BOBP/MAG/12

How to Build a Timber Outrigger Canoe

BOBP For Fisheries Development
BAY OF BENGAL PROGRAMME

8.6m OUTRIGGER CANOE INS-5

BUILDING INSTRUCTIONS

by

O Gulbrandsen
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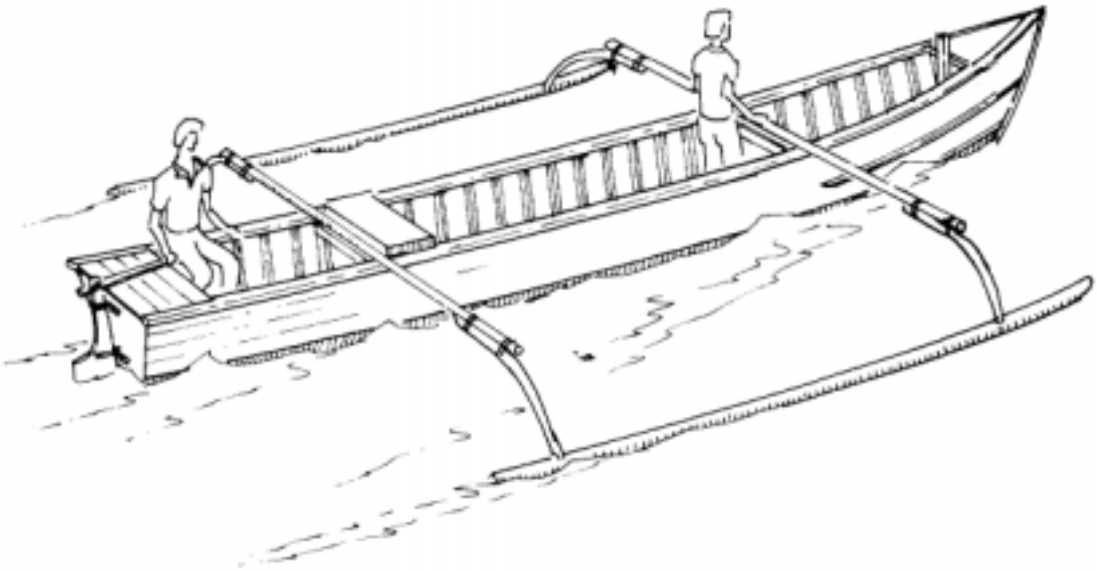

Bay of Bengal Programme
Madras, India
Provincial Fisheries Service of North Sumatera
Indonesia

1993

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INTRODUCTION

Dug-out outrigger canoes, traditional fishing craft found from Madagascar in the west to Indonesia and the Pacific Islands in the east, are made from tree trunks of adequate diameter. But logs for construction of large canoes are becoming difficult to find and construction is consequently becoming more and more expensive. Dug-out construction also wastes a lot of timber. For each dug-out canoe, two or three planked canoes can be built. The Bay of Bengal Programme (BOBP) undertook a project in Nias Island, Sumatera, Indonesia, and Shri Lanka to design and construct planked outrigger canoes that would provide an answer to the problems now being laced in building the traditional outrigger canoes.

The outrigger canoe, INS-5, developed by BOBP in Nias Island was fully tested and demonstrated for hook-and-line fishing, using an insulated ice box to preserve the catch, and was found acceptable by fisherfolk in several fishing villages of Nias Island and the west coast of the Province of North Sumatera. This manual, describing the design and construction of this BOBP-designed canoe, is presented in a simple 'how-to-do' format that can be easily used by any boat-builder or carpenter with a little experience. The manual also describes the construction of a canoe with diagonal planking of its sides, as done in Shri Lanka, where it is difficult and expensive to obtain planks of 4-5 m length.

The project for the development of the outrigger canoe and this manual have been sponsored by the Bay of Bengal Programme's "Small-Scale Fisherfolk Communities in the Bay of Bengal" (GCP!RAS/118/MUL). The project was executed by the Provincial Fisheries Service of North Sumatera, An Indonesian edition of the manual has been published in cooperation with the Semarang Fishing Technology Development Centre, Ministry of Agriculture, Directorate General of Fisheries, Indonesia.

The manual shows, step by step, how to build the main hull of the 8.6 m-long INS-5 canoe using sawn planks. The same methods of construction may be used for canoes from 7.5 m to 10.8 m length. Sawn planks are available either cut locally or bought from a timber shop. The different dimensions of timber used have been kept to a minimum and these dimensions correspond to common commercial sizes. The planks alone need to be planed to the correct thickness with an electric planer.

The shape of the canoe is given by the main frames spaced apart. These frames can easily be drawn in full size from the measurements given in the manual.

The bottom of the canoe is crossplanked with two layers of planking to ensure good watertightness even after the craft has been left sitting on the beach for several days. The sides can be planked longitudinally in the conventional way, or diagonally. The diagonal planking is preferred if it is difficult to obtain planks of 4-5 m length.

A wooden boat is only as strong as its fastenings. Oniy nails and bolts that have been hot dip galvanized are recommended. Note that electroplating is not suitable.

The design, with sharp forebody and moderate width of transom, is suitable lor low-powered diesel engines. The INS-5 canoe is fitted with an inboard diesel engine of 6-8 hp with no reverse/reduction gear or clutch. It is a horizontal cylinder engine used for many purposes, such as irrigation pumps and generators. The price of this engine is relatively low and spare parts are easily available. Because the fuel consumption is only half that of a similar outboard engine, it has become the most popular fishing boat engine between 5 hp and 15 hp in Sumatera, Indonesia.

Though this manual has been prepared specially for small-scale carpenters with basic tools, engaged in the construction of small timber craft in remote villages, it could also be useful for trainers teaching in fisheries schools and extension workers in small-scale fisheries.

The Bay of Bengal Programme (BOBP) is a multi-agency regional fisheries programme which covers seven countries around the Bay of Bengal — Bangladesh, India, Indonesia, Malaysia, Maldives, Shri Lanka and Thailand. The Programme plays a catalytic and consultative role: it develops, demonstrates and promotes new techniques, technologies or ideas to help improve the conditions of small-scale fisherfolk communities in member-countries. The BOBP is sponsored by the governments of Denmark, Sweden and the United Kingdom, by member-governments in the Bay of Bengal region, and also by AGFUND (Arab Gulf Fund for United Nations Development Organizations) and UNDP (United Nations Development Programme). The main executing agency is the FAO (Food and Agriculture Organization of the United Nations).

This document is a manual which has been prepared by *0* Gulbrandsen, Consultant Naval Architect. It has not been cleared by the Government concerned or the FAO.

ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED

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TIMBER

Two different types of timber are required:

A A rot-resistant timber for internal parts that are difficult to replace, such as frames, keel and battens. This timber should usually be of medium weight, 650kg/m^3 , or750kg/m^3 when it is air-dried.

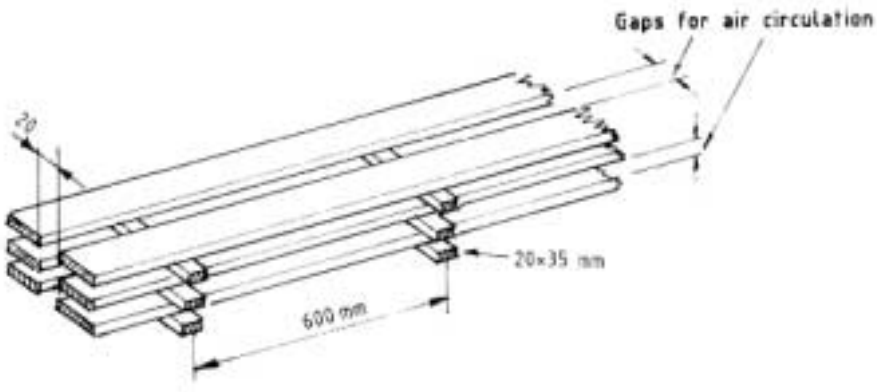
B A stable timber for the outside planking that does not swell and shrink much with changes in humidity. This timber should usually be of low weight, 500 -600 kg/rn3.

The list for timber (below) includes an allowance of 25% for wastage
Note: The list does not include the building jig (see page 7)

TYPE OF TIMBER	DIMENSIONS SAWN mm	MINIMUM LENGTH m	NUMBER OF PIECES	TOTAL LENGTH m	TOTAL VOLUME m^3
	25x150	4	7	28	
	40x150	4	9	36	
A	50x150	5	4	20	0.59
	50x300	1.8	1	1.8	
	75x100	4	1	4	
	100x200	3	1	3	
	20x150	4	32	128	
B	20x 150	5	15	75	0.73
	25x250	4	6	24	

AIR DRYING

The timber must be stored under a roof, protected against sun and rain. Minimum time for air-drying is 3 months after sawing.



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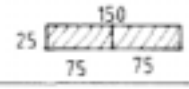
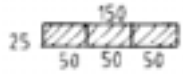
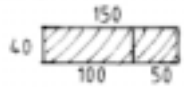
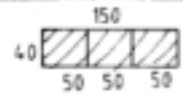
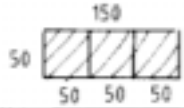
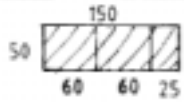
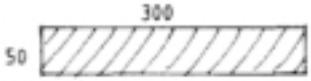
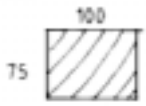
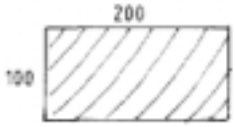
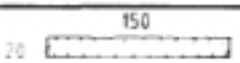
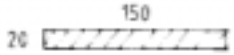
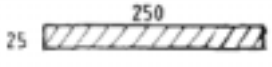
SAWING AND PLANING – AFTER AIR DRYING

2

TYPE OF TIMBER	DIMENSIONS SAWN mm	LENGTH m	NUMBER OF PIECES	DIMENSIONS PLANED mm	NUMBER OF PIECES
A		4	5	20 × 140	5
		4	1	20 × 70	2
		4	1	20 × 45	3
		4	4	35 × 45	4
				35 × 90	4
		4	5	35 × 45	15
		5	2	45 ×45	6
		5	2	45 × 55	4
				20 × 45	2
		1.8	1	45 × 300	1
		4	1	70 × 90	1
		2	1	90 × 200	1
B		4	32	15 × 140	32
		5	15	15 × 140	15
		4	6	20 × 240	6

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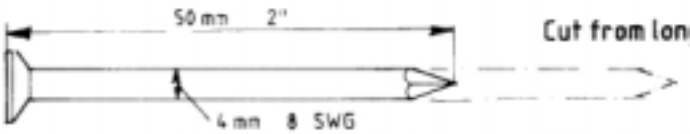
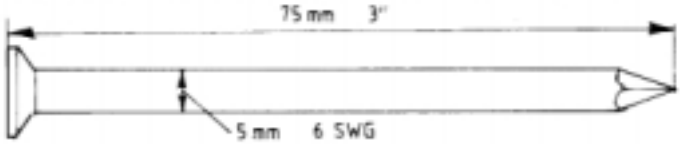
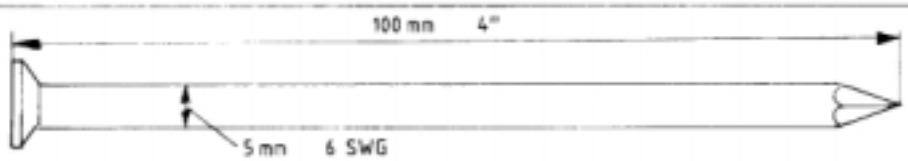
FASTENINGS

3

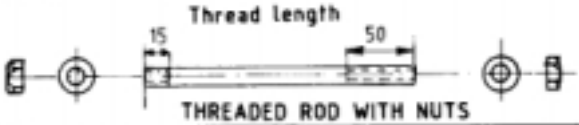
Fastenings must be HOT DIP GALVANIZED, *i.e.* **they must be dipped** in **a molten** zinc bath to obtain a thick zinc cover
(Electro-galvanized fastenings must not **be used)**

ROUND WIRE NAILS HOT DIP GALVANIZED

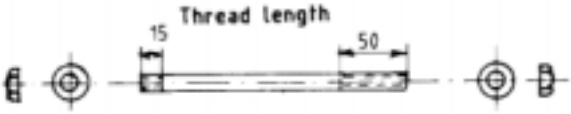
Round wire nails available locally are generally too thin in relation to the length necessary for boat-building use. Either a special order must be made from a nail factory, or longer nails of the correct diameter should be cut down to size and then galvanized.

	QUANTITY
	11 kg
	1.5 kg
	0.6 kg

BOLTS WITH NUTS AND WASHERS HOT DIP GALVANIZED

	DIMENSION mm	DIMENSION inch	QUANTITY
 CARRIAGE BOLTS	10 × 75	3/8 × 3	10
	10 × 150	3/8 × 6	7
 THREADED ROD WITH NUTS	10 × 220	3/8 × 9	1
	10 × 280	3/8 × 11	4

BOLTS WITH NUTS AND WASHERS STAINLESS STEEL FOR PARTS THAT ARE REMOVABLE

 THREADED ROD WITH NUTS	10 × 50	3/8 × 2	6
	10 × 100	3/8 × 4	2
	10 × 110	3/8 × 4 ½	7
	10 × 230	3/8 × 9 ½	1
 COACH SCREWS	10 ×50	3/8 × 2	2

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MISCELLANEOUS

ITEM	GUANTITY
Nylon flyscreen 1m wide roll	8 m
Bitumenous compound (roofing compound, Hydroseal)	15 kg
Hemp for caulking	0.2 kg
FilLer	1kg
Wood primer	12 Liter
Glossy paint (topcoat)	liter
Antifouling paint	2 liter
Anticorrosive primer for steel	0.5 liter
Kerosene	3 Liter
Terpentine or white spirit	2 titer
Glasspaper, coarse	S sheets
Glasspaper, fine	S sheets
PoLystyrene 75 1000 1000 mm	2 sheets
Stainless steel flat 2 x 25 x 1300 mm (See alternative page 32)	1 Pc
Stainless steel rod 16 θ x 150 mm (Rudder, page 32)	1 Pc

ENGINE_AND_ACCESSORIES

Diesel engine, horizontal cylinder, hopper cooled, 6 hp- 8 hp /2200 rpm	1pc
Propeller shaf t, stainless steel 316, diameter=22 mm, length = 1640mm	1pc
Propeller, bronze, three blade, left handed, diameter = 240 mm= 9 1/2 pitch=165mm=61/2"	1pc
Sternfube with bearings and greasing system. Between flanges = 1500 mm	1
Flexible coupLing propeller shaft to engine with bolts	
Angle iron for makinng engine bed 7 x50 x 50	2.3 m
Metal shims for engine aLLignment 1 mm	8 PC
" " 3 mm	4 pc
Hexagonal bolts 12 x 50 with double nuts for engine fixation	4 pc
Exhaust pipe with water injection elbow	1 Pc
Exhaust through hull fitting	1 pc
Wafer scoop with through huU fitting, tube outside diameter=19 mm	1pc
Cooling water fitting for bloting to engine, tube outside thameter =19 mm	1pc
Hose for cooling water inside diameter = 19 mm	3 m
Hose for exhaust, heat resistant rubber, inside diameter = 50 mm	0.4 m
Hose clamp to suit 20 mm hose preferably stainless steel	4 Pc
Hose clamp to suit 50mm hose preferably stainTess steel	4
Rudder fittings	1set
Glandpacking for stern tube	0.25m
Grease for sterntube	1kg
Spring 250 mm for engine throttle	1 pc
Pulley, brass, for 5mm throttle rope	1pc

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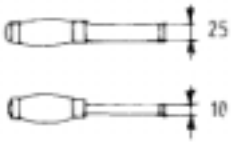
TOOLS

Crosscut saw

Planes

Rabbet plane

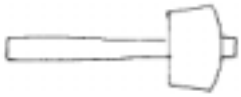


Chisels

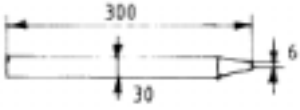
Sharpening stone

Combination coarse / fine

Claw hammer



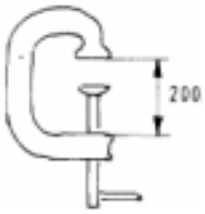
Wooden mallet



Holding iron

Nail punch

Rasp

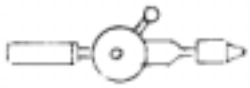


G-clamp

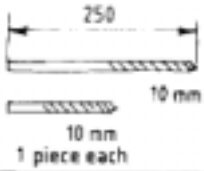
4 pieces

Ratchet brace

Breast drill



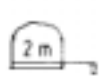
Hand drill



Drill bits

4 mm 5 pieces

3.5 mm 10 pieces



Measuring tape

Pencil

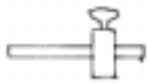
Ballpen

Straight edge

Cut from 9 mm plywood 1.2 m long

Square

Bevel



Marking gauge

Plumb bob

Hacksaw

With 5 spare blades

Open end / box end spanner

To fit nuts of 10 mm and 12 mm bolts

2 spanners of each size

Spirit level

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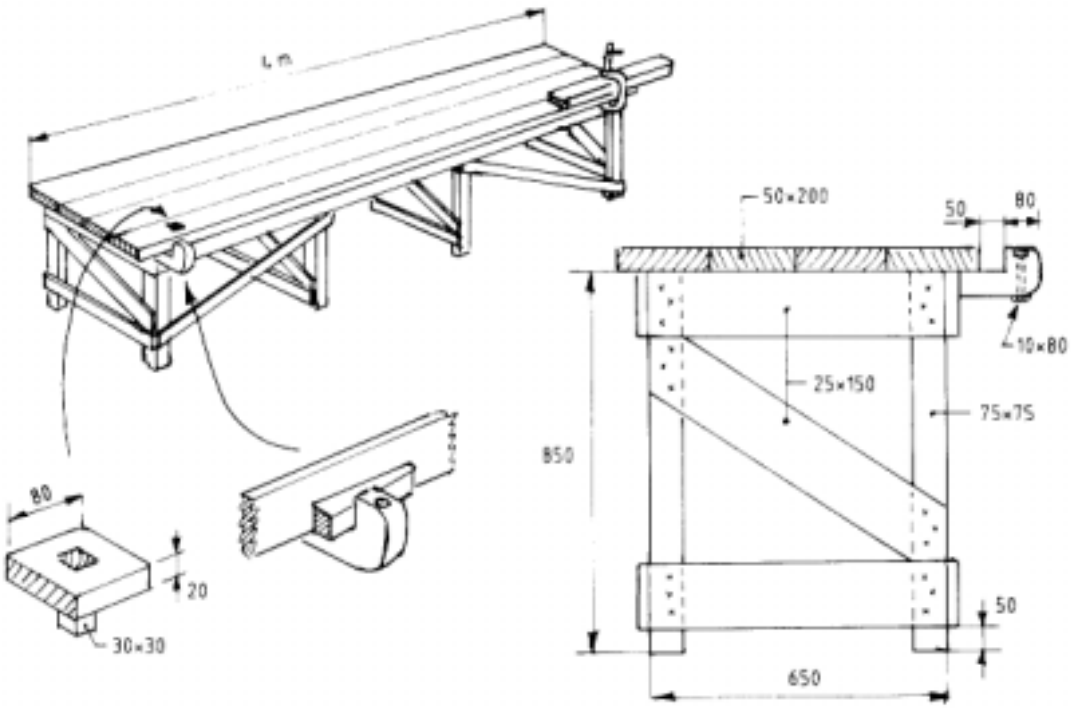
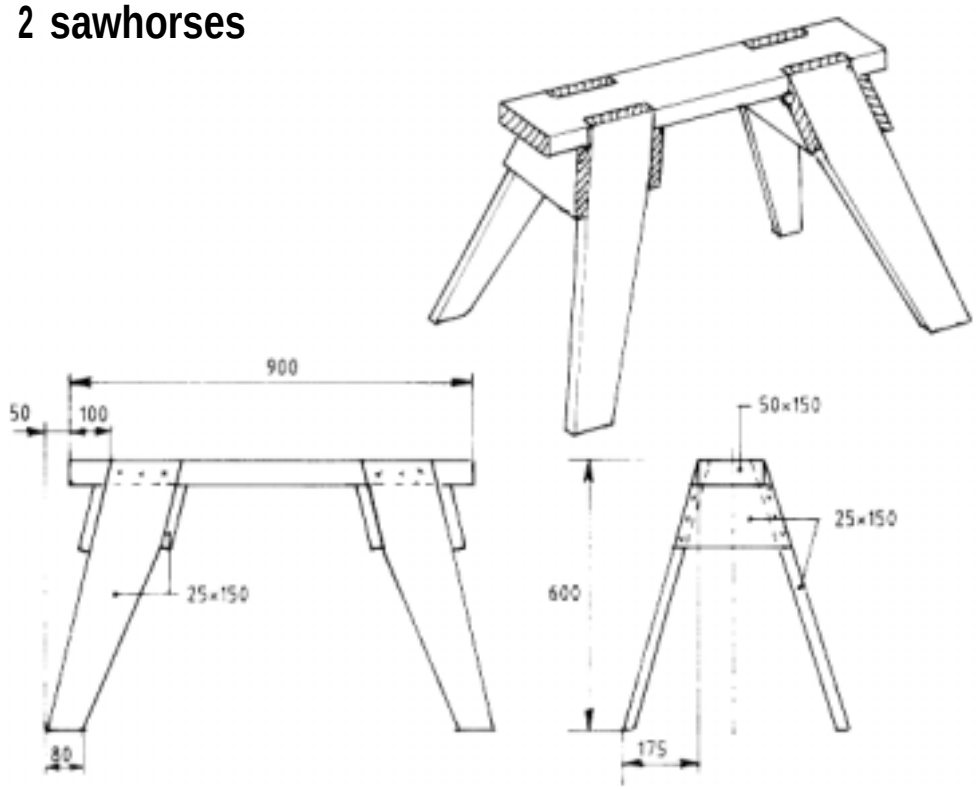
WORK BENCH and SAWHORSES

