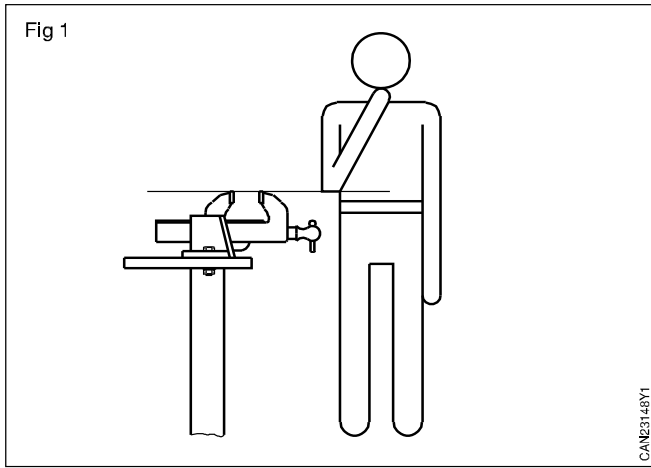


Fig 1

– Material of the job.  
Check whether the handle of the file fits tightly. Hold the handle of the file (Fig 2) and push the file forward using your right hand palm on left hand palm.

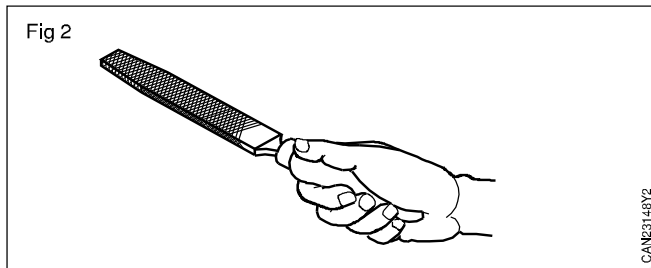


Fig 2

Hold the tip of the file according to the quantity of the metal to be removed.  
For heavy filing. (Fig 3)

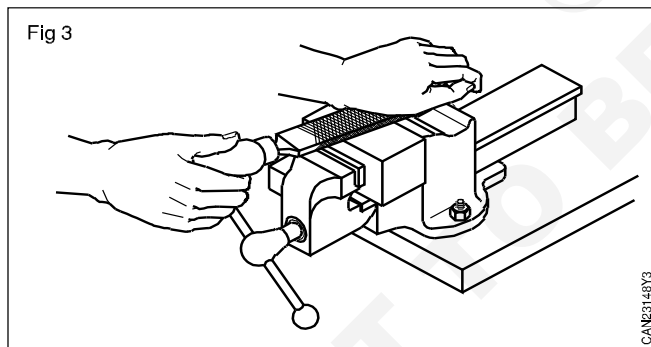


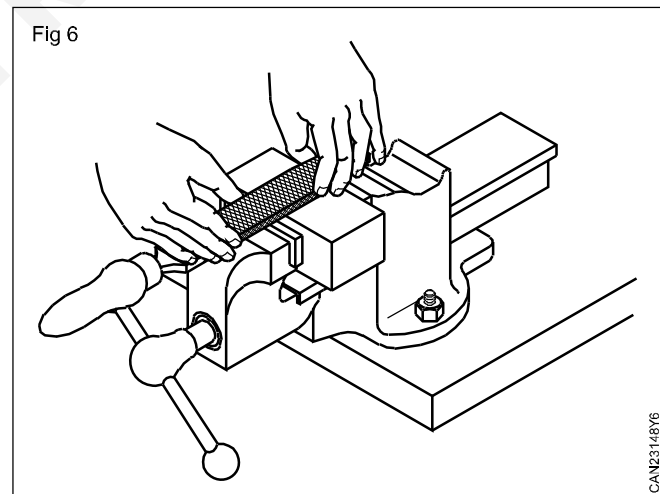
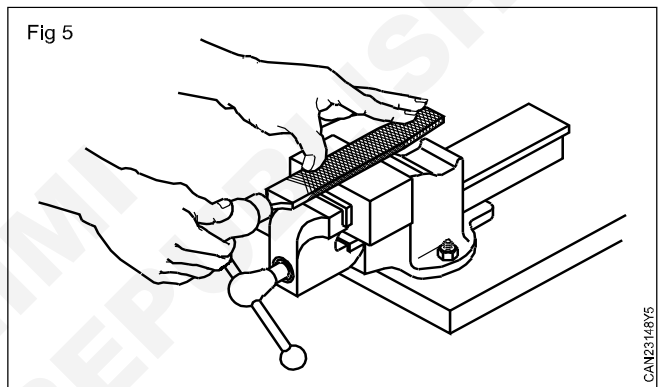
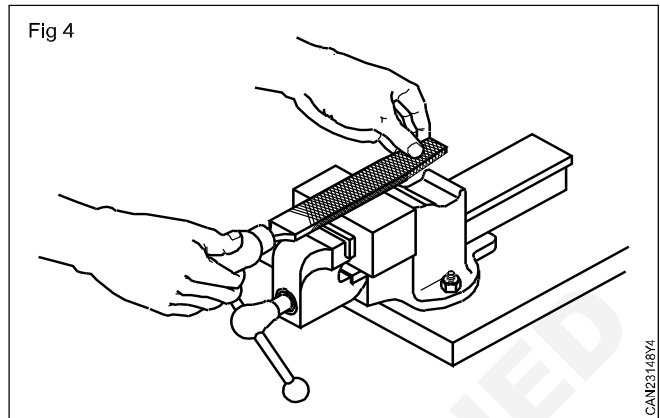
Fig 3

For light filing. (Fig 4)

For removing local unevenness. (Fig 5)  
For removing the local unevenness draw filing can also be done. (Fig 6) The same filing can also be done for fine finishing.

Start filing by pushing the file uniformly during the forward stroke and release the pressure during the return stroke.

Continue giving strokes. Balance the pressure of the file in such a way that the file always remains flat and straight over the surface to be filed.



# Countersinking

**Objective:** This shall help you to  
 • countersink holes of different sizes.

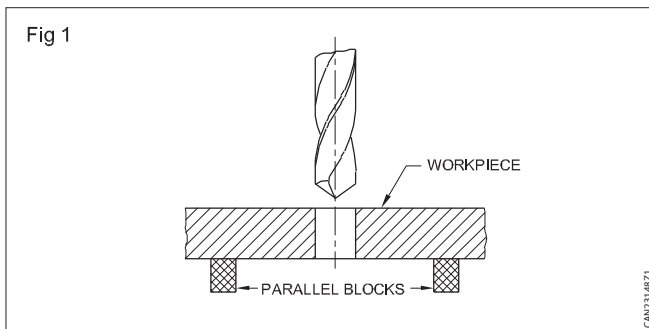
## Selection of countersinks

Select the countersinking tool according to the angle of the taper head of the screw. Use the table for countersink holes.

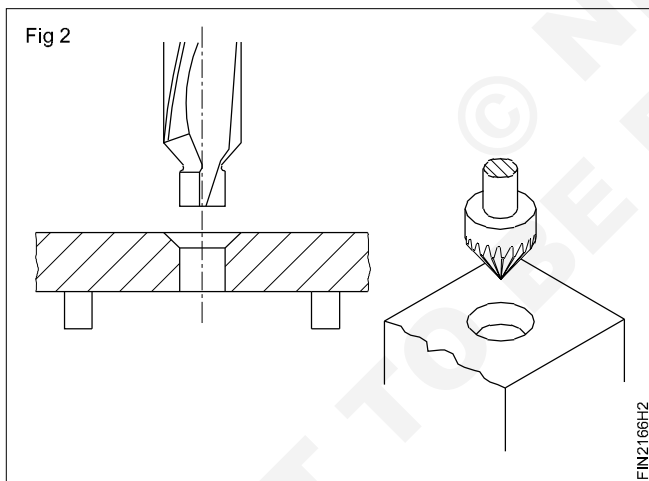
## Procedure

Fix the job in the machine vice (if necessary, use parallel blocks) and set it square.

Align the machine spindle with the drilled hole to be countersink. (Fig 1)



Remove the drill and fix the countersink tool on the machine without disturbing the alignment. (Fig 2)

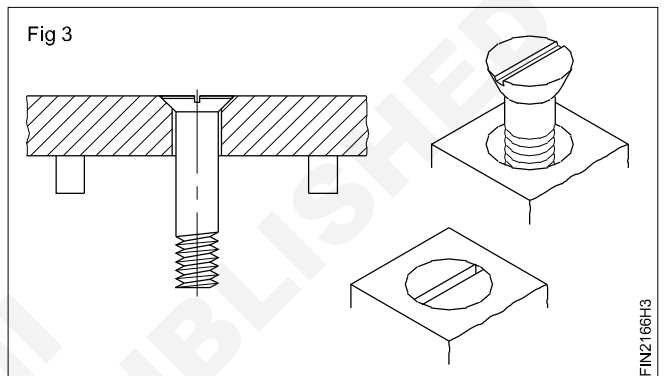


Set the spindle speed of the drilling machine to the nearest calculated r.p.m. Use the formula.

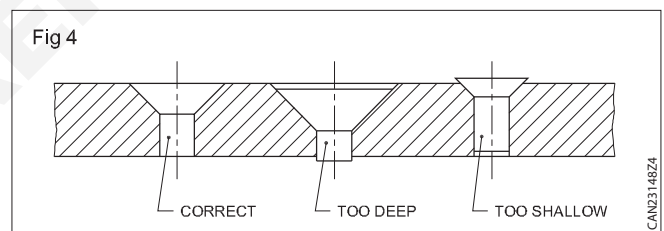
$$V = \frac{\lambda x D x N}{1000}$$

Substitute the recommended value of 'V' and diameter of countersink. (V = 1/3rd of drilling cutting speed)

Countersink the hole to a depth equal to the head length of the screw. (Fig 3)



Check the countersink hole with a suitable countersink headscrew for proper seating. (Fig 4)

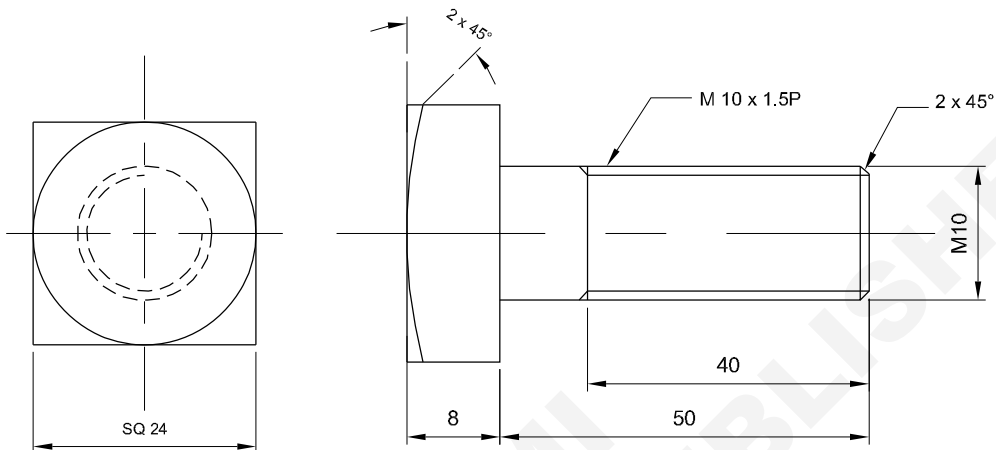


Make bolt, nut and washer

Objectives: At the end of this exercise you shall be able to

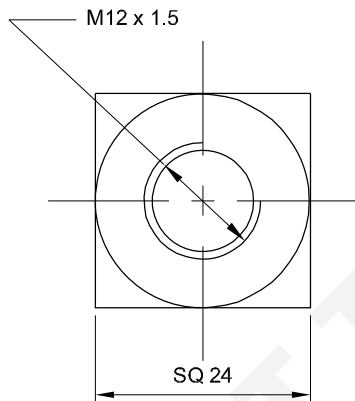
- mark and make square bolt
- mark and make square nut
- mark and make plain washer.

TASK-1



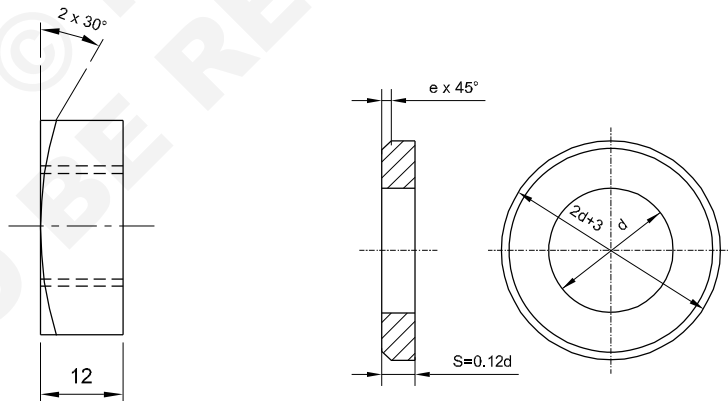
SQUARE BOLT

TASK-2




SQUARE NUT

TASK-3



PLAIN WASHER

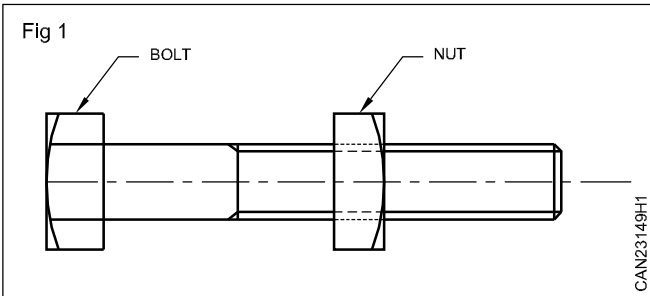
1	SQUARE 25 x 2	-	M.S.SHEET	-		
1	SQUARE 25 - 68 (BOLT & NUT)	-	Fe310	-	2	1.8.138
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>MAKE BOLT,NUT AND WASHER</b>				TOLERANCE : ±0.04	TIME : 6 Hrs
					CODE NO : CA20N18138E1	



# Job Sequence

## TASK 1: Square head bolt

- Check the raw material size using steel rule.
- Cut the square rod to size 53 mm using hacksaw.
- File square, rod side 25 mm to side 24 mm and length 50 mm.
- File to size  $\varnothing 11.9$  mm x 40 mm length as shown in Fig 1.



- File chamfer in blank end to 2 mm x 45° and head side 2 x 30°.
- Hold the square head bolt blank in bench vice to 90°.
- Fix M 12 split die in die stock.
- Set M 12 split die on square head bolt blank end and cut external thread.
- Repeat the thread cutting process until the nut matches.
- Check the external thread using screw pitch gauge and matching nut.

## TASK 2: Square nut

- Check the raw material size 15 mm using steel rule.
- File nut to size 12 mm thickness in 25 mm side square rod.
- File chamfer in one end to 2 mm x 30°.
- Determine tap drill size for M12 tap.
- Mark centre of hole for tapping hole.
- Punch on the tap drill hole centre with centre punch 90°.
- Make centre drill to locate hole centre.
- Drill  $\varnothing 6$  mm pilot hole in square nut.
- Drill  $\varnothing 10.5$  mm for tapping hole.
- Chamfer both ends of drilled hole to 2 mm x 45°.
- Hold the nut in bench vice parallel to vice jaws.
- Fix M 12 first tap in tap wrench and cut internal thread as per drawing.
- Similarly, fix M12 second tap, third tap and cut and form full internal thread.
- Check the threaded hole with screw pitch gauge and matching bolt.
- Clean the thread in bolt and nut.
- Match the nut with bolt as shown in Fig 1.
- Apply a little oil and preserve it for evaluation.

## TASK 3: Plain washer

- Check the raw material size.
- Mark centre of hole and outer circular line.
- Punch on the washer drill hole centre with center punch 90° and drilled circular line.
- Make centre drill to locate hole centre.
- Drill  $\varnothing 6$  mm pilot hole in washer.
- Drill  $\varnothing 12$  mm for washer hole.
- Sawing and filing outer circular line.
- One face is chamfered at 2 mm x 45°.
- Clean the washer.

## Skill sequence

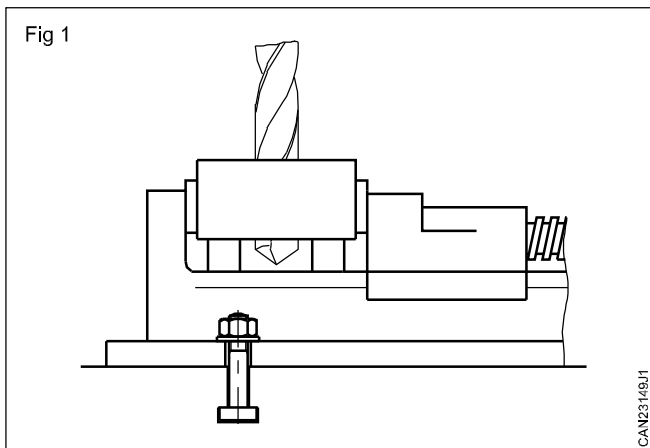
### Drilling through holes

**Objective:** This shall help you to

- drill holes of different diameter in a drilling machine.

Punch the centre of the hole to be drilled by a centre punch.

Set the job in the machine vice securely by using two parallel bars to clear the drill. (Fig 1)



Fix the drill chuck into the spindle of the drilling machine.

Fix the 6 mm dia drill in the drill chuck for pilot hole.

Select the spindle speed by shifting the belt in the appropriate cone pulleys.

Drill the pilot hole for 6 mm.

Remove the 6 mm drill and fix the 10.5 mm.

Make drill  $\varnothing$  10.5 mm hole.

Remove the drill and drill chuck.

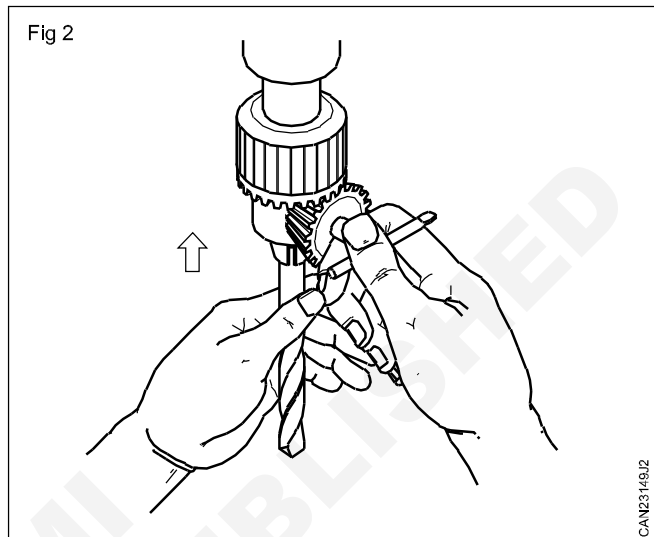
#### Caution

Do not remove chips with your bare hands - use brush.

Do not try to change the belt while the machine is running.

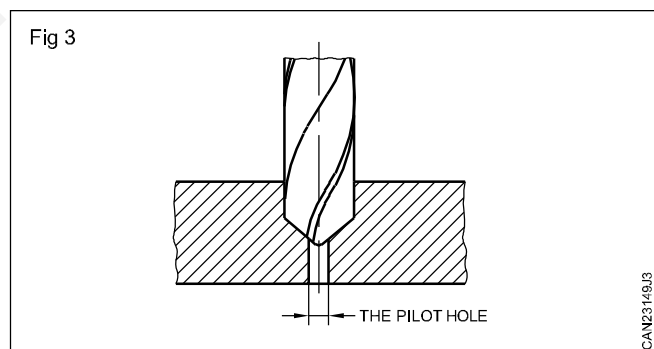
Ensure that the drill do not penetrate into the vice.

Fix securely the drill deep into the drill chuck. (Fig 2)



Since the web of large diameter drills are thicker, the dead centres of those drills do not sit in the centre punch marks. This can result in the shifting of the hole location. Thick dead centres cannot penetrate into the material easily and will impose severe strain on the drill.

These problems can be overcome by drilling pilot holes initially. (Fig 3)



### Tapping through holes

**Objective:** This shall help you to

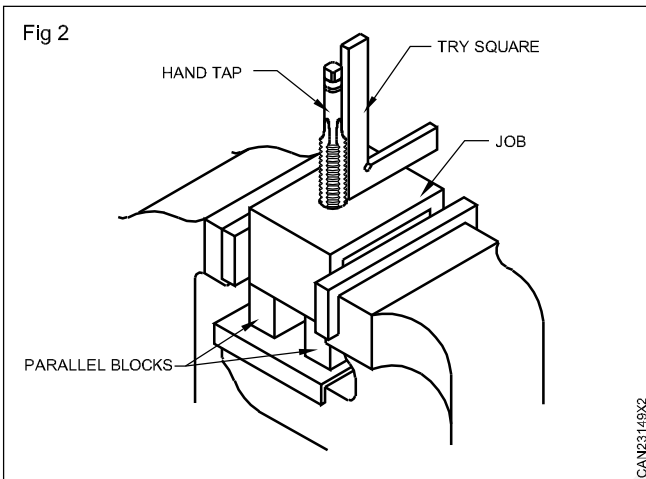
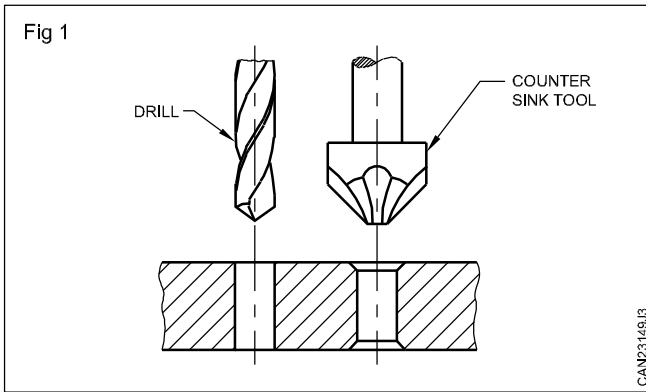
- cut internal threads using hand taps.

Determine the tap drill size either using the formula or the table.

Drill the hole to the required tap drill size. [An undersized hole will lead to breakage of the tap].

Chamfer the end of the drilled hole for easy aligning and starting of the tap. (Fig 1)

Hold the work firmly and horizontally in the vice. The top surface of the job should be slightly above the level of the vice jaws. This will help in using a try square without any obstruction while aligning the tap. (Fig 2)

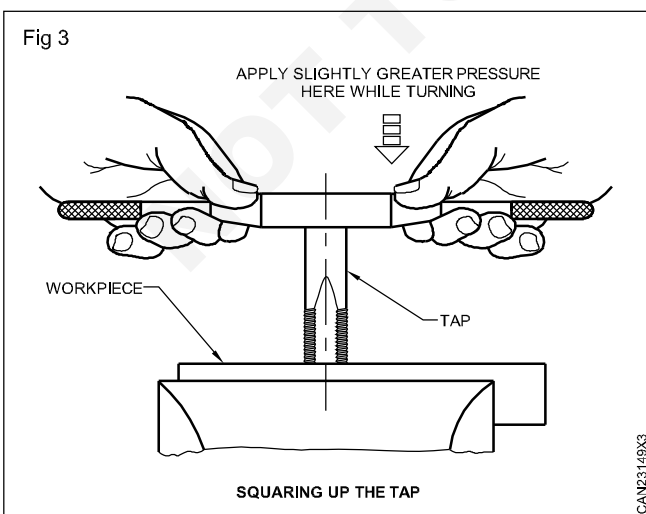


Fix the first tap (taper tap) in the correct size tap wrench. Too small a wrench will need a greater force to turn the tap. Very large and heavy wrenches will not give the 'feel' required to turn the tap as it cuts and may lead to breakage of the tap.

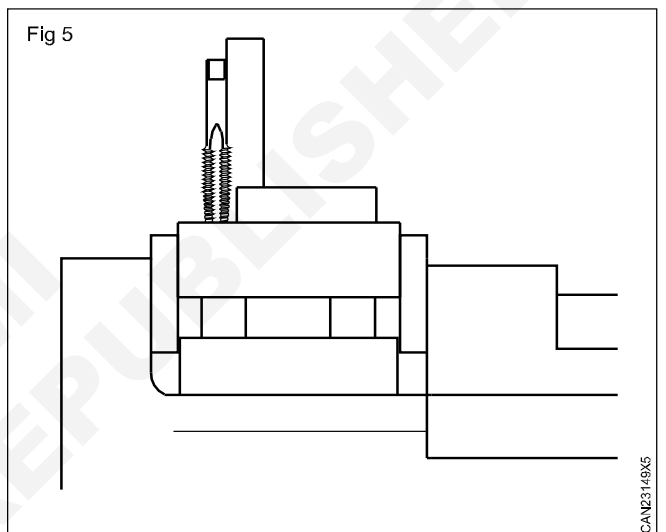
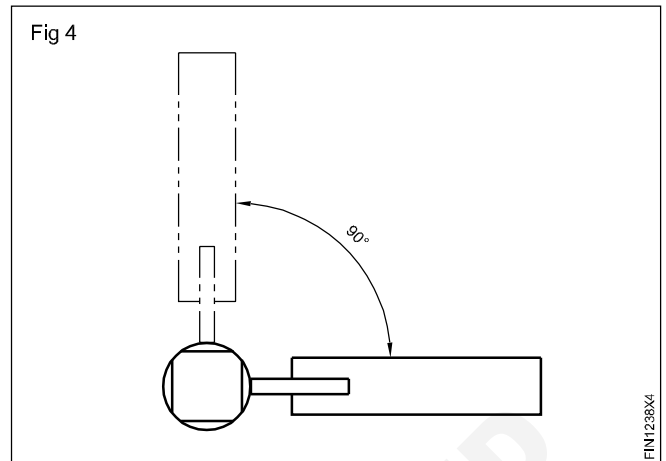
Position the tap in the chamfered hole vertically by ensuring the wrench is in a horizontal plane.

Exert steady downward pressure and turn the tap wrench slowly in the clockwise direction to start the thread. Hold the tap wrench close to the centre. (Fig 3)

Remove the wrench from the tap when you are sure of starting the thread without disturbing the setting.



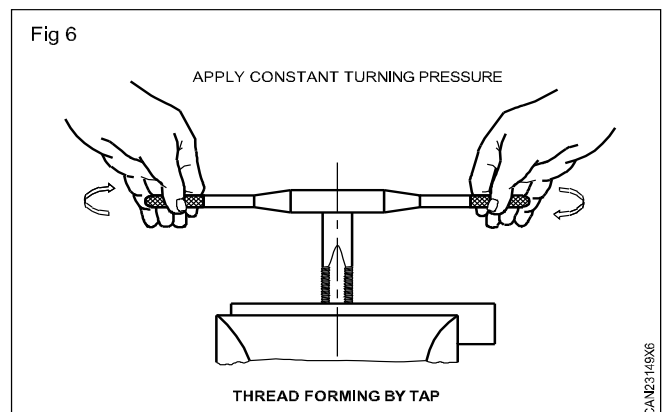
Check and make sure that the tap is vertical by using a try square in two positions at 90° to each other. (Figs 4 & 5)



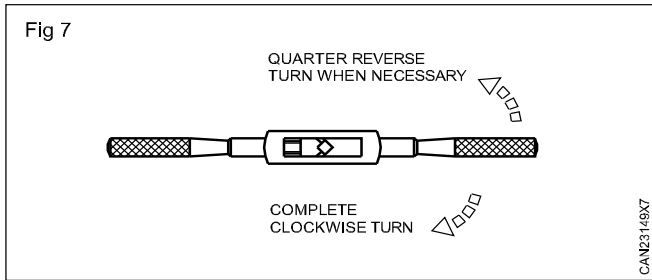
Make correction if necessary by exerting slightly more pressure on the opposite side of the tap inclination.

Check the tap alignment again. The tap alignment should be corrected within the first few turns. If it is tried afterwards there is a chance of breaking of the tap.

Turn the wrench lightly by holding at the ends without exerting any downward pressure after the tap is positioned vertically. The wrench pressure exerted by the hands should be well balanced. Any extra pressure on one side will spoil the tap alignment and can also cause breakage of the tap. (Fig 6).



Continue cutting the thread. Turn backwards frequently about quarter turn, to break the chips. (Fig 7)



Stop and turn backwards when any obstruction to the movements is felt.

**Use a cutting fluid while cutting the thread to minimize friction and heat.**

Cut the thread until the hole is totally threaded.

Finish and clean up using the intermediate and plug tap will not cut any thread in the first tap as entered the hole fully.

Remove the chips from the work and clean the tap with a brush.

**Make sure that the dia of the hole to be tapped is correct for the given size of the tap.**

**Turn backwards to break the chip after every quarter turn.**

**Select the length of wrench suitable to the size of the tap over length of wrench may cause the breakage of tap.**

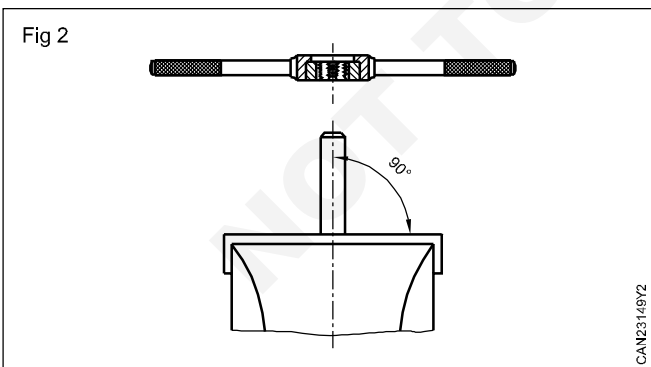
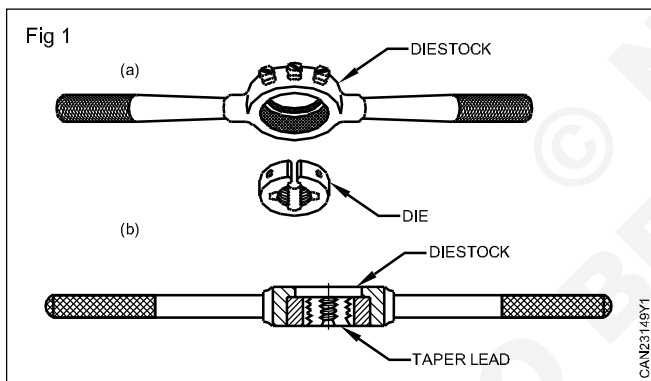
## External threading using dies

**Objective:** This shall help you to  
 • cut external threads using dies.

Check blank size.

Blank size = Thread size - 0.1 x pitch of thread.

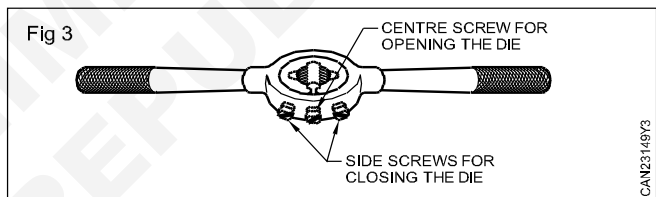
Fix the die in the diestock and place the leading side of the die opposite to the step of the die stock. (Figs 1 & 2)



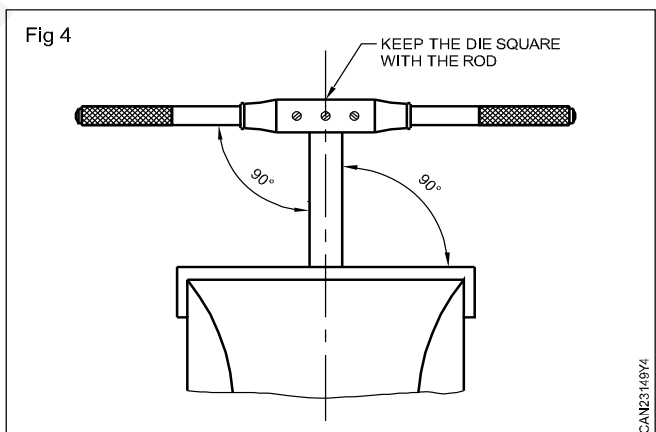
**Use vice clamp for ensuring a good grip in the vice.**

**Project the blank above the vice - just the required thread length only.**

Place the leading side of the die on the chamfer of the work. (Fig 3)



Make sure that the die is fully open by tightening the centre screw of the diestock. (Fig 4)

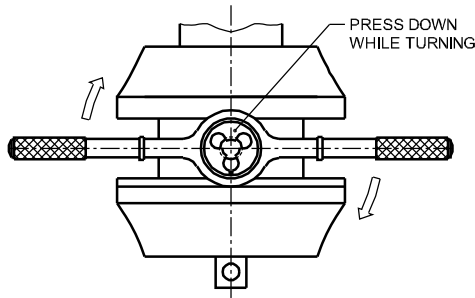


Start the die, square to the bolt centre line. (Fig 5)

Apply pressure on the diestock evenly and turn in a clockwise direction to advance the die on the bolt blank. (Fig 5)

Cut slowly and reverse the die for a short distance in order to break the chips.

Fig 5



CAN23149Y5

**Use a cutting lubricant.**

Increase the depth of the cut gradually by adjusting the outer screws.

Check the thread with a matching nut.

Repeat the cutting until the nut matches.

**Too much depth of cut at one time will spoil the threads. It can also spoil the die.**

**Clean the die frequently to prevent the chips from clogging and spoiling the thread.**

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**Wood & Carpentry**  
**WWT - Basic fitting**

**Exercise 1.8.139**

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**Grind chisel, drill and check for correct cutting angle**

**Objectives:** At the end of this exercise you shall be able to

- grind of flat chisel
- grind the twist drill bit and check the cutting angle.

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**Refer Ex No 1.6.112**

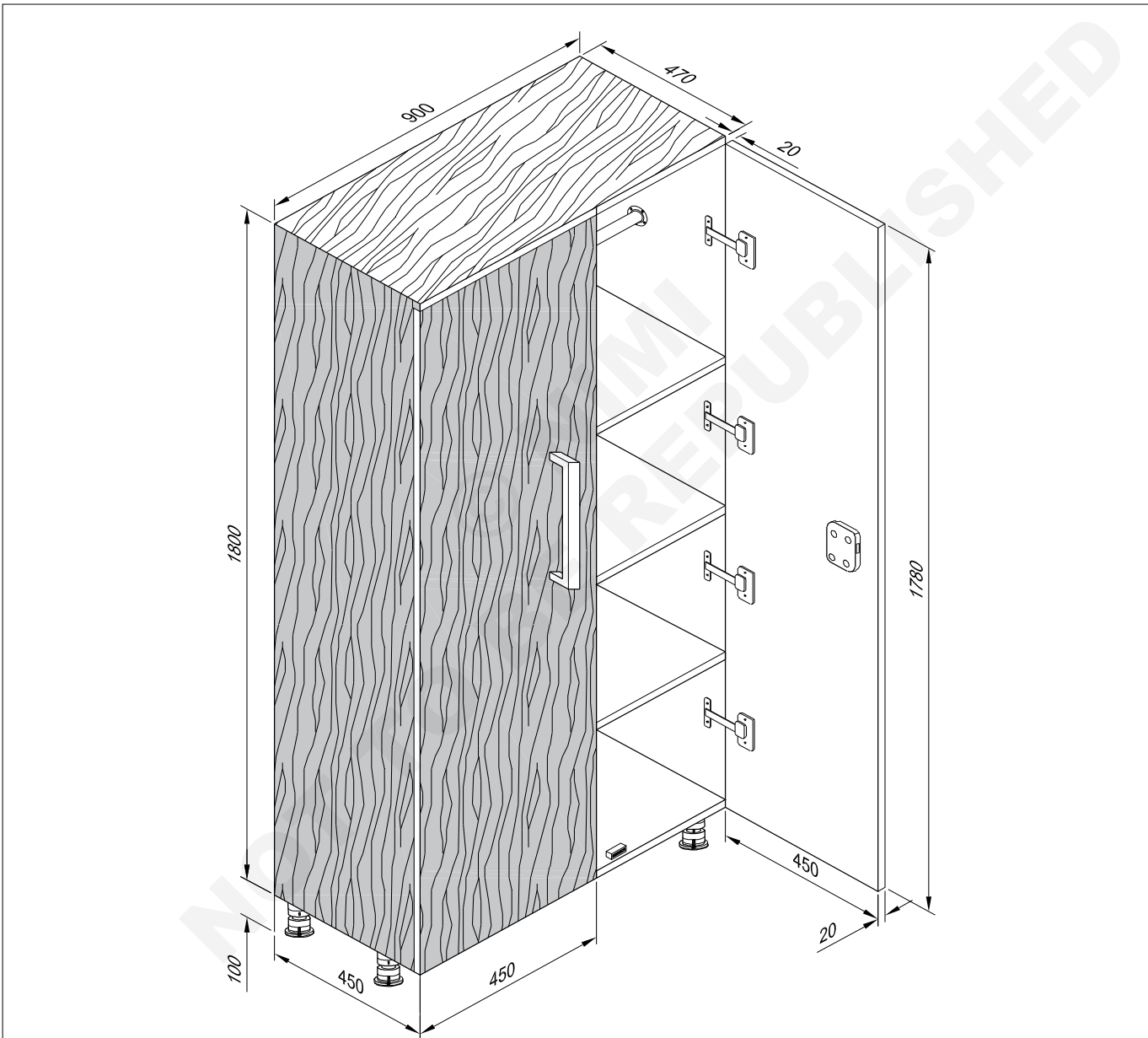
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Demonstrate on modular furniture, study and plan the making of desired cabinet

- Objectives:** At the end of this exercise you shall be able to
- demonstrate the modular office and domestic furniture
  - determine the work by studying the cabinet drawing

**Job sequence**

TASK 1: Demonstrate on modular furniture



1	-	-	-	-	-	1.9.140
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	MODULAR CABINET				TOLERANCE ±0.01	TIME : 6hrs
					CODE NO. CA20N19140E1	

**Instructor may arrange a youtube video display or arrange for a site visit and demonstrate the modular furniture name and its uses for office and domestic**

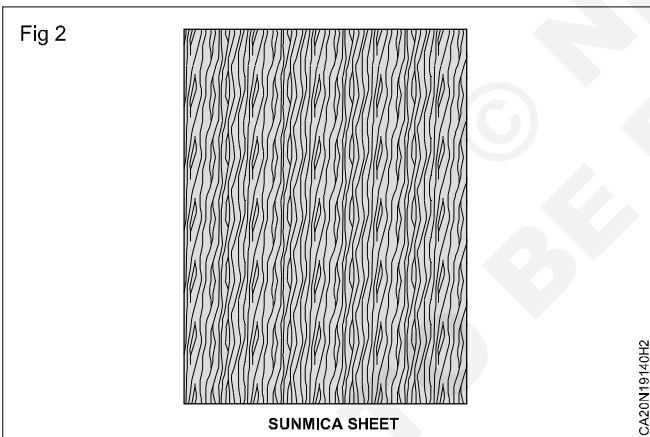
- Trainees will note down all the display furniture name and uses
- Record it in your note book
- Get it checked by the instructor

**TASK 2: Plan for making desired cabinet**

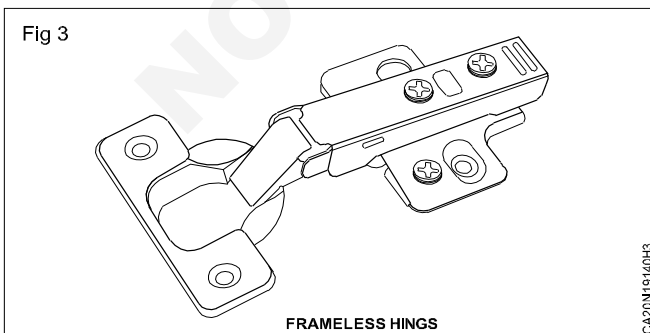
- Must have a good understanding of the details mentioned in the drawing.
- Calculate the required size plywood (Fig 1)



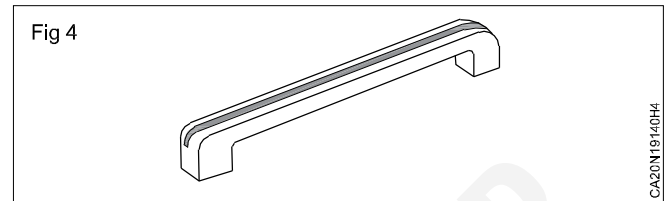
- Determine the required sunmica for interior and exterior of cabinet (Fig 2)



- Choose the appropriate shape and size of hinges to suit the cabinet (Fig 3)



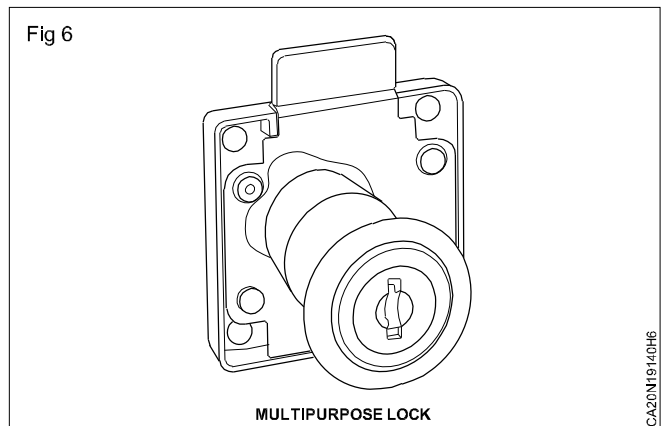
- Choose the suitable handle for the cabinet (Fig 4)



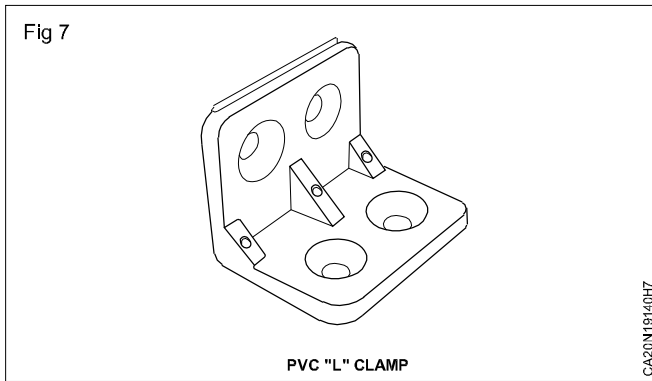
- Similarly choose the handle side
- Determine the best suited side before finishing the hinges
- Plan mark and cut the plywood according to size and number of pieces
- Note the thickness and choose of the sunmic shades
- Calculate the required fevicol and other addesives.
- Calculate the required banding edge tape (Fig 5)



