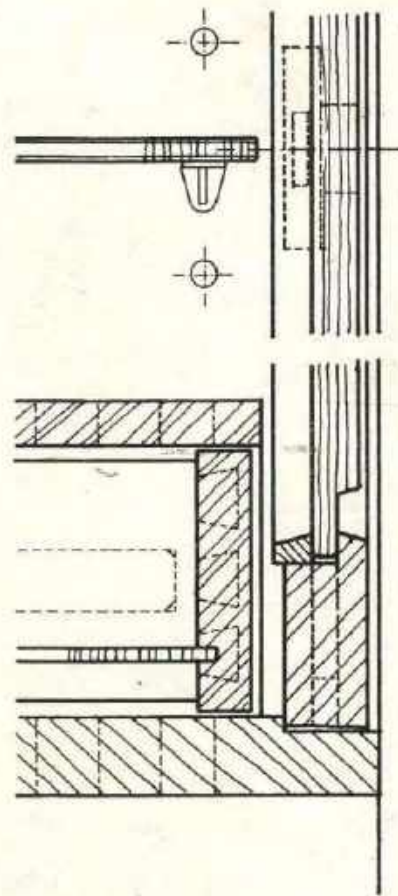
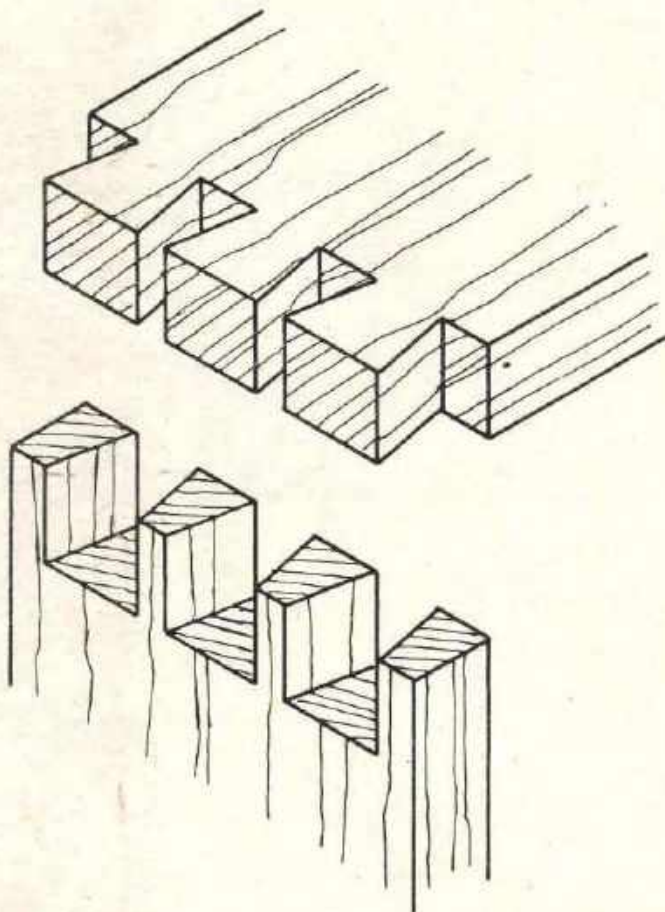


TECHNICAL DRAWING & PRACTICAL COURSE

WOOD WORKING TRADES



DEVELOPMENT CELL

FOR SKILLED LABOUR TRAINING

DIRECTORATE OF MANPOWER & TRAINING
GOVERNMENT OF THE PUNJAB
LAHORE

T. T. P Series No.35



TECHNICAL DRAWING & PRACTICAL COURSE

WOOD WORKING TRADES

Prepared by : W. Schumacher member of GOPA - Consultants
Advisory Group at Pak-German Wood working
Centre, Peshawar.

for

Development Cell for Skilled Labour Training
8/A, Abu Bakar Block, New Garden Town, Lahore.

Printed at

2nd edition

151 NOV 1982

Rice

15/-

C O N T E N T S

Importance of exercise drawings:

XXX = must be done

XX = should be done

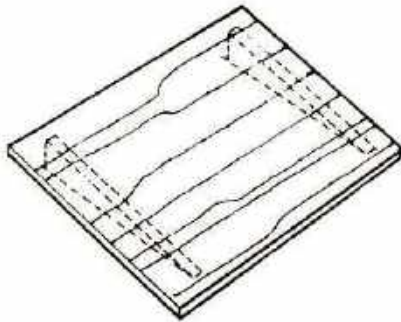
X = to be done if time is available

<u>INTRODUCTION OF TECHNICAL DRAWING</u>	<u>Exercise No.</u>	<u>Sheet No.</u>
Drawing instruments		1
Standard sizes of drawing paper, folding to size A 4		2, 3
Technical lettering		4
Kinds of lines and title strip		5
Symbols of screws, nails, dowels, glued joints		6
Hatching and symbols		7
Dimensioning, scales		8, 9
Technical representation of an object	1	XXX 10, 11
<u>WORKPIECES AND EXPLANATIONS</u>		
End lap joint	2	XXX 12
Slip mitre joint	3	XX 13
Slip tenon mortise joint	4	XXX 14
Try square	5	XXX 15
Slip tenon mortise joint with rabbet	6	XX 16
Wedged tenon and mortise joint	7	XXX 17
Coat hanger	8	XX 18
Haunched mortise and tenon joint	9	XXX 19
Mortise and tenon joint	10	XX 20
Slip tenon mortise mitre joint (one side mitred only)	11	XX 21
Slip tenon mortise mitre joint	12	XX 22
Closed tenon mortise mitre joint	13	XX 23
French lapped wedge joint	14	XXX 24

	<u>Exercise No.</u>	<u>Sheet No.</u>
Mallet	15	XX 25
Open dovetails (with 3 tails)	16	XXX 26
Open dovetails (with 4 tails)	17	XX 27
Open dovetails (with 2 tails, front edge mitre joint)	18	XX 28
Angle joints (double tenoned)		29
Angle joints (tenoned, dove tailed, dovetailed dado joint)	19	XX 30
Angle joints (nailed)		31
Angle joints (tongued and grooved)		32
Angle joints (dovetailed dado joints)		33
Angle joints (tongued and grooved)		34
Angle joints (tongued grooved and dado joints)	20	XX 35
Angle joints (doweled)		36
Angle joints (doweled)		37
Angle joints (doweled)	21	XX 38
Key mortise and tenon joint	22	XXX 39
Horse rack	23	XX 40
How to join a solid top with a carcass		41
Foot stool	24	XX 42
Stool	25	XXX 43
Lapped dovetails	26	XXX 44
Lapped dovetails (front piece in sloping position)	27	XX 45
Funnel-shaped dovetails	28	XX 46
Funnel-shaped dovetails (explanation)		47
Dovetail dado groove joint and tongued butt joint	29	XX 48
Methods and explanation of various sections		49
Telephone shelf	30	XXX 50
Cross bar joint		51

	<u>Exercise No.</u>		<u>Sheet No.</u>
Frame with cross bar	31	XX	52
Frames and panels			53
Secret mitred dovetails	32	XX	54
First aid cabinet	33	XX	55
First aid cabinet (details)			56
Doors and hinging possibilities (piano- & butt hinges)			57
Bedside cabinet	34	XXX	58
Drawers' sliding systems (1. possibility)	35	XX	59
" " " (2. possibility)	36	XX	60
" " " (3. possibility)	37	X	61
" " " (4. possibility)	38	X	62
Sliding door system			63
Cupboard with sliding doors	39	XXX	64
The English drawer			65
Writing desk	40	XX	66
Doors and hinging possibilities (pivot hinges)			67
Side board	41	X	68
Desk flaps and hinging possibilities			69
Writing cabinet	42	X	70
Knobs for drawers and doors			71

DRAWING INSTRUMENTS

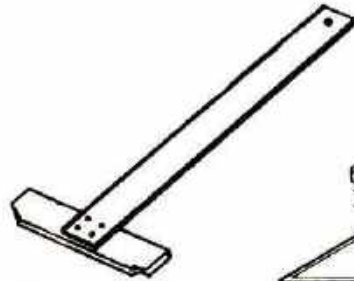
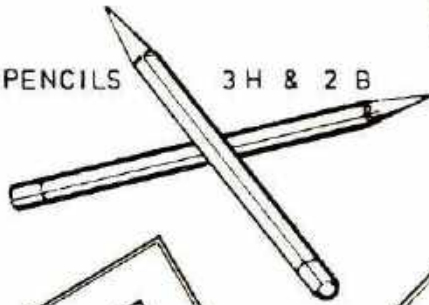


DRAWING BOARD

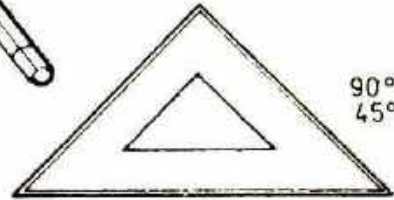
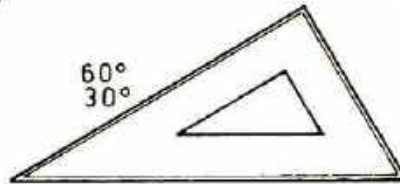


DRAWING TABLE

PENCILS 3H & 2B

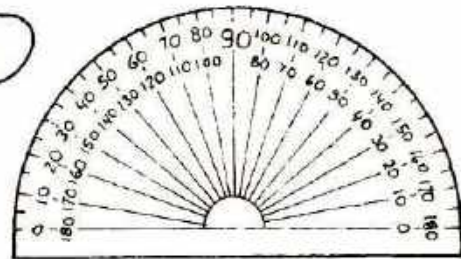
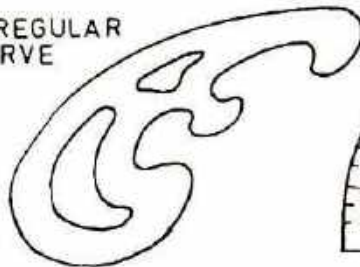


T-SQUARE

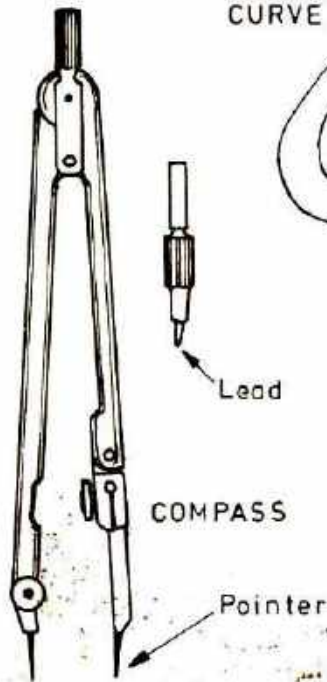


SET SQUARE

IRREGULAR CURVE



PROTRACTOR



COMPASS

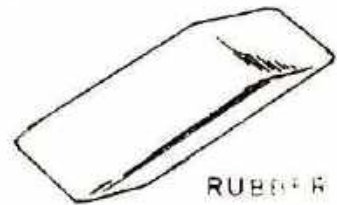
Lead

Pointer

SANDPAPER PAD



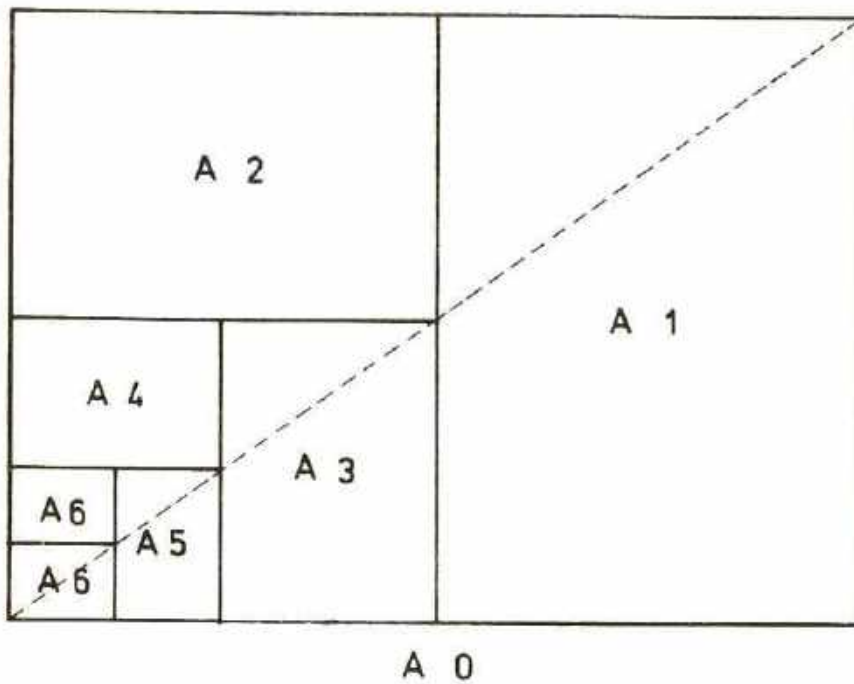
RUBBER



RULER 300 mm



STANDARD SIZES OF DRAWING PAPER



"A"-SERIES

"A"	Size of drawing paper and blue prints	Area for drawing	The dimensions of the paper can be used either way (vertical or horizontal)
A 0	841 × 1189	831 × 1179	
A 1	594 × 841	584 × 831	
A 2	420 × 594	410 × 584	
A 3	297 × 420	287 × 410	
A 4	210 × 297	200 × 287	
A 5	148 × 210	138 × 200	
A 6	105 × 148	95 × 138	



← Cut size of drawing paper
 ← Area for drawing
 ← Rough size of drawing paper



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SHEET NO. 2

FOLDING OF DRAWING PAPER

To size A 4 = standard file size

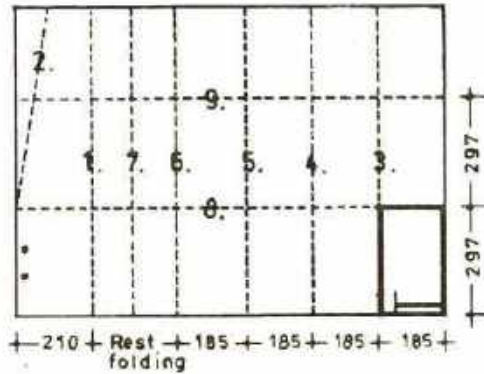
Size of paper

Folding scheme

Vertical folding

Horizontal folding

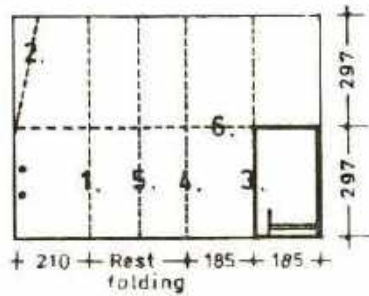
A 0
841 × 1189



297
297

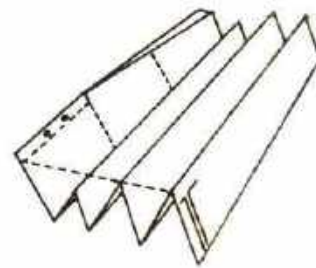
+ 210 + Rest + 185 + 185 + 185 + 185 +

A 1
594 × 884

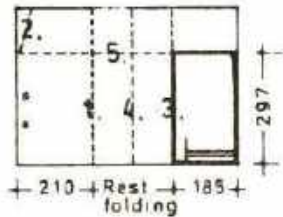


297
297

+ 210 + Rest + 185 + 185 +



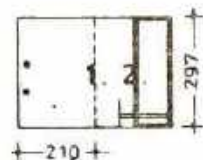
A 2
420 × 594



297

+ 210 + Rest + 185 +

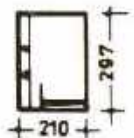
A 3
297 × 420



+ 210 +



Folding completed



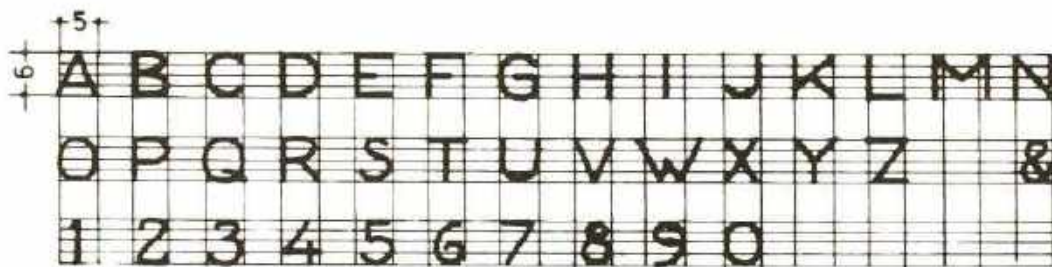
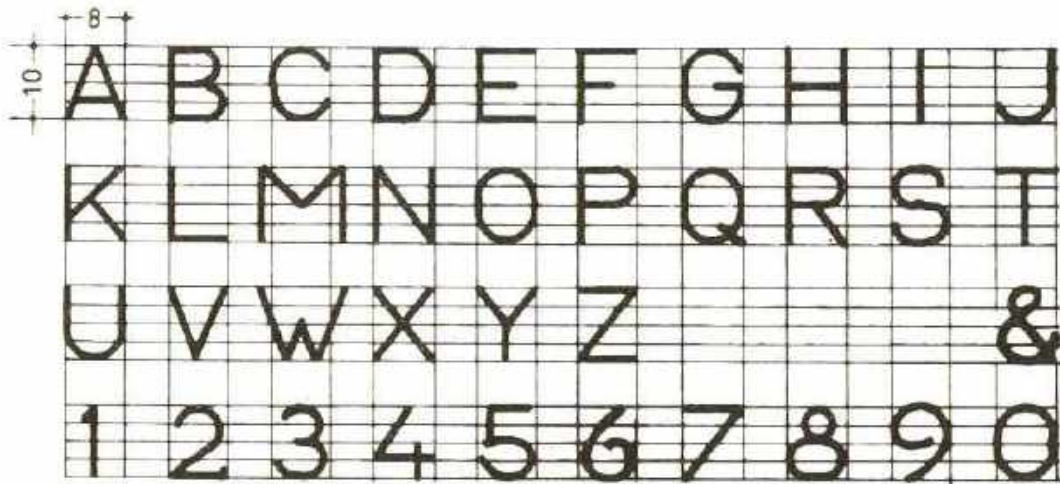
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SHEET NO. 3

TECHNICAL LETTERING

Vertical capitals and numerals



When writing words, the distance between the letters may be different from each other.



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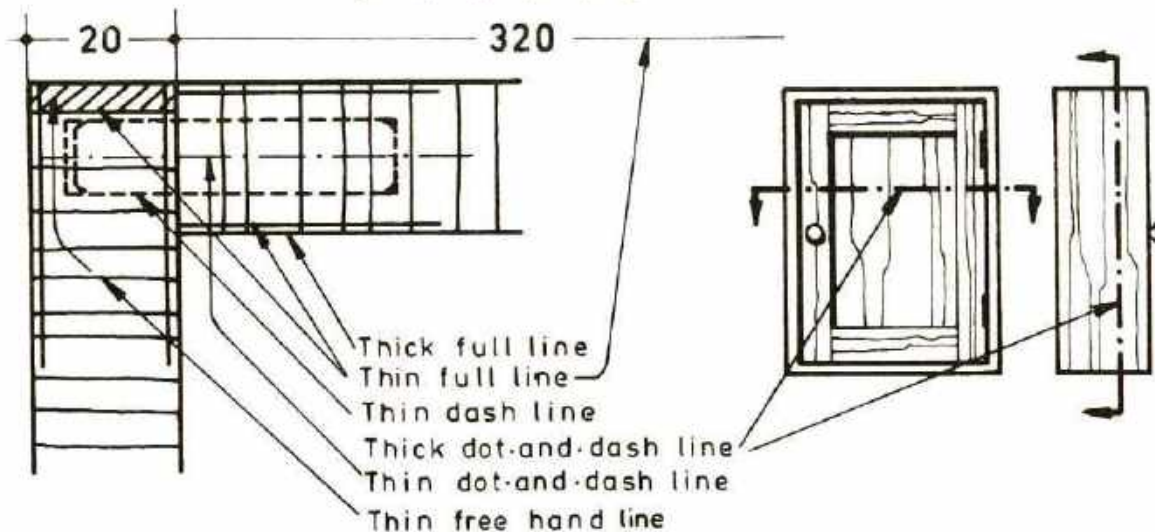
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 4

DRAWING LINES & TITLE STRIP

Thick full line	0,6-0,8 mm	Visible edges in sections
Thin full line	0,2-0,4	Helping lines
Thin dash line	0,2-0,4	Invisible edges
Thick dot-and-dash line	0,6-0,8	Indicating sections
Thin dot-and-dash line	0,2	Centre lines
Thin free hand drawn line	0,4	Hatching lines

SAMPLE



52 32 18	90	60
	T I T L E	
	SCALES :	DATE :
	DESIGNED BY:	JOB.NO.:
DRAWN BY:		
CHECKED BY:		
P A K G E R M A N W O O D W O R K I N G C E N T R E P E S H A W A R		DRG.NO.:

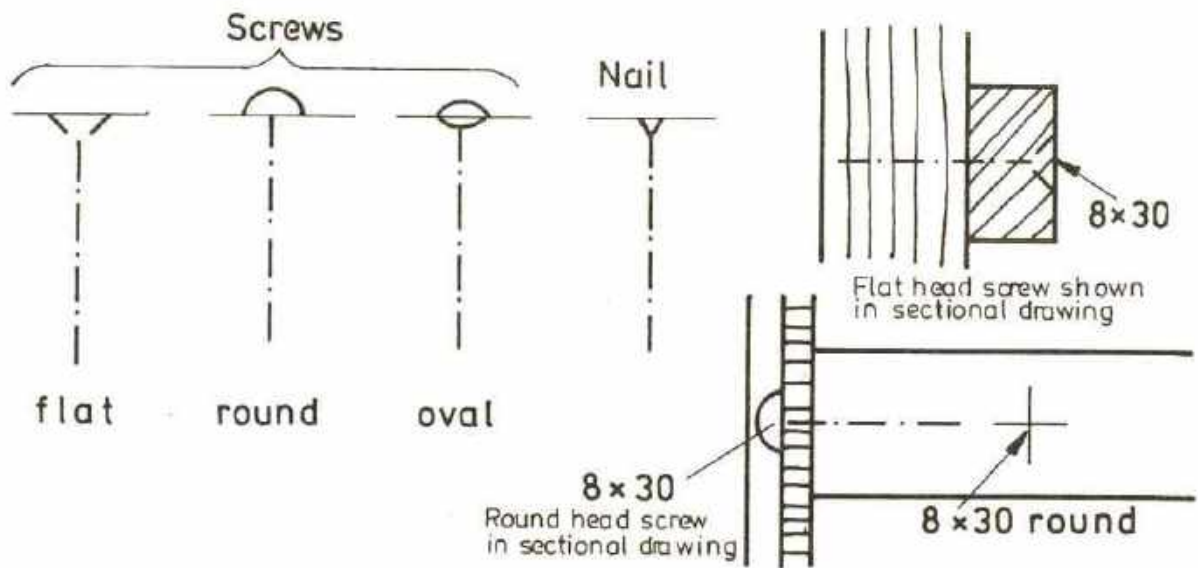


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

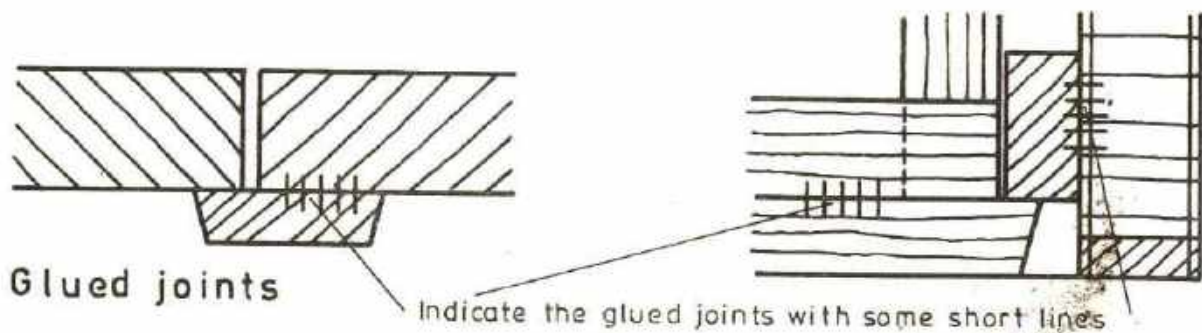
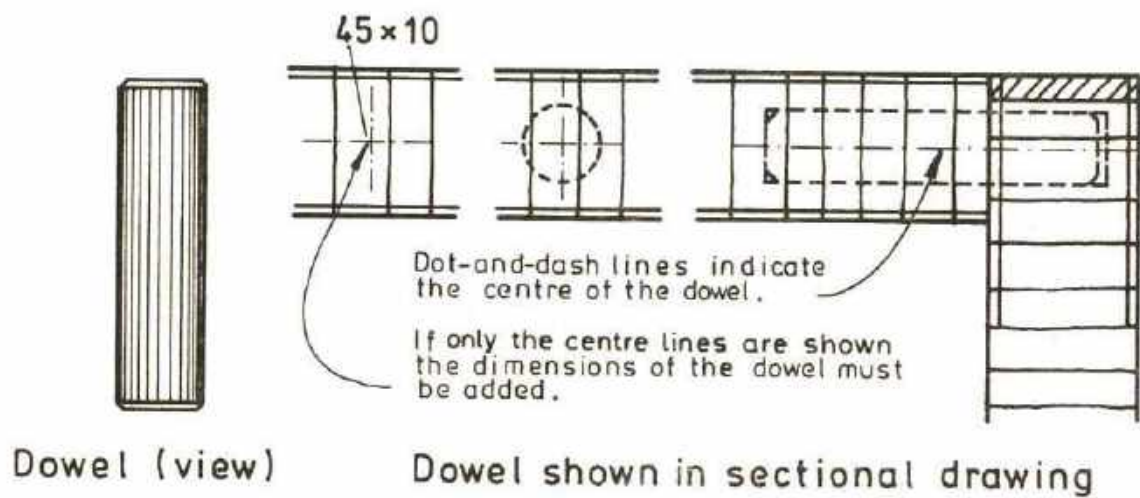
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 5

SYMBOLS Screws, Nails, Dowels, Glued joints



The actual length and diameter of screws and nails are not shown in drawing. The dimensions (length and diameter) and the material, other than steel must be entered in the drawing.



HATCHING AND SYMBOLS

Used for detail drawings



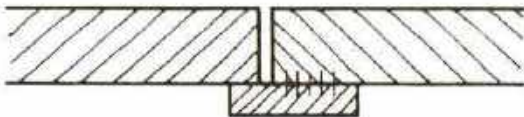
END GRAIN WOOD

Marked with free hand lines at an angle of 45°.



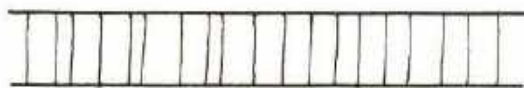
WOOD ALONG THE GRAIN

Marked with free hand lines parallel to the surface.



END GRAIN WOOD (several pieces)

Marked with free hand lines at an angle of 45° in reversed direction.



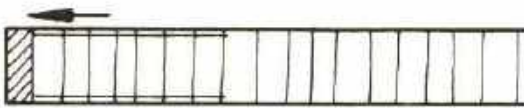
CHIPBOARD BLOCKBOARD PLYWOOD LAMINATED BOARD BATTENBOARD

Marked with free hand lines at an angle of under 90°.



CHIPBOARD ETC.

With wooden beading and both sides veneer. The "X" indicates the direction of the veneer (end grain). The beading is covered by the veneer.



CHIPBOARD ETC.

With wooden beading and both sides veneer. The arrow indicates the direction of the veneer (along the grain). The beading is joined after veneering.



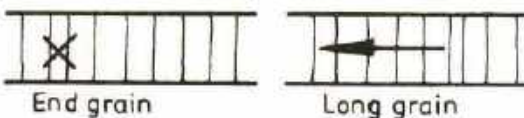
CHIPBOARD ETC.

Surface and edge with plastic laminated board. One side veneer.



CHIPBOARD ETC.

The abbreviations indicate the type of boards.

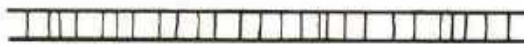


BLOCK-LAMINATED-BATTENBOARD

The two marks "X" and "←" indicate the direction of the middle layer.

End grain

Long grain



HARD BOARD



HARD BOARD

Both sides veneered.



GLASS AND ASBESTOS



MARBLE

The dotted marks are applied only in sectional drawings.

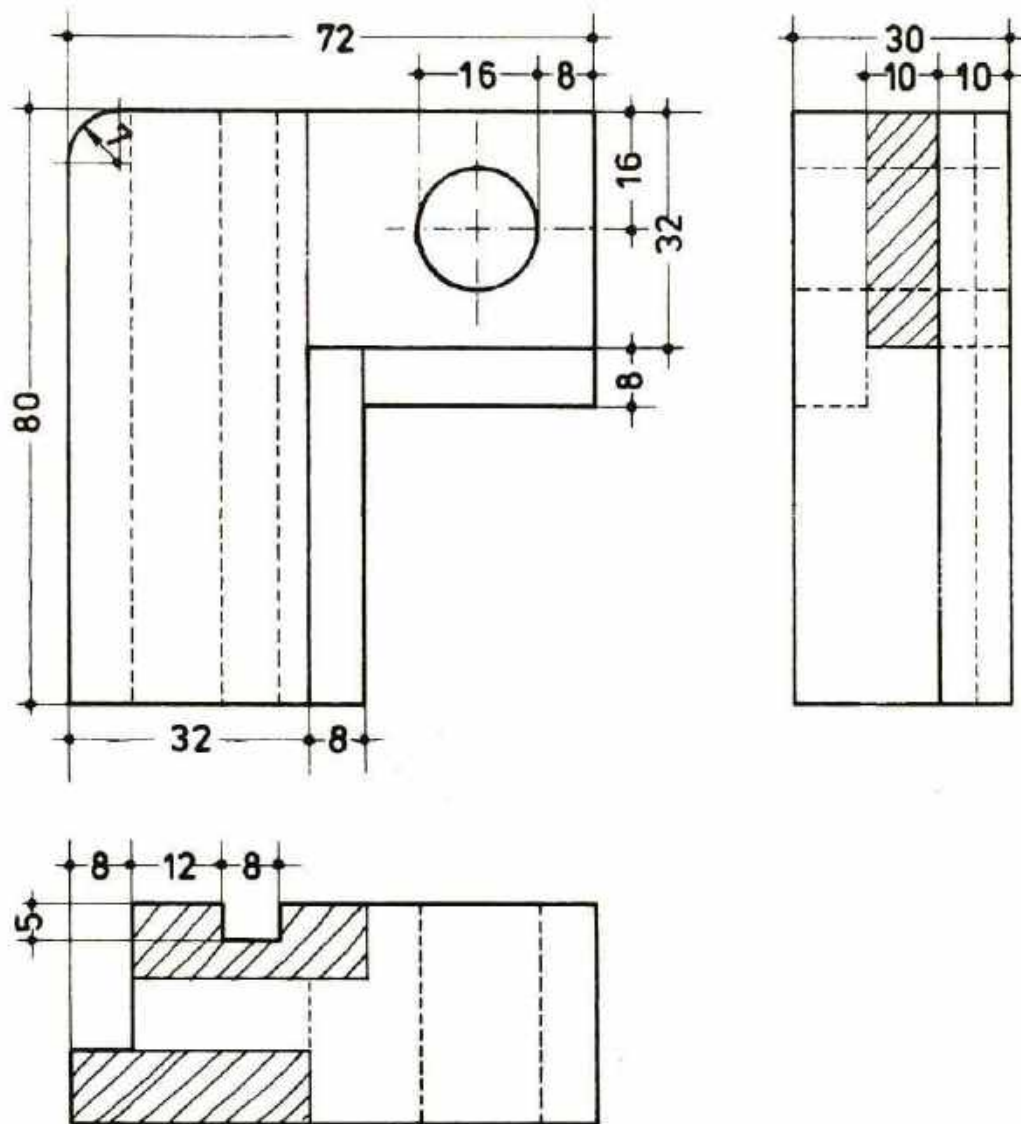


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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 7

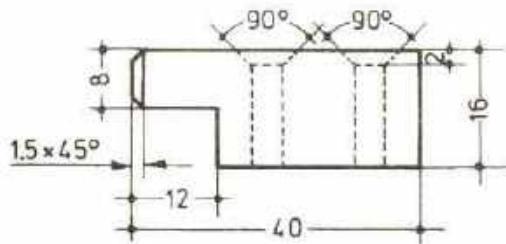
D I M E N S I O N I N G



Note: Enter all dimensions in mm. (Do not add "mm")
 Give only as many dimensions as necessary.
 The centre line (dot-and-dash-line) is an important help for dimensioning symmetrical work pieces.
 Avoid dimensioning at invisible (broken) lines.
 Avoid (as far as possible) to enter dimensions in the object.
 The dimensions must be readable from bottom or from the right hand side never from up side down or from the left hand side.
 The dimension line should end with dots or arrows.
 Enter smaller dimensions close to the object.

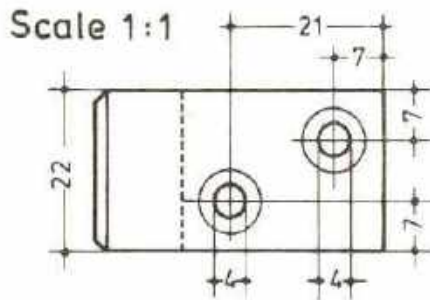


SCALES AND DIMENSIONING



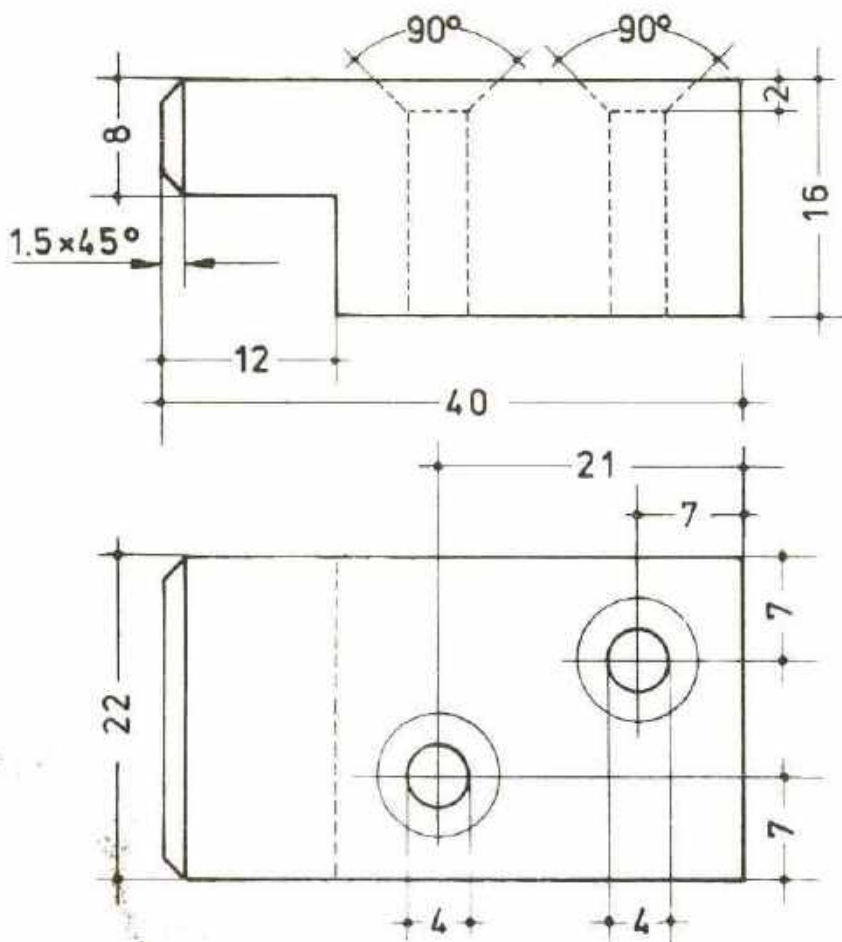
DRAWING TRUE TO SCALE

Technical drawings must always be prepared true to scale.
When the object to be drawn is too small an enlarged scale can be used.
When the object to be drawn is too big a reduced scale can be used.



STANDARD SCALES

Full (plain)	1 : 1		
Enlarged	2 : 1	5 : 1	10 : 1
Reduced	1 : 2,5	1 : 5	1 : 10 1 : 50

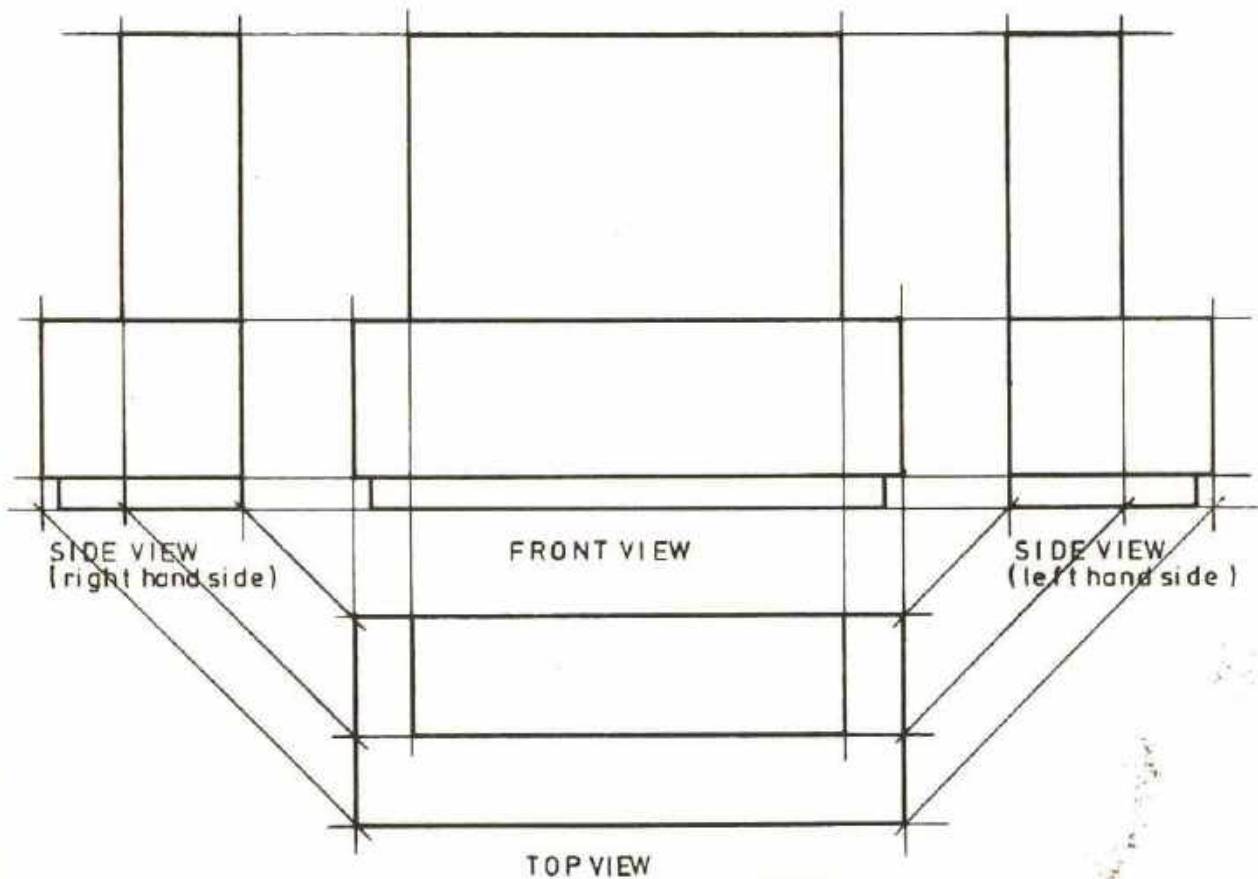
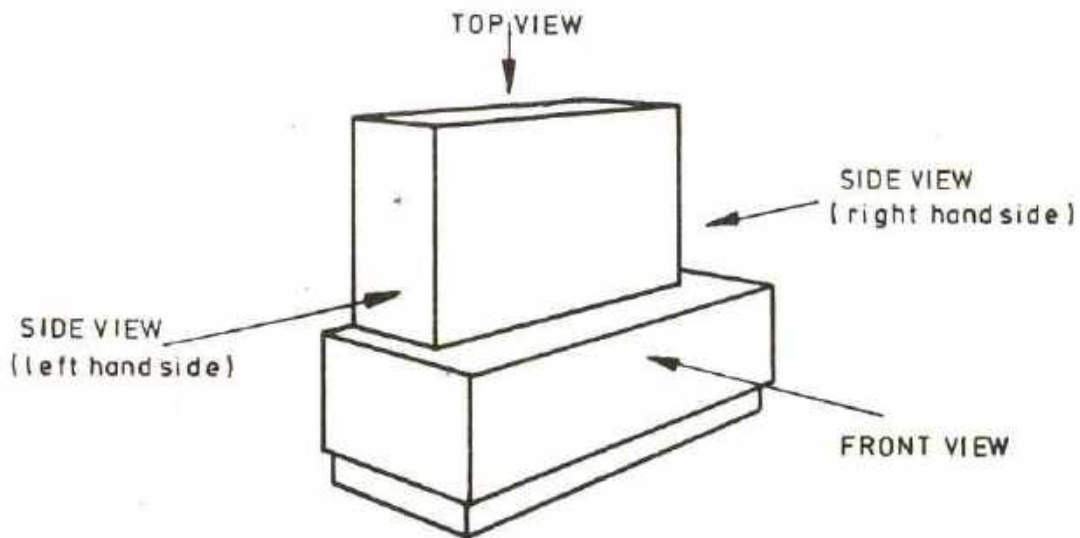


Scale 2 : 1

Note: The dimensions given in the drawings — also in enlarged or reduced scales — always indicate the actual size.



THE TECHNICAL REPRESENTATION OF AN OBJECT



NOTE:
In technical drawings, only the left hand side of an object is drawn.