6



Make 2 sawhorses



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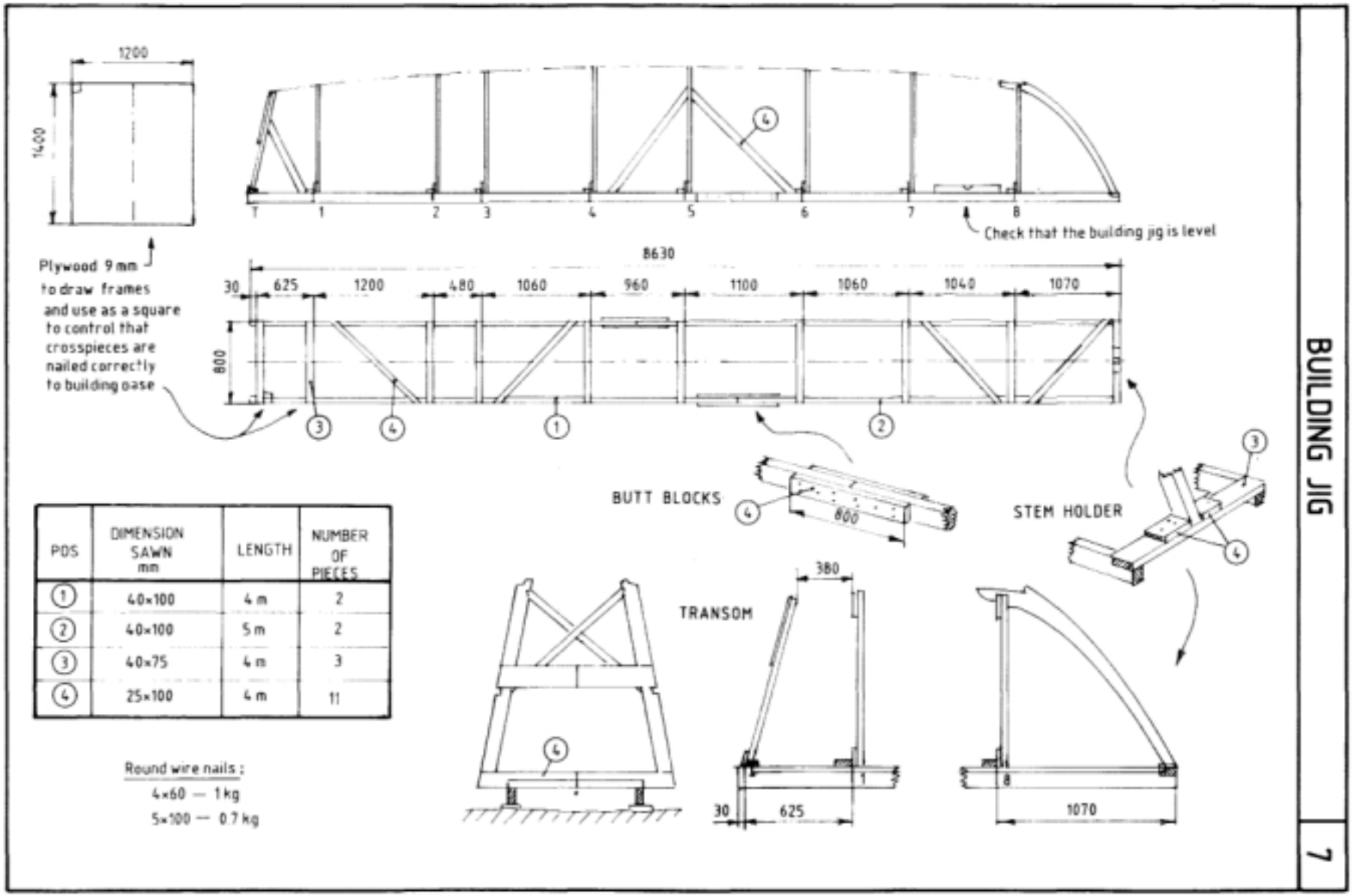
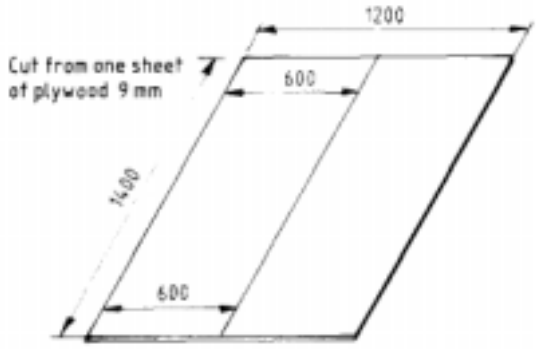
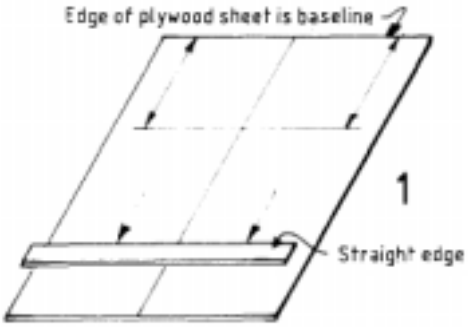
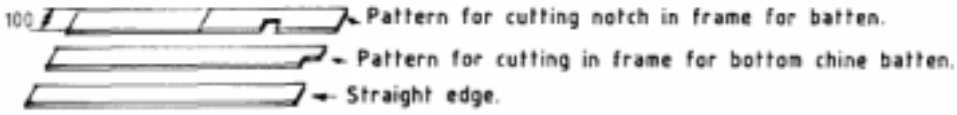


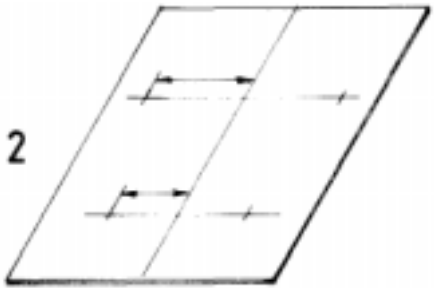
POS	DIMENSION SAWN mm	LENGTH	NUMBER OF PIECES
①	40×100	4 m	2
②	40×100	5 m	2
③	40×75	4 m	3
④	25×100	4 m	11

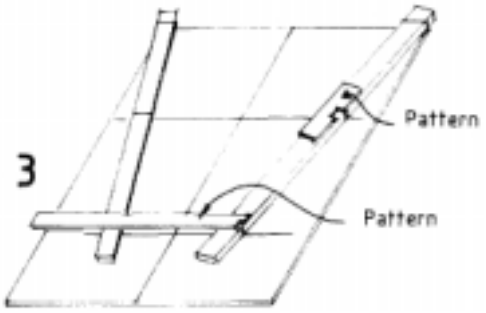
DRAWING FRAMES

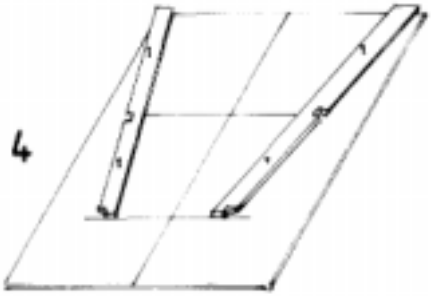


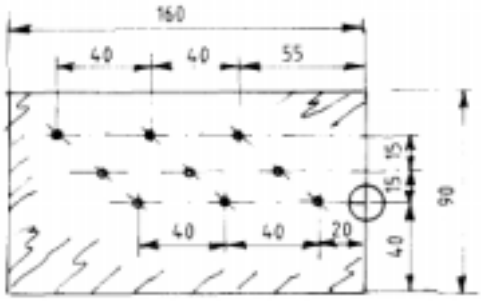




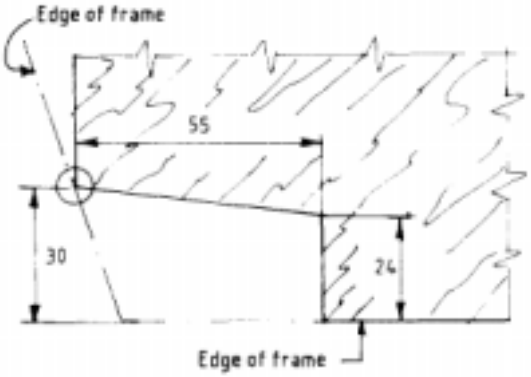




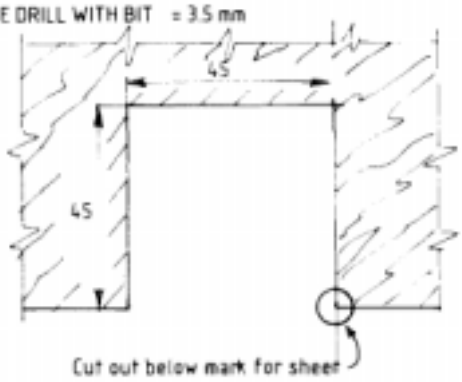




NAIL PATTERN

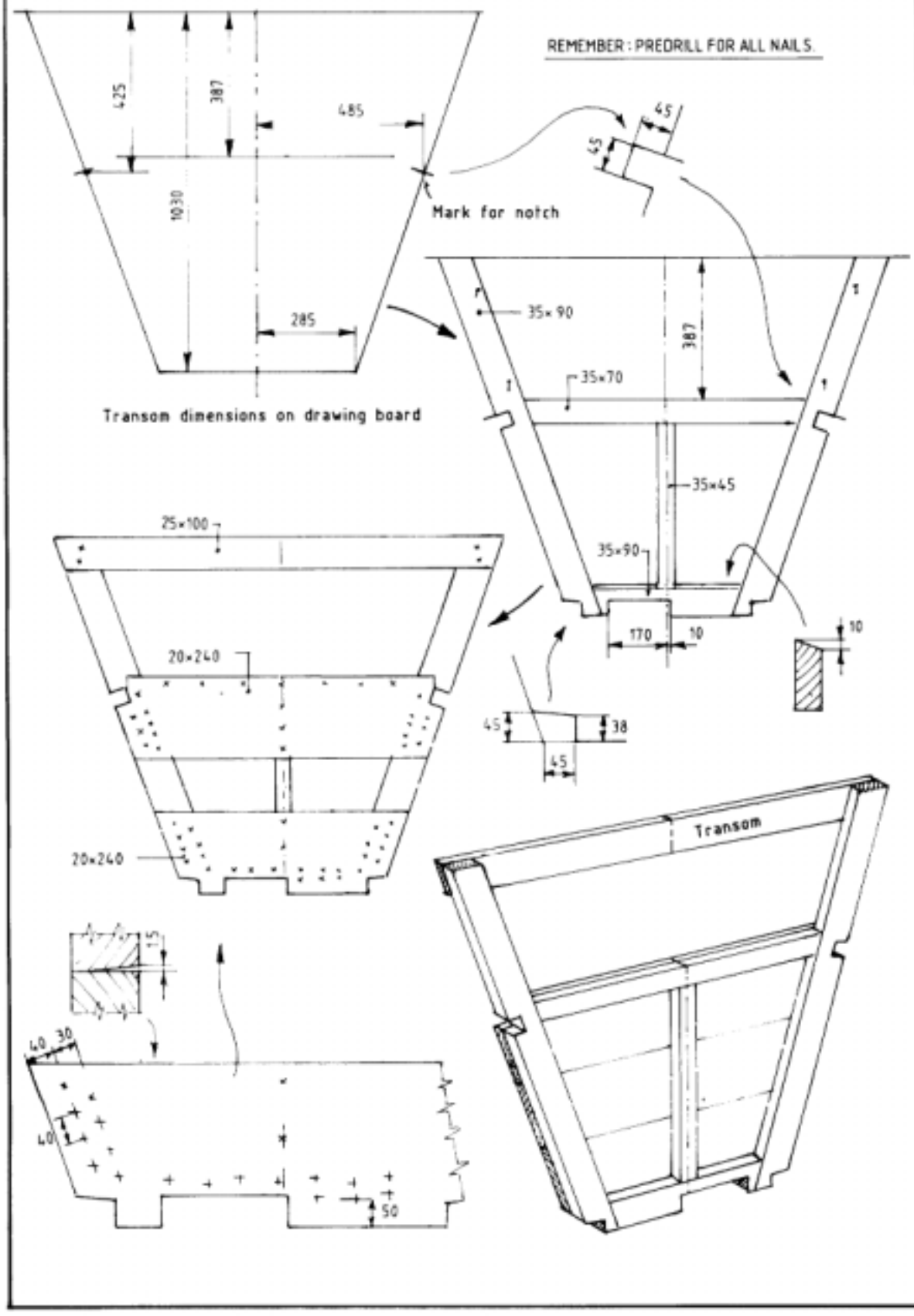


PRE DRILL WITH BIT = 3.5 mm



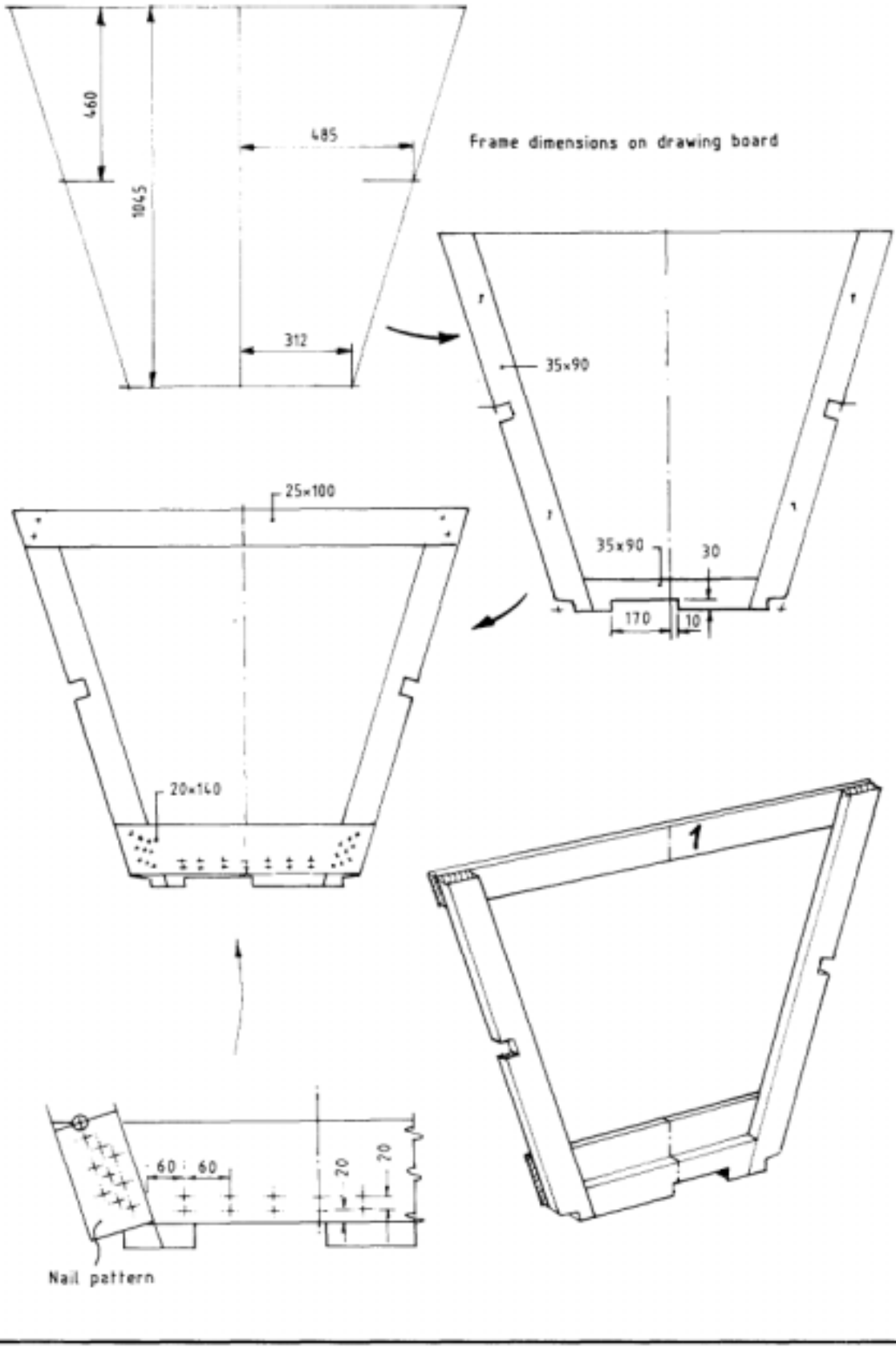
<<

TRANSOM


REMEMBER : PREDRILL FOR ALL NAILS.
425
387
485
1030
285
Transom dimensions on drawing board
Mark for notch
45
45
35×90
387
35×70
35×45
35×90
170
10
10
45
38
45
25×100
20×240
20×240
15
40
30
40
50
Transom

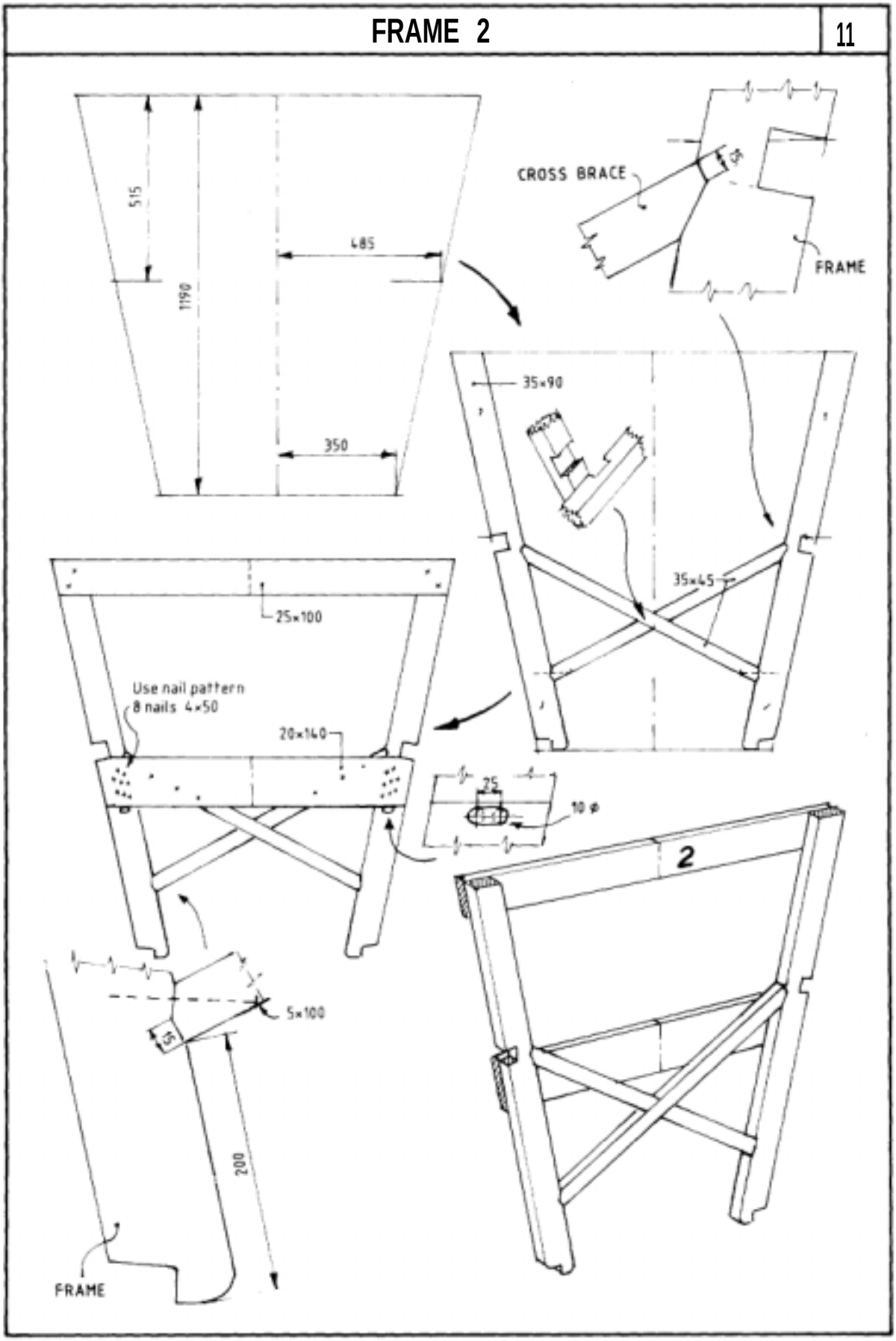
<<

FRAME 1


460
1045
485
312
Frame dimensions on drawing board
35×90
35×90
30
170
10
25×100
20×140
1
60
60
20
20
Nail pattern

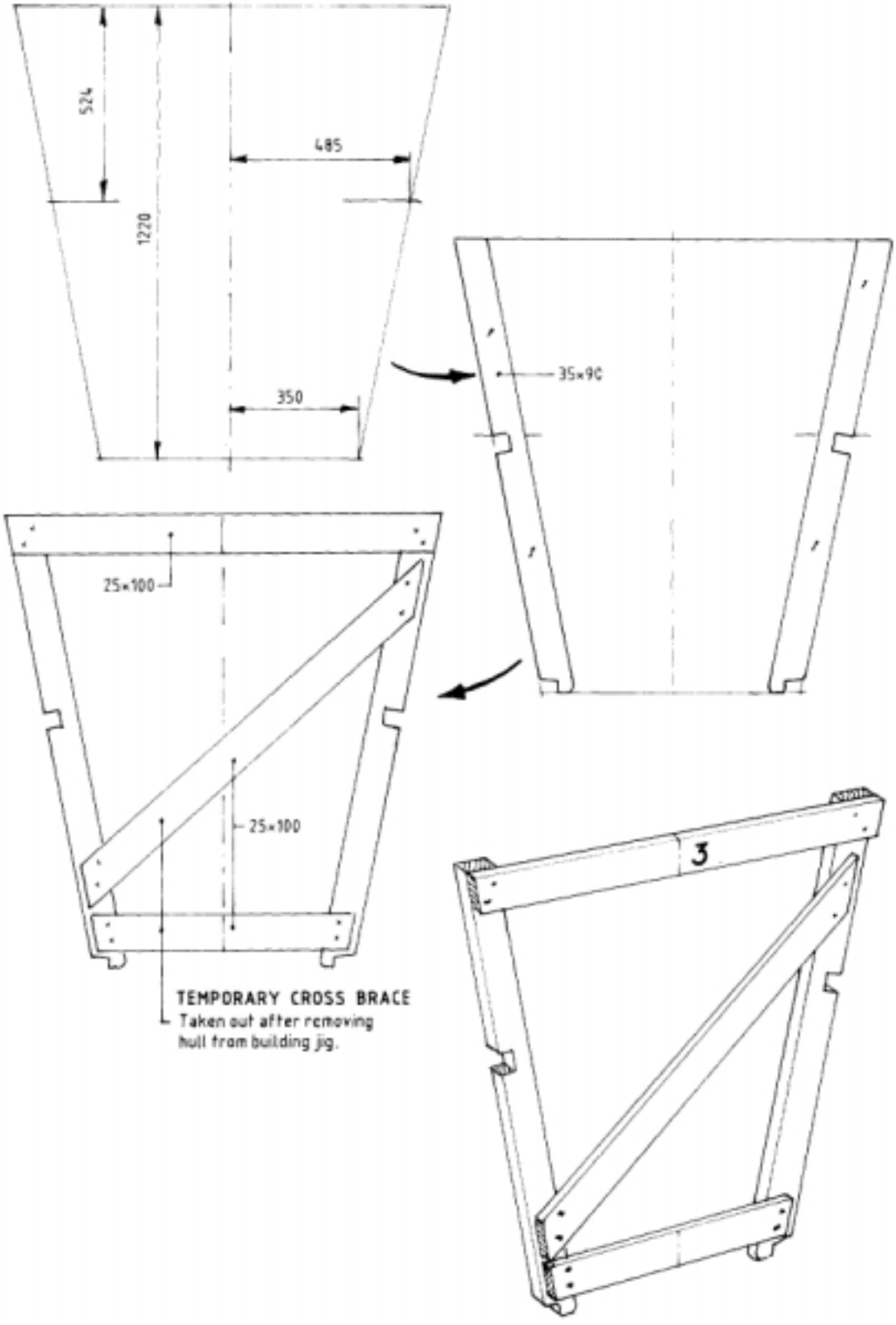
<<

FRAME 2


515
1190
485
350
CROSS BRACE
25
FRAME
35×90
35×45
25×100
Use nail pattern
8 nails 4×50
20×140
25
10 ø
2
5×100
25
200
FRAME