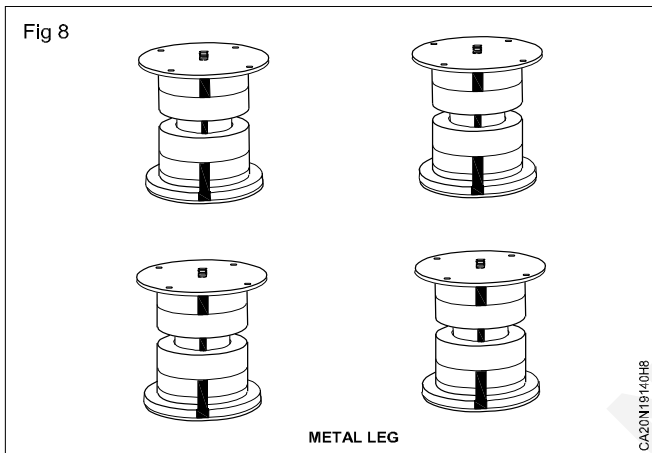
- Note the size and number of screws required
- Note the size and type of cabinet lock (Fig 6)



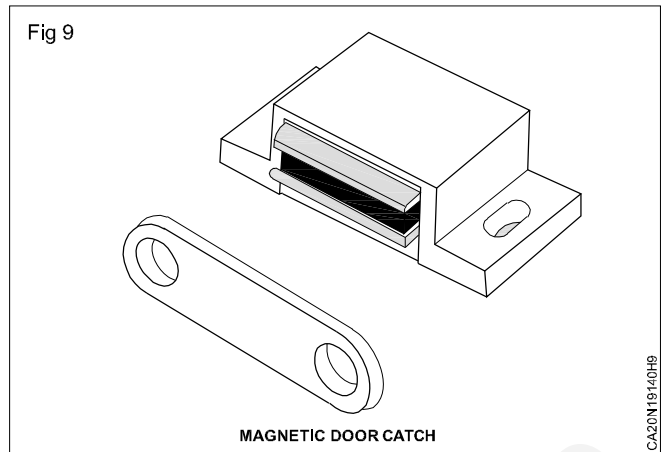
- Note the size and number of PVC "L" bracket (Fig 7)



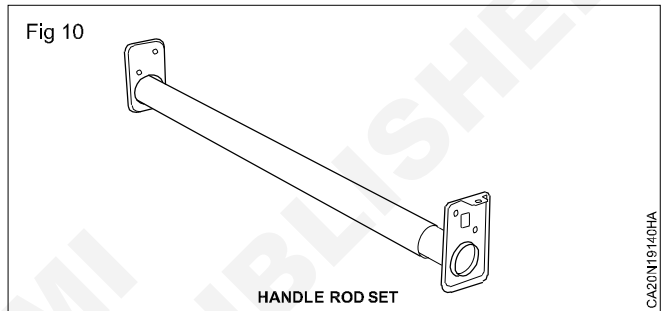
- Calculate the required leg size as per drawing
- Choose the suitable leg shape for the cabinet (Fig 8)



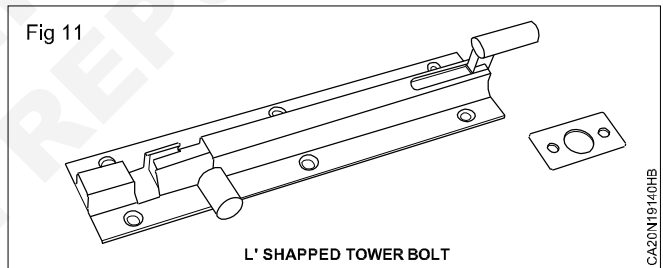
- Choose the suitable magnetic door catch (Fig 9)



- Choose the suitable cabinet hanging rod set (Fig 10)



- Choose the suitable "L" shaped tower bolt (Fig 11)





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**Select proper material and tool for making cabinet**

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**Objective:** At the end of this exercise you shall be able to

- **select the required material for cabinet making**
  - **select the required tools for cabinet**
- 

**Job sequence**

**Required materials**

**For drawing refer Ex No 1.9.140**

- 19 mm Plywood
- 900 x 1800 - Back piece - 1 No
- 900 x 1800 - Door piece - 1 No
- 900 x 1000 - Top and bottom piece - 1 No
- 900 x 1350 - Middle pieces - 1 No
- 900 x 1800 - Side pieces - 1 No

**0.8 mm half white sunmica**

- 910 x 1010 - Top and bottom pieces inside - 1 No
- 910 x 1810 mm - Door pieces inside - 1 No
- 910 x 1810 mm - Back piece inside - 1 No
- 910 x 1810 mm - Side pieces inside - 1 No
- 910 x 1360 mm - Middle pieces - 2 No

**1 mm colour (design) sunmica**

- 910 x 1810 side pieces outside - 1 No
- 910 x 910 mm Top and bottom piece outside - 1 No
- 910 x 1810 mm Door piece frontside - 1 No
- 910 x 1810 mm back piece outside - 1 No
- Fevicol S.R - 7 kgs
- Fevicol S.H - 150 grams
- Fevicol heatx - 500 grams
- 300 mm Cabinet handle - 2 No's
- Banding edge lape - 25 mm - 15 meters
- Full overlay, frame less cabinet hinge with screws = 8 No's
- Cabinet lock set CMP22 Multipurpose lock - 1 No
- PVC 'L' Bracket - 25 x 25 mm with screws - 24 No's
- 'L' shaped tower bolt 150 mm with screws - 2 No's
- 54 mm magnetic door catch with screws - 2 No's
- Cabinet hanging rodset - 1 No
- Phillips flat head screws 60 x 5 - 1 Box

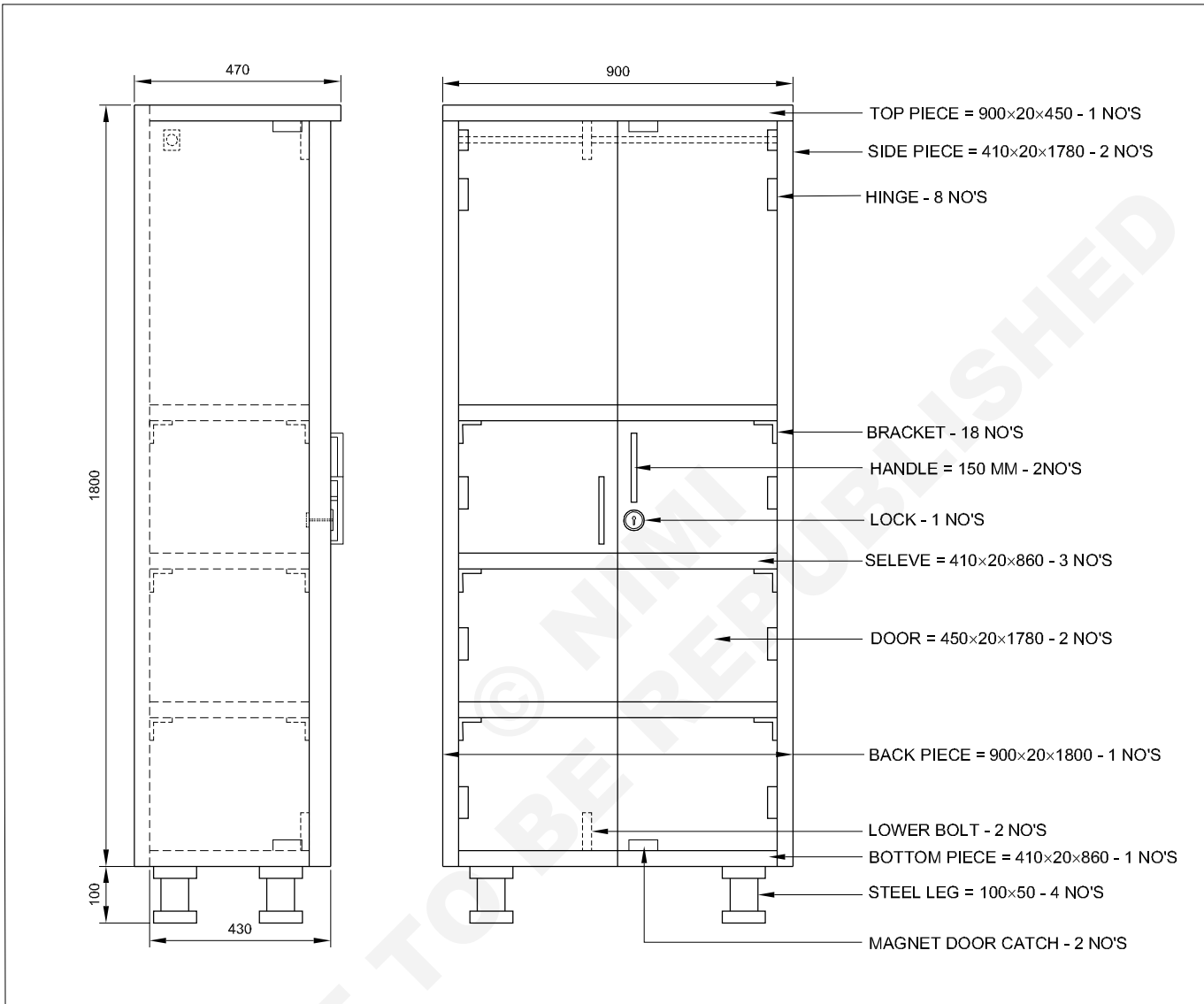
**Required handtools**

- 3 Meters steel tape rule - 1 No
- 200 mm try square - 1 No
- 600 mm wooden try square - 1 No
- Firmer chisel 30,50 mm each - 1 No
- ' T ' bar clamps - 1800 mm - 1 No
- ' C ' clamp - 2 No's
- Mallet - 1 No
- Marking gauge - 1 No
- Hand saw - 1 No
- Screw driver 300 mm - 1 No
- Claw hammer - 1 No
- Oil stone - 1 No
- Cleaning hand brush 100 mm - 1 No
- Ball pein hammer - 1 No
- Pincer - 1 No
- Slim taper file 150 mm - 1 No
- Centre punch 5 mm - 1 No
- Oil can - 1 No

**Required machines Refer Ex. No. 1.7.132**

**Prepare the layout for cabinet structure**

**Objectives:** At the end of this exercise you shall be able to  
 • Prepare the layout for desired cabinet

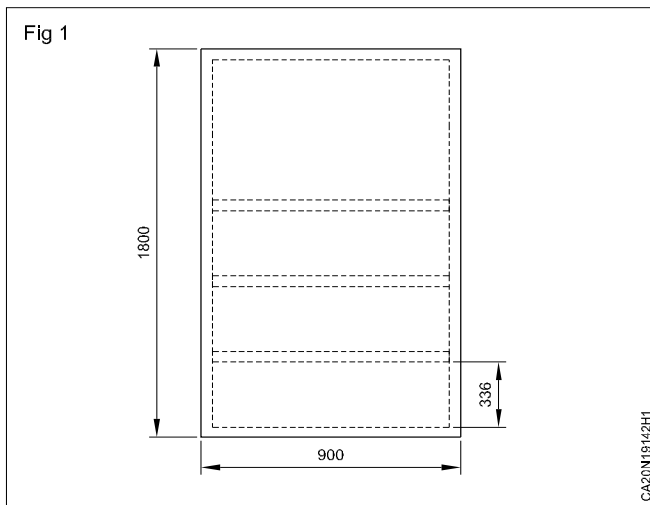


-	-	-	-	-	-	1.9.142
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1					TOLERANCE : - ±0.5mm	TIME : 12Hrs
<p><b>LAYOUT OF MODULAR CABINET STRUCTURE</b></p>					CODE NO. CA20N19142E1	

# Job Sequence

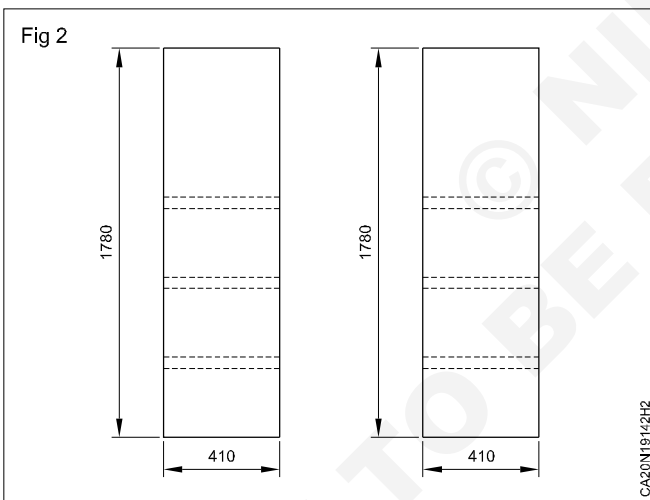
## Layout of cabinet back piece (Fig 1)

- Layout the backpiece of a cabinet. considering the sawing edge planing and sunmica bonding allowances as per drawing (Fig 1)



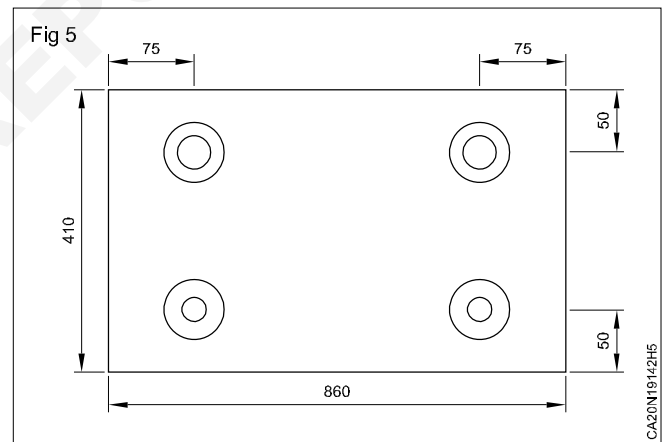
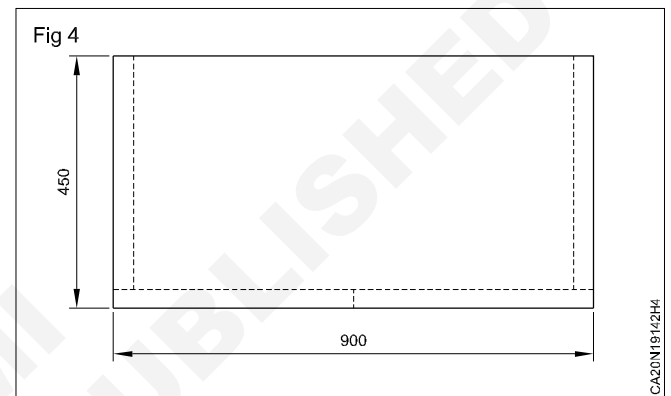
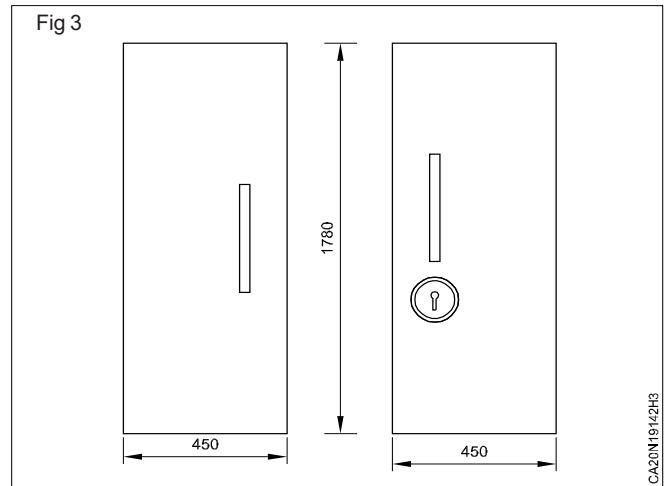
## Layout of cabinet side piece (Fig 2)

- Layout the side pieces of cabinet considering the sawing edge planing, sunmica bonding and edge tape bonding allowance



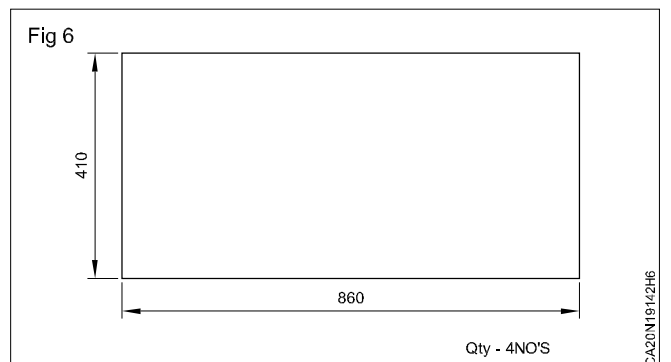
## Layout of cabinet door (Fig 3)

- Layout the door pieces of a cabinet considering the sawing edge planing, sunmica bonding edge tape bonding and door closing allowance



## Layout of cabinet middle pieces - 3 No's (Fig 6)

- Layout the middle pieces of a cabinet considering the sawing, edge planing sunmica bonding and edge tape bonding allowance



## Layout of cabinet top piece (Fig 4)

- Layout the top piece of a cabinet considering the sawing edge planing sunmica bonding, edge tape bonding allowance

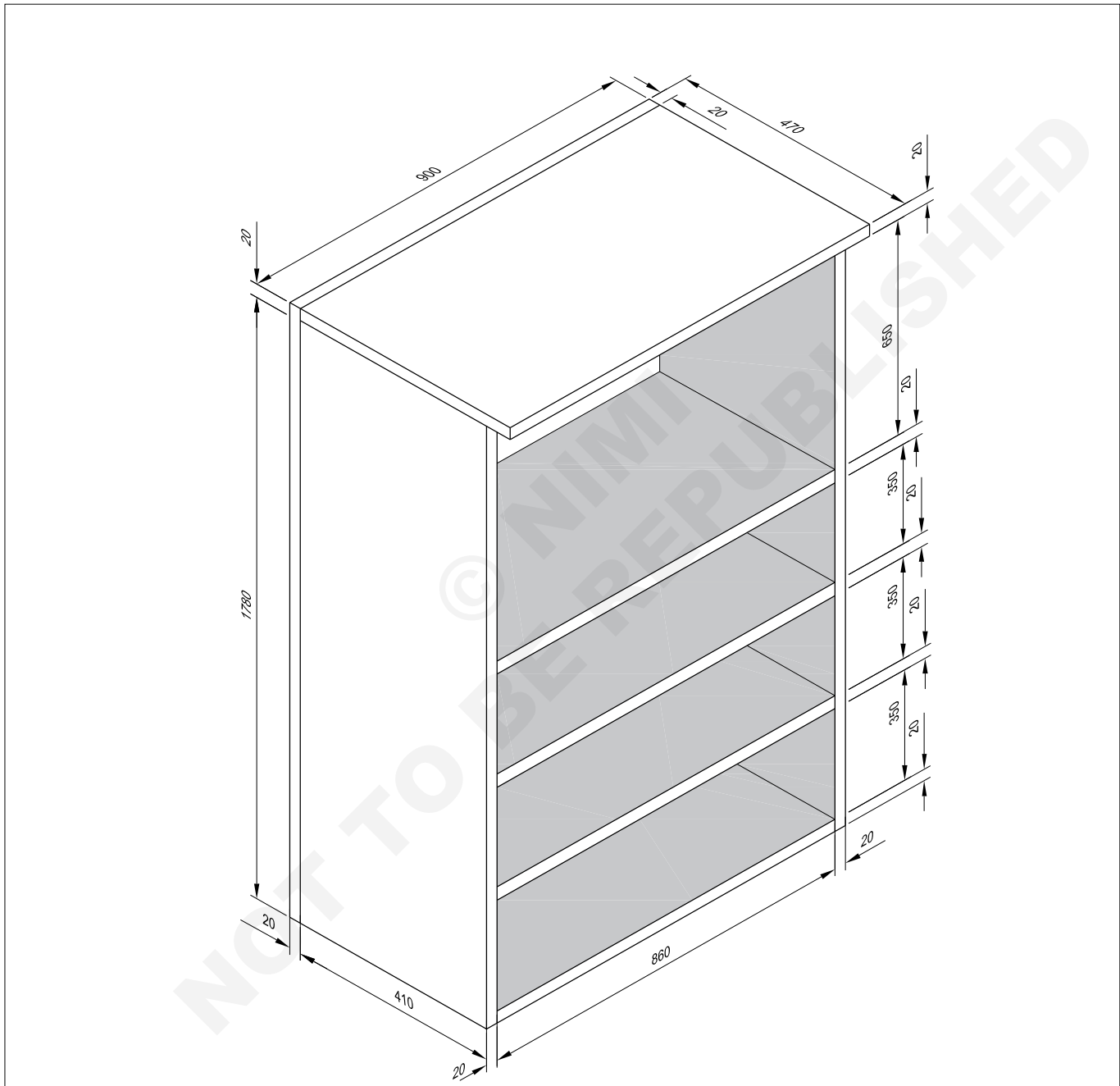
## Layout of cabinet bottom piece (Fig 5)

- Layout the bottom piece of a cabinet considering the sawing, edge planing sunmica bonding, edge tape bonding allowance

**Make the material as per layout, finish the cabinet frame and check the dimensions**

**Objective:** At the end of this exercise you shall be able to

- make the material as per layout
- assemble, finish the cabinet and check the dimensions.



NOTE: THE MATERIAL IS AVAILABLE IN EX.NO:1.9.152

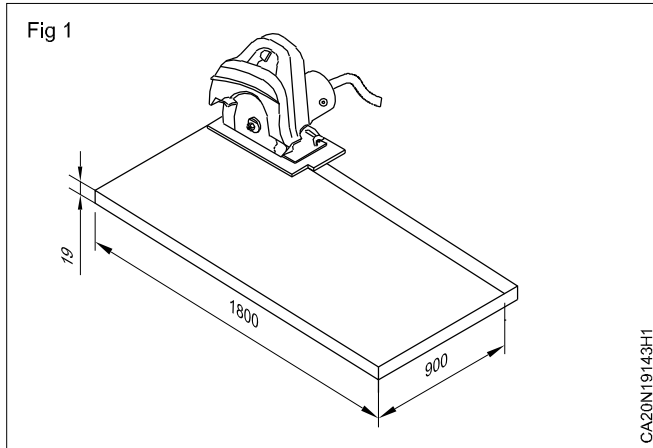
1	-	-	-	-	-	1.9.143
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>CABINET MAKING AND FINISHING</b>				TOLERANCE $\pm 0.01$ mm	TIME :10hrs
					CODE NO. CA20N19413E1	

## Job sequence

- Check the material size as per the layout

### Back side vertical piece

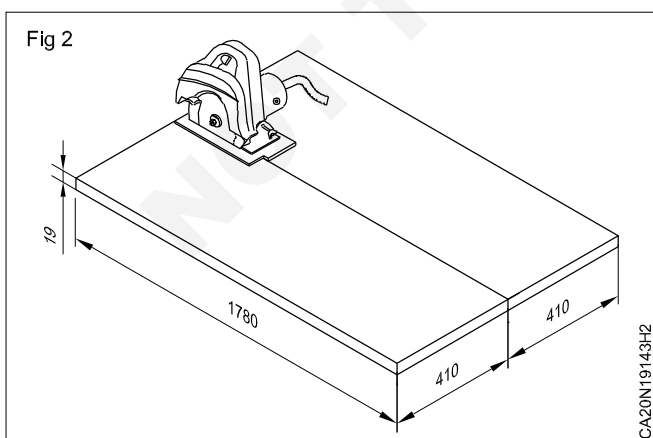
- Mark and make the total length and width of the backside piece of the cabinet as per drawing using portable power circular saw and power disc sander (Fig 1)



- 1800 x 900 x 19 mm - 1 No
- Mark and make the total length and width of the half white sunmica in back piece inside using sunmica cutter
- Bond the half white, sunmica on inside surface of the cabinet backside piece using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica using smoothing plane carefully
- Mark the lines according to the dimension as per drawing to fix the middle pieces, bottom pieces.

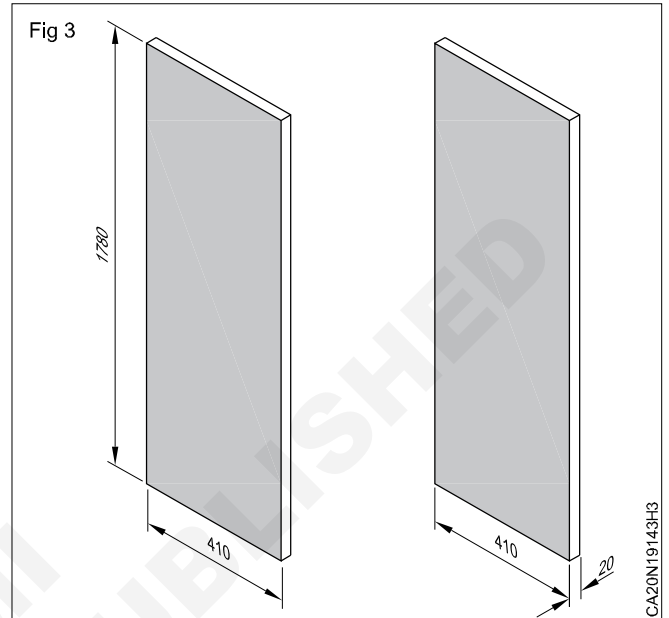
### Side vertical piece

- Mark and make the total length and width of the side pieces (Fig 2) as per drawing 410 x 1780 x 19 mm - 2 Nos



- Mark and make the total length and width of the half white sunmica as per drawing (Fig 3)

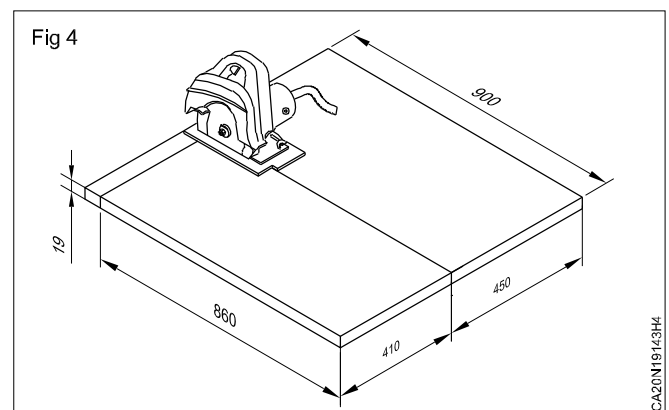
- Bond the sunmica on inside of the side pieces plywood using fevicol S.R
- Allow the fevicol to dry
- Plane the excess sunmica using smoothing plane to finish (Fig 3)



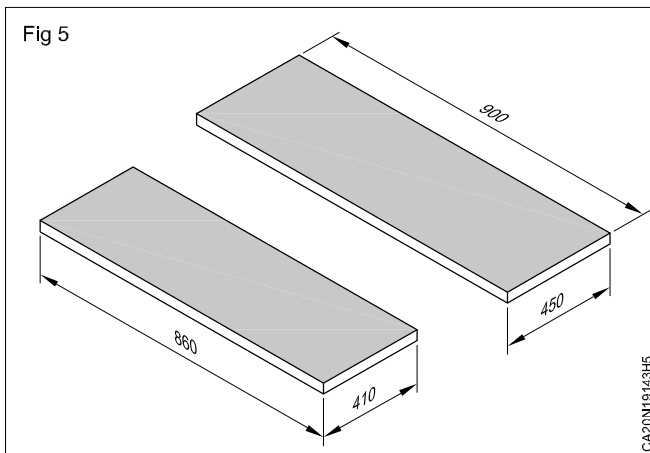
- Mark the lines according to the dimension as per drawing, to fix the middle pieces.

### Top and bottom horizontal pieces (Fig 4)

- Mark and make the total length and width of the top piece and bottom piece as per drawing 450 x 19 x 900 mm top piece - 1 No
- 410 x 19 x 860 mm bottom piece - 1 No
- Mark and make the total length and width the of the half white sunmica on top and bottom inside as per drawing.



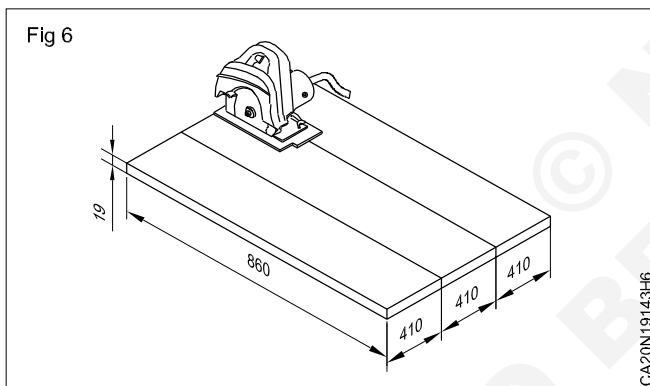
- Bonding the sunmica on inside of the top and bottom plywood piece using fevicol S.R (Fig 5)
- Allow the fevicol to dry.
- Plane the excess sunmica using smoothing plane of finish (Fig 5)



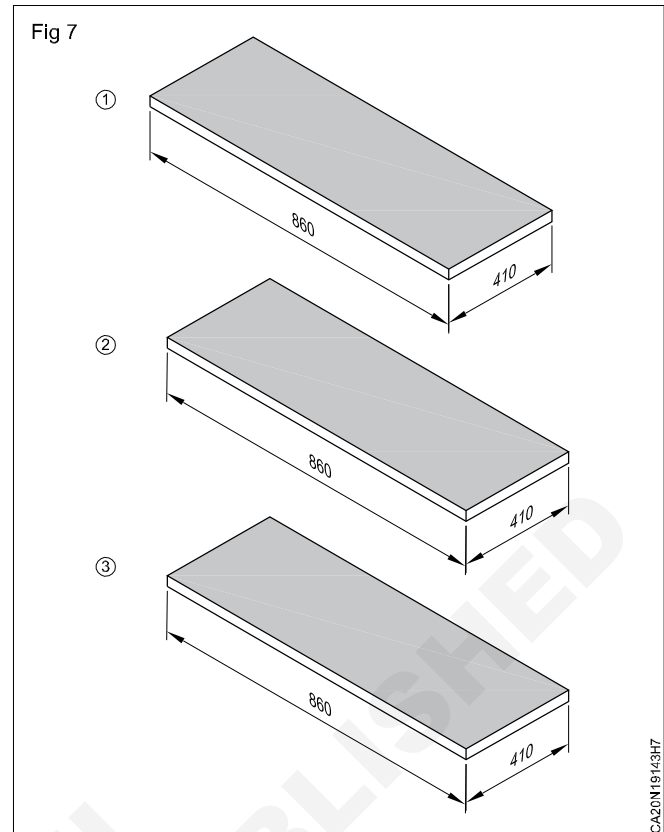
- Mark the lines in top piece according to the dimension as per the drawing to fix side vertical piece.

#### Middle piece

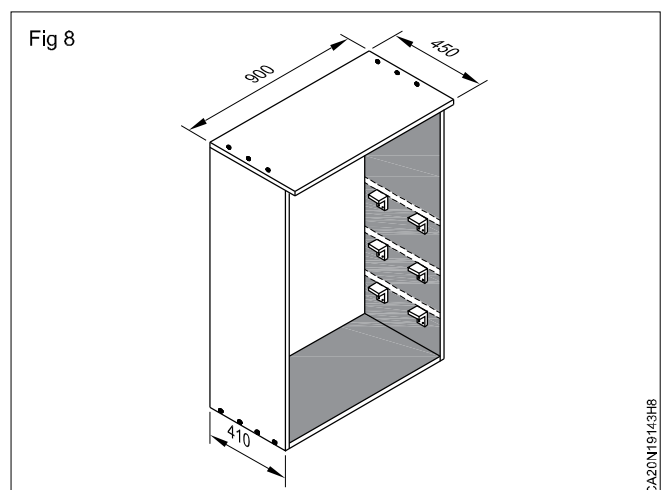
- Mark and make the total length and width of the middle pieces as per drawing (Fig 6)



- 410 x 19 x 860 mm - 3 No's
- Mark and make the total length and width of the half white sunmica on middle pieces both side as per drawing
- Bond the sunmica on both side of the middle pieces plywood using fevicol S.R (Fig 7)
- Allow the fevicol to dry.
- Plane the excess sunmica using portable power planner to finish
- Bonding the edge tape on front edge of the middle pieces using fevicol heatx to finish
- Prepare the electric screw driver on screwing
- Check all the side pieces, middle pieces top and bottom piece of the cabinet to the required measurement before assembling.

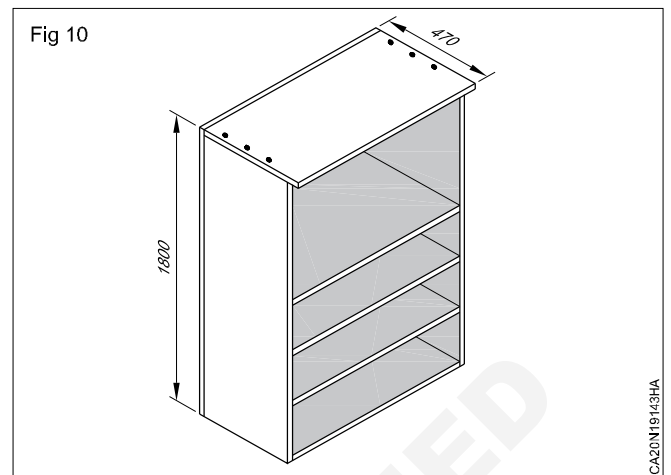
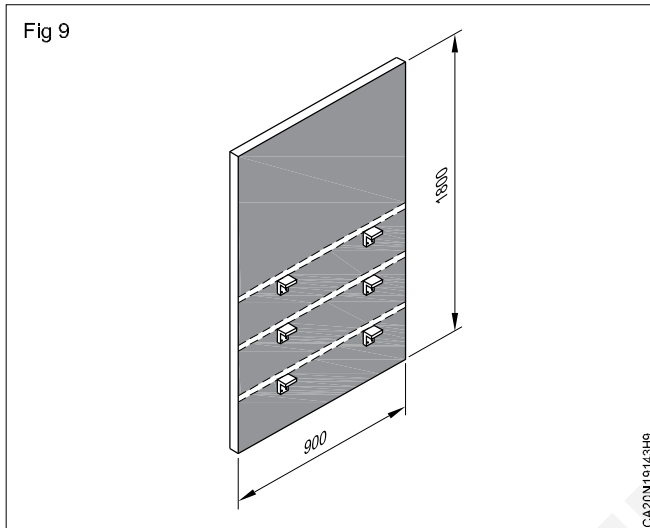


- Set the bar clamp to assemble the side, top and bottom piece of cabinet frame.
- Apply the fevicol on bottom, side pieces edge surface
- Assemble the side, top and bottom piece to make a cabinet frame and mark the drill hole point on the middle of the edge.
- Place on the bar clamp with wooden support pieces and tighter it.
- Make the pilot hole on the marked points of the edge.
- Insert and drive the phillips flat hand screws using electric screw driver as per the drawing.
- Check the squareness of the cabinet frame. (Fig 8)
- Check the back piece of the cabinet frame to the required measurements before assembling (Fig 8)



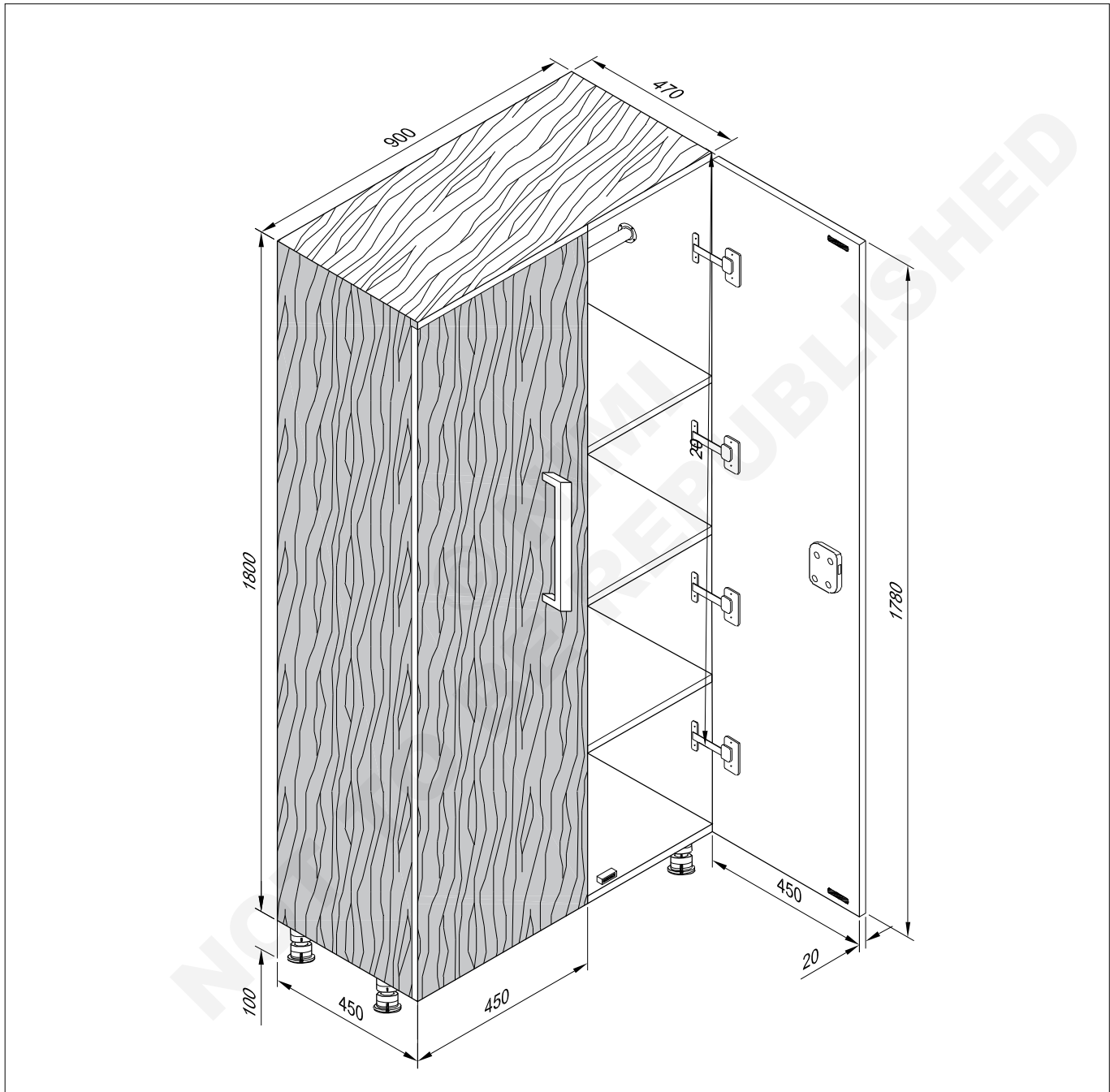
- Position the back piece plywood on back side of the frame
- Mark the drill hole point on the middle of the all edges.
- Apply fevicol on the frame back side edge surface
- Make the pilot hole on the marked points of the edge
- Insert and drive the phillips flat head screws using electric screwdriver.
- Mark and fix the PVC 'L' braket inside of the cabinet to assemble the middle pieces (Figs 8 to 10)

- Smooth all the surface using portable power disc sander (Fig 10)
- Check the squareness of the cabinet frame (Fig 10)



Structuring the cabinet and finishing with sunmica and hardware

- Objectives:** At the end of this exercise you shall be able to
- bonding the sunmica on the cabinet frame and door setting
  - fix the hardware on the cabinet
  - finish the modular cabinet.