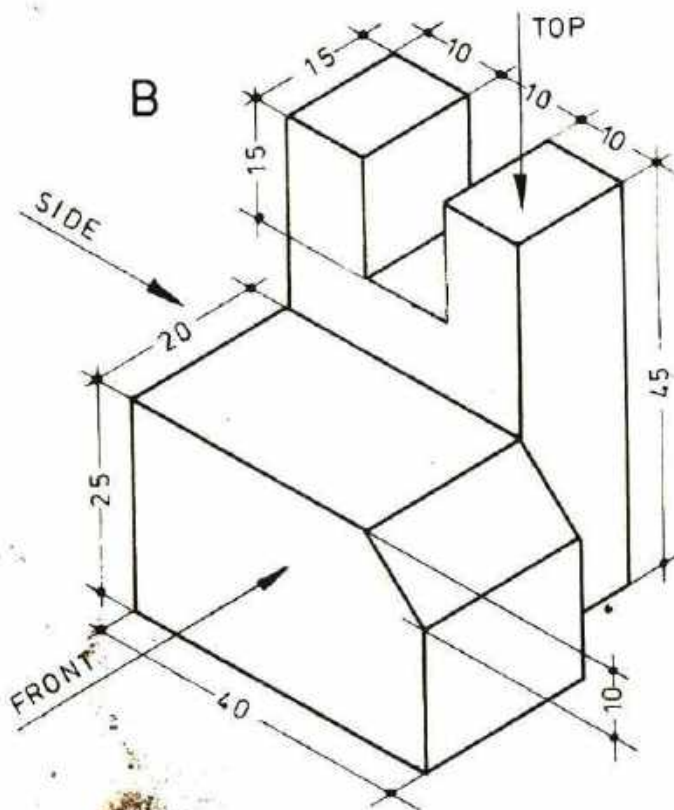
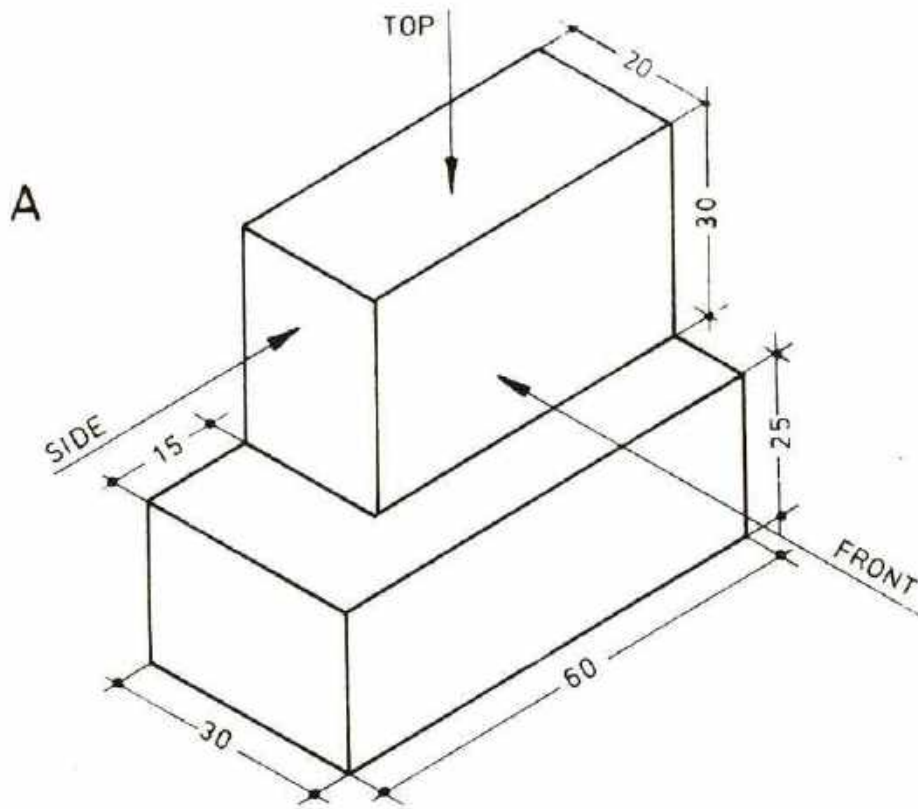


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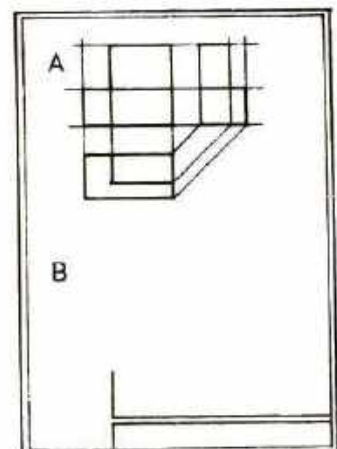
SHEET NO. 10

THE TECHNICAL REPRESENTATION OF AN OBJECT

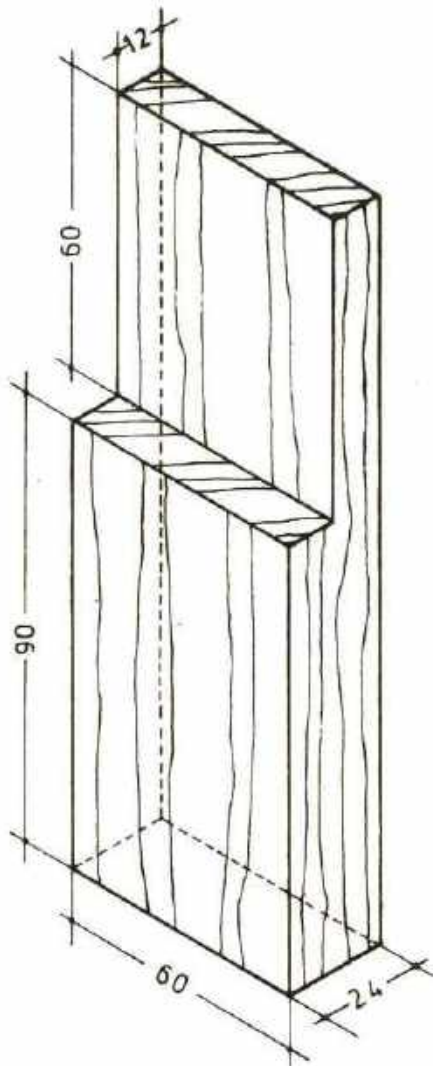


EXERCISE :
 Draw the front, side and top views of the objects A and B in scale 1:1. Enter the dimensions.

Paper size A 4

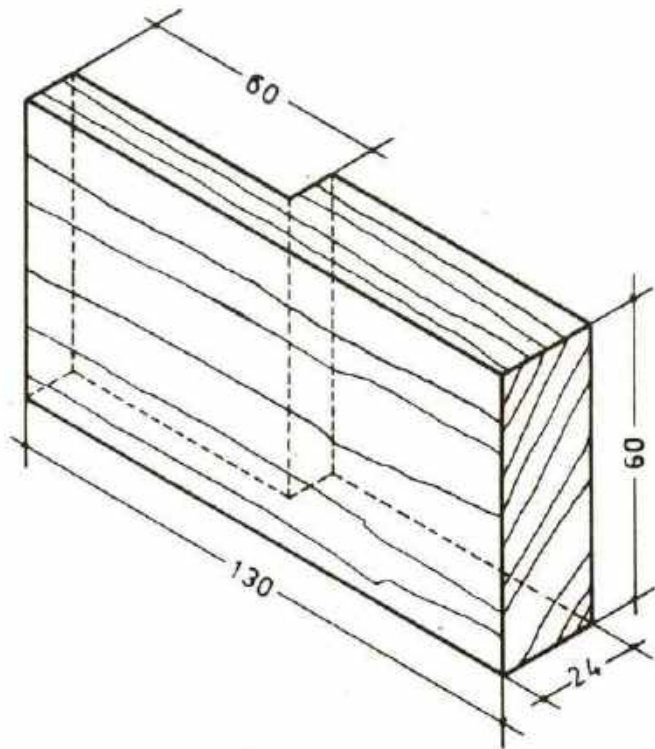


END LAP JOINT



Material

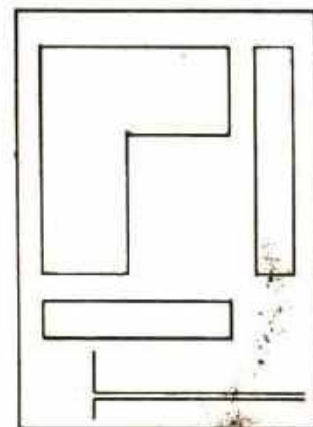
1 piece $150 \times 60 \times 24$
1 piece $130 \times 60 \times 24$



EXERCISE

Draw the front, side and top views
in scale 1:1 and show the joint
with dashed lines.

Paper size A 4



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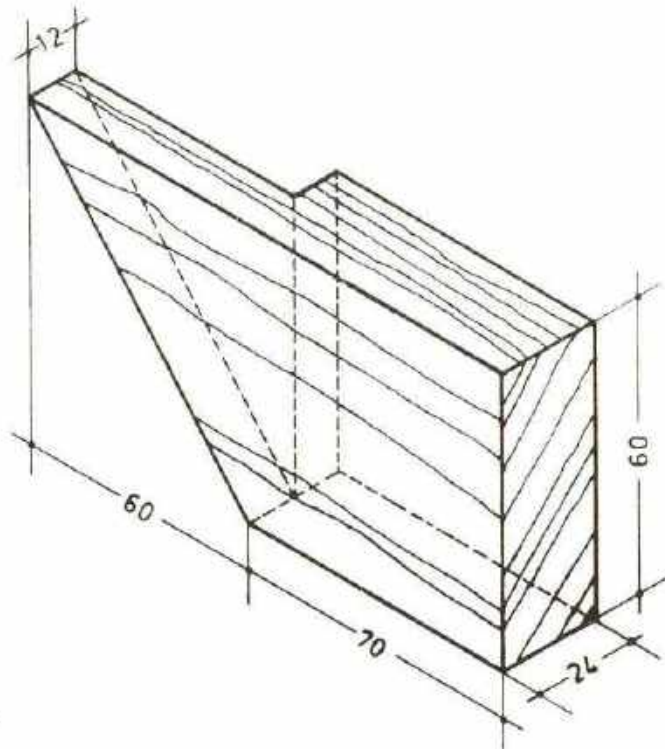
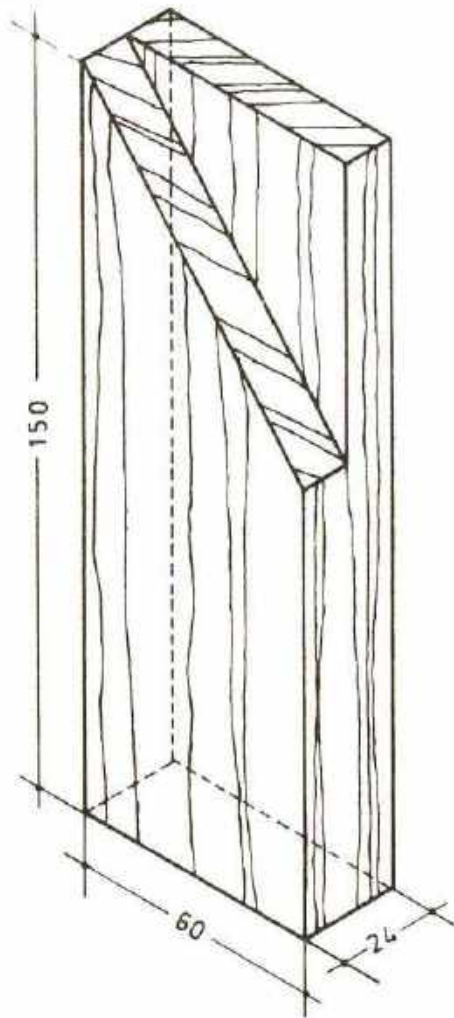
SHEET NO. 12
PRACTICAL
EXERCISE
NO. 2

SLIP MITRE JOINT

Material

1 piece $150 \times 60 \times 24$

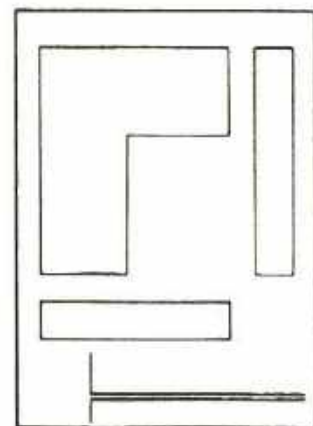
1 Piece $130 \times 60 \times 24$



EXERCISE

Draw the front, side and top view
in scale 1:1 and show the joint with
dashed lines.

Paper size A4

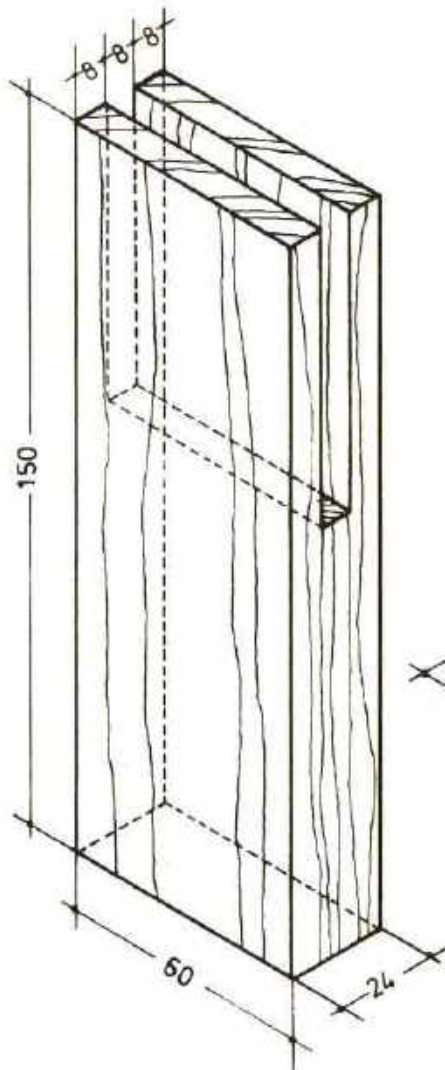


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

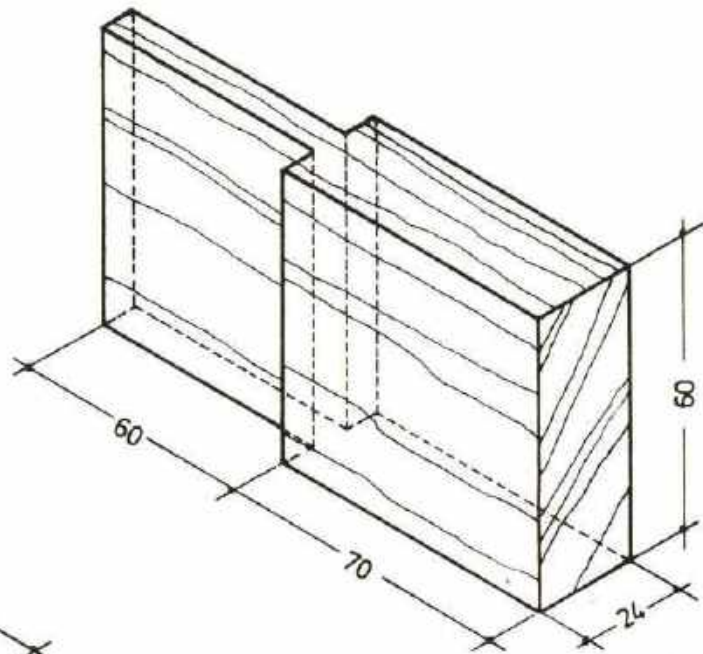
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 13
PRACTICAL
EXERCISE
NO. 3

SLIP TENON MORTISE JOINT



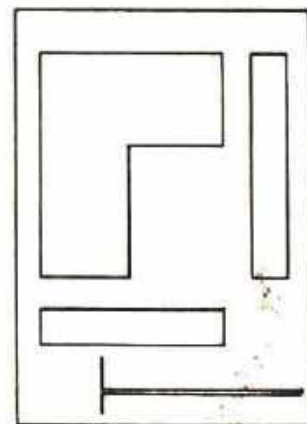
Material
1 piece 150 x 60 x 24
1 piece 130 x 60 x 24



EXERCISE

Draw the front, side and top view
in scale 1:1 and show the joint with
dashed lines.

Paper size A4

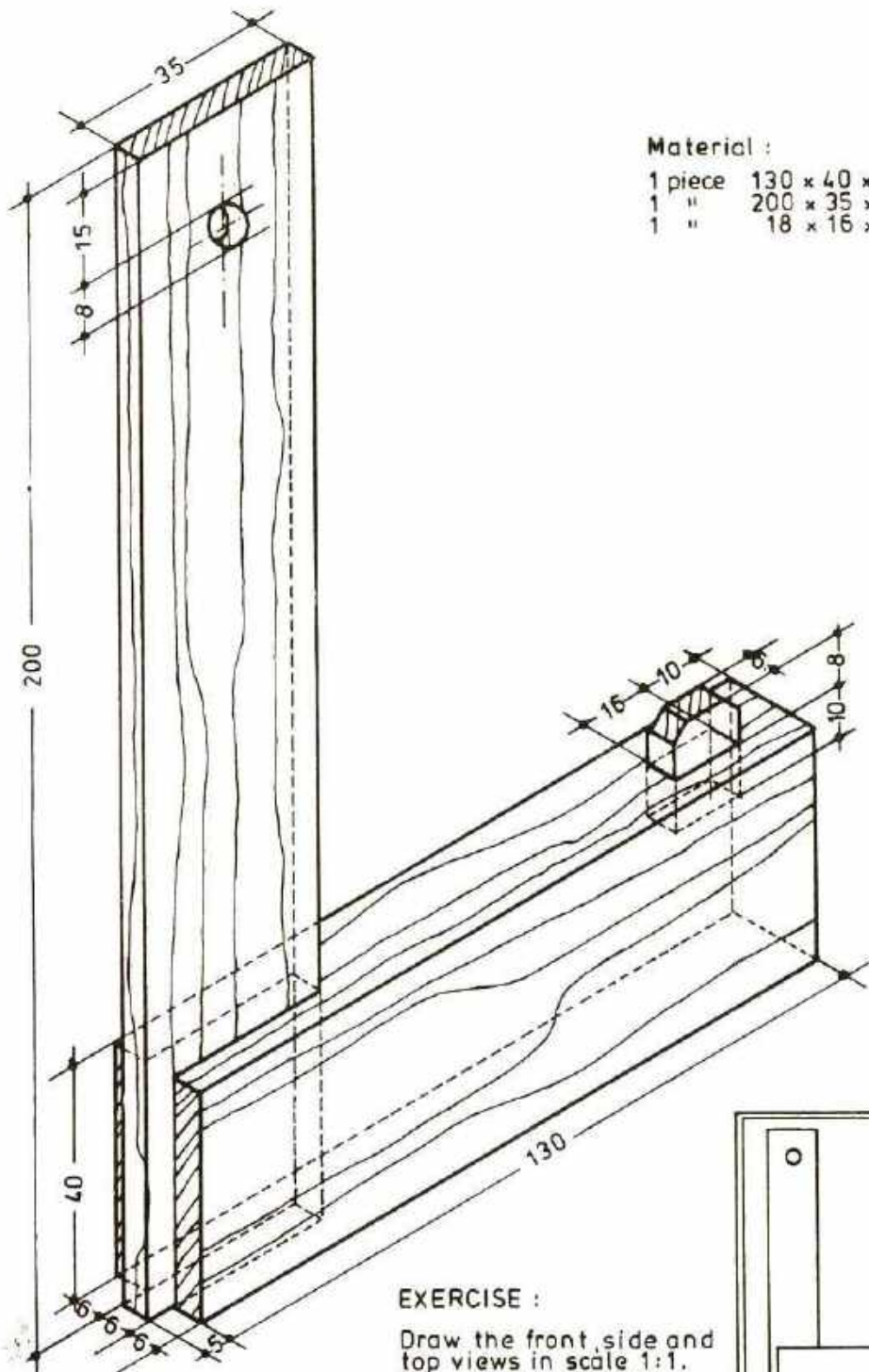


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 14
PRACTICAL
EXERCISE
NO. 4

TRY - SQUARE



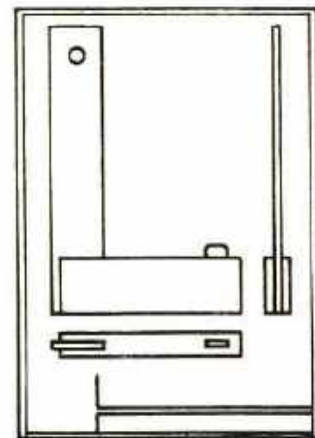
Material :

1 piece	130 × 40 × 18
1 "	200 × 35 × 6
1 "	18 × 16 × 6

EXERCISE :

Draw the front, side and top views in scale 1:1. Show the joints with dashed lines. Enter the dimensions.

Paper size A 4

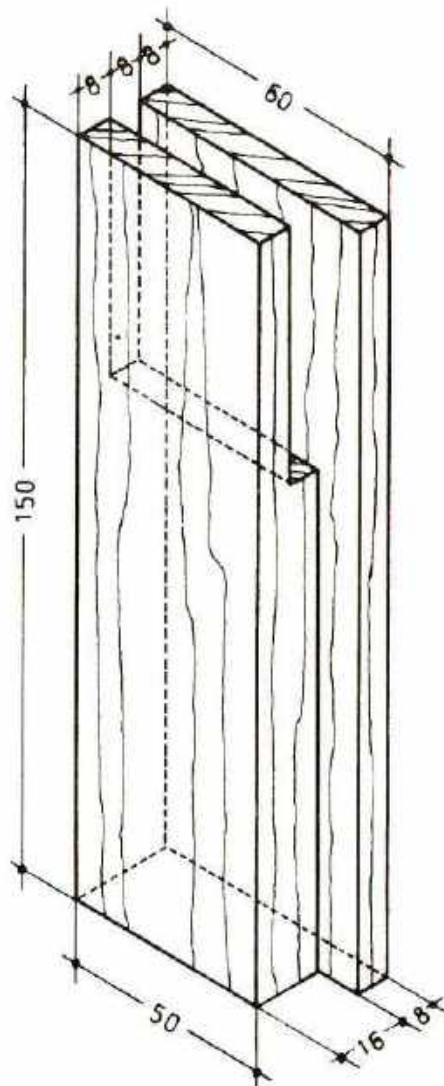


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 15
PRACTICAL
EXERCISE
NO. 5

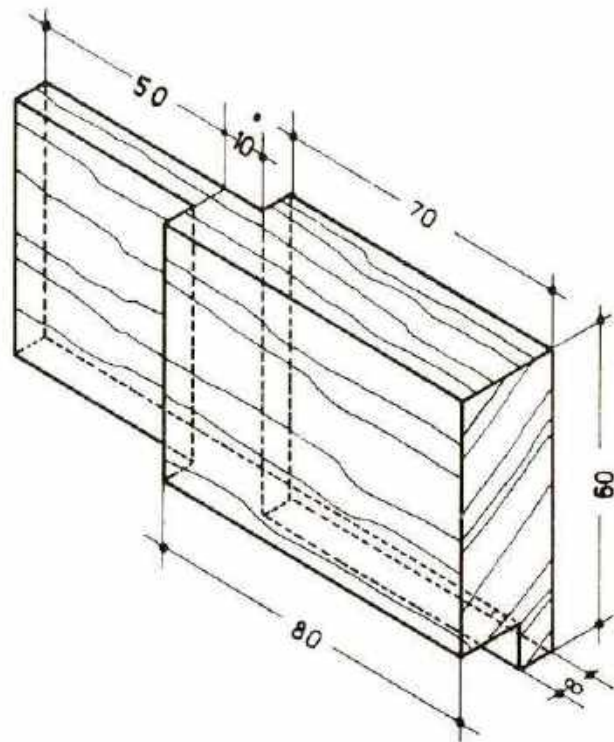
SLIP TENON MORTISE JOINT WITH RABBET



Material

1 piece 150 x 60 x 24

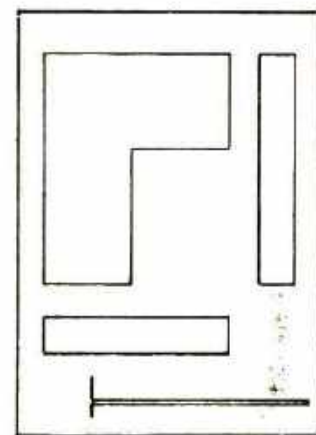
1 piece 130 x 60 x 24



EXERCISE

Draw the front, side and top views in scale 1:1 and show the joint with dashed lines.

Paper size A4

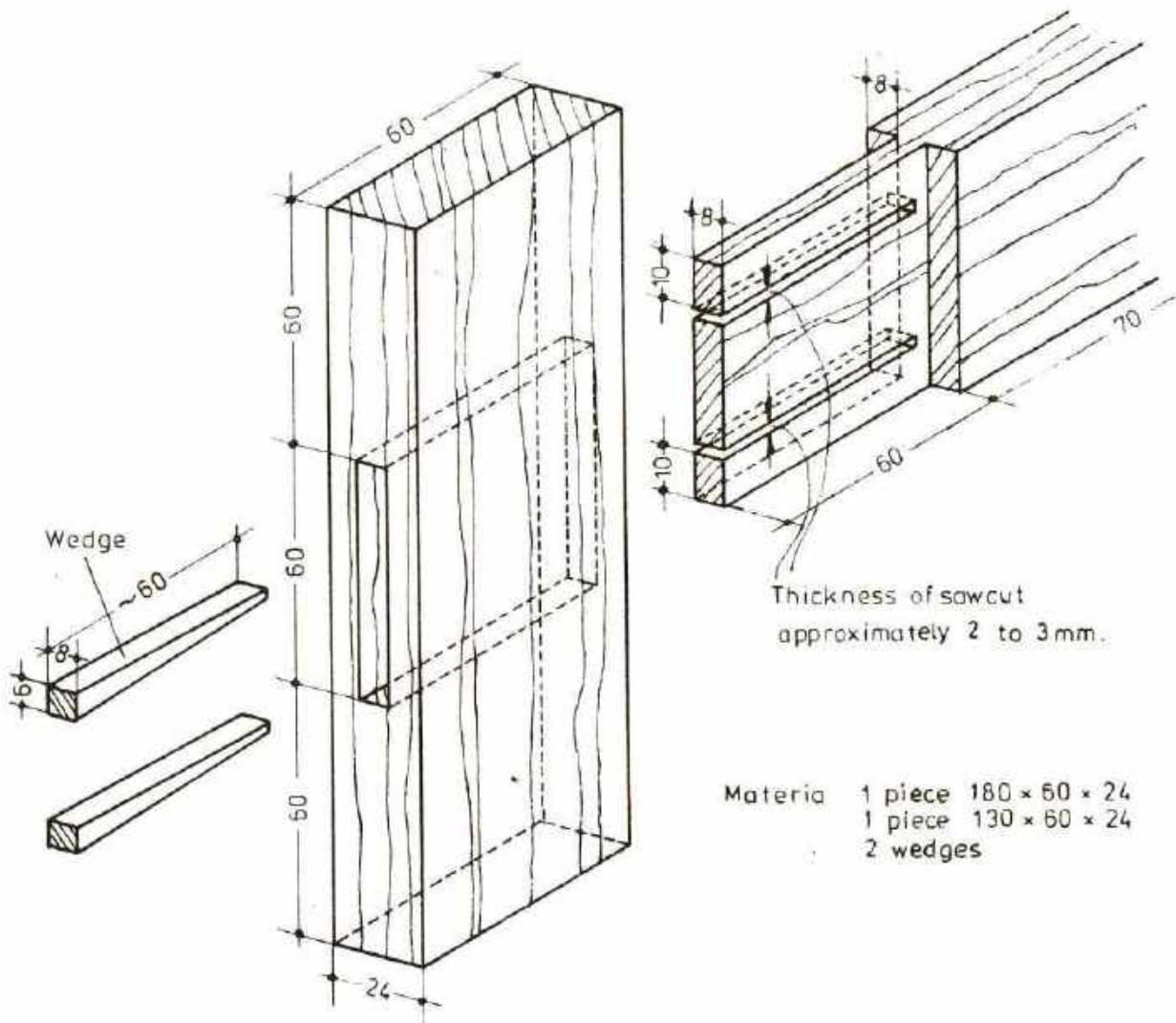


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO.-16
PRACTICAL
EXERCISE
NO. 6

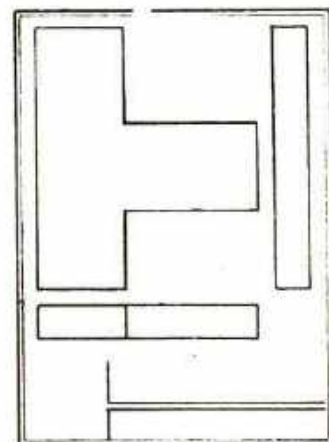
WEDGED TENON AND MORTISE JOINT



EXERCISE :

Draw the front, side and top views in scale 1:1 and show the joint with dashed lines. Enter the dimensions

Paper size A 4

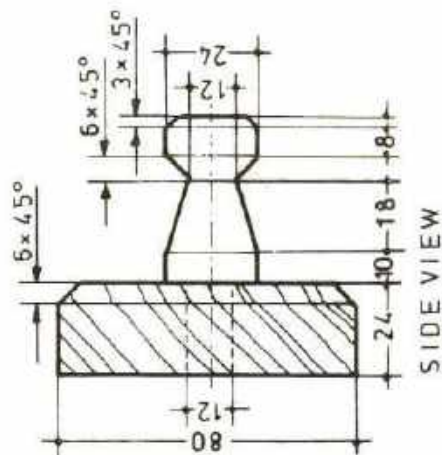


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

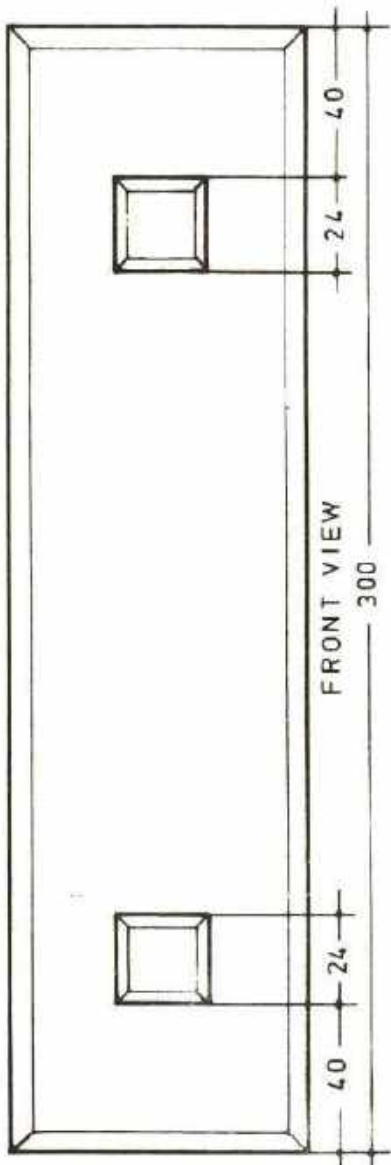
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 17
PRACTICAL
EXERCISE
NO. 7

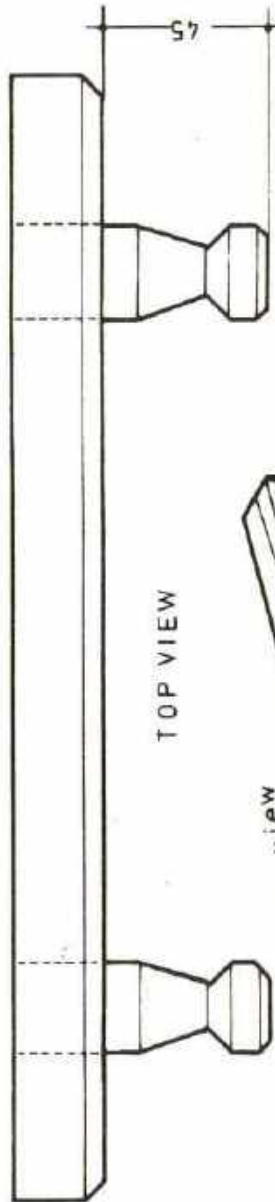
COAT HANGER



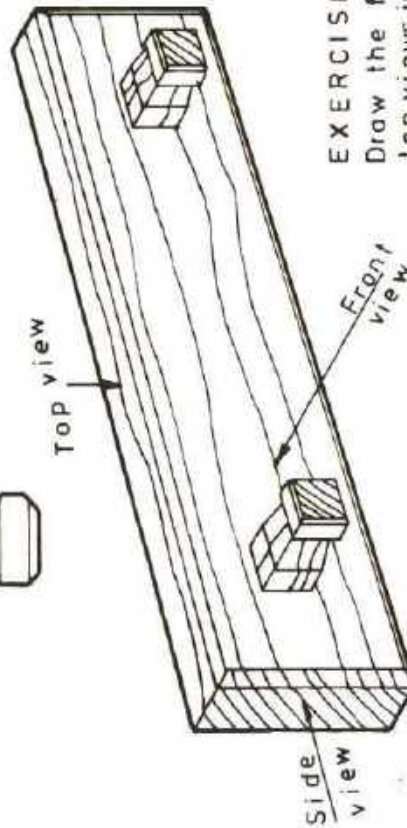
SIDE VIEW



FRONT VIEW



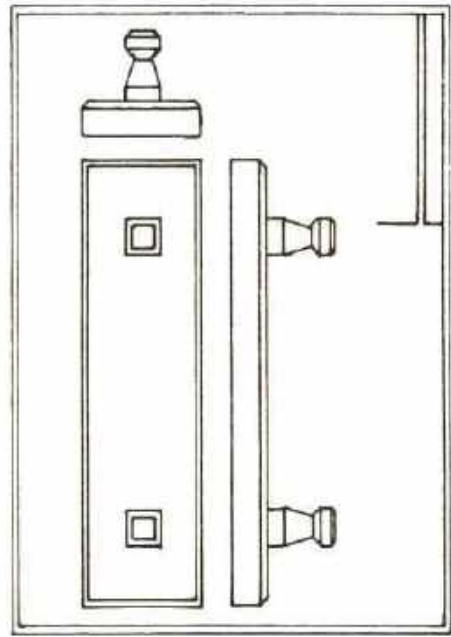
TOP VIEW



SCALE 1:2

MATERIAL:

1 piece 300 x 80 x 24
2 pieces 69 x 24 x 24



EXERCISE :
Draw the front, side and top views in scale 1:1.
Enter all the dimensions.

Paper size A 3



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

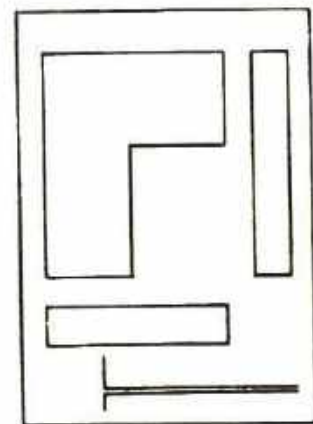
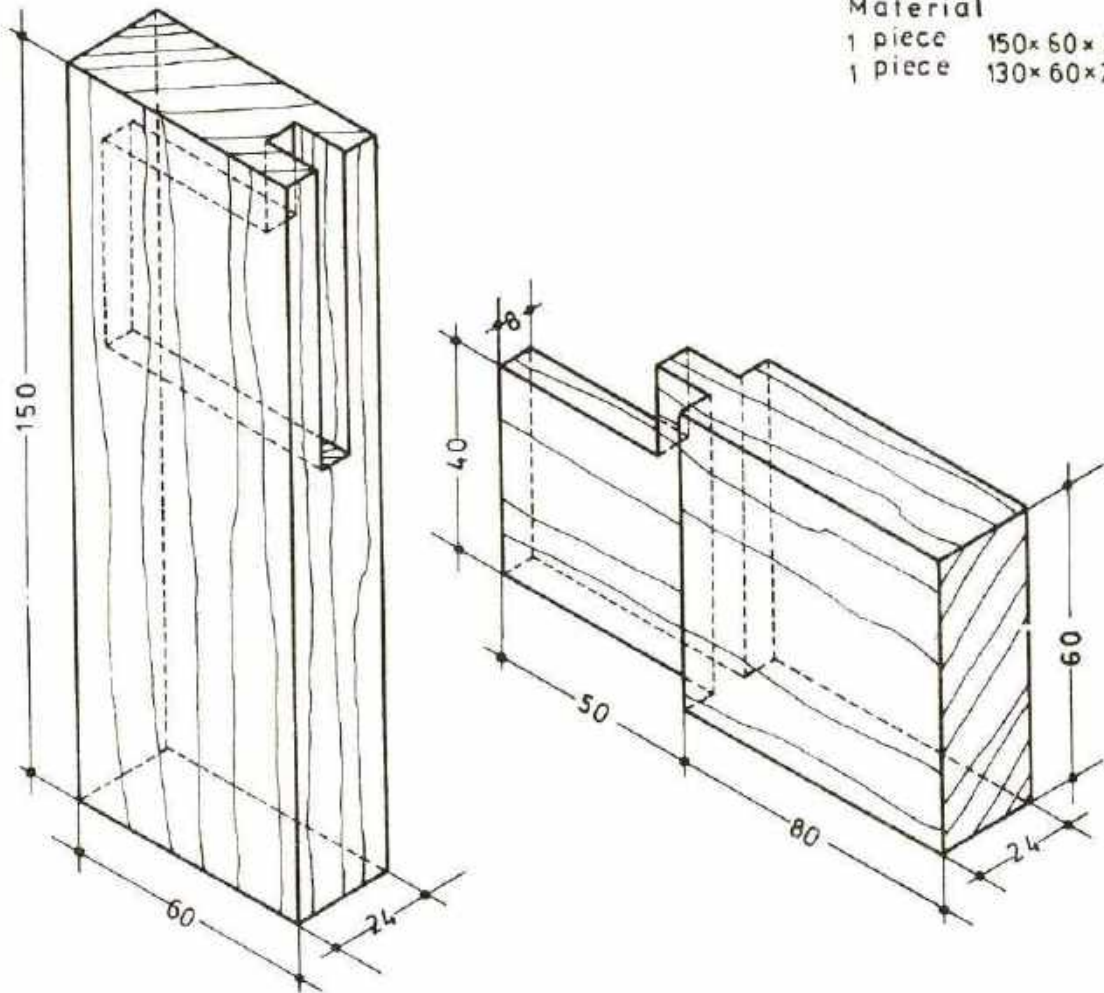
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 18
PRACTICAL
EXERCISE
NO. 8

HAUNCHED MORTISE AND TENON JOINT

Material

1 piece 150×60×24
1 piece 130×60×24



EXERCISE

Draw the front, side and top views
in scale 1:1 and show the joint with
dashed lines.

Paper size A4

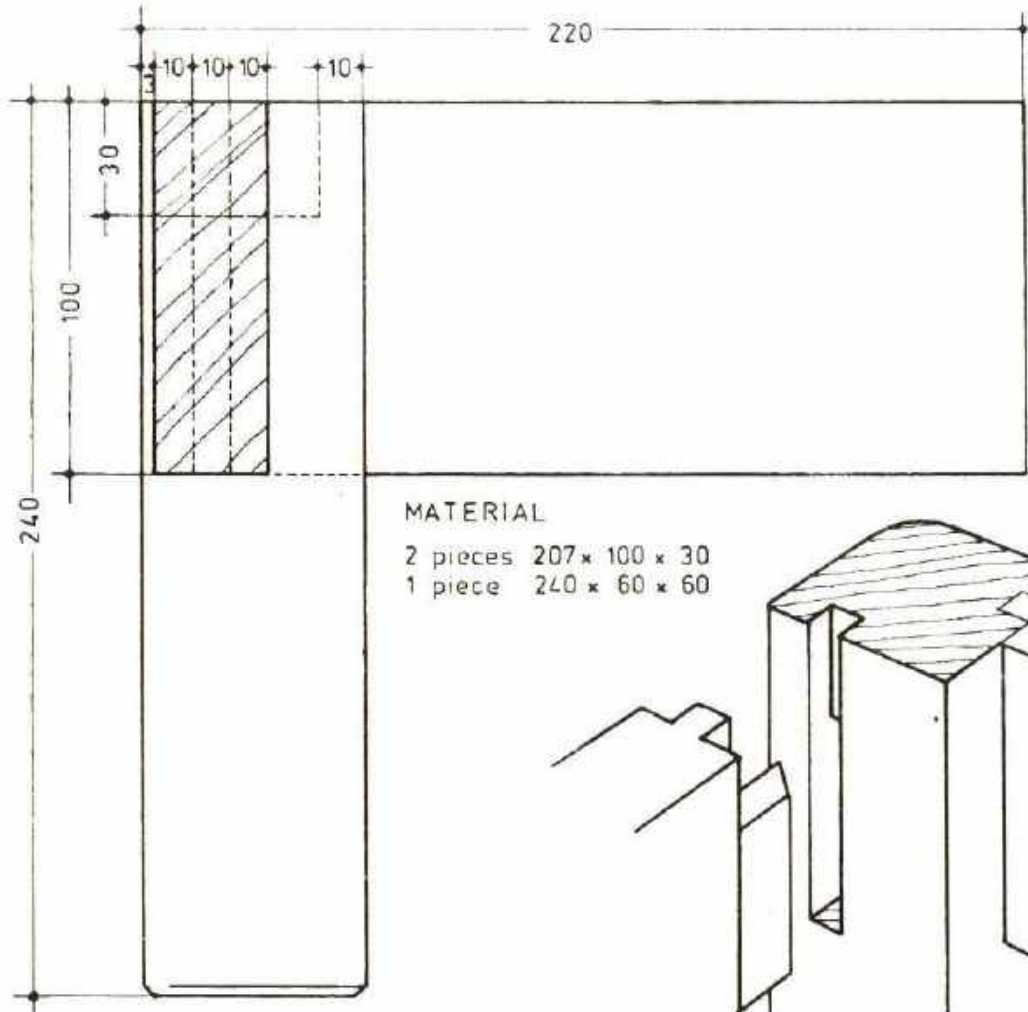


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

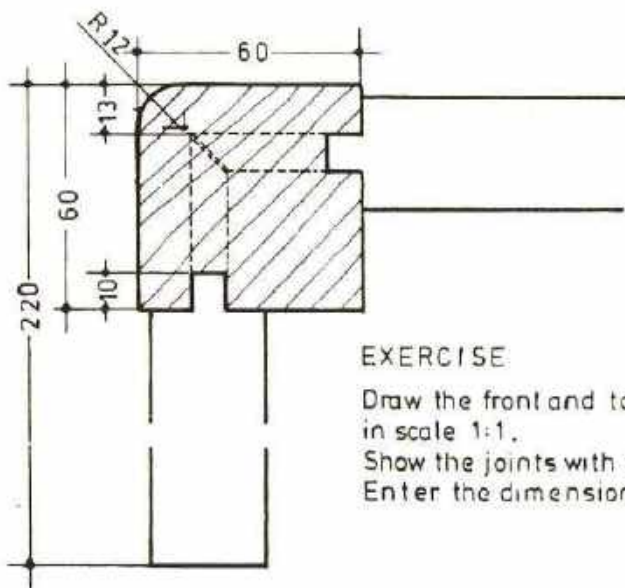
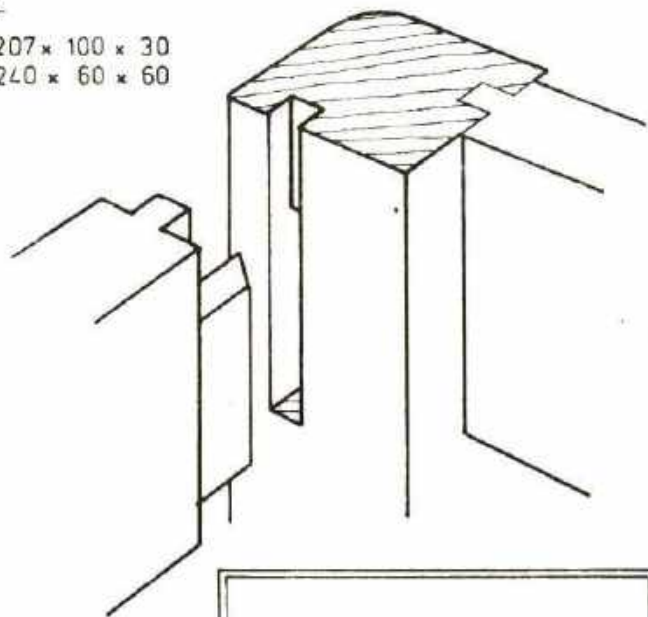
SHEET NO. 19
PRACTICAL
EXERCISE
No. 9

MORTISE AND TENON JOINT



MATERIAL

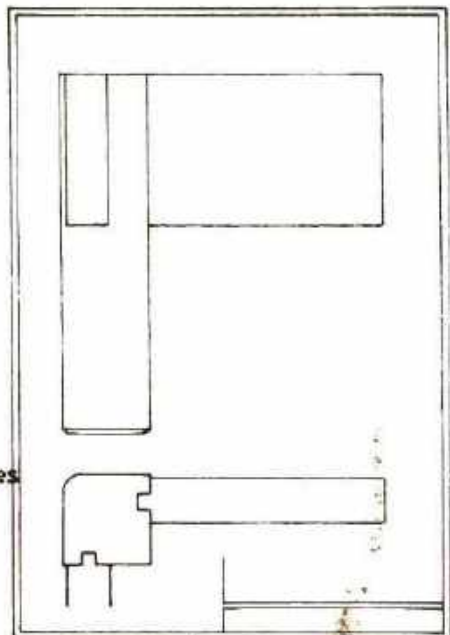
- 2 pieces 207 × 100 × 30
- 1 piece 240 × 60 × 60



EXERCISE

Draw the front and top views
in scale 1:1.
Show the joints with dashed lines.
Enter the dimensions.