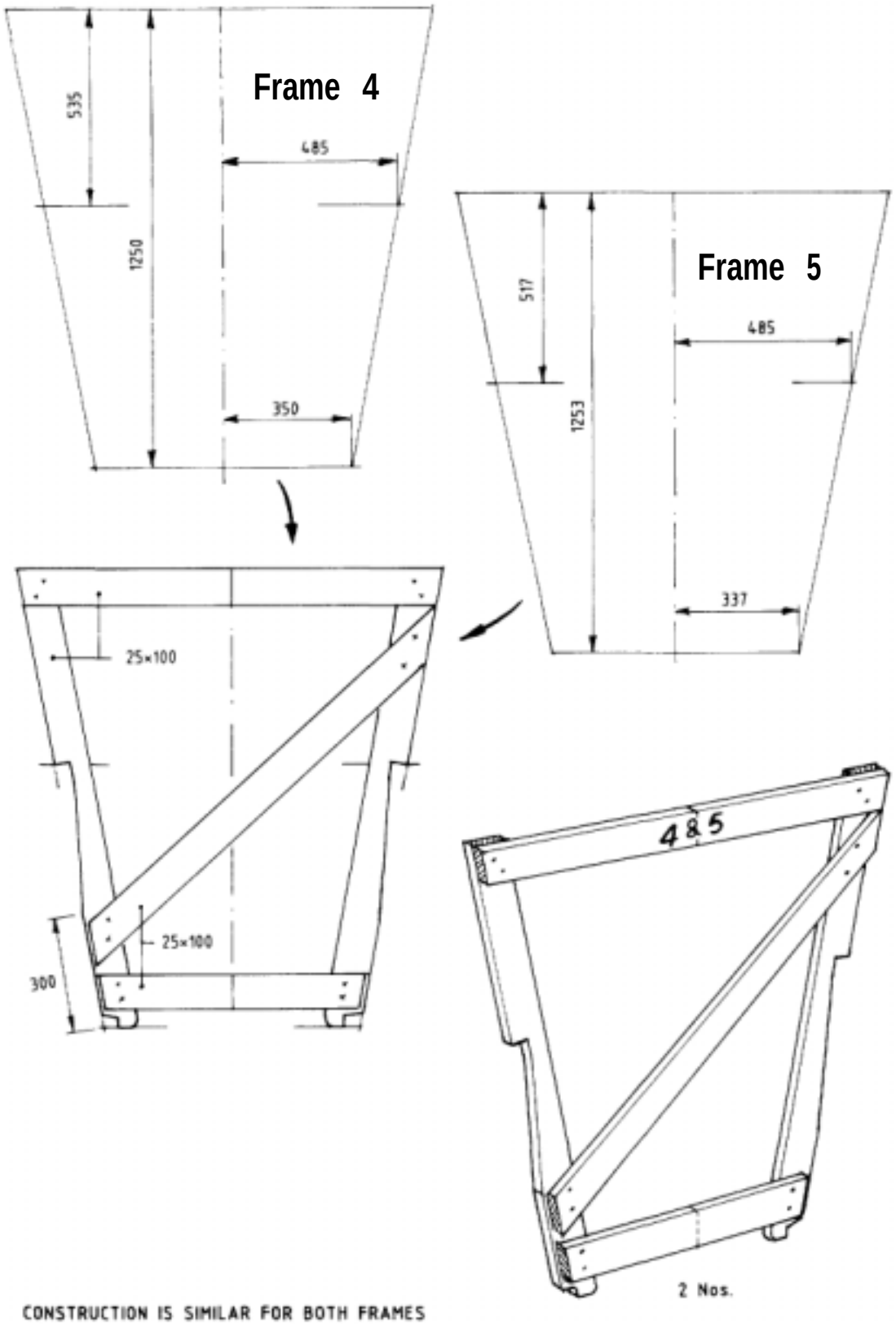
<<

FRAME 3


524
485
1220
350
35×90
25×100
25×100
3
TEMPORARY CROSS BRACE
Taken out after removing
hull from building jig.

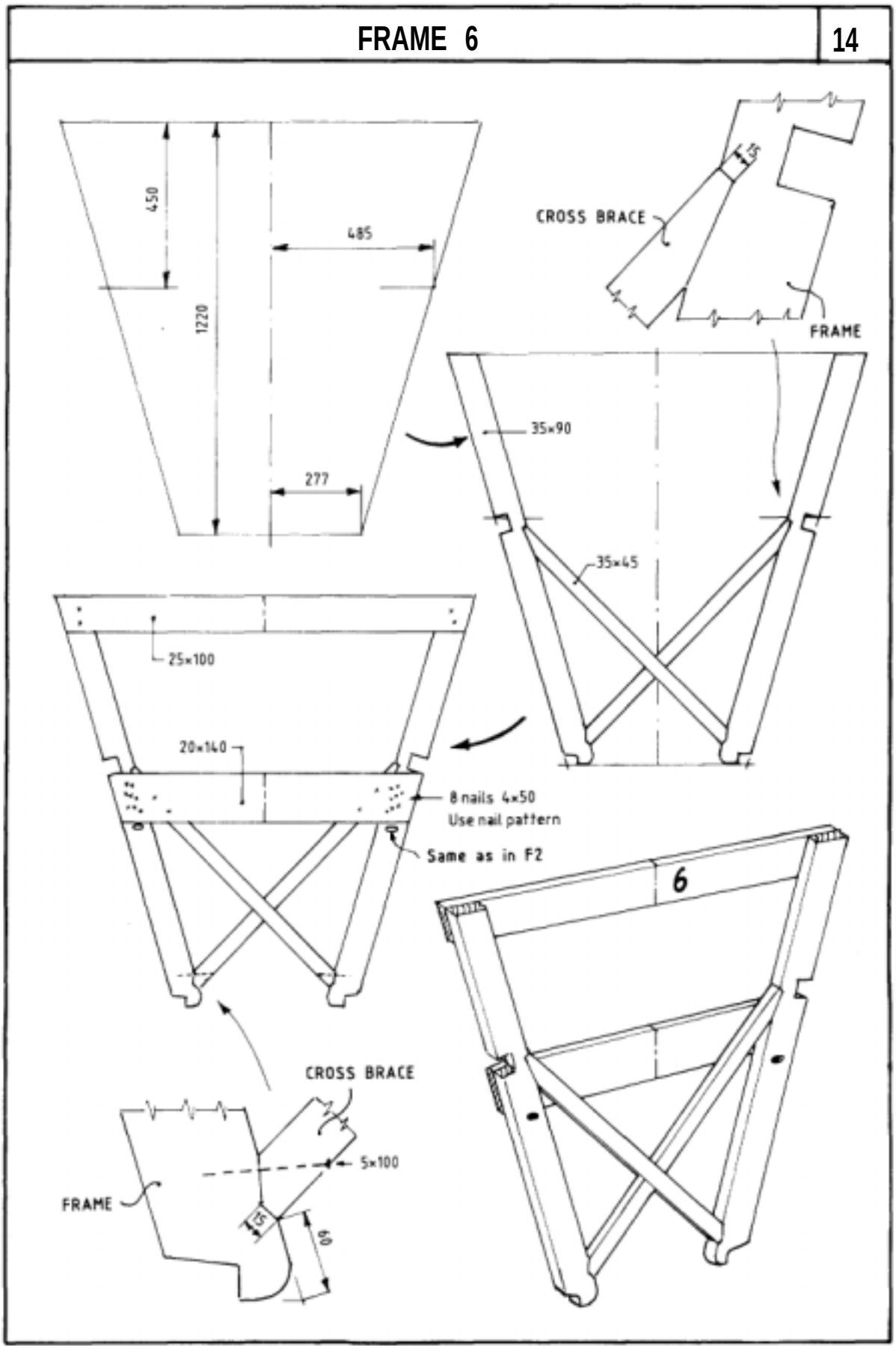
<<

FRAME 4 and FRAME 5 -Removable



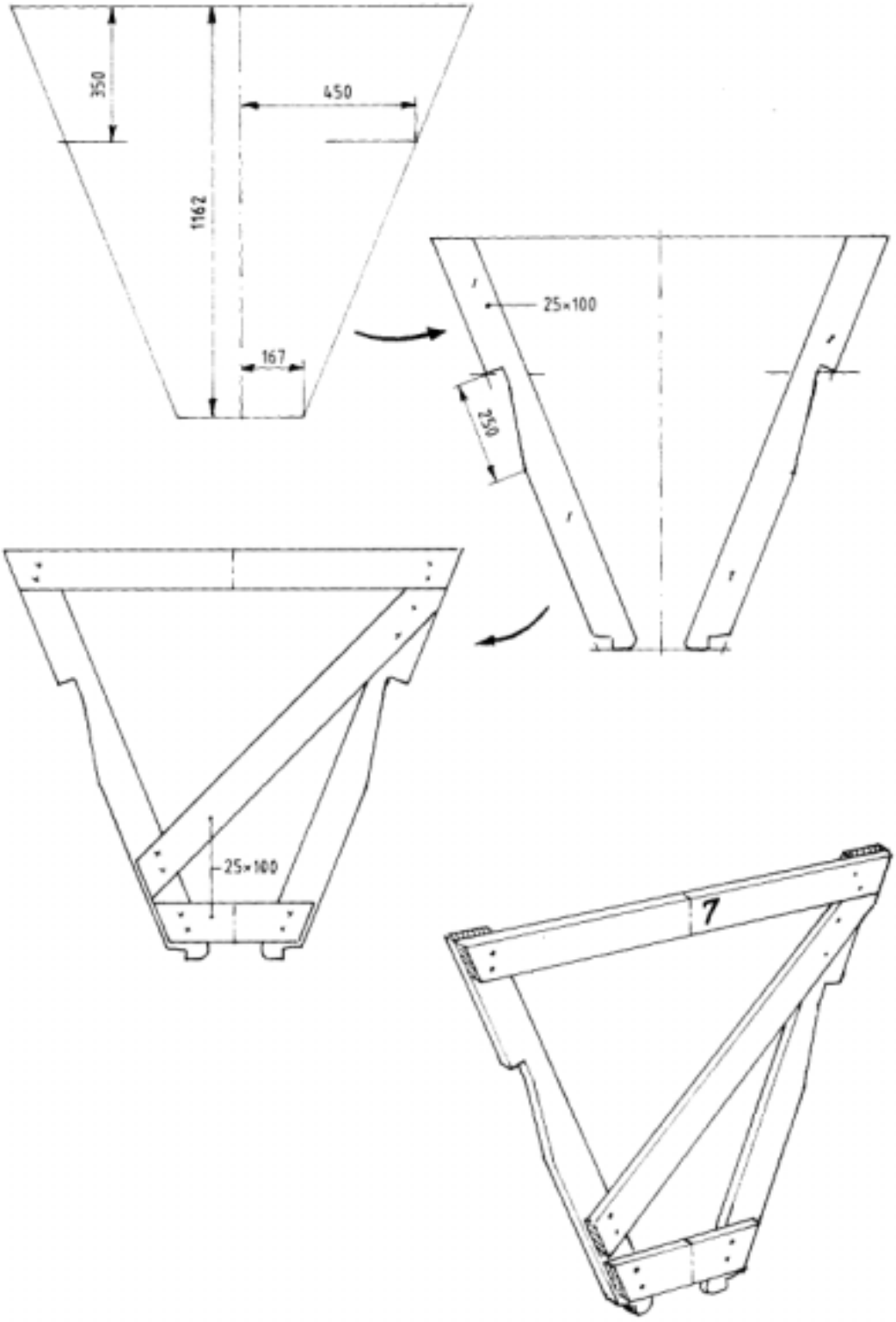
<<

FRAME 6


450
485
1220
277
CROSS BRACE
15
FRAME
35×90
35×45
25×100
20×140
8 nails 4×50
Use nail pattern
Same as in F2
6
CROSS BRACE
5×100
FRAME
15
60

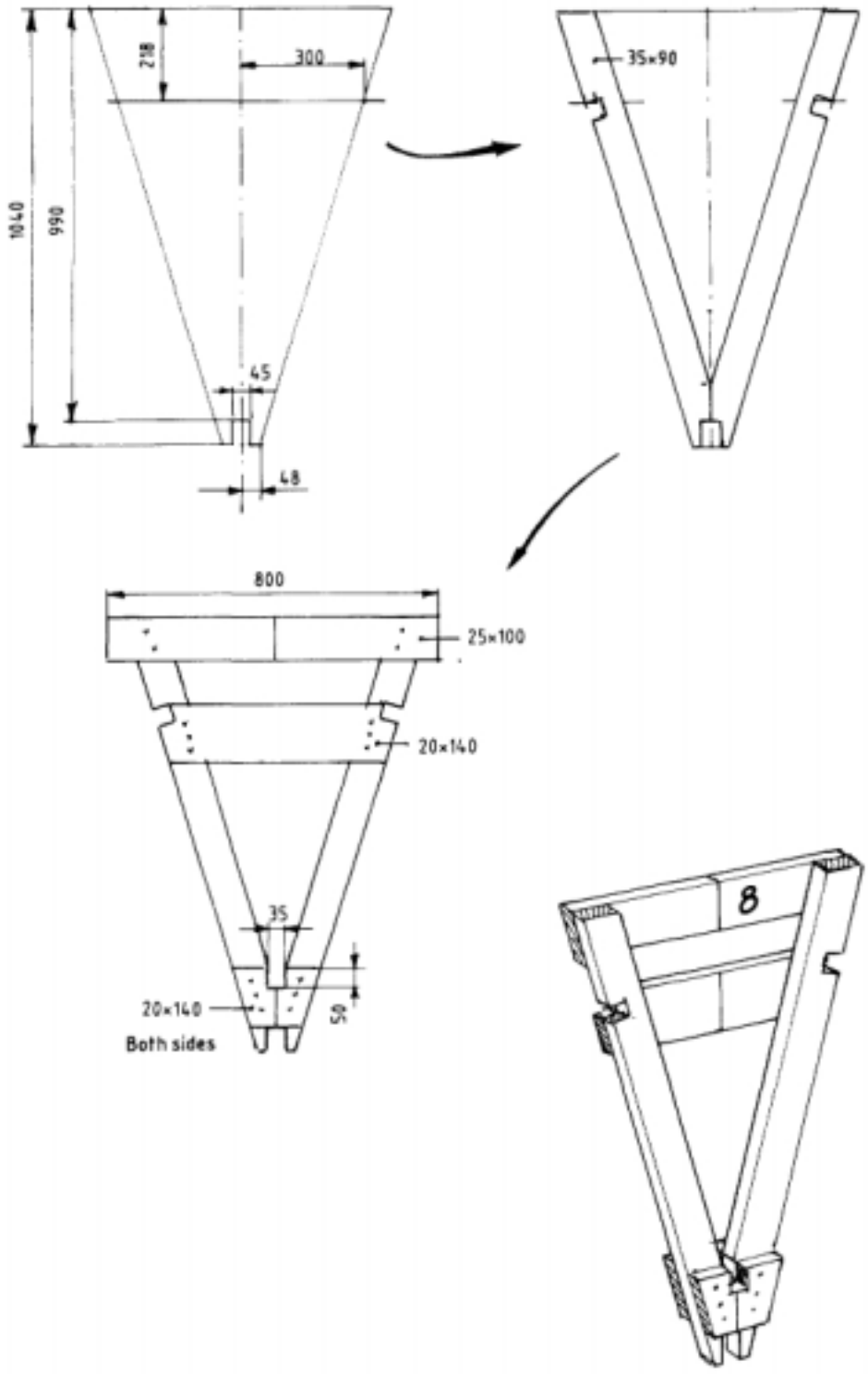
<<

FRAME 7- removable



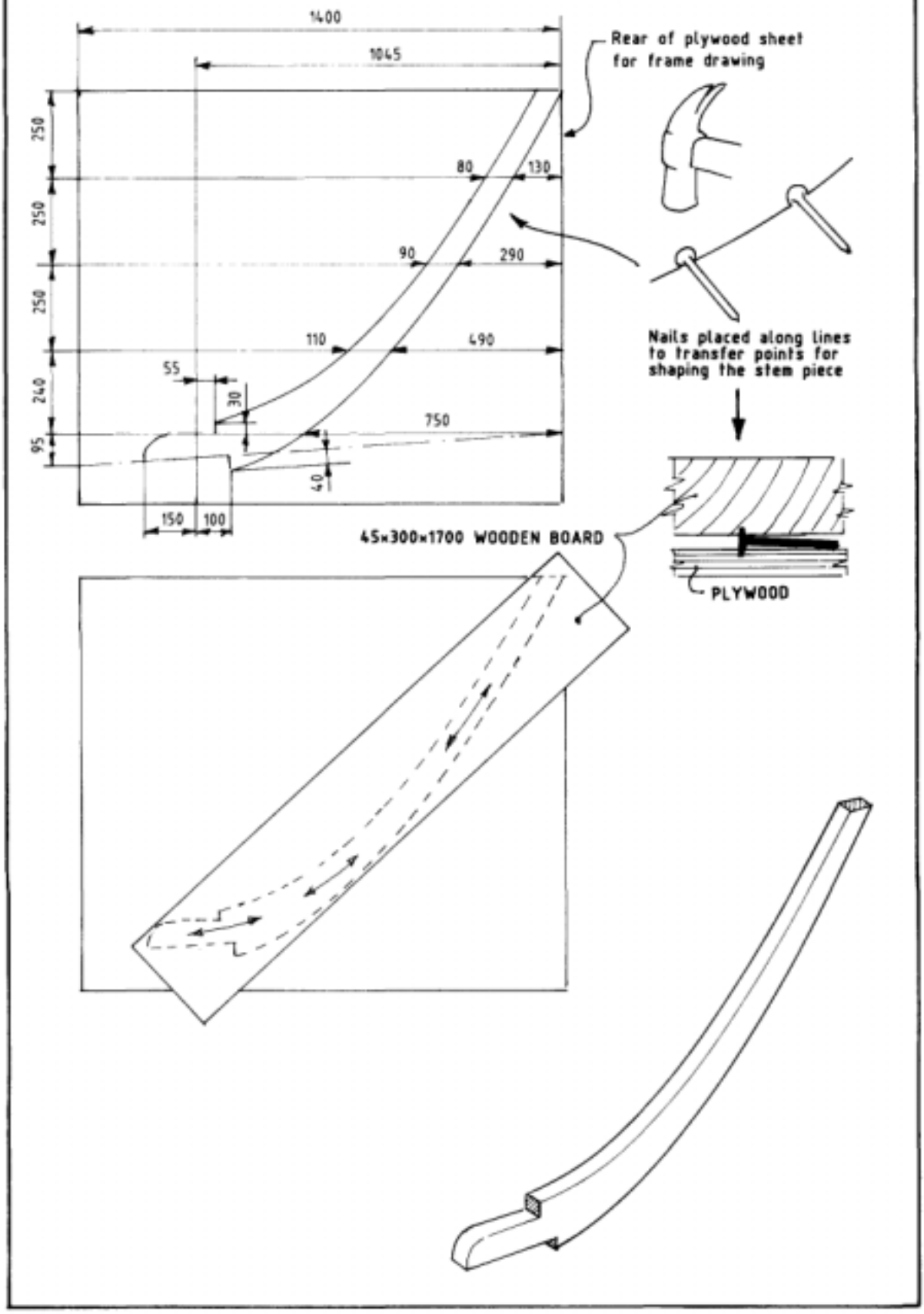
<<

FRAME 8


218
300
1040
990
45
48
35×90
800
25×100
20×140
35
50
20×140
Both sides
8

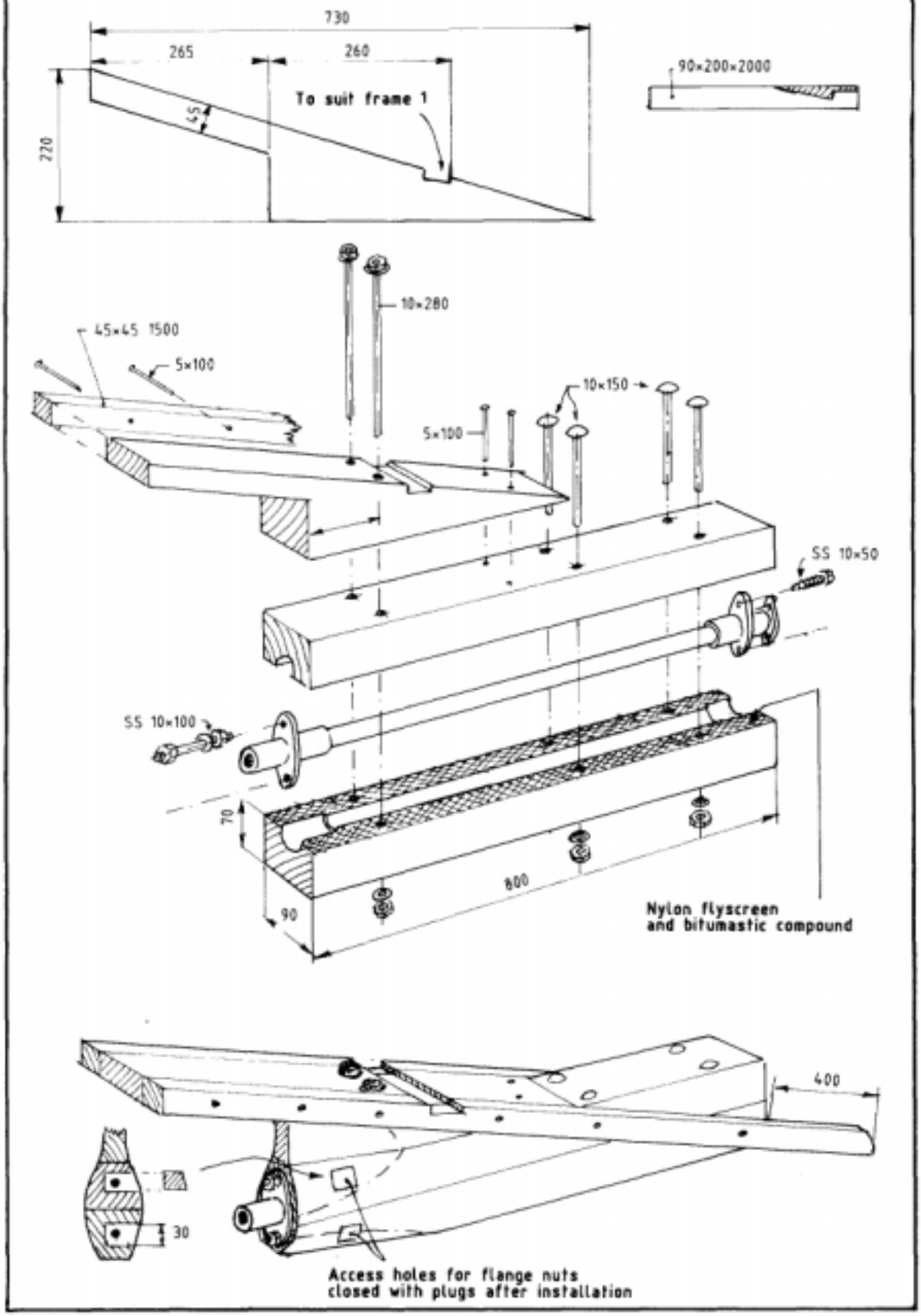
<<

STEM


1400
1045
250
250
250
240
95
80
130
90
290
110
490
55
30
750
40
150
100
Rear of plywood sheet
for frame drawing
Nails placed along lines
to transfer points for
shaping the stem piece
45×300×1700 WOODEN BOARD
PLYWOOD