1	-	-	-	-	-	1.9.144
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1	<b>STRUCTURING THE CABINET AND FINISHING</b>				TOLERANCE ±0.01 mm	TIME:4hrs
					CODE NO. CA20N19144E1	

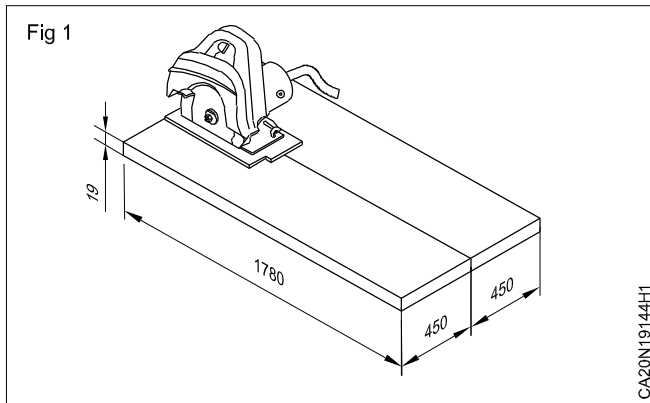


## Job Sequence

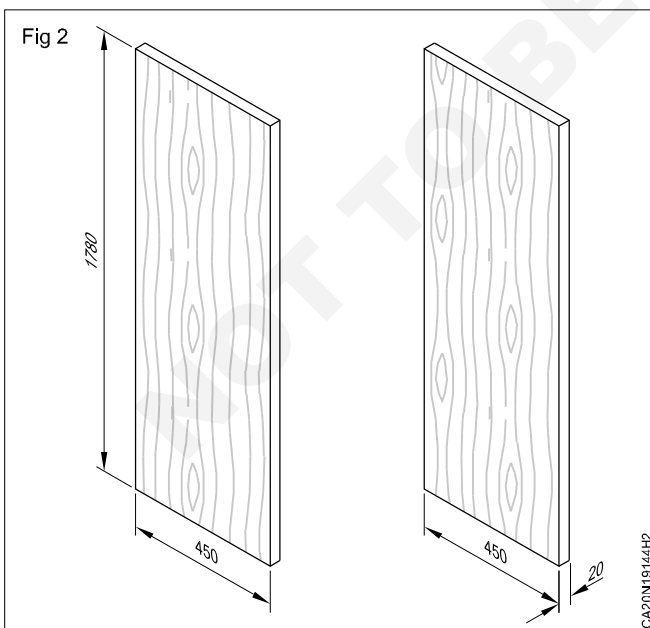
- Check the dimension of the cabinet frame as per drawing

### Door part

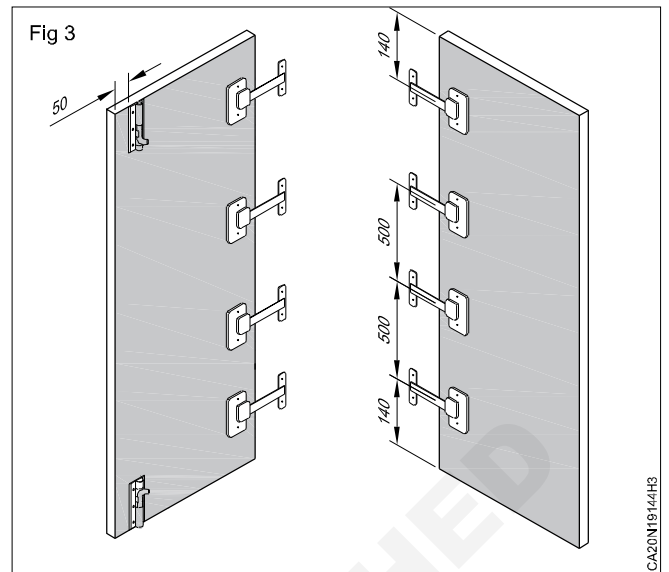
- Mark and make the total length and width of the door piece of the cabinet as per drawing using portable power circular saw machine (Fig 1)



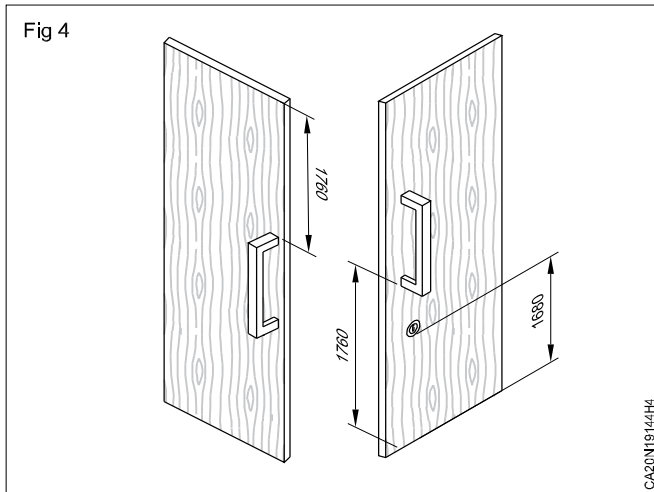
- 450 x 19 x 1780 mm = 2 No's
- Mark and make the total length and width of the half white sunmica using sunmica cutter 455 x 1785 mm = 2 No's as per drawing
- Bonding the half white sunmica on inside of the door pieces using fevicol (S.R)
- Allow the fevicol to dry
- Plane the excess sunmica using power planner
- Repeat the same procedure for the front side door to bond the colour sunmica (Fig 2)



- Bonding the edge bonding tape on door all edges using fevicol (heatx) (Fig 3)
- Shave the excess edge bonding tape using firmer chisel



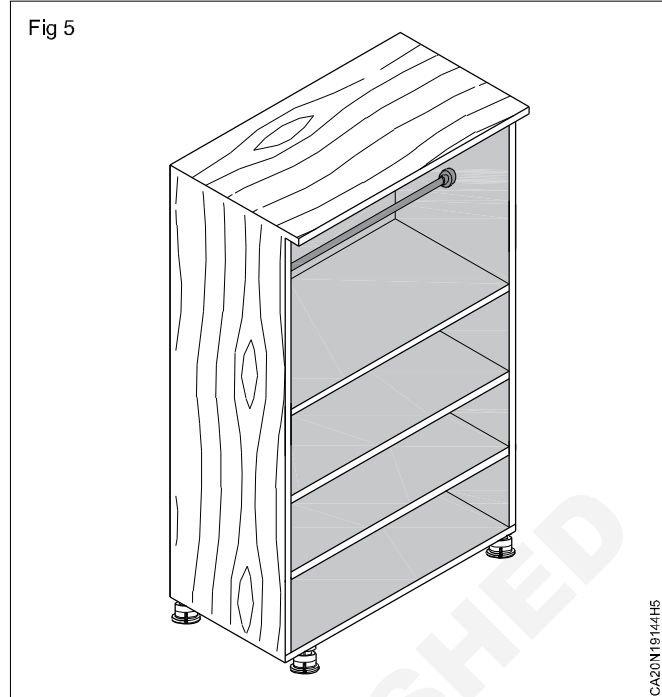
- Mark the position of the hinge on the door inside as per drawing
- Prepare the portable power drill machine for boring
- Make the hinge boring of the marked points of the door
- Press the hinge in place once the recess base is completely flat
- Make a pilot hole through the hinge hole to fix the screw
- Insert and drive the suitable screws in all holes. Using portable electric screwdriver.
- Repeat the same procedure for fixing other hinge also (Fig 3)
- Mark the position of the 'L' shaped tower bolt on the left side door in side of top and bottom (Fig 3) as per drawing
- Make the a pilot hole through the tower bolt to fix the screw
- Set the tower bolt on the door top and bottom
- Fix the screw through the all screw holes
- Check the alignment of tower bolt
- Mark the position of the handle on the door fronside as per drawing (Fig 4)
- Make the pilot hole through the handle hole to fix the screw
- Set the handle on the door front side in position
- Fix the screw through the screw holes. (Fig 4)
- Check the hand shake
- Repeat the same procedure for fixing the other handle (Fig 4)
- Mark the position of the multi purpose lock. on the door (Fig 4) as per drawing
- Make the through hole to fix the lock key way



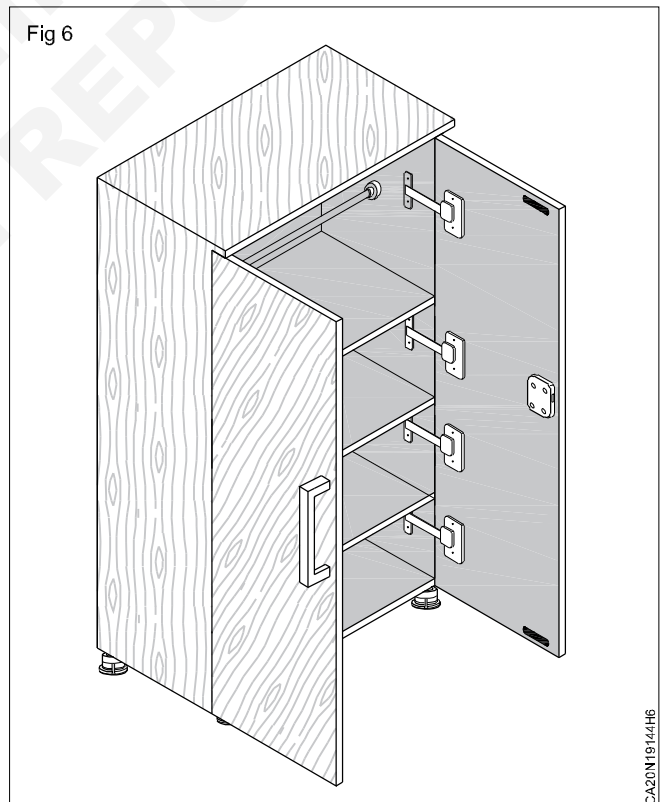
- Press the multi purpose lock in place of the key way hole maintain completely flatness
- Mark and make the lock pilot hole to fix the screw.
- Fix the screw through the hole
- Check the key alignment of lock

#### Over all assembling and finishing

- Mark and make the total length and width of the colour sunmica on cabinet frame side face as per drawing using
- 455 x 1805 mm = 2 No's
- Bonding the colour sunmica on face side of the frame side piece using fevicol S.R (Fig 5)
- Allow the fevicol to dry
- Plane the excess sunmica using power planner carefully
- Repeat the same procedure for bonding the colour sunmica on the back side of the frame. as per dimention.
- Repeat the same procedure for bonding the colour sunmica on the top and bottom side of the frame. as per dimention. (Fig 5)
- Bonding the edge bonding tape on cabinet frame on all front edges using fevicol heatx
- Shave the excess tape using firmer chisel (Fig 5)
- Mark the position of the steel leg on the bottom of the cabinet frame as per drawing
- Mark and make the hole through the leg bolt hole and screw hole to fix the bolt and screw
- Set the leg on the cabinet frame in position
- Fix the bolt and screw throught the hole and check the shake on leg fitting (Fig 5)
- Mark the position of the hanging rod on the cabinet frame as per drawing (Fig 5)
- Make the hole through the hanging rod hole to fix the screw

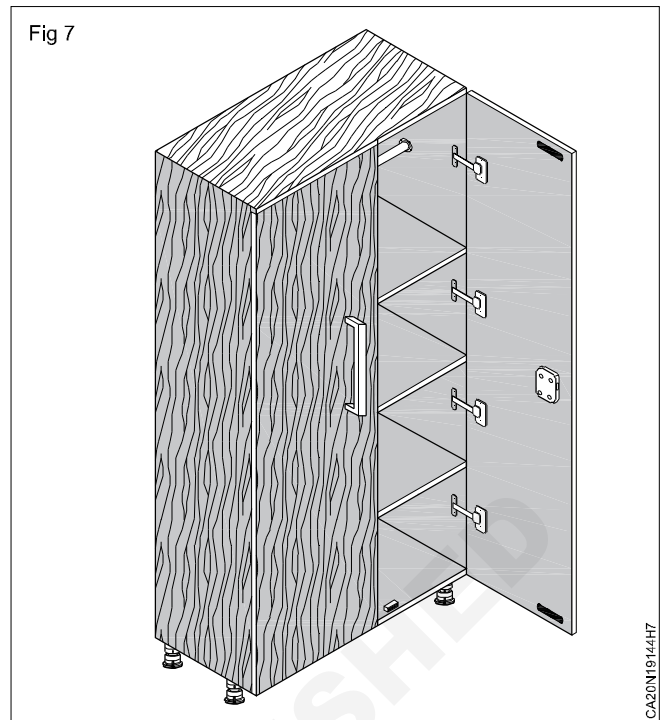


- Set the hanging rod on the cabinet frame in position
- Fix the screw through the hole and check the hanging rod fitting (Fig 6)
- Lay the middle piece in position to the cabinet frame middle (Fig 6)



## Door fixing

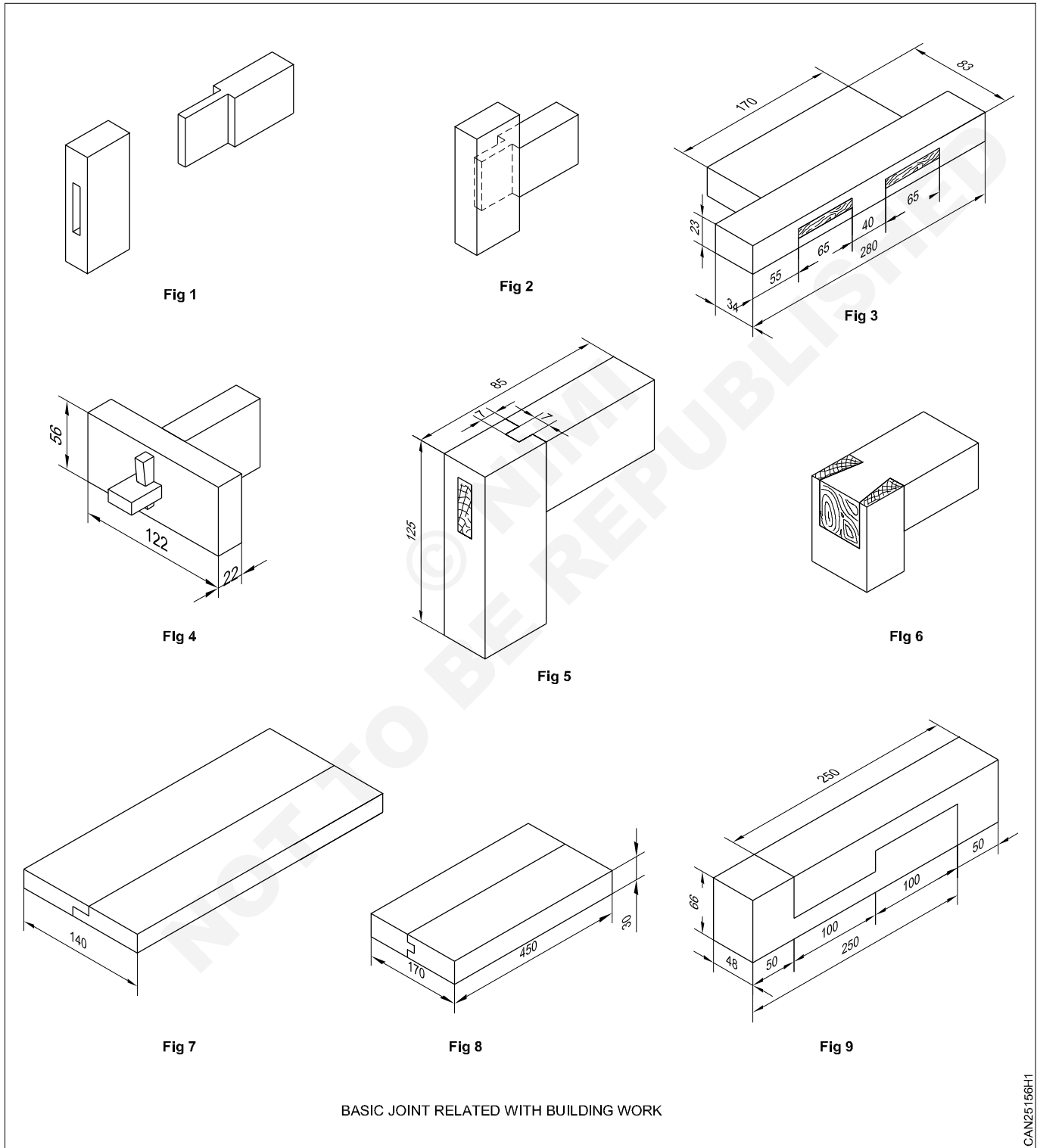
- Mark the hinge position on cabinet frame after marking the cabinet door as per drawing
- Transfer the cabinet door hinge position on inside of the cabinet frame
- Mark recess on cabinet frame to fix the hinge as explained earlier
- Lay the cabinet door in position to the cabinet frame for hinging screw the hinge to the cabinet frame using screw in the centre hole of each leaf after making the pilot hole
- Check the alignment of the cabinet hinge
- Insert suitable screws in all holes after making pilot holes
- Repeat the same procedure for other door fittings
- Check one again the fitting of cabinet door (Fig 6)
- Make a tower bolt sized hole on the top and bottom of the cabinet frame to lock the L shaped tower bolt
- Check the alignment of the tower bolt (Fig 6)
- Mark the position of the magnetic door catch on the cabinet frame as per drawing
- Make the pilot hole through the magnetic catch hole to fix the screw
- Set the magnetic catch on the cabinet frame top and bottom in position
- Fix the screw through the hole and check the catch (Fig 7)
- Check once again the fitting. Multipurpose lock, tower bolt and magnetic door catch
- Check the free movement of cabinet doors.
- Finish the modular furniture cabinet with dusting brush (Fig 7)



Revision of basic joint related with building work

Objectives: At the end of this exercise you shall be able to

- identify the basic joints
- identify the joints for specific uses for building work.



CAN25156H1

## Job Sequence

Instructor shall display and demonstrate to the students regarding the revision of basic joints related with building work with uses.

- Trainees will note down all the displayed joint and uses.
- Record it in table 1.
- Get it checked by the instructor.

**Table 1**

### Identify the joint

Fig No.	Name of the joint	Uses
1		
2		
3		
4		
5		
6		
7		
8		
9		

## Skill sequence

### Specific use of joint with building work

**Objective:** This shall help you to

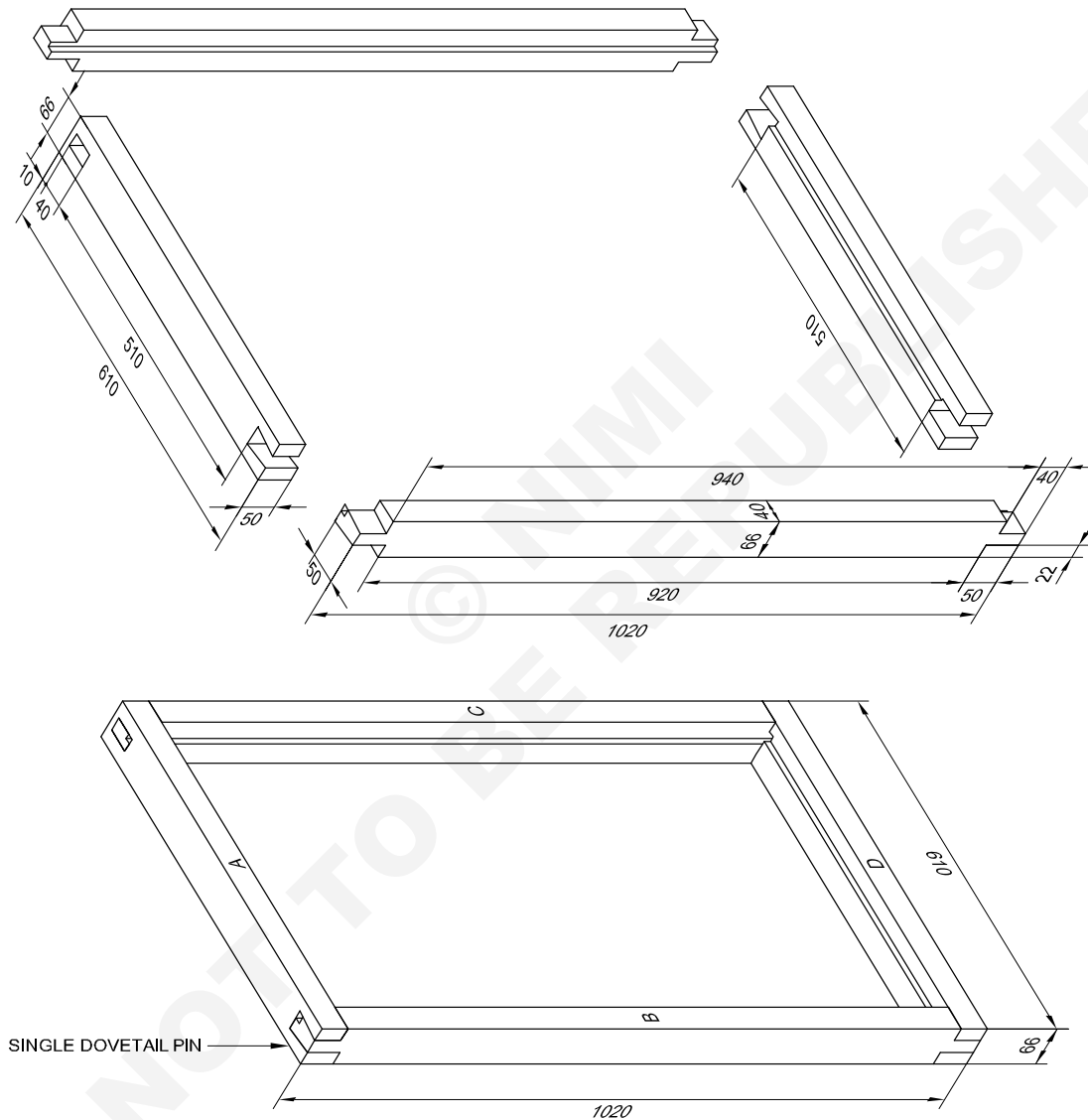
- name and use of joint in building work.

- Mortise and tenon joint used in framed doors, frames for cabinets.
- Stub mortise and tenon joint used in framed lock rail for doors.
- Double mortise and tenon joint used in framed bottom rail for doors.
- Task tenon and mortise joint used in framed by wooden floors.
- Hatched mortise and tenon joint used in framed by top rail for doors.
- Dove tail joint used in framed by door frame.
- Rebated, tongue and groove joint used in framed by Ledges doors.
- Table scraf joint used in framed by roofs.

Mark and making door frame (model)

Objectives: At the end of this exercise you shall be able to

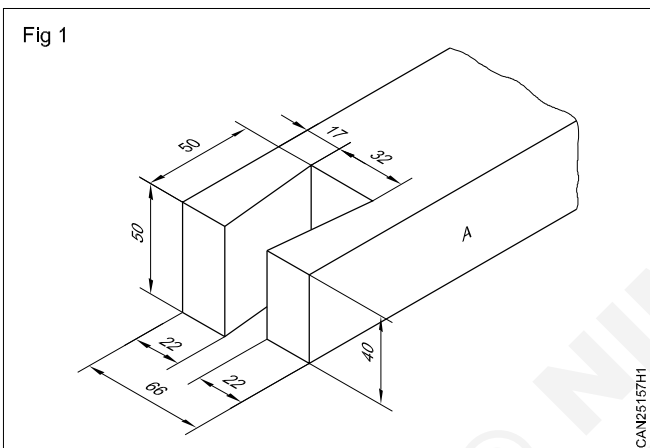
- make tenon and mortise joint
- make single dovetail joint
- make bridle joint
- make rebate on inside the frame
- assemble and finish the door frame.



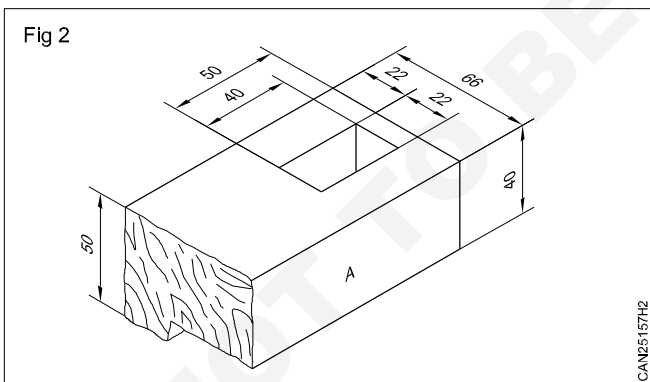
8	8 x 6 x 75		TEAK WOOD			
2	75 x 65 x 1080		TEAK WOOD			
2	75 x 65 x 690		TEAK WOOD			1.10.146
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>DOOR FRAME (MODEL)</b>			TOLERANCE ±3.0 mm	TIME 3h
					CODE NO. CA20N110146E1	

## Job Sequence

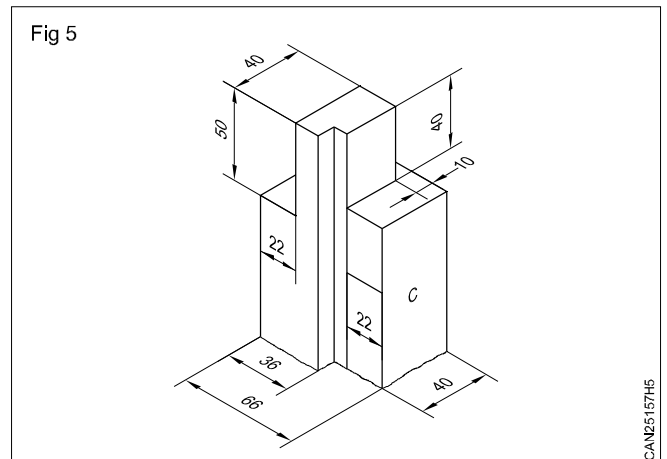
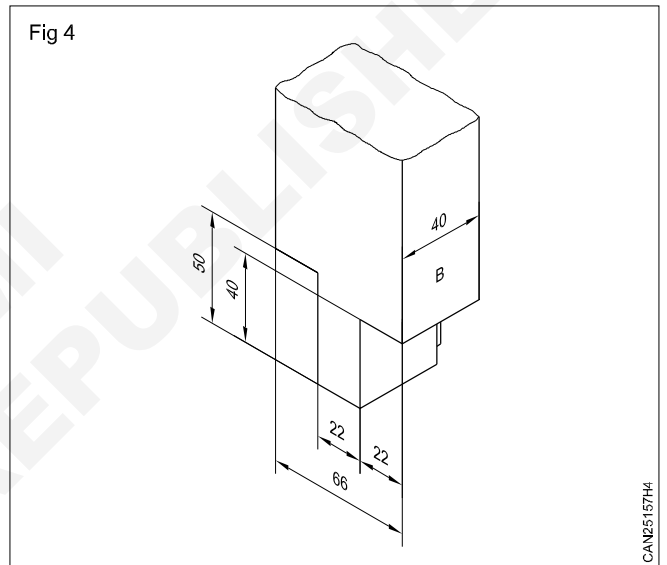
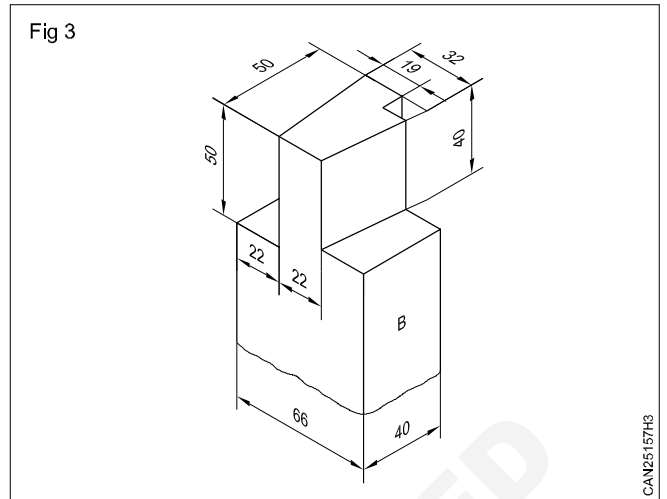
- Check the size of the raw material using wooden rule.
- 75 x 65 x 1080 - 2 Nos.  
75 x 65 x 690 - 2 Nos.  
8 x 6 x 75 - 8 Nos.
- Plane the raw material to the required size of using jack plane, try square and marking gauge.
- 66 x 50 x 1080 - 2 Nos.  
66 x 50 x 690 - 2 Nos.
- Mark the total length on A, B, C and D pieces as per drawing. Wooden rule, scribe and try square.
- Mark and make the dovetail socket on left end of part A as per the drawing (Fig 1)



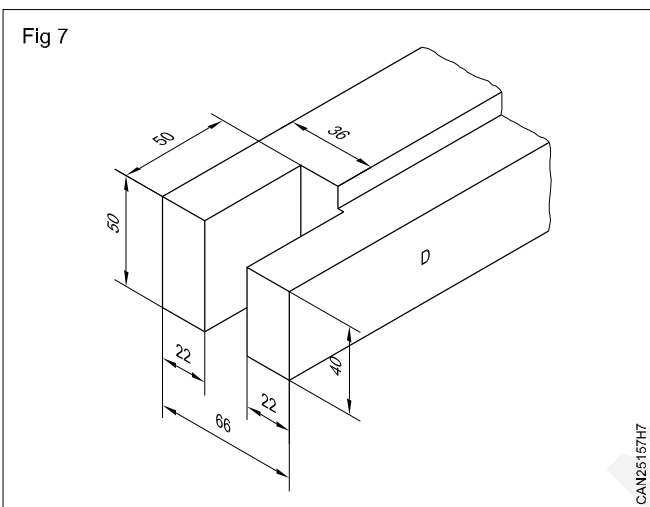
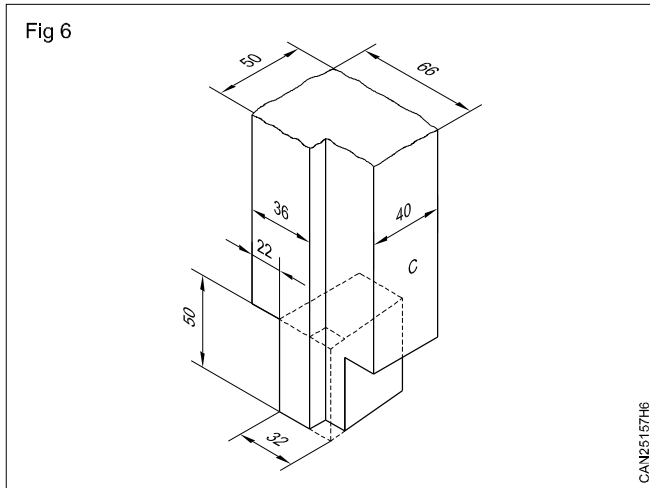
- Mark and make haunched mortise on right hand end of part A as per drawing. (Fig 2)



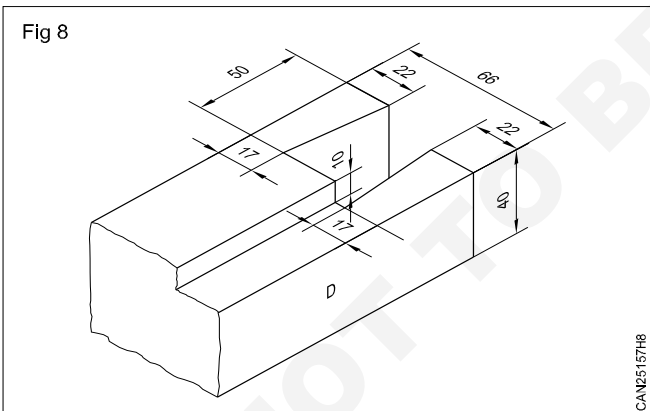
- Mark and make dove tail pin on one end (left side) of part B as per drawing. (Fig 3)
- Mark and make the pin portion of bridle joint on the other end of part B as per the drawing. (Fig 4)
- Mark and make haunched tenon on top end of part C as per drawing. (Fig 5)



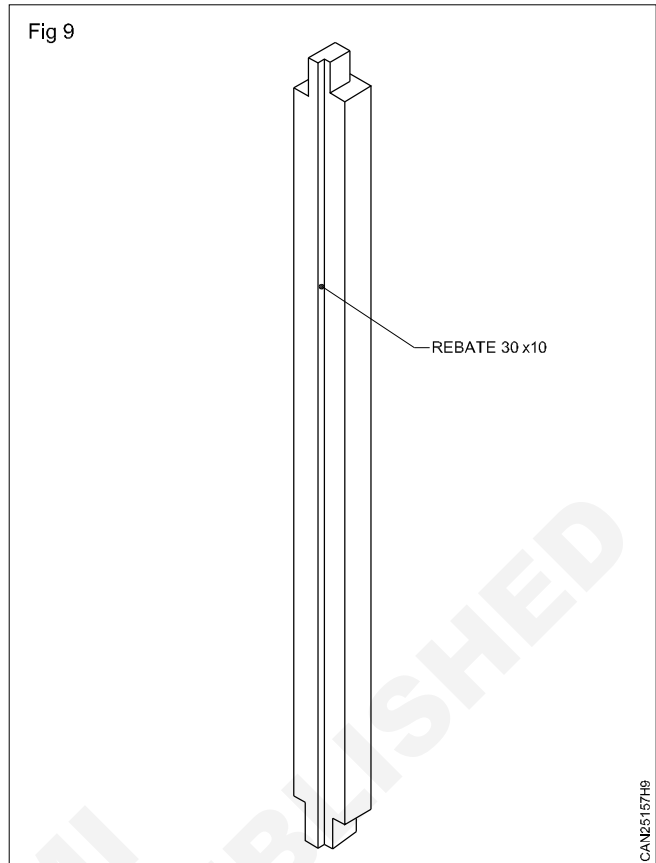
- Mark and make dove tail pin on bottom end of part C as per drawing. (Fig 6)
- Mark and make bridle socket on left end of part D as per drawing. (Fig 7)



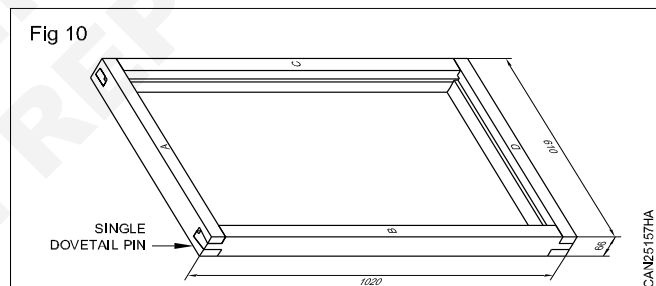
- Mark and make the single dove tail socket on right end of the part D as per drawing. (Fig 8)



- Mark and make the rebate of 30 mm deep and 10 mm wide on the face side and face edge of all four pieces A, B, C and D through out length. (Fig 9)
- Check and assemble the joints, if any fault noticed rectify with firmer chisel.
- Mark the drill hole position for wooden peg.
- Apply glue on all joint portions and fix the bar clamp with supporting piece at the ends of the frame near the joints and tighten it gently.



- Check the squareness and dimension using try square and wooden measuring rule. (Fig 10)



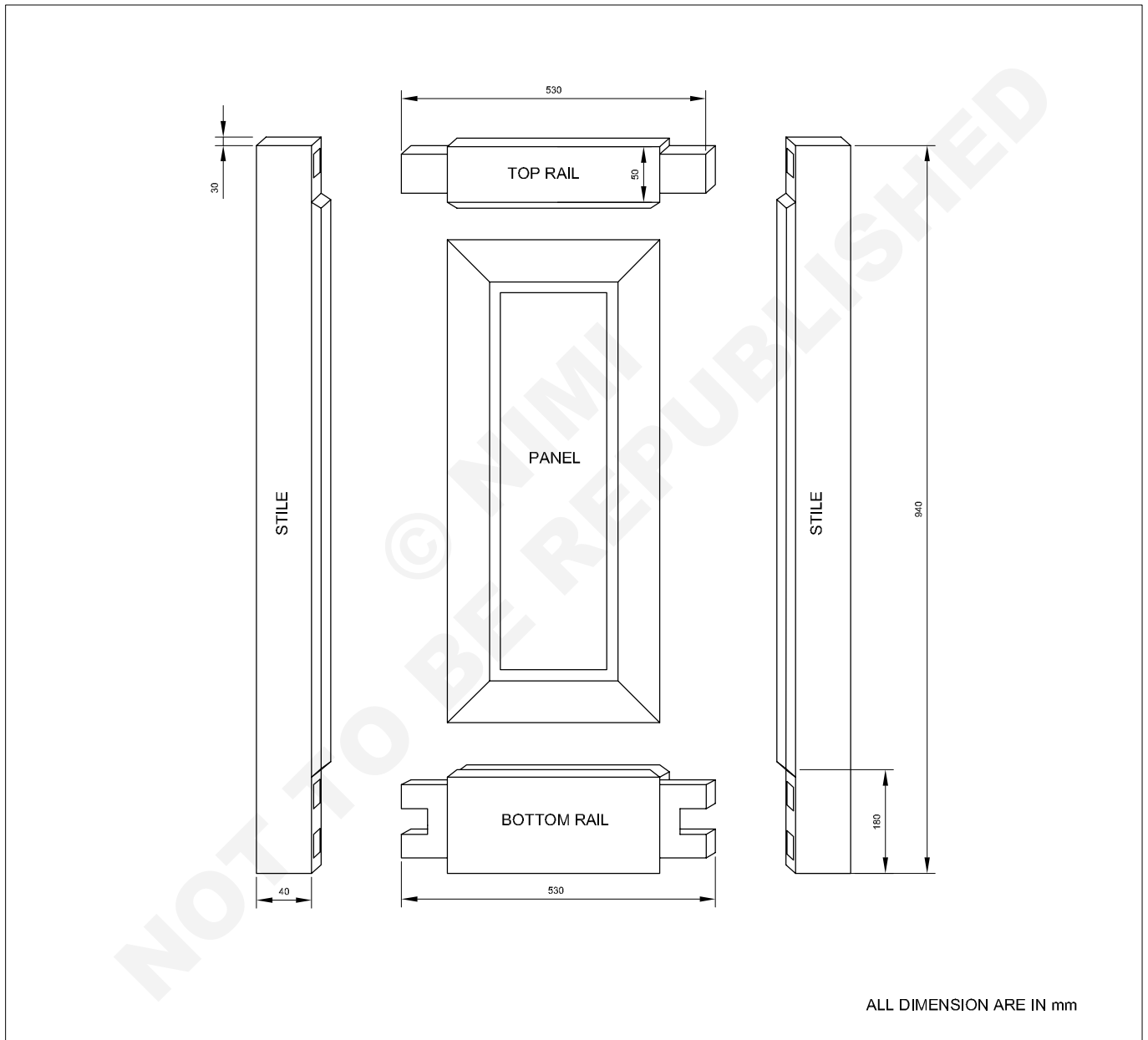
- Adjust the bar clamp and set the frame using ball peen hammer.
- Drill 6 mm hole on the centre of the joints.
- Prepare wooden peg (8 Nos.) of 6 mm dia.
- Apply glue on wooden peg of 6 mm dia and insert in the drill holes and strike with ball peen hammer.
- Cut the projection of wooden peg using tenon saw.
- Remove the bar clamp.
- Allow the glue to dry. Finish the door fame using smoothing plane as per drawing.



**Making single panel door shutter**

**Objectives:** At the end of this exercise you shall be able to

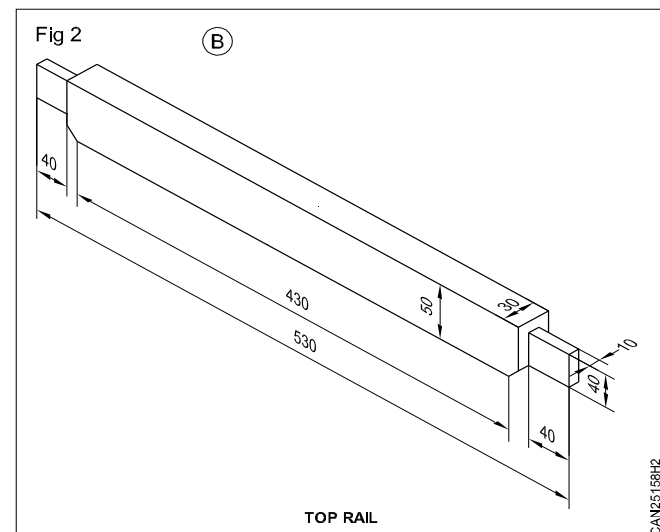
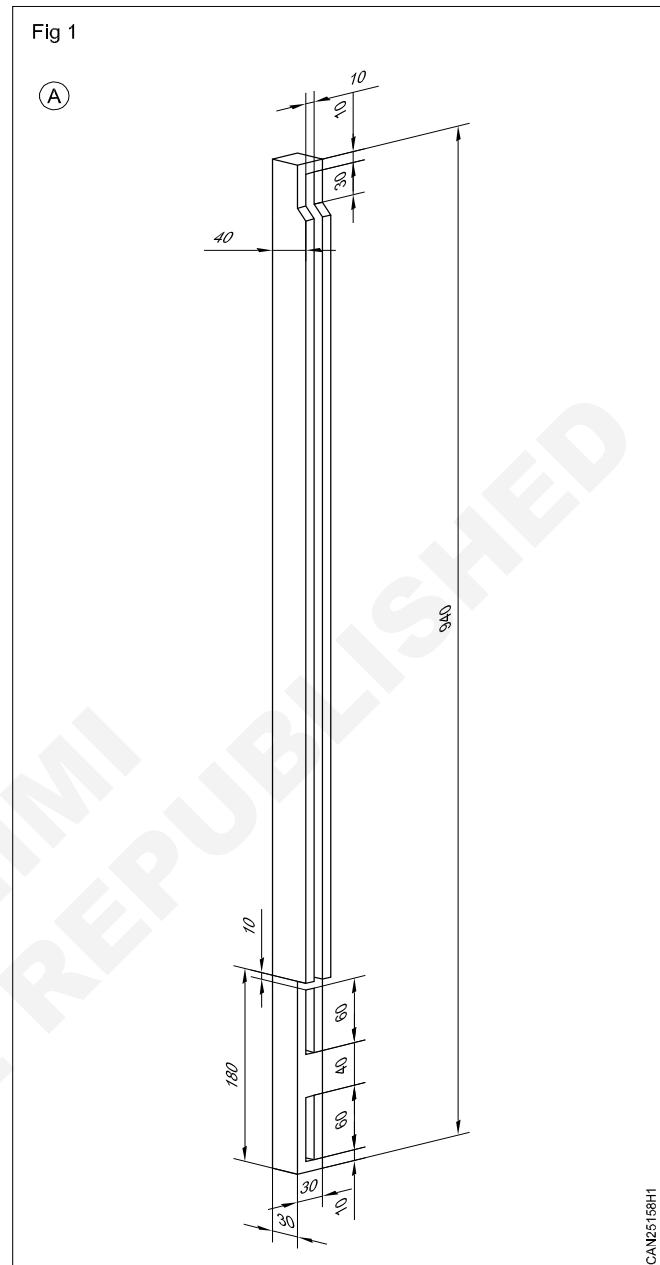
- make double haunched mortise and tenon joint
- make haunched mortise and tenon joint
- make groove panel
- make the panel on plank
- assemble and finished the paneled door shutter.