Paper size A 3



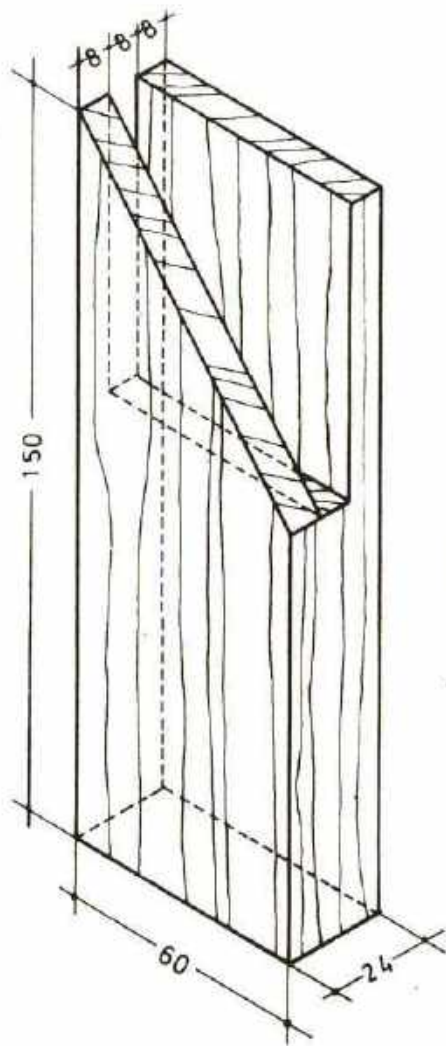
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 20
PRACTICAL
EXERCISE
NO. 10

SLIP TENON MORTISE MITRE JOINT

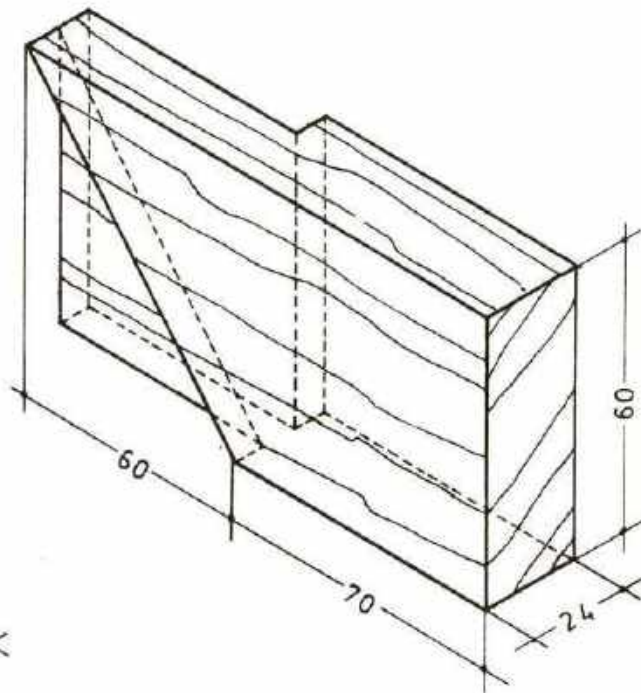
One side mitred only



Material

1 piece 150 × 60 × 24

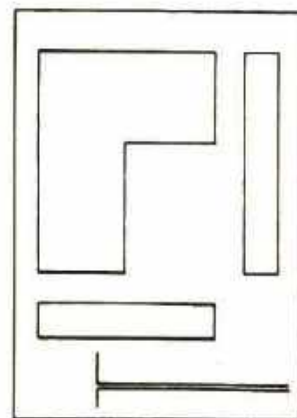
1 piece 130 × 60 × 24



EXERCISE

Draw the front, side and top views in scale 1:1 and show the joint with dashed lines.

Paper size A 4

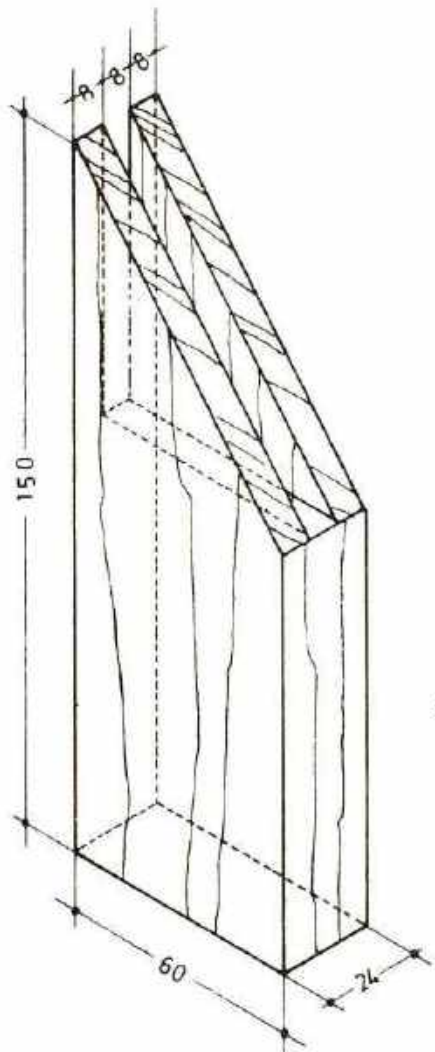


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

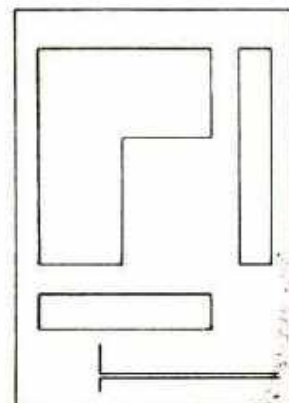
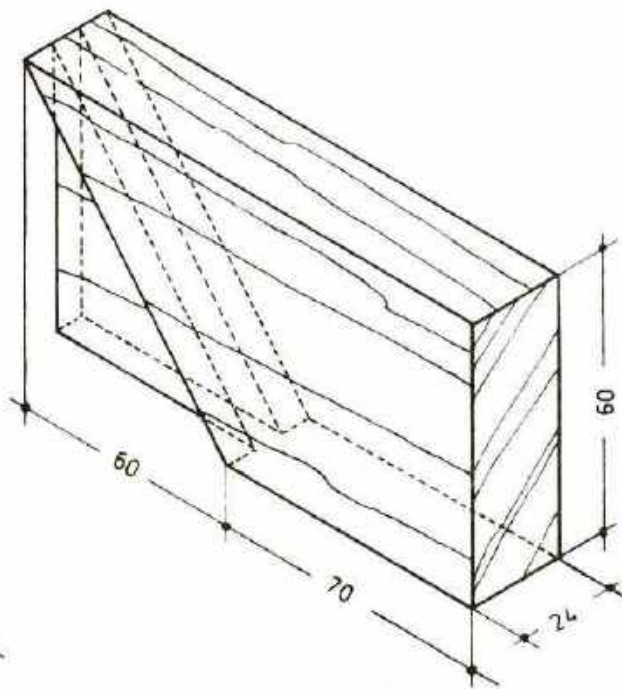
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 21
PRACTICAL
EXERCISE
NO. 11

SLIP TENON MORTISE MITRE JOINT



Material
1 piece 150 x 60 x 24
1 piece 130 x 60 x 24



EXERCISE

Draw the front, side and top views in scale 1:1 and show the joint with dashed lines.

Paper size A4

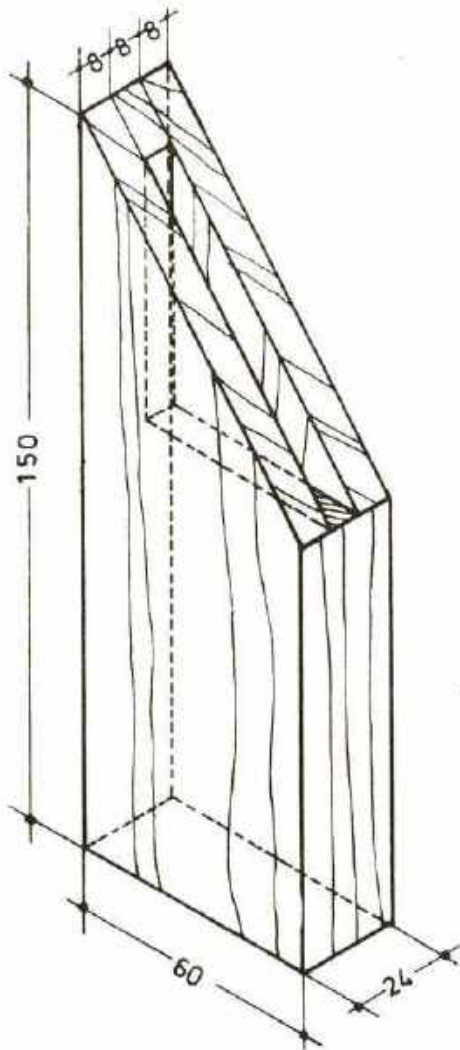


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

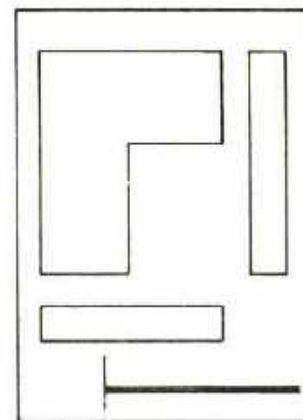
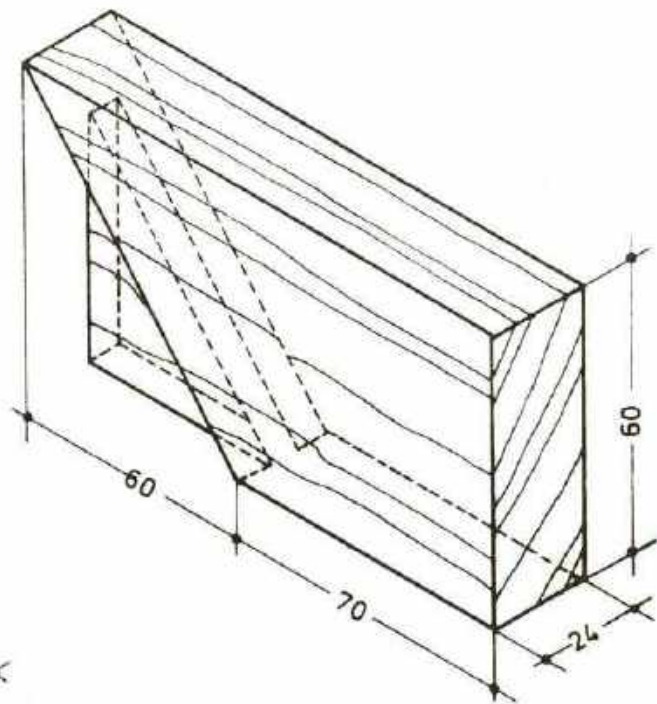
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 22
PRACTICAL
EXERCISE
NO. 12

CLOSED TENON MORTISE MITRE JOINT



Material
1 piece 150 x 60 x 24
1 piece 130 x 60 x 24



EXERCISE

Draw the front side and top views
in scale 1:1 and show the joint with
dashed lines.

Paper size A4

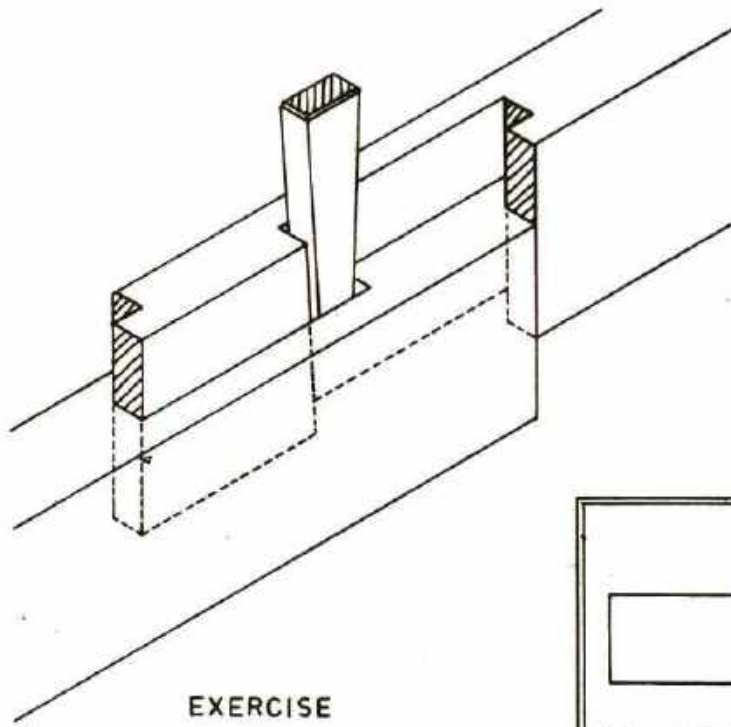
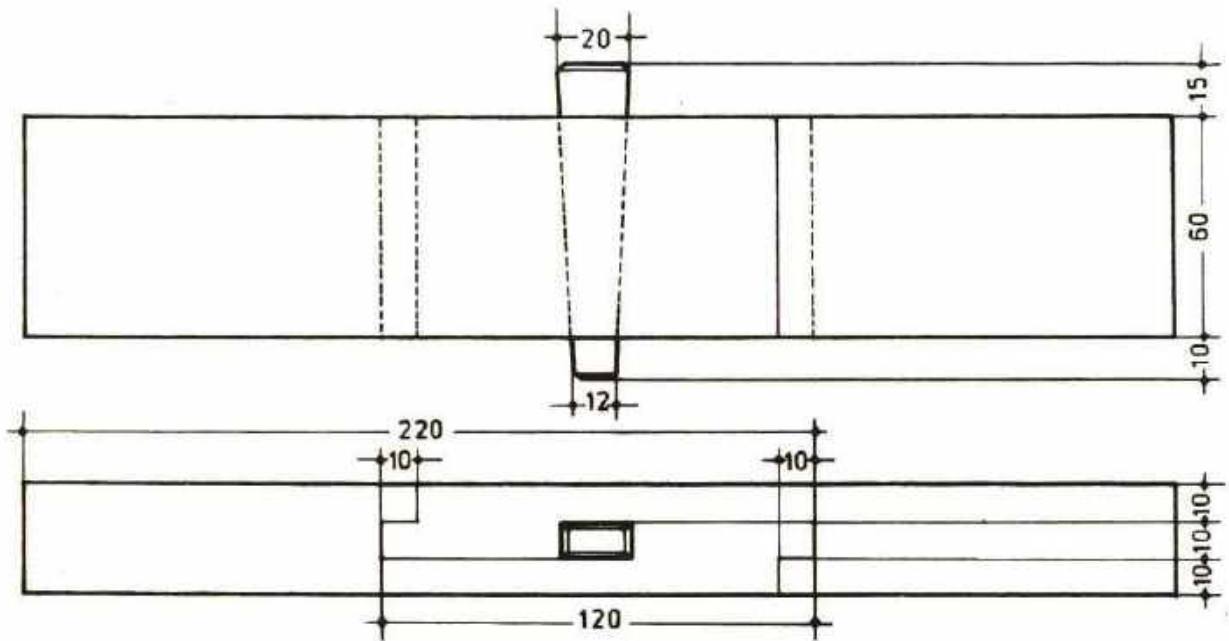


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

Part GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 23
PRACTICAL
EXERCISE
NO. 13

FRENCH LAPPED WEDGE JOINT



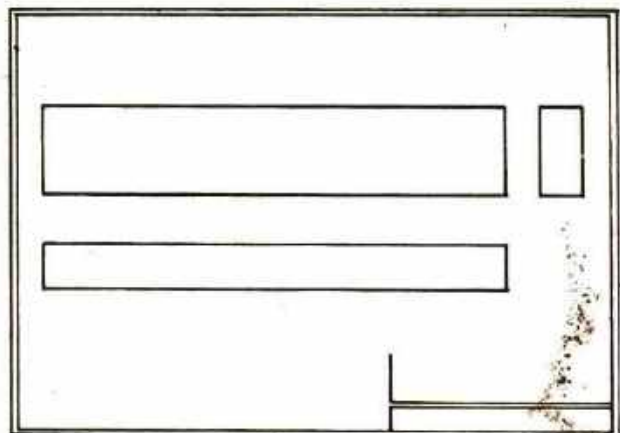
MATERIAL :

2 pieces 220 x 60 x 30
1 piece 85 x 20 x 10

EXERCISE

Draw the front side and top views in scale 1:1.
Enter the measurements.

Paper size A 3

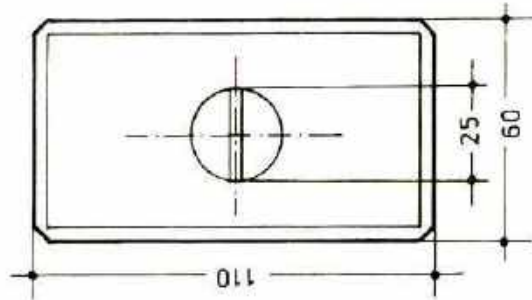


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

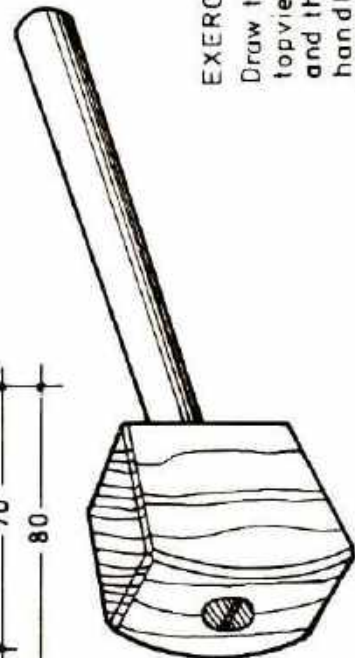
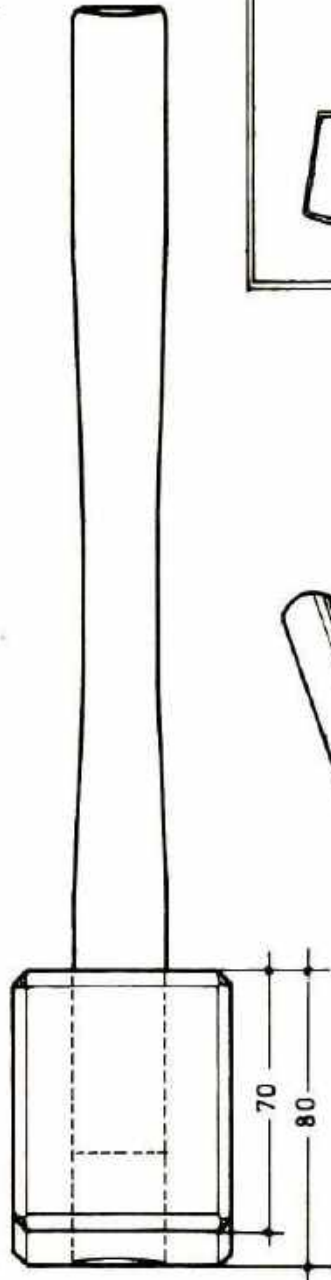
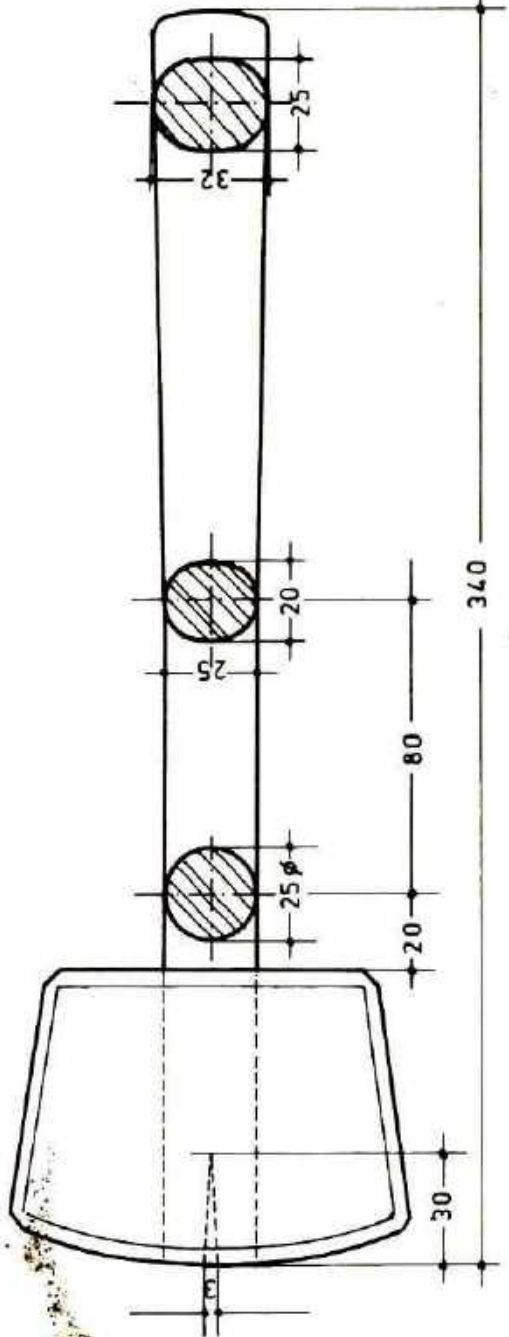
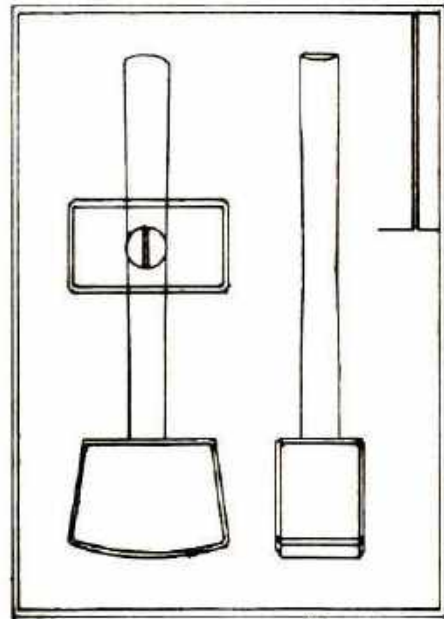
SHEET NO. 24
PRACTICAL
EXERCISE
NO. 14

MALLET



SCALE 1:2

Material :
1 piece 340 x 32 x 25
1 piece 110 x 80 x 60



EXERCISE :
Draw the front side and
top views of the above object
and the sections of the
handle in scale 1:1.
Enter all dimensions.
Paper size A 3



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 25
PRACTICAL
EXERCISE
NO. 15

OPEN DOVETAELS (with 3 tails)

How to find the number of tails and pins ?

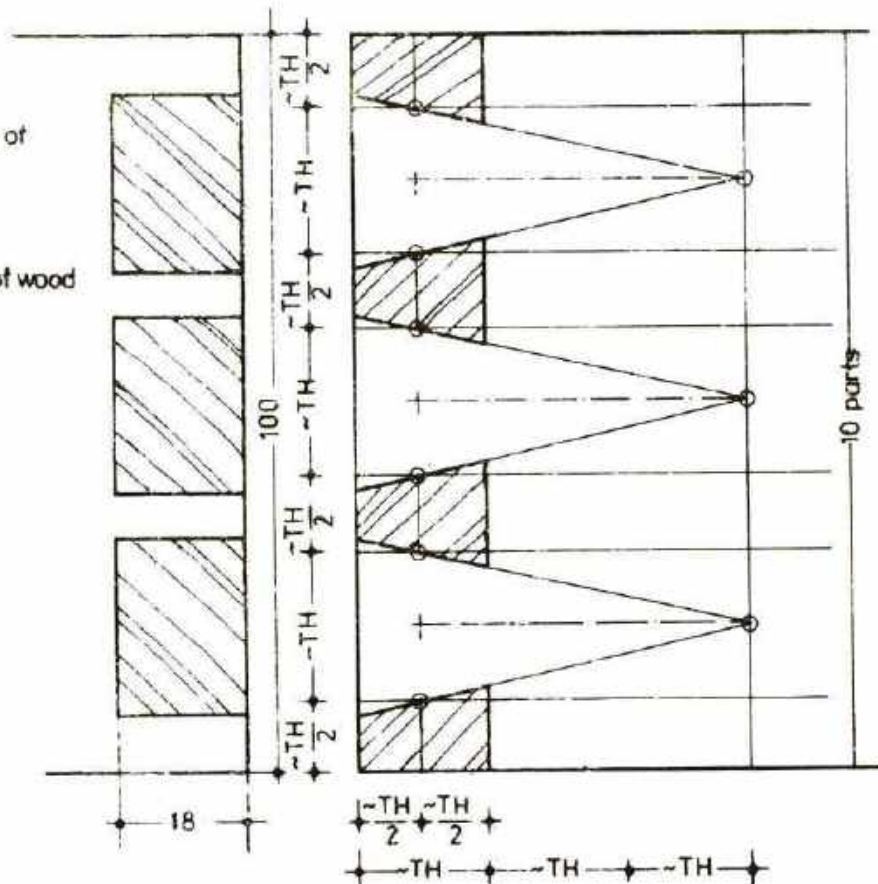
Number of tails = $\frac{\text{width of wood}}{3 \times \text{half of the thickness of wood}}$

Sample :

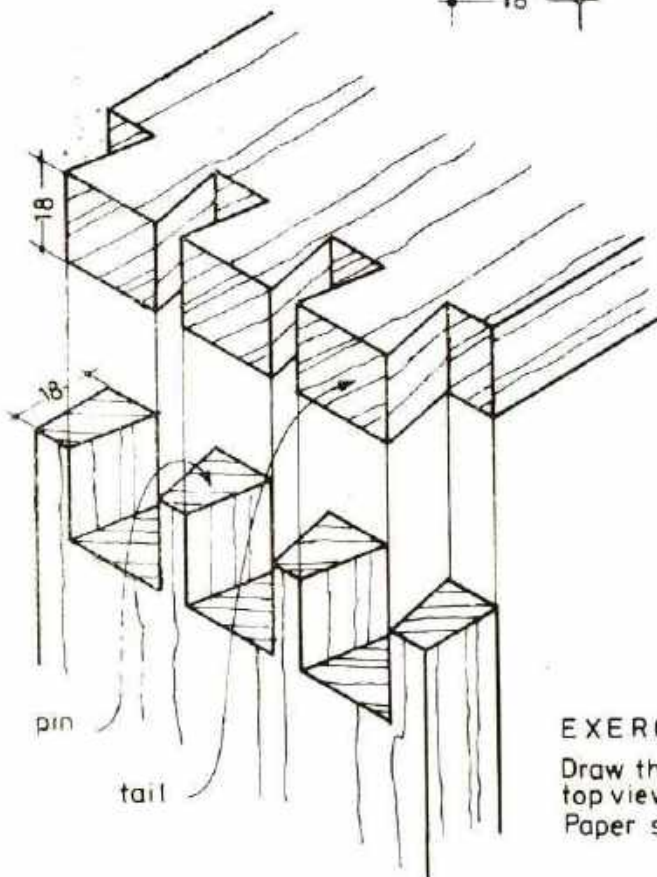
$$\frac{100}{3 \times 9} = 3.7$$

= 3 or 4 tails

Number of pins = Number of tails + 1

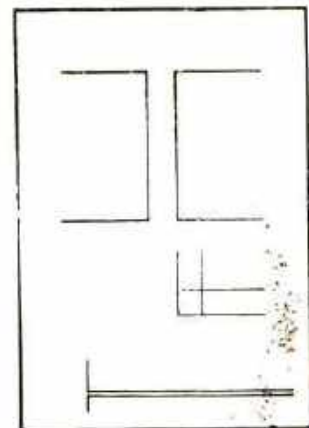


~ TH = Approximate thickness of wood.



Material :

2 Pcs. 160 × 100 × 18



EXERCISE :

Draw the front, side and top views in scale 1:1.

Paper size A4

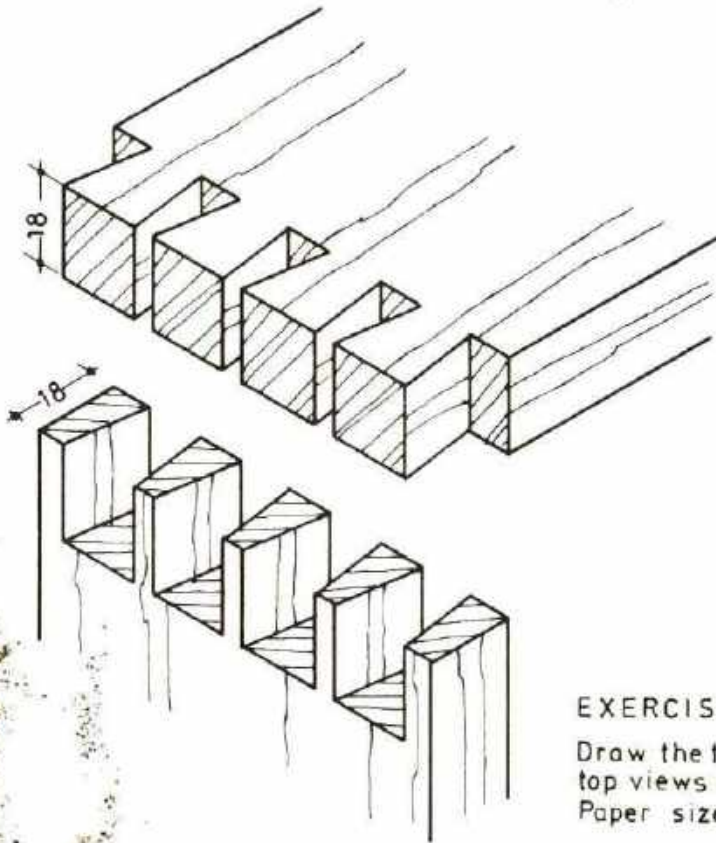
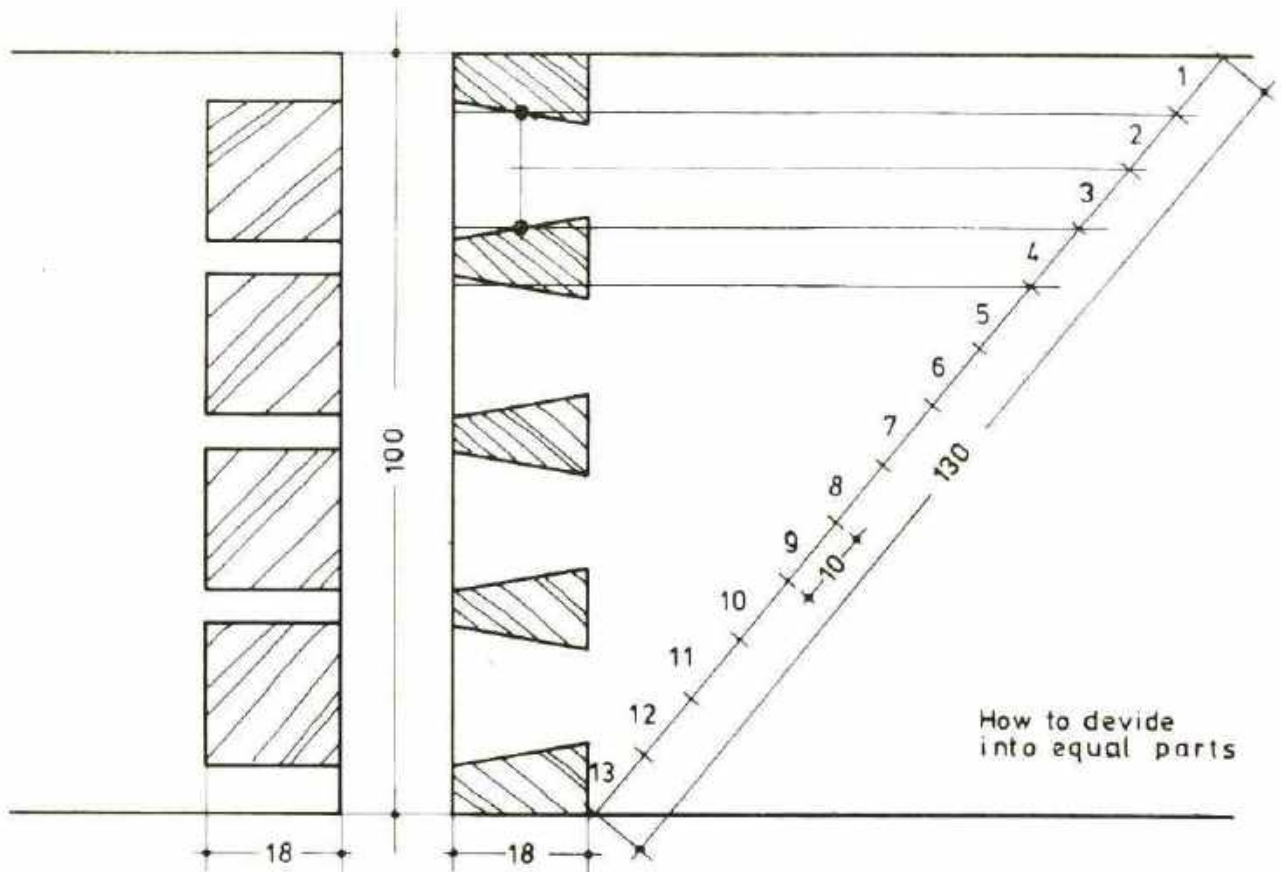


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

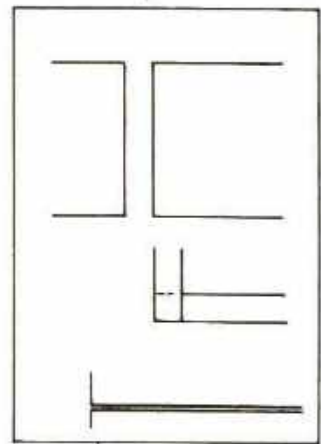
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 26
PRACTICAL
EXERCISE
NO. 16

OPEN DOVETAILES (with 4 tails)



Material
2 Pcs. 160 x 100 x 18



EXERCISE

Draw the front, side and top views in scale 1:1.
Paper size A4.

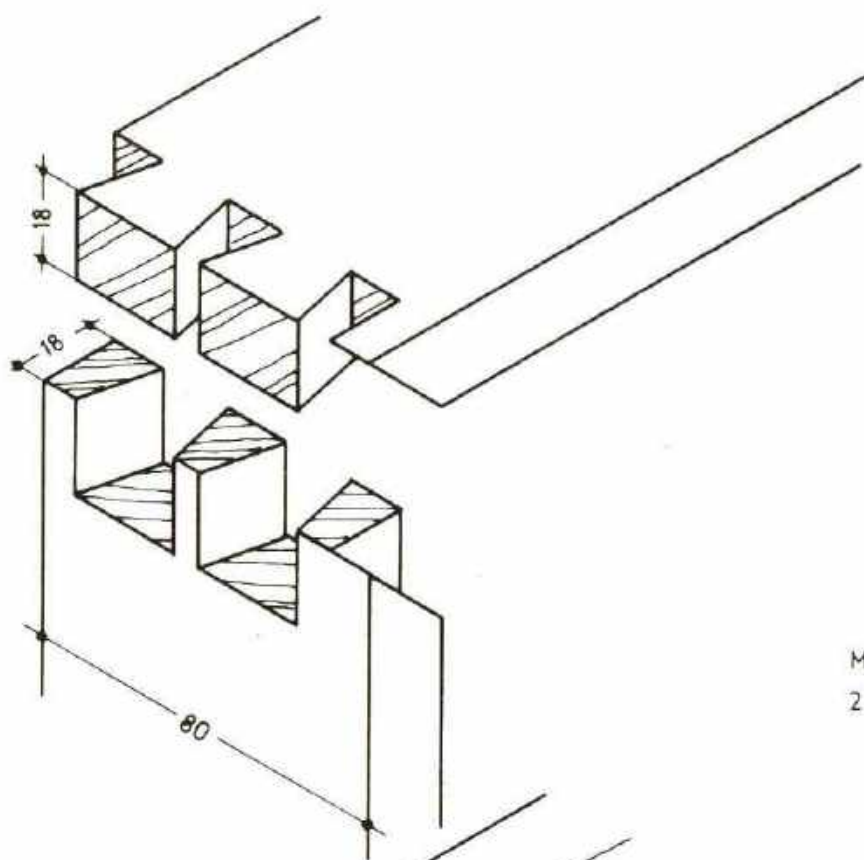


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

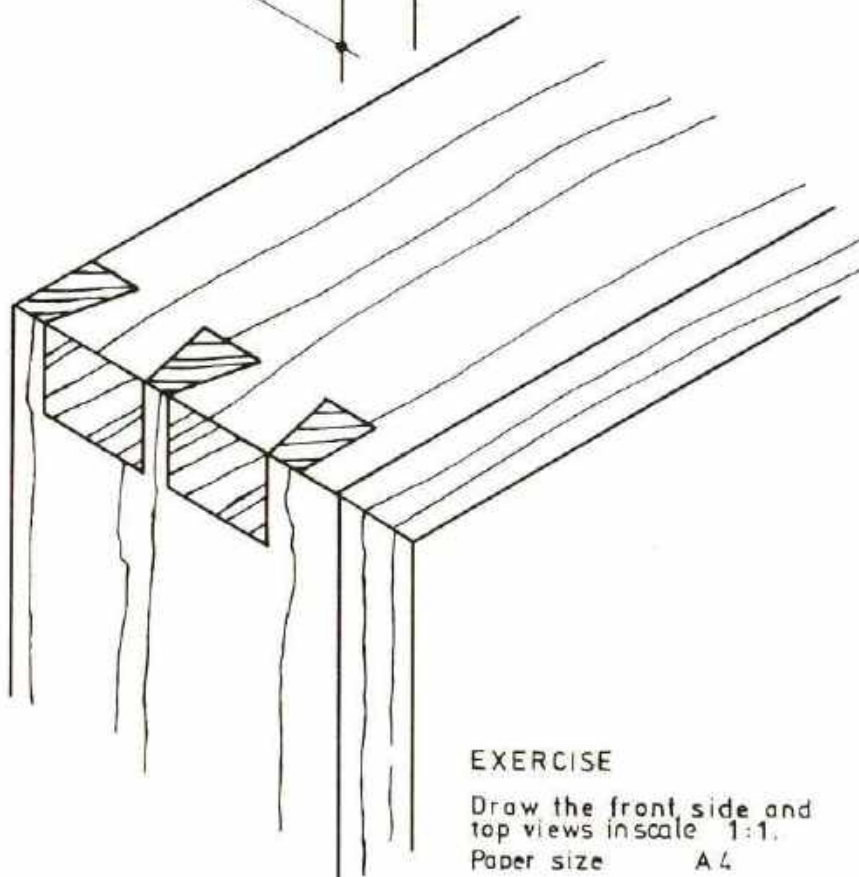
SHEET NO. 27
PRACTICAL
EXERCISE
NO. 17

OPEN DOVETAILED (with 2 tails, front edge mitre joint)



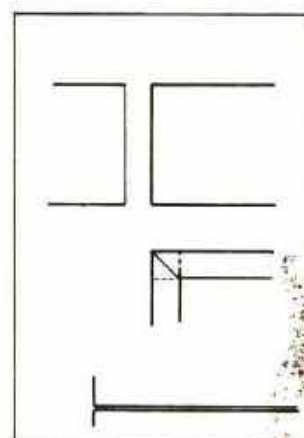
Material

2 Pcs.: 160 × 80 × 18



EXERCISE

Draw the front side and top views in scale 1:1.
Paper size A4



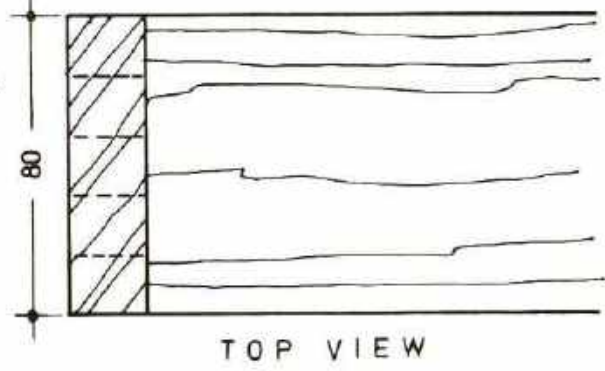
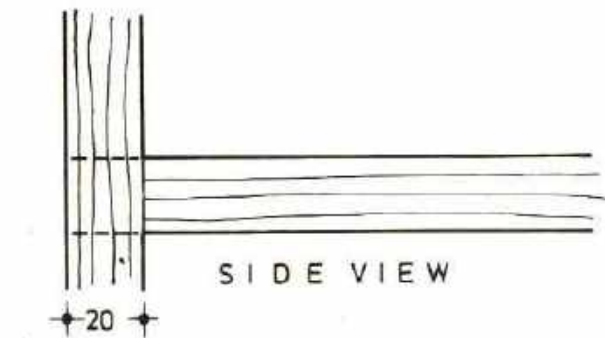
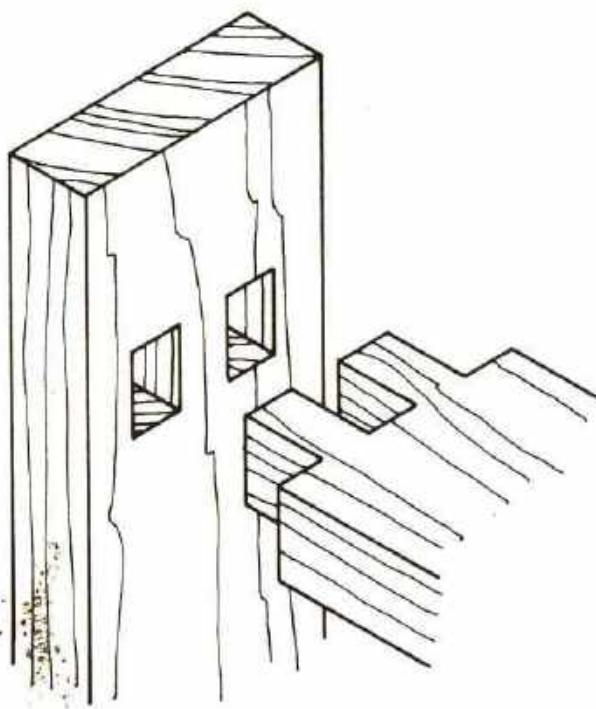
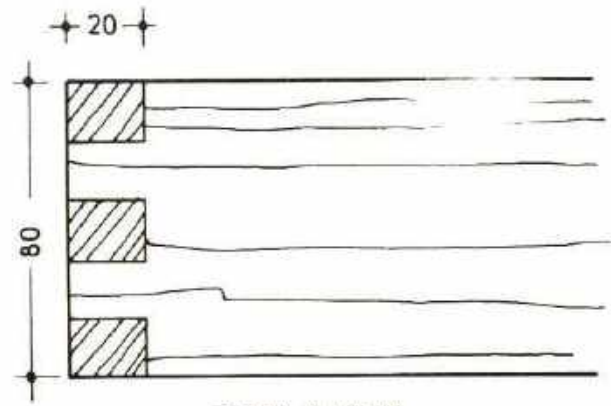
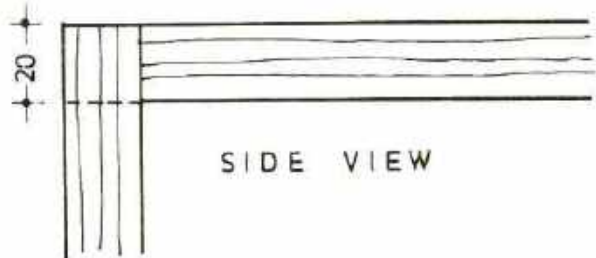
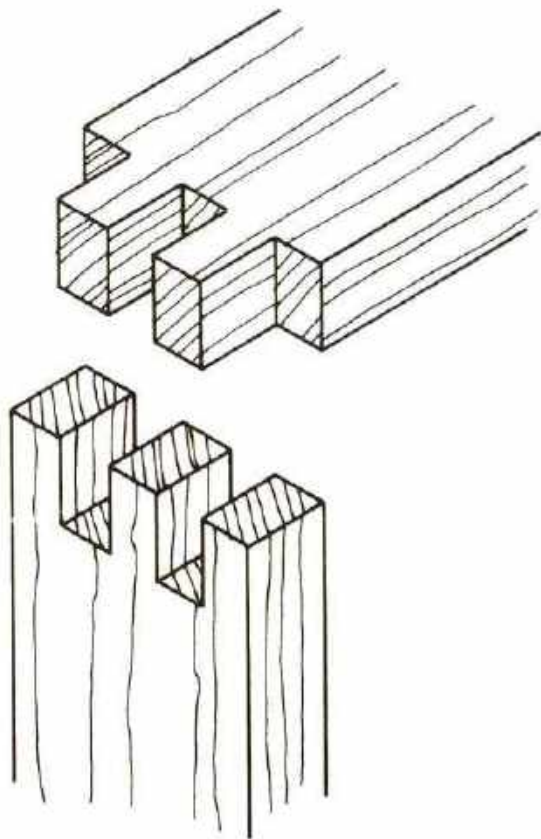
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

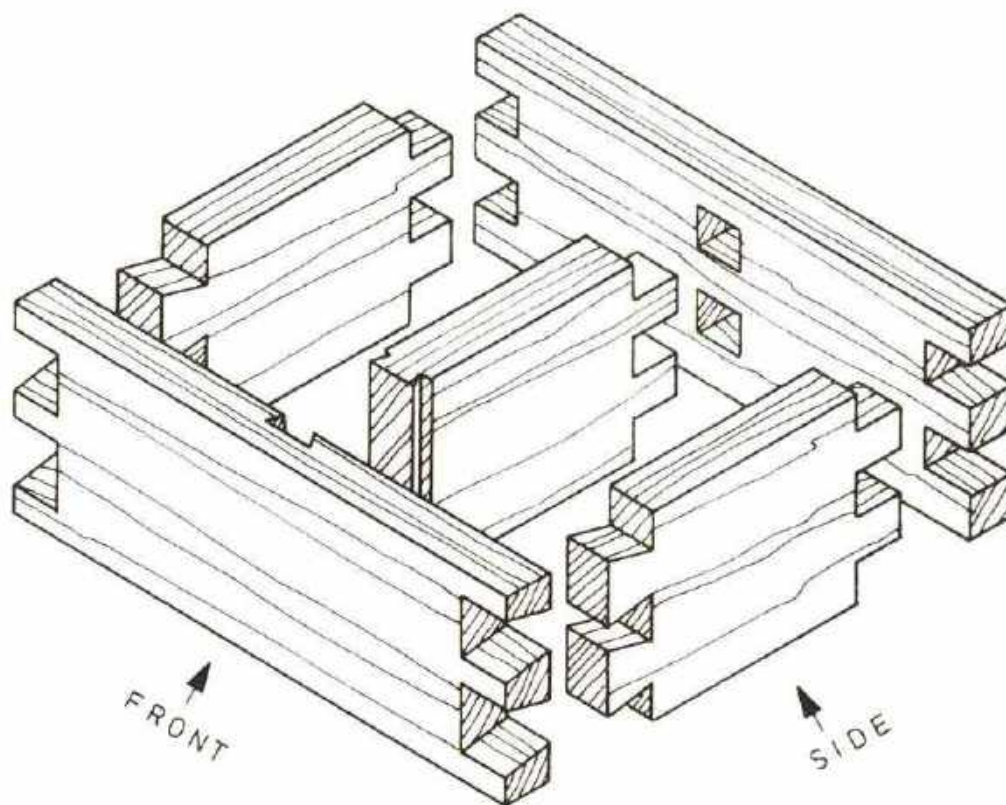
SHEET NO. 28
PRACTICAL
EXERCISE
NO. 18

ANGLE JOINTS

(Double tenon)



ANGLE JOINTS



Outside dimensions of the frame

200 × 140 × 80
thickness of wood : 20

EXERCISE :

Produce a technical drawing of the above shown frame.