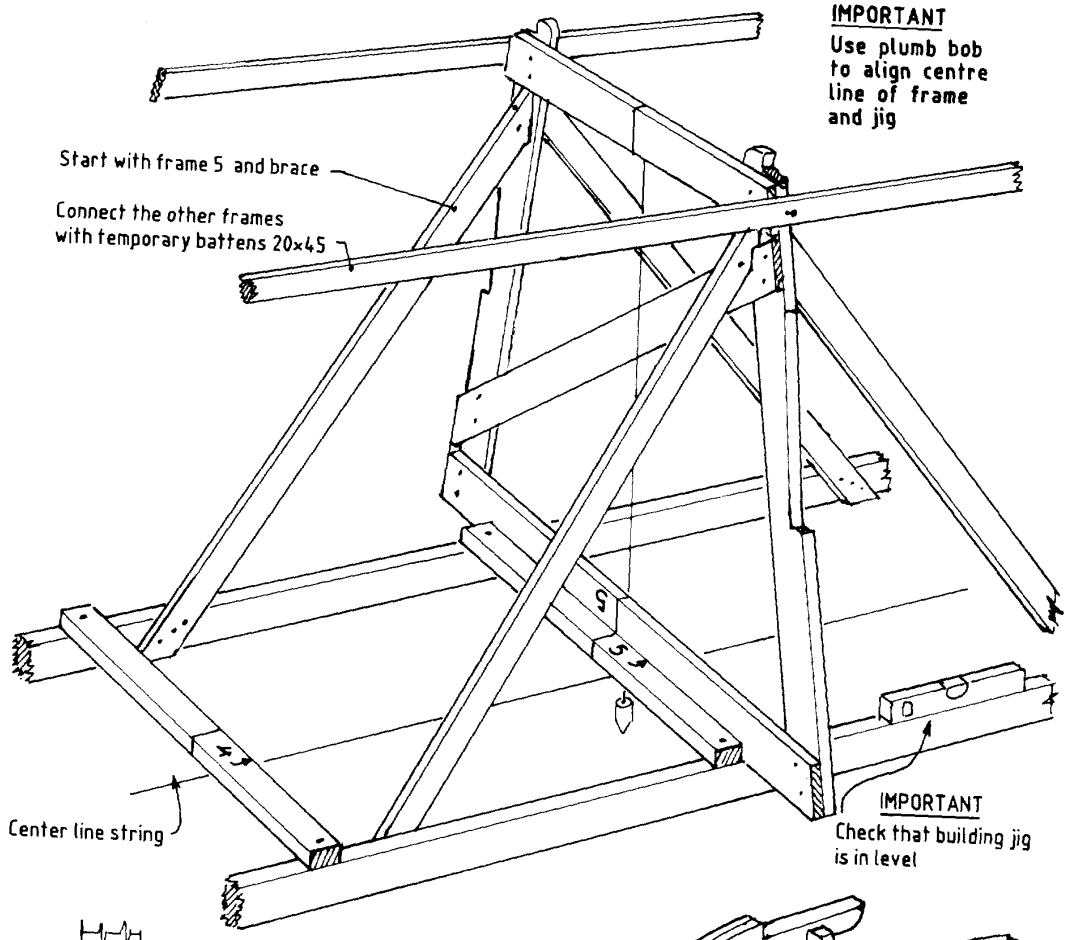
<<

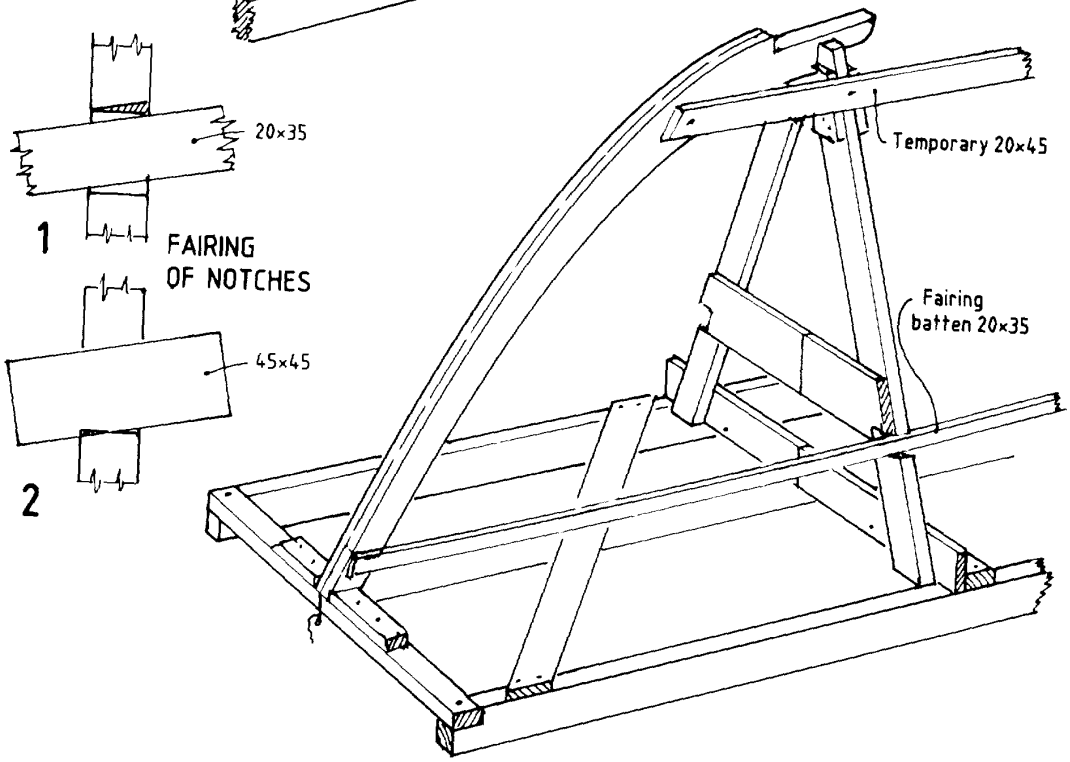
SHAFT LOG


730
265
260
To suit frame 1
45
220
90×200×2000
10×280
45×45 1500
5×100
10×150
5×100
SS 10×50
SS 10×100
70
800
90
Nylon flyscreen
and bitumastic compound
400
30
Access holes for flange nuts
closed with plugs after installation