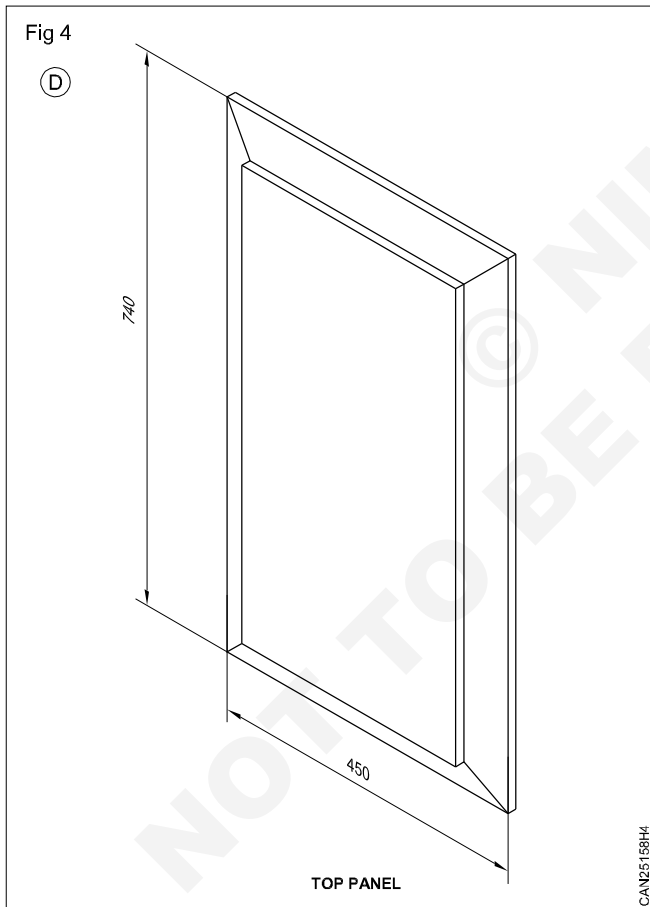
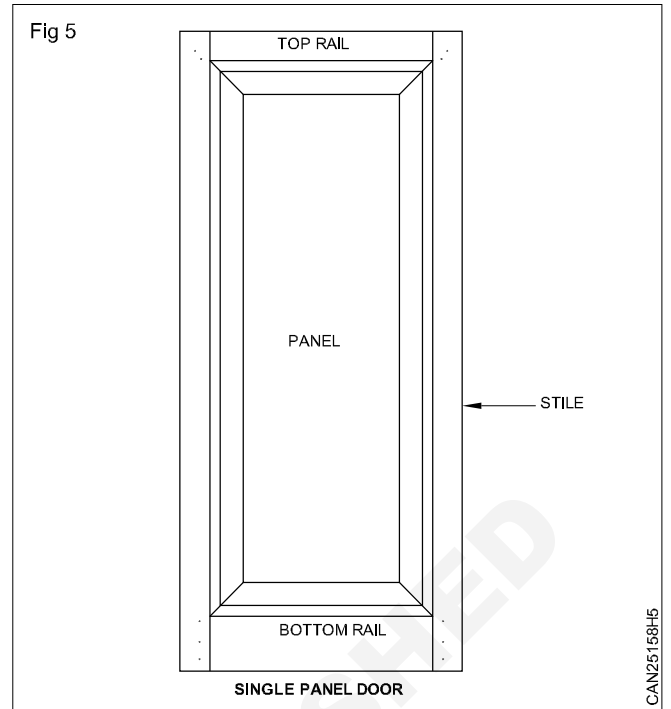
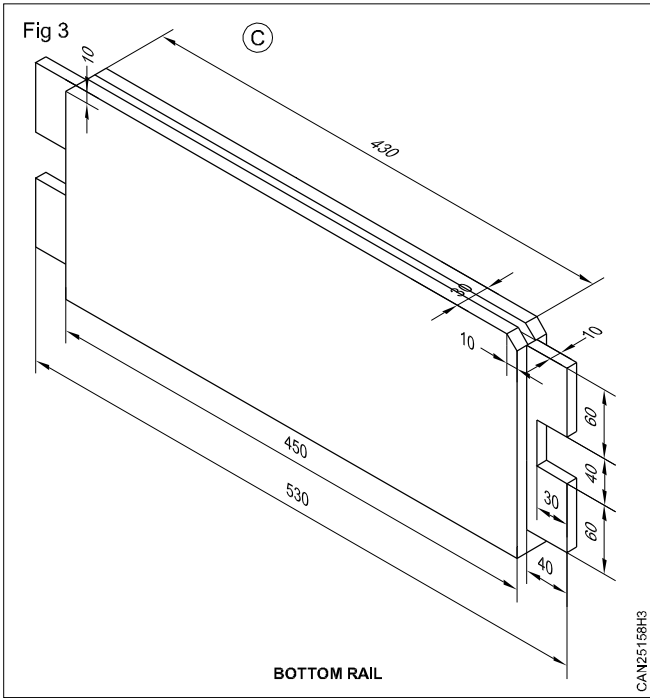


						1.10.147
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>SINGLE PANEL DOOR SHUTTER (MODEL)</b>				TOLERANCE ± 2.0 mm	TIME 6hrs
					CODE NO. CA20N110147E1	

## Job Sequence

- Check all the wooden pieces of single panel door shutter as per the required size using tape rule.
  - 55 x 35 x 960 mm - 2 Nos. Teak wood
  - 55 x 35 x 540 mm - 1 No. Teak wood
  - 190 x 35 x 540 mm - 1 No. Teak wood
  - 460 x 30 x 750 mm - 1 No. Teak wood
  - 8 x 8 x 75 mm - 16 Nos. Teak wood
  - Fevicol 150 gm - 1 No.
- Plane the wooden pieces to the required size using jack plane, try square and marking gauge.
  - Stiles 50 x 30 x 940 - 2 Nos.
  - Top rail - 50 x 30 x 530 - 1 No.
  - Bottom cross rail - 180 x 30 x 530 - 1 No.
  - Panel plank - 450 x 24 x 740 - 1 No.
- Mark and make the total length on all pieces as per drawing.
- Mark and make through the haunched mortise on top of the stiles as per drawing. (Fig 1)
- Mark and make double through haunched mortise on the bottom end of the stiles as per drawing. (Fig 1)
- Mark and make haunched tenon on both the ends of the top rail as per drawing. (Fig 2)
- Mark and make the double through haunched tenon on both the ends of the bottom rail as per drawing. (Fig 3)
- Mark and make the groove on stiles, rails pieces as per drawing. (Figs 1 to 3)
- Mark and make the bevels on panel piece of the door as the drawing. (Fig 4)
- Check the required dimension of mortise, tenon, groove and panel on respective pieces before assembling.
- Prepare the wooden pegs.
- Mark the drill hole position on stiles and rails.
- Apply the glue on mortise and tenon surfaces and assemble the stiles, rails and panel with their respective pieces for correct assembling.
- Clamp the pieces together using bar clamp on top cross rail and stiles of the frame.
- Drill the holes at the centre of the mortise and tenon joint.
- Insert the wooden peg in drilled hole of the frame.
- Repeat the same procedure on all other mortise and tenon joints also.
- Cut of the projected wooden pegs using hand saw.



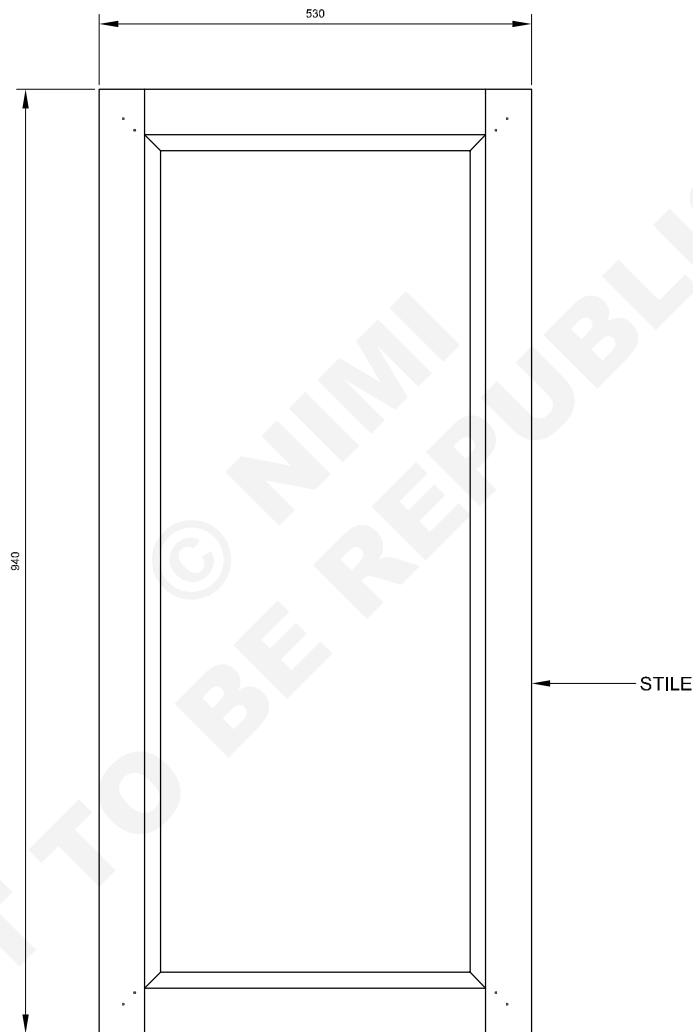


- Remove the bar clamp.
- Finish the doors shutter using jack smoothing plane. (Fig 5)

**Making glazed door shutter frame**

**Objectives:** At the end of this exercise you shall be able to

- make haunched mortise and tenon joint
- make rebate for fixing glass and bending
- assemble and finished the door frame.

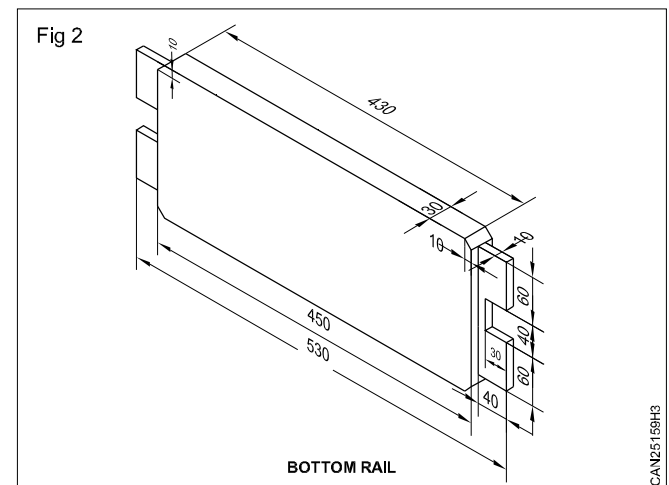
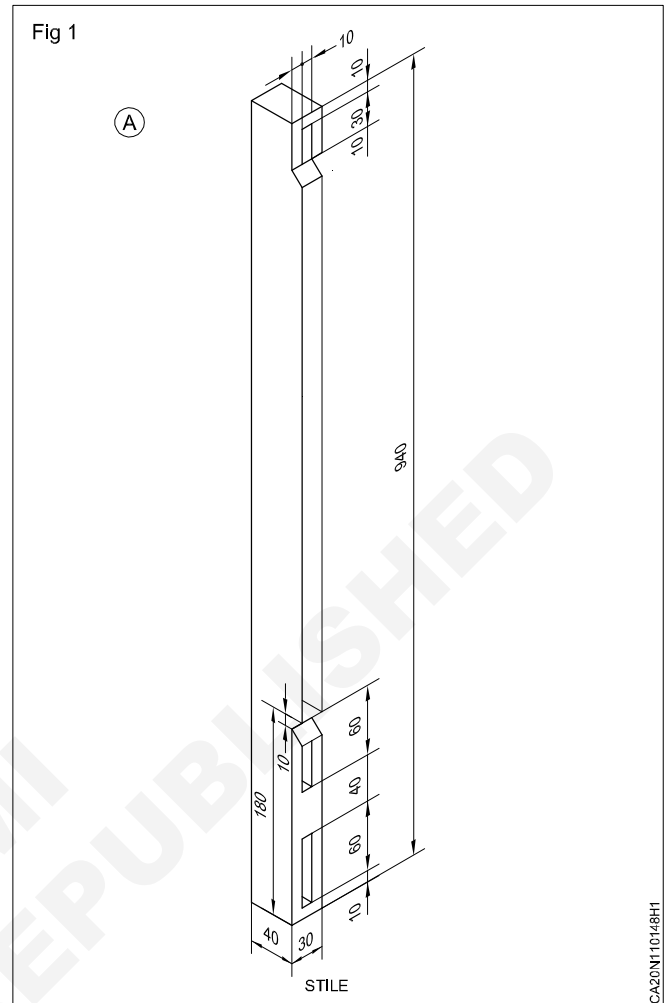


FULLY GLAZED DOOR SHUTTER FRAME

						1.10.148
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>FULLY GLAZED DOOR SHUTTER FRAME</b>				TOLERANCE $\pm 2.0$ mm	TIME 3h
					CODE NO. CA20N110148E1	

## Job Sequence

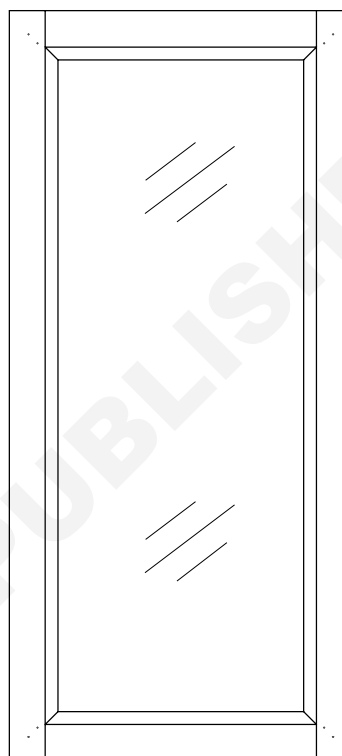
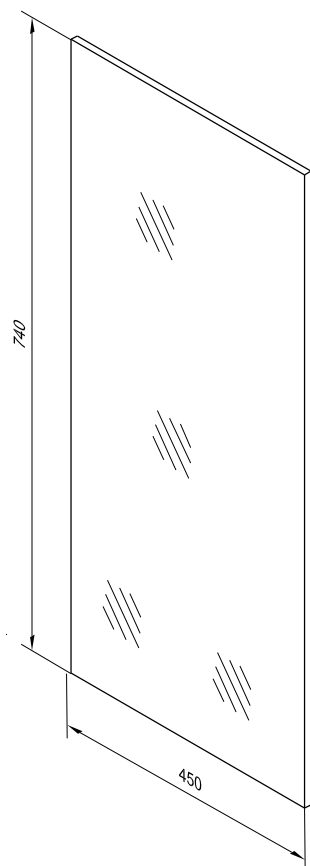
- Check all the wooden pieces of fully glazed panel door shutter as per the required size using tape rule.
  - 55 x 35 x 960 mm - 2 Nos. Teak wood
  - 95 x 35 x 550 mm - 1 No. Teak wood
  - 180 x 35 x 550 mm - 1 No. Teak wood
  - 8 x 8 x 75 mm - 16 Nos. Wooden peg
  - Fevicol 150 gm - 1 No.
- Plane the wooden pieces the required size
  - Stiles 50 x 30 x 940 mm - 2 Nos.
  - Top rail - 50 x 30 x 530 mm - 1 No.
  - Bottom rail - 180 x 30 x 530 mm - 1 No.
- Mark and make the total length on both the stiles, top and bottom members as per drawing..
- Mark and make the haunched mortise on both top and bottom stiles ends as per drawing. (Fig 1)
- Mark and make the haunched tenon on both the ends of the top rail as per drawing. (Fig 1)
- Mark and make the haunched tenon (double) on both ends of the bottom rail as per drawing. (Fig 2)
- Mark and make the rebate on vertical stiles, top and bottom rails as per drawing.
- Check all the pieces for the required dimension and proper shapes before assembling.
- Prepare a suitable wooden peg to fixing.
- Mark the drill hole position on stiles.
- Apply the glue on mortise and tenon surface for assembling door shutter frame.
- Assemble the pieces together respective fitment places.
- Clamp the assembled frame together using bar clamp on top cross rail and stiles.
- Drill the holes at the centre of the mortise and tenon joint.
- Insert the wooden peg in drilled hole of the frame.
- Repeat the same procedure on other mortise and tenon joints also.
- Cut off the projected wooden pegs using tenon saw.
- Finish the door frame using smoothing plane as per drawing.



**Fitting, moulding with glass in door frame**

**Objective:** At the end of this exercise you shall be able to

- set the glass on the door frame.



**NOTE: THE GLASS DOOR FRAME IS AVAILABLE IN EX. NO : 1.10.148**

**Job Sequence**

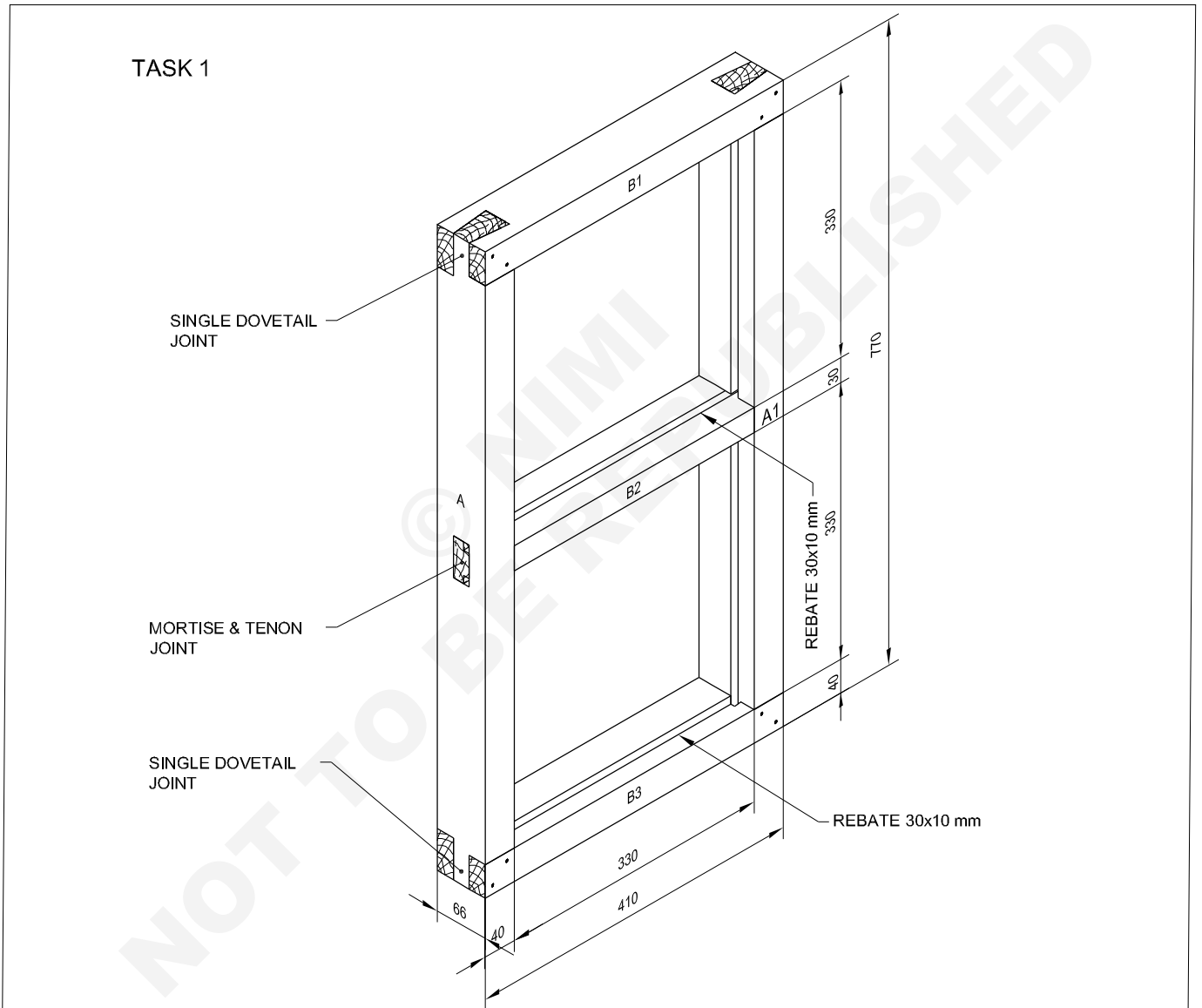
- Check the glass for the required size.
- Prepare the glass for the required door frame size as per drawing and using glass cutter 740x450 mm
- Prepare the wooden beading as required.
- Fix the glass on rebate surface with wooden beading using panel pin with task hammer.
- Finish the glazed shutter using smoothing plane as per drawing.

100 mm	STOCK SIZE		PANEL PIN			
2	10X10X450 mm		WOOD BEADING			
2	10X10X740 mm		WOOD BEADING			
1	450X740X6 mm		PLAIN GLASS			1.10.149
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>FITTING MOULDING WITH GLASS IN DOOR SHUTTER</b>				TOLERANCE ± 2.0 mm	TIME 3h
					CODE NO. CA20N110149E1	

Marking and making window frame and window shutter

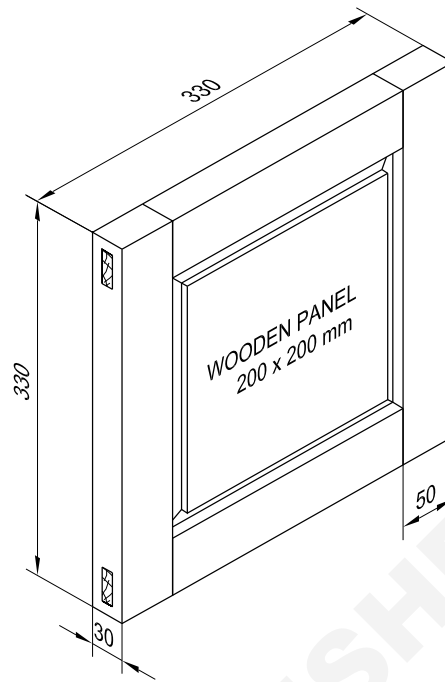
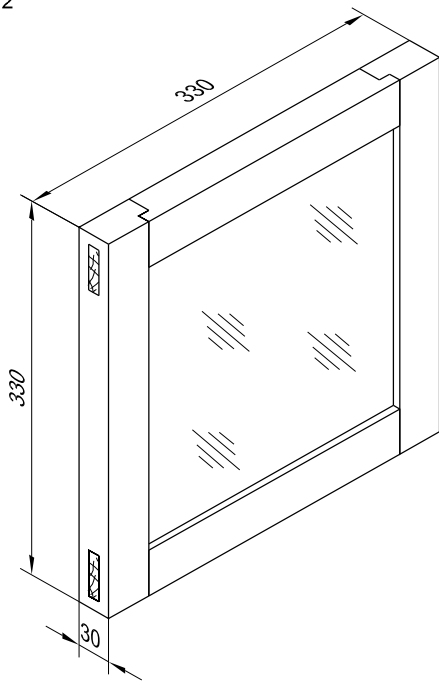
Objectives: At the end of this exercise you shall be able to

- make single dove tail joint
- make through mortise and tenon joint
- make rebate on face side and face edge
- assemble and finish the window frame
- make single through haunched tenon and mortise joint
- make groove inside at the frame
- make assembling and finishing the shutter frame.



10	10 x 8 x 75		TEAK WOOD			
2	75 x 65 x 800		TEAK WOOD			
3	75 x 65 x 450		TEAK WOOD			1.10.150
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>WINDOW FRAME</b>			TOLERANCE ± 2.0 mm	TIME 6h
					CODE NO. CA20N11150E1	

TASK 2

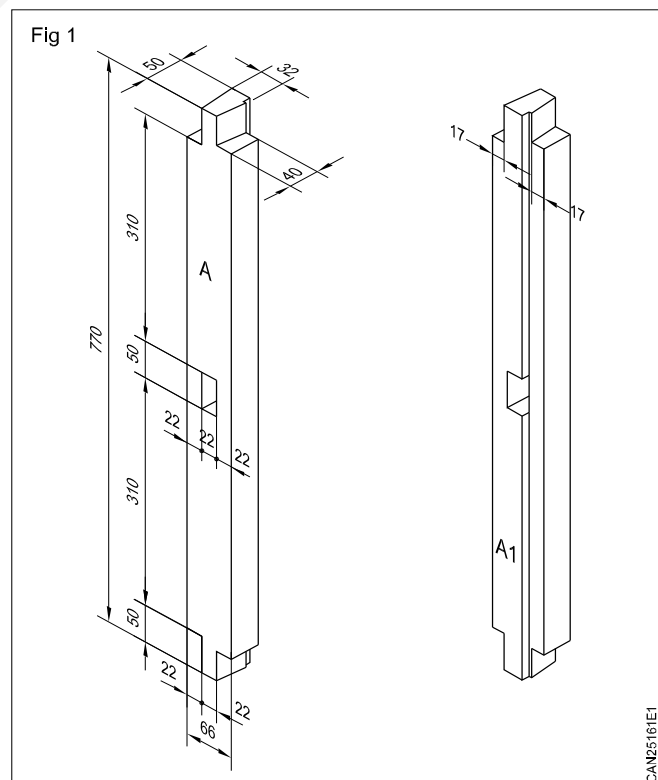


1	250 x 250 x 4		GLASS			-
4	20 x 20 x 300		TEAK WOOD			-
8	60 x 40 x 450		TEAK WOOD			-
1	255 x 25 x 300		TEAK WOOD			1.10.150
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>WINDOW SHUTTER</b>				TOLERANCE ± 2.0 mm	TIME 6h
					CODE NO. CA20N110150E2	

## Job Sequence

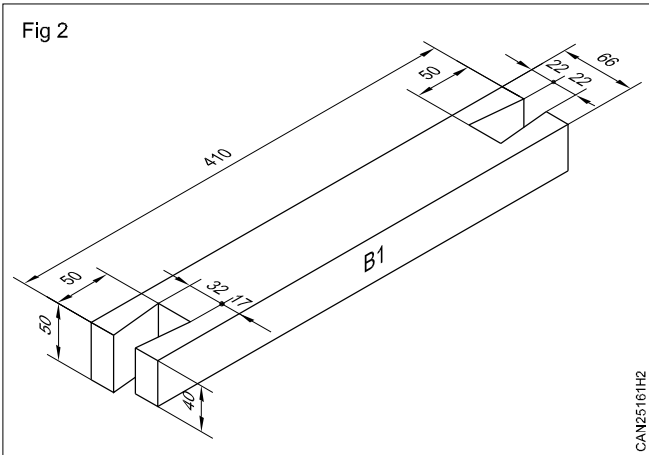
### TASK 1: Window frame

- Check the raw material size for the required dimension using wooden rule.
  - 75 x 65 x 800 mm - 2 Nos.
  - 75 x 65 x 450 mm - 3 Nos.
  - 10 x 8 x 75 mm - 10 Nos.
- Plane the width and thickness of window frame as per the required dimensions using jack plane and try square.
- Mark and make the total length on both the vertical stiles. (A-A1) as per the drawing using wooden rule and try square. (Fig 1)
- Mark and make the dove tail pin on top and bottom ends of the vertical stiles. (A, A1) as per drawing.
- Mark and make through mortise on middle of the vertical stiles (A, A1) as per drawing. (Fig 1)

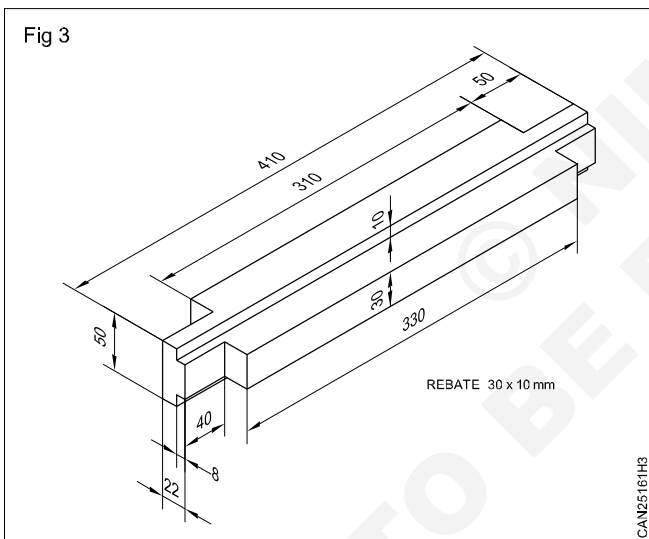




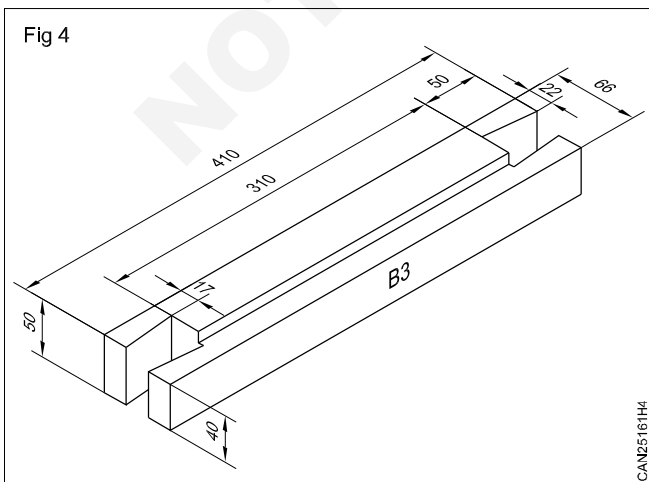
- Mark and make the total length on top of the cross rail B1 as per drawing. (Fig 2)
- Mark and make the dove tail socket on both the ends of the top cross rail (B1) as per drawing. (Fig 2)



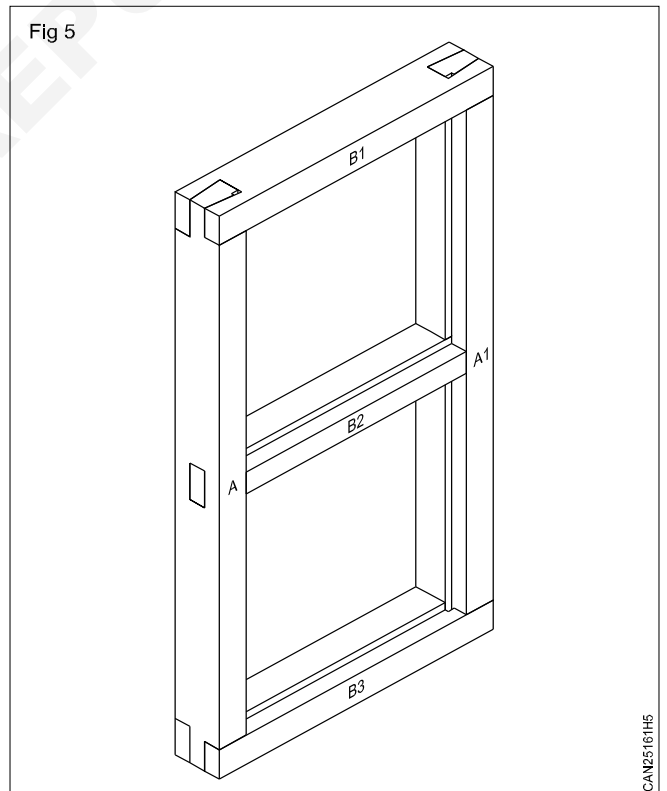
- Mark and make the total length on middle cross rail (B2) as per drawing. (Fig 3)
- Mark and make tenon on both the ends of the middle cross rail (B2) as per drawing. (Fig 3)



- Mark and make the total length of bottom cross rail (B3) as per drawing. (Fig 4)

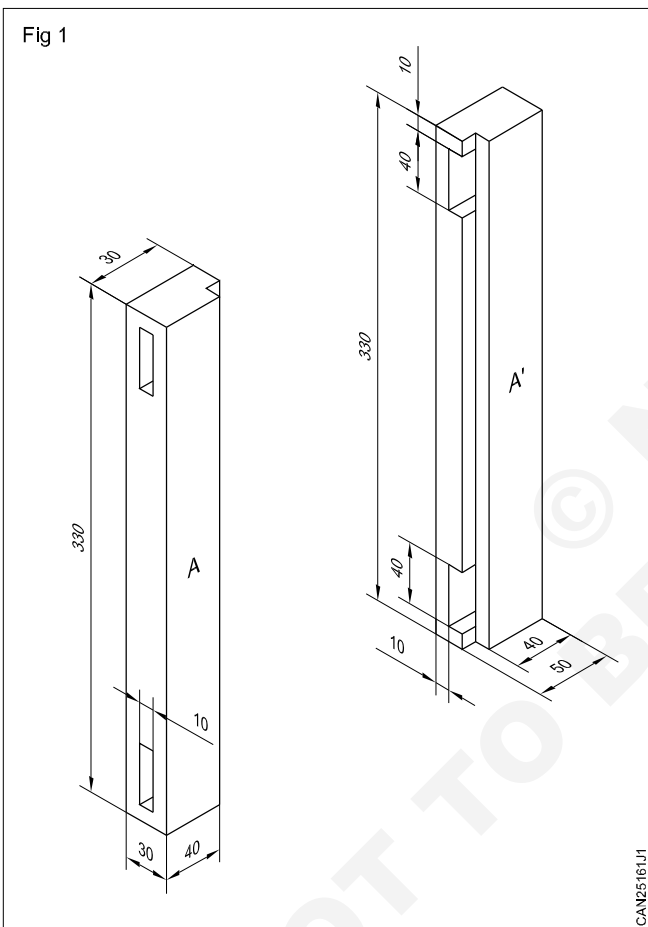


- Mark and make the dove tail socket on both the ends of the bottom cross rail (B3) as per drawing. (Fig 4)
- Make a rebate surface on a, A1, B1, B2 and pieces as per drawing.
- Check all the pieces for the required dimensions and proper shape as per drawing before assembling.
- Mark the drill hole position on stiles and rails.
- Prepare the suitable wooden peg for fixing the frame.
- Apply glue on dovetail pin, dovetail socket, mortise and tenon surfaces.
- Assemble the pieces together to their respective fitment places.
- Clamp the assembled window frame squarely using bar clamp (at top cross rail)
- Make a drill hole on the centre of dove tail pin and socket joint. (Fig 5)
- Insert wooden peg in drilled hole of the window frame properly.
- Cut off the excess projected peg using hand saw.
- Repeat the same procedure for fixing the wooden peg on middle cross rail and bottom cross rail also. (Fig 5)
- Finish the assembled frame using smoothing plane. (Fig 5)



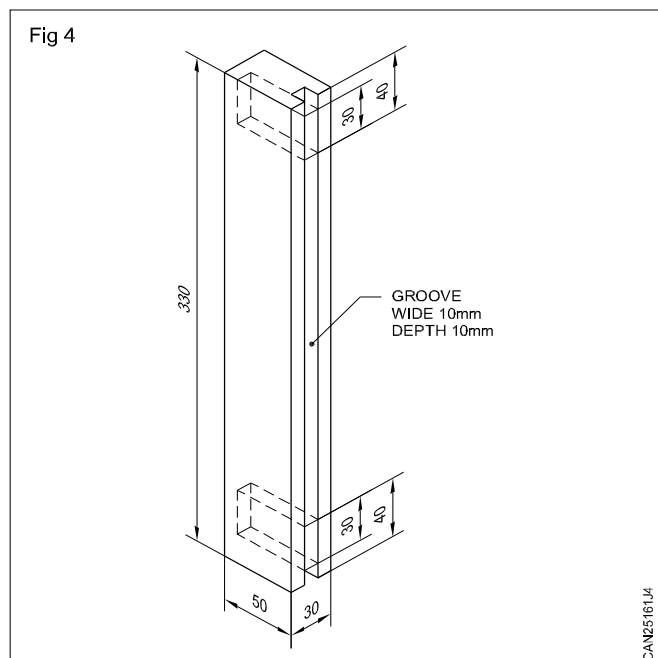
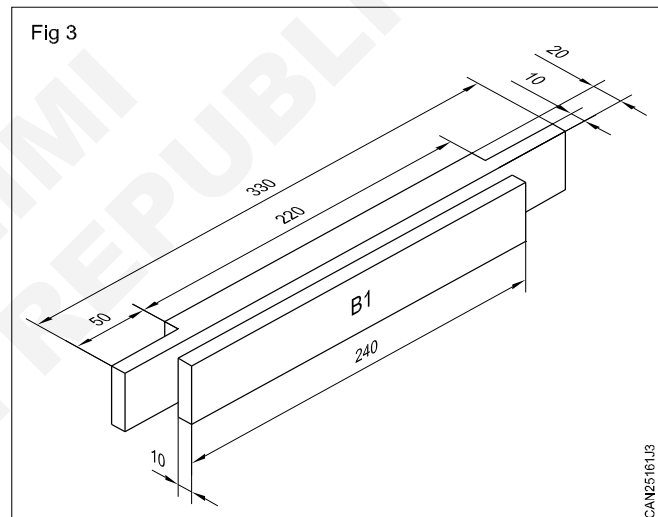
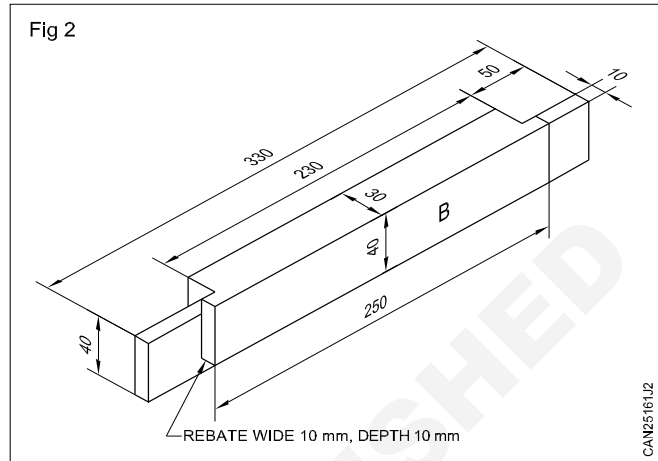
## TASK 2: Window shutter

- Plane the raw materials to required sizes
  - Vertical rails 50 x 30 x 330 - 4 Nos.
  - Cross rails 50 x 30 x 330 - 4 Nos.
  - Beadings 15 x 15 x 330 - 4 Nos.
  - Plank 250 x 25 x 50 - 1 No.
- Check the length and squareness of planed pieces using try square and steel rule.
- Mark and make the total length on both the vertical stiles A, A1 as per drawing. (for glass) (Fig 1)
- Mark and make the haunched mortise on both the top and bottom ends of the vertical stiles (A, A1) as per drawing (for glass). (Fig 1)

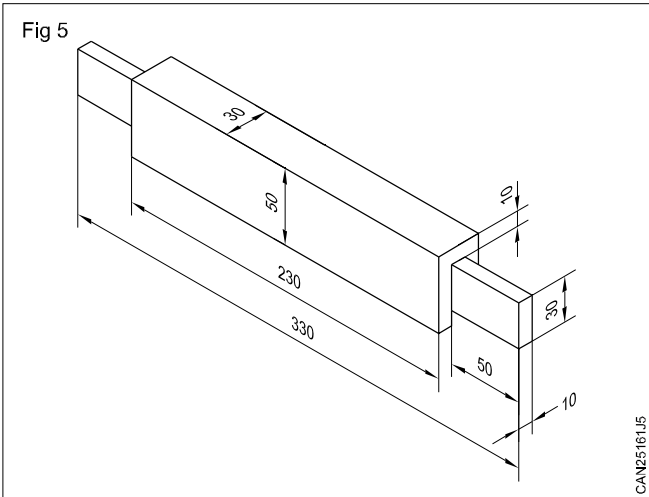


- Mark and make the haunched tenon on both the ends of the top cross rail (B) as per drawing (for glass). (Fig 2)
- Mark and make the haunched tenon on both the ends of the bottom cross rail (B1) as per drawing (to glass). (Fig 2)
- Mark and make the rebate on vertical stiles (A, A1) top cross rail (B) and bottom cross rail (B1) as per the drawing (for glass). (Figs 1 and 3)
- Mark and make the total length on both the vertical stiles. (D, D1) as per drawing. (for panel). (Fig 4)

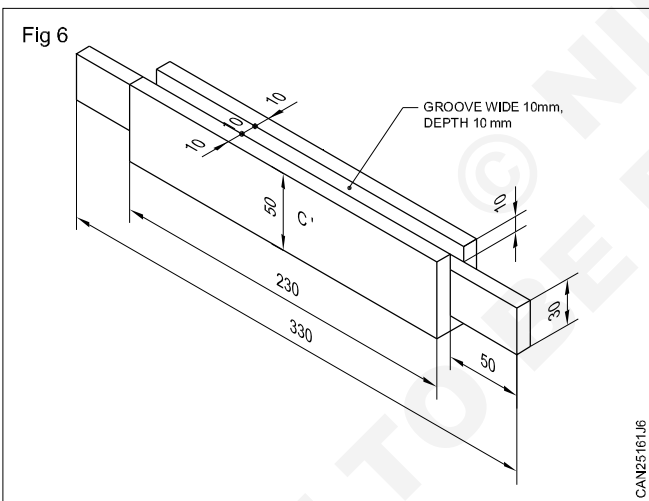
- Mark and make the haunched mortise on both the top ends of the vertical stiles (D, D1) as per drawing (for panel). (Fig 4)
- Mark and make the haunched mortise on both the bottom ends of the vertical stiles (D, D1) as per drawing (for panel). (Fig 4)



- Mark and make the haunched tenon on both the ends of the top cross rail (C) as per drawing (for panel). (Fig 5)
- Mark and make the haunched tenon on both the ends of the bottom cross rail (C1) as per drawing. (Fig 5)
- Mark and make the groove on vertical stiles (D-D1) top cross rail (C) as per drawing. (Fig 5)

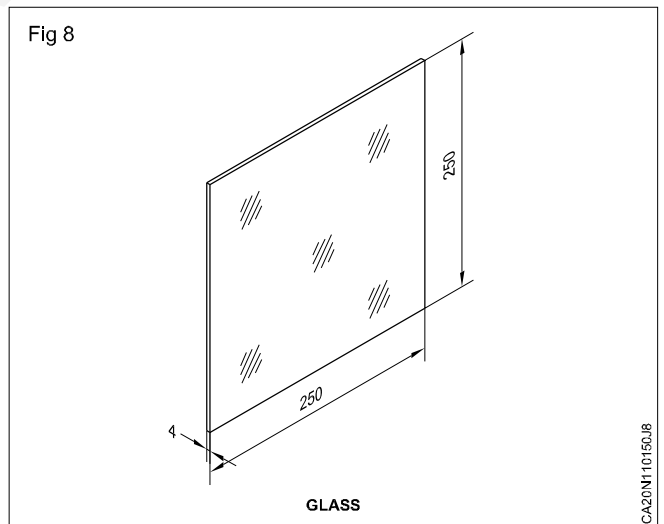
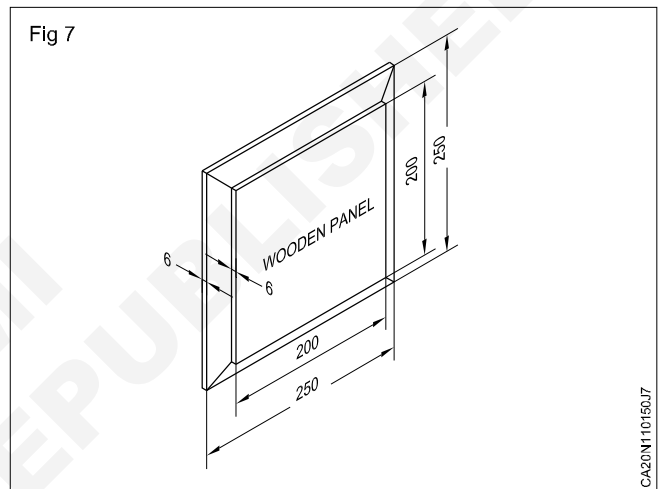


- Mark and make the groove on vertical stiles (D-D1) top cross rail (C) and bottom cross rail (C1) as per drawing (for panel). (Figs 4 & 6)



- Prepare the panel piece for the required size as per drawing (E). (Fig 7)
- Check all the pieces for the required dimension and proper shapes before assembling.
- Prepare a suitable wooden peg for fixing.
- Mark the drill hole position in stiles.
- Apply the glue on mortise and tenon surfaces for assembling (for panel).
- Assemble the pieces together to their respective fitment places.