Draw the front, side and top views in scale 1:1.

Show the joints with dashed lines.

Give all the dimensions for details of the different joints, see page nos. 26, 29, 33

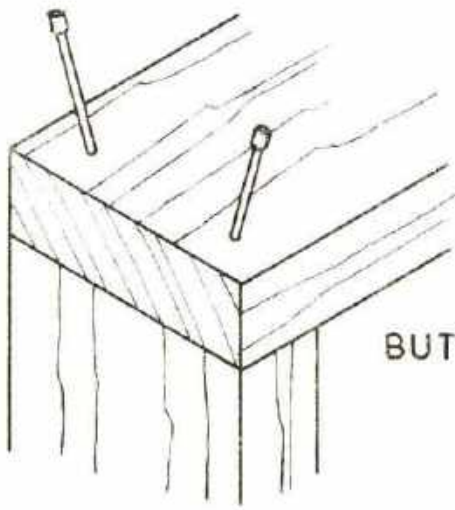
Prepare the material list.

Paper size A 3

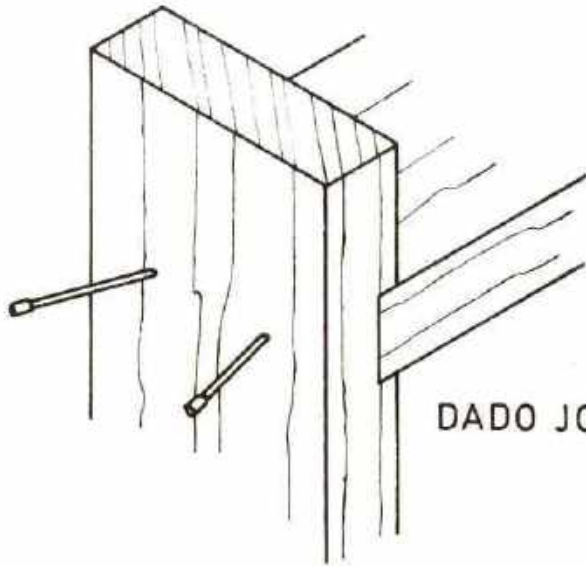
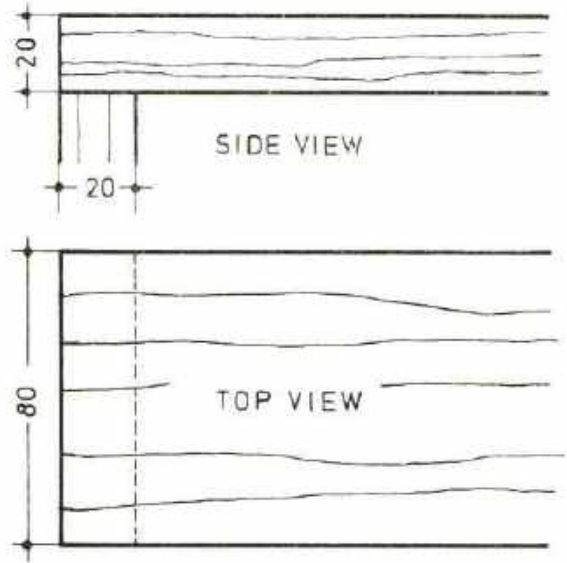
<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 80%; height: 80%; margin: 0 auto;"></div> </div> <div style="border: 1px solid black; padding: 5px;"> <div style="border: 1px solid black; width: 80%; height: 80%; margin: 0 auto; display: flex; justify-content: space-around;"> <div style="border: 1px solid black; width: 40%; height: 40%;"></div> <div style="border: 1px solid black; width: 40%; height: 40%;"></div> </div> </div>	<p>Material Pos. : L × W × Th</p> <hr style="width: 100%;"/>



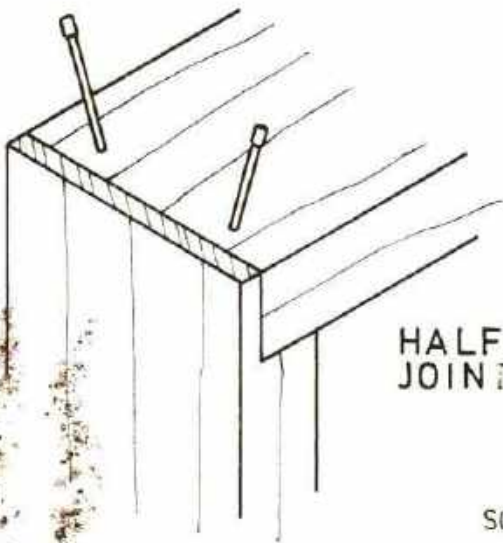
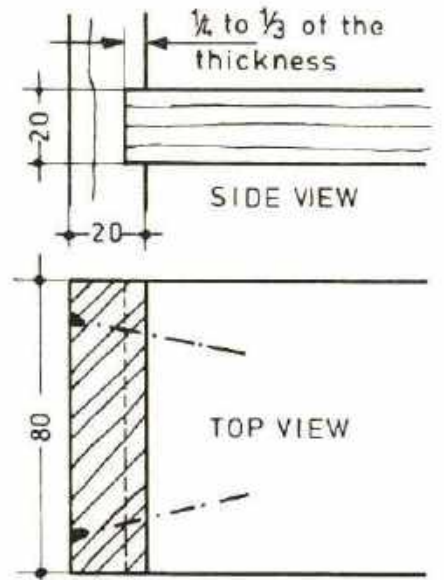
ANGLE JOINTS (Nailed)



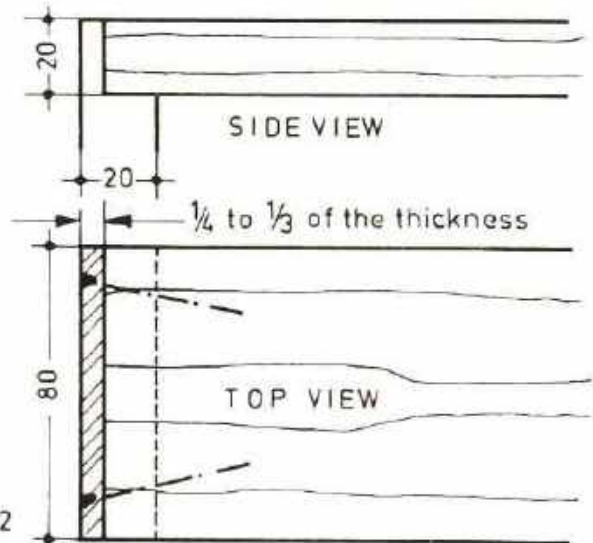
BUTT JOINT



DADO JOINT



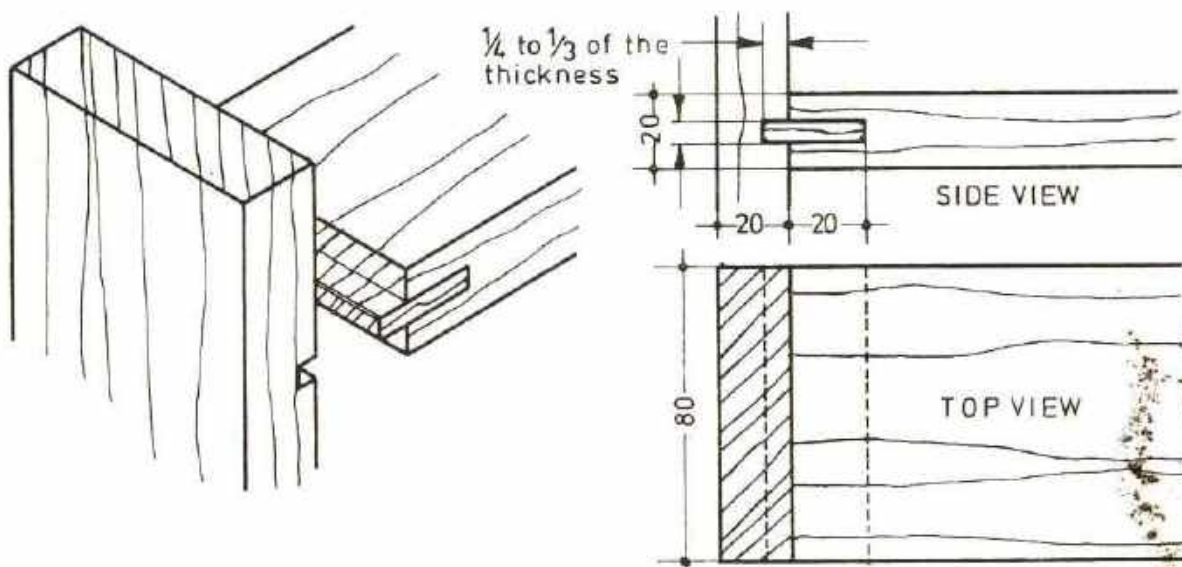
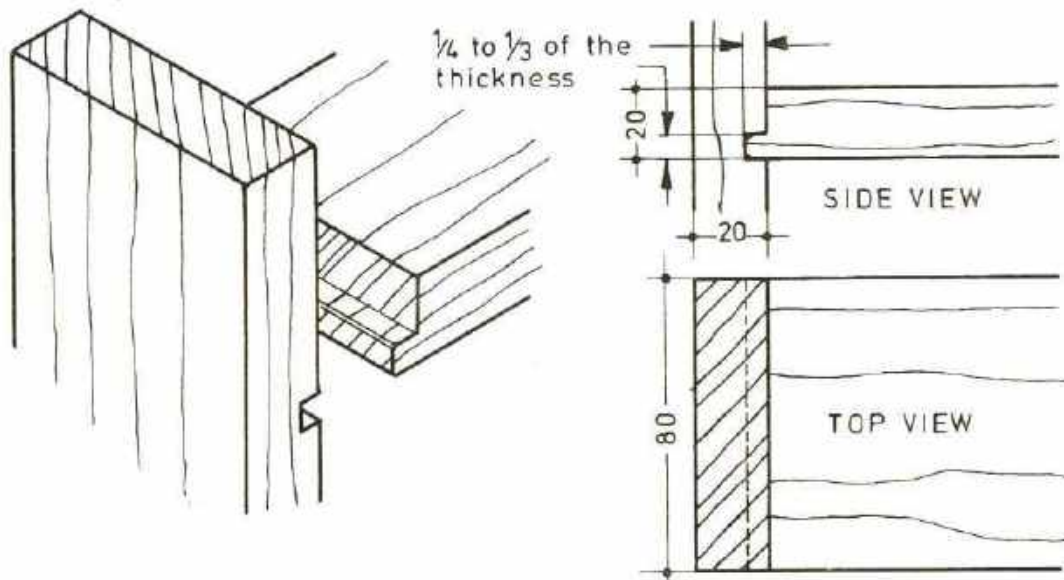
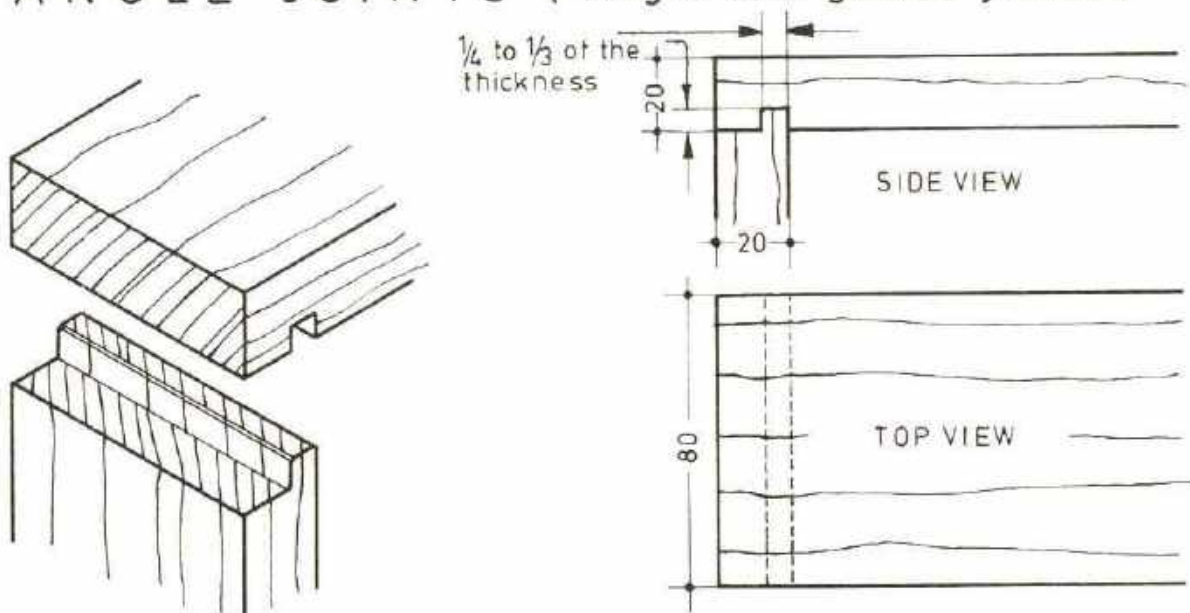
HALF LAP JOINT



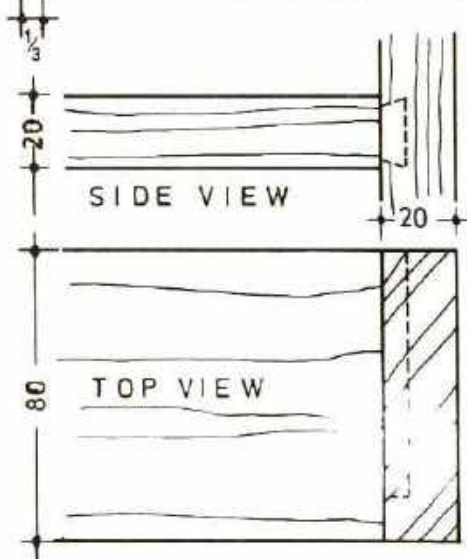
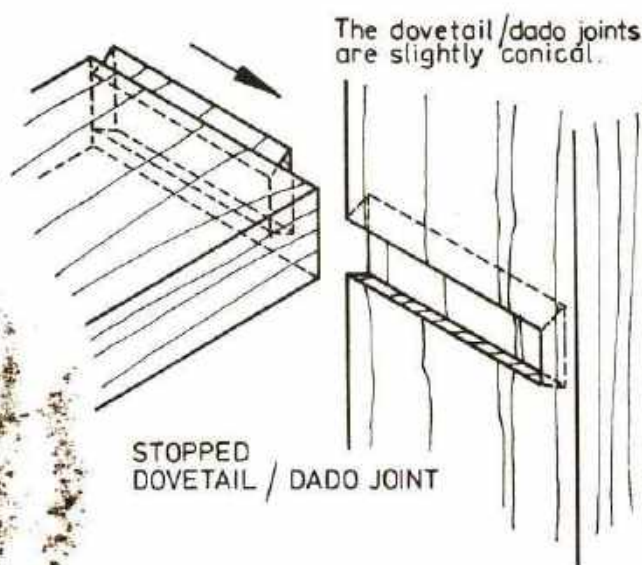
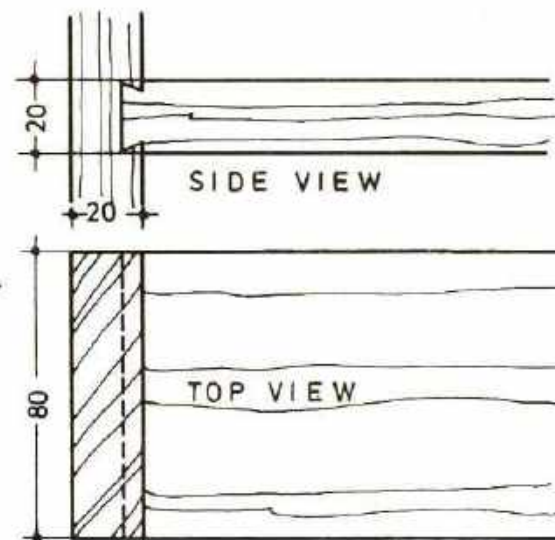
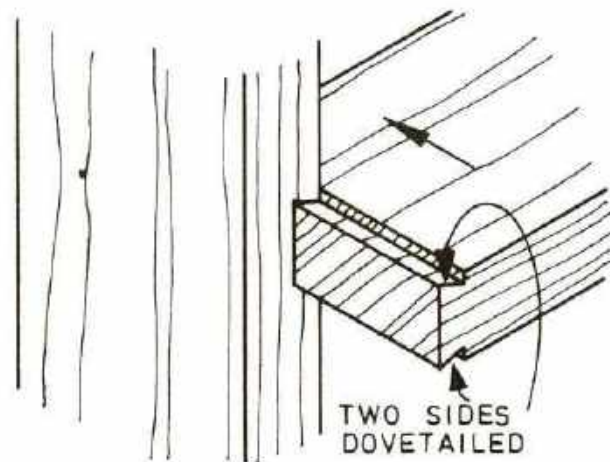
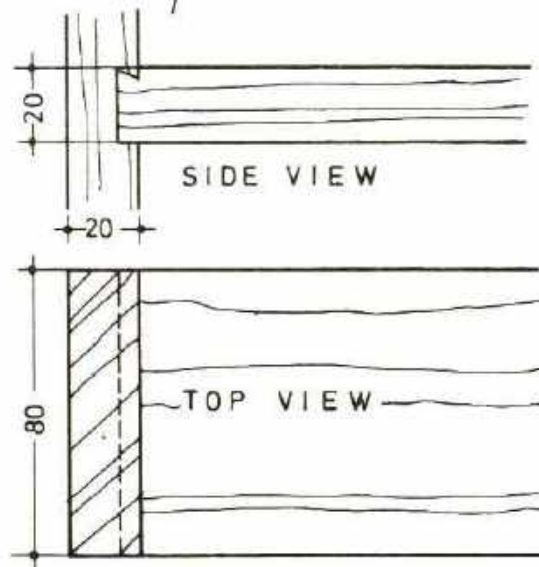
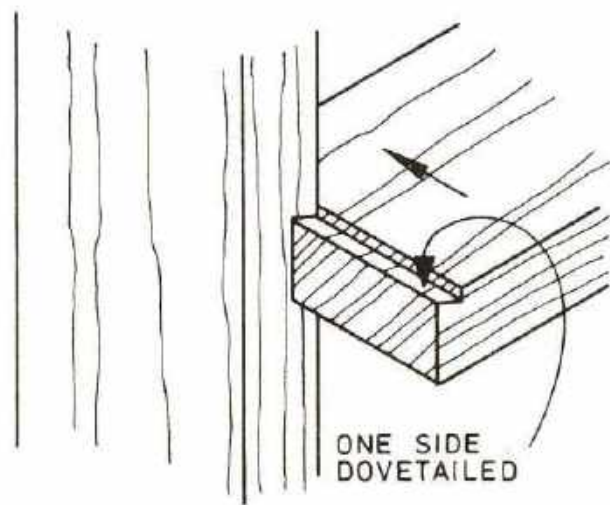
SCALE 1:2



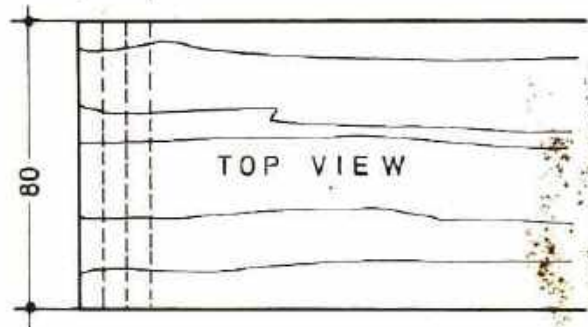
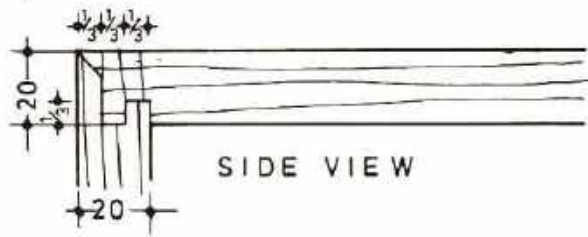
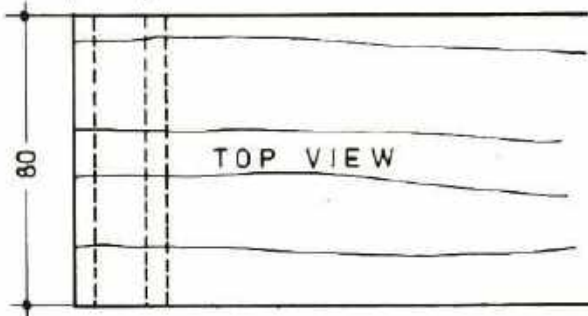
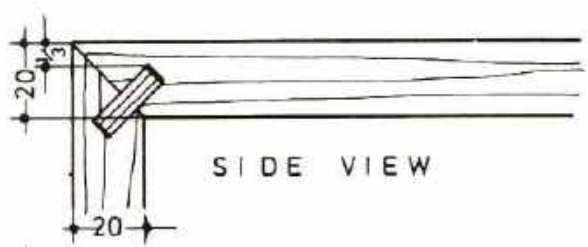
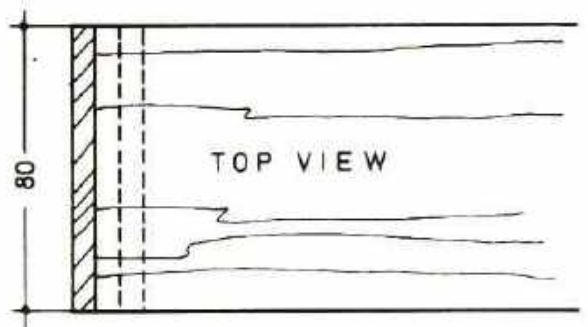
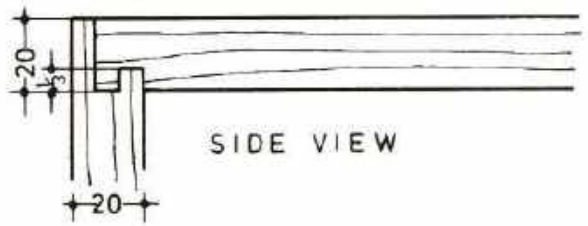
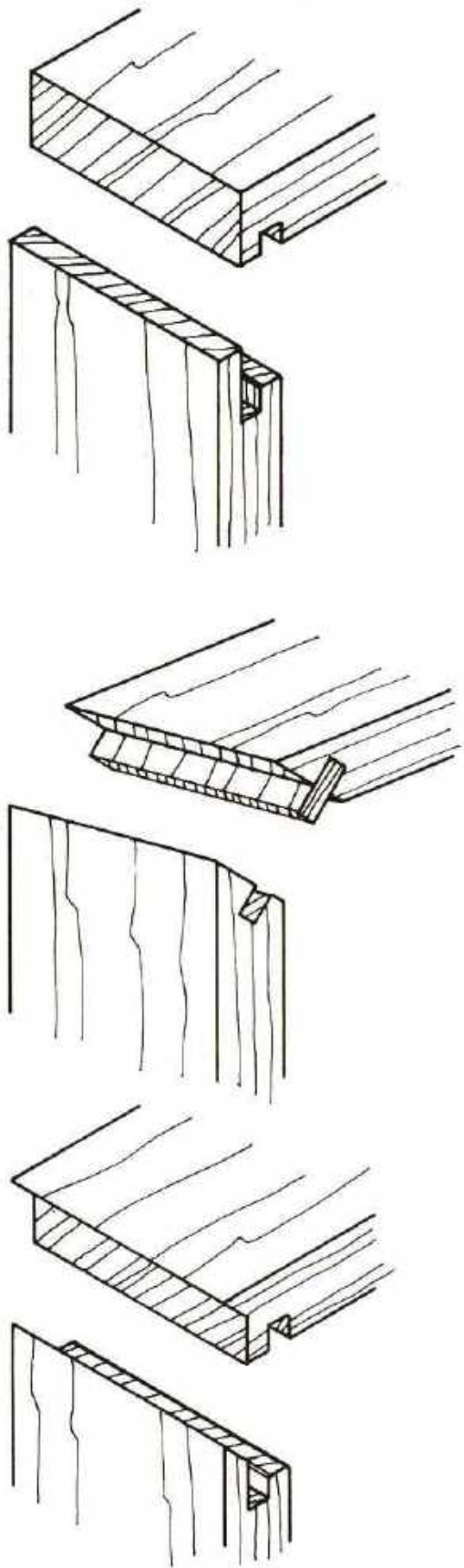
ANGLE JOINTS (Tongue and groove joints)



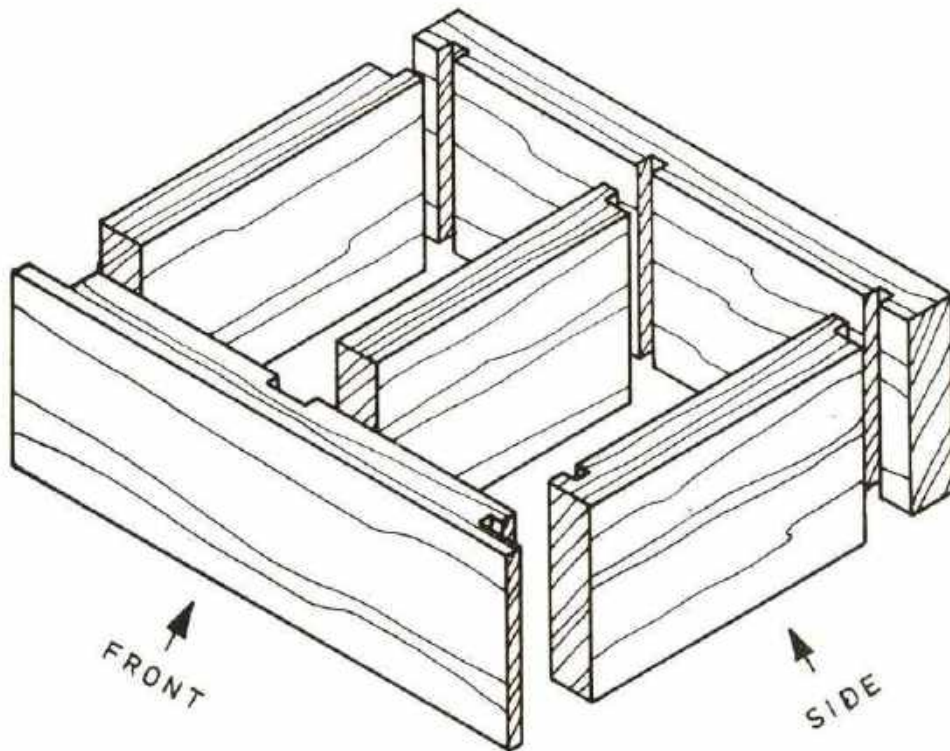
ANGLE JOINTS (Dovetail / Dado Joints)



ANGLE JOINTS (Tongue and groove joints)



ANGLE JOINTS



Outside dimension of the frame

200 140 80
thickness of wood: 20

EXERCISE :

Produce a technical drawing of the above shown frame.

Draw the front, side and top views in scale 1:1

Show the joints with dashed lines.

Give all the dimensions for details of different joints, see page nos. 31, 32, 34.

Prepare the material list.

Material -
Pcs: L x W x Th

Paper size A 3

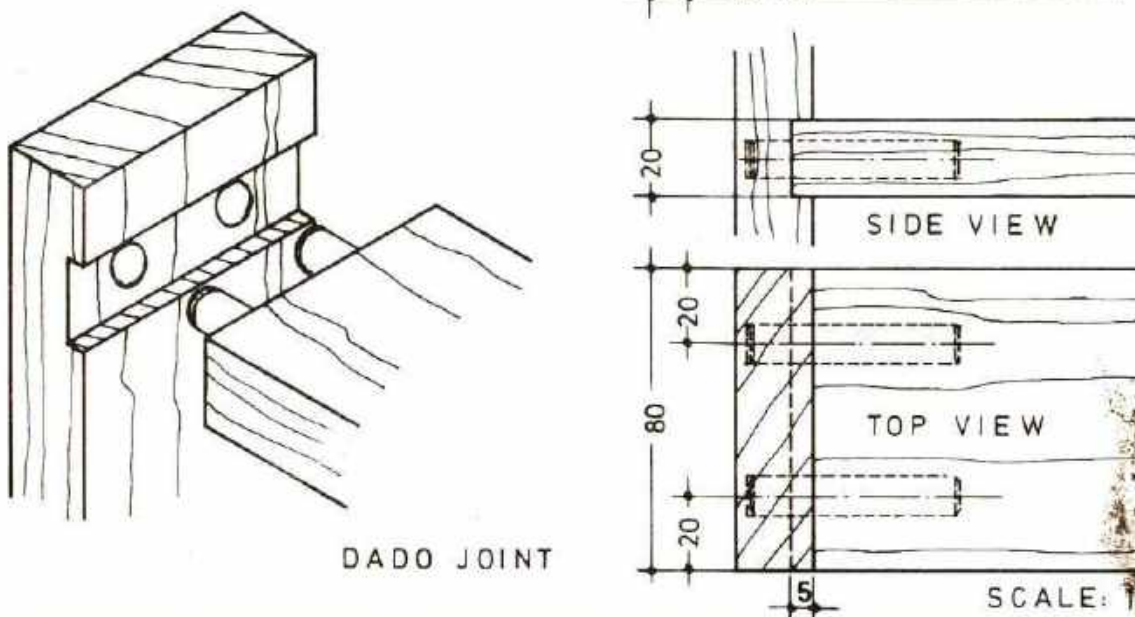
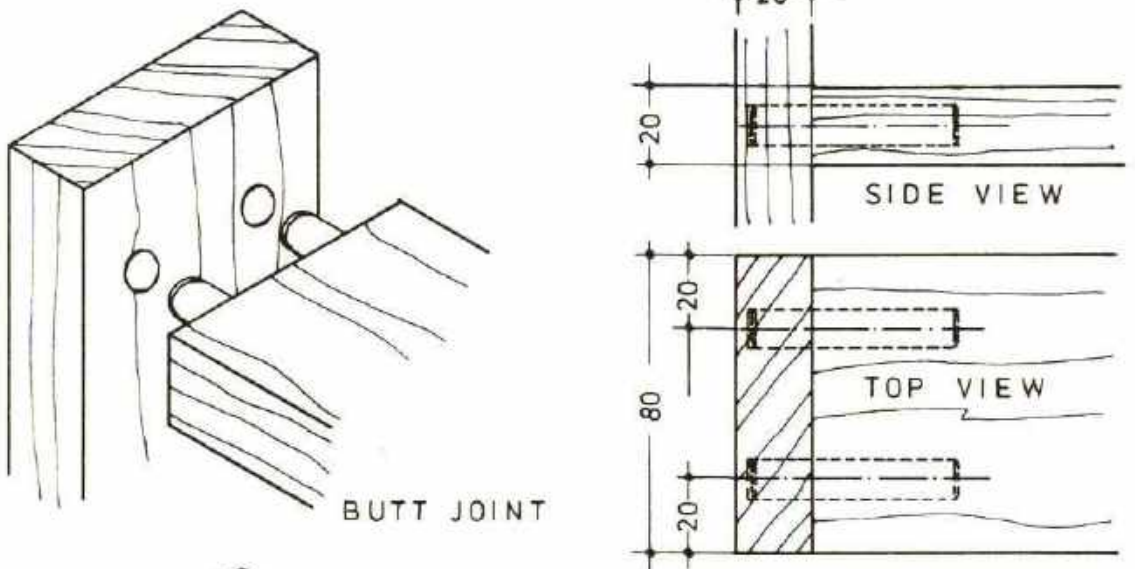
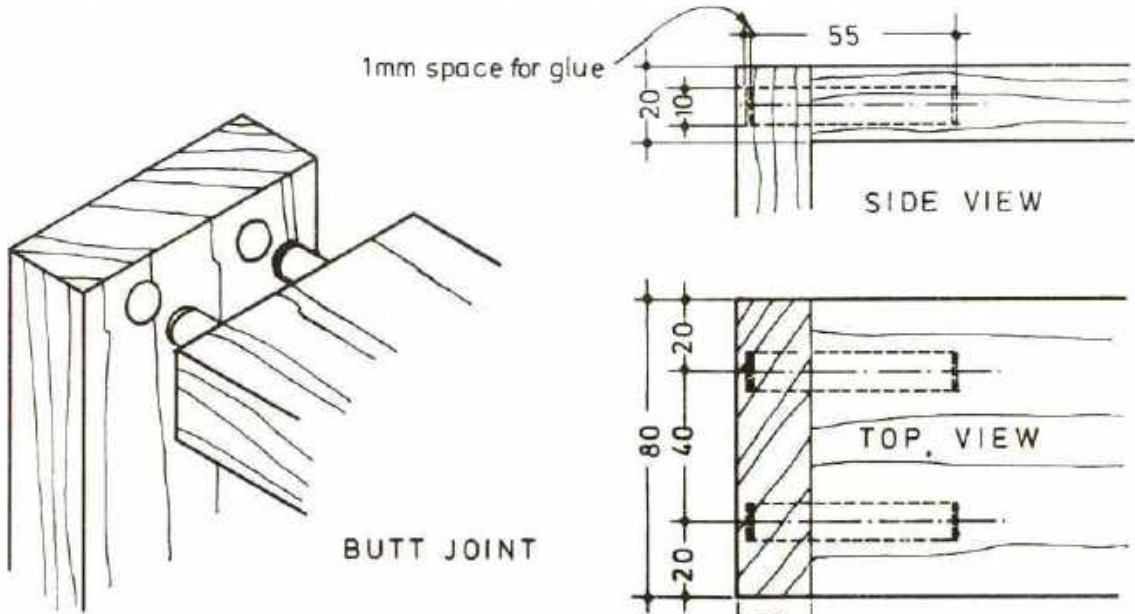


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 35
PRACTICAL
EXERCISE
NO. 20

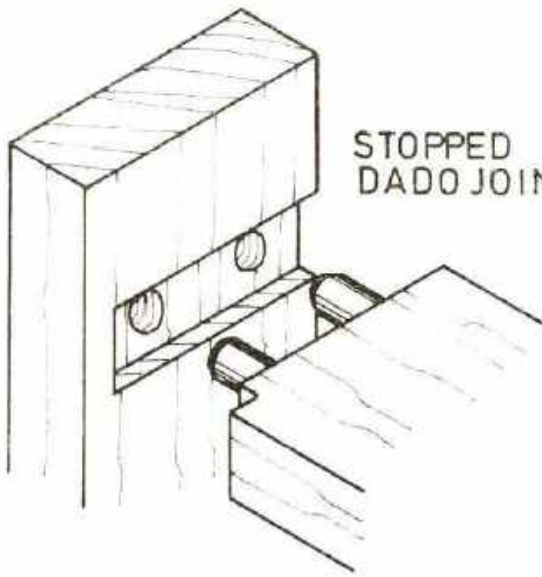
ANGLE JOINTS (Dowelled)



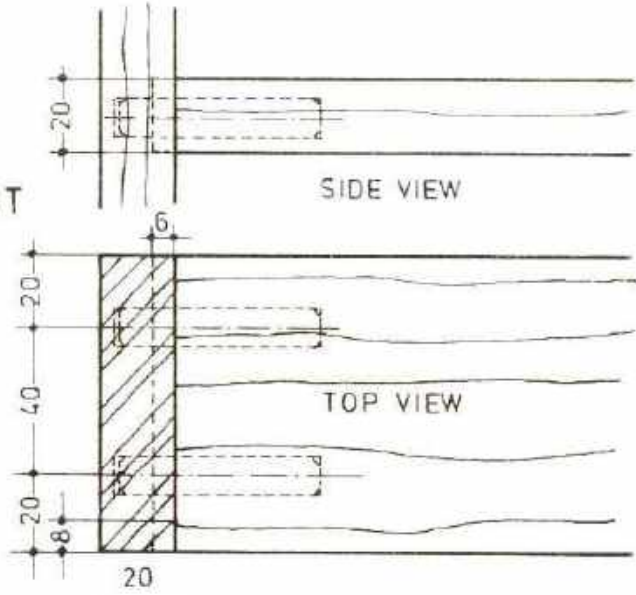
SCALE: 1:2



ANGLE JOINTS (Dowelled)

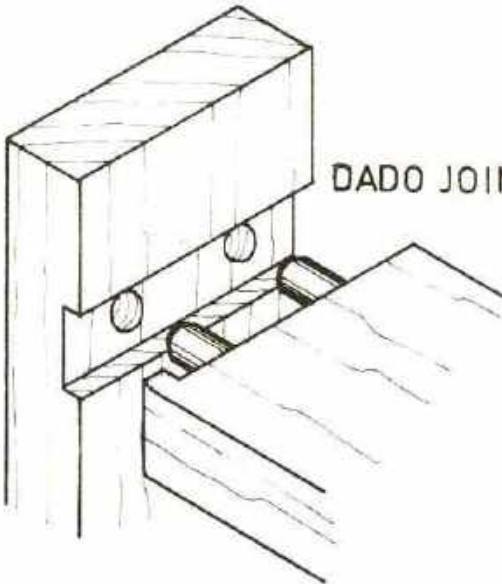


STOPPED DADO JOINT

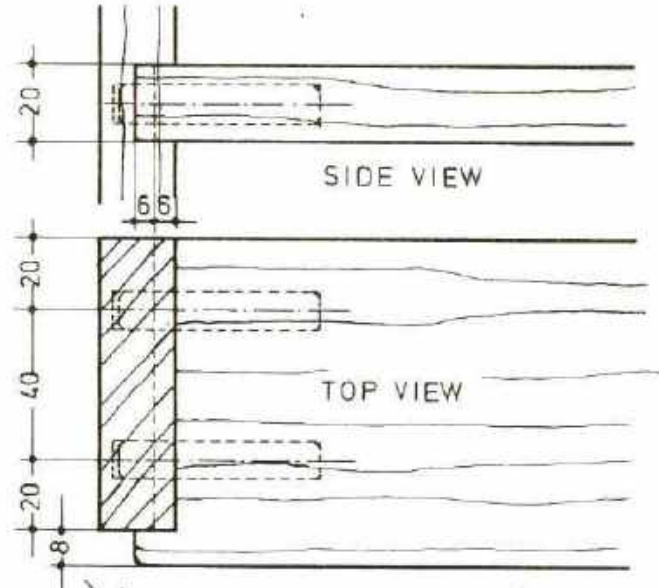


SIDE VIEW

TOP VIEW

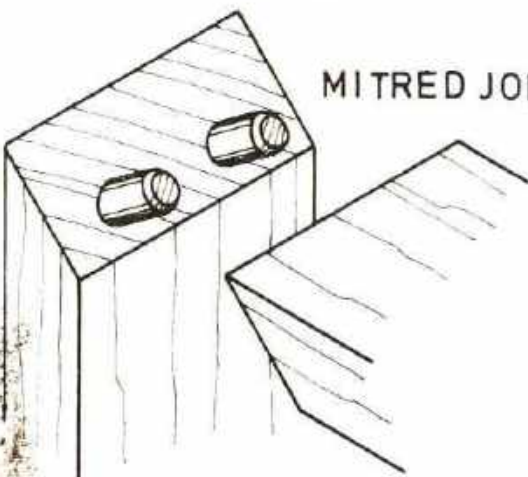


DADO JOINT

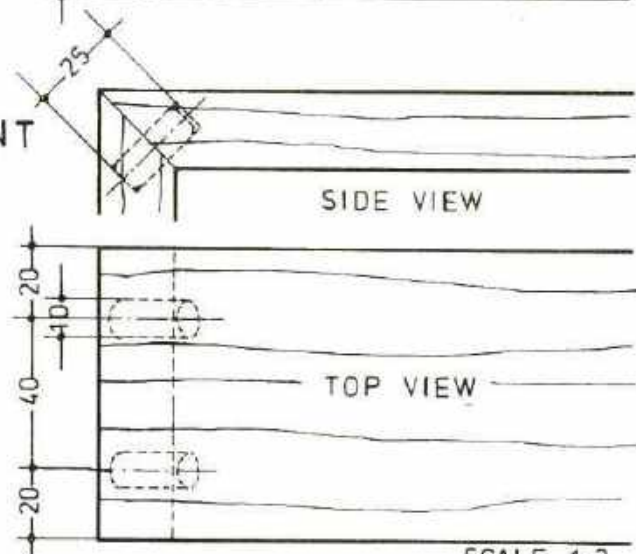


SIDE VIEW

TOP VIEW



MITRED JOINT



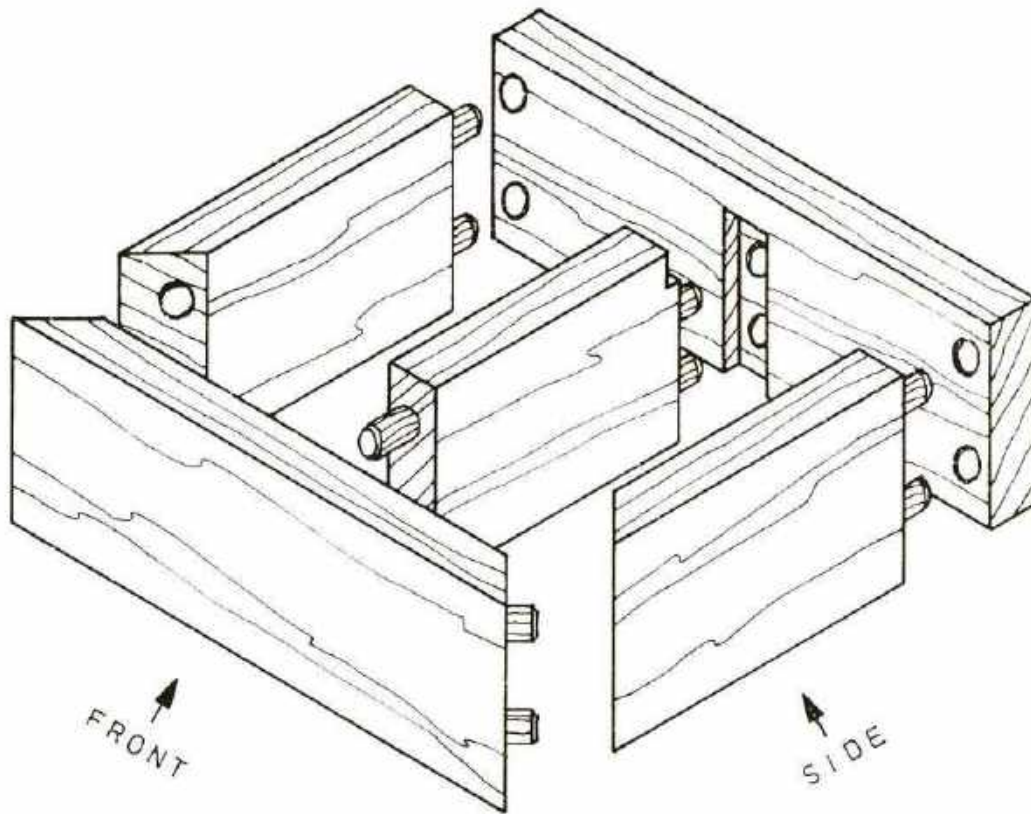
SIDE VIEW

TOP VIEW

SCALE 1:2



ANGLE JOINTS (Dowelled)



Outside dimensions of frame: 200 × 140 × 80
 thickness of wood: 20

EXERCISE :

Produce a technical drawing of the above shown frame.