<<

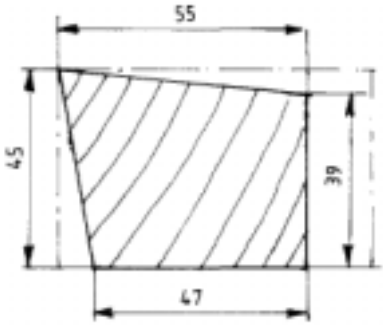
FRAMES ON BUILDING JIG

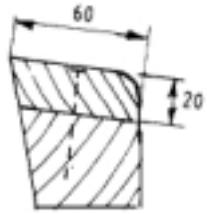


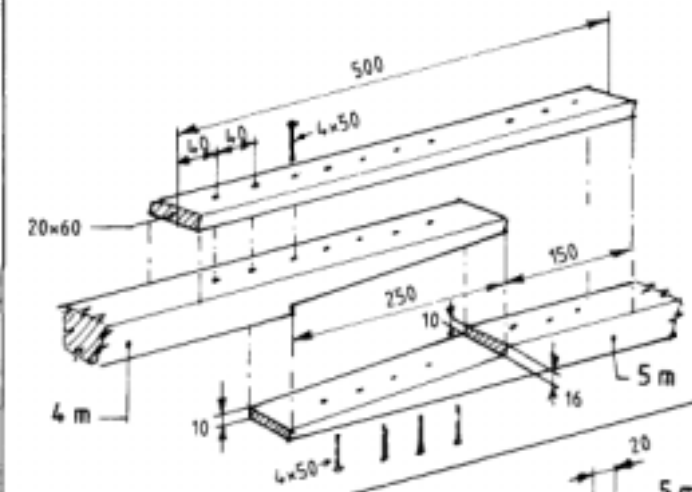


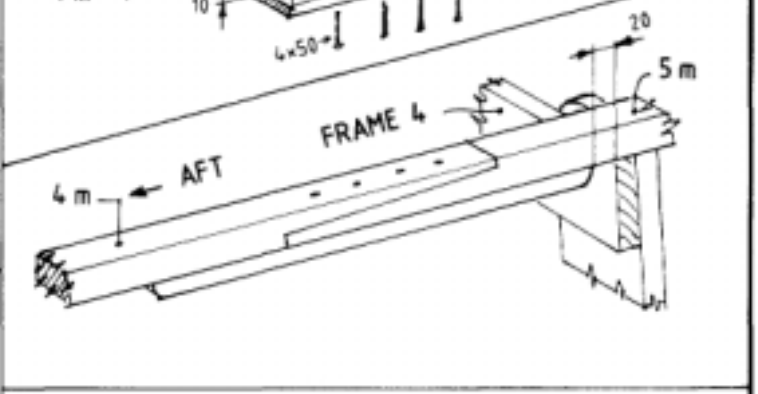
<<

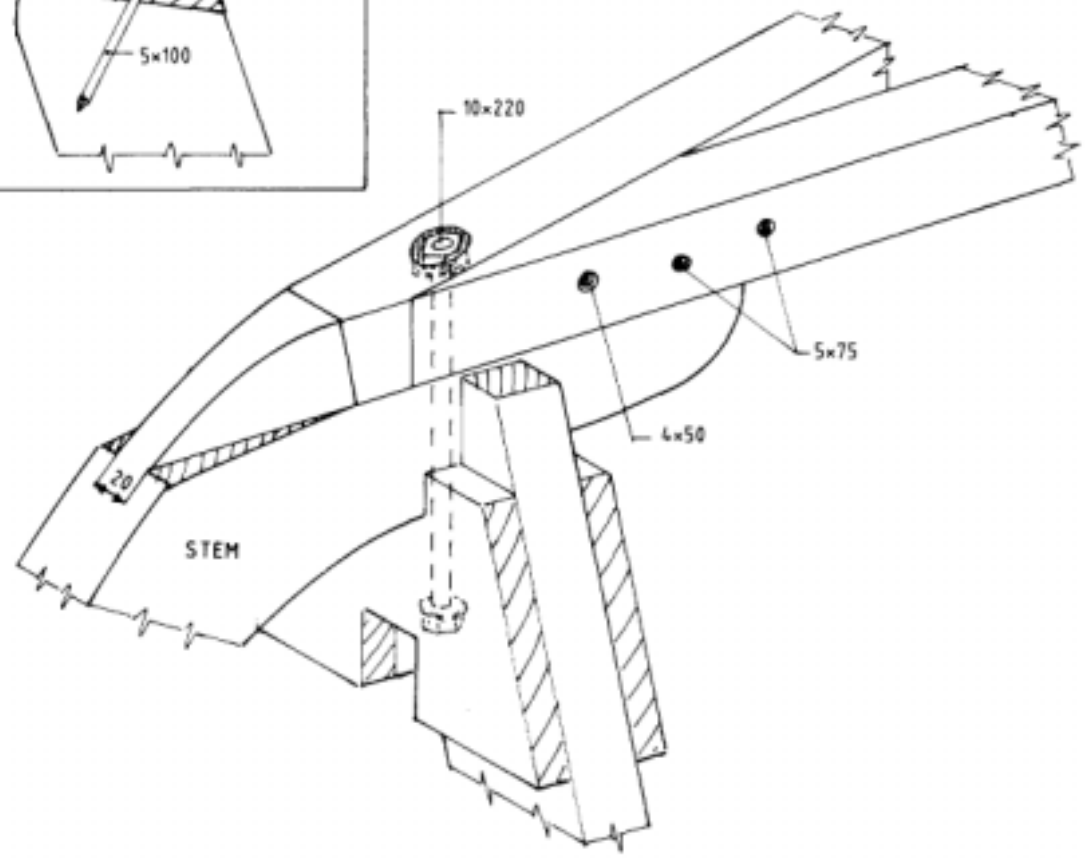
CHINE BATTEN





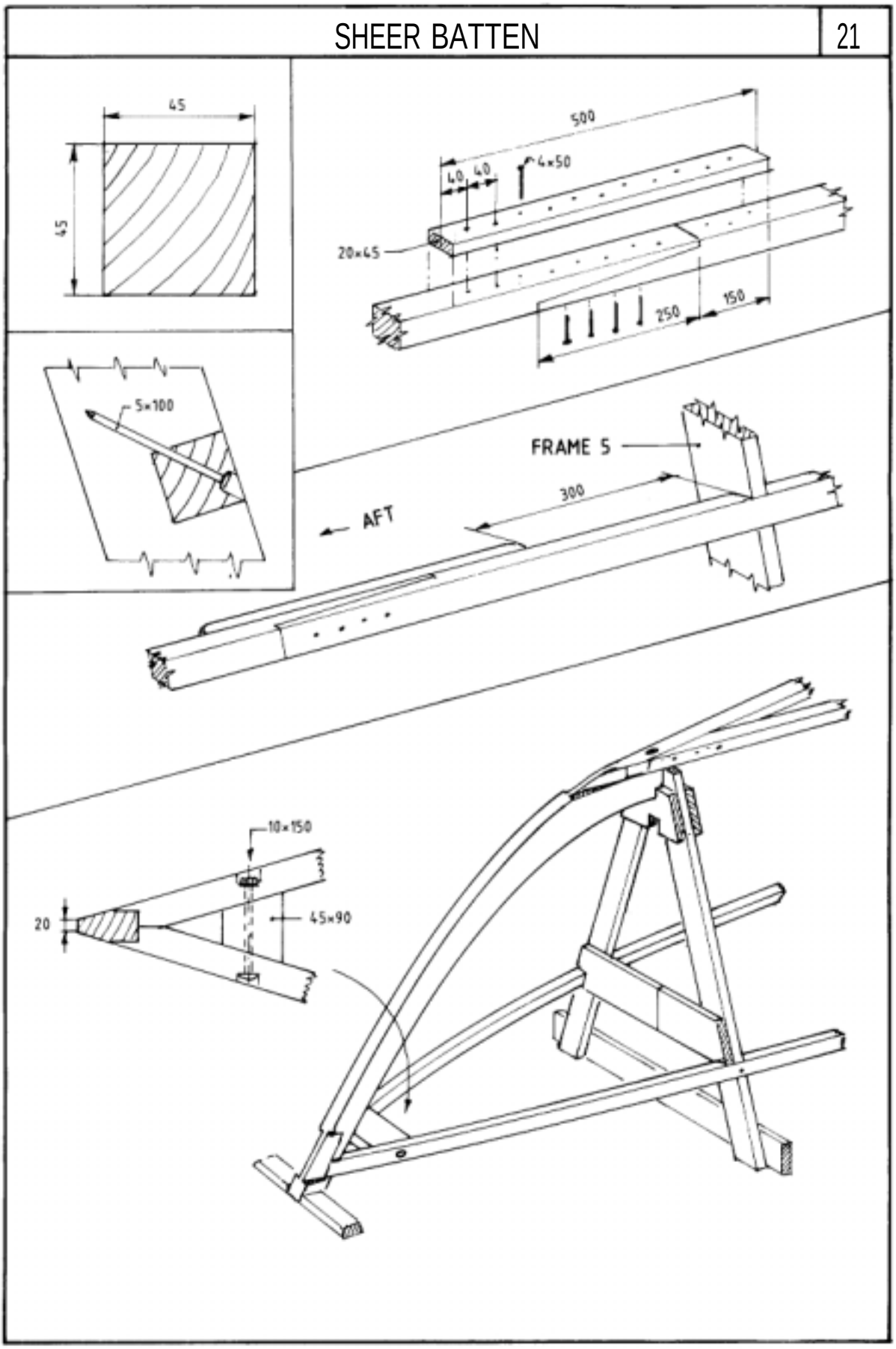






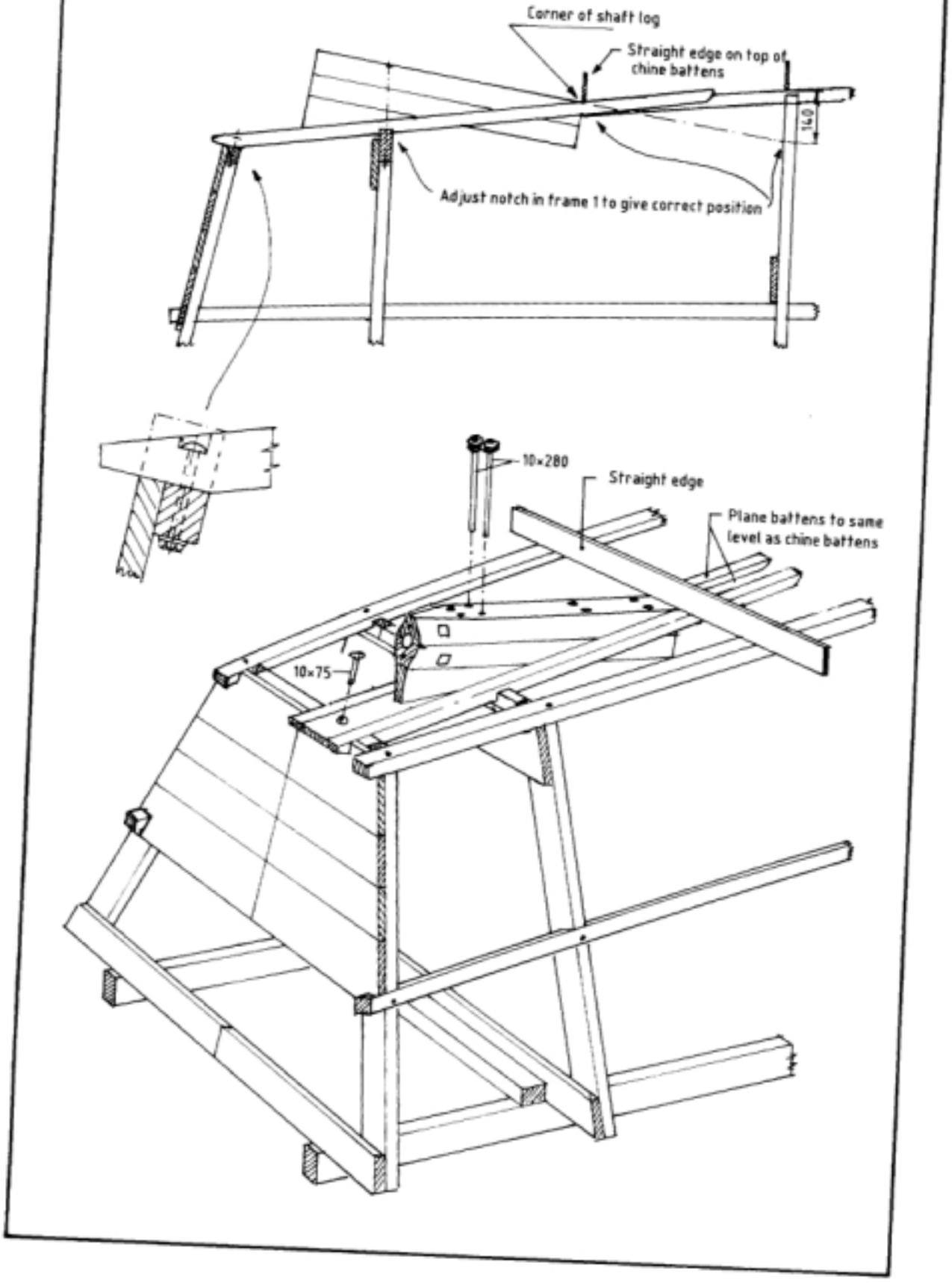
<<

SHEER BATTEN



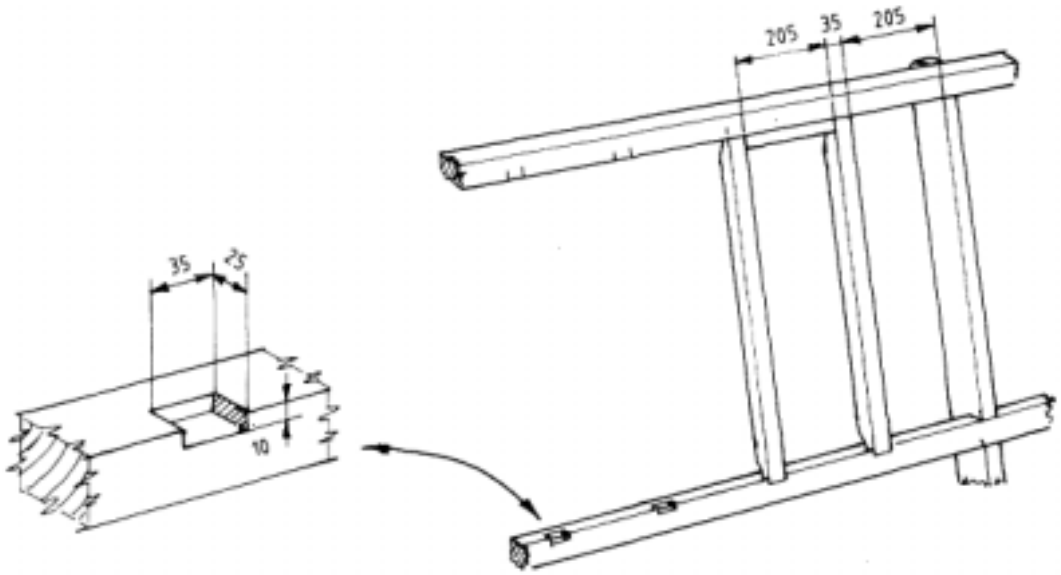
<<

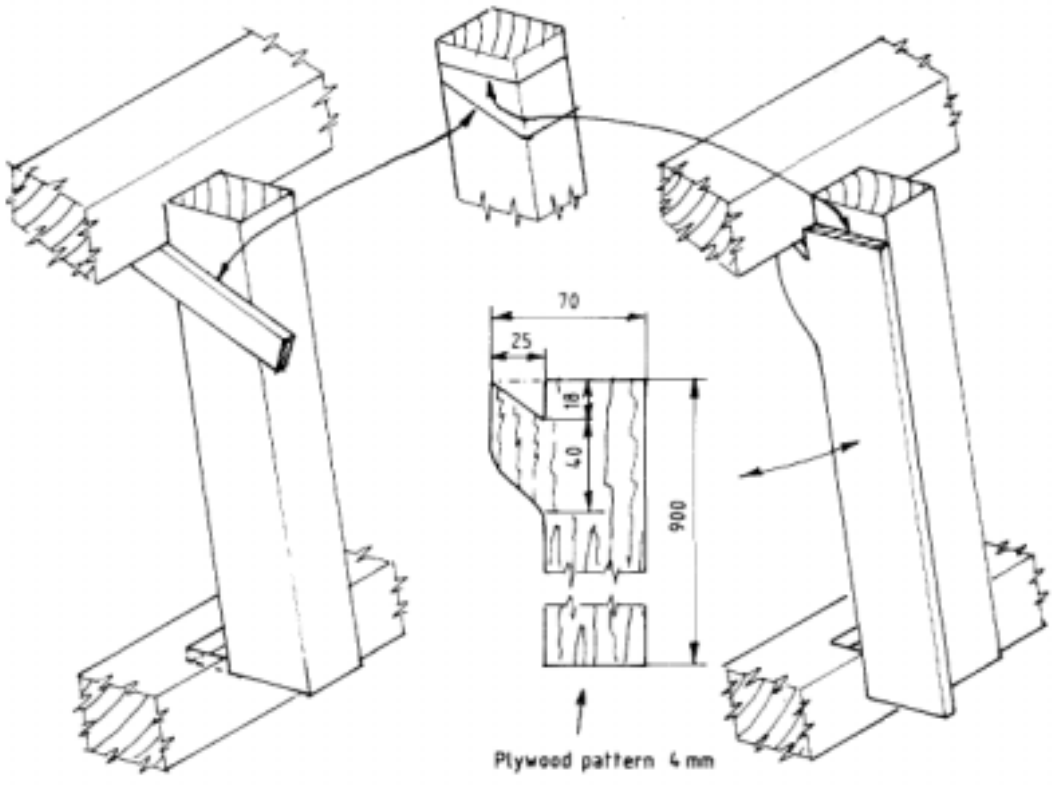
FIXING SHAFT LOG



<<

SIDE FRAMES

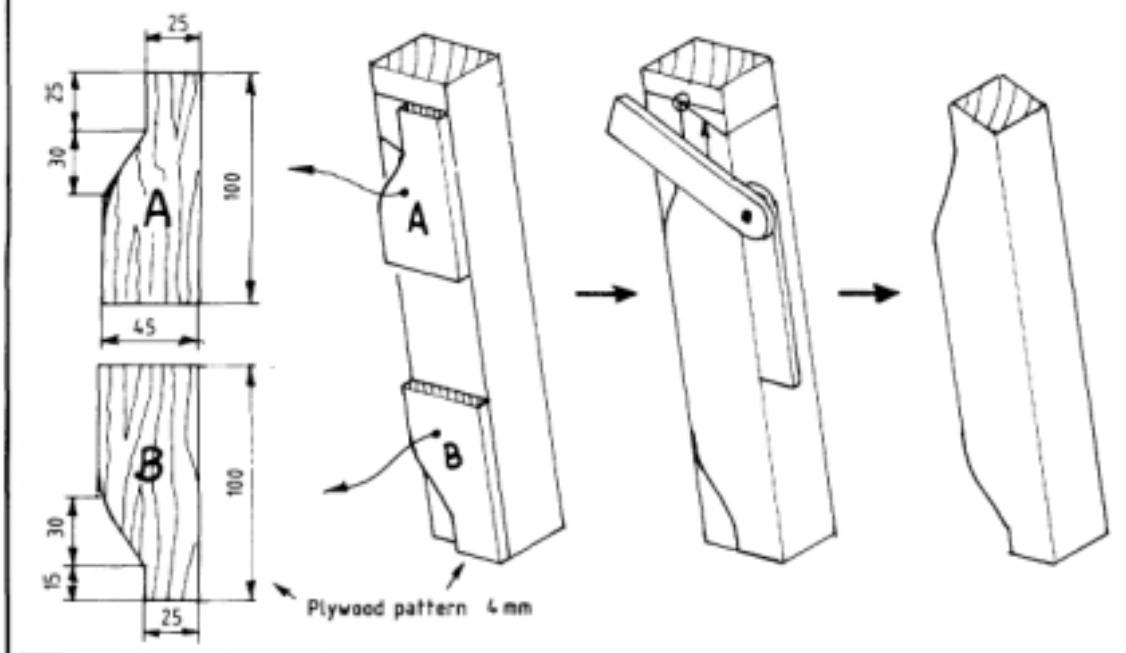


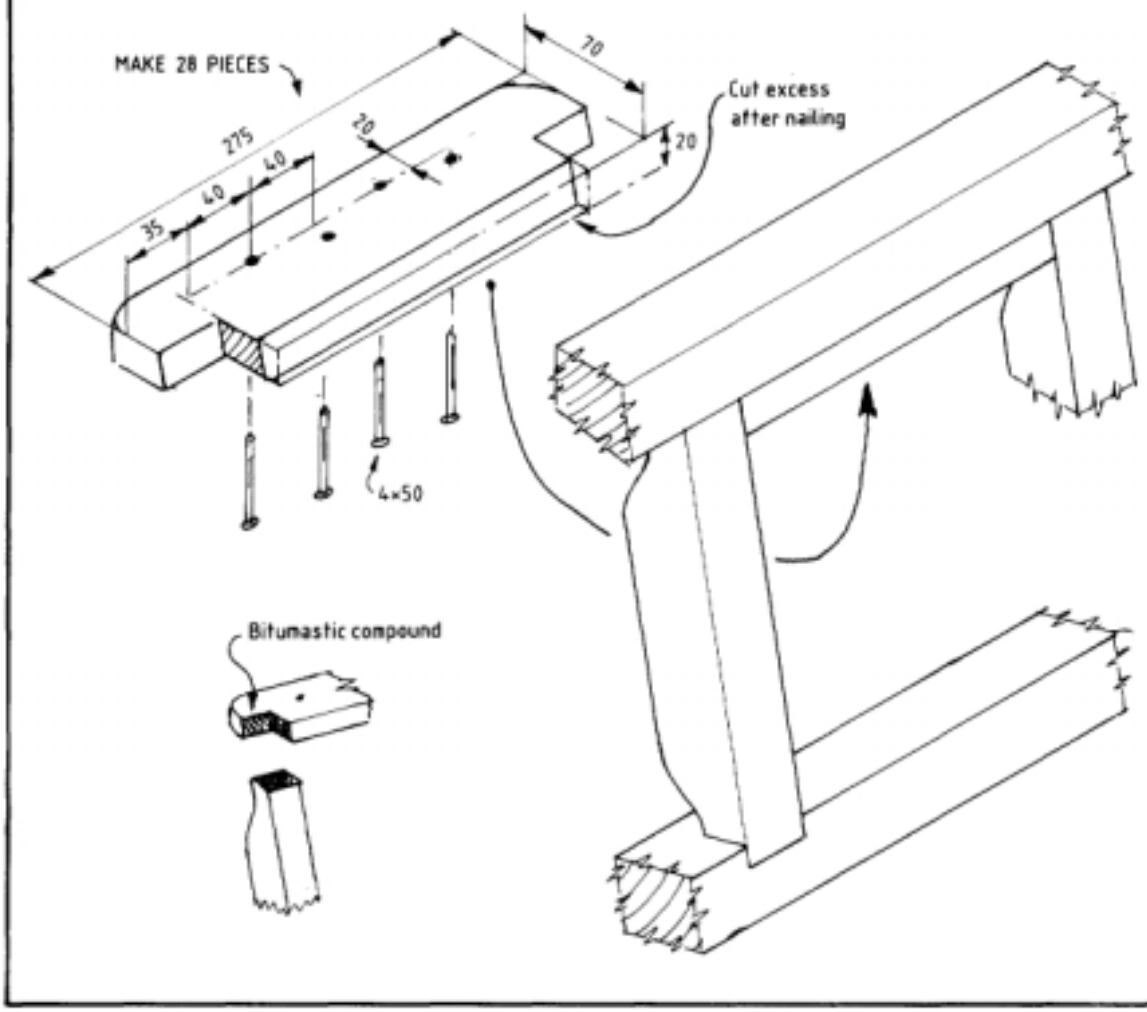


Continued on sheet 24

<<

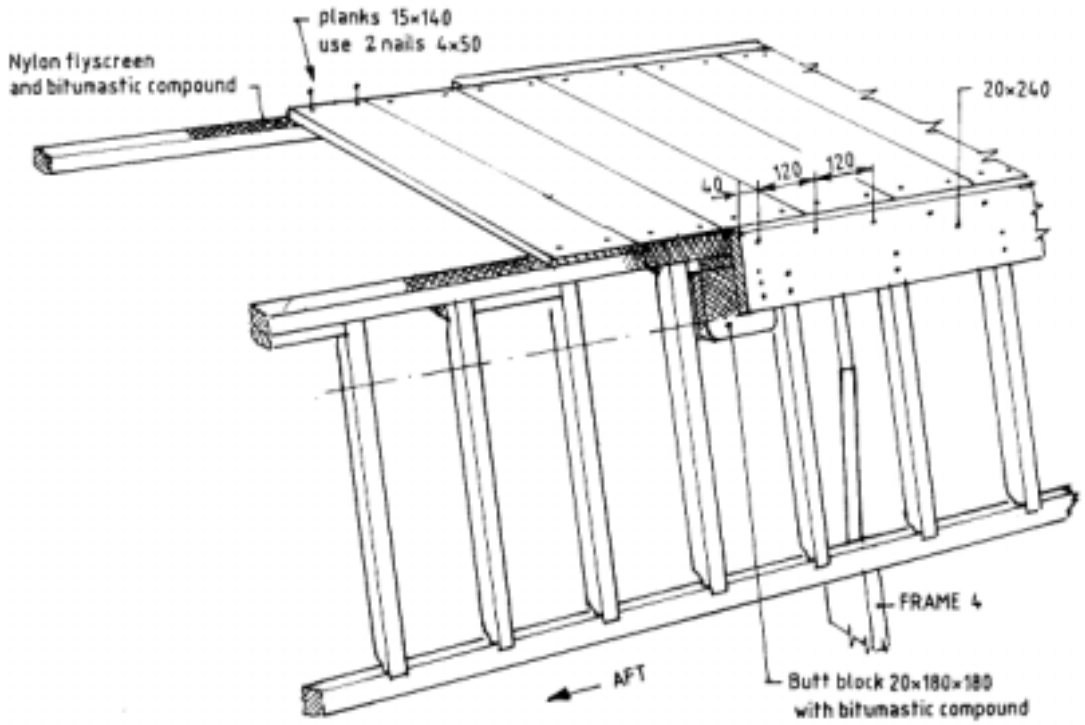
SIDE FRAMES


25
25
30
A
100
45
B
100
30
15
25
A
B
Plywood pattern 4 mm

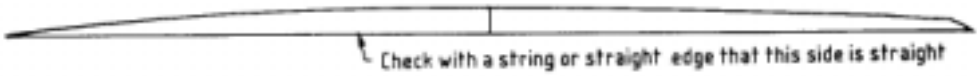

MAKE 28 PIECES
70
275
20
40
40
35
20
Cut excess
after nailing
4×50
Bitumastic compound