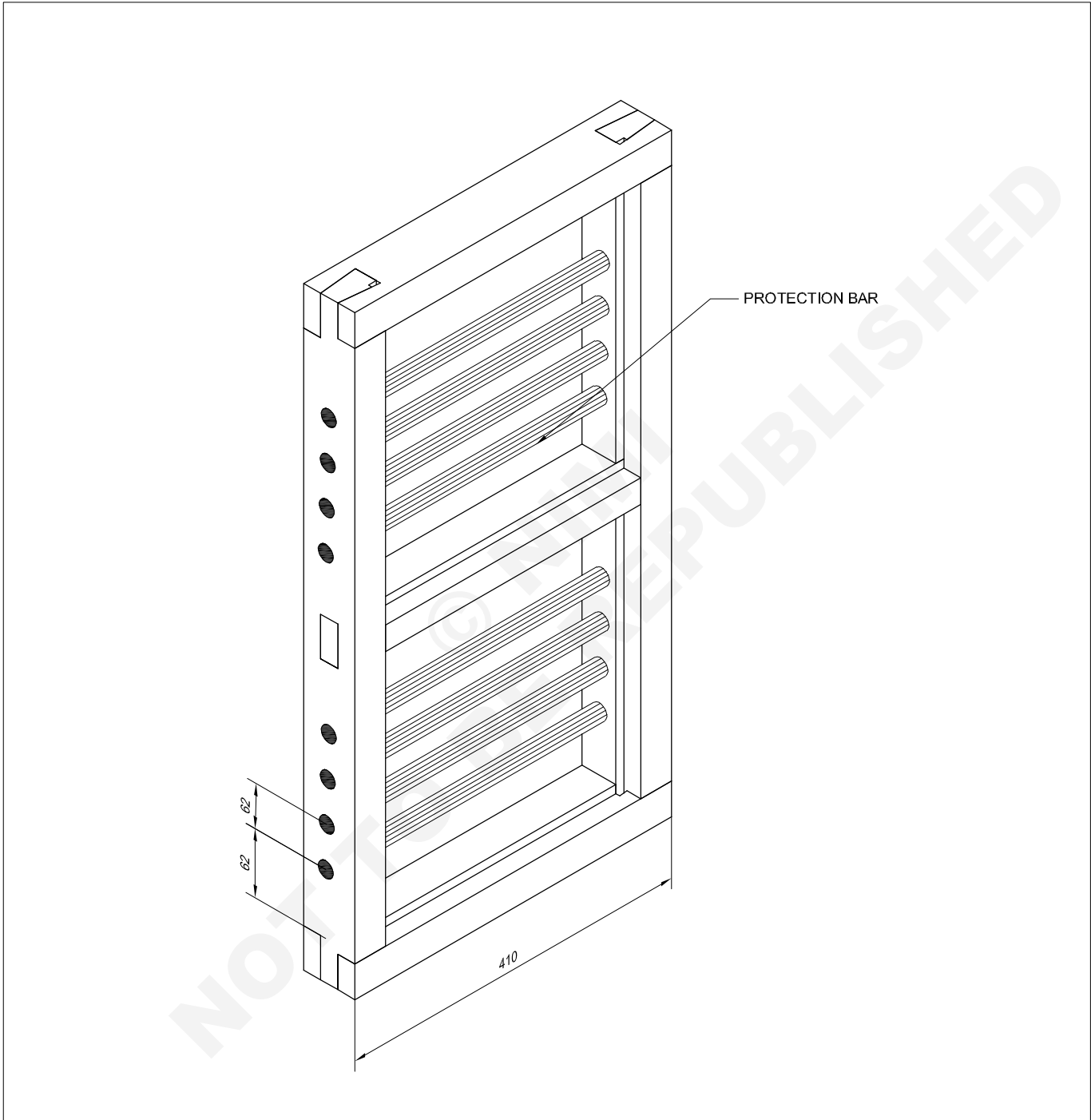
- Clamp the assembled frame to squarely.
- Make a drill hole on the center of the mortise and tenon joints.
- Insert the prepared wooden peg tightly on drilled hole.
- Cut off the excess projected pegs using hand saw.
- Repeat the same process for fixing the opposite side of the frame and the other frame also.
- Finish the frame using smoothing plane.
- Prepare the glass for the required size. (Fig 8)
- Prepare the beading as required.
- Fix the glass on rebate surface with beading using panel pin.
- Finish the window shutter using smoothing plane.



Use protection bar in window frame

Objective: At the end of this exercise you shall be able to

- use of protection bar in window frame.

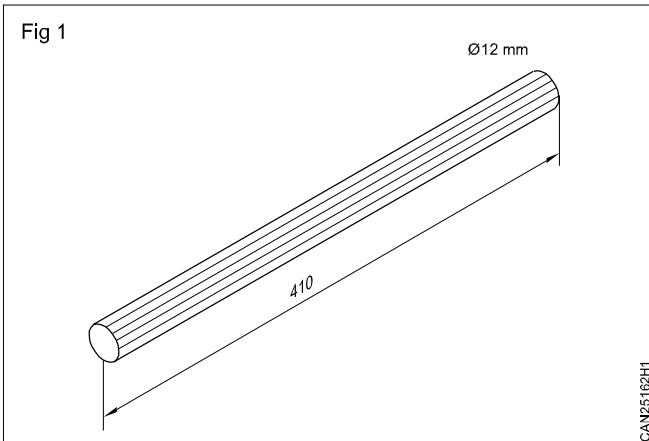


8	Ø12X410 mm		M.S ROUND BAR			1.10.151
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS	<b>USE PROTECTION BAR IN WINDOW FRAME</b>				TOLERANCE ± 2.0 mm	TIME 2h
					CODE NO. CA20N110151E1	

## Job Sequence

Instructor shall display and demonstrate to the students regarding the use of protection bar for wooden window frame.

- Check the window frame size.
- Check the M.S round rod (Protection bar) as per required dimension. (Fig 1)
- Removed the wooden peg of the window frame.
- Dismantling the window frame with carpenter hammer.



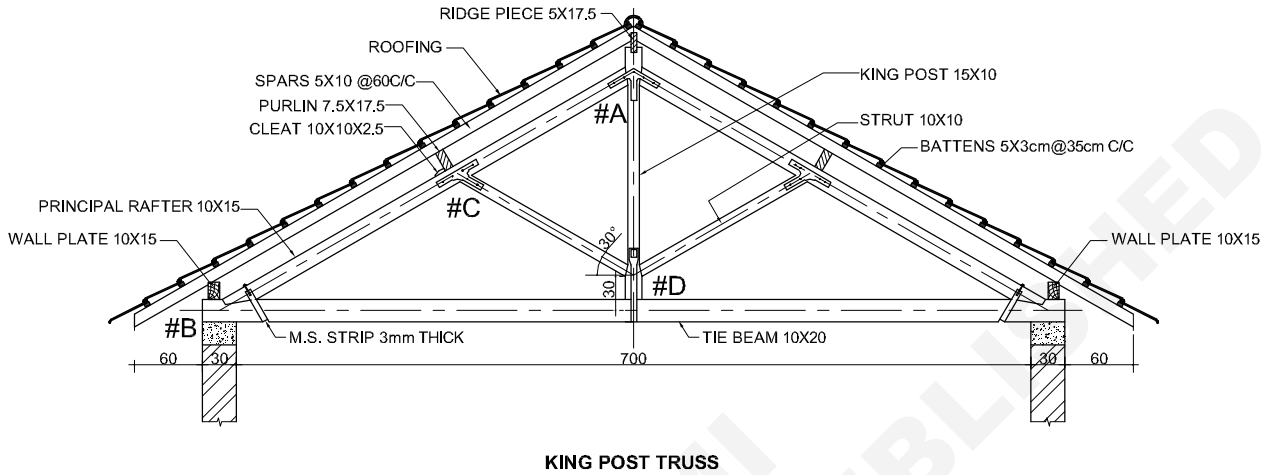
- Mark the drill hole on two vertical stiles as per drawing with foot rule, try square, marking gauge and scriber.
- Drill the 12 mm holes of the marked points on the two vertical stiles with portable power heavy duty drill machine.
- Apply glue on dove tail pin, dove tail socket, mortise and tenon surface.
- Assembled window frame using bar clamp.
- Insert wooden peg in drilled hole of the window frame properly.
- Cut off the excess projected peg using hand saw.
- Insert the M.S round rod (protection bar) in vertical stiles 12 mm drilled hole of the window frame.
- Repeat the same procedure for fixing the all protection bar on vertical stiles.
- Finish the assembled frame using smoothing plane.

King post and queen post roof trusses layout

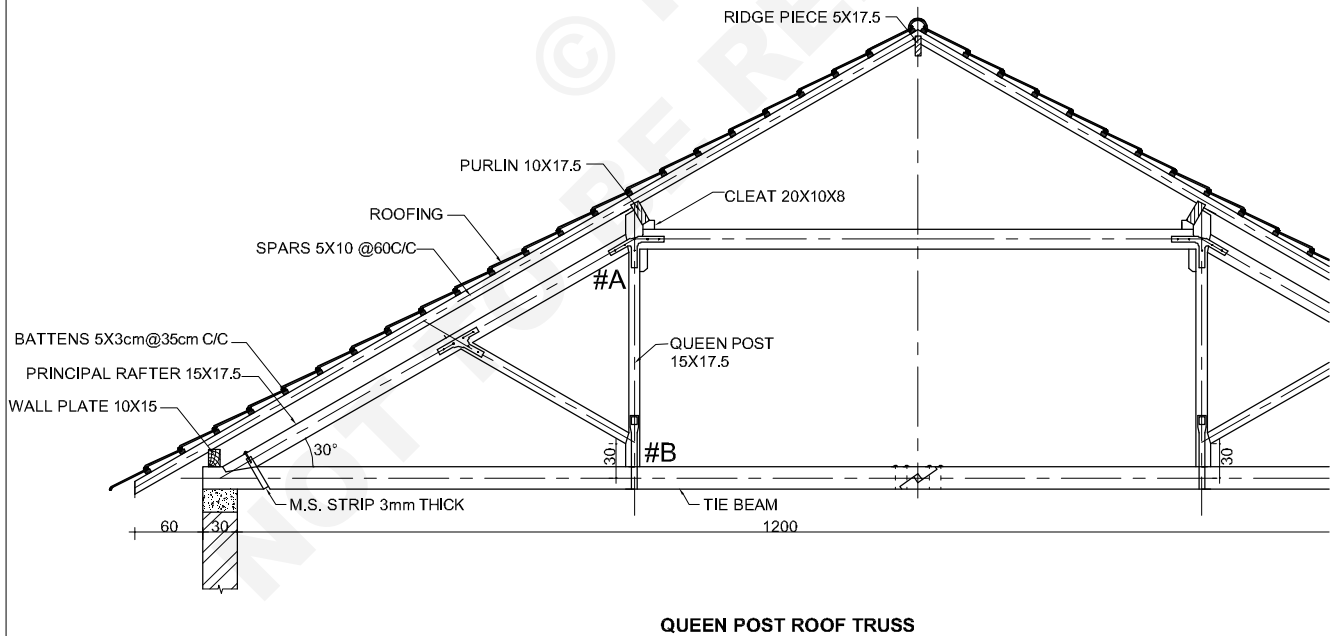
Objectives: At the end of this exercise you shall be able to

- make the layout for king post roof truss
- make the layout for queen post roof truss.

TASK 1



TASK 2



							1.10.152
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.	
SCALE NTS	<b>KING POST AND QUEEN POST ROOF TRUSSES LAYOUT</b>					TOLERANCE ±3.0 mm	TIME 4h
						CODE NO. CA20N110152E1	

## Job Sequence

### TASK 1: Draw the layout of king post roof truss (Fig 1)

- Draw the section of king post truss a scale 1:50.

#### DATA

- Span = 700 cm.
- Thickness of main wall = 30 cm.
- Cross section size of wall plate = 10 x 15 cm.
- Cross section size king post = 10 x 10 cm.
- Cross section size of principle rafter = 10 x 15 cm.
- Cross section size of struts = 10 x 10 cm.
- Cross section size of tie beam = 10 x 20 mm.
- Cross section size of common rafter = 5 x 10 mm.
- Cross section size of ridge piece = 5 x 17.5 cm.
- Cross section size of purlin = 7.5 x 17.5 cm.
- Size of cleat = 20 x 10 x 2.5 cm.
- Cross section size of battens = 5 x 3 cm @ 35 cm C/C.
- Cross section size of eaves boards = 5 x 20 cm.
- Eaves projection = 60 cm.
- Pitch of the roof = 30° or 1/3 of span.
- Draw two main walls with clear span 7000 mm.

- Complete the drawing as shown in figure 1.
- Draw concrete bed block 300 x 100 mm on the top of main wall.
- Draw 7600 x 200 mm rectangle for tie beam.
- Draw centre line of king post truss.
- Draw centre line of struct (30° inclination)
- Draw wall plate at the end of tie beam as shown in figure 1.
- Draw the centre line of principle rafter.
- Draw parallel line from the centre line to inside and outside according to the size of members (king post, strut, principle rafter)
- Draw ridge piece above the king post.
- Draw purlin above the principle rafter.
- Draw cleat to support the purlin.
- Draw common rafter above the purlin.
- Draw battens above the common rafter.
- Draw the roof tiles above the battens.
- Draw eave boards at the end of common rafter.

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### TASK 2: Draw the layout of queen post roof truss (Fig 2)

- Draw the section of queen post truss a scale 1:50.

#### DATA

- Span = 1200 cm.
- Thickness of main wall = 30 cm.
- Cross section size of wall plate = 10 x 15 cm.
- Cross section size queen post = 15 x 17.5 cm.
- Cross section size of principle rafter = 15 x 17.5 cm.
- Cross section size of top joist = 15 x 17.5 cm.
- Cross section size of struts = 15 x 10 cm.
- Cross section size of tie beam = 15 x 20 cm.
- Cross section size of common rafter = 5 x 10 cm.
- Cross section size of ridge piece = 5 x 17.5 cm.
- Size of cleat = 20 x 10 x 8 cm.
- Cross section size of battens = (5 x 3) cm @ 35 cm C/C.

Cross section size of elevation boards = 5 x 20 cm.

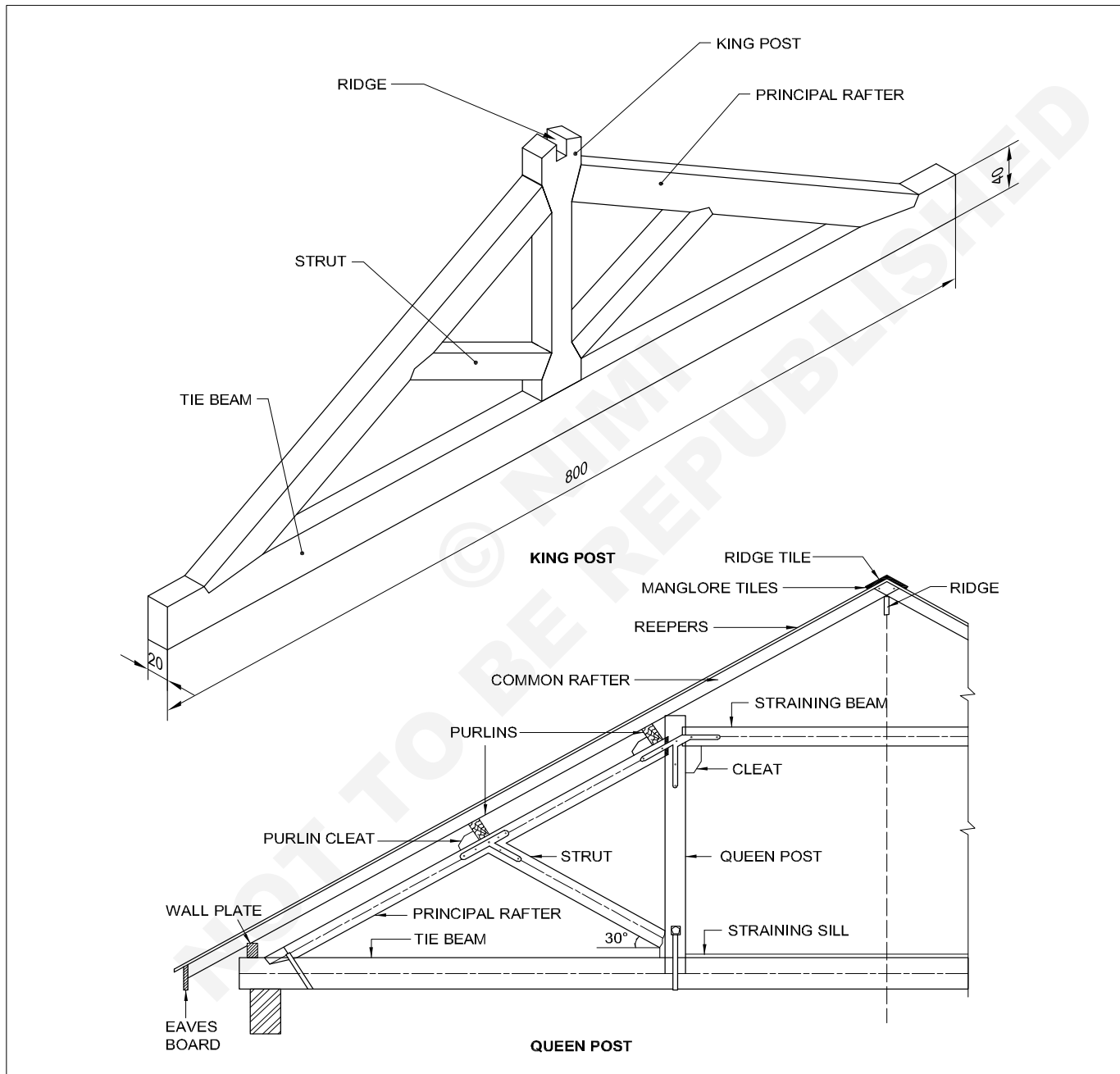
Elevation projections = 60 cm.

- Pitch of the roof = 30° or 1/3 of span.
- Draw two main walls with clear span 1200 cm.
- Draw concrete bed block 300 x 100 mm on the top of main wall.
- Draw 1260 x 20 cm rectangle for tie beam.
- Draw centre line of queen post truss.
- Draw wall plate at the end of tie beam as shown in figure.
- Draw lines parallel to the centre line to show the thickness of members. (queen post, top joist, strut, principal rafter)
- Draw purlin above the principle rafter.
- Draw cleat to support the purlin.
- Draw common rafter above the purlin.
- Draw battens above the common rafter.
- Draw the roof tiles above the battens.
- Draw eave boards at the end of common rafter.
- Complete the drawing as shown in figure.

Make model type king post and queen post

Objectives: At the end of this exercise you shall be able to

- make the mortise and tenon joint
- make the oblique mortise and tenon joint
- make the logged (brindle) joint
- assemble and finish the king post truss and queen post truss.



NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	DESCRIPTION	PART NO.	EX. NO.
						1.10.153
SCALE NTS	<b>KING POST AND QUEEN POST (MODEL)</b>				DEVIATIONS ± 2.0 mm	TIME 8h
					CODE NO. CA20N110153E1	



# Job Sequence

## TASK 1: King post model

- Check all the raw materials and plane the wood pieces for the required size as per drawing.

Teak wood

40 x 20 x 800 Tie beam - 1 No.

40 x 20 x 280 King post - 1 No.

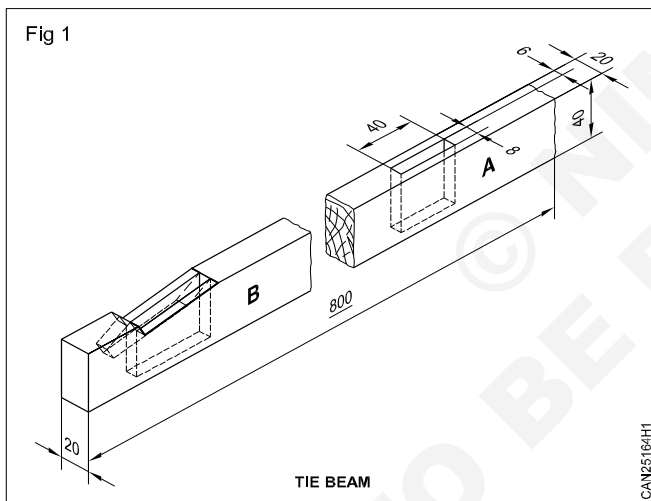
30 x 20 x 398 Principal rafter - 2 Nos

20 x 2 x 170 strut - 1 No

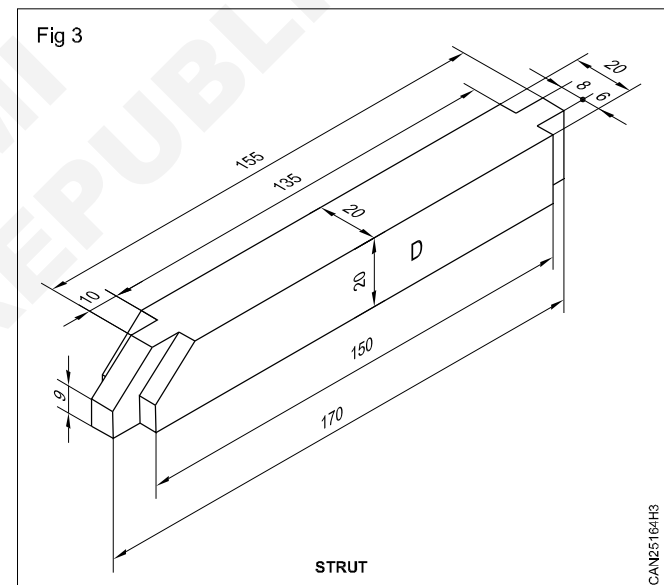
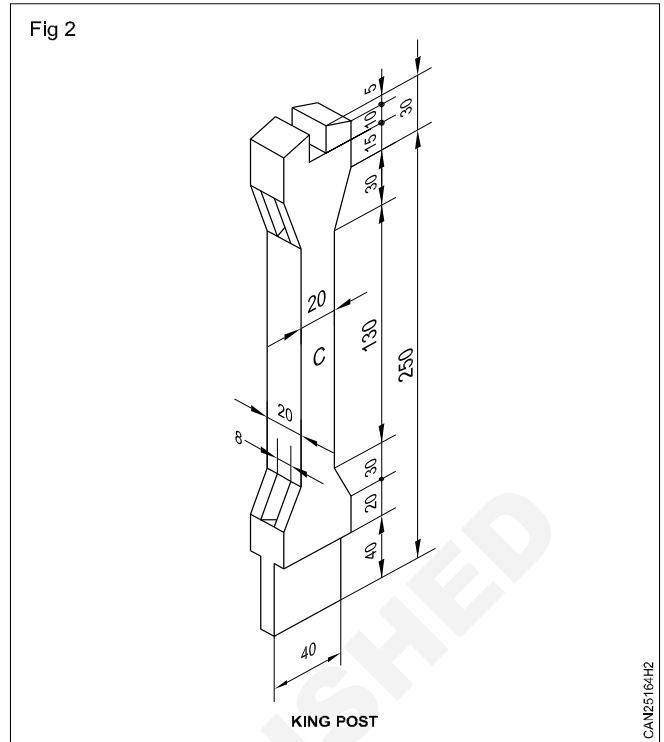
Fevicol - 100 gm

Wooden peg 8 x 8 x 50 - 10 Nos.

- Mark and make the length of the tie beam as per drawing layout. (Fig 1)
- Mark and make the mortise on middle of the tie beam as per the drawing to fix the king post tenon. (Fig1)
- Mark and make the bridle mortise (oblique mortise) on both the end of the tie beam to fix the principal rafter as per the drawing. (Fig 1)

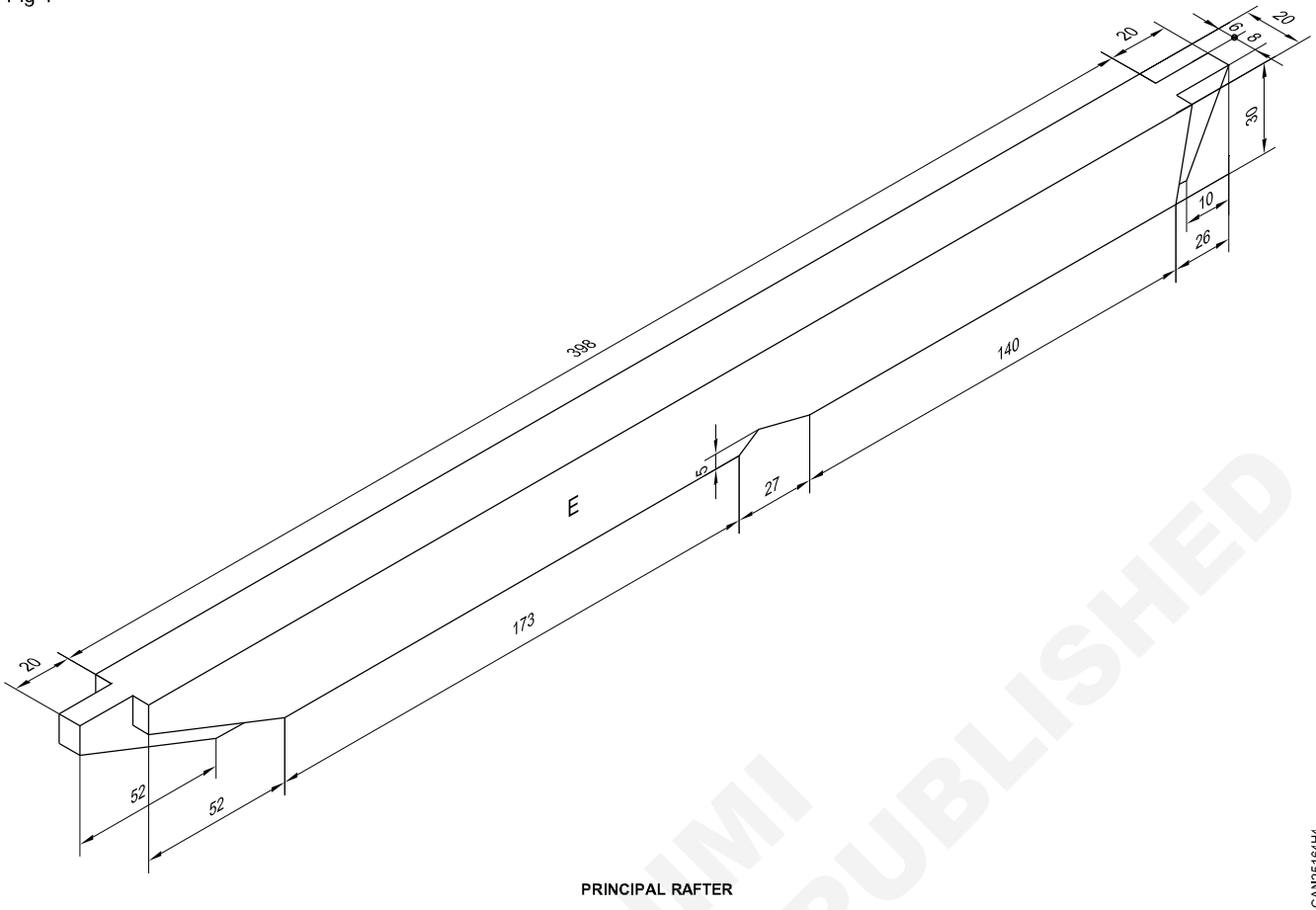


- Mark and make the length on king post as per the drawing. (Fig 2)
- Mark and make the tenon on bottom end of the king post to fix on tie beam mortise portion as per the drawing. (Fig 2)
- Mark and make the mortise on bottom part of the king post as per the drawing to fix the strut piece. (Fig 2)
- Mark and make the mortise on top part of the king post to join the common rafter as per the drawing. (Fig 2)
- Mark and make the slot (ridge) on top end of the king post to fix the ridge piece as per the drawing. (Fig 2)
- Mark and make the total length on both the slot piece as per drawing. (Fig 3)
- Mark and make the oblique tenon on top end of the slot to fix principle rafter as per drawing. (Fig 3)



- Mark and make the oblique on bottom ends of the strut piece. (Fig 3)
- Mark and make the length on both the pieces of principal rafter as per drawing. (Fig 4)
- Mark and make the oblique tenon (brindle pin) on bottom end of the principal rafter to fix on the beam as per drawing. (Fig 4)
- Mark and make the tenon (mortise) on top end of the principal rafter to fix on king post piece (mortise) as per drawing. (Fig 4)
- Mark and make the oblique mortise on middle of the principal rafter as per the drawing. (Fig 4)
- Check the squareness and correct measurement of prepared work pieces with prepared layout of king post truss before assembling.

Fig 4



- Apply glue on all the joined surfaces.
- Mark the drill hole points on centre of the joints.
- Prepare the bar cramp to assemble the king post truss pieces.
- Place the assembled pieces on bar cramp and tighten it.
- Make the drill hole on centre of the joints.
- Insert the wooden peg on drilled hole and tighten it.
- Allow the king post truss to dry and cut of the projected wooden pegs using tenon saw.
- Finish the king post truss using smoothing plane.
- Check the prepared king post truss by placing on layout.

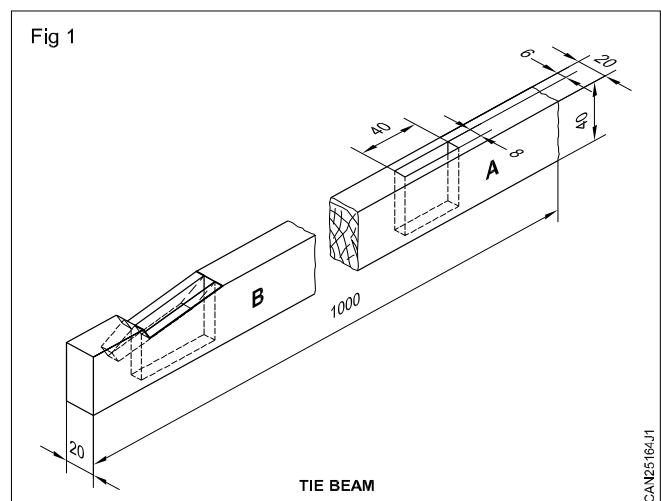
### TASK 2: Queen post model

- Check all the raw materials and plane the wood pieces for the required size as per drawing.
- Mark and make two mortise of the tie beam as per the drawing to fix the queen post tenon. (Fig 1)

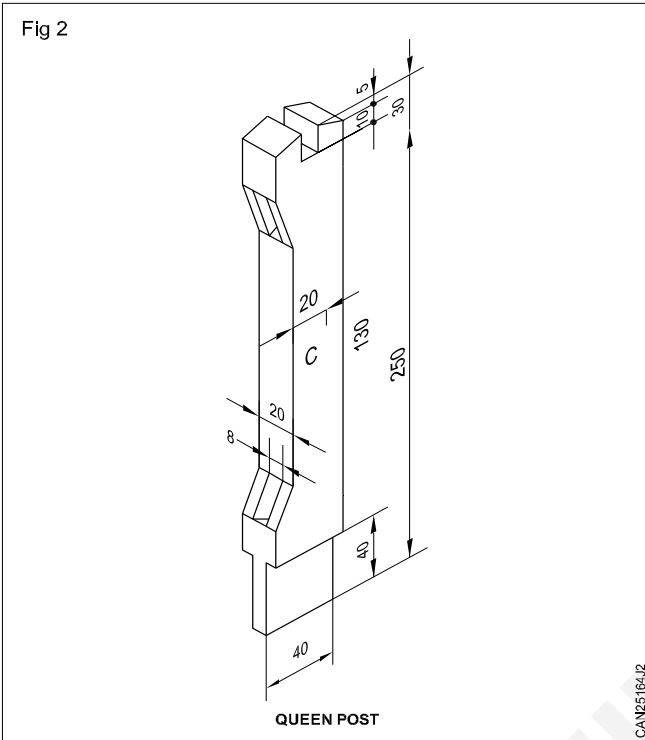
#### Teak wood

- 40 x 20 x 1000 Tie beam Teak wood - 1 No.
- 40 x 20 x 280 Queen post Teak wood - 2 Nos.
- 30 x 20 x 358 Principal rafter Teak wood - 2 Nos.
- 20 x 20 x 170 strut Teak wood - 2 Nos.
- Fevicol - 100 gm
- Wooden peg 8 x 8 x 50 - 10 Nos.
- 40 x 20 x 600 straining beam Teak wood - 1 No.
- 20 x 10 x 600 straining sill Teak wood - 1 No.

- Mark and make the length of the tie beam as per drawing layout. (Fig 1)



- Mark and make the bridle mortise (oblique mortise) on both the end of the tie beam to fix the principal rafter as per the drawing. (Fig 1)
- Mark and make the length of queen post as per the drawing. (Fig 2)



- Mark and make the tenon on bottom end of the queen post to fix on tie beam mortise portion as per the drawing. (Fig 2)
- Mark and make the mortise on bottom part of the queen post as per the drawing to fix the strut piece. (Fig 2)
- Mark and make the mortise on top part of the queen post to join the straining beam as per the drawing. (Fig 2)
- Mark and make the slot on top to tenon on end as straining beam to fix the queen post as per the drawing. (Fig 2)
- Mark and make the total length on both the strut piece as per drawing. (Fig 3)
- Mark and make the oblique tenon on bottom ends of the strut to fix the principle rater as per drawing. (Fig 3)
- Mark and make the oblique tenon on bottom ends of the strut piece. (Fig 3)

- Mark and make the length on both the pieces of principal rather as per drawing.
- Mark and make the oblique tenon (brindle pin) on bottom end of the principal rafter to fix on tie beam as per drawing flow TASK 1 Fig 4
- Mark and make the tenon (mortise) on top end of the principal rafter to fix on queen post piece (mortise) as per drawing. Flow TASK 1 Fig 4
- Mark and make the oblique mortise on middle of the principal rafter as the drawing. TASK 1 Fig 4
- Mark and make the tenonn both end of the straining beam to fix on queen post top as per the drawing. (Fig 4)
- Mark and make the total length of bottom straining sill as per the drawing.
- Check the squareness and correct measurement of prepared work pieces with prepared layout of queen post truss before assembling. (Fig 4)
- Apply glue on all the joined surfaces.
- Mark the drill hole points on centre of the joints.
- Prepare the bar clamp to assemble the queen post truss pieces.
- Place the assembled pieces on bar clamp and tighten it.
- Make the drill hole on centre of the joints.
- Insert the wooden peg on drilled hole and tighten it.
- Allow the queen post truss to dry and cut of the projects wooden pegs using tenon saw.
- Finish the queen post truss using smoothing plane.
- Check the prepared queen post truss by placing or layout.

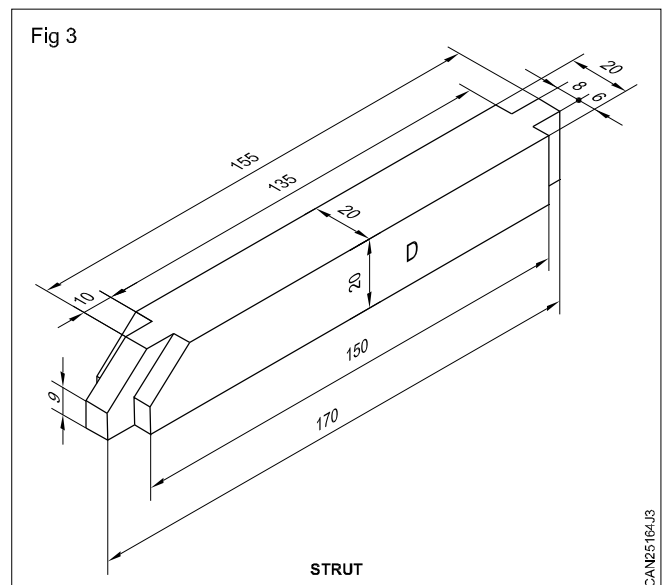
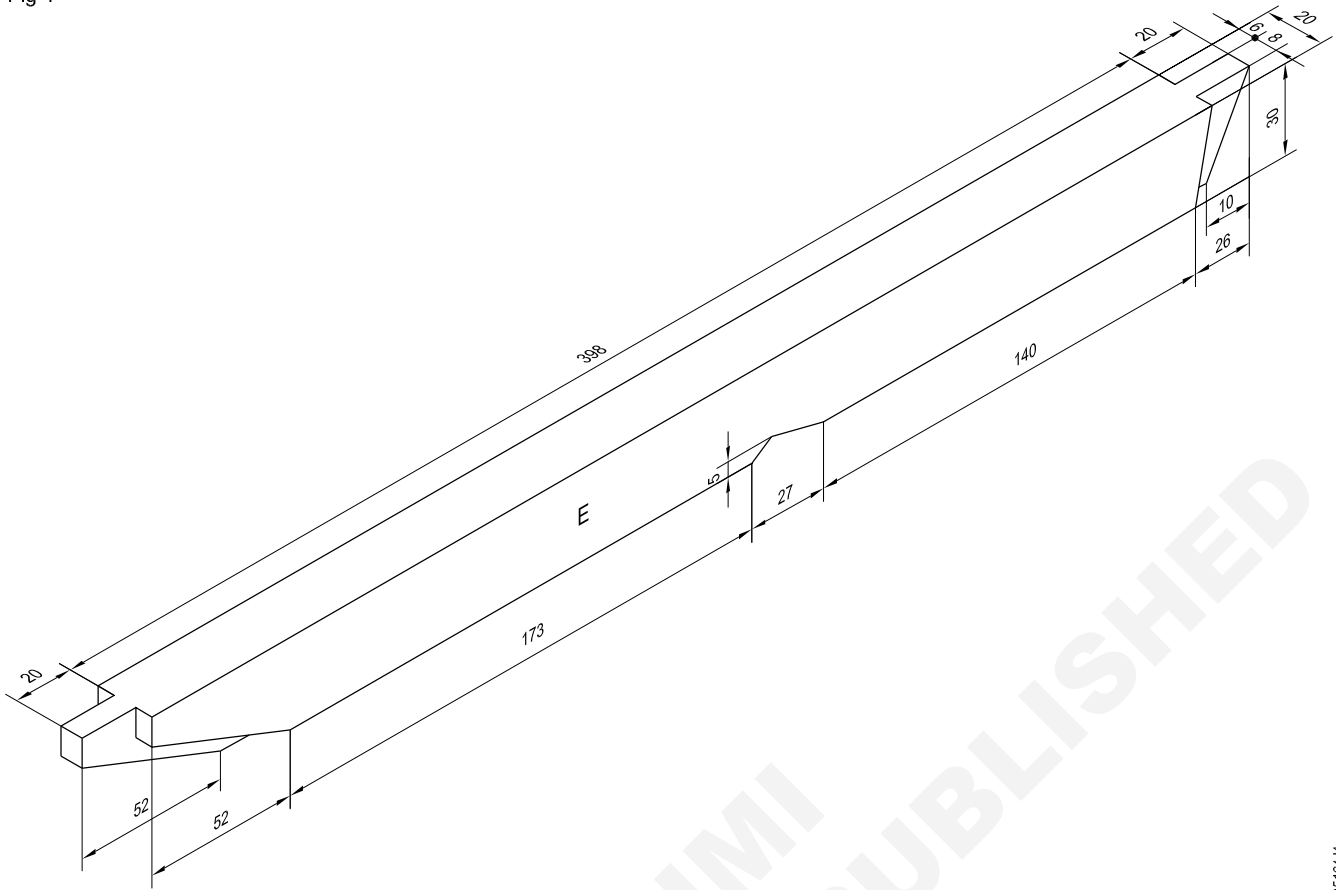


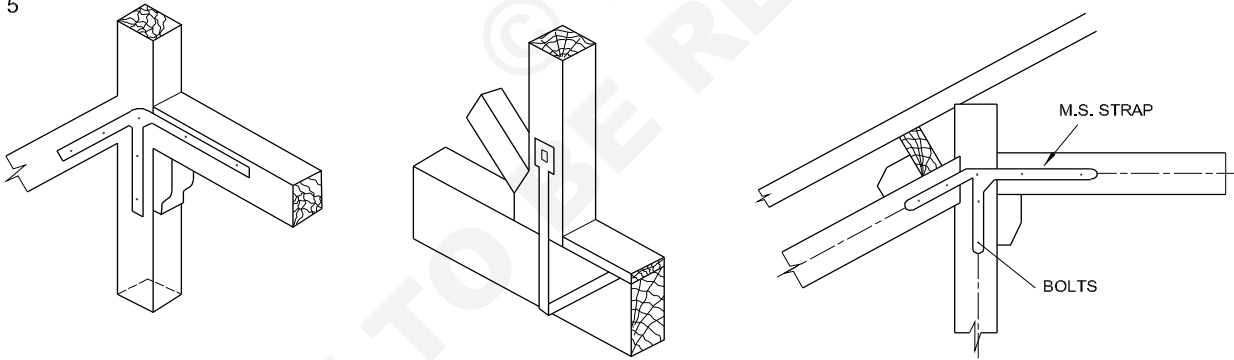
Fig 4



PRINCIPAL RAFTER

CAN25164J4

Fig 5



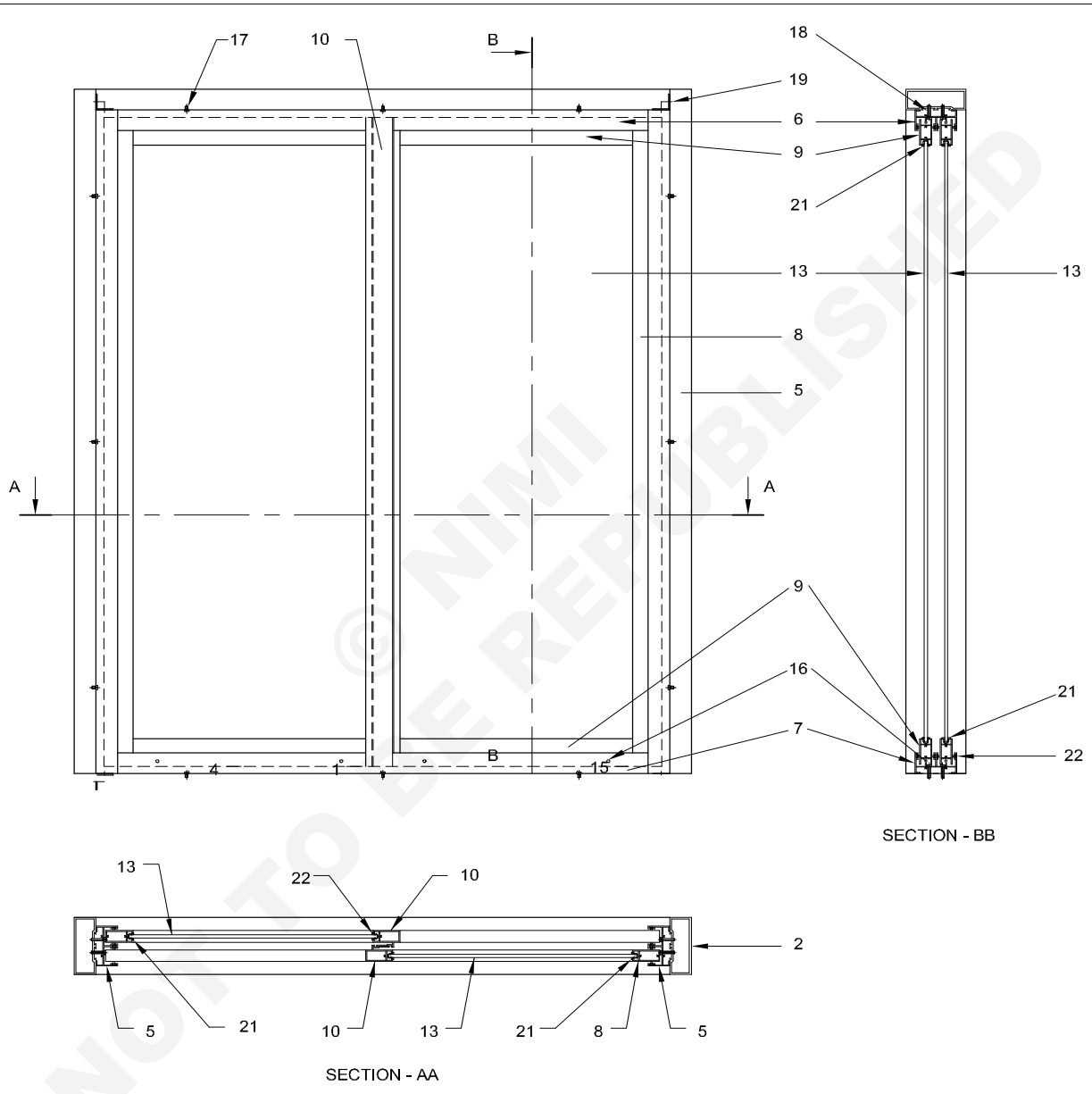
QUEEN-POST TRUSS

CAN25164J5

Angular cutting of aluminium two track channel sliding window outer frame

Objectives: At the end of this exercise you shall be able to

- identify the aluminium window sections for making aluminium sliding window outer frame
- mark and cutting two track bottom, top and side frames
- join two track bottom, top and side frames using screw.