Draw the front, side and top views in scale 1:1

Show the joints with dashed lines.

Give all the dimensions for details of different joints see page nos. 36, 37.

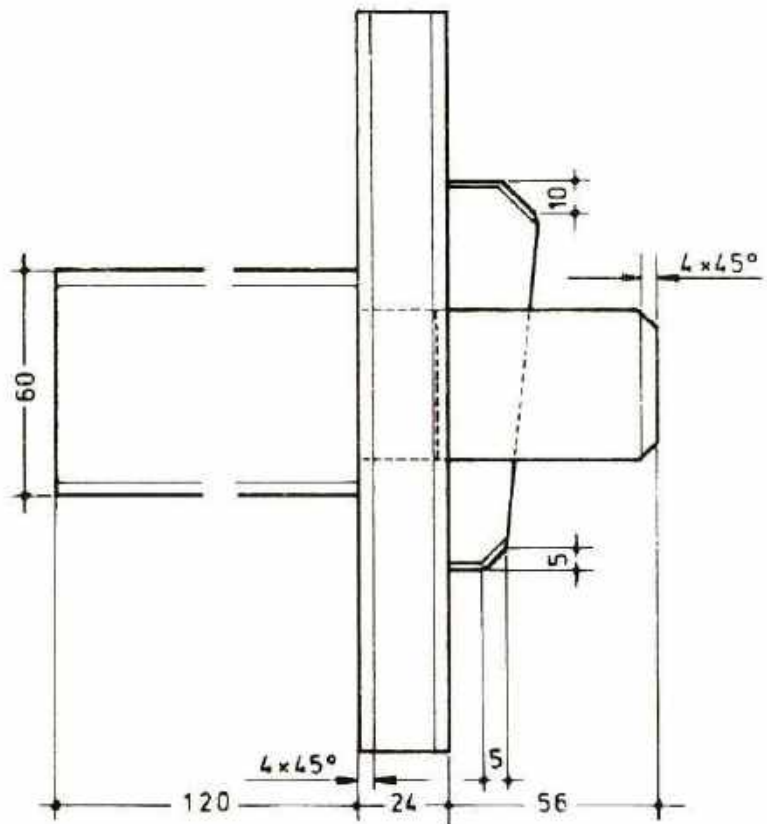
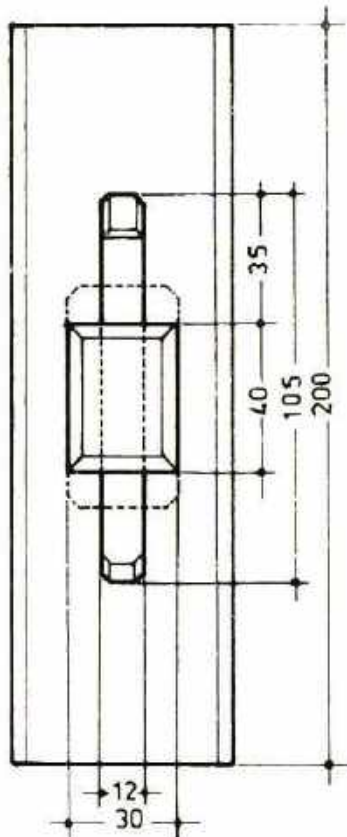
Prepare the material list.

Paper size : A 3

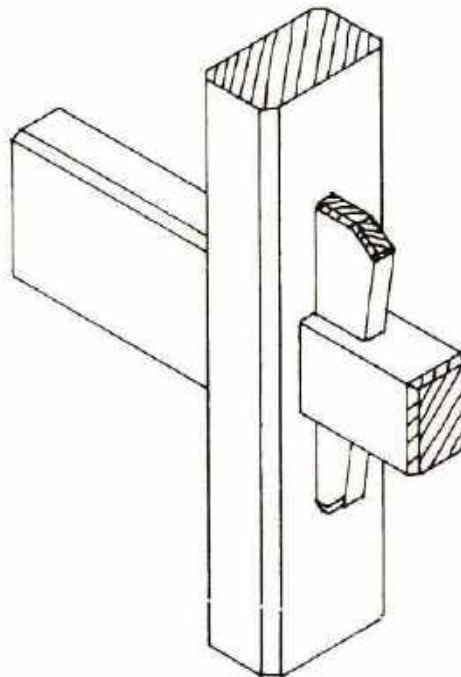
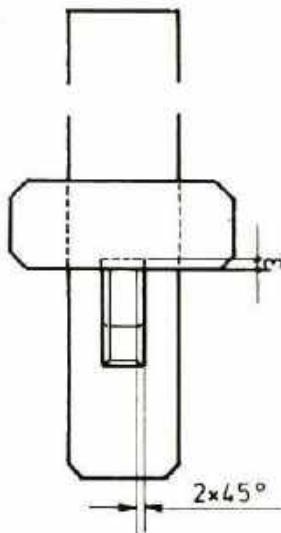
	Material Pcs L × W × Th



KEY MORTISE AND TENON JOINT



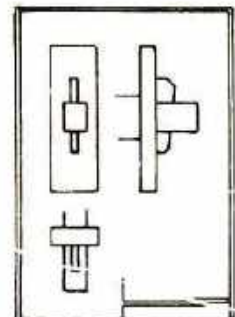
SCALE 1:2



EXERCISE :

Draw the front, side and top views in scale 1:1. Enter the dimensions.

Paper size A 3



MATERIAL

- 1 piece 200x60x24
- 1 " 200x60x30
- 1 " 105x26x12

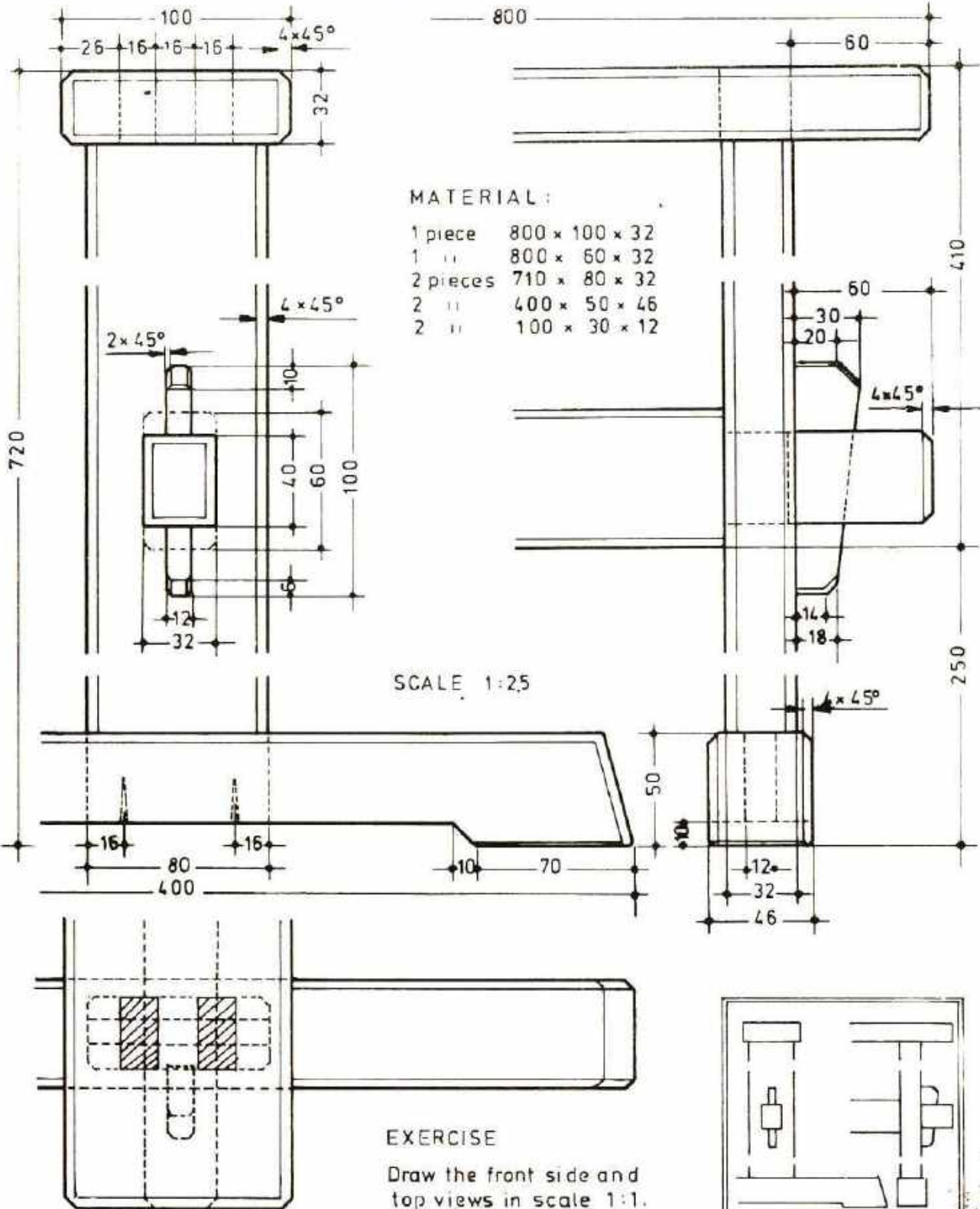


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

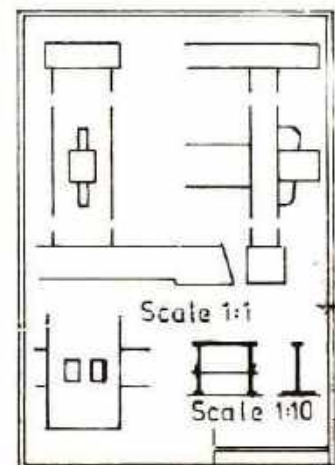
SHEET NO. 39
PRACTICAL
EXERCISE
NO. 22

HORSE RACK



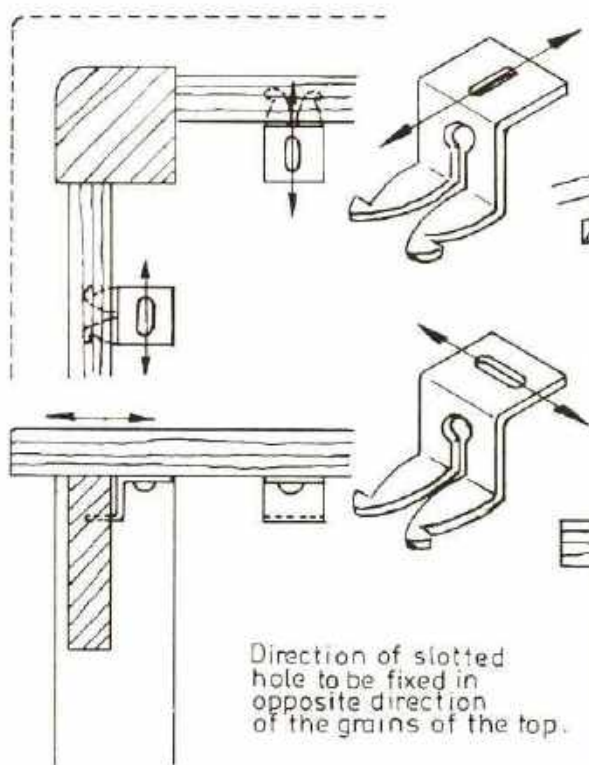
EXERCISE

Draw the front side and top views in scale 1:1. Show the joints if necessary with dashed lines. Enter all the dimensions. Draw also the front and side views in scale 1:10 and enter the major dimensions. Paper size A 2

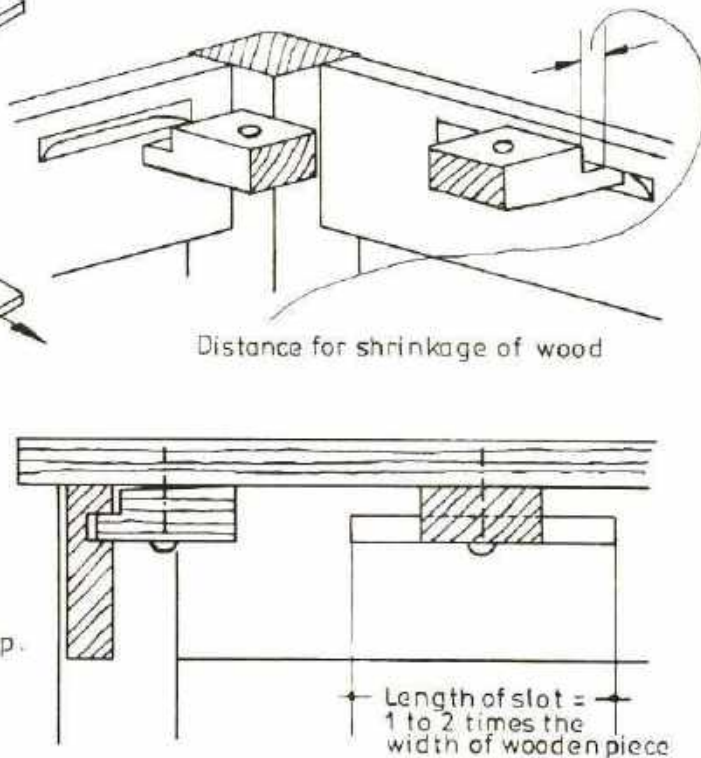


HOW TO JOIN A SOLID TOP WITH A CARCASE

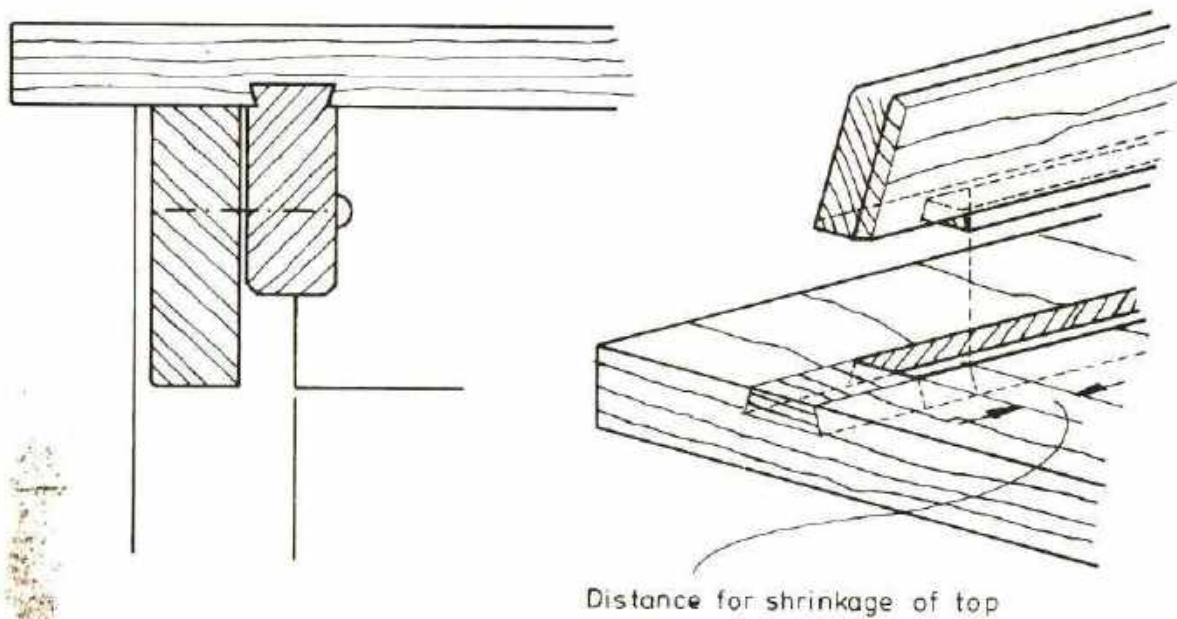
A IRON BRACKETS



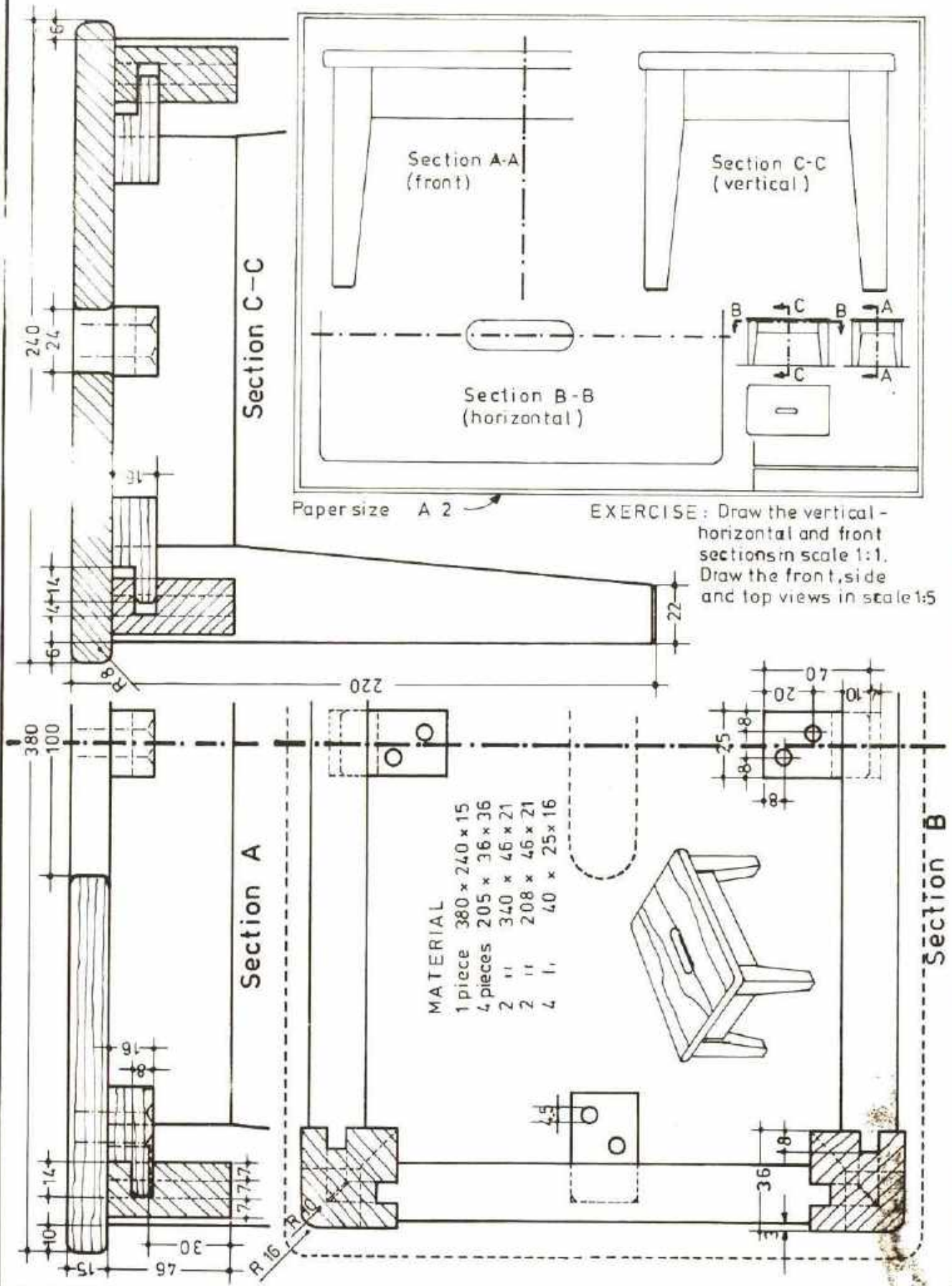
B GROOVED WOODEN PCS.



C DOVETAIL DATO GROOVE JOINT



FOOT STOOL

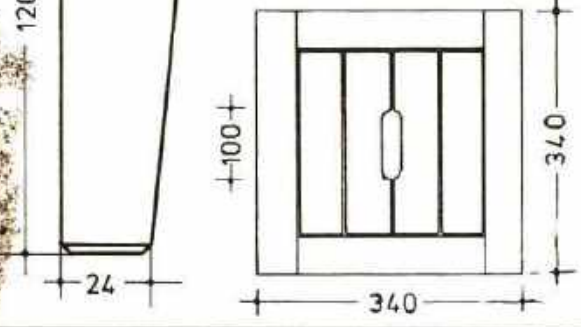
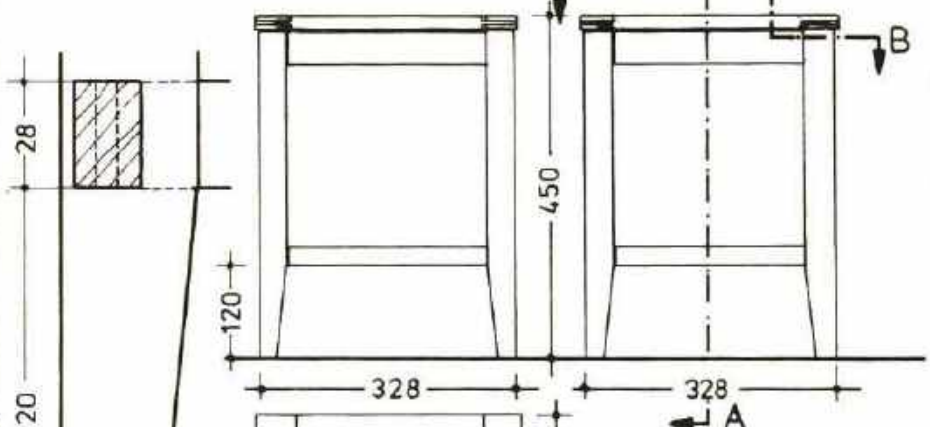
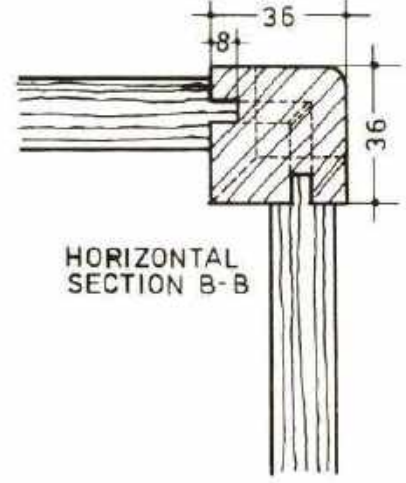
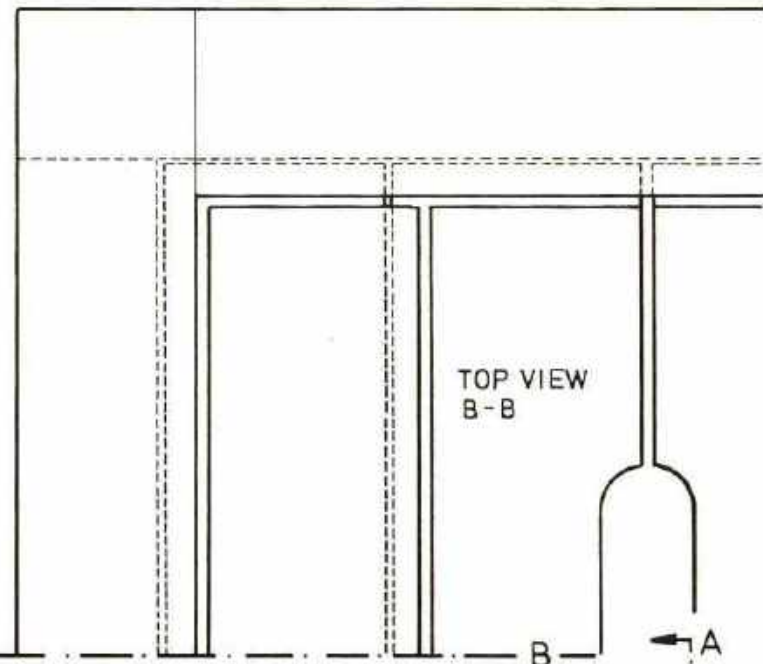
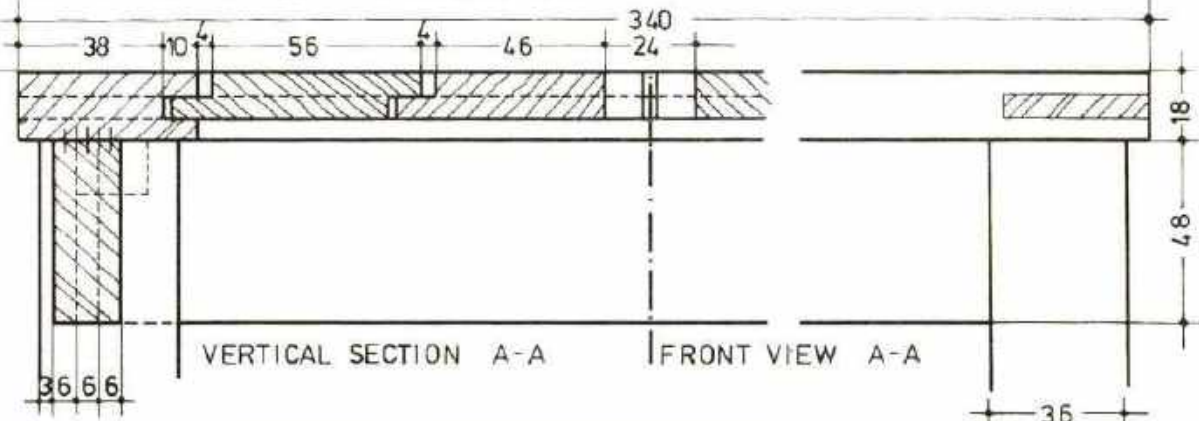


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 42
PRACTICAL
EXERCISE
NO. 24

STOOL SCALE 1:2



EXERCISE

- Draw details of vertical section A-A and front view A-A (as shown above) in scale 1:1
- Draw horizontal section B-B and top view in scale 1:1
- Draw the front, side and top views in scale 1:5
- Paper size A 2 (vertical)

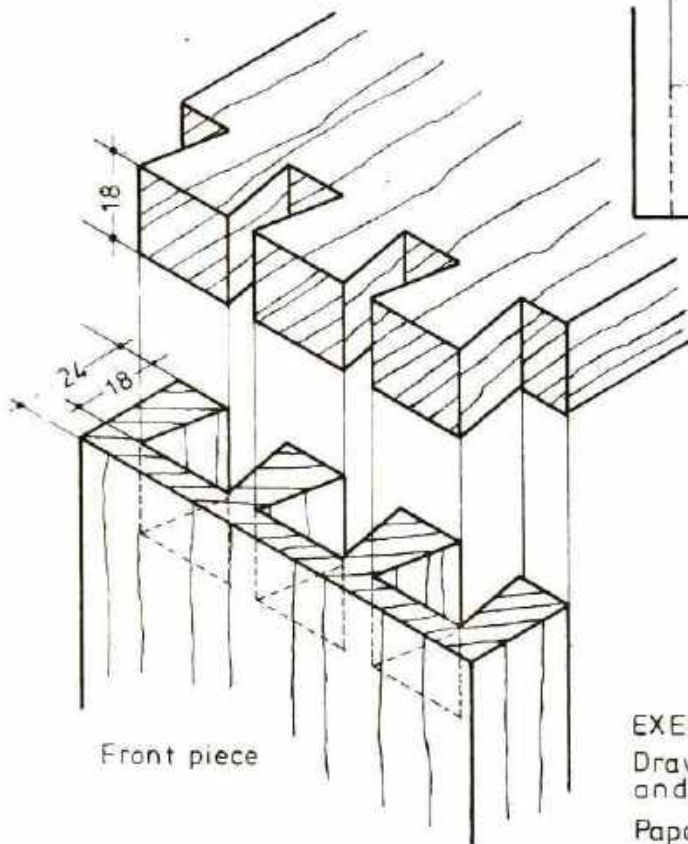
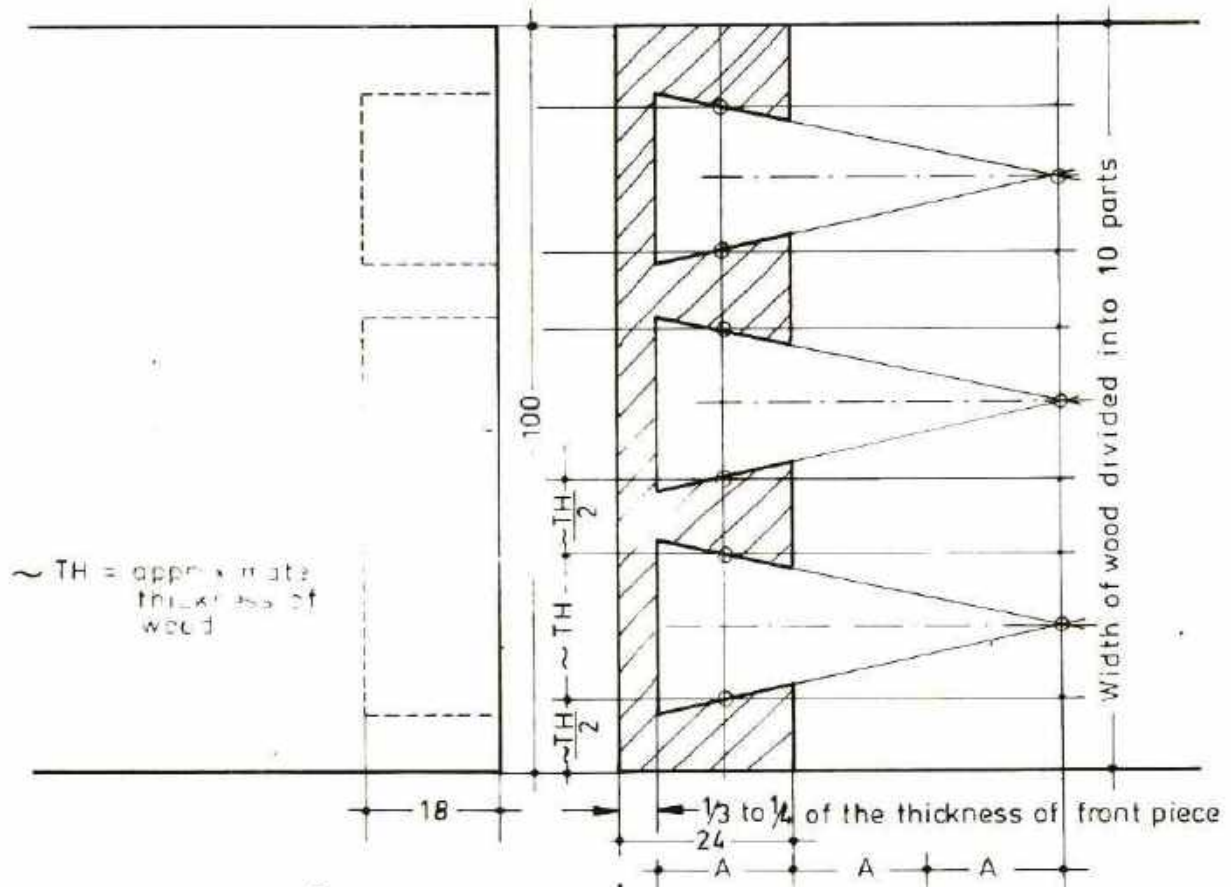


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

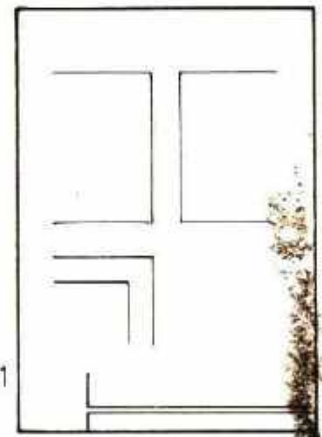
SHEET NO. 43
PRACTICAL
EXERCISE
NO. 25

LAPPED DOVETAILS



Material : 1 piece 160x100x24
1 piece 160x100x18

EXERCISE :
Draw the front, side
and top views in sc.1:1
Paper size A 4



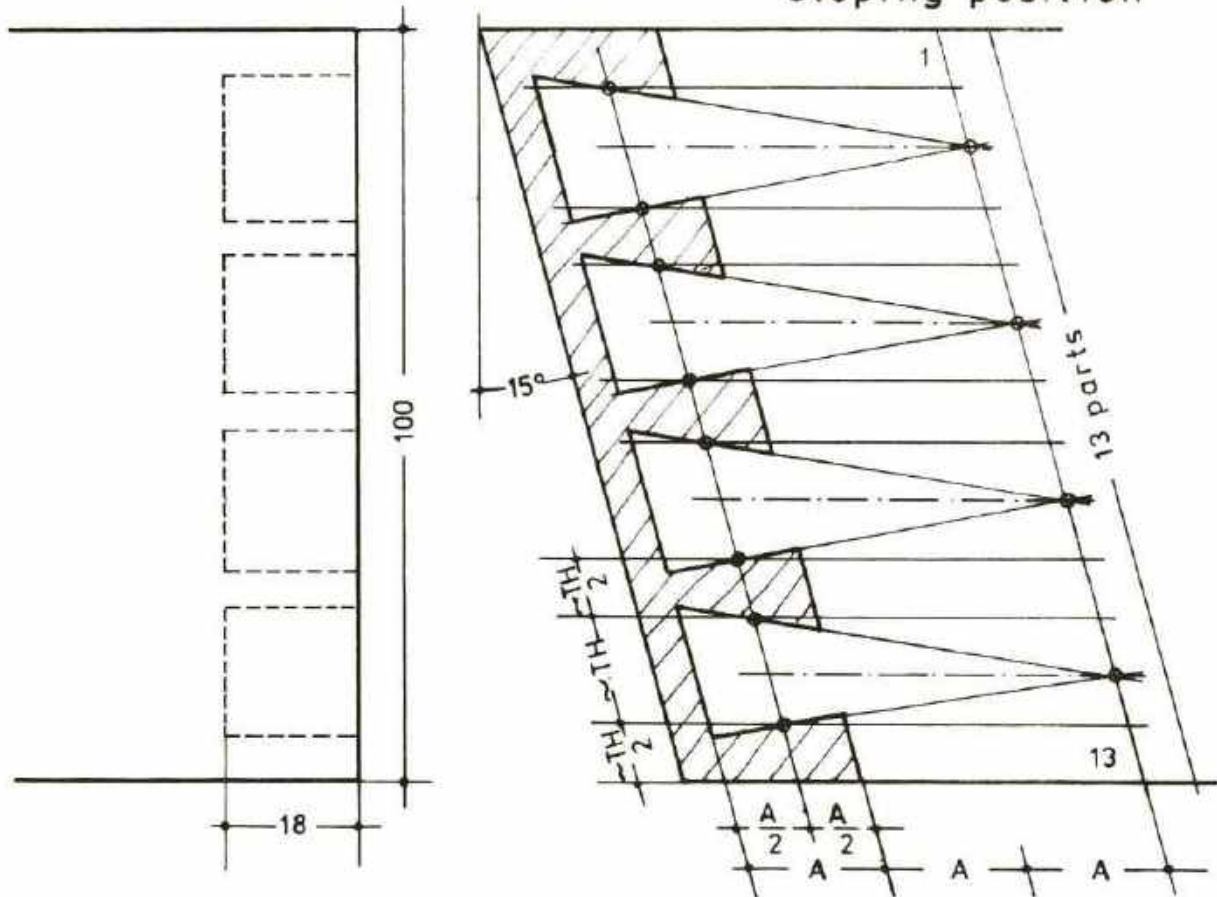
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