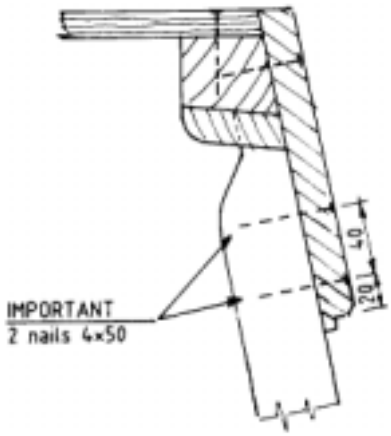
<<

FIRST BOTTOM PLANKING AND SIDE PLANKING

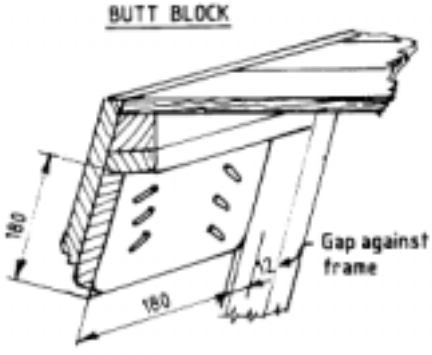


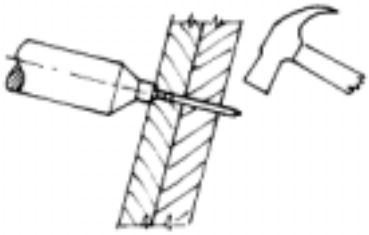
FIRST SIDE PLANK

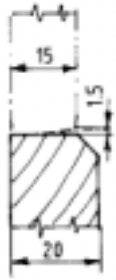




BUTT BLOCK

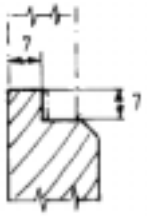






FIRST SIDE PLANK

Alternative caulked seam

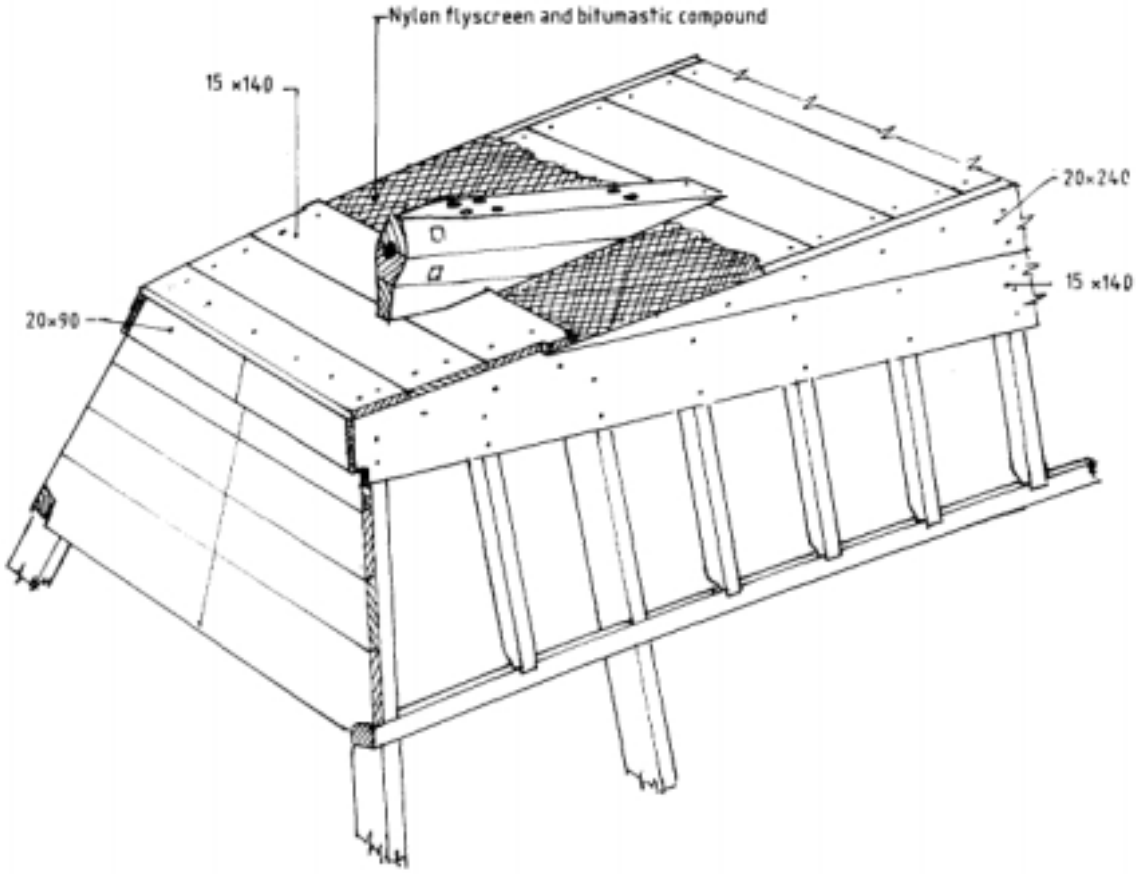


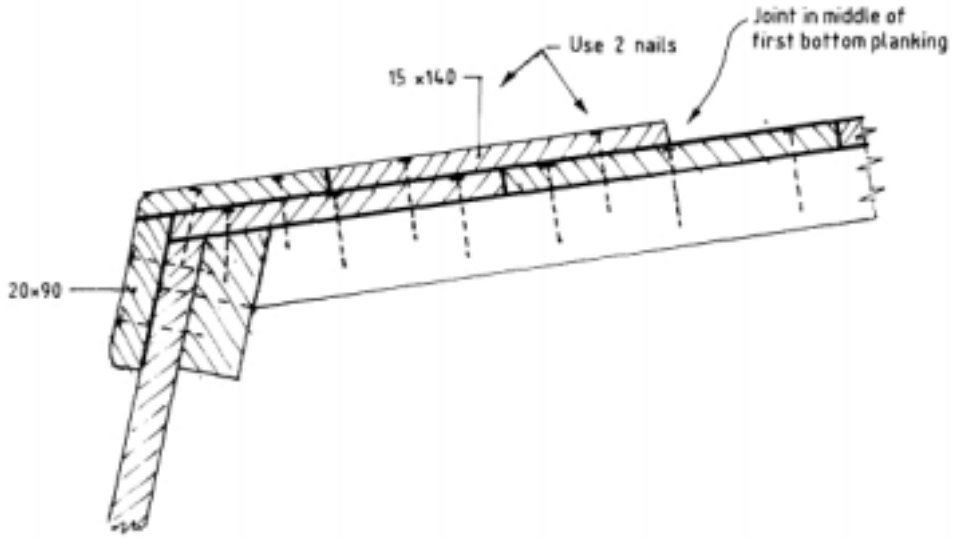
FIRST SIDE PLANK

Alternative rabbeted seam

<<

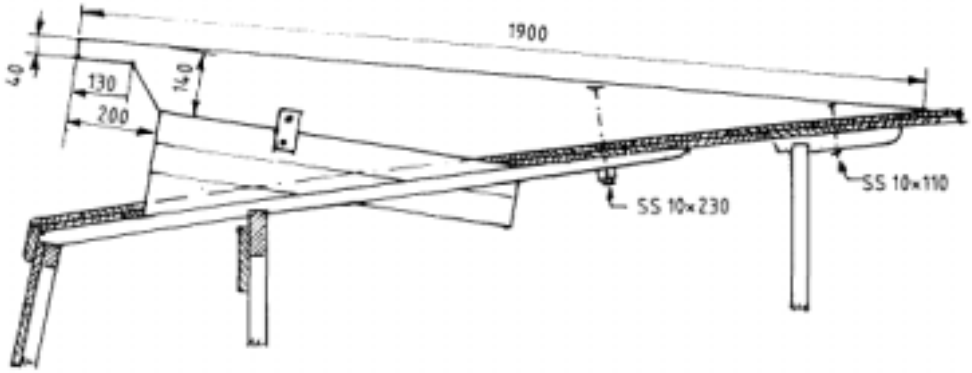
SECOND BOTTOM I PLANKING

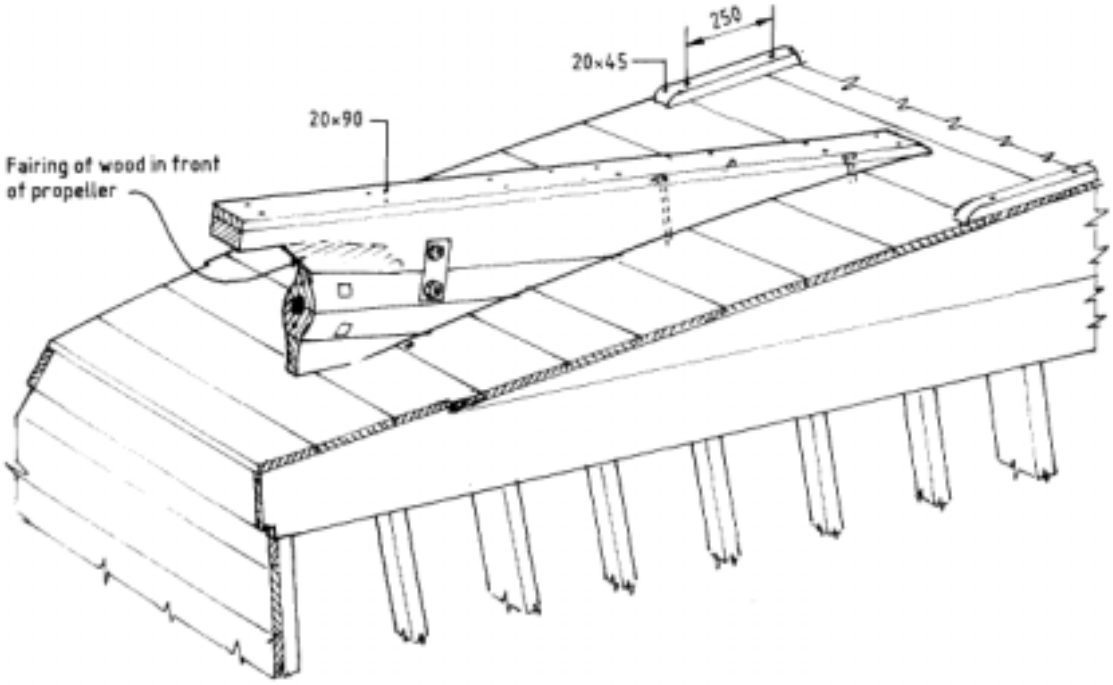


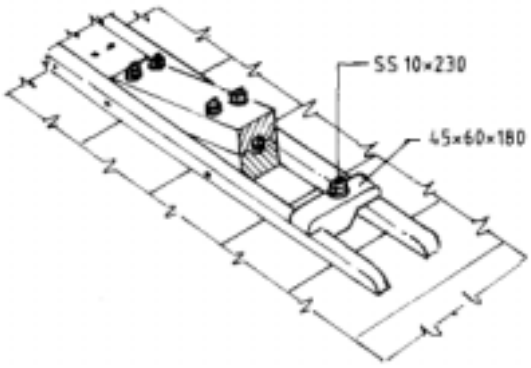


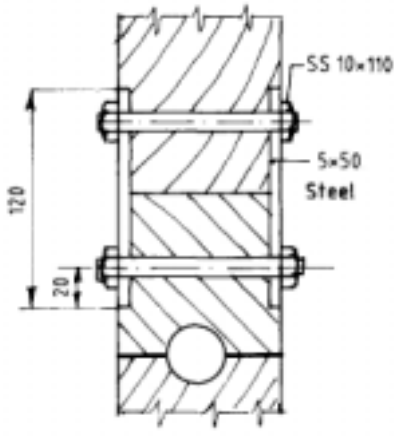
<<

REMOVABLE KEEL



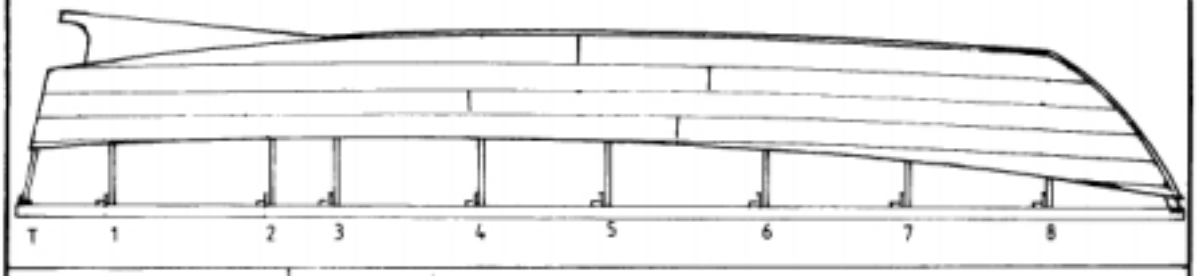


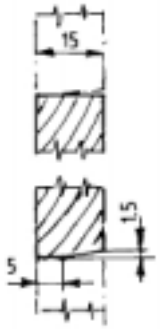




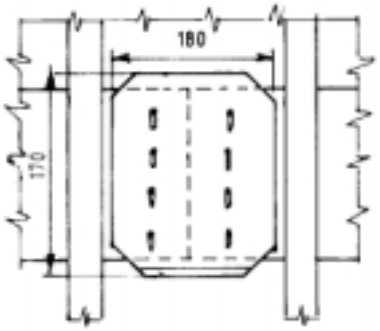
<<

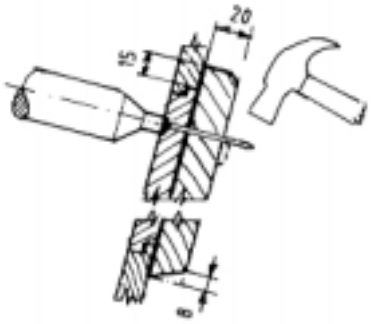
SIDE PLANKING

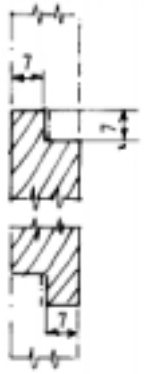




Alternative caulked seam





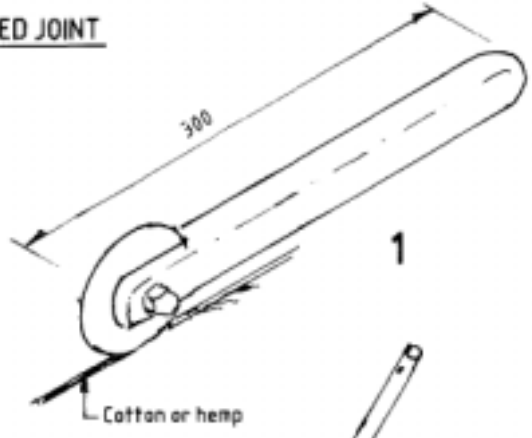


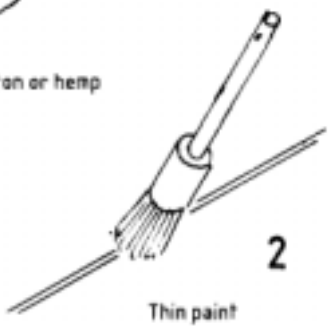
Alternative rabbeted seam

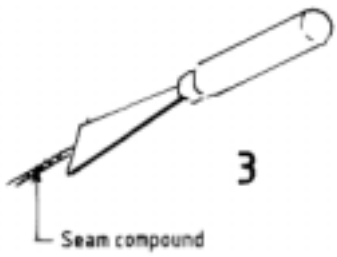
<<

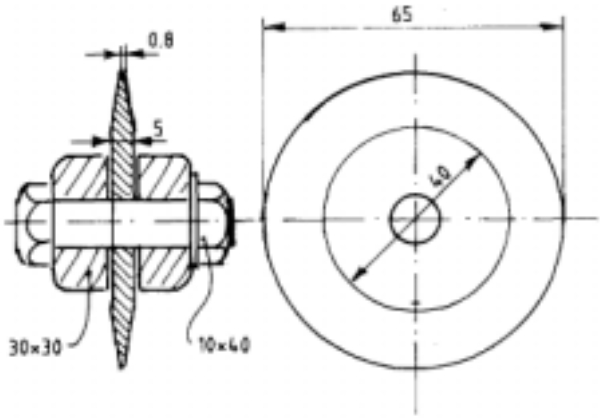
ALTERNATIVE : RABBETED JOINT WITH BITUMASTIC COMPOUND

ALTERNATIVE : CAULKED JOINT



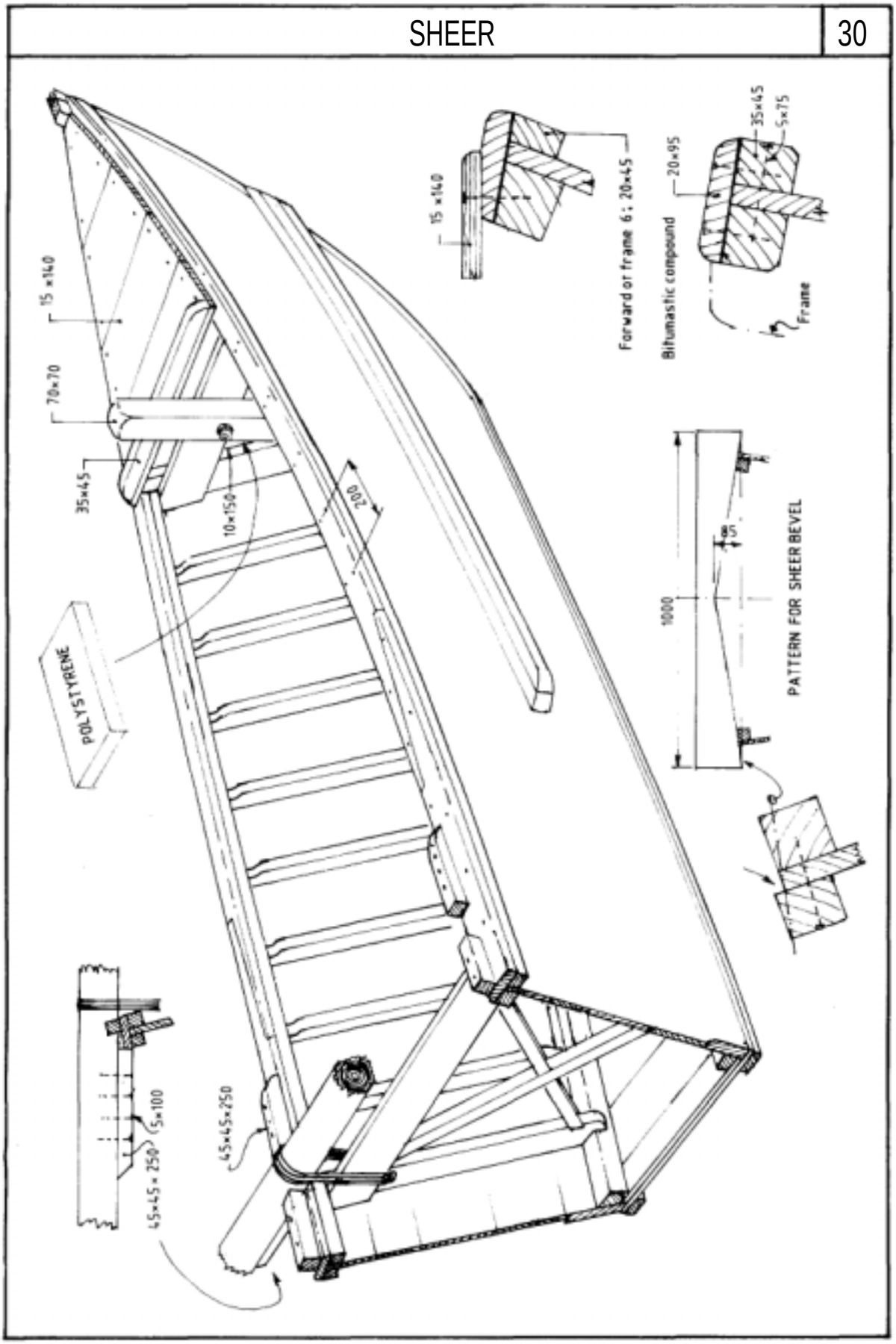






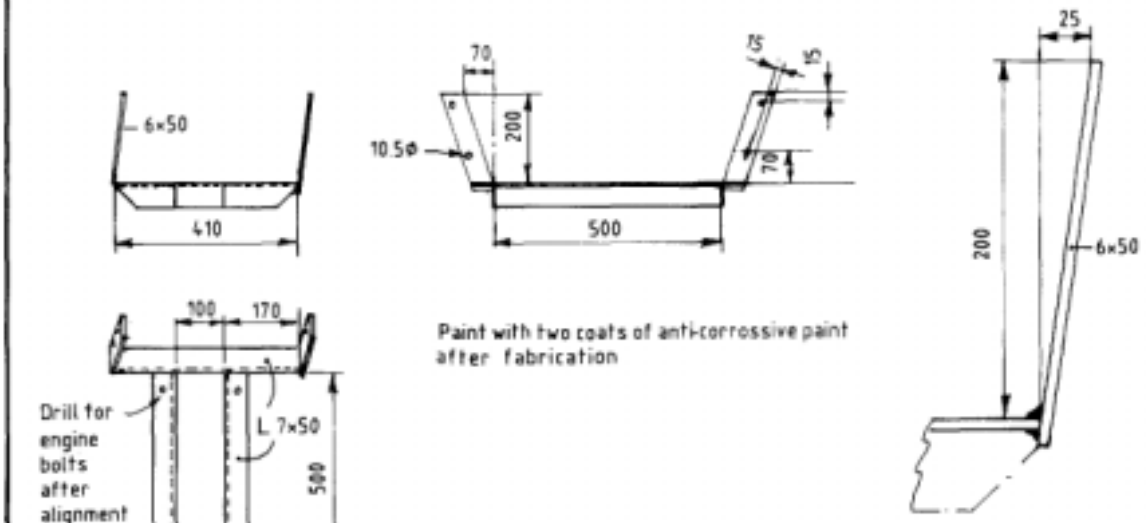
CAULKING WHEEL

<<

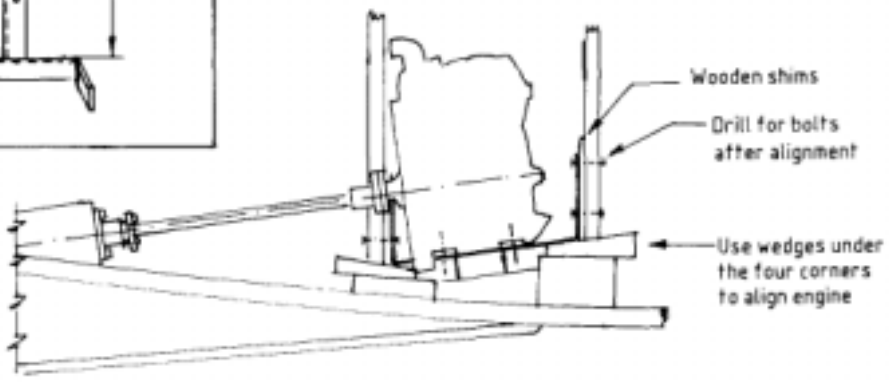

15 x140
70x70
35x45
10x150
200
POLYSTYRENE
45x45x250
5x100
45x45x250
15 x140
Forward of frame 6: 20x45
20x95
Bitumastic compound
35x45
5x75
Frame
1000
PATTERN FOR SHEER BEVEL

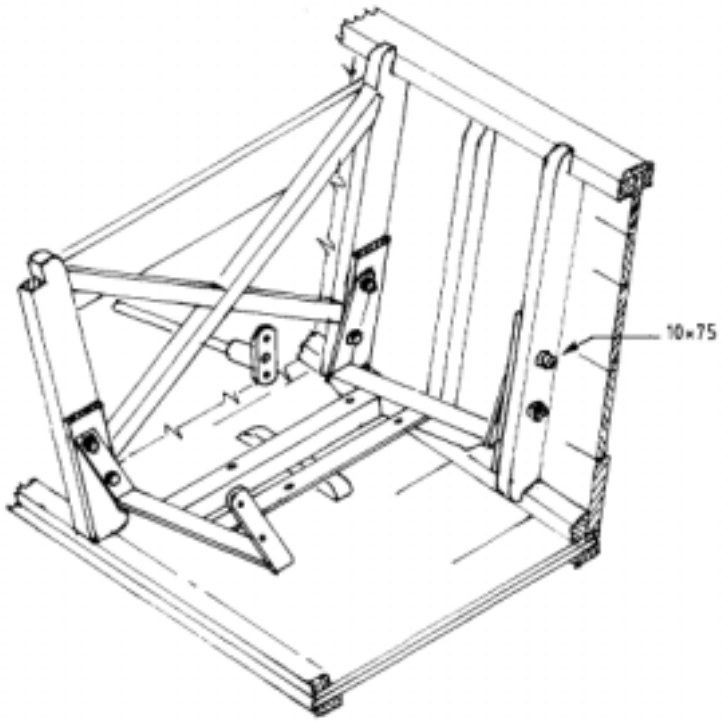
<<

ENGINE BED



Paint with two coats of anti-corrossive paint after fabrication





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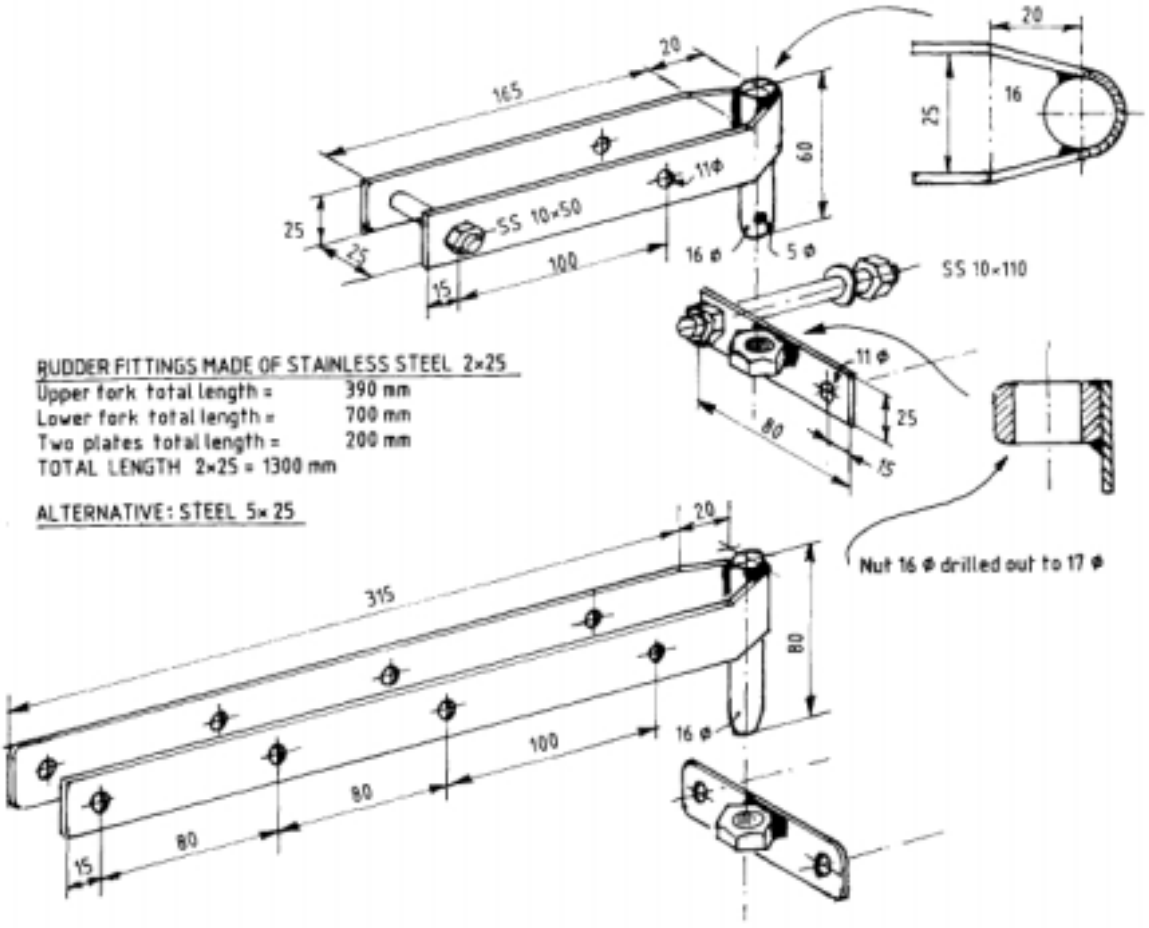
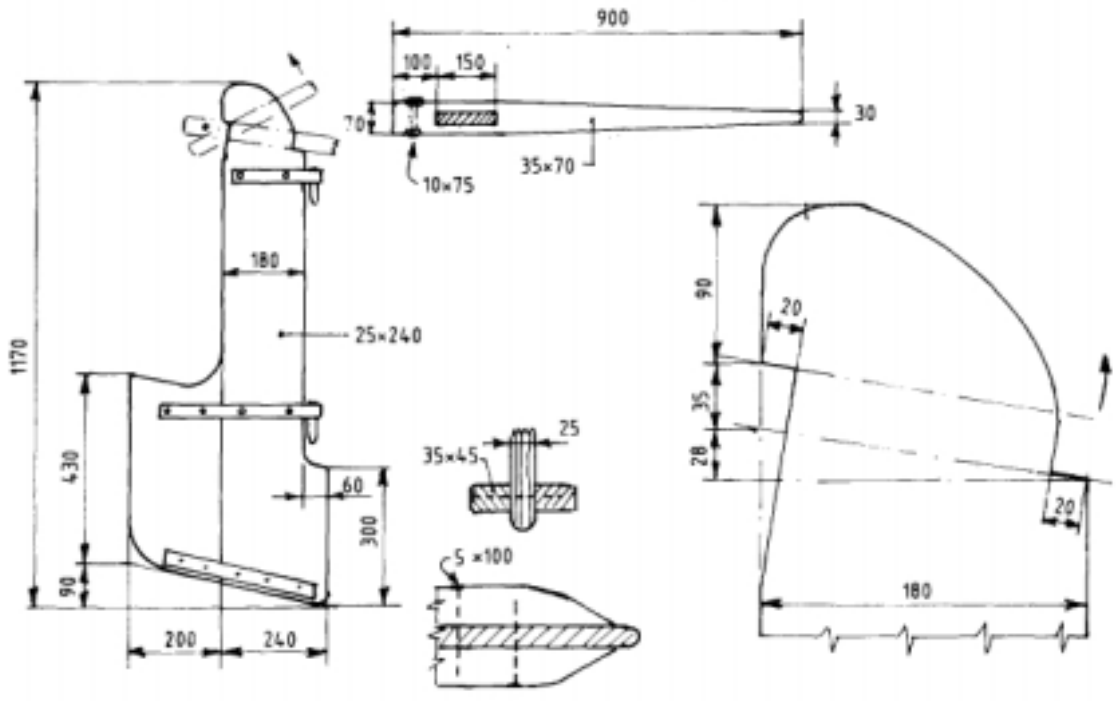


RUDDER FITTINGS MADE OF STAINLESS STEEL 2×25

Upper fork total length =	390 mm
Lower fork total length =	700 mm
Two plates total length =	200 mm
TOTAL LENGTH 2×25 = 1300 mm	

ALTERNATIVE: STEEL 5× 25



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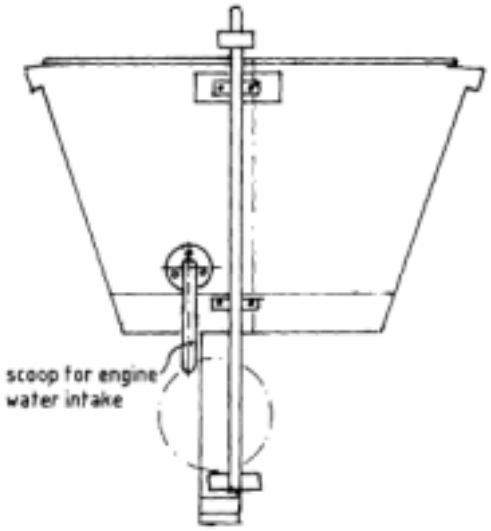
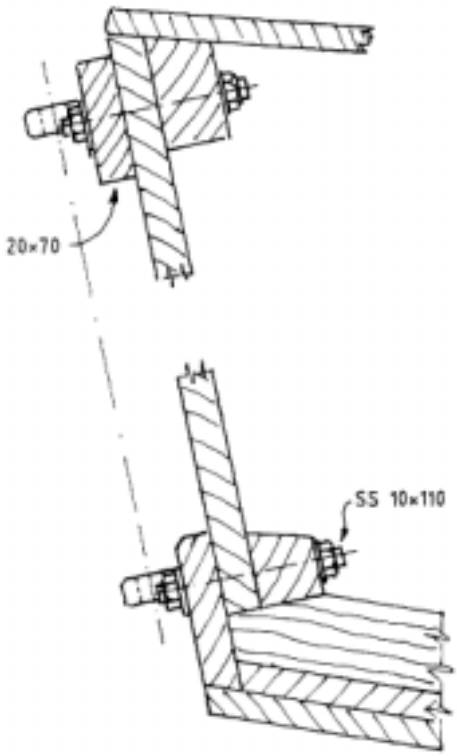
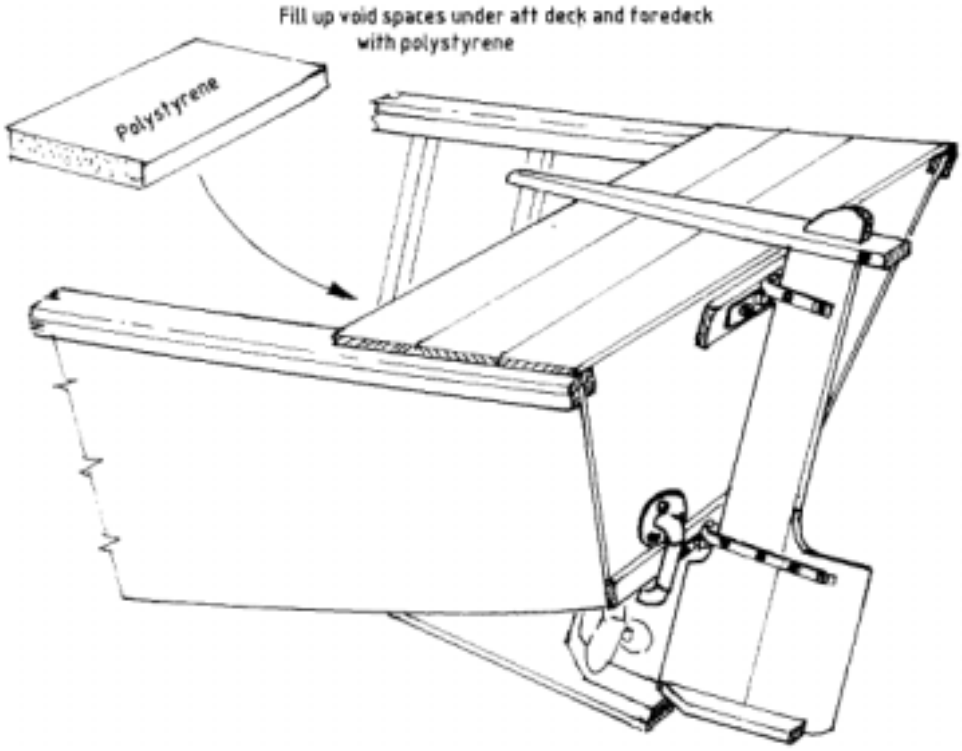

scoop for engine
water intake


20×70
SS 10×110


Fill up void spaces under aft deck and foredeck
with polystyrene
Polystyrene

<<

ADVANTAGES

Timber for planking can be of short length, minimum 1.4 m
Short planks are easier to fit.
The number of frames are reduced by half.