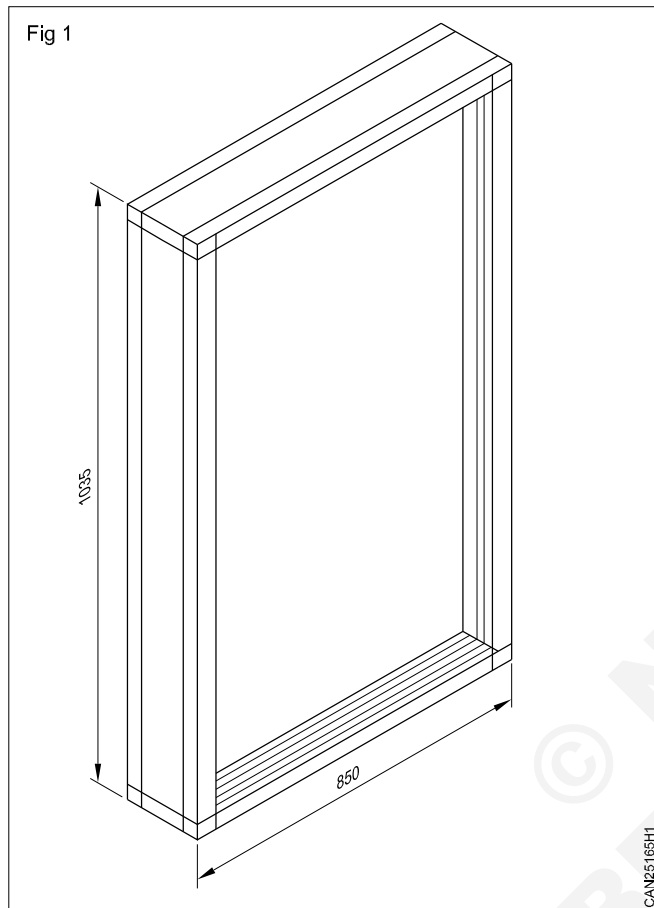


8	M6X40	-	SLOTTED CHEESE METAL HEAD SCREW			
2	62X32-860	-	ALUMINIUM TWO TRACK 'E' CHANNEL TOP, BOTTOM			
2	62X32-1040	-	ALUMINIUM TWO TRACK 'E' CHANNEL SIDE			1.10.154
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.

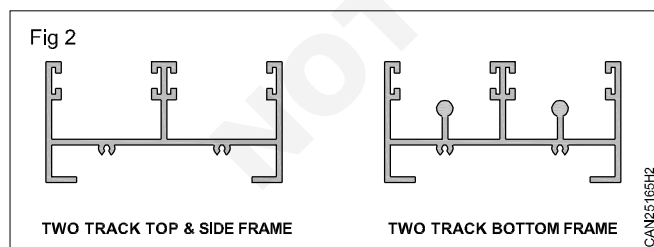
SCALE 1:1	<b>MAKE ALUMINIUM SLIDING WINDOW OUTER FRAME</b>	TOLERANCE ±0.06 mm	TIME 3h
		CODE NO. CA20N110154E1	

## Job Sequence

- Identify two track bottom frames, two track top and side frames to make an aluminium sliding window outer frame. (Fig 1)
- Mark the two track bottom frame, two track top and side frames required length as per the drawing Fig 1 using tape rule and try square.

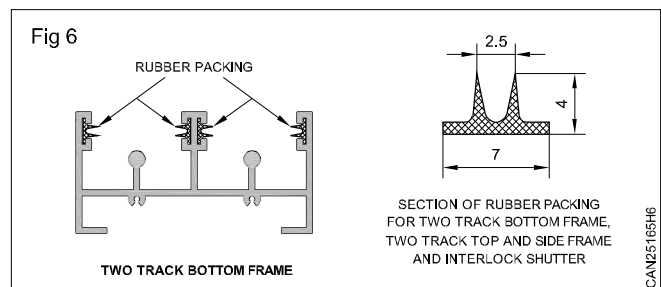
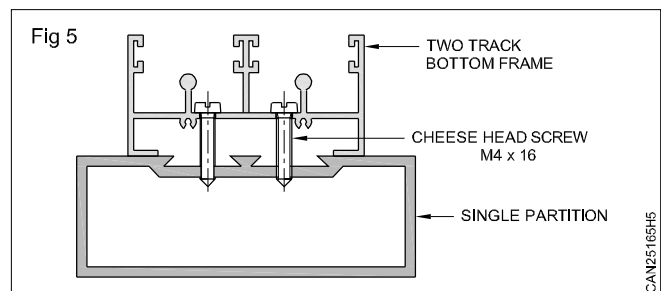
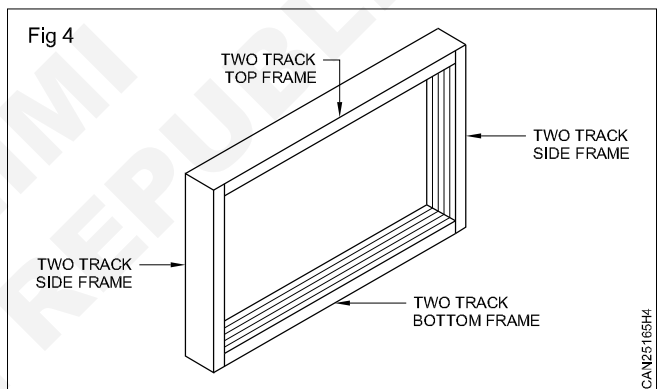
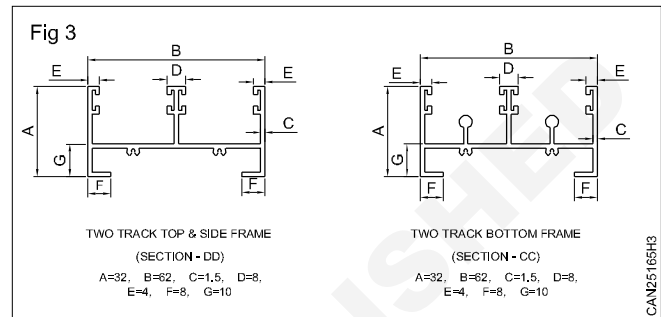


- Cut the 90° at two track bottom, top and side frames to the required length, using hacksaw by hand.
- While cutting the frames, remember that the top and bottom frames are fixed between two vertical side frames. (Figs 2 and 3)



- First hold to track side frame vertically at side and bottom, top to track section at side drill 3 mm holds through inside of the track tracing through using power operated portable drilling machine. Then enlarge the holes on the track to 4 mm and fix rigidly with slotted cheese head screws. Fix screws at a distance of approximately 300 mm. (Fig 5)

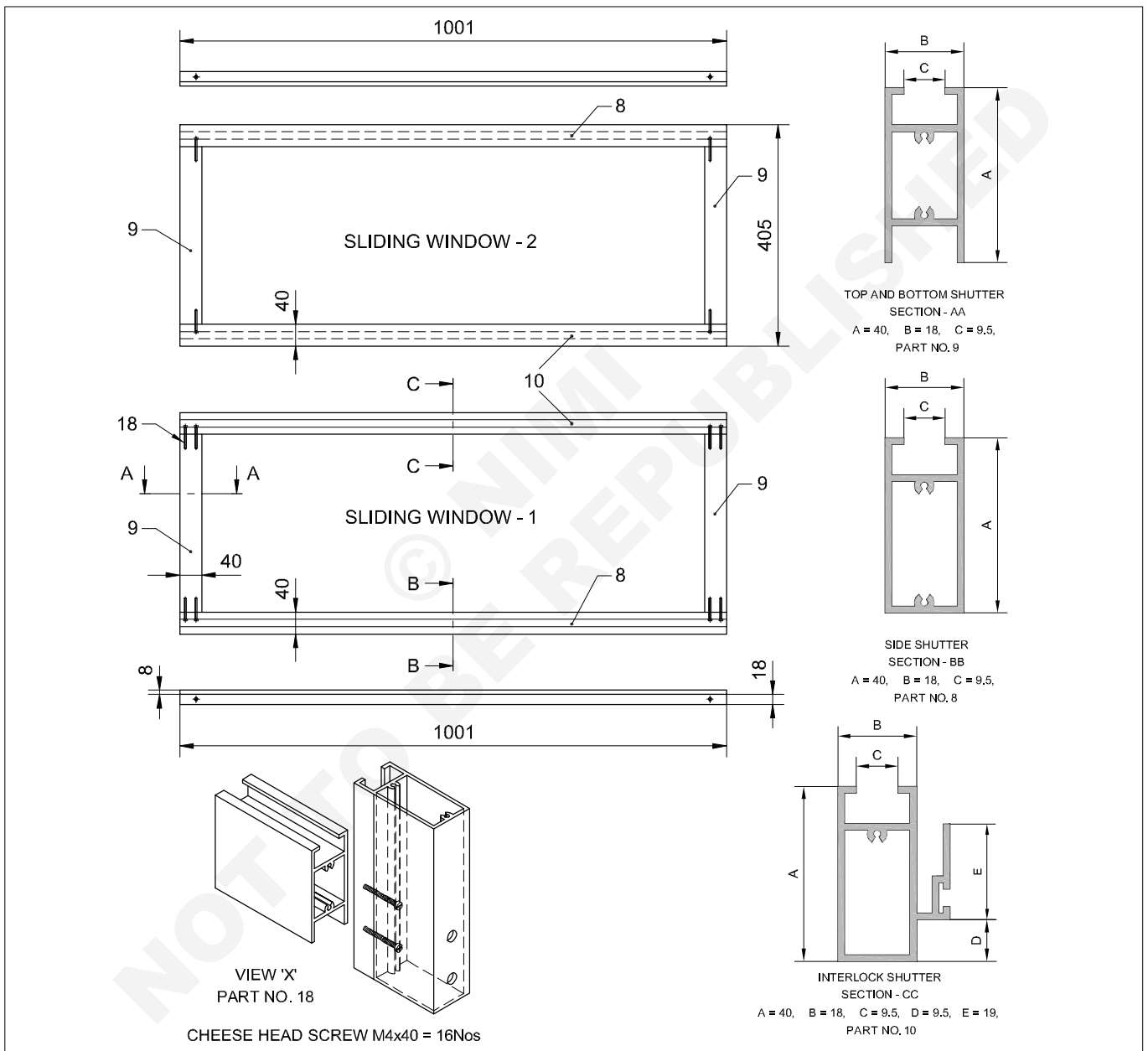
- After fixing two track side frames on both sides take exact distances between the two at top and bottom, accordingly hold the top and bottom frame in two track position and fix on the side frames section similarly. (Fig 4)
- Now apply rubber adhesive to rubber packing and insert the packing in slots of track sections as shown in Fig 6.
- Finish the sliding window outer frame as per the drawing.



Join angular aluminium sliding window shutter box by screw and modern sliding window bearing

Objectives: At the end of this exercise you shall be able to

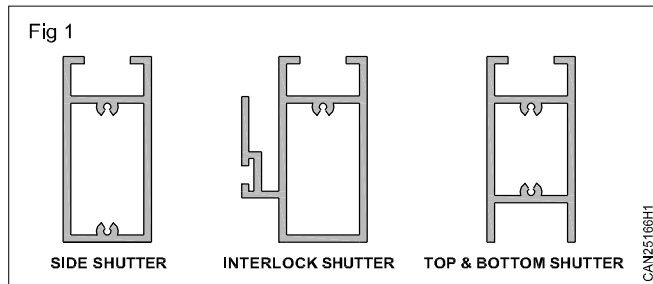
- identify an aluminium window sections to make sliding windows shutter
- fix top and bottom shutters to the side and interlock shutters with cheese head screws
- fix the bearing on bottom track from using cheese head screws.



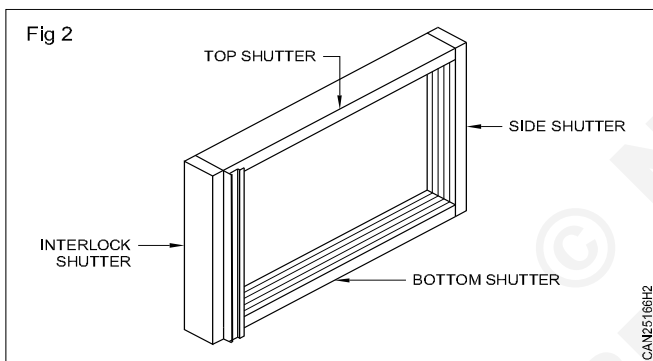
4	-	-	SLIDING WHEEL BEARING				
4	40X18X340	-	TOP AND BOTTOM SHUTTER SECTION				
2	40X18X1010	-	ALUMINIUM SIDE SHUTTER SECTION				
2	40X18X1010	-	ALUMINIUM INTER LOCK SHUTTER SECTION	-	-	-	1-10-155
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.	
SCALE 1:1					TOLERANCE ±0.06 mm		TIME 3h
					<b>ALUMINIUM SLIDING WINDOW SHUTTER</b>		
					CODE NO. CA20N110155E1		

## Job Sequence

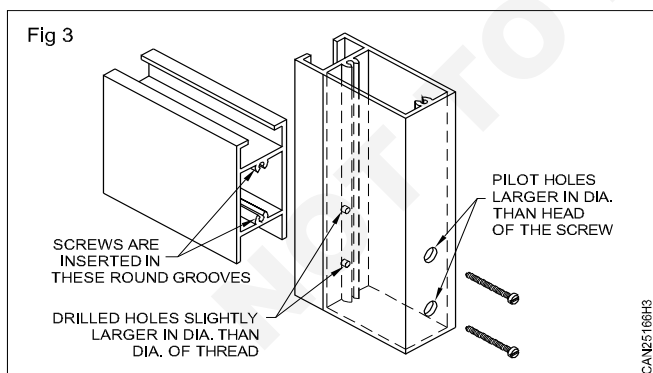
- Identify an aluminium window section required to make an aluminium sliding windows. (Fig 1)



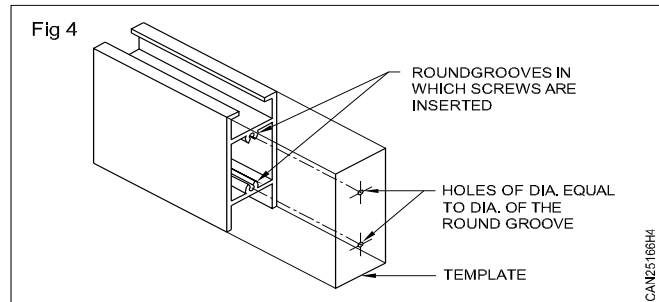
- Top and bottom (SEC-AA) for part No.9.
- Side shutter (SEC-BB) for part No.8
- Inter lock shutter (SEC CC) for part No.10.
- Slotted cheese head screw M.4 x 40 part No.18
- Mark and cut the sections to the required length square to their length using try square and hacksaw by hand.
- While cutting the sections, remember that the top and bottom shutters are fixed between the side and interlock shutter. (Fig 2)



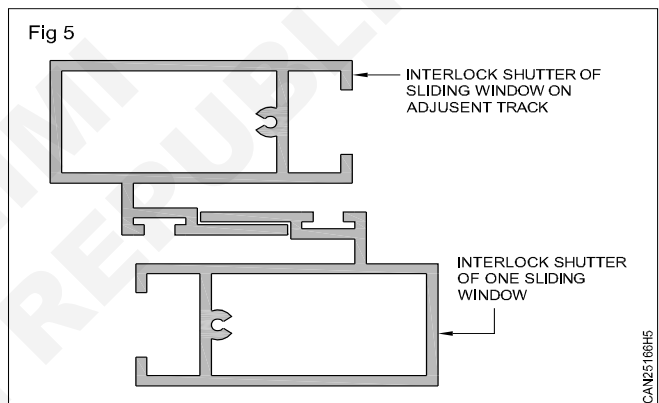
- Fix bottom and top shutters to the side and interlock shutter as shown in Fig 3.



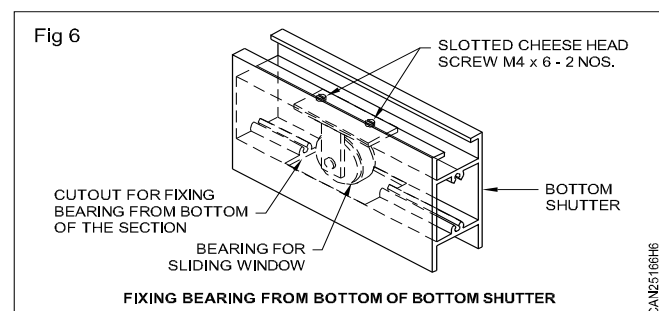
- For drilling the holes, first make the template for making the position of holes as shown in Fig 4.
- Mark the position of holes, by placing the diameter of the round groove using portable power operated hand drilling machine.
- Now enlarge the diameter of the outside section to the diameter larger than the diameter of the head of the screw. (Fig 3)



- Now hold the bottom and the side shutter perpendicular and insert the screws having root diameter of thread equal to the diameter of round groove. (Fig 4)
- Tighten the screws as the material is aluminium, while rotating threads will be formed inside the round groove and screws get lightened.
- Similarly for interlock shutter is top and bottom shutter at corners to make sliding window. Remember interlock shutters are fixed in opposite direction to facilitate interlocking of windows. (Fig 5)



- For fixing the bearing on bottom shutter from bottom, cut the lower rib section in rectangular shape to accommodate bearing in it (Fig 6) using chisel.
- Insert the bearing inside the bottom frame as shown in Fig 6 and fix it on the horizontal round groove, by passing mounting holes on bearing bracket through it. Drill diameter should be equal to the diameter to the round groove.
- Fix the bearing using slotted cheese head screw. Ensure that the bearing roller groove is at the centre line of the bottom shutter.
- Fix two bearing on each window at about 150 mm length from its ends.

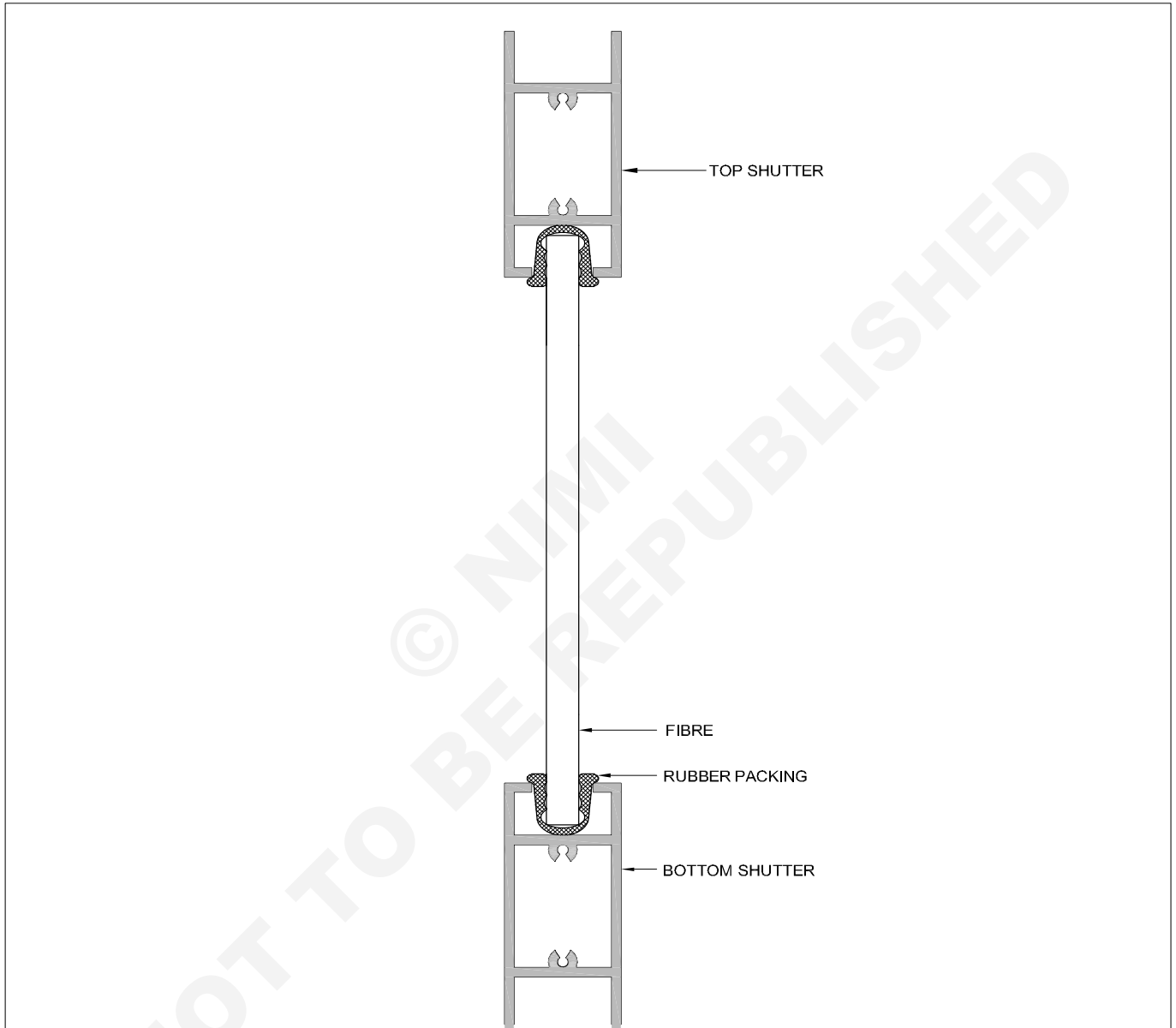




**Aluminium sliding window shutter joining by fibre glass**

**Objectives:** At the end of this exercise you shall be able to

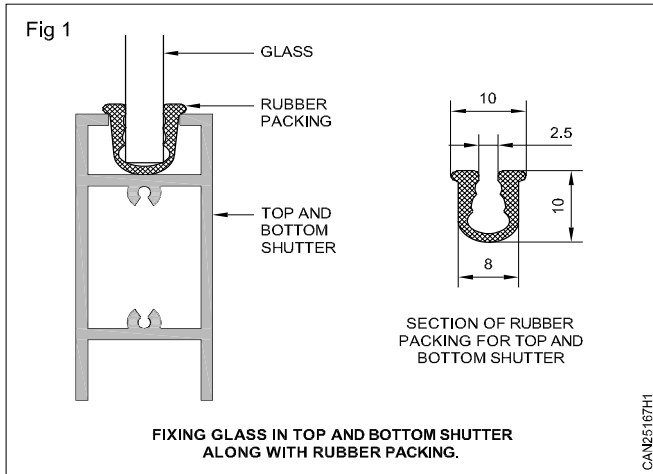
- fix the fibre glass in the shutter frame along with rubber packing
- fix rubber packing interlock, top, bottom and shutter.



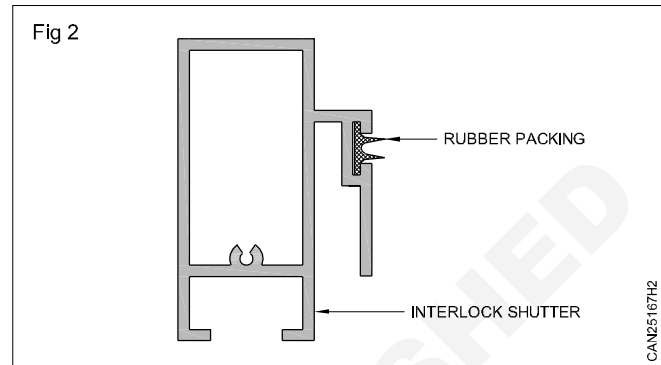
1	200 ml	-	RUBBER ADHESIVE	-	-	
1	8 METER	-	RUBBER PACKING INTER LOCK SHUTTER	-	-	
5.2 METER	40X10X5mm glass	-	WINDOWS SHUTTER RUBBER PACKING	-	-	
2NOS	937X363X5mm	-	PLAIN FIBRE GLASS	-	-	1.10.156
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1		<b>ALUMINIUM SLIDING WINDOW SHUTTER JOINING BY FIBRE GLASS</b>			TOLERANCE ±0.06 mm	TIME 3h
					CODE NO. CA20N110156E1	

## Job Sequence

- Take the fibre glass of the required size (as supplied)
- Apply rubber adhesive in the middle slot of the rubber packing and insert the rubber packing in the edges of all the sides of glass.
- Now loosen the screws holding the shutter frame, open it wide to accommodate glass in it. Hold the glass along with rubber packing in position and tighten the screws at corners, uniformly. (Fig 1)



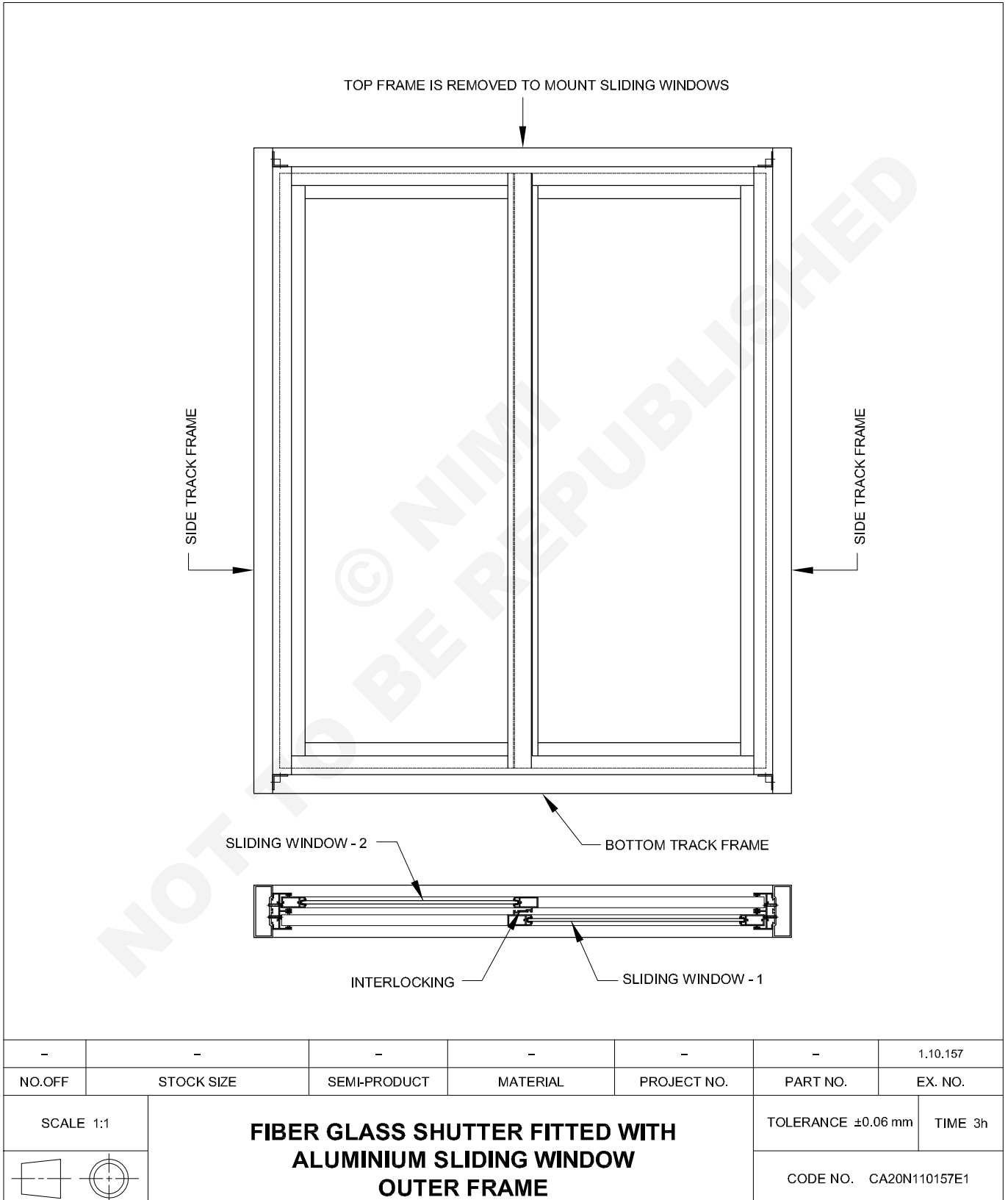
- Ensure that the glass is mounted properly in shutters.
- Insert the rubber packing in side of interlock shutter. (Fig 2)
- Finishing the fixing fibre glass.
- Finishing the aluminium sliding window door shutter as per the drawing.



**Fibre glass shutter fitted with sliding window aluminium channel outer frame**

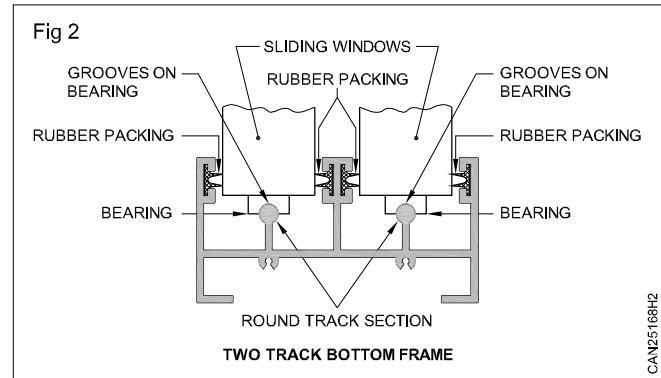
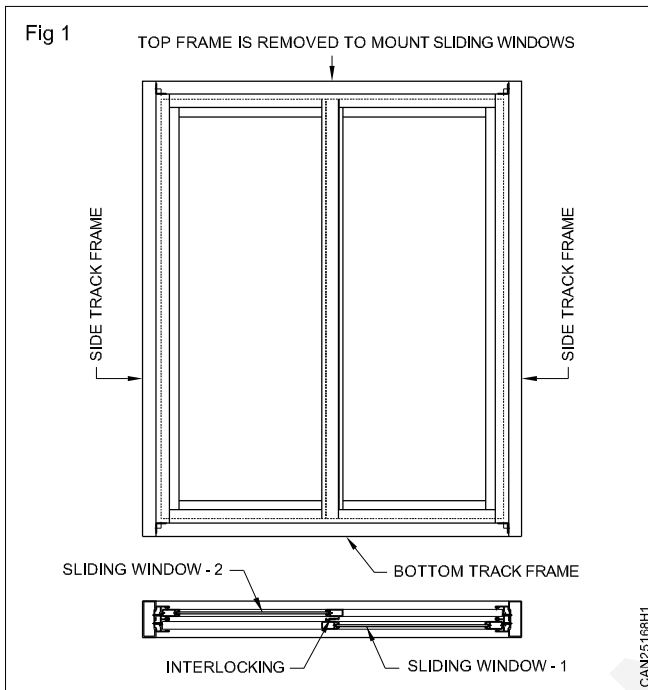
**Objective:** At the end of this exercise you shall be able to

- mount the sliding window shutters on tracks in aluminium sliding outer frame.



## Job Sequence

- First remove top track frame from the outer window frame. (Fig 1)
- Mount one sliding window on each track vertically such that interlock shutter interlocks the windows. See that groove of bearing roller is engages with the track section and it is properly sliding on track section. (Figs 1 & 2)

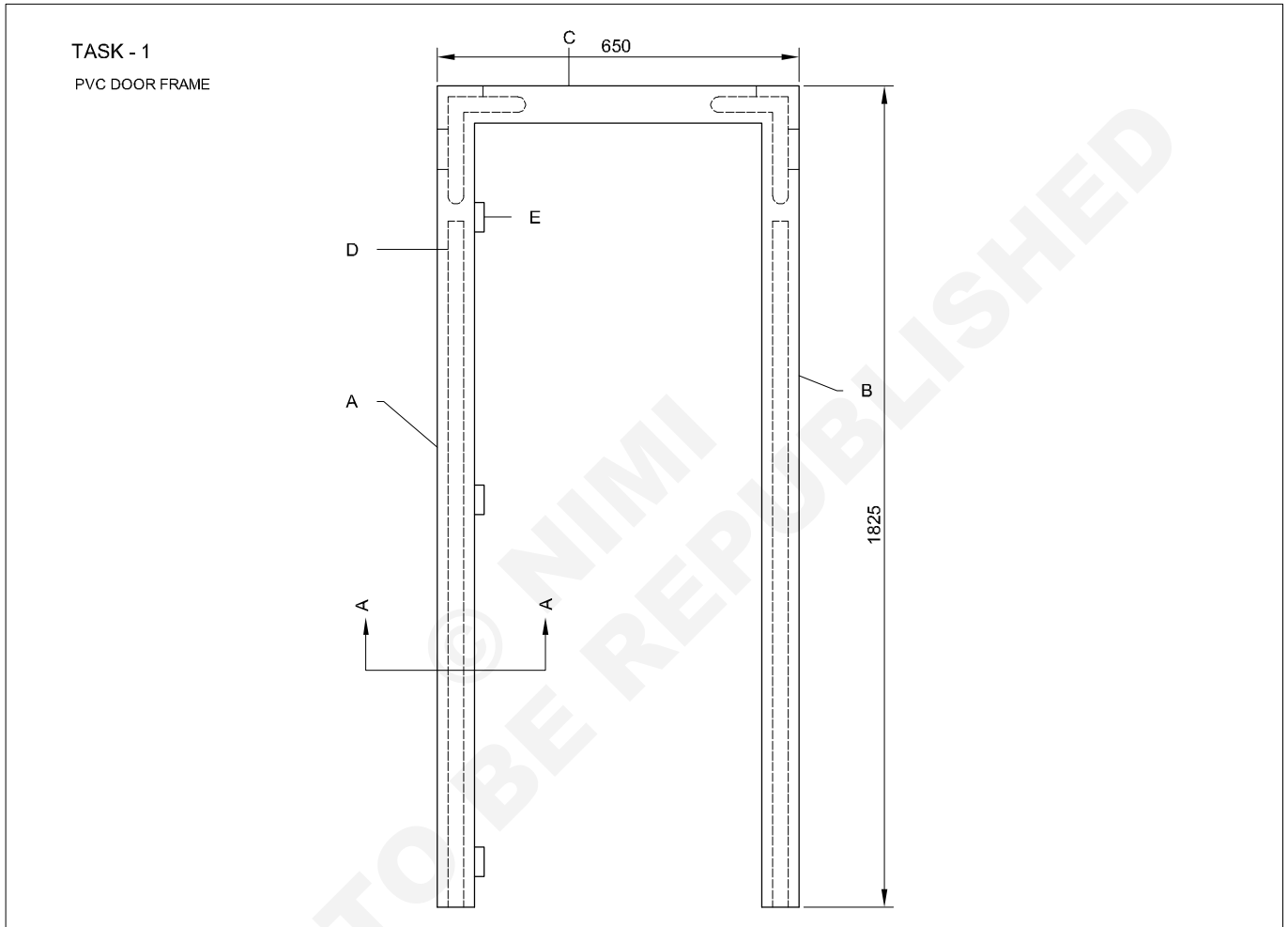


- Now holding both the sliding windows firmly by hand, tilt it slightly and engage top track frame from top properly and then again hold the windows vertical. Before fixing top track frame to top partition, once again check the movement of the sliding windows.
- After ensuring sliding movement of the window on bearing, fix the top track frame to top pattern frame.
- After top track frame is fixed once again check the movement of the sliding window and interlocking of the window.
- Finish the door shutter for fitted in window outer frame.

Mark, make assembling and fixing of PVC door for kitchen, W.C bath

Objectives: At the end of this exercise you shall be able to

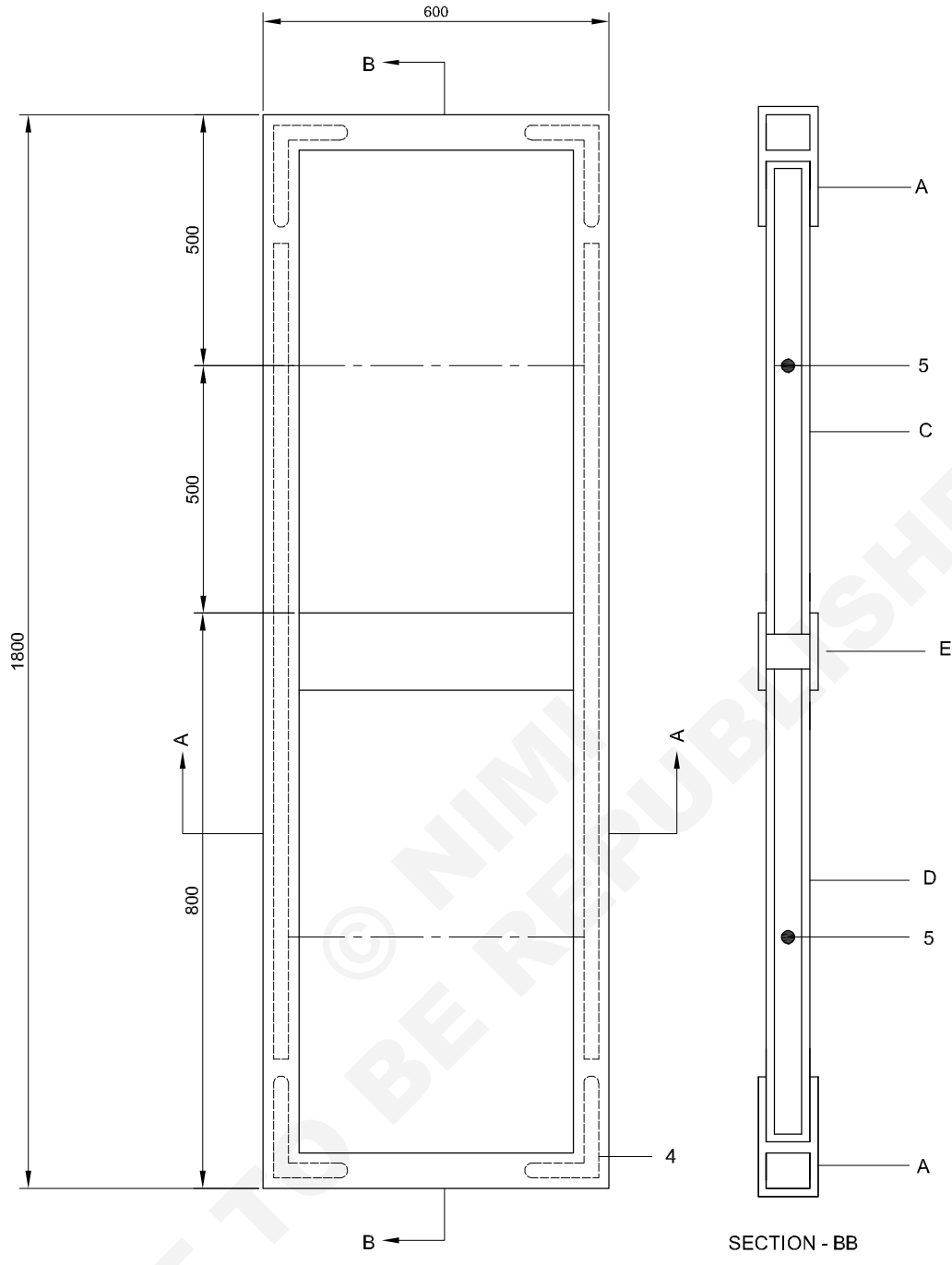
- cutting angular wise PVC door frame
- form shape by joining adhesive and screwing
- fixing PVC shutter door by adhesive and screwing
- assemble and fix the PVC door.