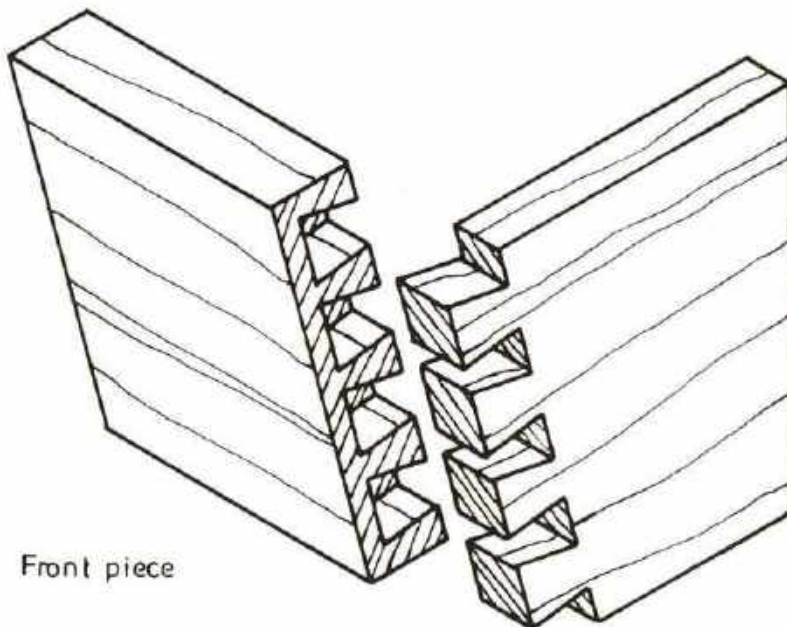
SHEET NO. 24
PRACTICAL
EXERCISE
NO. 26

LAPPED DOVETAILED

Front piece in sloping position

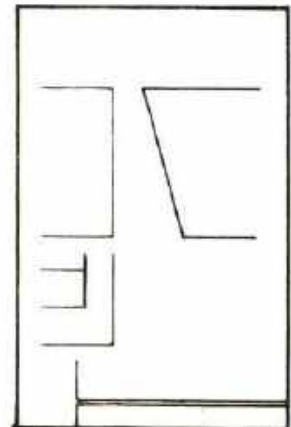


Material: 1 piece 160×110×24
1 piece 160×100×18



Front piece

EXERCISE:
Draw the front, side and top views in scale 1:1



Paper size A 4

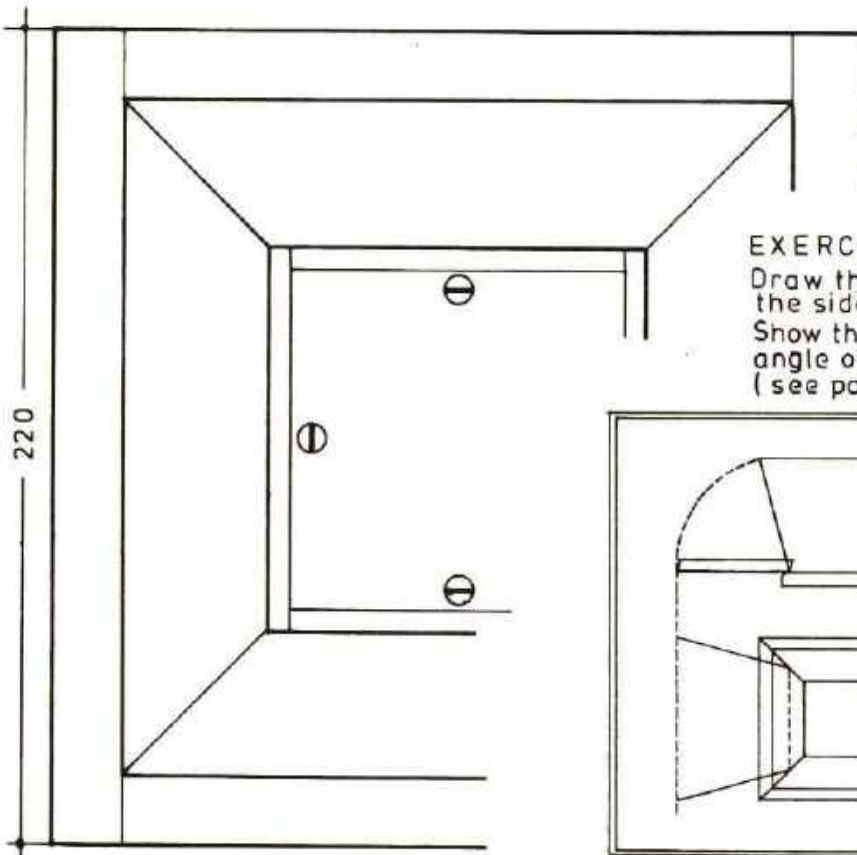
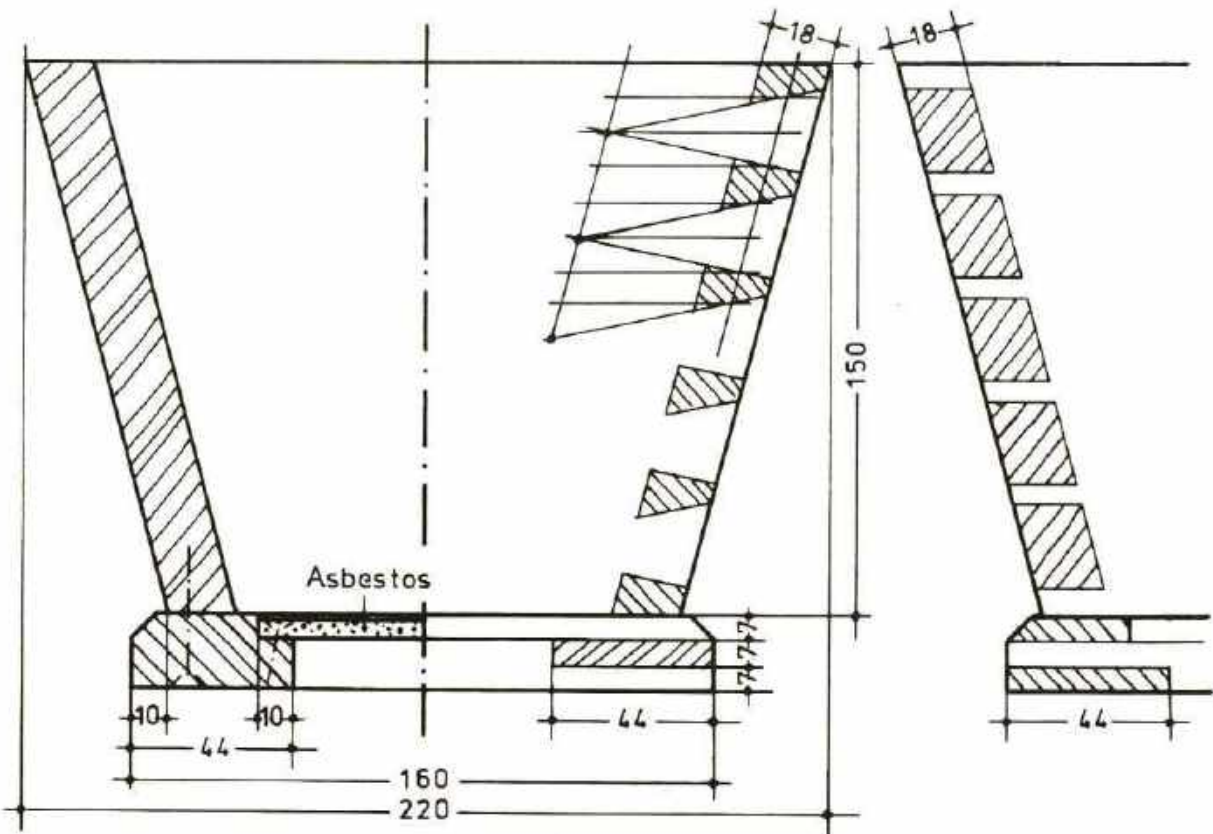


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

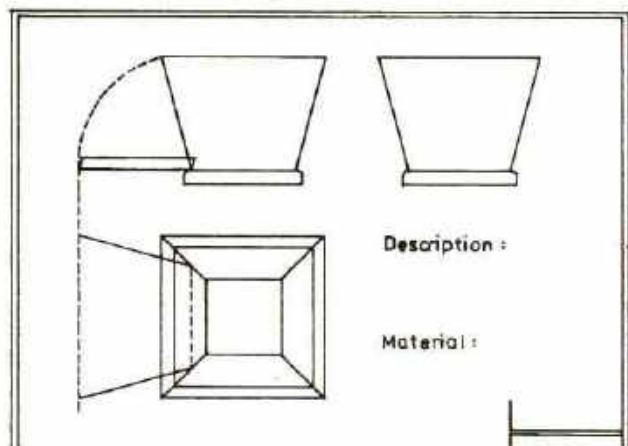
SHEET NO.45
PRACTICAL
EXERCISE
NO. 27

FUNNEL - SHAPED DOVETAILED



EXERCISE :

Draw the front section/view,
the side and top views in scale 1:1.
Show the construction of the real
angle of the mitre and butt joints.
(see page no.47)



Description :

Material :

Paper size A 1



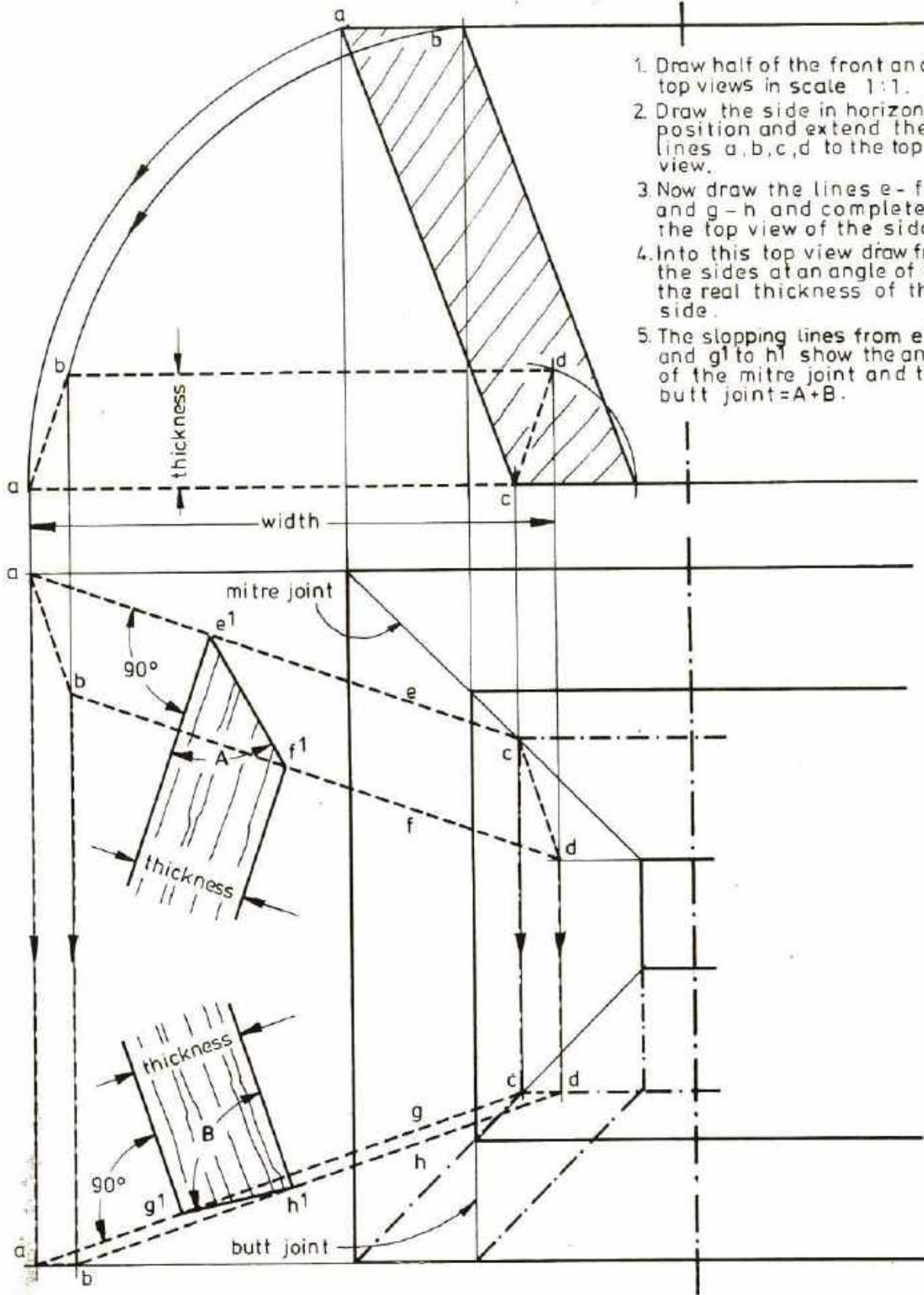
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 46
PRACTICAL
EXERCISE
NO. 28

FUNNEL - SHAPED DOVETAILS

How to find the angles for funnel-shaped mitre and butt joints



1. Draw half of the front and top views in scale 1:1.
2. Draw the side in horizontal position and extend the lines a, b, c, d to the top view.
3. Now draw the lines e - f and g - h and complete the top view of the sides.
4. Into this top view draw from the sides at an angle of 90° the real thickness of the side.
5. The sloping lines from e1 to f1 and g1 to h1 show the angles of the mitre joint and the butt joint = $A+B$.

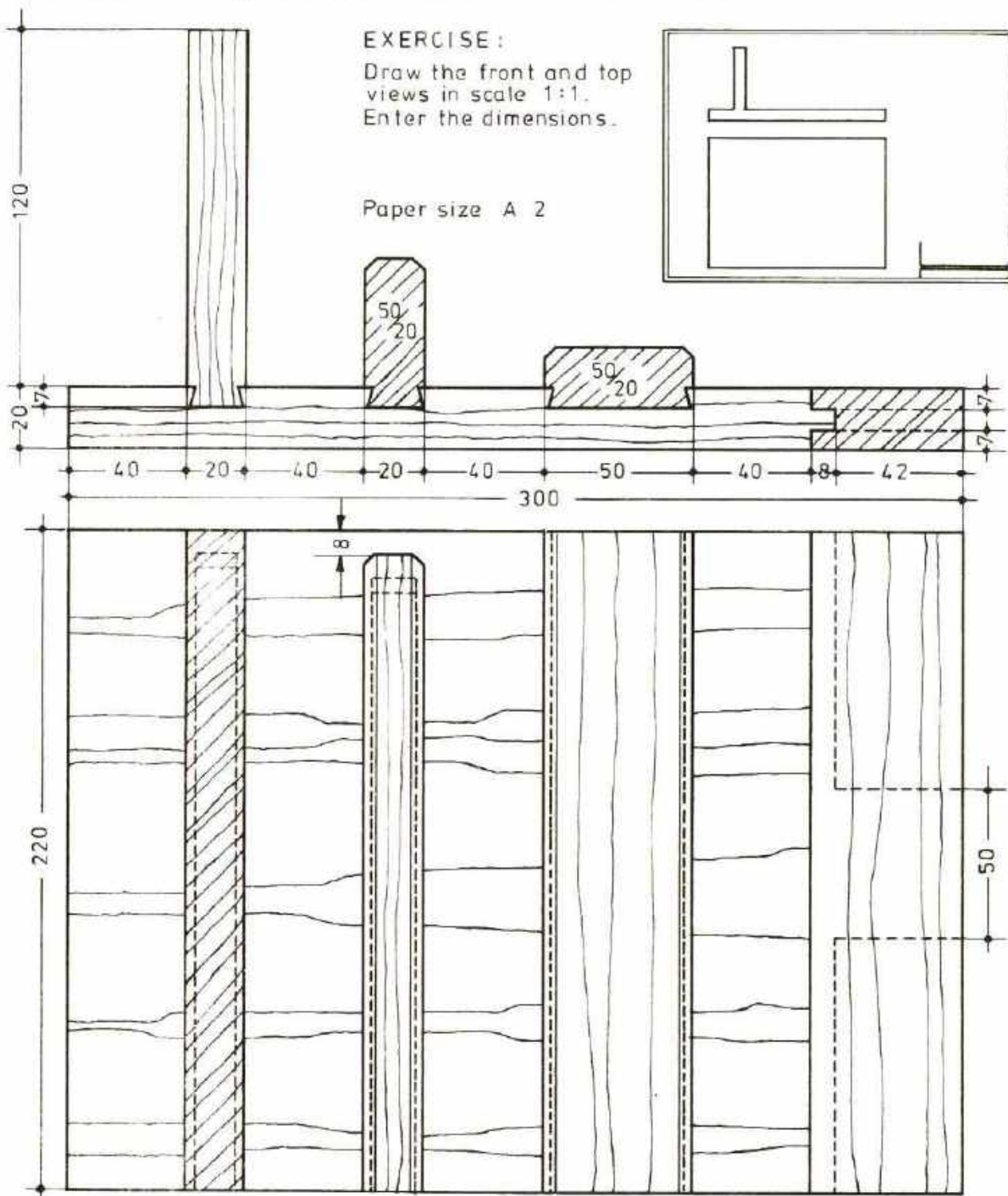
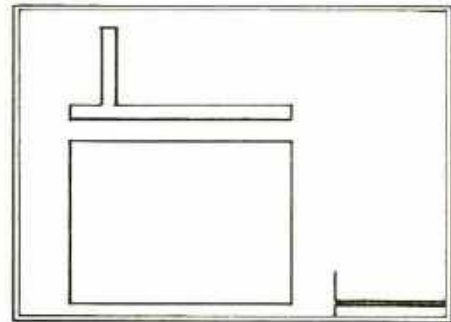


DOVETAIL DADO GROOVE JOINT AND TONGUED BUTT JOINT

EXERCISE :

Draw the front and top views in scale 1:1.
Enter the dimensions.

Paper size A 2



Material :

- 1 piece 300 × 220 × 20
- 1 piece 127 × 220 × 20
- 1 piece 212 × 50 × 20
- 2 pieces 220 × 50 × 20

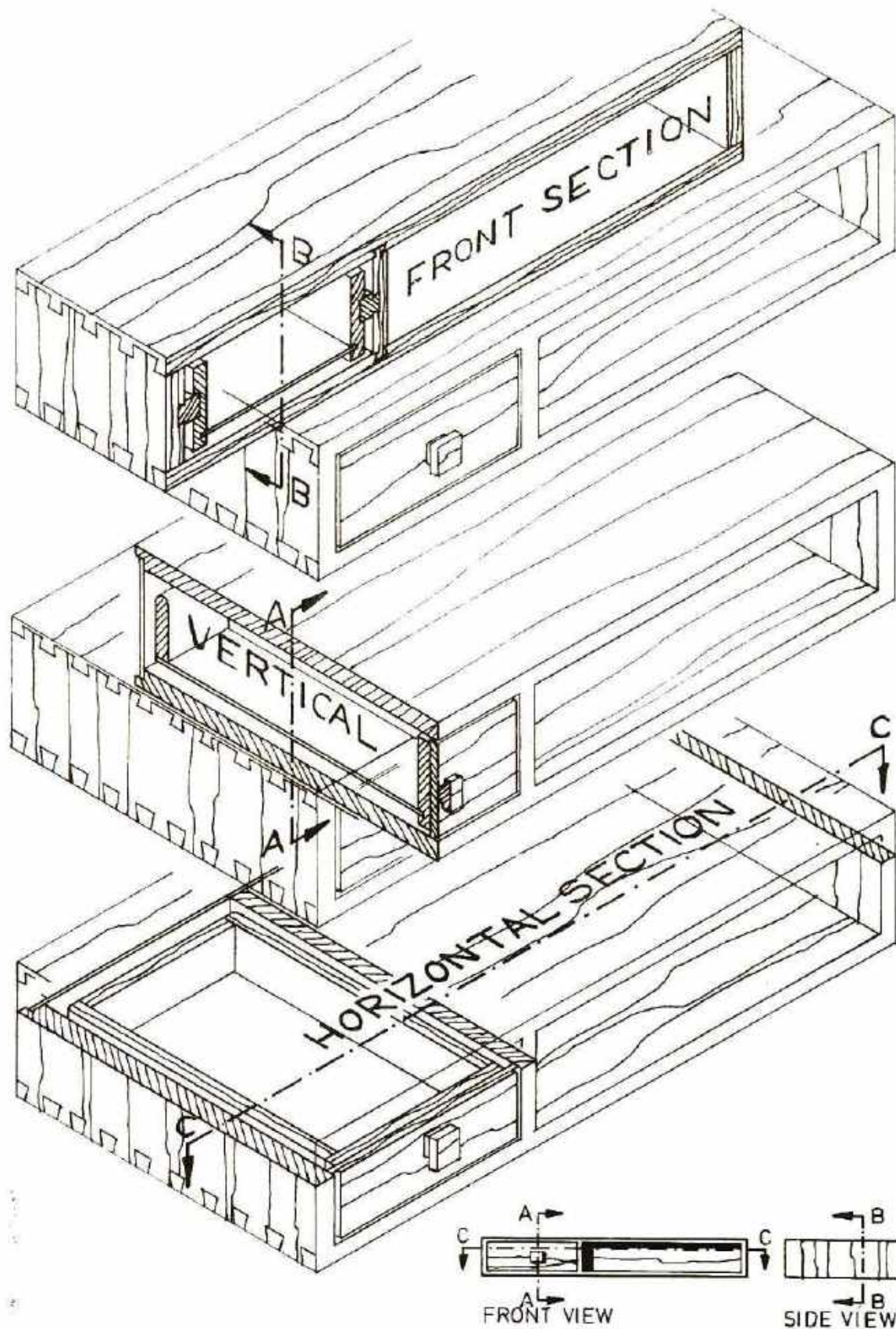


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 48
PRACTICAL
EXERCISE
NO. 29

METHODS AND EXPLANATIONS VARIOUS SECTIONS



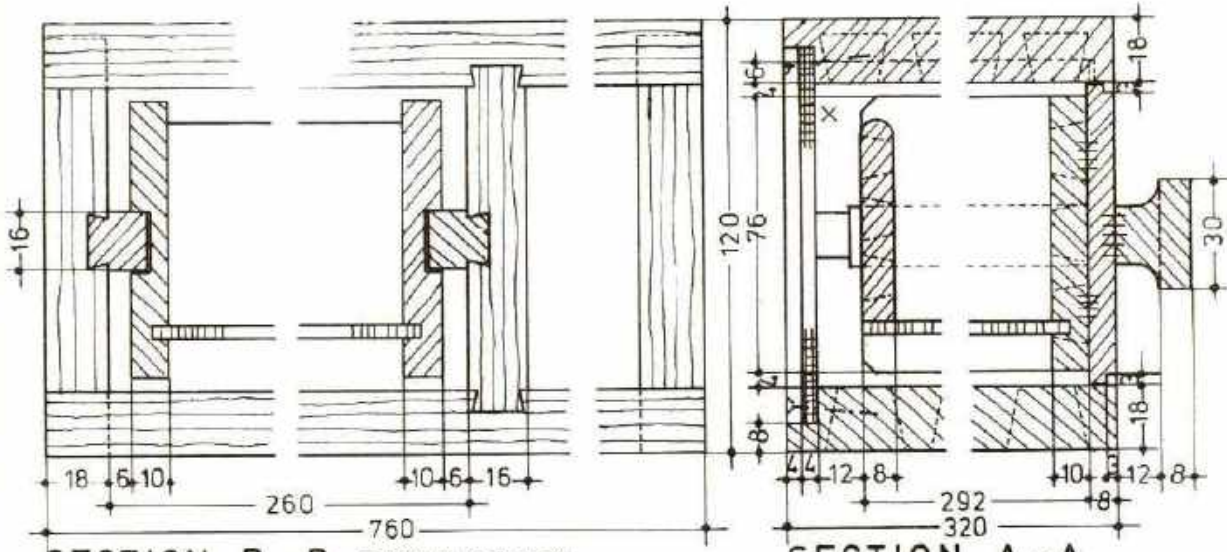
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 49

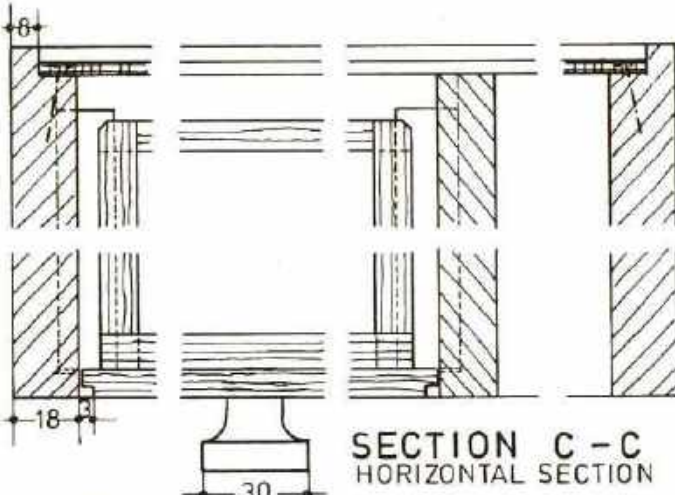
TELEPHONE SHELF

SCALES 1:2 & 1:10



SECTION B - B FRONT SECTION

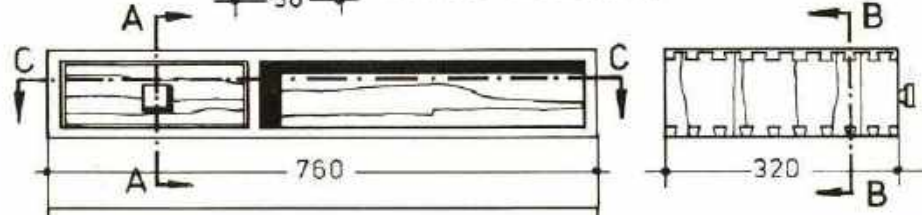
SECTION A - A VERTICAL SECTION



SECTION C - C HORIZONTAL SECTION

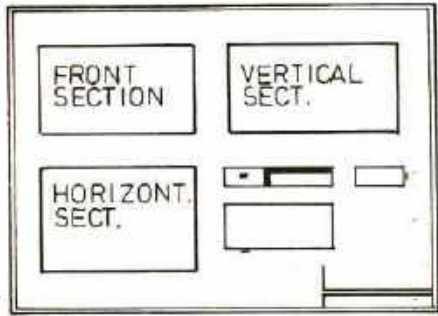
Note:
The methods and explanations of various sections see on page no. 49

EXERCISE: Draw the front vertical and horizontal sections in scale 1:1. Enter the dimensions. Draw the three views in scale 1:5.



Paper size A 3

SCALE 1:10

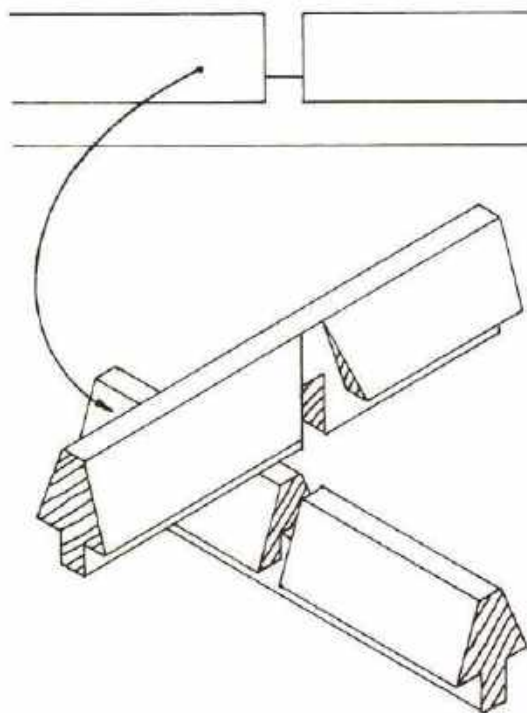
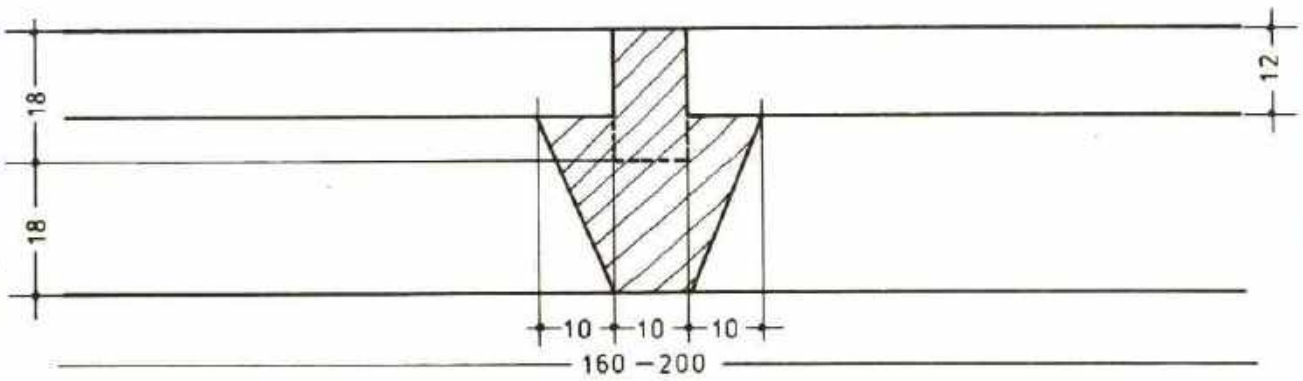
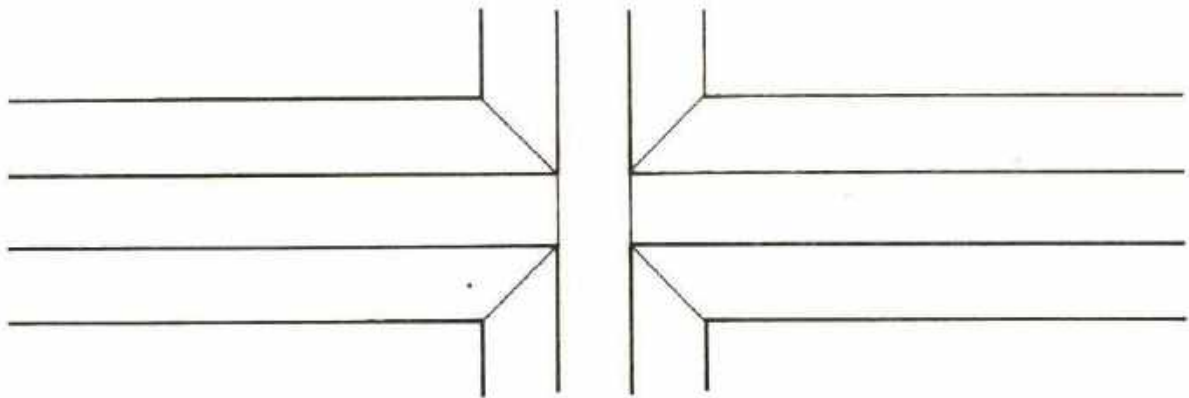


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

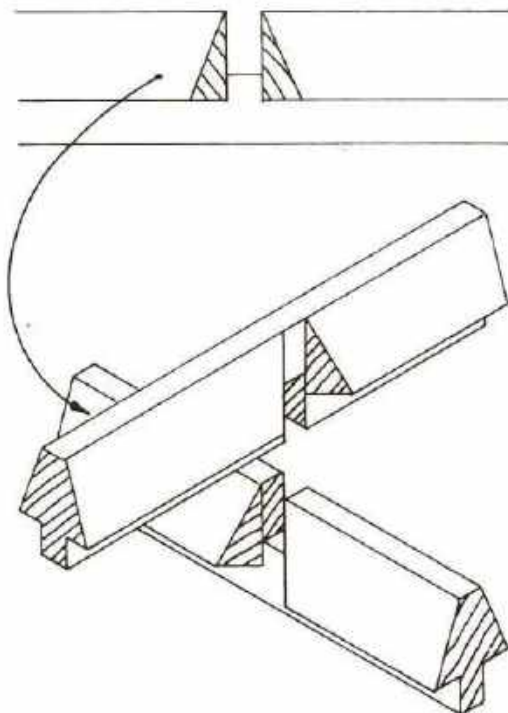
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 50
PRACTICAL
EXERCISE
NO. 30

CROSS BAR JOINTS



ALTERNATIVE A

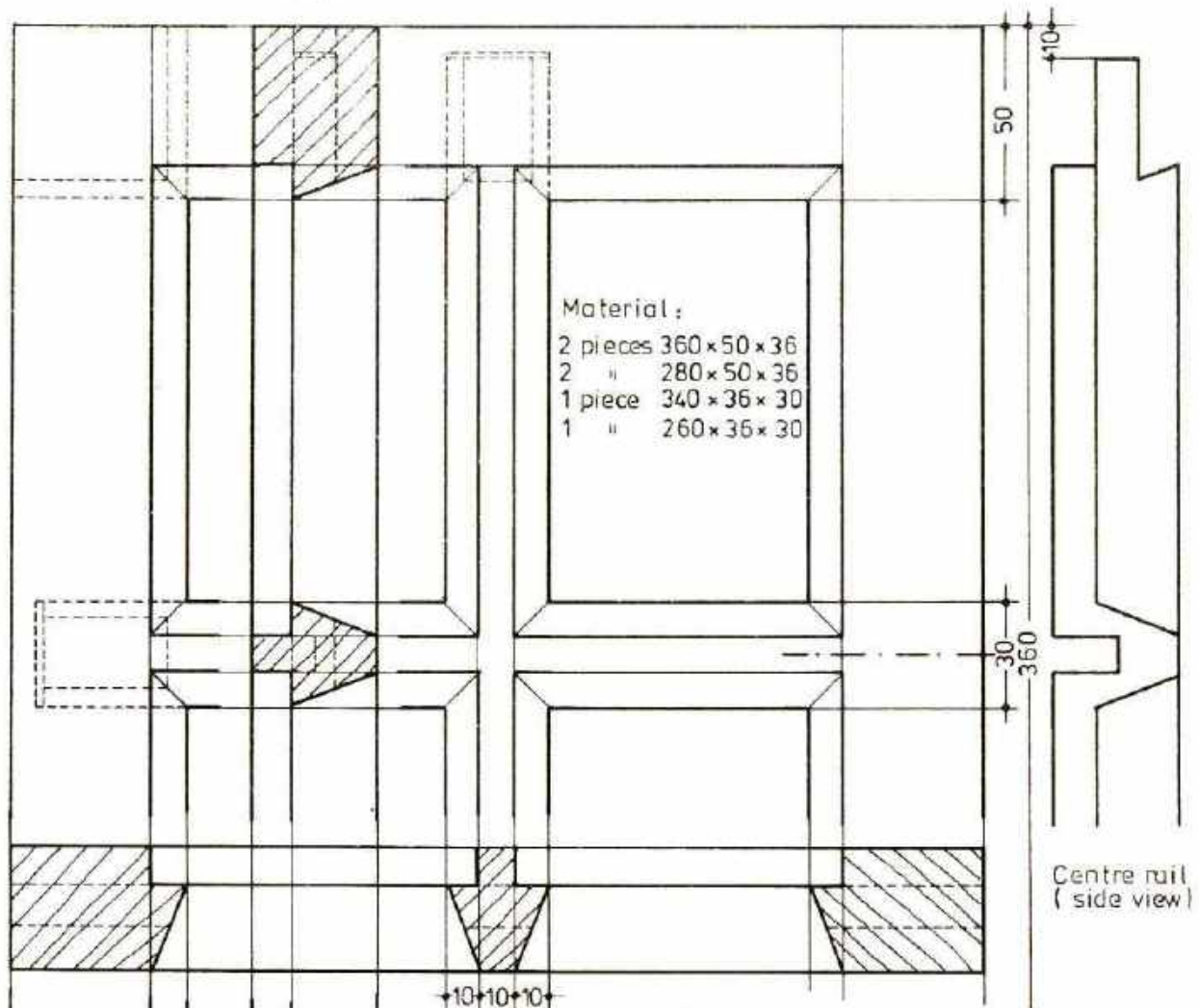


ALTERNATIVE B



FRAME WITH CROSS BAR

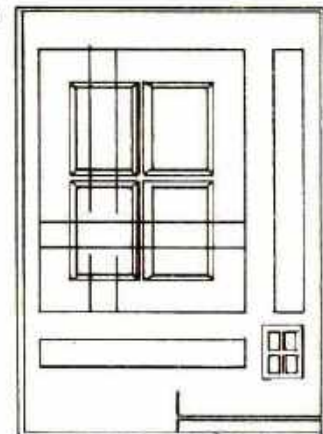
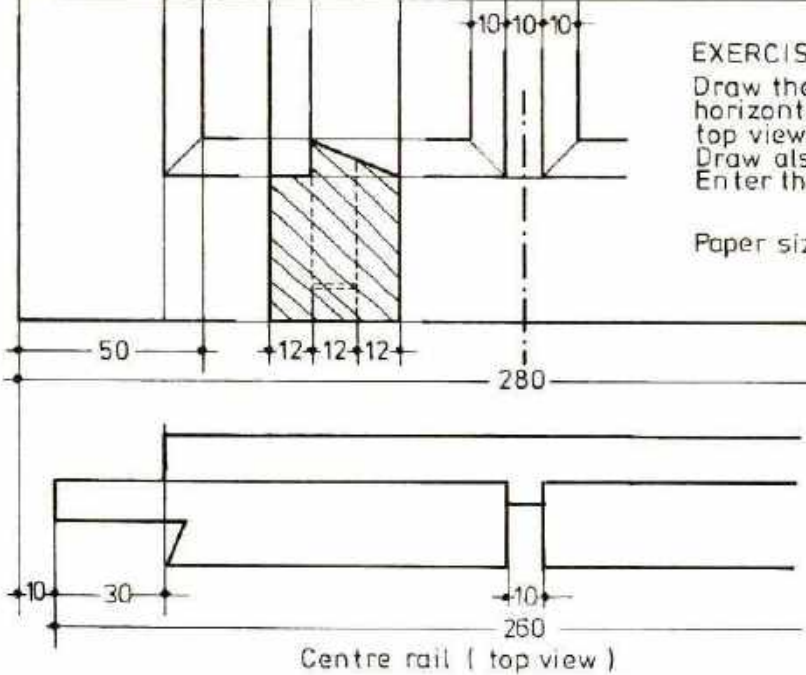
For cross bars see page 51



EXERCISE:

Draw the front view, the vertical and horizontal sections, the side and top views of the centre rail in scale 1:1. Draw also the front view in scale 1:5. Enter the dimensions.

Paper size A 2



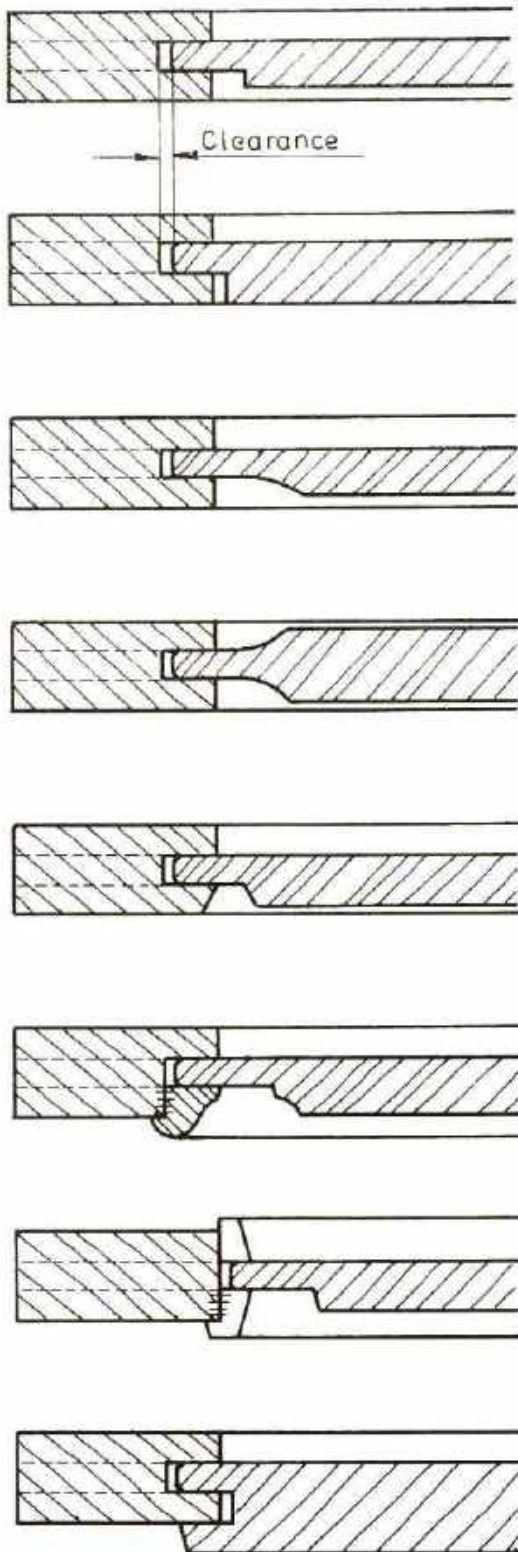
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

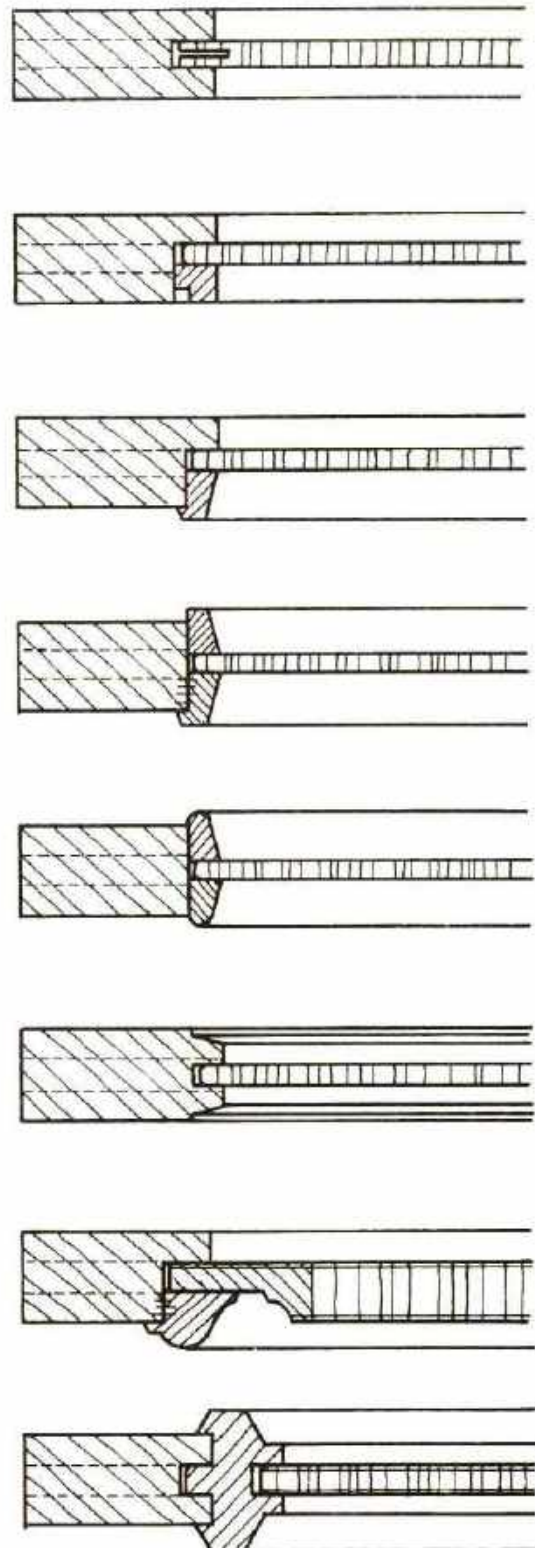
SHEET NO. 52
PRACTICAL
EXERCISE
NO. 31

FRAMES AND PANELS (HORIZONTAL SECTIONS)