DISADVANTAGES

If the planking is attacked by toredo worm under the waterline, the whole side has to be changed.

CONSTRUCTION PROCEDURE

The building method is the same as for longitudinal bottom planking, except for the following:

PAGES 1 AND 2. **REVISED TIMBER SPECIFICATION**

TYPE OF TIMBER	DIMENSIONS SAWN mm	MINIMUM LENGTH m	CORRECTED NUMBER OF PIECES	DIMENSION SPLIT AND PLANED mm
A	25x150	4	1	20x140
	25x150	4	1	20x70
	25x150	4	1	20x45
	40x150	4	1	35x45 35 x 90
	40x150	5	2	35x45 35x90
	40x200	3	2	35x200
	50x150	5	2	45x55 20 x 45
	50x150	5	2	45x45
	50x300	1.8	1	45x300
	75x100	4	1	70x90
	100x200	2	1	90x200
B	20x150	1.4	*	15x140

* Total length is 230 m

PAGE 3 – Item to be added: Cap head bolts with nuts and washers, Dimension: 8 x 80 mm.
Quantity: 12.

PAGE 23 – See page35

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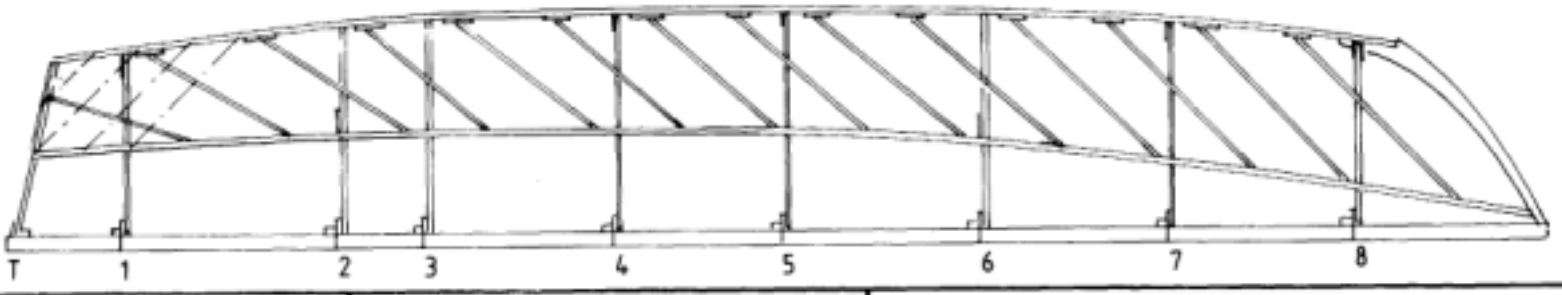
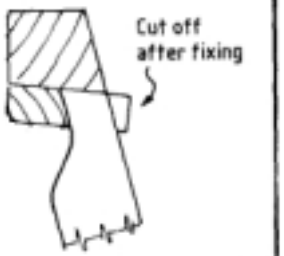
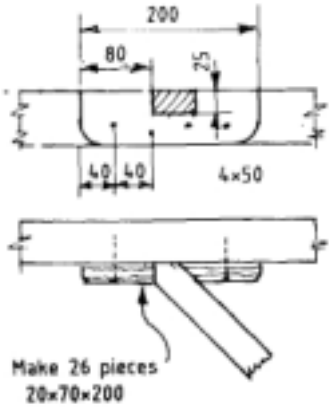
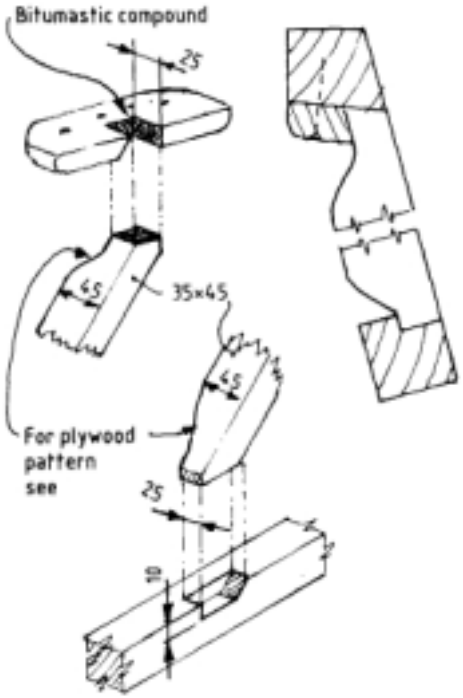
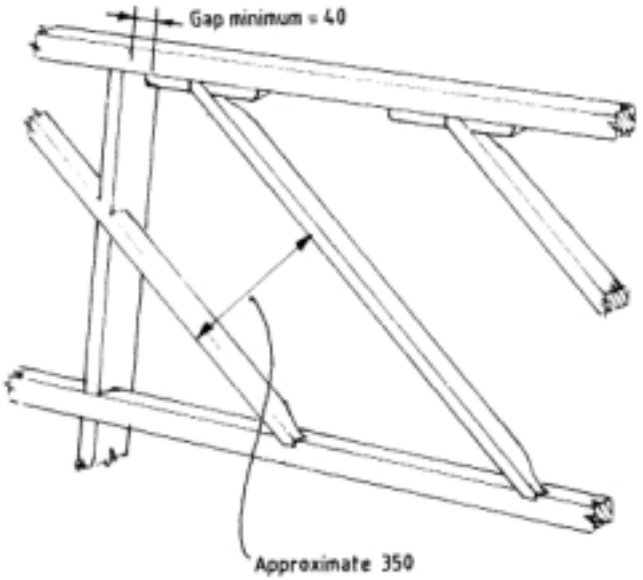

T
1
2
3
4
5
6
7
8


Cut off
after fixing

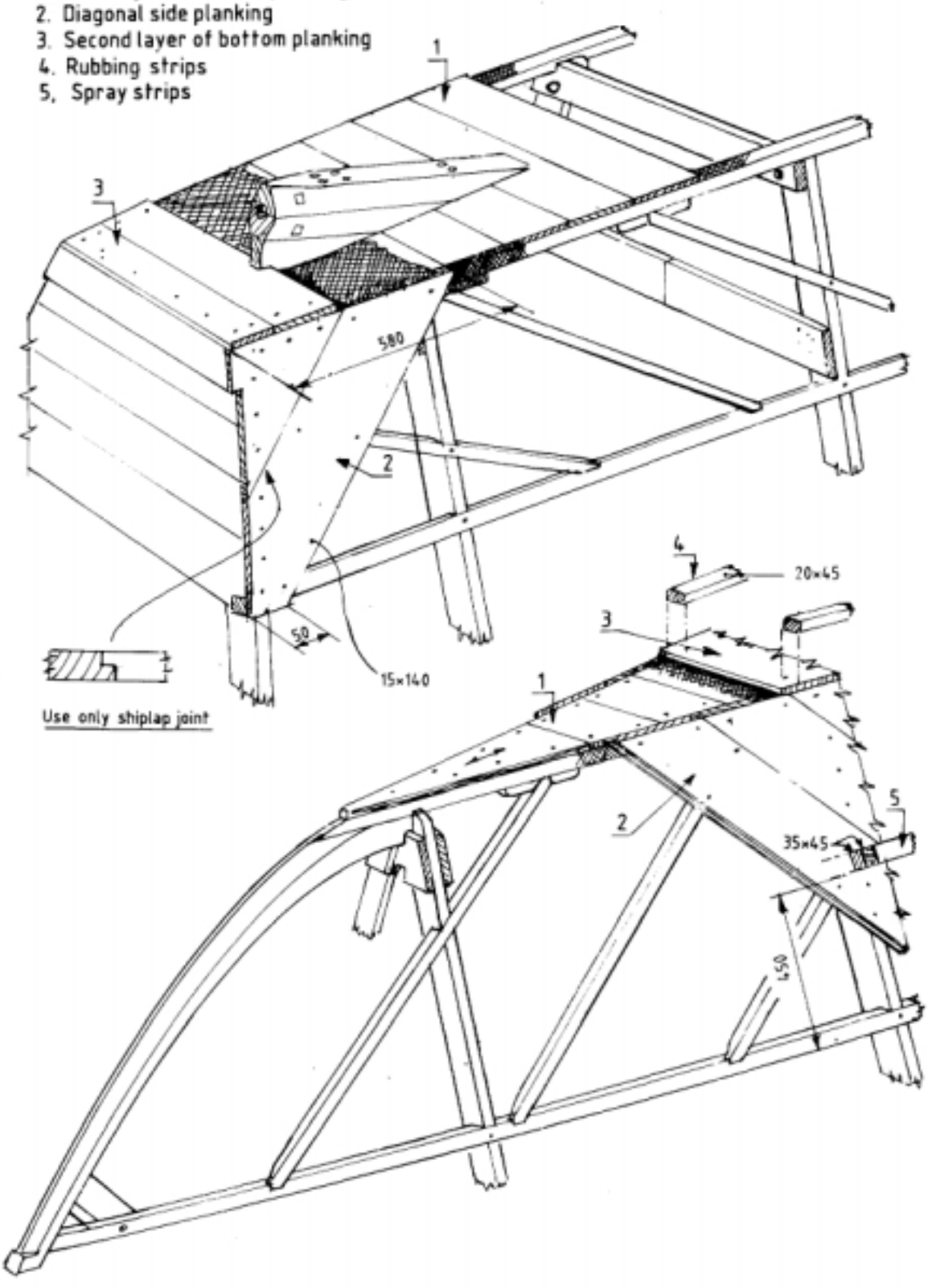

200
80
25
40
40
4x50
Make 26 pieces
20x70x200


Bitumastic compound
25
45
35x45
45
For plywood
pattern
see
25
20


Gap minimum = 40
Approximate 350

IDIAGONAL PLANKING

1. First layer of bottom planking.
2. Diagonal side planking
3. Second layer of bottom planking
4. Rubbing strips
5. Spray strips



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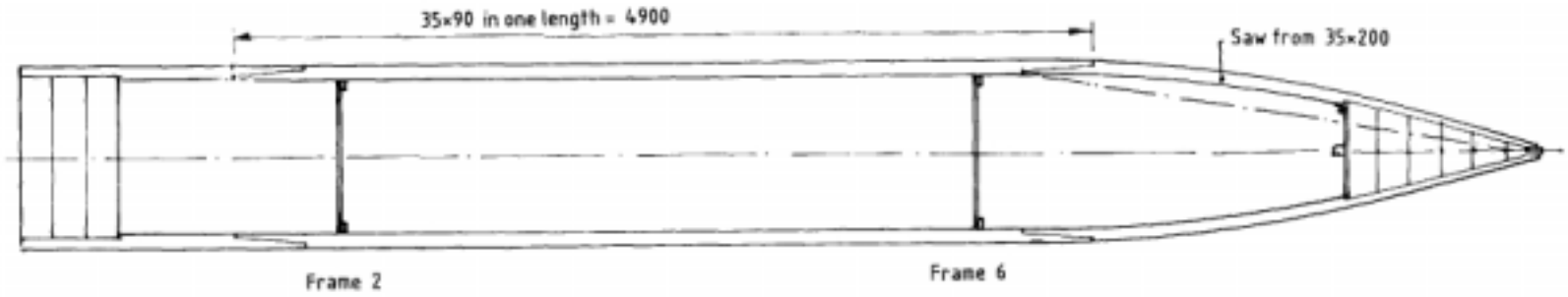
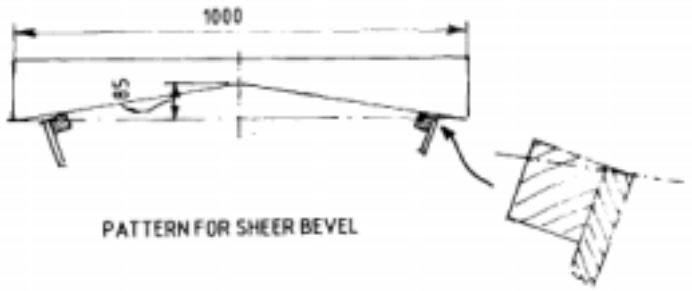
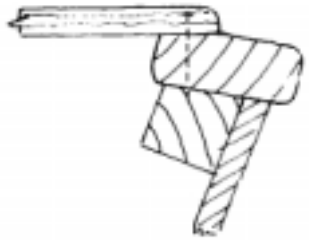
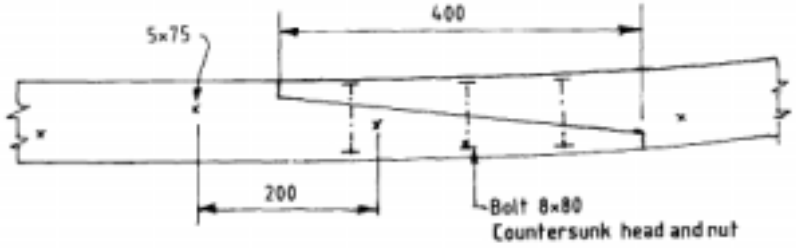
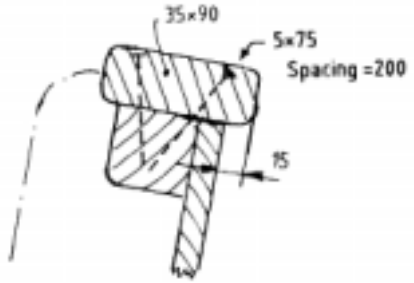
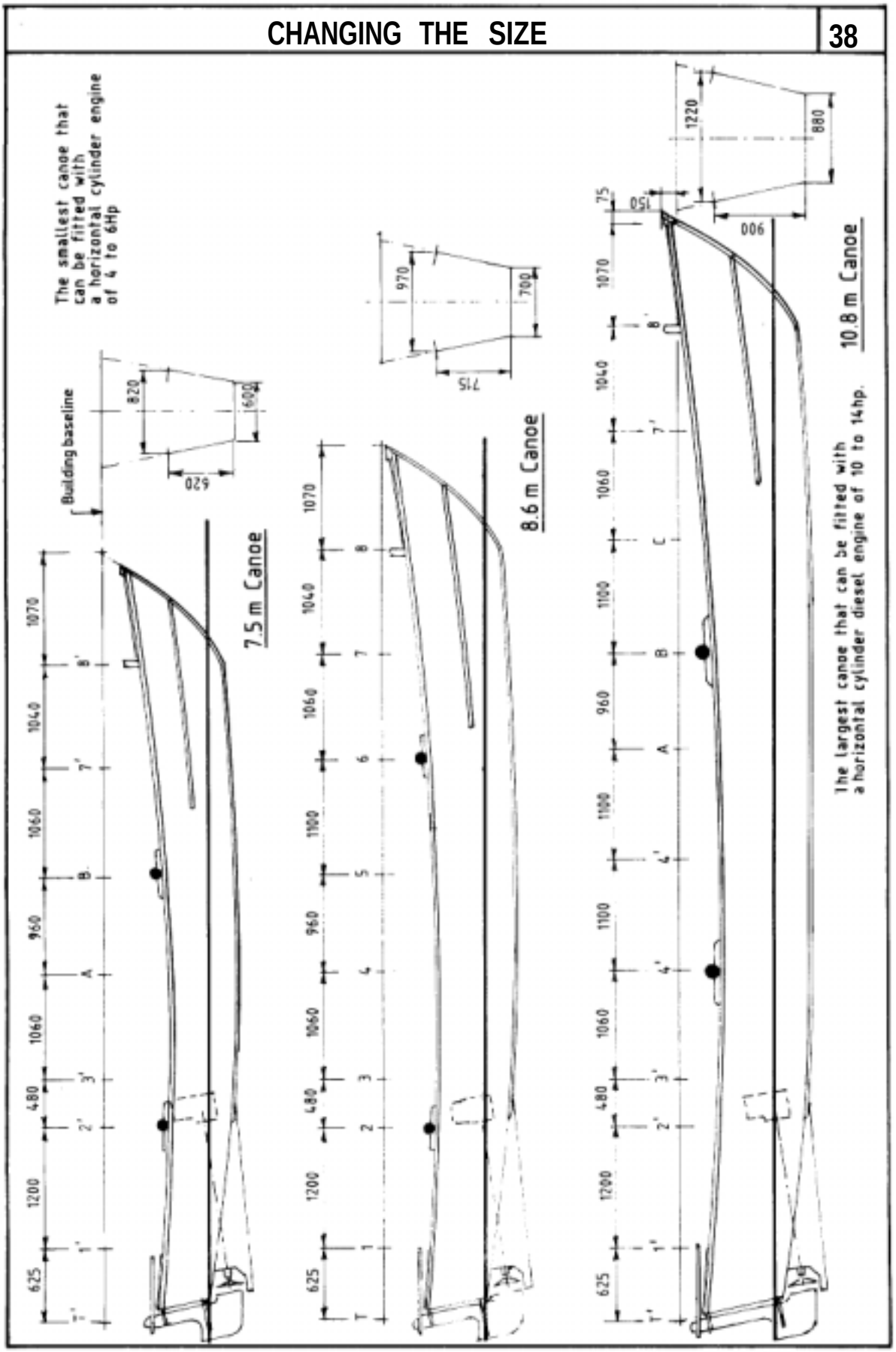

35×90 in one length = 4900
Saw from 35×200
Frame 2
Frame 6


1000
45
PATTERN FOR SHEER BEVEL

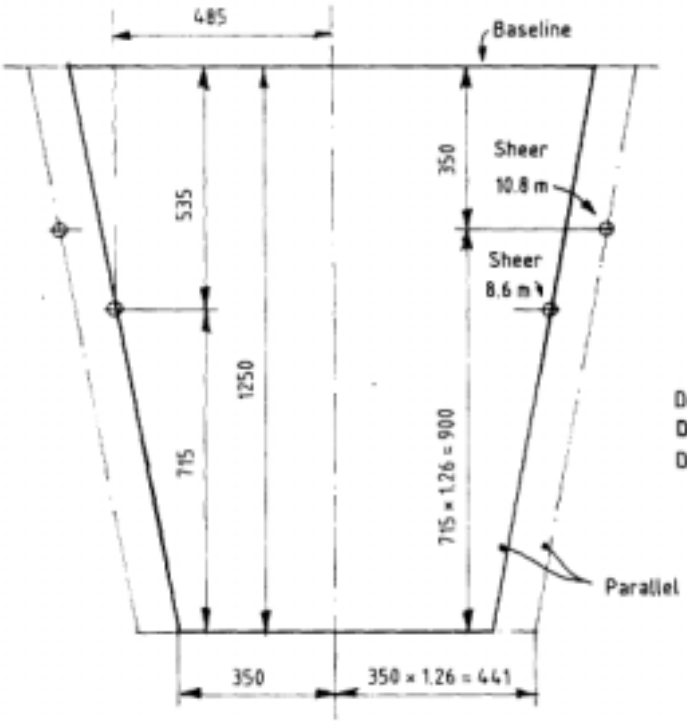



5×75
400
200
Bolt 8×80
Countersunk head and nut


35×90
5×75
Spacing =200
15


The smallest canoe that can be fitted with a horizontal cylinder engine of 4 to 6Hp
Building baseline
820
600
620
7.5 m Canoe
970
700
715
8.6 m Canoe
1220
880
900
150
75
10.8 m Canoe
The largest canoe that can be fitted with a horizontal cylinder diesel engine of 10 to 14hp.

<<



RULE 1

Frames T, 1, 2, 3 and 4 are changed in proportion to change in length.