550 cm	59X24X2mm		PLASO "A" SECTION		TASK 2	
2	-		GALVANISED TIE BAR		TASK 2	
60cm	100X24		PLASO "H" SECTION		TASK 2	
210cm	620X20		P.V.C SOLITAIRE PAN		TASK 2	
32	25X4		FLAT HEAD PHILLIPS SCREW		TASK 1,2	
1	200 ml		P.V.C ADHESIVE		TASK 1,2	
3	75X40X1mm		S.S HINGES		TASK 1	
520cm	20X20X1mm		M.S GALVANISED TUBE		TASK 1,2	
6 Nos	230X75mm		PLASTIC "L" BRACKET		TASK 1,2	
4500mm	48X40X2mm		P.V.C. ECOFRAM (AA SECTION)		TASK 1	1.10.158
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.

SCALE NTS	<b>PVC DOOR FRAME AND PVC SHUTTER DOOR</b>	TOLERANCE ± 0.1 mm	TIME 21hrs
		CODE NO. CA20N110158E1	

TASK 2

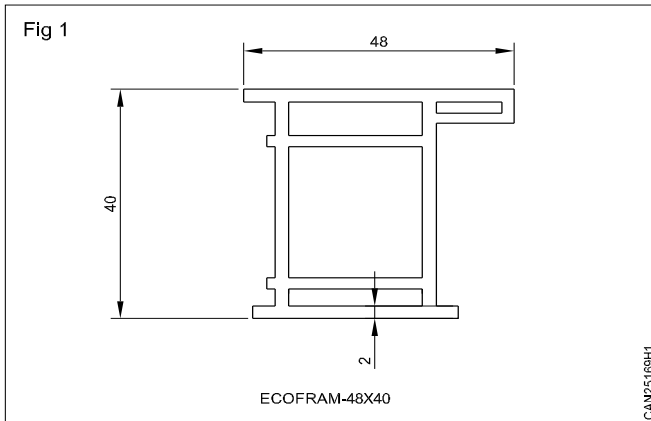


-	-	-	-	-	-	1.10.158
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1		<b>PVC SHUTTER DOOR</b>			TOLERANCE $\pm 0.06$ mm	TIME 25Hrs
					CODE NO. CA20N110158E2	

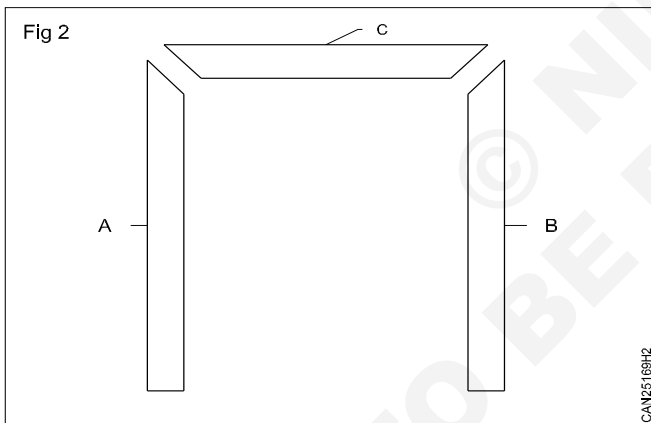
# Job Sequence

## TASK 1: Make PVC 48 mm door frame

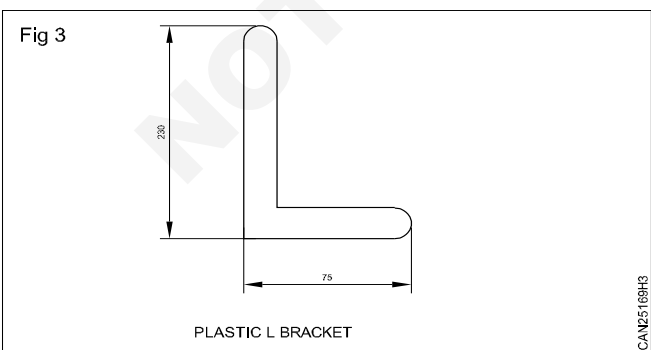
- Check the size of the raw material using steel tap. (Fig 1) 48 x 40 x 4500, Eco frame - 1 No.



- Mark and cut the total length on A, B and C using portable power circular saw as per drawing.  
48 x 40 x 1825 = 2 Nos.  
48 x 40 x 650 = 1 No.
- Mark and cut the mitre on top end of A and B pieces and C piece both end. (Fig 2)

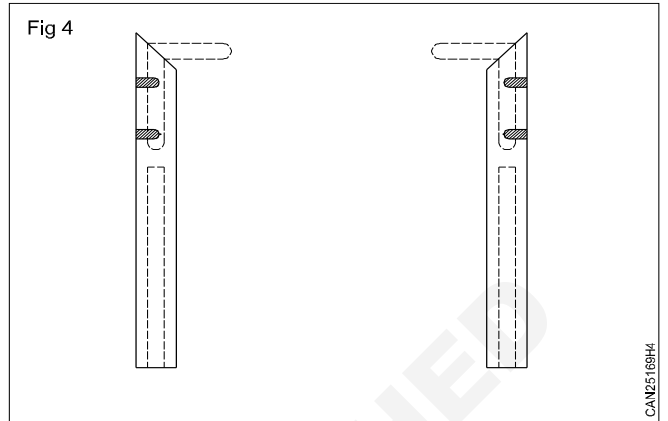


- Check the plastic 'L' bracket. (Fig 3)  
230 x 75 = 2 Nos.

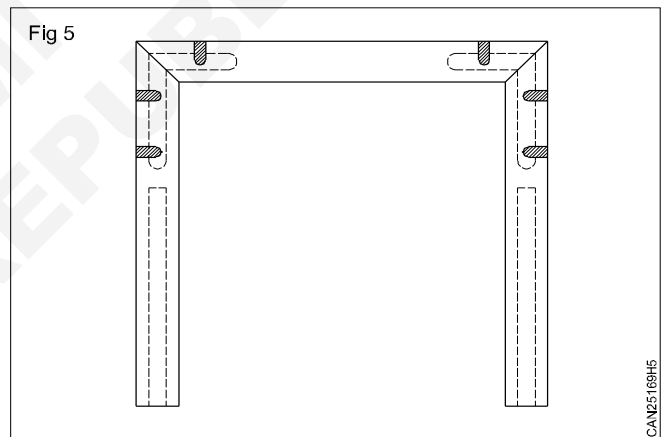


- Fix the plastic 'L' bracket top end of mitre place A and B. (Fig 4)
- Mark and drill on plastic 'L' bracket A and B using portable drilling machine. (Fig 4)

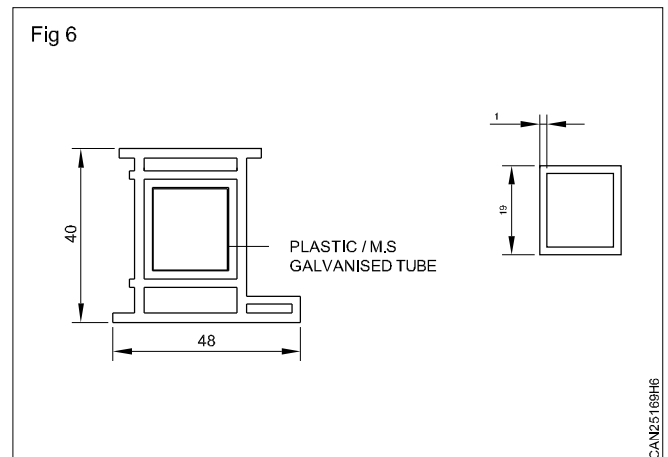
- Place the screws on holes drive the screws through pocket holes using screw driver properly. (Fig 4)



- Check and assemble the mitre joint on A, B and C, A section. (Fig 5)
- Mark the drill hole position for screw on C piece both end of the plastic L bracket centre.



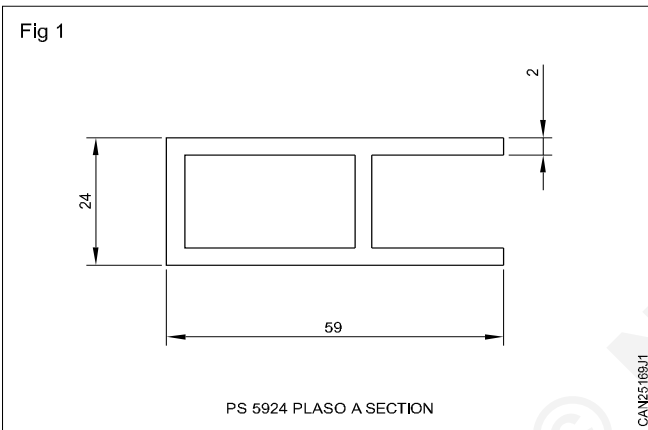
- Check the sequences and dimensions using try square and wooden measuring rule.
- Insert the plastic/M.S galvanised tube in side on hinge side section A, B piece. (Fig 6)



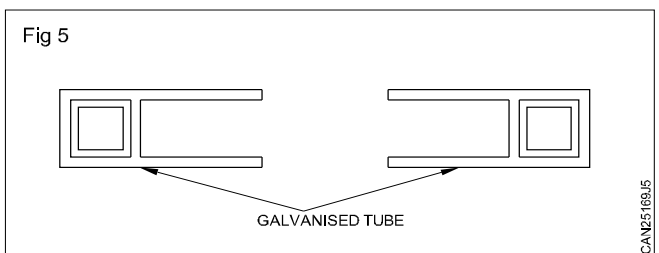
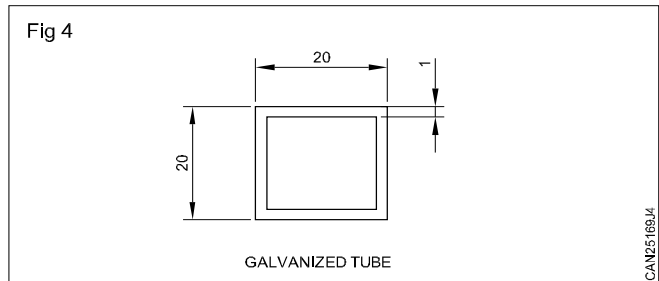
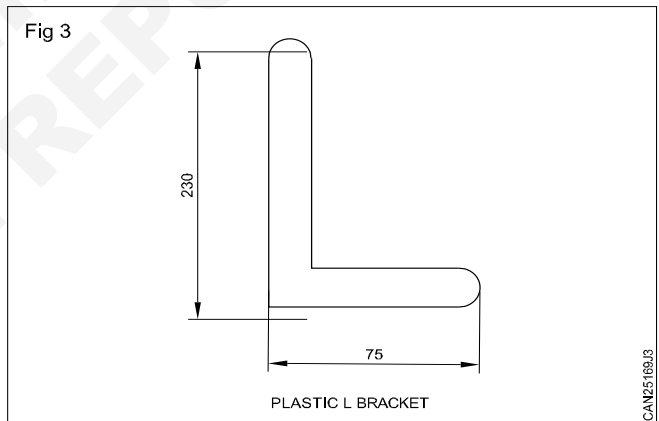
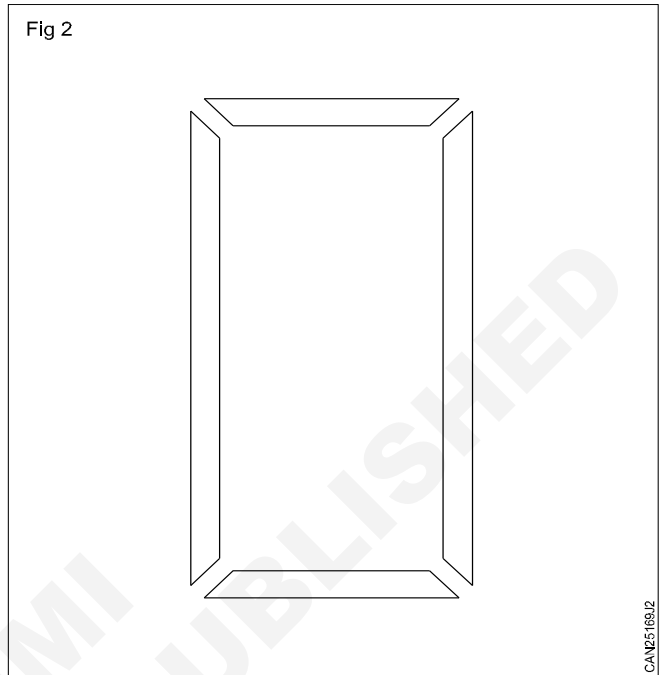
- Adjust the bar clamp and set the top horizontal on frame.
- Drill 2 mm hole through the plastic 'L' bracket take to the screw properly. (Fig 5)
- Apply PVC adhesives on mitre joints.
- Allow the adhesives to dry.
- Remove the bar clamp, finish the PVC door frame.

**TASK 2: Make PVC 24 mm shutter door**

- Check the raw materials to the required size.  
 PS. 62020/73020 solitairepen = 620 x 20 x 2100 mm  
 PS. 5924 Plaso A section = 59 x 24 x 5500 mm  
 PS 10024 plaso H section = 100 x 24 x 600 mm  
 Plastic L bracket = 230 x 75 = 4 Nos.  
 Galvanised Tie bar = 2 Nos. 1 mm = 5200 mm
- Mark and make total length plaso A section (Fig 1) on stiles AA 2 pieces as per drawing using portable power circular saw.

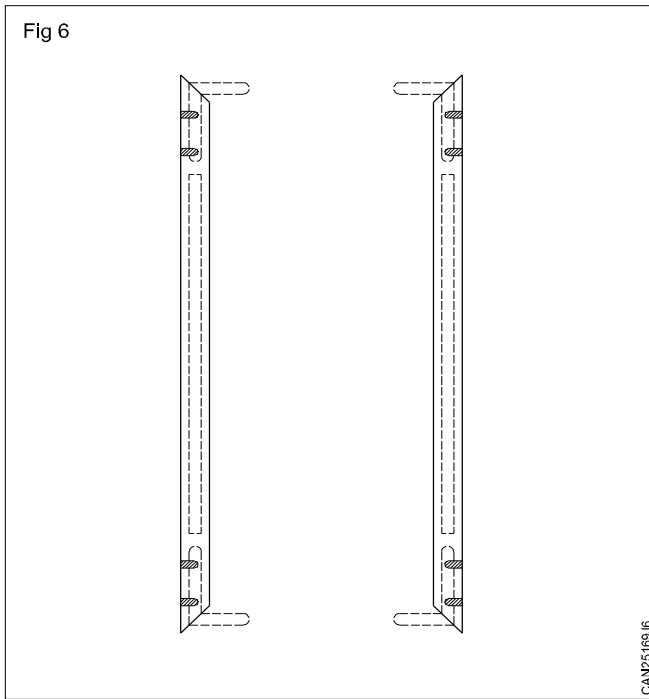


- Mark and make the total length B plaso A section Fig on BB top and bottom 2 pieces as per drawing. (Fig 2)
- Mark and make mitre cut on both ends of the stiles plaso A section (Fig 1) on AA - 2 pieces using portable power circular saw as per drawing. (Fig 2)
- Mark and make the mitre cut on both end of the top and bottom plaso A section on AA, (Fig 2) BB - top and bottom 2 pieces as per drawing.
- Mark the drill hole on stile AA 2 pieces and top and bottom BB 2 piece at the centre of plastic L bracket (Fig 3) as per drawing.
- Mark and cut the total length of stile on galvanised tube (Fig 4) as per drawing.
- Insert the galvanised tube inside of the stile A section on AA 2 pieces.(Fig 5)
- Insert the plastic L bracket mitre joint inside AA - 2 pieces both end of stile.
- Drill the 3 mm holes at the marked at the mitre both and plastic L bracket AA - 2 pieces of stile.
- Place the screws on 3 mm holes drive the screws through holes using screw driver properly. (Fig 6) Fit the 'L' bracket.

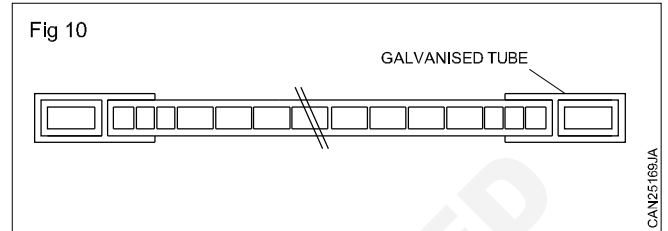




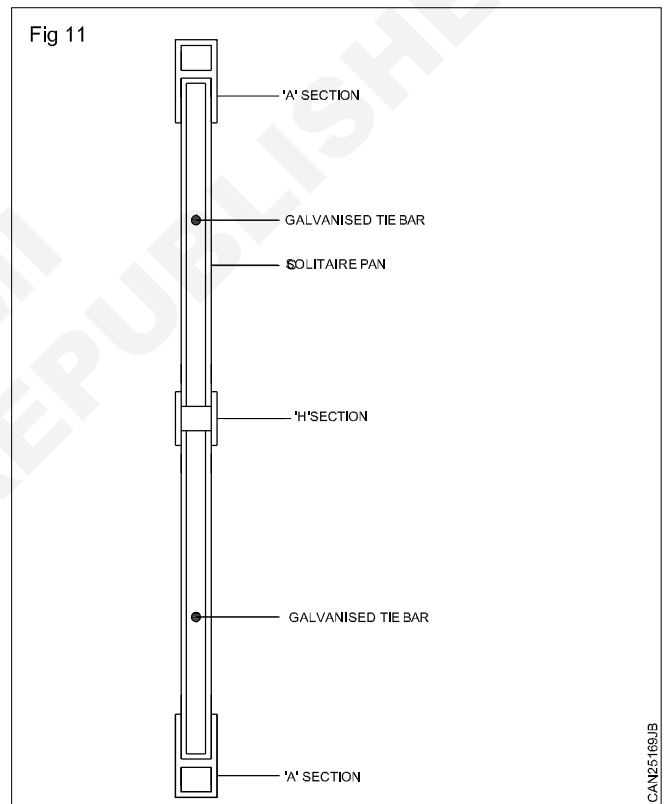
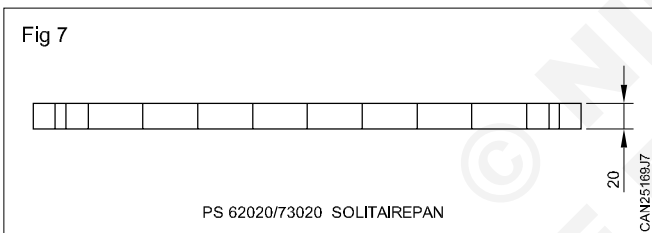
- Check the tightness of plastic L bracket. (Fig 6)



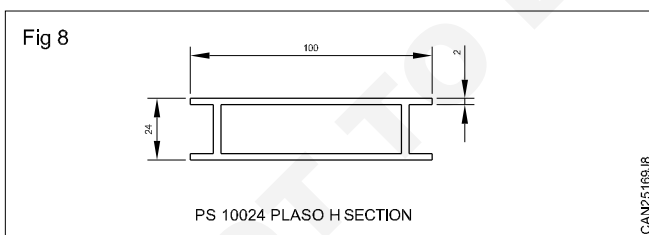
- Insert the galvanised the bar in 6 mm drill hole at the C and D PS solitairepen pieces as per drawing.
- Check the required dimensions of stile A section AA 2 pieces, BB 2 top and bottom pieces, PS solitairepen C and D panel lock rail pieces and plaso H section piece before assembling.
- Assemble the stile A section, PS solitairepen panel and lock rail plaso H section with their respective pieces for correct assembling as per drawing. (Figs10 & 11)



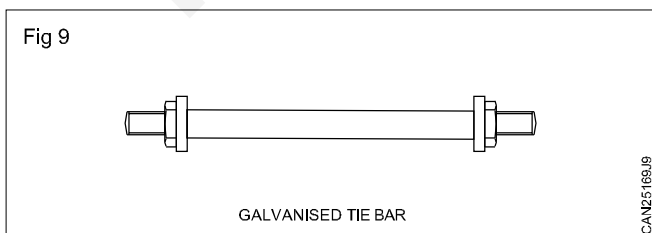
- Mark and cut the total length and width on panel C and D, PS solitairepen. (Fig 7) pieces as per drawing using portable power circular saw machine and wooden try square.



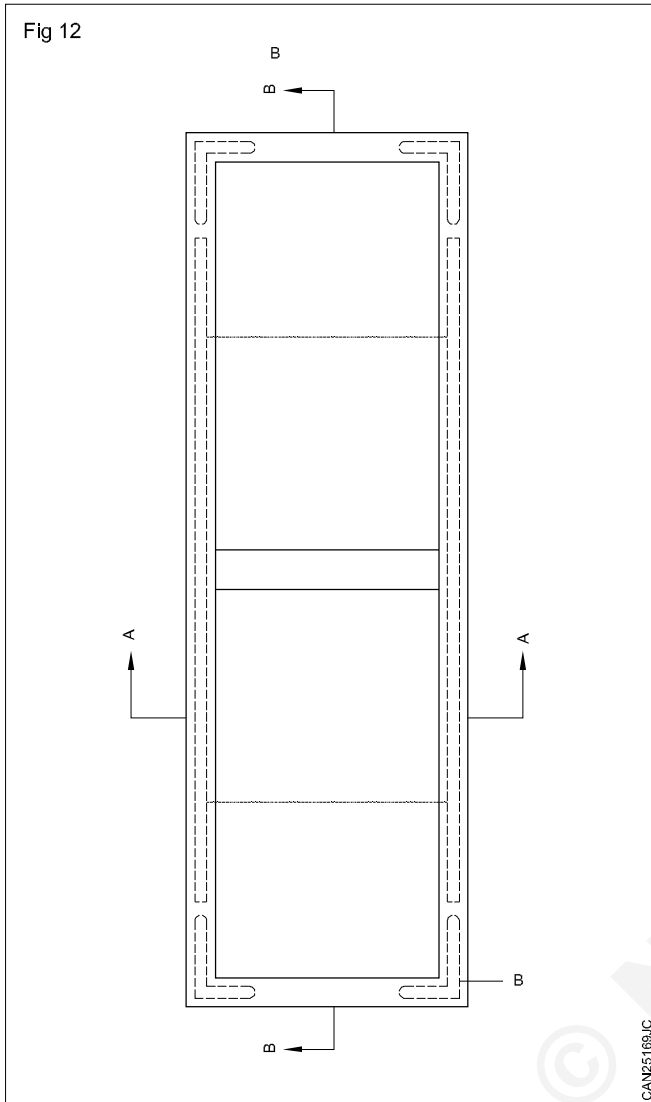
- Mark and cut the total length 'E' piece on lock rail plaso 'H' section. Fig 8 as per drawing.



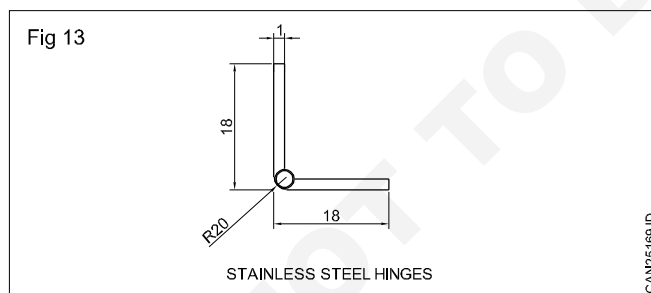
- Mark and make drill hole of 6 mm for galvanised tie bar on the face edge of PS solitairepen (Fig 8) C and D stile pieces as per drawing. (Fig 9)



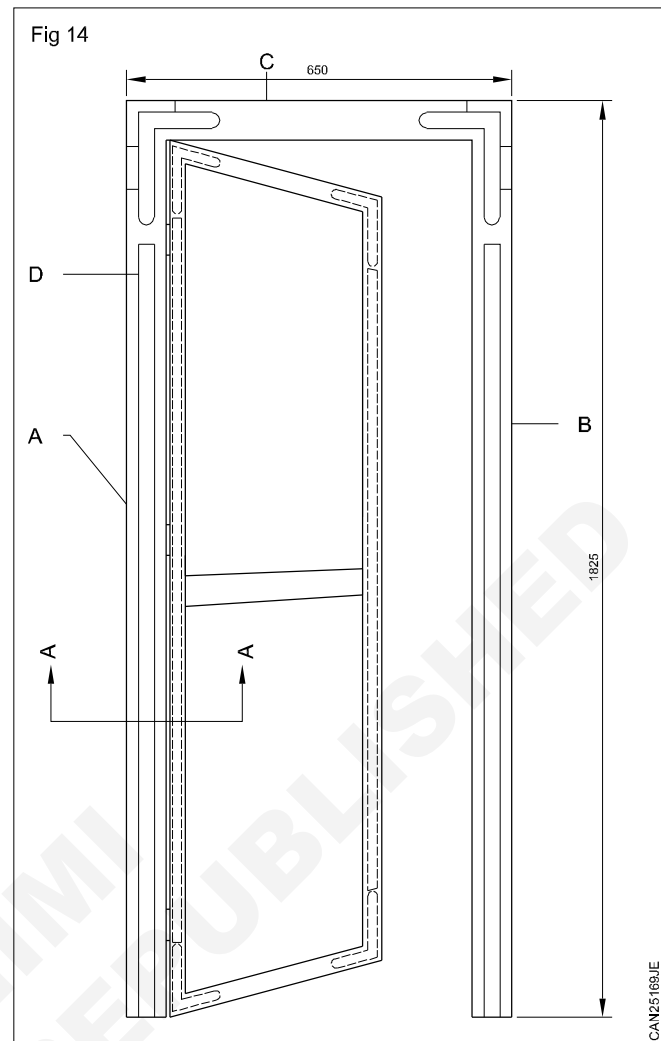
- Support the pieces together using bar clamp.
- Mark the drill hole position on B top rail piece A section.
- Drill 3 mm hole on the centre of the plastic 'L' bracket on top rail B piece A section.
- Place the screws on 3 mm holes. Drive the screws through holes using screw driver properly.
- Repeat the same procedure on other bottom rail B piece A section joints also. (Fig 12).
- Remove the bar clamp.
- Insert the galvanised tie bar in 6 mm drill hole of the AA stile section top and bottom properly tight. (Fig 12)



- Apply PVC adhesives mitre joint surface and joint at H section and all the assemble place for A section front and back side of the door shutter. (Figs 12 & 13).



- Allow the PVC adhesives to dry.
- Select steel hinges for PVC door shutter, (Fig 13)
- Mark the hinge position on the PVC door shutter. (Fig 14)
- Press the hinge leaf in place once the recess base completely flate.
- Make a pilot hole the hinge hole to fix the screw as per drawing. (Fig 14)

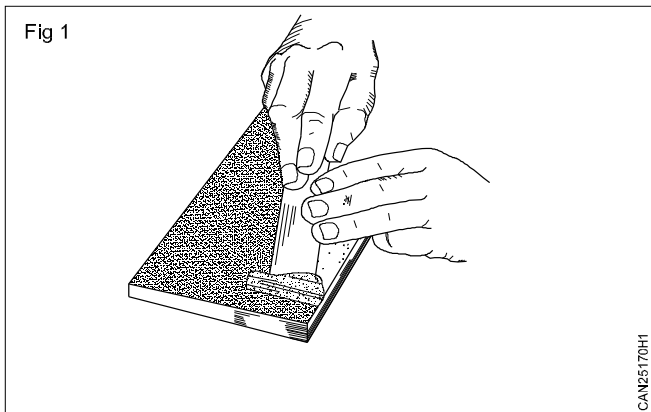


- Repeat the same procedure for fixing the other hinges. (Fig 14)
- Mark the hinge position on PVC door frame after marking the PVC door shutter.
- Transfer the door shutter hinge position to the inside of the PVC door frame.
- Make a recess on door frame to fix the hinge as explained earlier.
- Lay the door shutter in position to the door frame for hinging screw the hinge to the door frame using one screw in the centre hole of each leaf after making the pilot hole.
- Check the alignment of the door leaf.
- Insert suitable screws in all holes after making pilot holes.
- Check once again the fitting of PVC door shutter.
- Clean all the surface of the PVC door frame and PVC door shutter using dusting brush. (Fig 14)
- Finish the PVC door for kitchen, WC bath.

## Removal of old painting by application of chemical paint remover

**Objectives:** At the end of this exercise you shall be able to

- apply paint remover on the old painting surface
- remove the softened paint
- scrap and sand old painting surface.



- Dry the coating for 20 minutes.
- Remove the softened paint with plastic scraper. (Fig 1)
- If necessary apply second coat of paint remover.
- Dry the second coating for 20 minutes.
- Dip the steel wool with mineral spirits.
- Scrape the dust of remaining paint surface with scraper.
- Sanding all the surface using No.80, 120 sand paper.
- Finish the old paint surface with soft cloth/mineral spirits.

### Job Sequence

**Instructor shall display and demonstrate to the students regarding the application of chemical paint remover.**

- Clean all the old painting surfaces with dry cloth.
- Apply of thick coat of remover caustic soda/mixture of soda/washing soda all the painting surface with inexpensive paint brush.

**Wear heavier duty rubber gloves and a respirator when using them.**

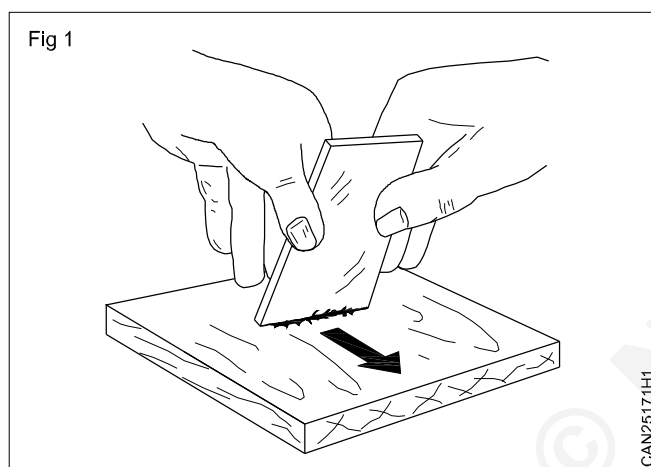
## New painting for door, window, stair and furniture

**Objectives:** At the end of this exercise you shall be able to

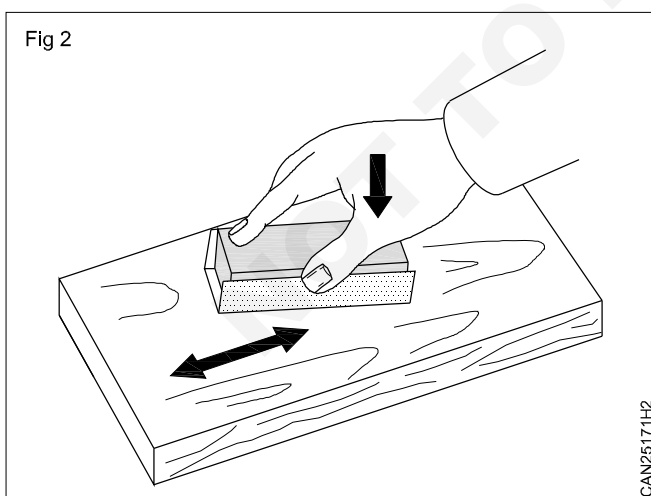
- scrap the surface door, window, stair and furniture
- sand the surface door, window, stair and furniture
- apply the wood putty on the gaps
- paint to all the surface.

### Job Sequence

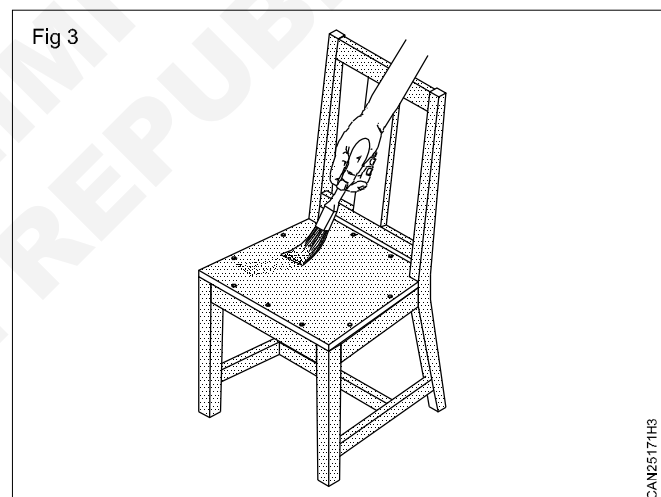
- Clean the door, window, stair and furniture surface with dusting brush or dry cloth.
- Scrap the door, window, stair and furniture surface with scraper. (Fig 1)



- Sand all the surface using No.80 sand paper for rough finishing.
- Repeat the same procedure using sand paper No. 100 and 120 for fine finishing surface. (Fig 2)



- Apply the wood primer using brush for first coat.
- Allow the primer to dry.
- Apply wooden putty to cover the gap with matching colour.
- Rubbing again using No.120 sand paper.
- Apply the wood primer second coat.
- Allow the primer second coat to dry.
- Give a first coat of paint. (Fig 3)



- Allow it to dry for 8 hours.
- Finishing coat is apply straight from tin brush.

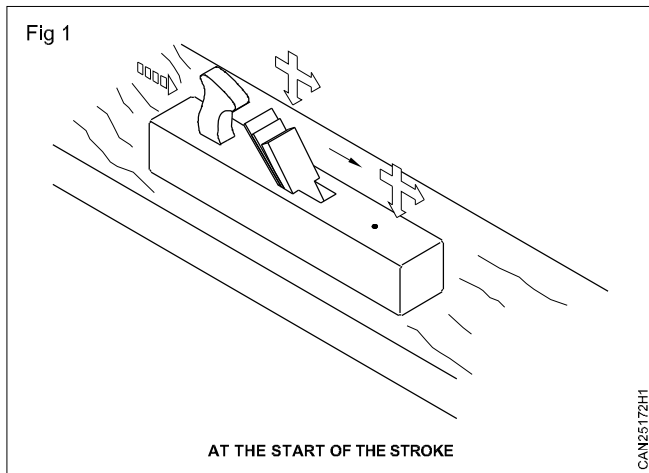
**Clean the brush after painting with thinner.**

- Finish the painting even and uniform and without any brush marks.

## Plain and smoothing of door and window and staircase railing

**Objectives:** At the end of this exercise you shall be able to

- plain the door, window and staircase railing surface
- smoothen the door, window and staircase railing.



- The edge of the cutting iron placed 0.001 mm extended from the base.
- Start the planning along the grain for door, window and staircase railing surface. (Fig 1)
- Adjust the plane to make finished surface.
- Repeat the same procedure for planning finishing surface.
- Scrap the surface using scraper.
- Sanding all the surface using No.80 sand paper.
- Apply the wooden putty to cover the gap with matching colour.
- Rubbing again using No.120 sand paper.
- Finish the door and window and staircase railing to the smooth.

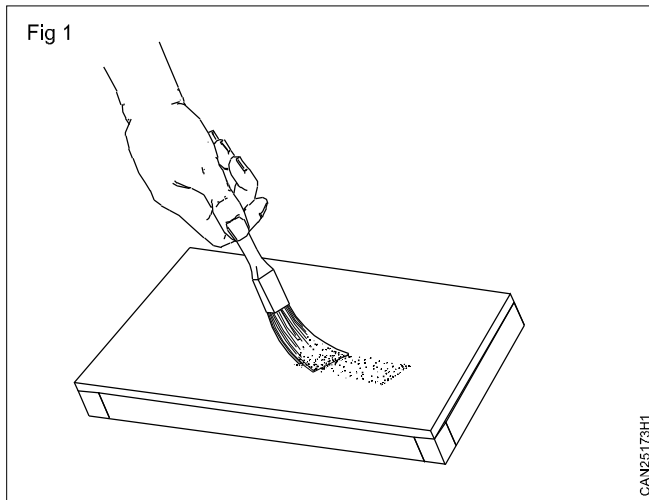
### Job Sequence

- Select the smoothing plane for planning.
- The cutting edge is sharpened slightly oval across the cutting iron.
- Set the gap between cap iron and cutting iron as 1 mm in the smoothing plane.

## Apply synthetic enamel primer on the new surface

**Objectives:** At the end of this exercise you shall be able to

- prepare the priming surface
- apply the primer on new surface.



### Job Sequence

- Check the prepared surface for enamel priming.
- Clean all the surface of the surface using dusting brush.
- Select the brush for enamel priming.
- Open the enamel primer container with opener.

- Shake the enamel primer with flat stick paddle.
- Dip the brush with enamel primer quenching level for 1/4".
- Apply first coat of enamel primer which acts as a filler and absorption well into the pores of surface.
- Apply first coat in crossing and re crossing motion.
- After enamel priming fill up the nailed holes, cracks etc. with putty made by mixing whiting with linseed oil to a thick past, with matching colour.
- Allow the first coat to dry and finishing coat. Apply the enamel primer along the direction with light quick strokes.

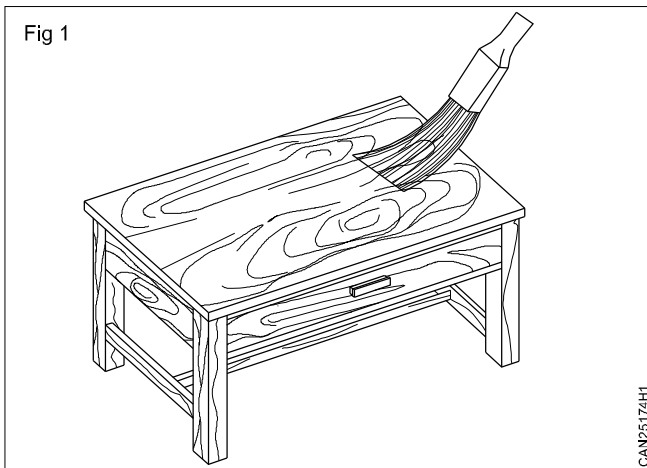
**Priming is one of the strong, elastic foundation film before painting.**

- Finishing the apply synthetic enamel primer to the new surface.

## Apply synthetic enamel paint or oil paint on the priming surface as finishing coat

**Objective:** At the end of this exercise you shall be able to

- apply the enamel paint on priming surface as finished coat.



### Job Sequence

- Check the priming surface for enamel painting.
- Clean all the surface using dusting brush.
- Select the brush for proper enamel painting.
- Open the enamel paint container with opener.
- Shake the enamel paint with flat stick paddle.
- Give a first coat of enamel paint applied evenly and smoothly in the direction of the grain.

- Apply the enamel paint covering the priming surface area.
- Finally brushing lightly in a direction at right angles to the grains in first coat.
- Allow it to dry for 8 hours.
- Sand again lightly using No.120 sand paper to get the smooth surface.
- Clean the dust with dusting brush.
- Finishing coat is applied straight from the tin it brushed.
- Finish the enamel paint/oil paint even and uniformly get the fine glossier finish and without any brush marks.

**Add paint with turpentine so that the brush will move smoothly.**

**Apply the painting area should be well ventilated and free from dirt and dust.**

**Enamel painting brush are normally 5-10 cm width be used.**

**Apply the paint for uniformity of thickness.**

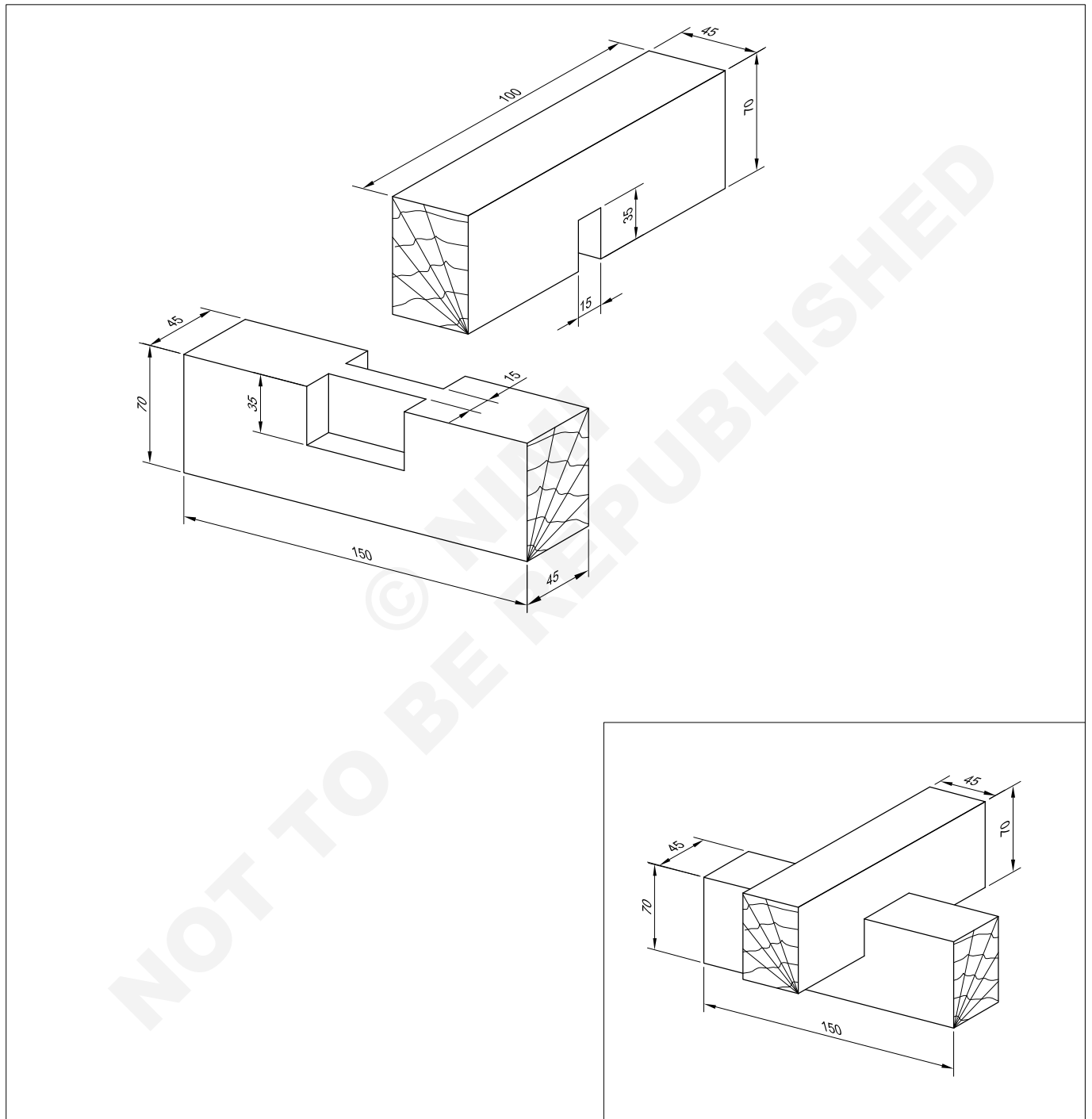




Use the cogged joint for wooden floors

Objectives: At the end of this exercise you shall be able to

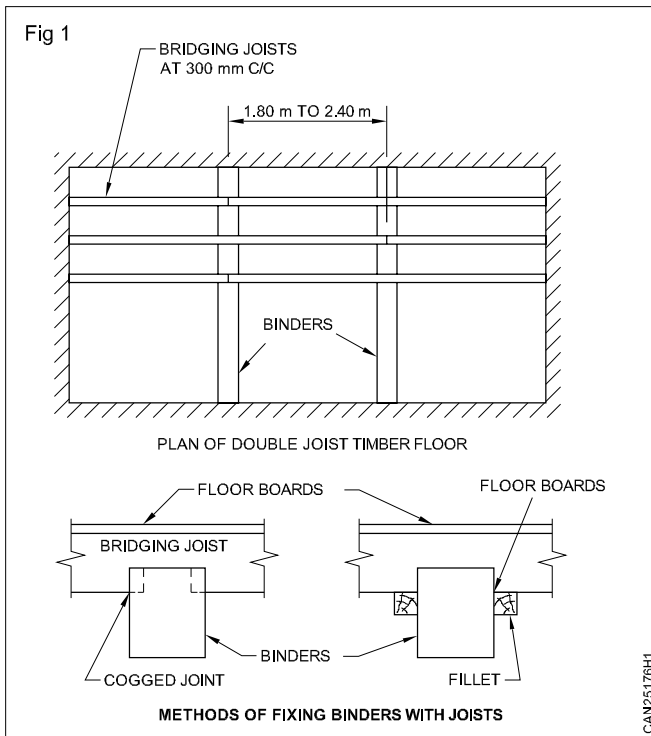
- use the cogged joint for wooden floors
- make the cogged joint.