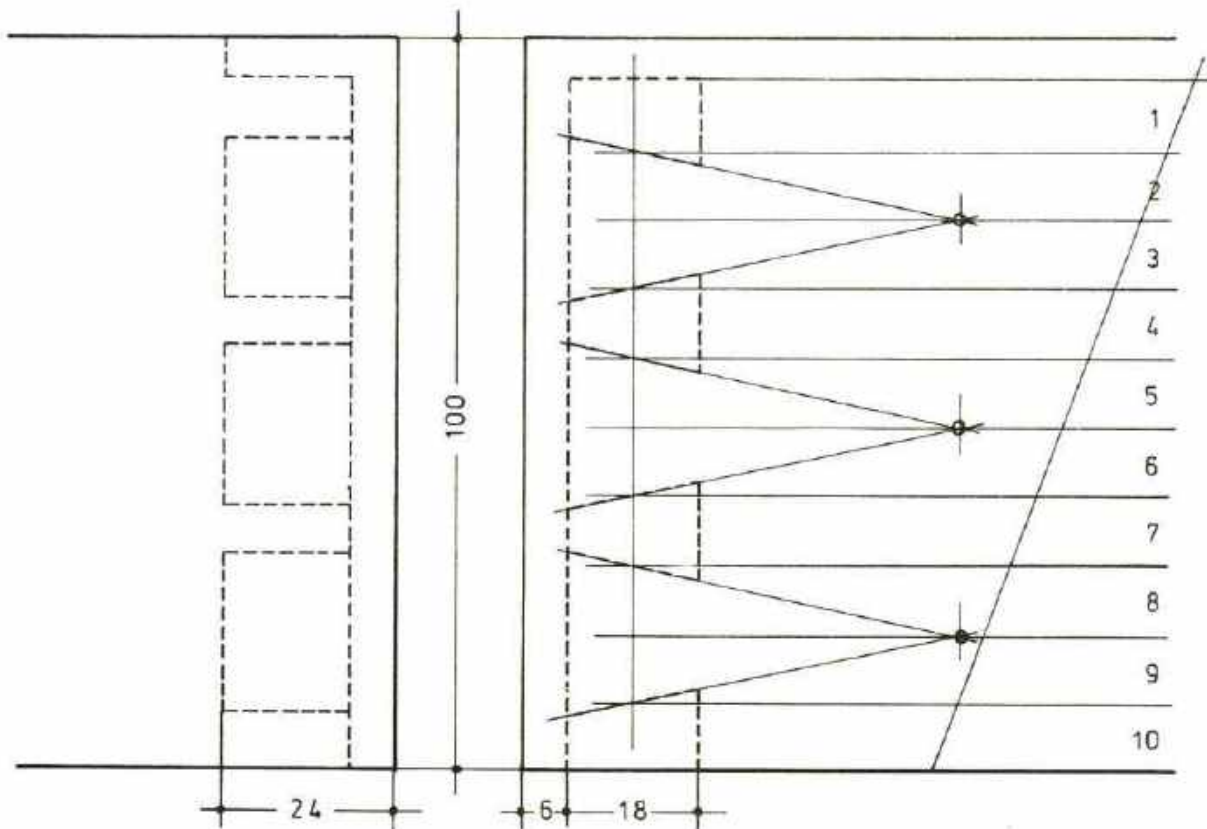
SOLID WOOD PANELS



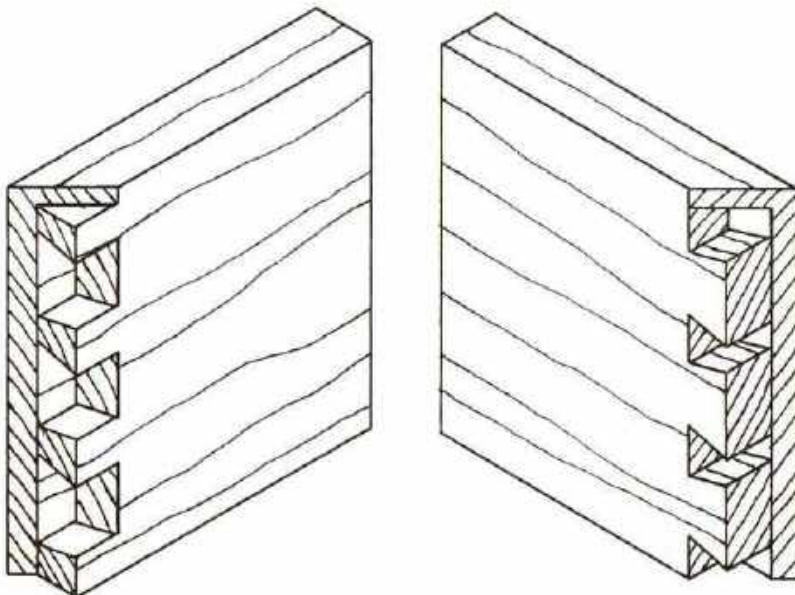
PLYWOOD PANELS



SECRET MITRE DOVETAILED

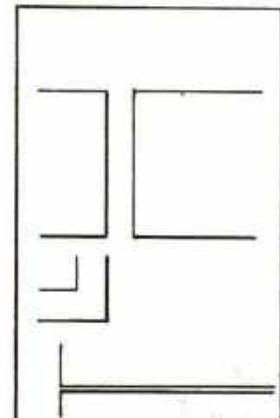


Material : 2 pieces 150×100×24



EXERCISE :
Draw the front, side
and top views in sc. 1:1

Paper size A 4



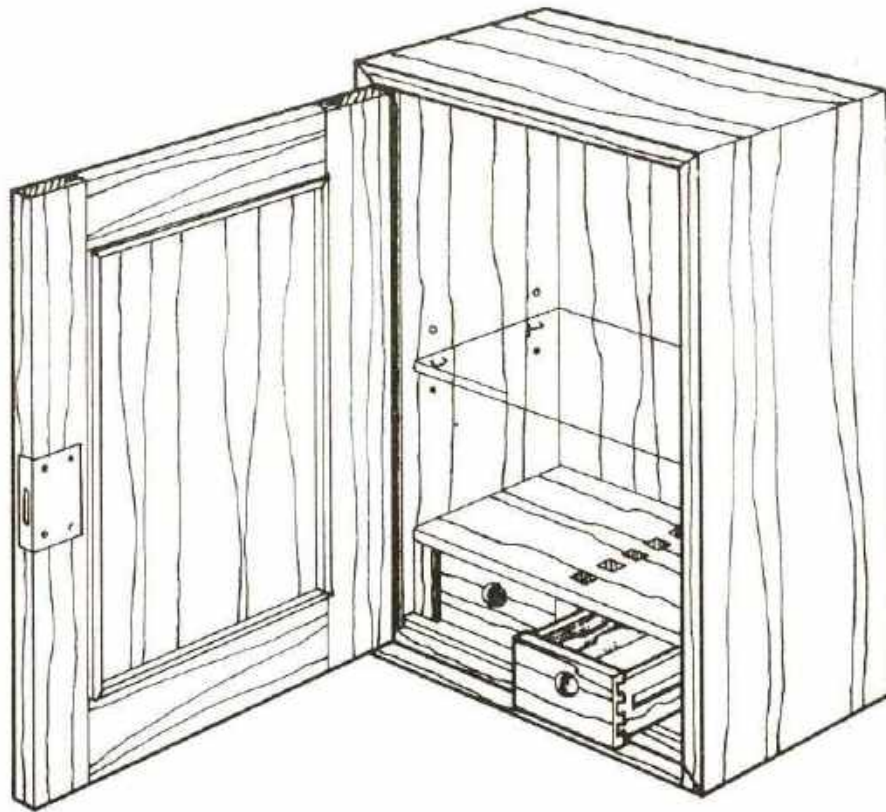
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 54
PRACTICAL
EXERCISE
NO. 32

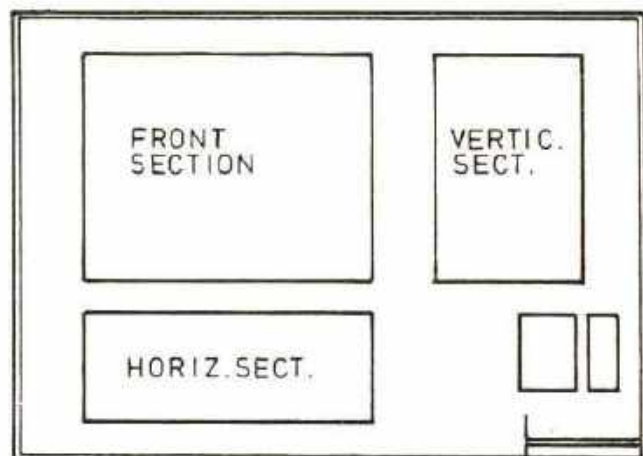
FIRST AID CABINET

For details see page no. 56



EXERCISE :

Draw the front, vertical and horizontal sections in scale 1:1. Complete the missing details. Enter all dimensions. Draw the front and side views in scale 1:5.



Paper size A 1

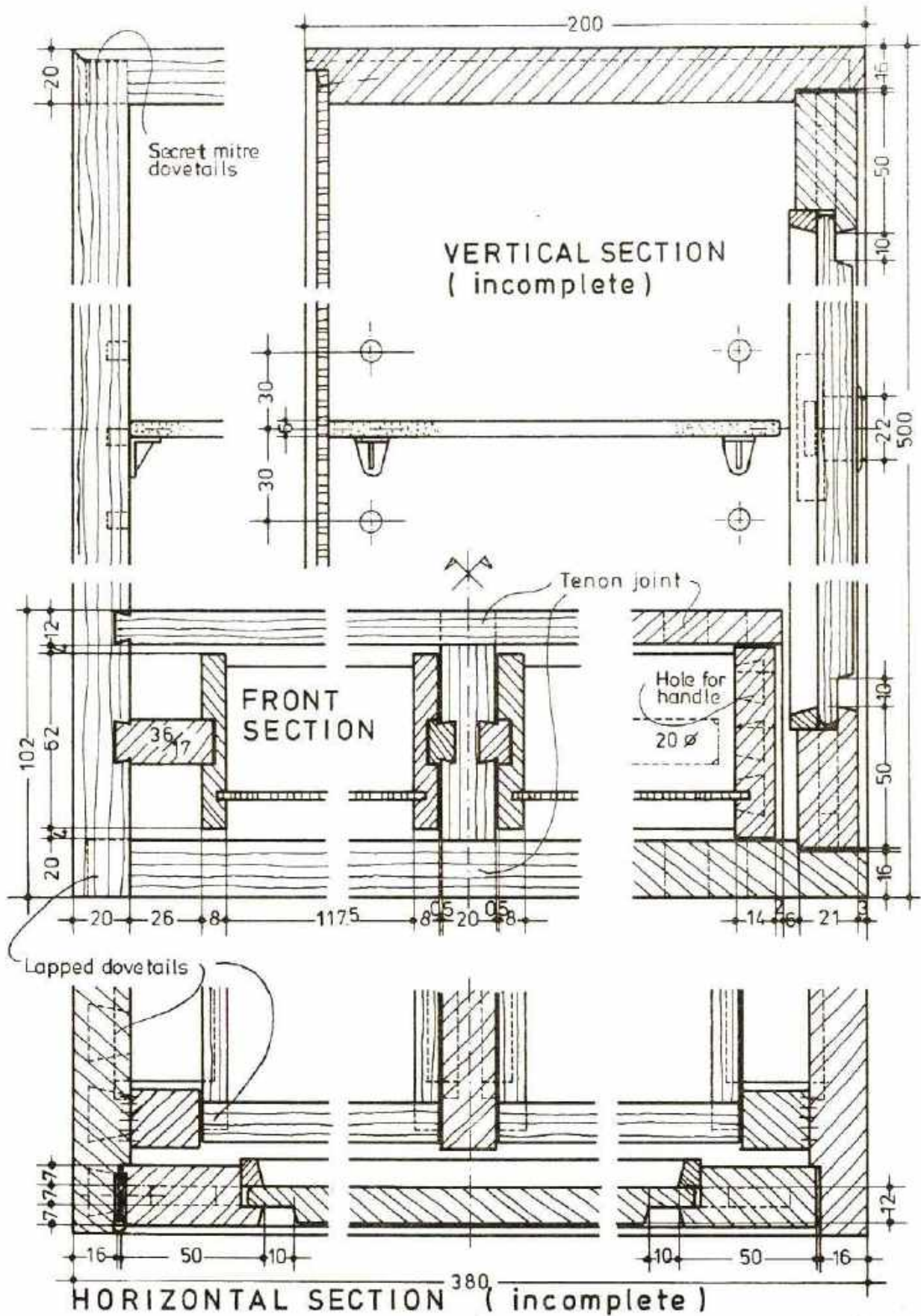


DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK GERMAN TECHNICAL TRAINING PROGRAMME

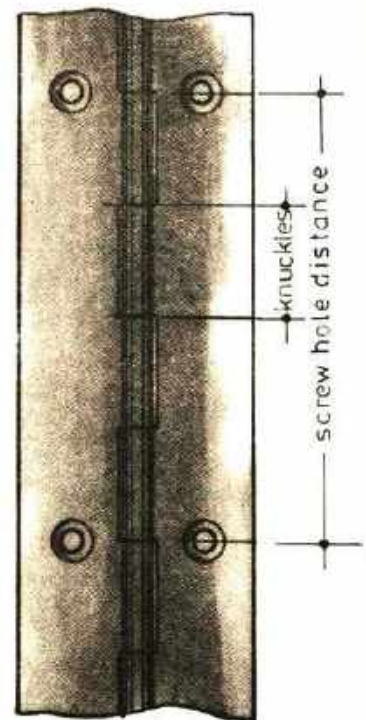
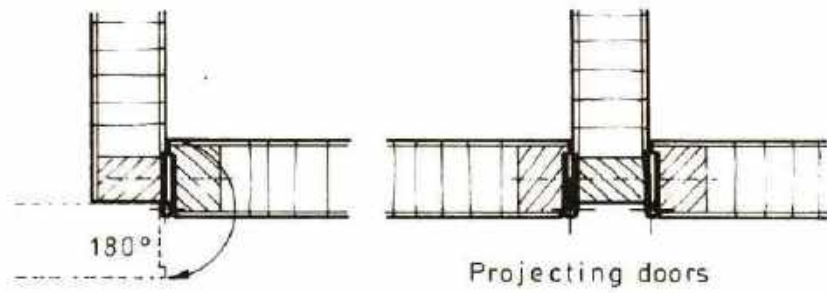
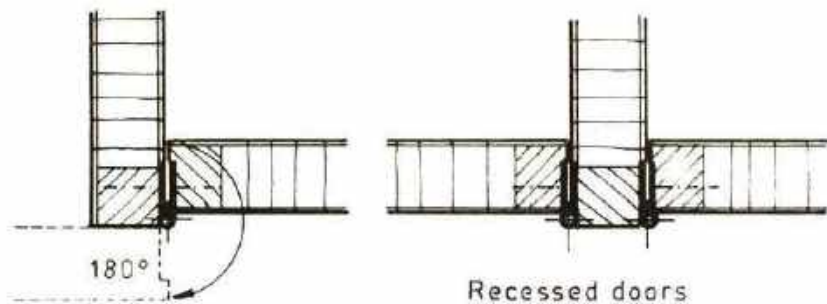
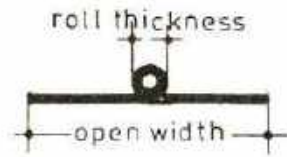
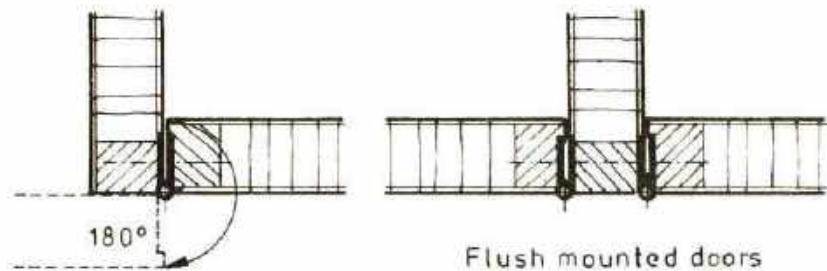
SHEET NO. 55
PRACTICAL
EXERCISE
NO. 33

FIRST AID CABINET DETAILS SC. 1:2

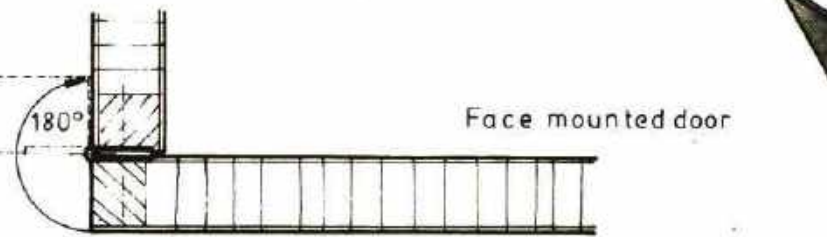
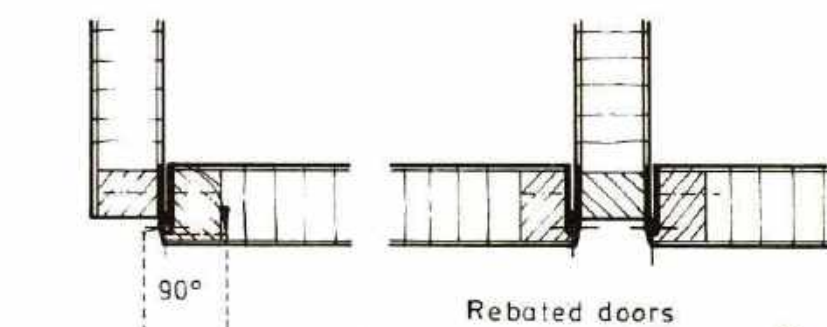


DOORS AND HINGING METHODS

PIANO HINGES AND BUTT HINGES



Piano hinge



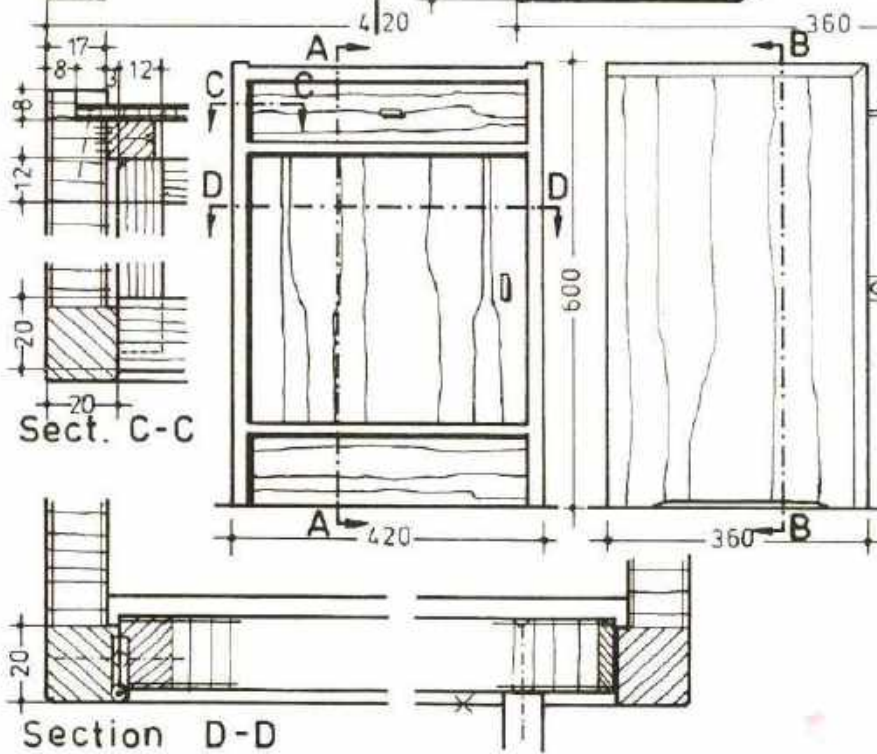
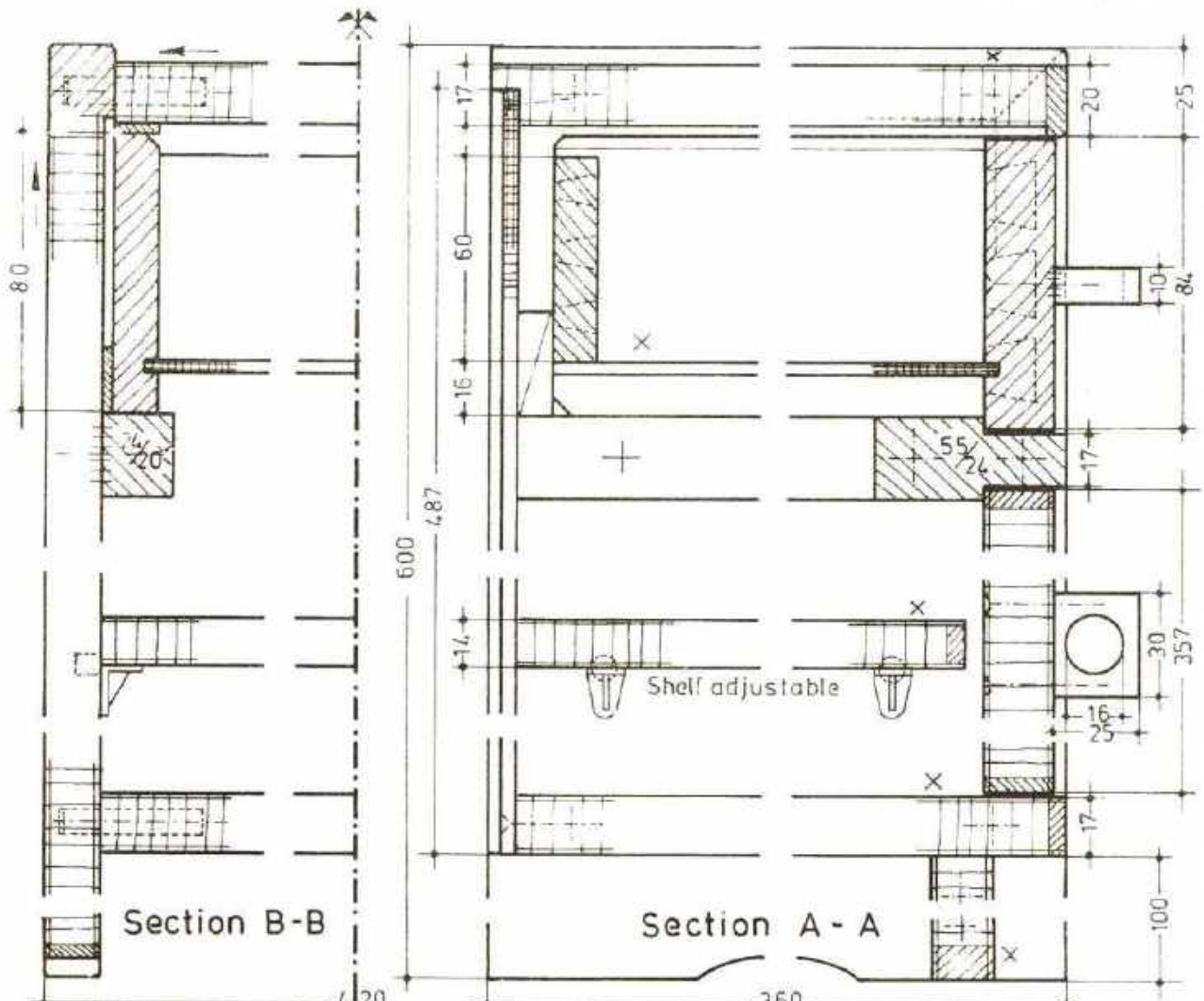
Butt hinge

NOTE : Drawers should move freely in or out whilst the door is open at an angle of less than 90°.

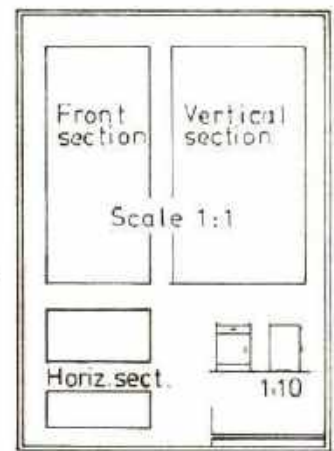


BEDSIDE CABINET

SCALE 1:2/1:10



EXERCISE:
 Draw the vertical, horizontal and front sections in scale 1:1.
 Draw the front and side views in scale 1:10.
 Enter all the dimensions.



Paper size A 2



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

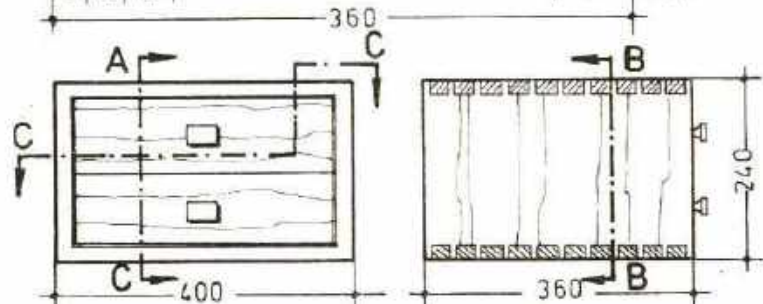
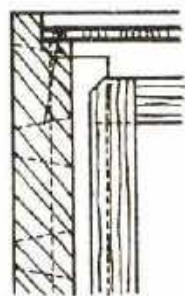
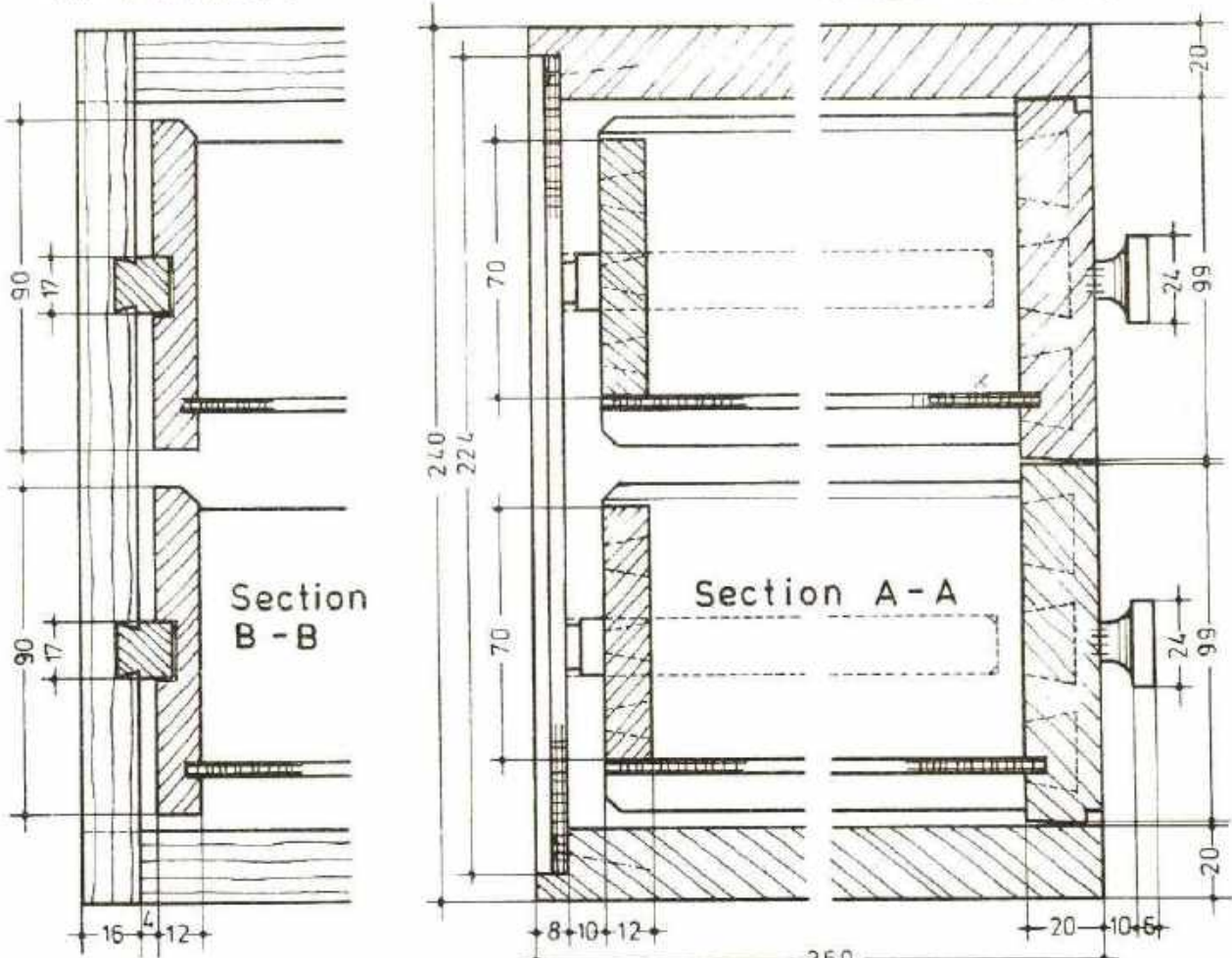
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 58
 PRACTICAL
 EXERCISE
 NO. 34

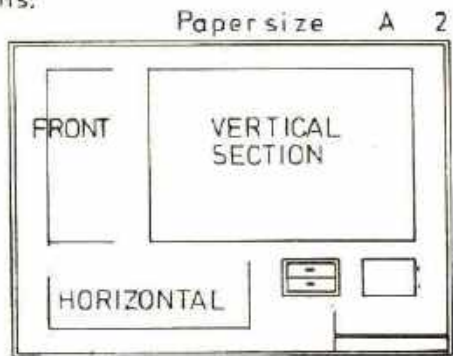
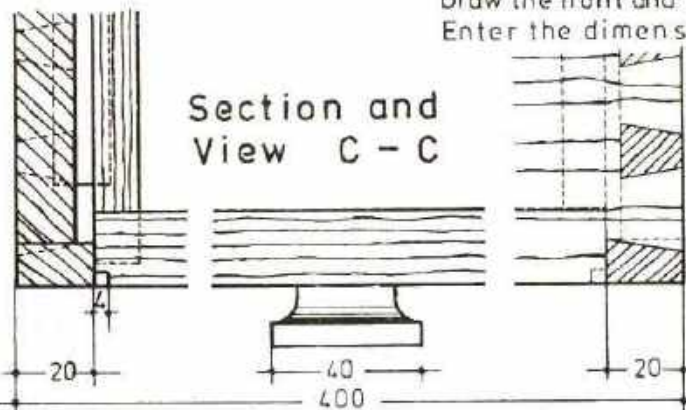
DIFFERENT SLIDING SYSTEMS FOR DRAWERS

(1. Method)

SCALES 1:2 & 1:10



EXERCISE : Draw the vertical, horizontal and front sections in sc.1:1.
 Draw the front and side views in scale 1:5.
 Enter the dimensions.



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

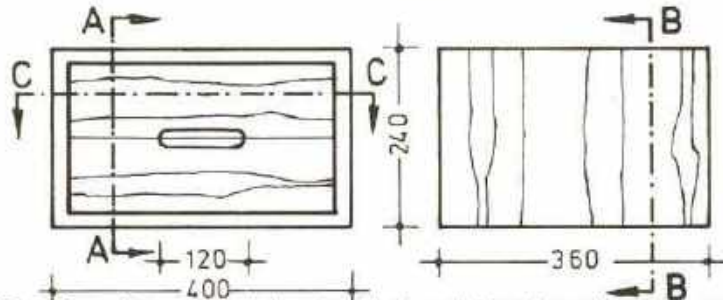
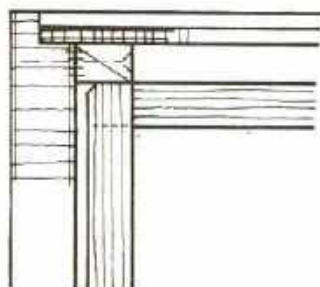
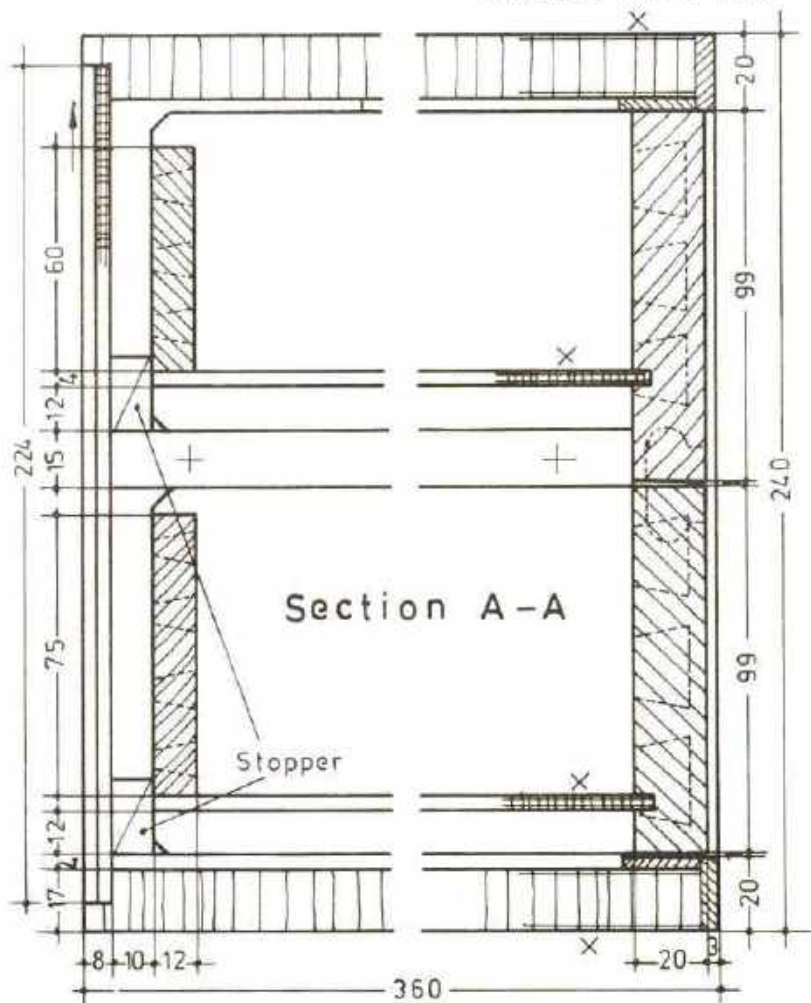
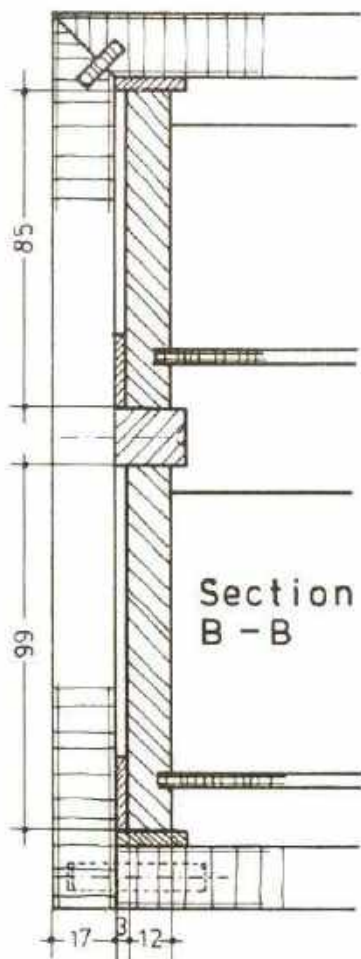
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 59
 PRACTICAL
 EXERCISE
 NO. 35

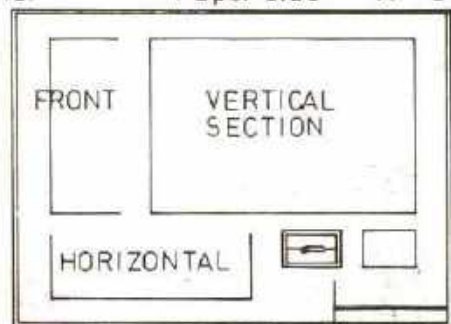
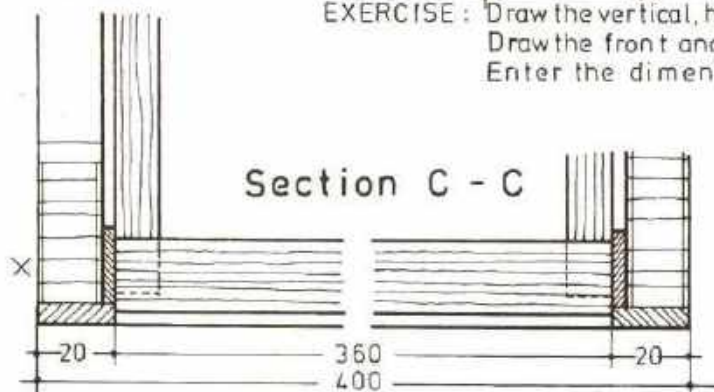
DIFFERENT SLIDING SYSTEMS FOR DRAWERS

(2. Method)

SCALES 1:2 & 1:10



EXERCISE : Draw the vertical, horizontal and front sections in sc.1:1.
 Draw the front and side views in scale 1:5.
 Enter the dimensions. Paper size A 2



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

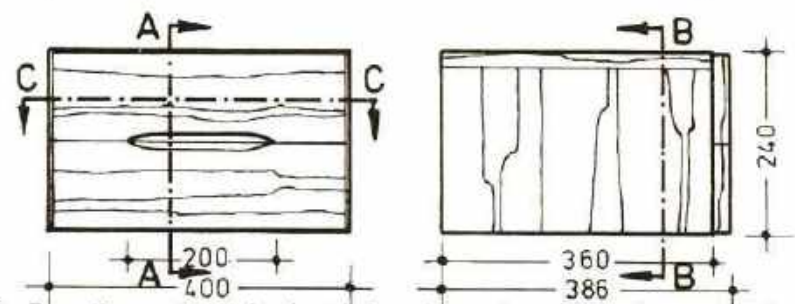
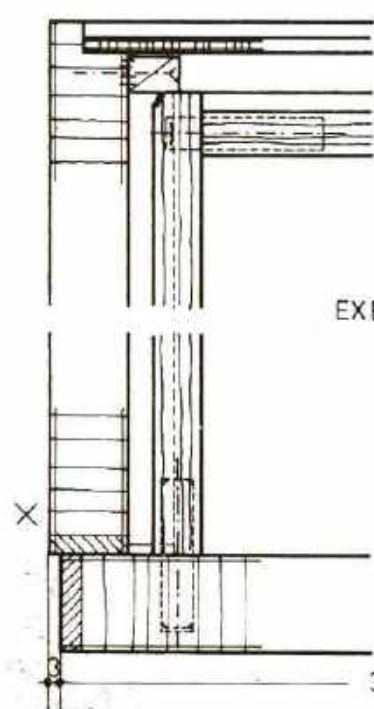
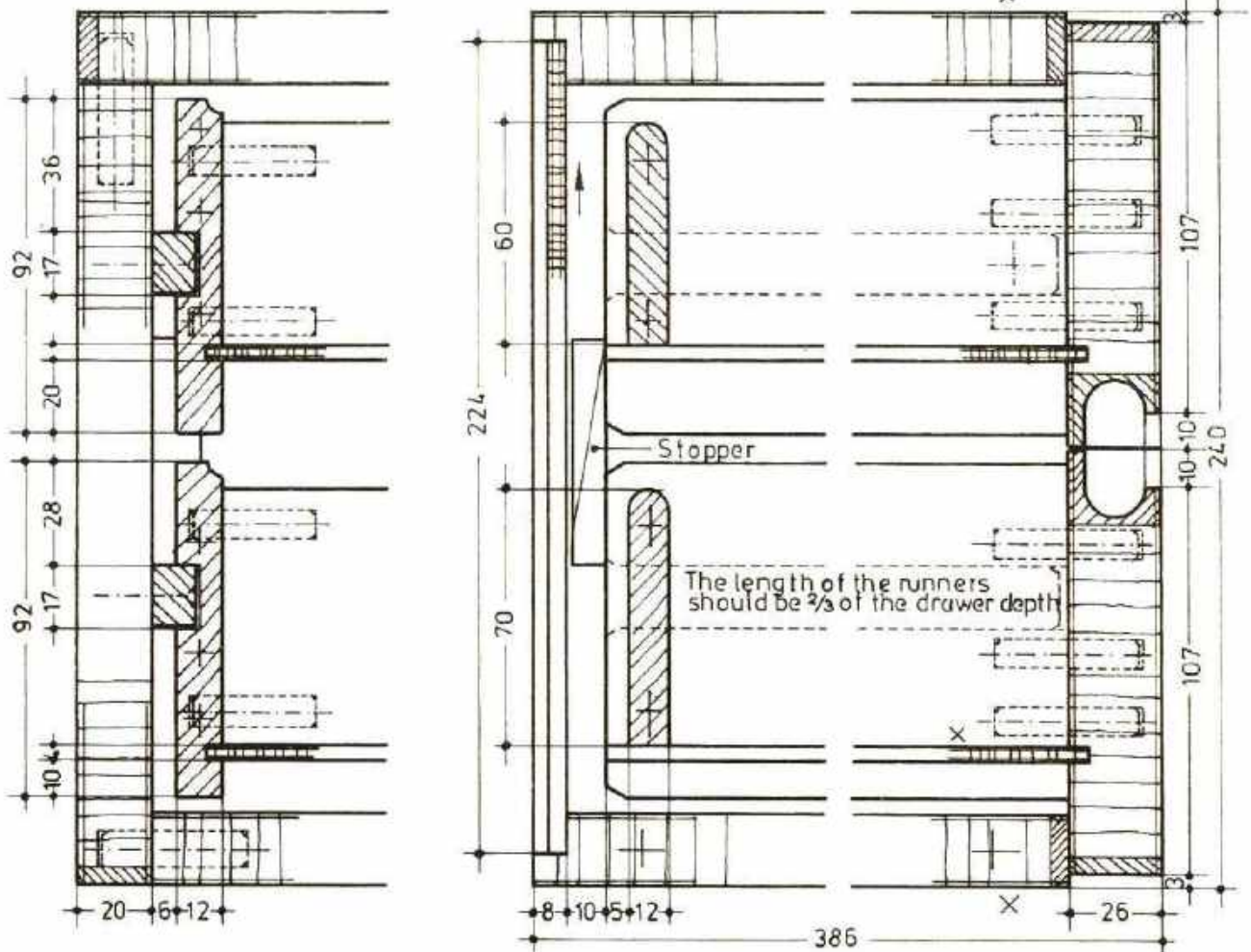
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 60
 PRACTICAL
 EXERCISE
 NO. 36

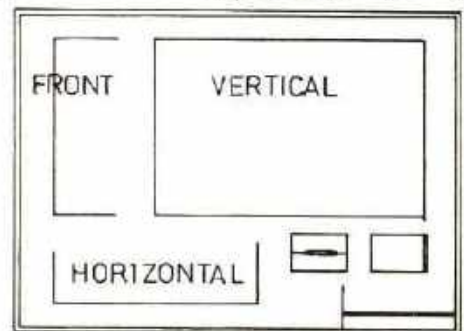
DIFFERENT SLIDING SYSTEMS FOR DRAWERS

(3. Method)

SCALES 1:2 & 1:10



EXERCISE : Draw the vertical, horizontal and front sections in scale 1:1.
 Draw the front and side views in scale 1:5.
 Enter the dimensions. Paper size A 2