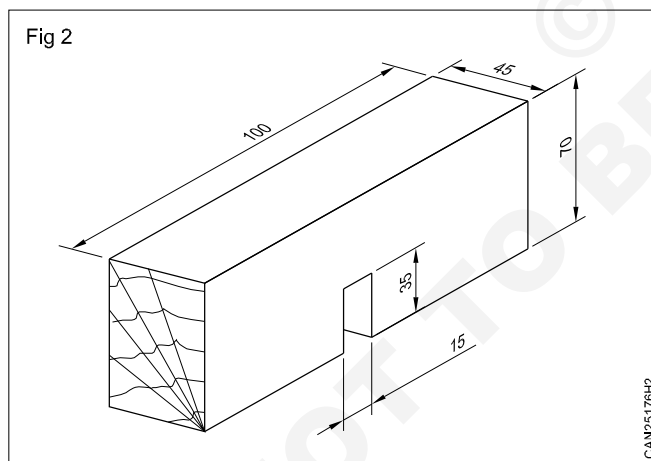
1	75X50X250 mm		TEAK WOOD			1.10.165
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE 1:1		<b>USE THE COGGED JOINT FOR WOODEN FLOOR</b>			TOLERANCE $\pm 0.06$ mm	TIME 7h
					CODE NO. CA20N110165E1	

## Job Sequence

Instructor shall display the wooden floor in the section and brief their coggled joint and their uses (Fig 1)



- Check the size of wooden pieces with foot rule.
- Plane the coggled joint pieces to the required size with jack plane, try square and marking gauge. (Fig 2)



- Cut the planing wood used in to two pieces for bridging joist and binder with a tenon saw as per drawing.

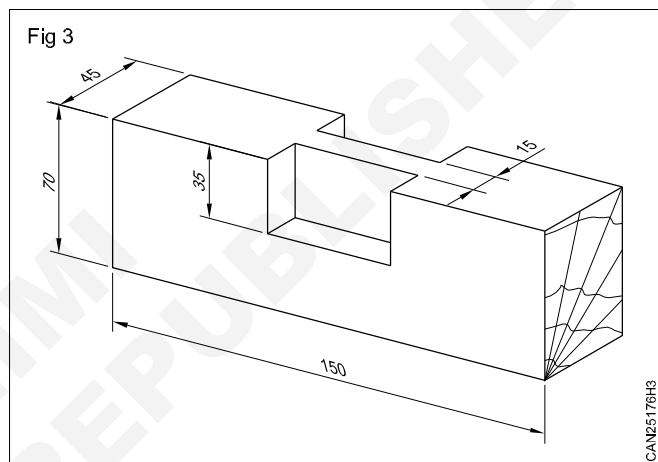
### Bridging joist

- Mark the measurements of bridging joist as per the drawing. (Fig 2)
- Place the work piece on work bench vice properly.
- Saw on waste portion of the bridging joist vertically.

- Pare out the waste portion of the bridging joist surface with correct measurement. Smoothly using mortise chisel, firmer chisel with mallet.

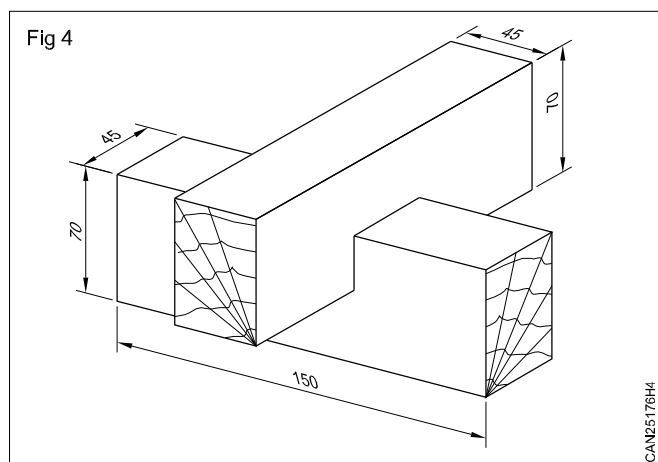
### Binder

- Mark the measurements of binder as per the drawing with foot rule, try square, marking gauge and scribe. (Fig 3)
- Place the work piece on work bench vice properly.
- Chiseling on waste portion of the binder vertically and surface with correct measurement smoothly using firmer chisel with mallet. (Fig 3)



### Assembling and finishing

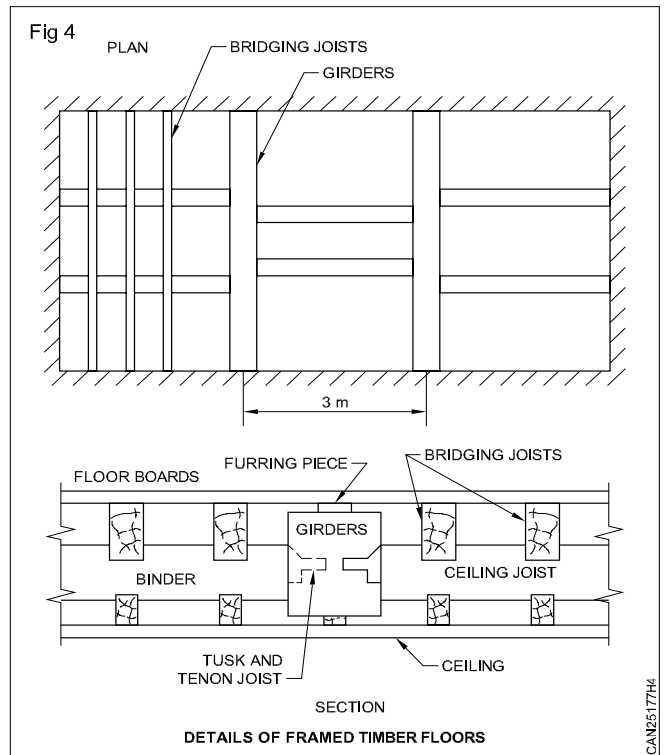
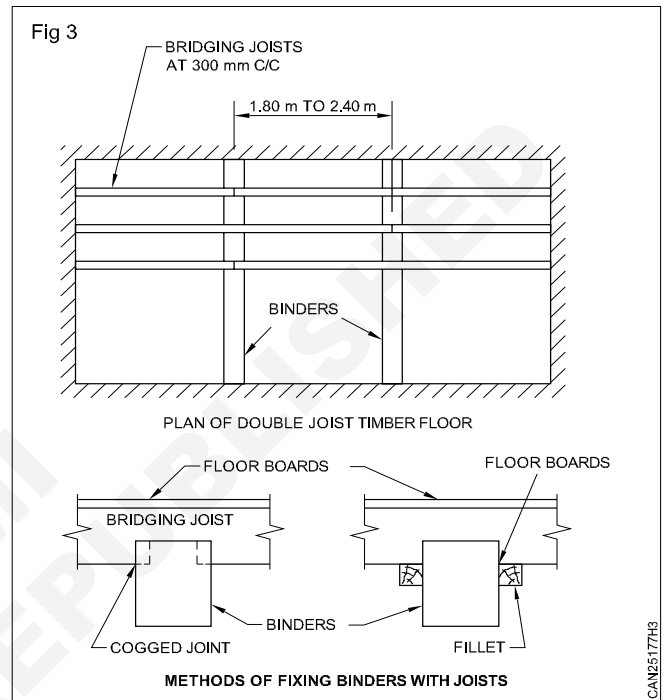
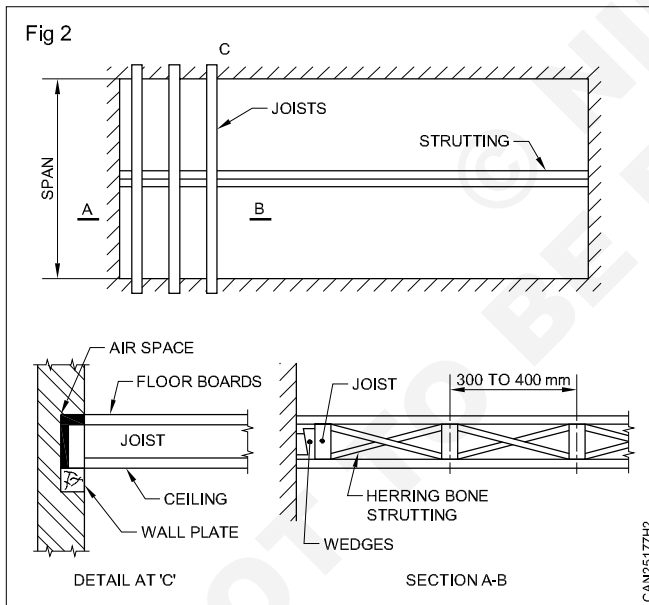
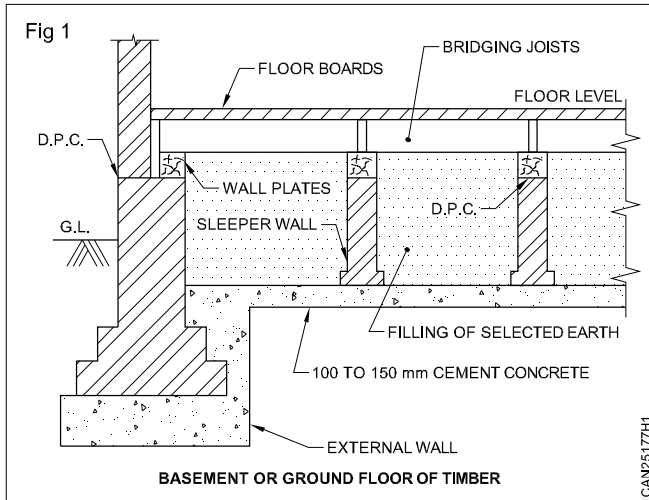
- Check the correct measurements of these pieces before assembling.
- Assemble the bridging joist and binder of the wooden floor pieces together properly. (Fig 4)
- Check the squareness of the joint using try square.
- Finish the coggled joint using smoothing plane.



**Demonstrate different type basement floor, single joist wooden floor, double joist wooden floor and framed joist wooden floor**

**Objectives:** At the end of this exercise you shall be able to

- demonstrate the different type wooden floor
- identify the wooden floor.



## Job Sequence

Instructor shall display and demonstrate to the students regarding the different types of wooden floor in the section brief the names and their applications.

- Trainees will note down all the parts displayed wooden floor names and their applications.
- Record them in table 1.
- Get it checked by the instructor.

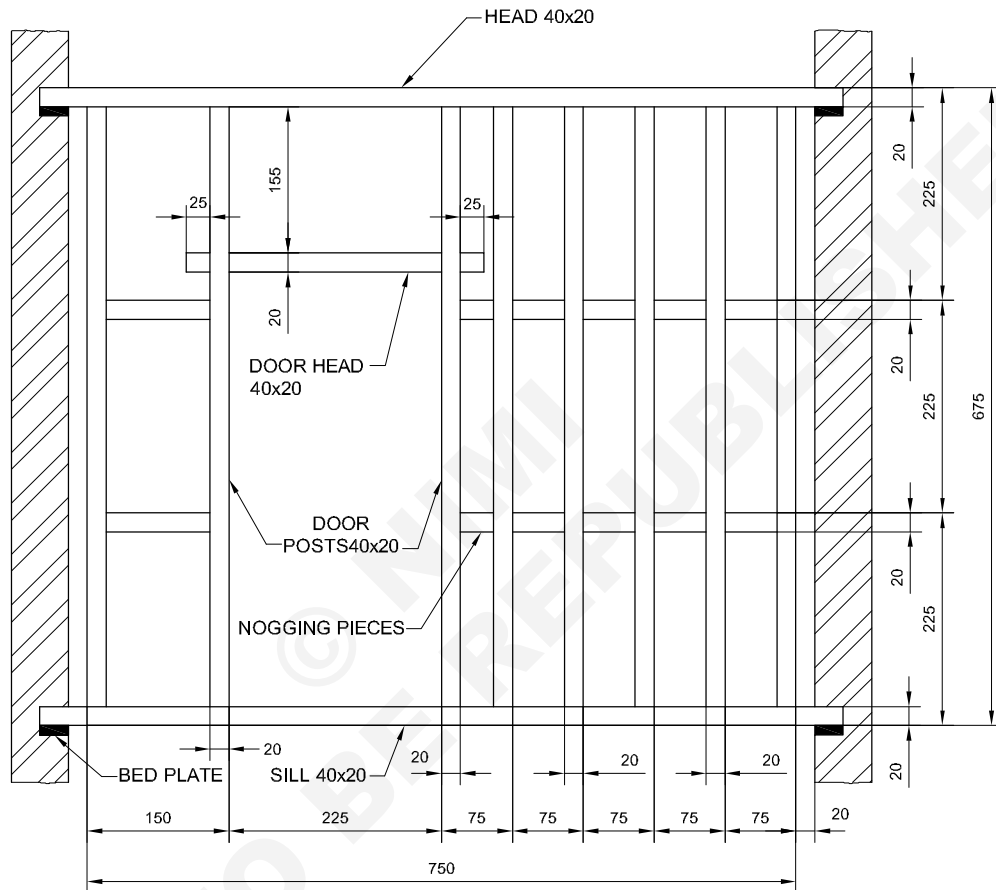
**Table 1**  
**Identify the wooden floors**

<b>Fig No.</b>	<b>Name of the wooden floor</b>	<b>Wooden floor applications</b>
1		
2		
3		
4		
5		
6		

Make structure of wooden partition wall

Objective: At the end of this exercise you shall be able to

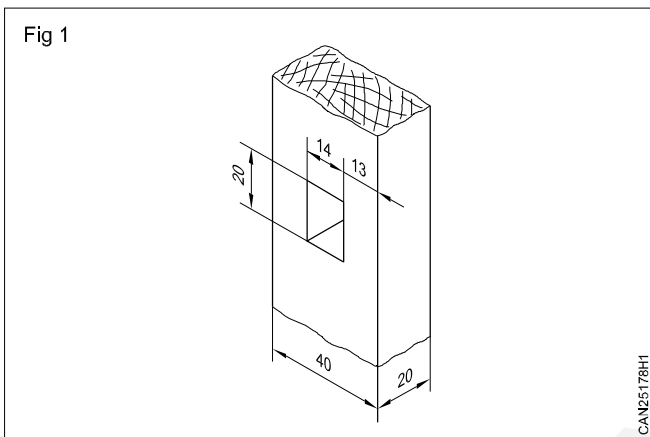
- mark and make structure of wooden partition wall.



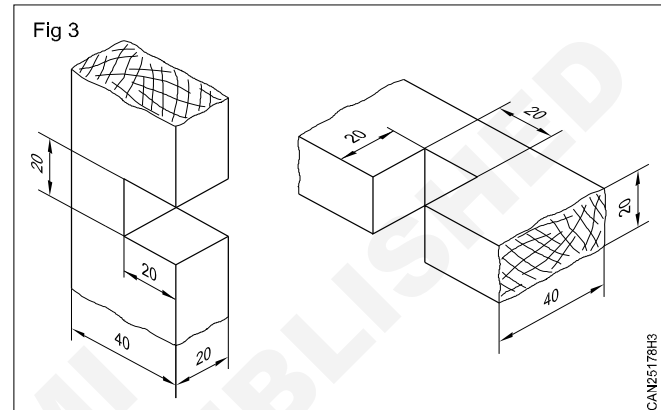
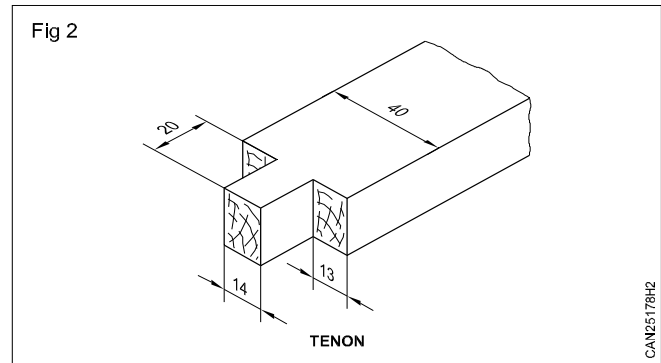
100 gram	25 mm		WIRE NAIL			
1	675 x 150 x 4		PLY WOOD			
1	675 x 400 x 4		PLY WOOD			
1	50 x 25 x 1050		HARD WOOD			
2	50 x 25 x 600		HARD WOOD			
2	50 x 25 x 1500		HARD WOOD			
2	50 x 25 x 3000		HARD WOOD			
8	50 x 25 x 2700		HARD WOOD			1.10.167
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE NTS		<b>WOODEN PARTITION</b>			TOLERANCE ± 2.0 mm	TIME 7h
					CODE NO. CA20N110167E1	

## Job Sequence

- Check all the raw materials of wooden partition for the required size as per the dimension given in the drawing with foot rule.
- Plane all the wooden partition pieces to the required width of 40 mm and the thickness of 20 mm as per the dimension given in the drawing with jack plane, try square and marking gauge.
- Mark and make the total length of head piece as per the dimension given in the drawing with foot rule, scribe, try square and marking gauge.
- Mark and make the mortise on head piece as per the dimension given in the drawing using mortise chisel and mallet. (Fig 1)



- Mark and make the total length of piece as per the dimension given in the drawing.
- Mark and make the total length of sill pieces as per the dimension given in the drawing.
- Mark and make the mortise sill pieces as per the dimension given in the drawing.
- Mark and make the total length on stud pieces as per the dimension given in the drawing.
- Mark and make the tenon on both the ends, (top and bottom) the cross half lap on below the top end (door head) and the blind mortise on middle of the door post as per the dimension given in the drawing.
- Mark and make the tenon on top and bottom ends and the cross half lap on middle post of the stud pieces for the dimension given in the drawing.
- Mark and make the mortise on both side pieces of studs as per the dimension given in the drawing.
- Mark and make the total length on door post as per drawing. (Fig 2)
- Mark and make the total length of door head as per the dimension given in the drawing.
- Mark and make the cross half lap on both the ends of (overhangs piece) the door head as per the dimension given in the drawing. (Fig 3)

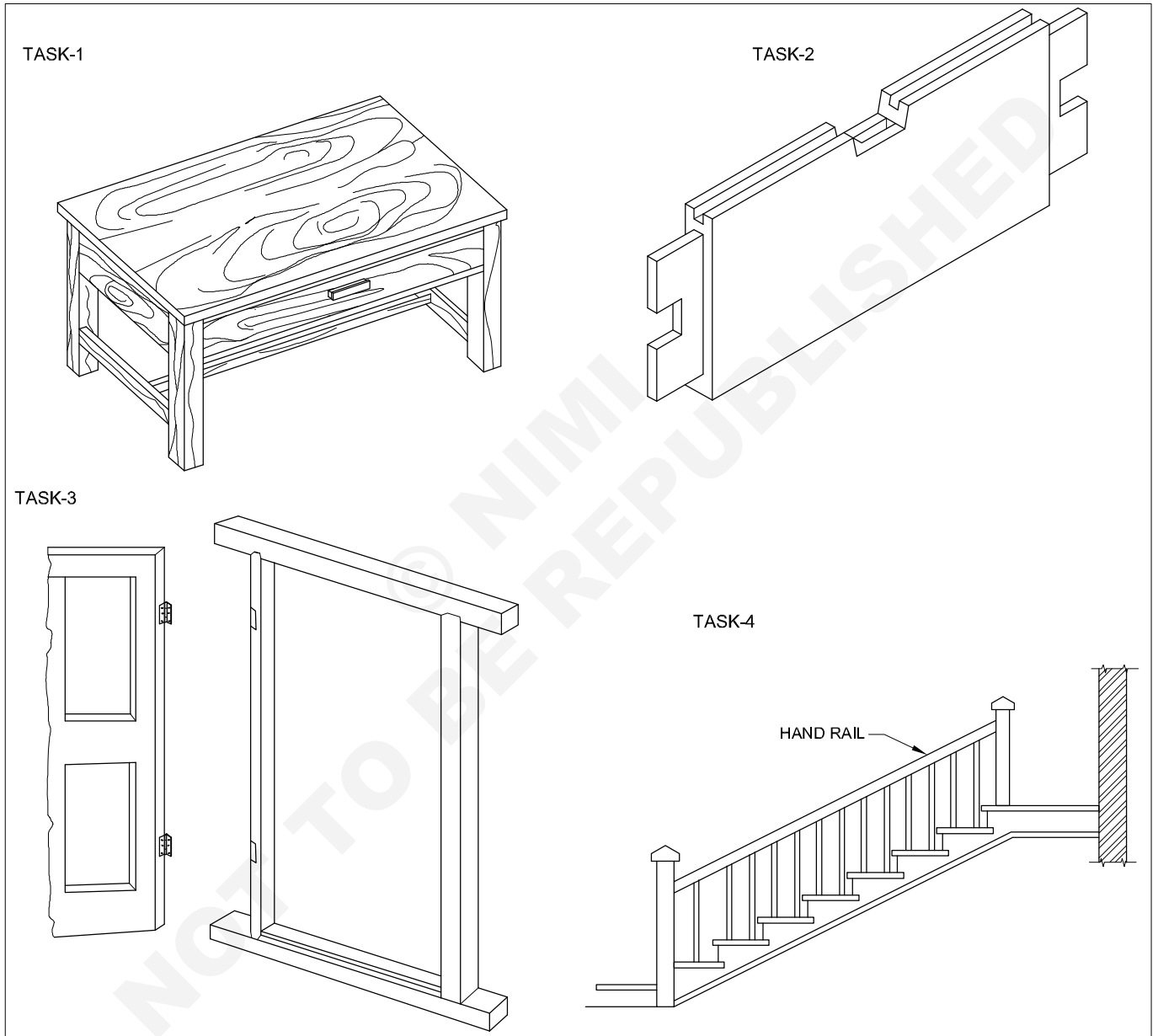


- Mark and make the total length of the nogging pieces as per the dimension given in the drawing.
- Mark and make the blind tenon one end (left) and the common tenon on the other end (right) and cross half lap on middle of the nogging pieces as per the dimension given in the drawing.
- Check all the dimensions, shapes of the wooden partition pieces before assembling.
- Mark the drill hole positions in respective places.
- Prepare the wooden peg to the required size.
- Apply the glue evenly allow the surfaces of the joints.
- Assemble the pieces together with their respective joints correctly.
- Place the bar clamp over the assembled frame and tighten it gently.
- Make the drill holes on centre of the joints.
- Insert the wooden peg with glue in the drilled of holes and strike it gently.
- Cut of the projected wooden pegs carefully.
- Finish the wooden partition surface smoothly.
- Prepare the plywood the required size.
- Position the plywood over the wooden partition frame.
- Drive the nails through the plywood to the partition frame.
- Finish the partition smoothly using smoothing plane.

Repair and recondition furniture, door, window and staircase hand railing

Objectives: At the end of this exercise you shall be able to

- replace the table leg
- replace the door bottom rail
- replace the hinges on window frame
- replace the staircase hand rail.

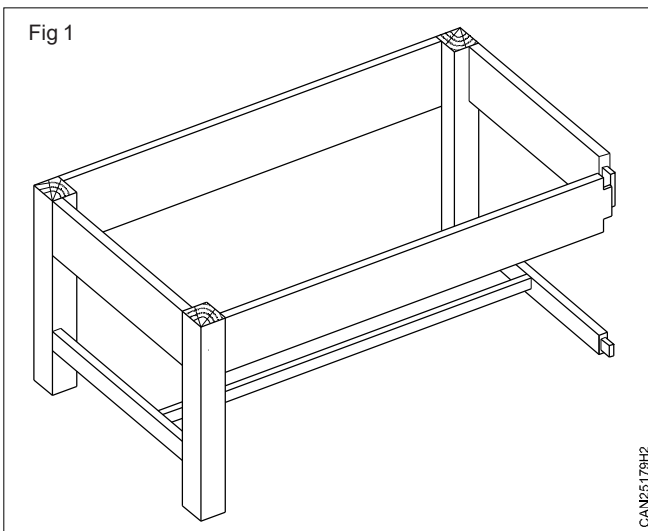


1	250 ml		FEVICOL			
16	25x6		WOOD SCREW			
2	100 mm		BUTT HINGE			
3	AS PER REQUIREMENT		TEAK WOOD/HARD WOOD			1.10.168
NO.OFF	STOCK SIZE	SEMI-PRODUCT	MATERIAL	PROJECT NO.	PART NO.	EX. NO.
SCALE : NTS		<b>REPAIR AND RECONDITION FURNITURE, DOOR, WINDOW AND STAIRCASE HAND RAILING</b>			TOLERANCE ± 1mm	TIME 7Hrs
					CODE NO. CA20N110168E1	

# Job Sequence

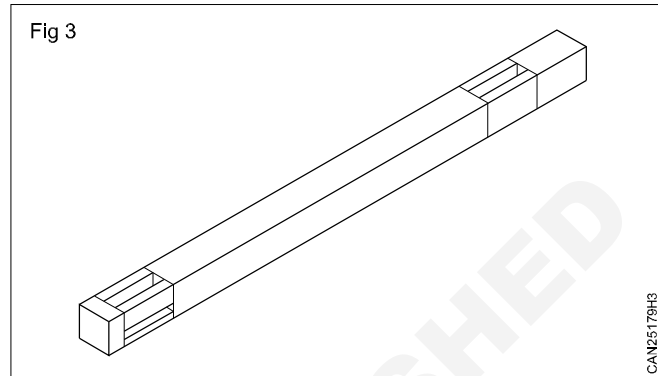
## TASK 1: Replace the table leg

- Remove the screws of top plank and separate it.
- Remove the wooden peg from the mortise and tenon joint drilling through hole on wooden peg using hand power drilling machine.
- Remove the remaining wooden peg carefully without damaging the tenon of the table rails. (Fig 1)



- Remove the leg from table assembly.
- Mark and make the total length of the leg as per the required size. (Fig 2)
- Mark and make the haunched mortise and blind mortise on leg as per the required measurements. (Fig 2)

- Apply glue on mortise and tenon surface using brush.
- Assemble the rails with the prepared leg together.
- Hold the 'T' clamp up side down on the side of the table and tighten it with wooden support pieces.



- Make a drill hole on the centre of the mortise and tenon joint and insert the wooden peg through the drill hole.
- Tap the wooden peg with hammer.
- Cut the projection of wooden peg using hand saw.
- Repeat the same procedure to fix the bottom rail and front rail also.
- Finish the surface of the table frame using smoothing plane.
- Fix the top plank on the table frame by driving the screws properly.

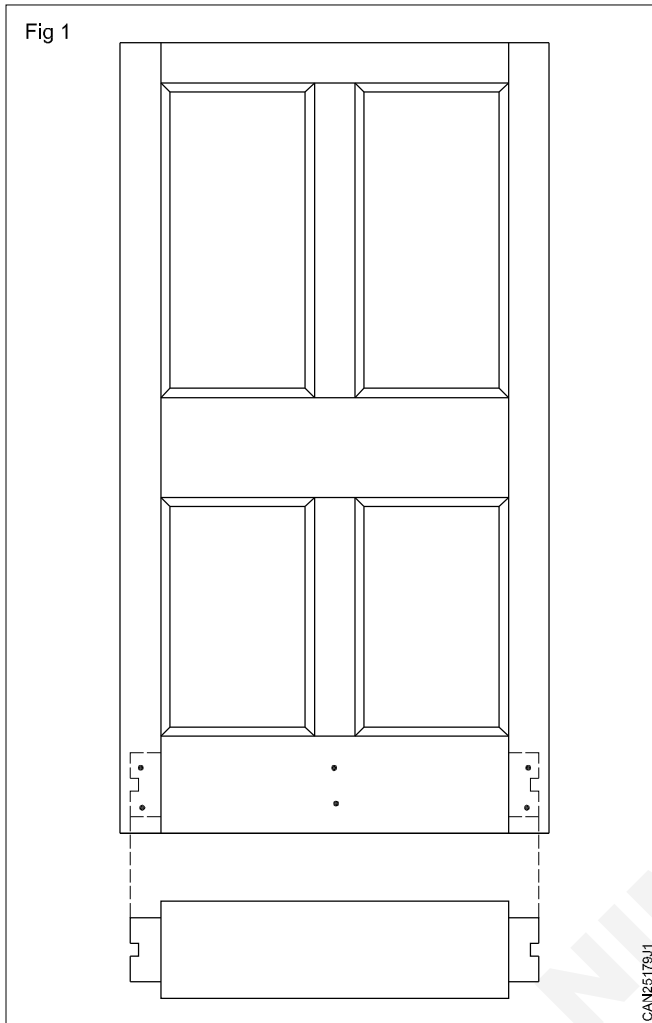
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## TASK 2: Replace the door bottom rail

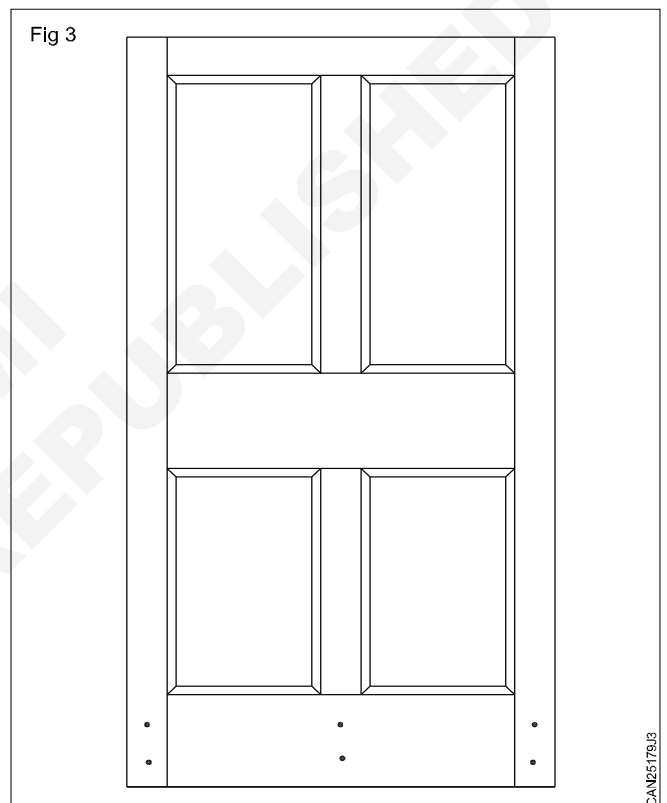
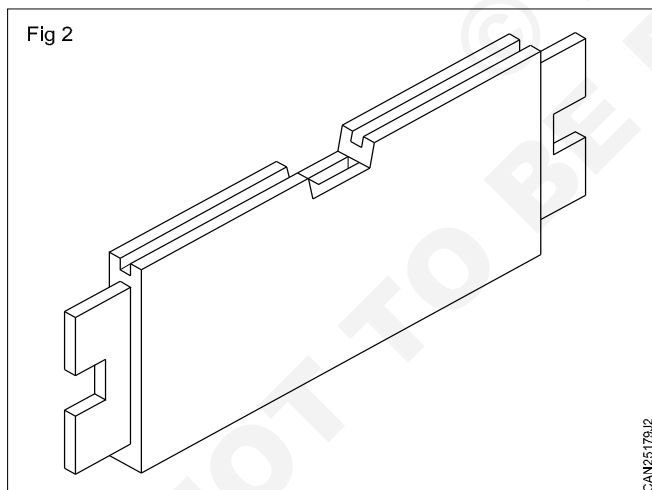
- Remove the door from the door frame carefully using suitable screw driver.
- Remove the damaged bottom rail from the door using hand saw. (Fig 1)
- Chip of the remaining tenon portion from the door stile using mortise chisel.
- Measure the dimensions of bottom rail from the door.
- Plane the width and thickness of the bottom rail as per the required measurements.
- Make the total length of the bottom rail as per requirement.

- Mark and make the haunched double tenon or both the ends of the bottom rail as per the required measurements.
- Mark and make the haunched double mortise on the middle of the bottom rail as per the required size. (Fig 2)
- Mark and make the groove on bottom rail as per the required measurements. (Fig 2)
- Prepare the wooden peg to fix the rail in the door as per requirement.





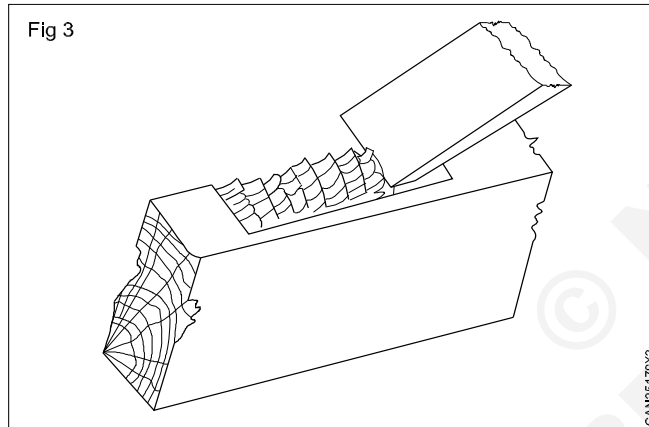
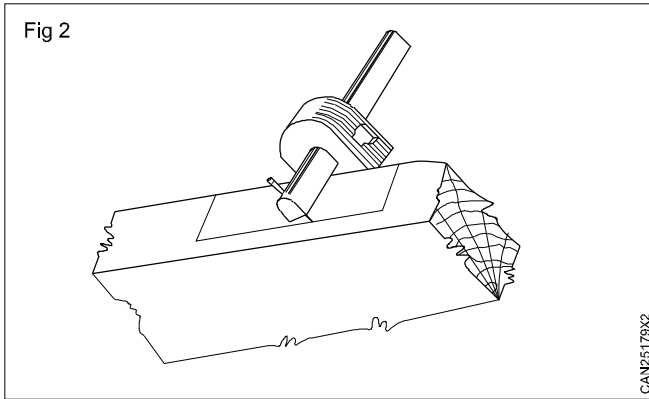
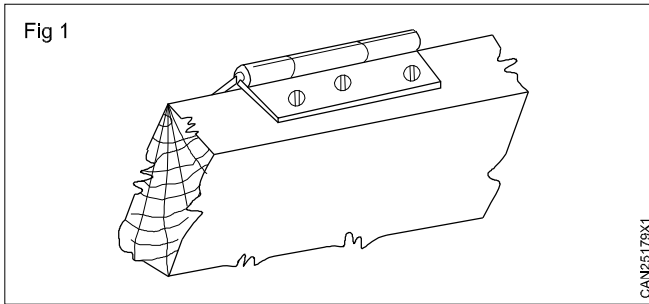
- Apply the glue on tenon surface and fix the bottom rail in the respective place of the door.
- Hold the door on 'T' cramp and tighten it with wooden support pieces.
- Make a drill hole on a centre of the mortise and tenon joint. Apply glue on the surface of wooden peg.
- Fix the wooden peg in the drilled hole using ball pein hammers.
- Remove the projected pegs from the door by using tenon saw.
- Finish the surface of the door smoothly using smoothing plane.
- Position the door within the door frame. (Fig 3)



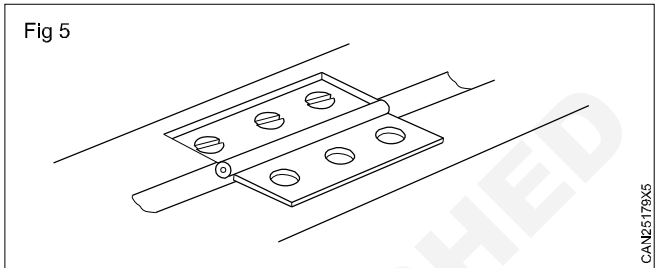
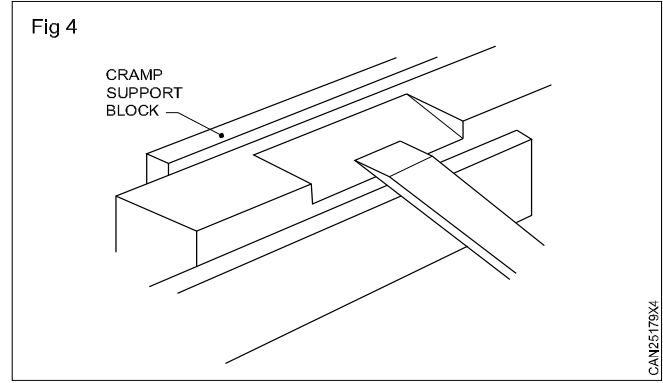
- Draw the screws through the holes of the hinge using screw driver.
- Check the resetting of the door with the door frame for the correct setting and proper movements.

### TASK 3: Replace hinges on window frame.

- Remove the screws of the window hinge and separate the window shutter.
- Remove the screws of window shutter hinge and separate the hinge.
- Plug the gap of hinged position with suitable wooden plugs on both the window and window frame.
- Mark the hinge position on the window shutter.
- Mark out the recess on window shutter stile using hinge itself as a template. (Fig 1)
- Gauge along the window shutter edge and the thickness along the front of the window shutter as per the required measurement of hinge. (Fig 2)
- Make the slant cut on waste side at each end to remove the waste wood from the hanging stile. (Fig 3)



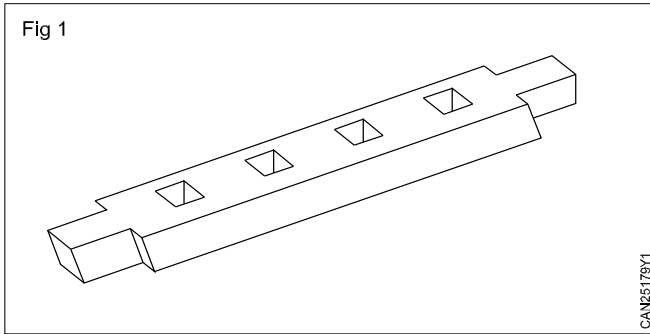
- Clamp a supporting block against the work. (Fig 4)
- Chip off across the grain with a firmer chisel and pare down the gauge lines. (Fig 4)
- Stop the recess from full knuckle depth front to the single leaf thickness at the back. (Fig 4)
- Press the hinge leaf in place once the recess base completely flat.
- Make a pilot hole through the hinge hole to fix the screw. (Fig 5)



- Secure the leaf initially with a single screw in the centre hole of the hinge.
- Repeat the same procedure for fixing the other hinge also.
- Secure the other two screws in the holes provided. Wedge the window shutter in position allowing for clearance it top and bottom.
- Mark the hinge position on window frame after marking the window shutter.
- Transfer the window shutter hinge position to the inside of the window frame.
- Make a recess on window frame to fix the hinge as explained earlier.
- Lay the window shutter in position to the window frame for hinging. Screw the hinge to the window frame using one screw in the centre hole of each leaf after making the pilot hole.
- Check the alignment of the window leaf.
- Insert suitable screws in all holes after marking pilot holes.
- Check one again the fitting of window shutters.

#### TASK 4: Replace the staircase hand rail

- Remove the damaged hand rail from the staircase. Using hammer hand saw, screw driver and pincer.
- Measure the dimensions of hand rail from staircase using tape rule.
- Plane the width and thickness of the hand rail as per required measurement.
- Mark the total length of the hand rail as per requirement.
- Mark and set up tenon on both the ends of the hand rail as per the required measurements. (Fig 1)
- Mark and set up mortise on bottom of the hand rail as per the required measurements and Nos. of baluster. (Fig 1)



- Prepare the wooden peg to fix the hand rail in the staircase newel post.
- Apply the glue on tenon and mortise surface and fix the hand rail in the respective place of the staircase. (Fig 2)
- Make a drill hole on a newel posts stup mortise and tenon joint. Apply glue on the surface of wooden peg.
- Fix the wooden peg in the drilled hole using ball pein hammer.
- Remove the projected pegs from newel posts by using tenon saw.
- Fix the wire nail in the joint of baluster using claw hammer.

- The nail head should be just below the hand rail surface using nail punch.
- Finish the surface of the hand rail smoothly using spoke shave. (Fig 2)