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

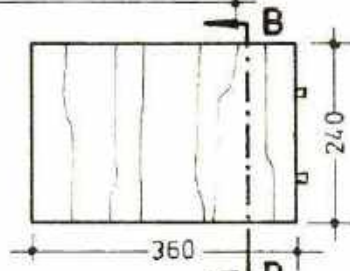
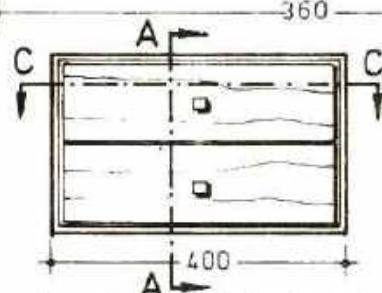
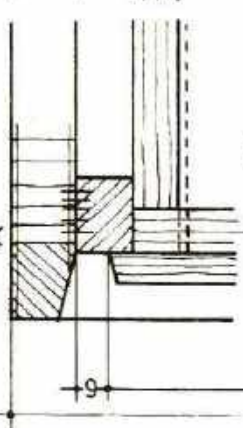
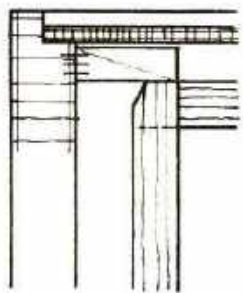
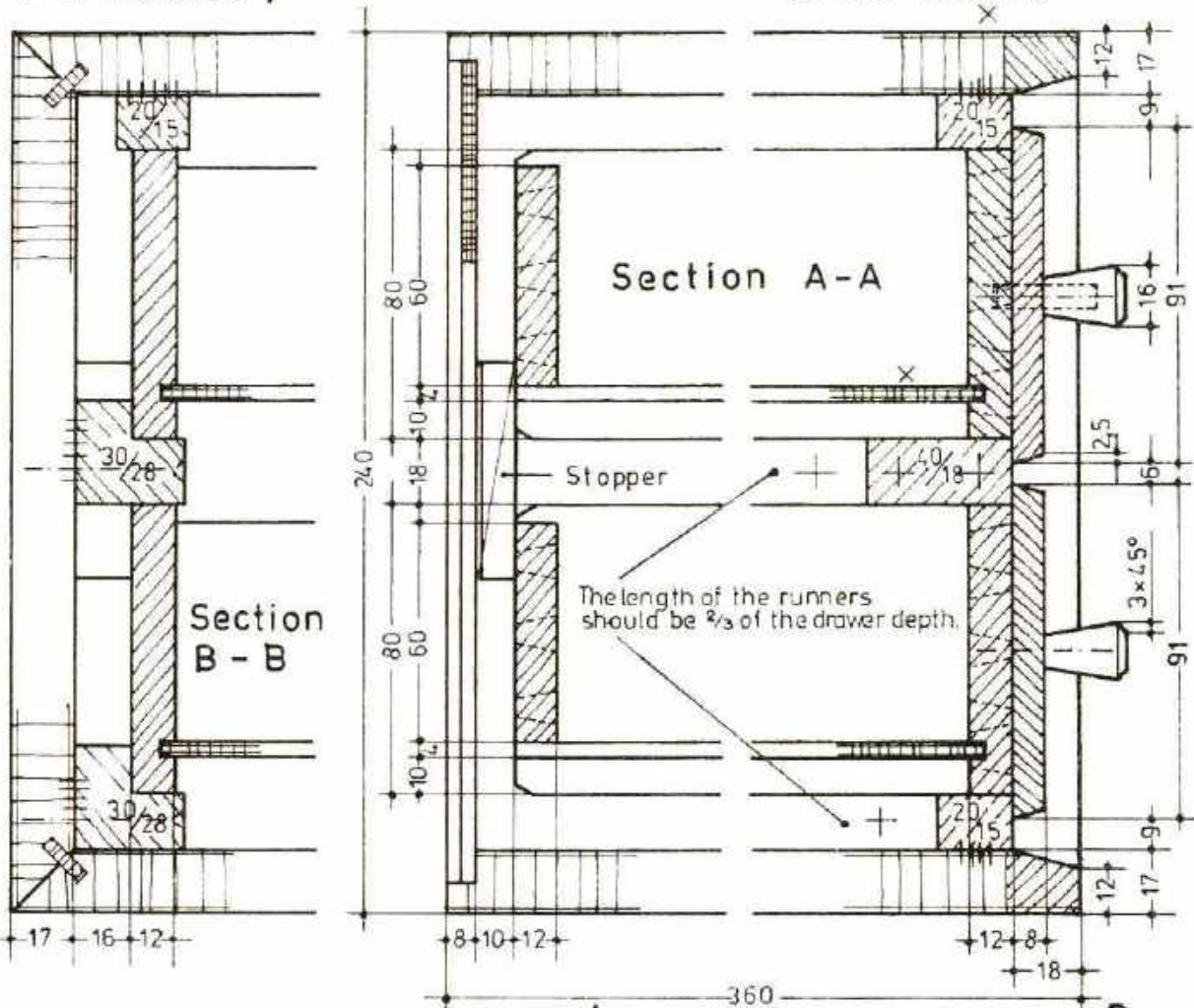
PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 61
 PRACTICAL
 EXERCISE
 NO. 37

DIFFERENT SLIDING SYSTEMS FOR DRAWERS

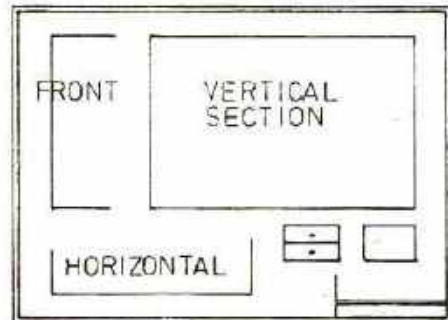
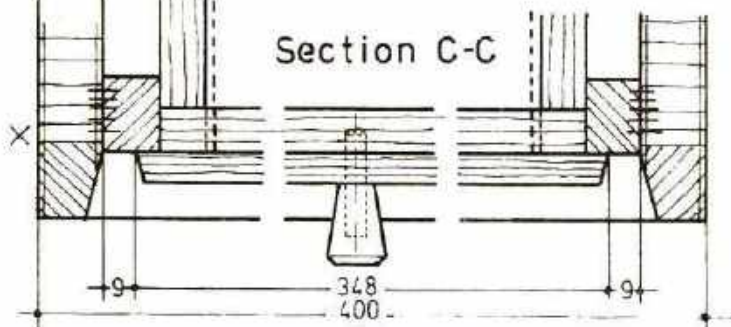
(4. Method)

SCALES 1:2 & 1:10



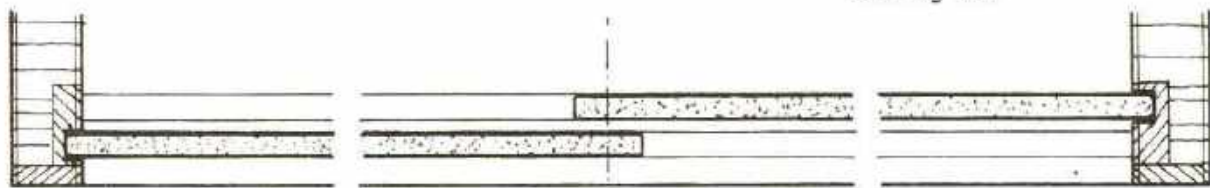
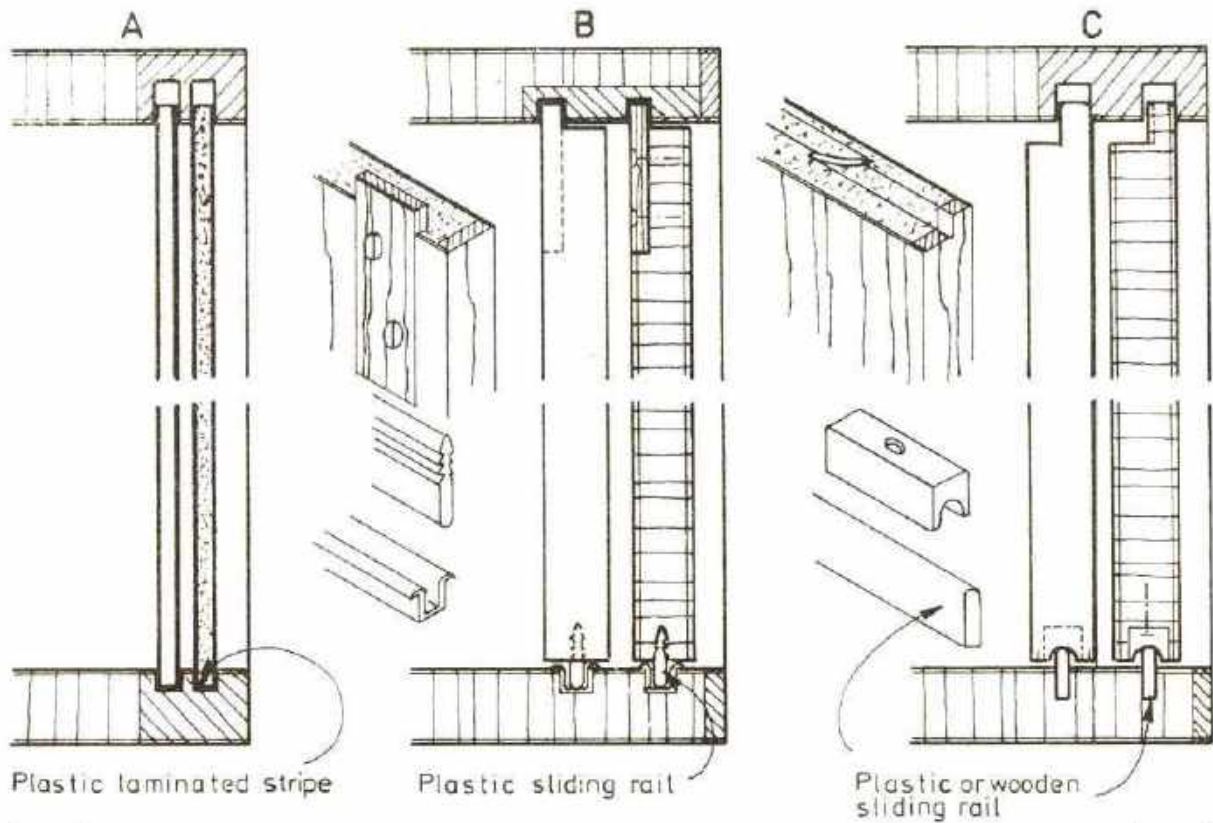
EXERCISE : Draw the vertical, horizontal and front sections in sc. 1:1.
 Draw the front and side views in scale 1:5.
 Enter the dimensions. Paper size A 2

Section C-C

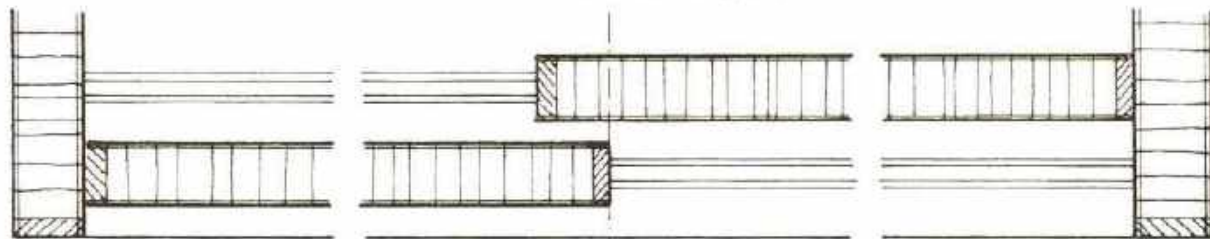


SLIDING DOOR SYSTEM

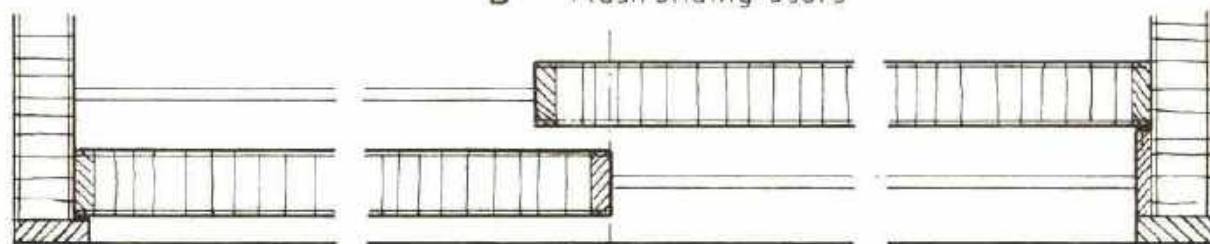
Vertical sections



A Glass sliding doors



B Flush sliding doors



Horizontal sections

C Flush sliding doors



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PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 63

CUPBOARD WITH SLIDING DOORS



Dimensions

Lower unit: 1220x530x26 (top)
 1160 500 724 (size of
 cupboard incl. footing.)
 Upper unit: 1060x345x26 (top)
 1010 320 904 (size
 of cupboard.)

Lower unit with two flush sliding
 doors, one vertical partition
 and two adjustable shelves.

Upper unit with two glass sliding
 doors and two adjustable
 shelves.

50x21

50x50

30

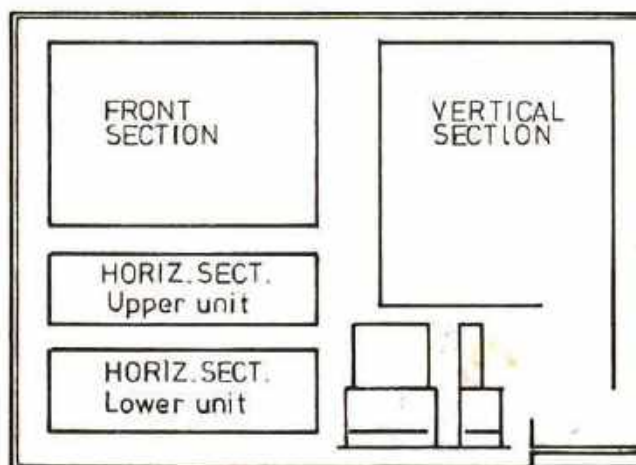
190

EXERCISE :

Draw the front, vertical and
 horizontal sections in scale 1:1
 and the front and side views
 in scale 1:10.
 Enter the dimensions.

For sliding doors see page no.63

Paper size A 1



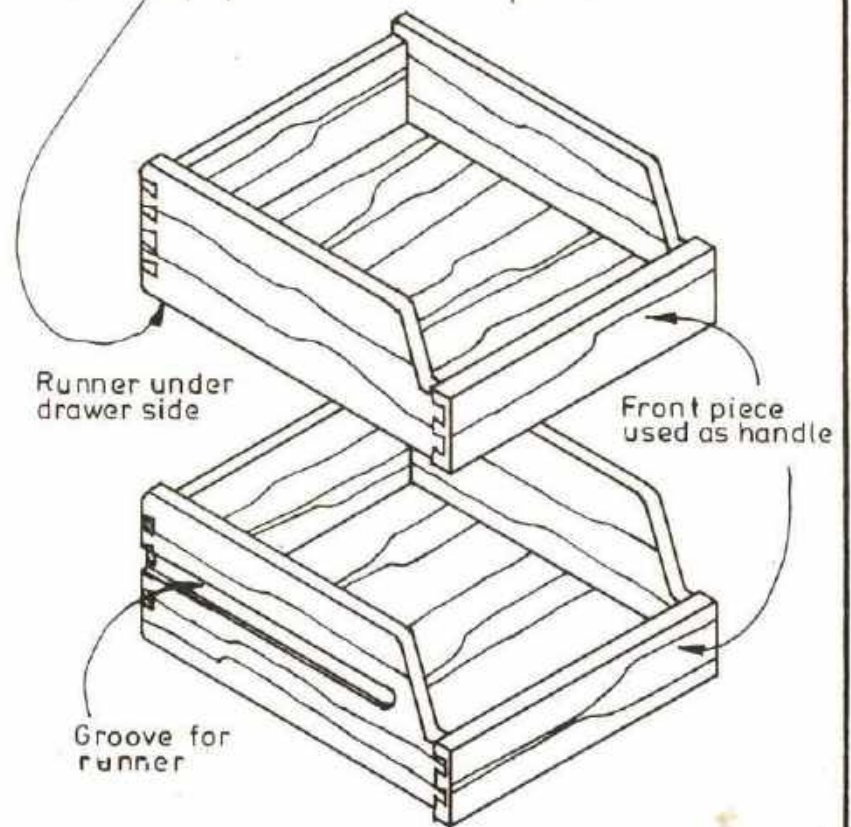
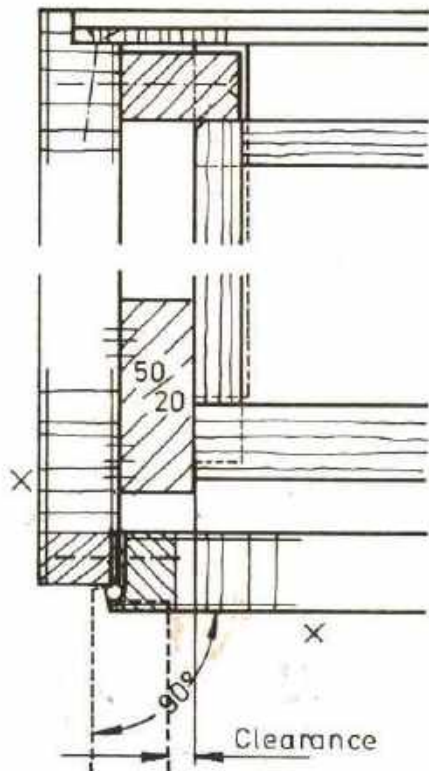
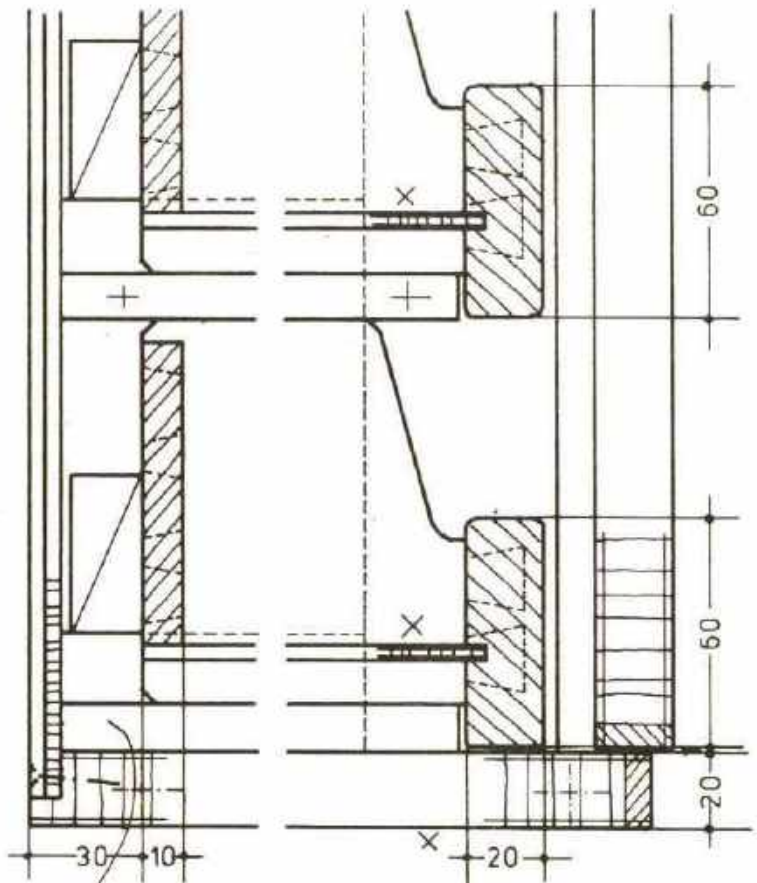
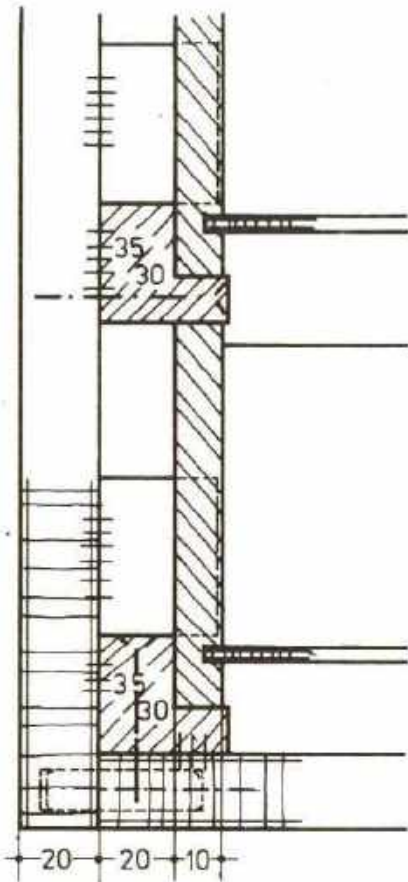
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO.64
 PRACTICAL
 EXERCISE
 NO. 39

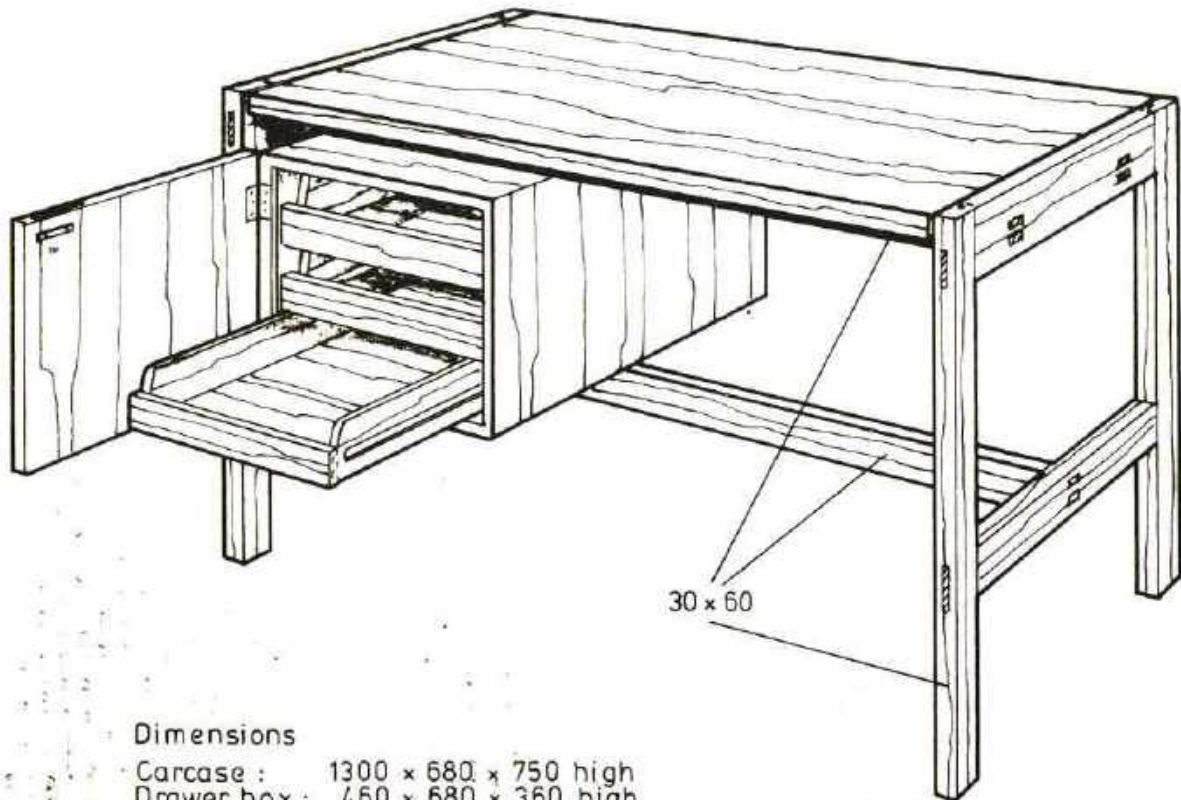
THE ENGLISH DRAWER

Drawer with narrow front piece.
For use inside cupboards, sideboards, desks etc.



WRITING DESK

For English drawer see page no 65



Dimensions

Carcase : 1300 x 680 x 750 high
Drawer box : 460 x 680 x 360 high

Top and drawer box made of chipboard/veneered.
Carcase and drawers made of solid wood.
Drawerbox with three English drawers
and flush door.

EXERCISE

Produce a technical drawing of
front vertical and horizontal
sections in scale 1:1.
Draw front and side views
in scale 1:10

Paper size A 1



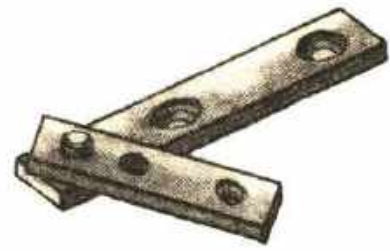
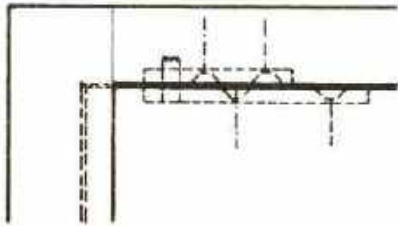
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

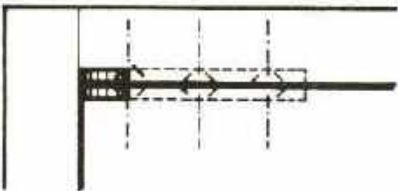
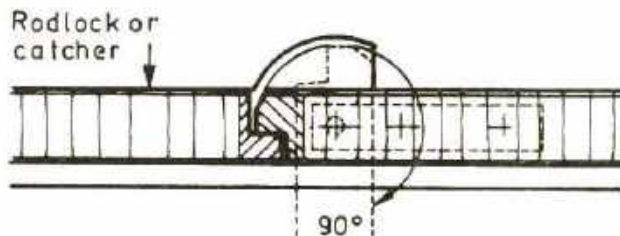
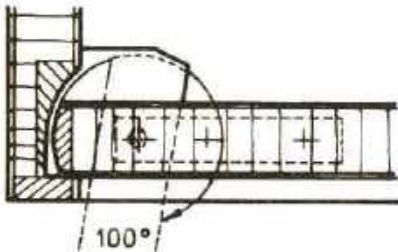
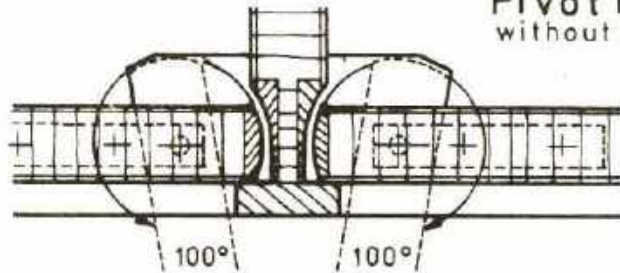
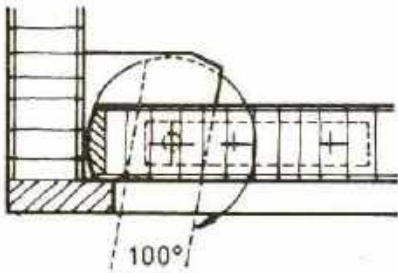
SHEET NO. 66
PRACTICAL
EXERCISE
NO. 40

DOORS AND HINGING METHODS

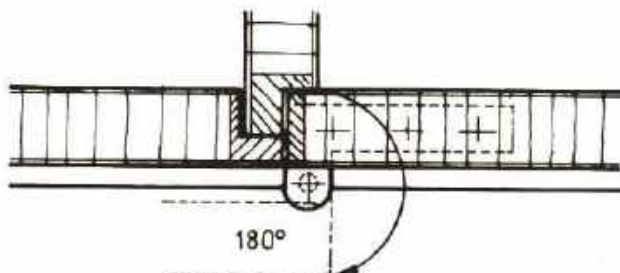
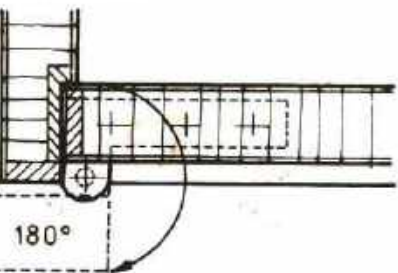
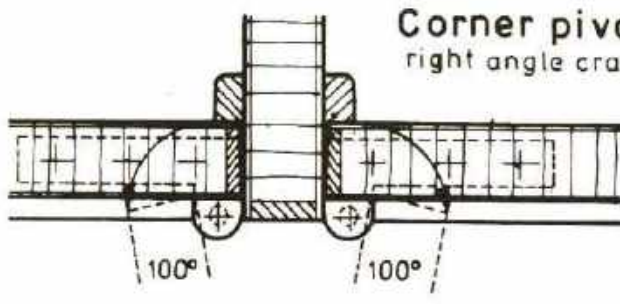
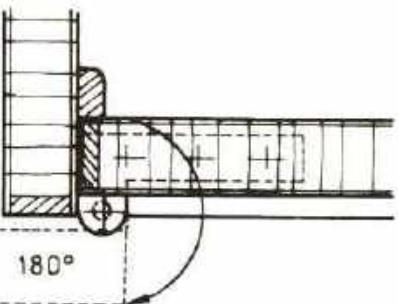
PIVOT HINGES



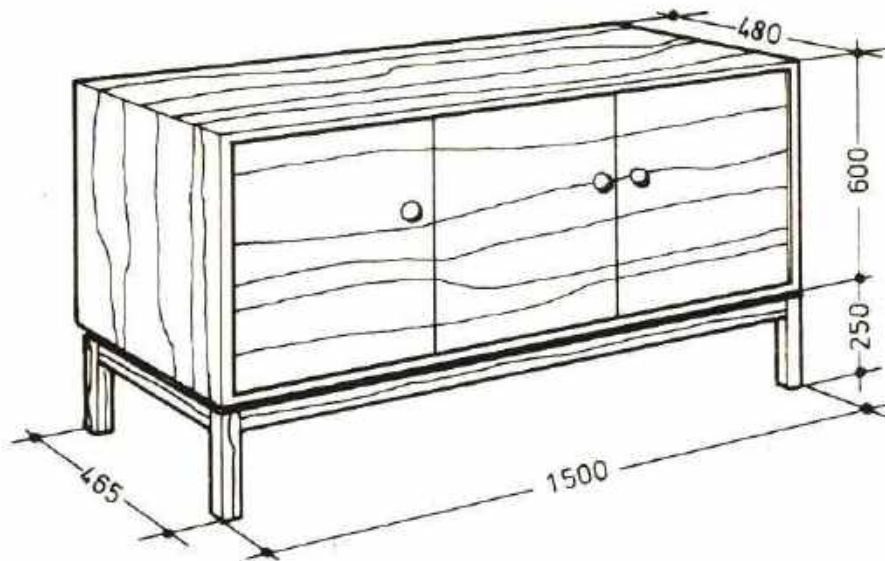
Pivot hinge
without stop



Corner pivot hinge
right angle cranked



SIDE BOARD



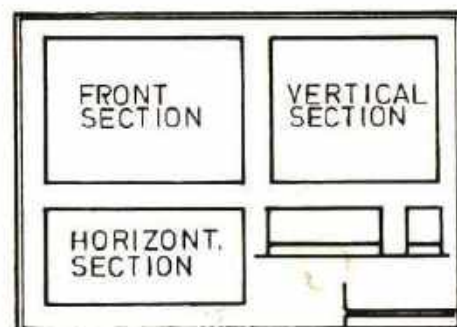
Dimensions: 1500 x 480 x 850

Box and doors made of 19 mm chipboard.
Doors hinged with pivot hinges, locked with magnet catchers.
Veneer on face of doors is laid horizontally.
Footing and handles made of solid wood.
Two vertical partitions. Three adjustable shelves.

EXERCISE :

Draw the front, vertical and horizontal sections in scale 1:1, the front and side views in scale 1:10.
Enter the dimensions.

For pivot hinges see page no. 67



Paper size A 2



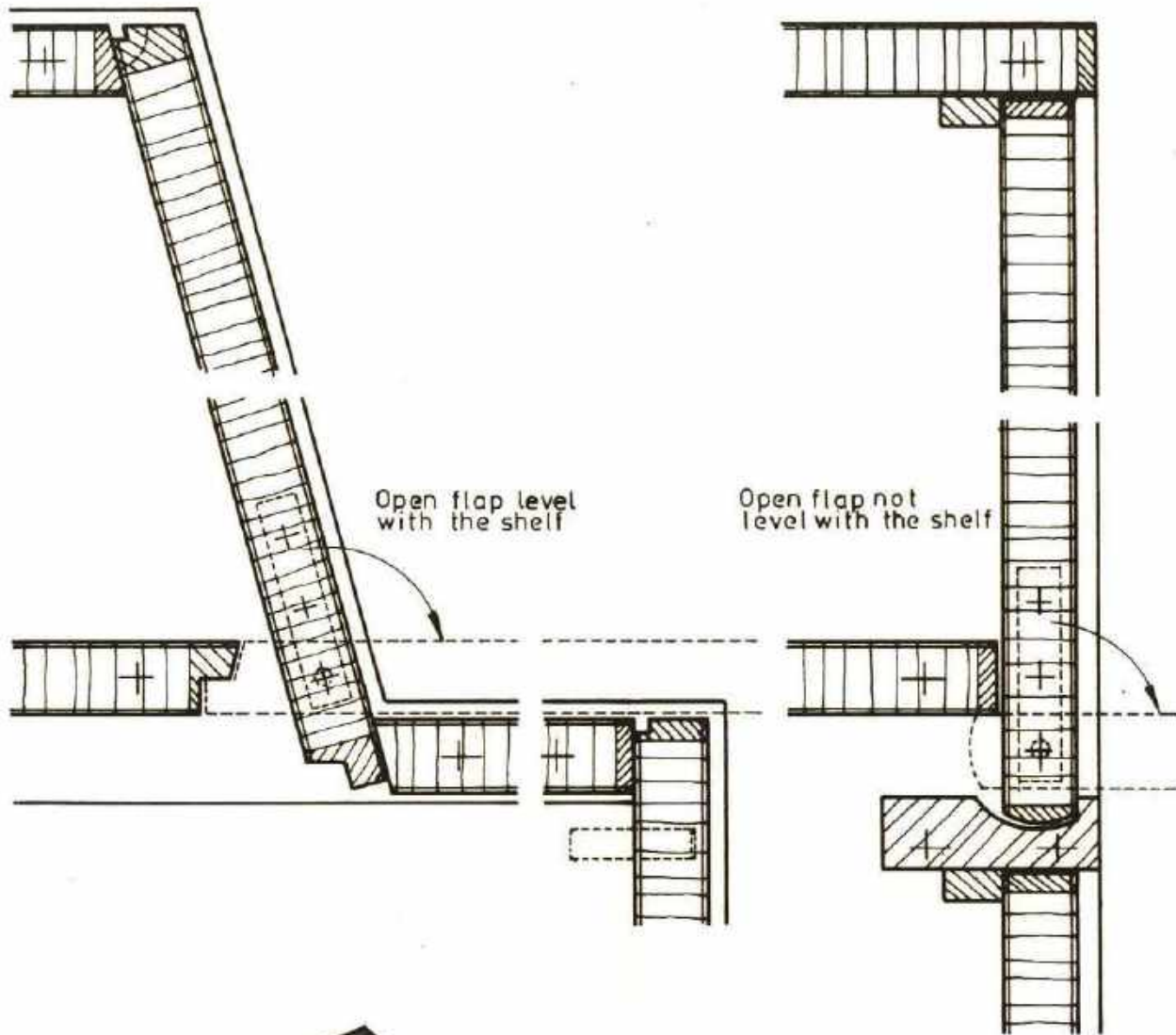
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO.68
PRACTICAL
EXERCISE
NO. 41

DESK FLAPS AND HINGING METHODS

PIVOT HINGES



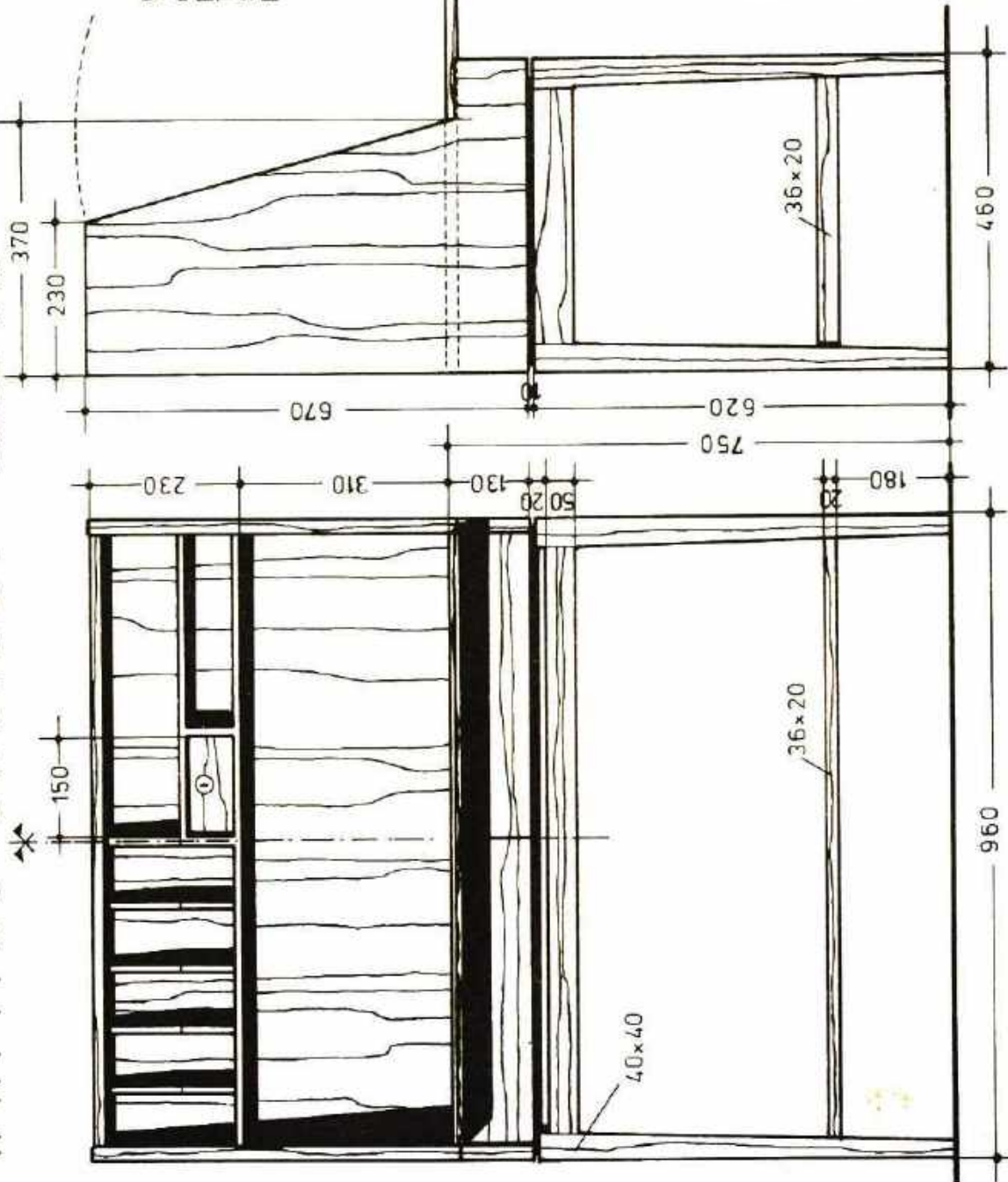
Pivot hinge

For large flaps, additional flap stays are required.



WRITING CABINET

SCALE 1:10



Dimensions : 960 x 460 x 1300 h.
 Cabinet made of chipboard/veneered.
 Footing made of solid wood
 Two drawers below writing flap.
 One lockable drawer inside.
 Flap hinged with pivot hinges.

EXERCISE :

Produce a technical drawing of all details in scale 1:1.
 Draw front and side views in scale 1:10.
 Enter the dimensions.
 For hinging possibility see page no. 69

Paper size A 1



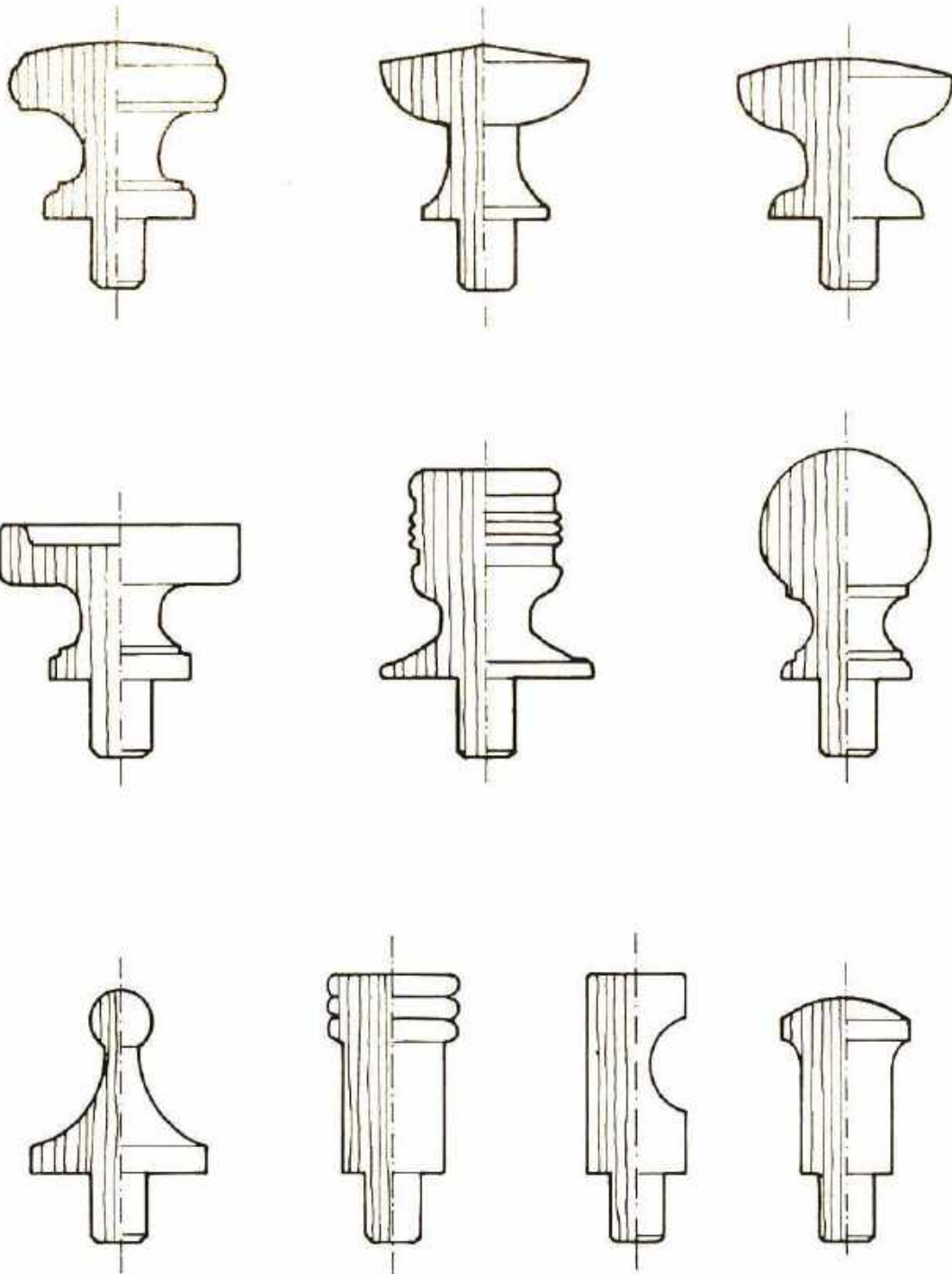
DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 70
 PRACTICAL
 EXERCISE
 NO. 42

KNOBS FOR DRAWERS AND DOORS

Scale 1:1



NOTE : The above shown designs of knobs can be manufactured in bigger or smaller dimensions, according to various types of furniture.



DEVELOPMENT CELL FOR SKILLED LABOUR TRAINING

PAK-GERMAN TECHNICAL TRAINING PROGRAMME

SHEET NO. 71