EXAMPLE FRAME 4
8.6 m canoe is increased with two frame spacings = 2×1100 = 2200 to a length of 10.8 m

$$\text{Ratio} = \frac{10.8\ \text{m}}{8.6\text{m}} = 1.26$$

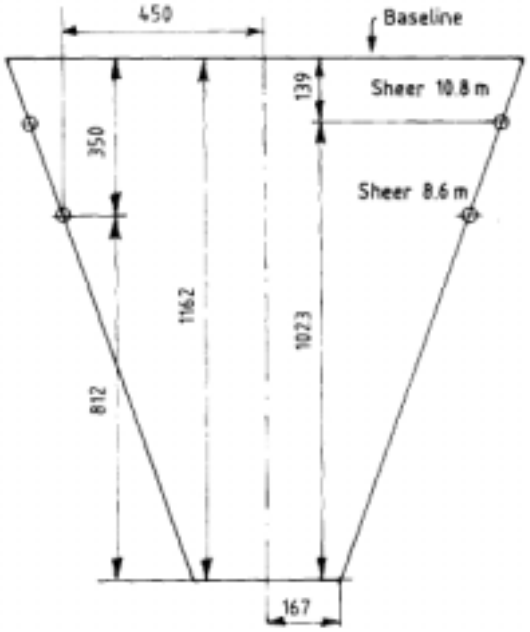
Bottom width of 8.6 m canoe = 350
Bottom width of 10.8 m canoe:

$$350 \times 1.26 = 441$$

Depth of 8.6 m canoe = 1250 − 535 = 715
Depth of 10.8 m canoe = 715 × 1.26 = 900
Distance from baseline to sheer:

$$1250 - 900 = 350$$

New frame marked 4'



RULE 2

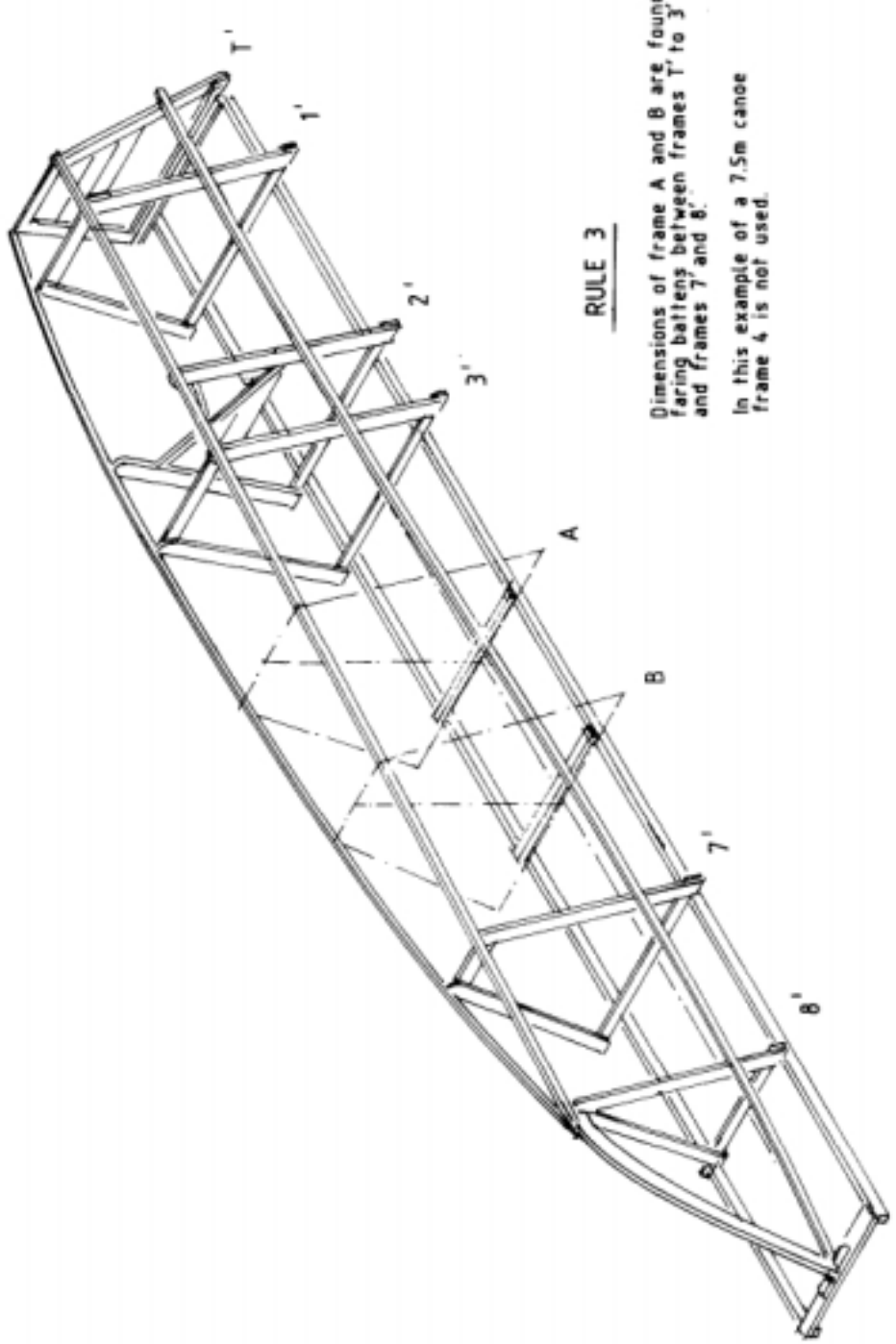
Frame 7 and 8 are not changed in shape. Only the height of the sheer is adjusted.

EXAMPLE FRAME 7
Depth of 8.6 m canoe: 1162 − 350 = 812
Depth of 10.8 m canoe: 812 × 1.26 = 1023
Distance from baseline to sheer:

$$1162 - 1023 = 139$$

New frame marked 7'

<<

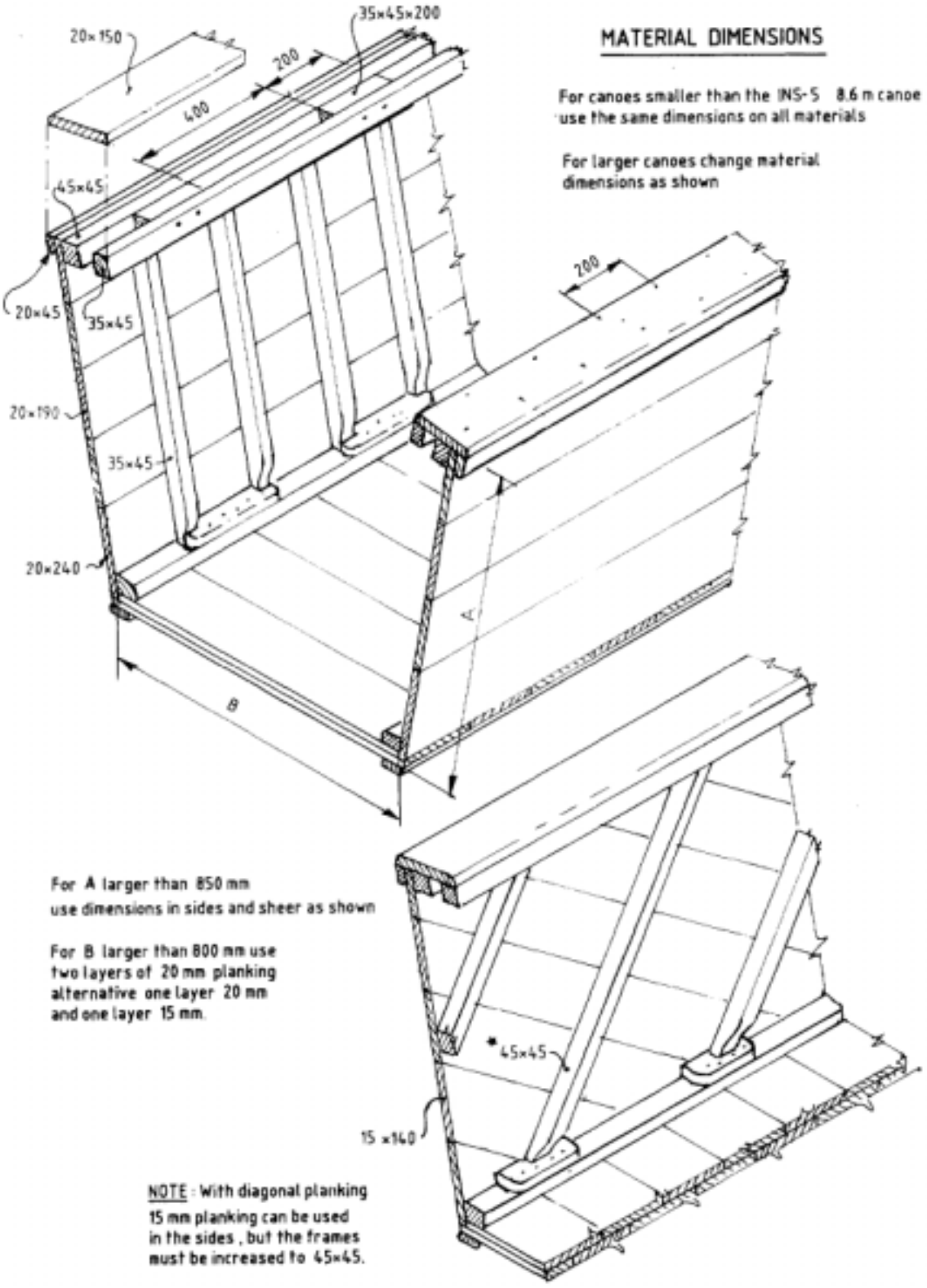


RULE 3

Dimensions of frame A and B are found by using faring battens between frames T' to 3' and frames 7' and 8'.

In this example of a 7.5m canoe frame 4 is not used.

<<



MATERIAL DIMENSIONS

For canoes smaller than the INS-S 8.6 m canoe use the same dimensions on all materials

For larger canoes change material dimensions as shown

For A larger than 850 mm use dimensions in sides and sheer as shown

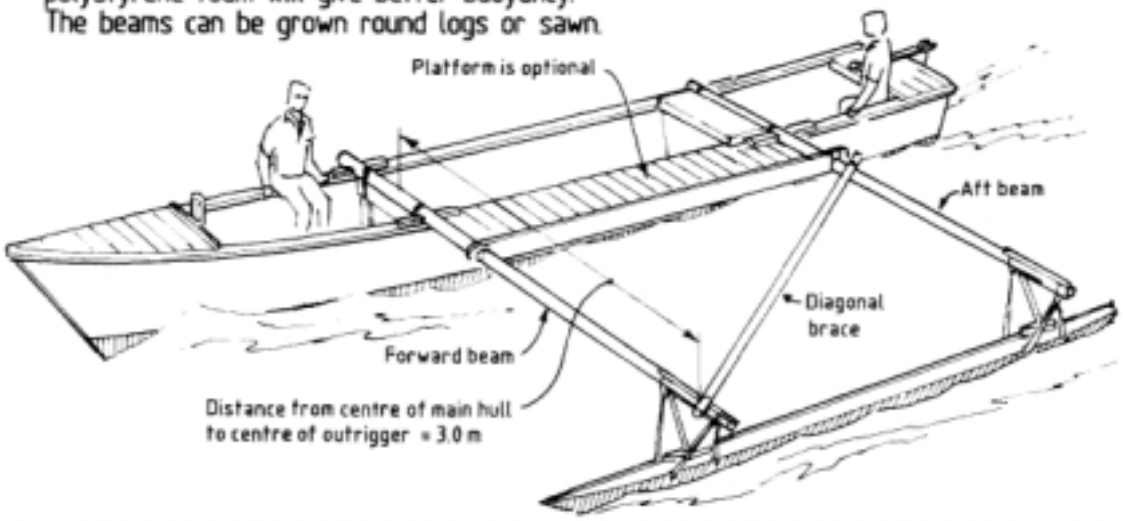
For B larger than 800 mm use two layers of 20 mm planking alternative one layer 20 mm and one layer 15 mm.

NOTE : With diagonal planking 15 mm planking can be used in the sides , but the frames must be increased to 45×45.

<<

ALTERNATIVE SINGLE OUTRIGGER

A traditional double outrigger with beams can be used, but the single planked outrigger fitted with polystyrene foam will give better buoyancy. The beams can be grown round logs or sawn.



MATERIALS

Not including platform.

TYPE OF TIMBER	DIMENSIONS SAWN mm	MINIMUM LENGTH m	NUMBER OF PIECES	DIMENSION SPLIT AND PLANED mm
A	50 × 125	0.8	1	1 pc 45 × 110 × 200
				2 pc 45 × 45 × 500
	40 × 150	1.1	1	35 × 140
	40 × 50	3.2	2	35 × 45
	40 × 100	3.0	1	35 × 90
B	25 × 200	4.5	6	20 × 190
	25 × 150	3.5	1	20 × 140

Total quantity of sawn timber = 0.18 m^3 (6.2 ft^3)

Hot dip galvanized nails : 4×50 - 2.0 kg , 5×75 - 0.1 kg

Polystyrene foam in slabs of whatever thickness is available in the market. Total volume = 0.15 m^3

For example: 50 mm slabs of 0.5 m × 1.0 m will require 6 pieces

Polyester (Terylene) braided rope for lashings, 5mm or 6 mm., Length = 40 m

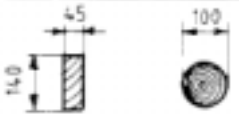
Bitumastic compound and nylon flyscreen in joints.

Paint.

BEAMS

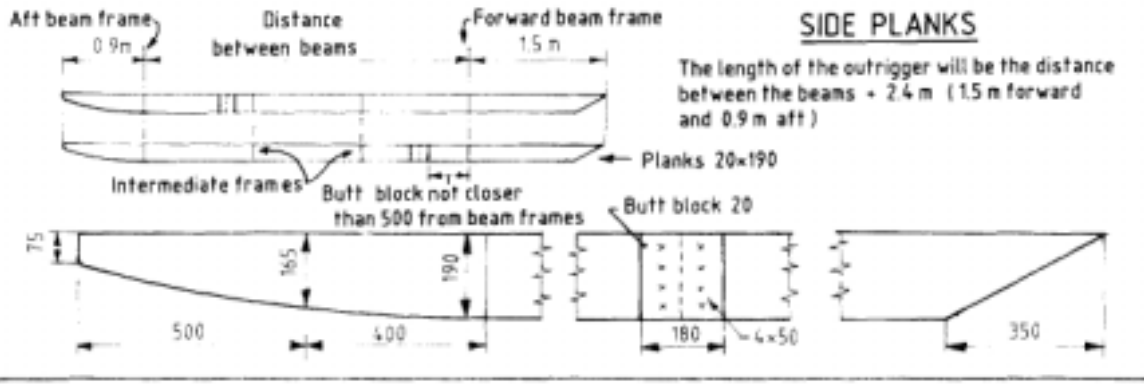
Timber must be free from defects and of weight 650 – 750 kg / m

Alternative sawn or grown round logs

FORWARD BEAM Length = 3.6 m	AFT BEAM Length = 3.6 m	DIAGONAL BRACE Length = 4.5 m
 Taper to 90 at outrigger	 Taper to 90 at outrigger	

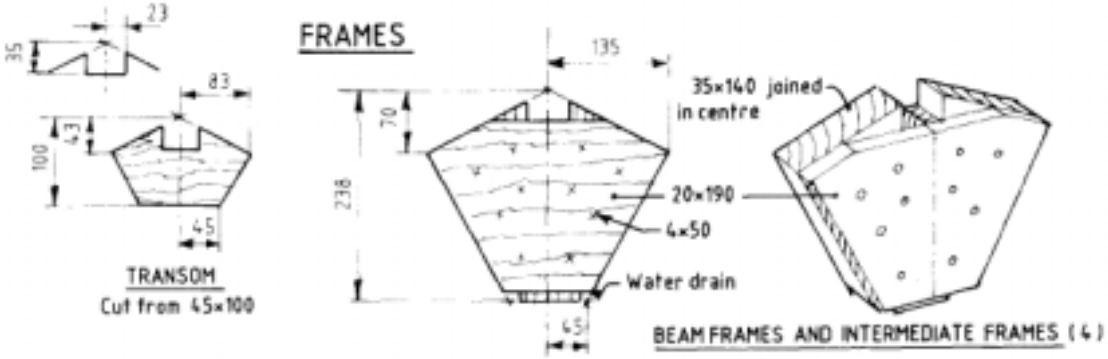
<<

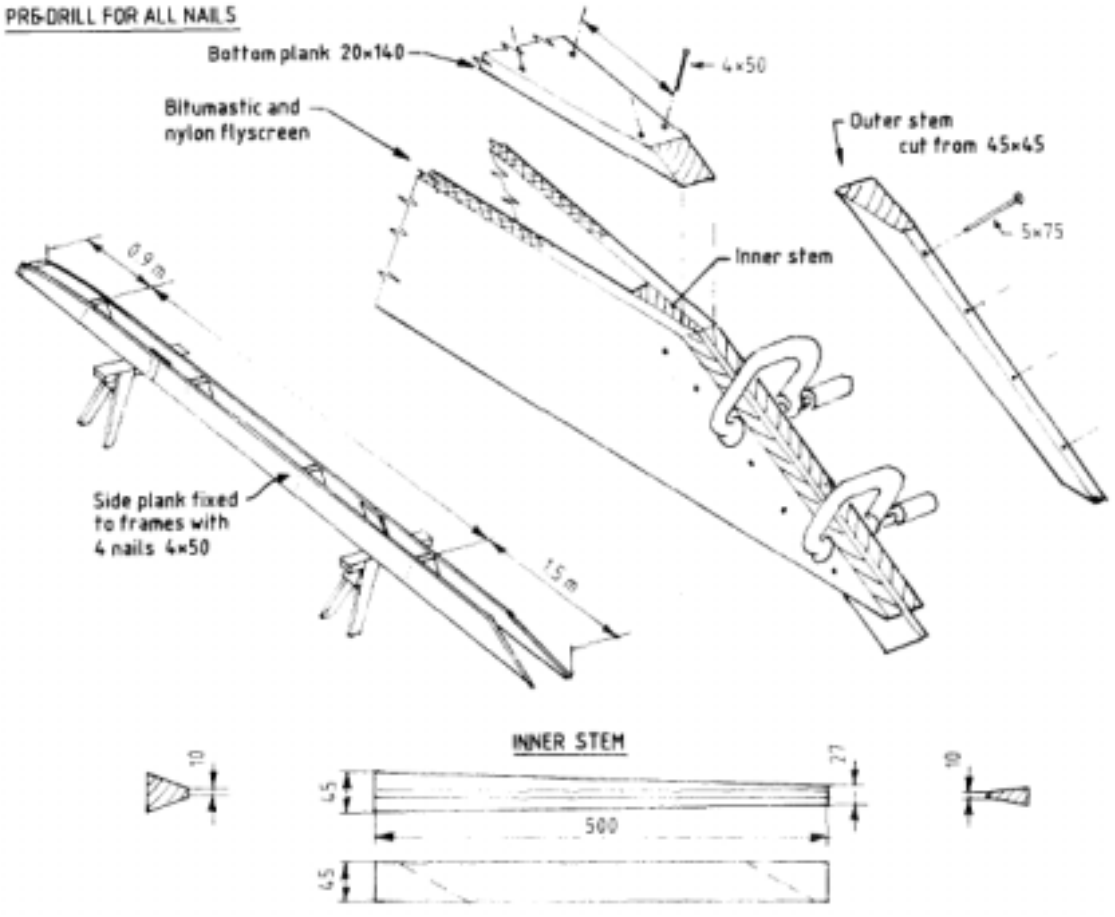
SINGLE OUTRIGGER



SIDE PLANKS

The length of the outrigger will be the distance between the beams + 2.4 m (1.5 m forward and 0.9 m aft)





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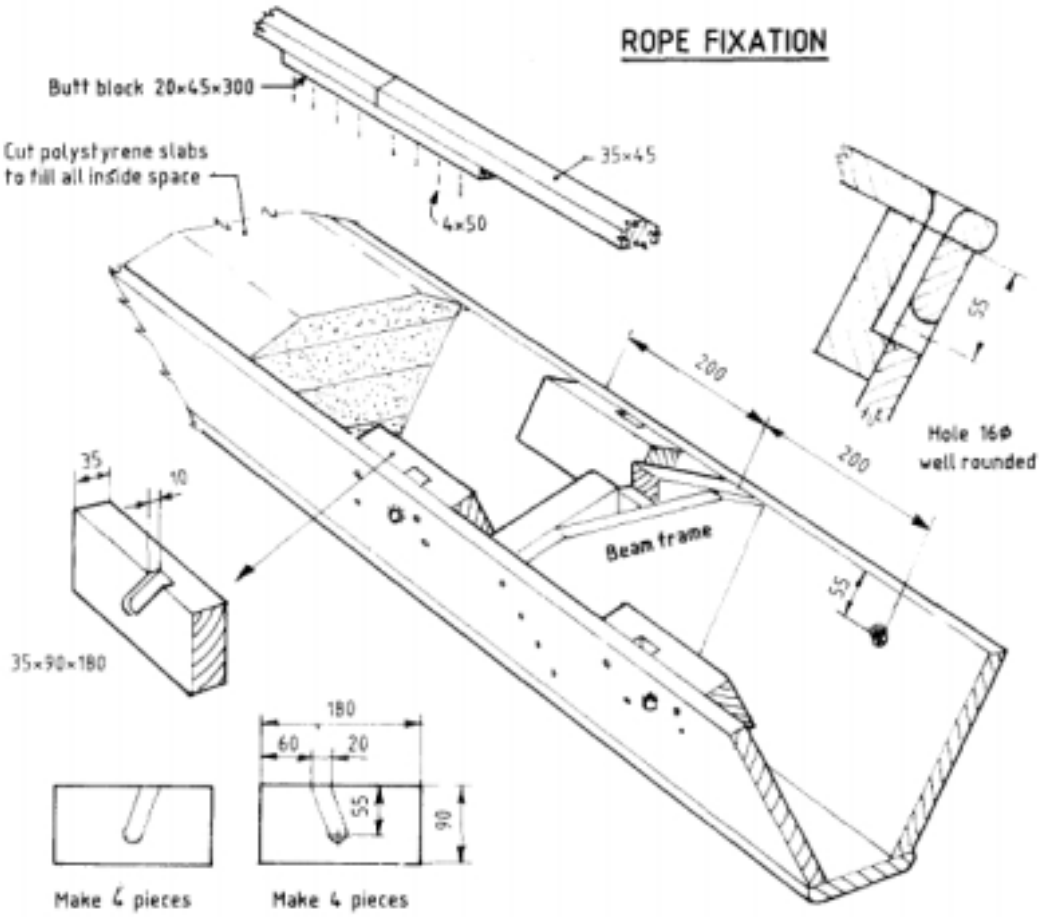
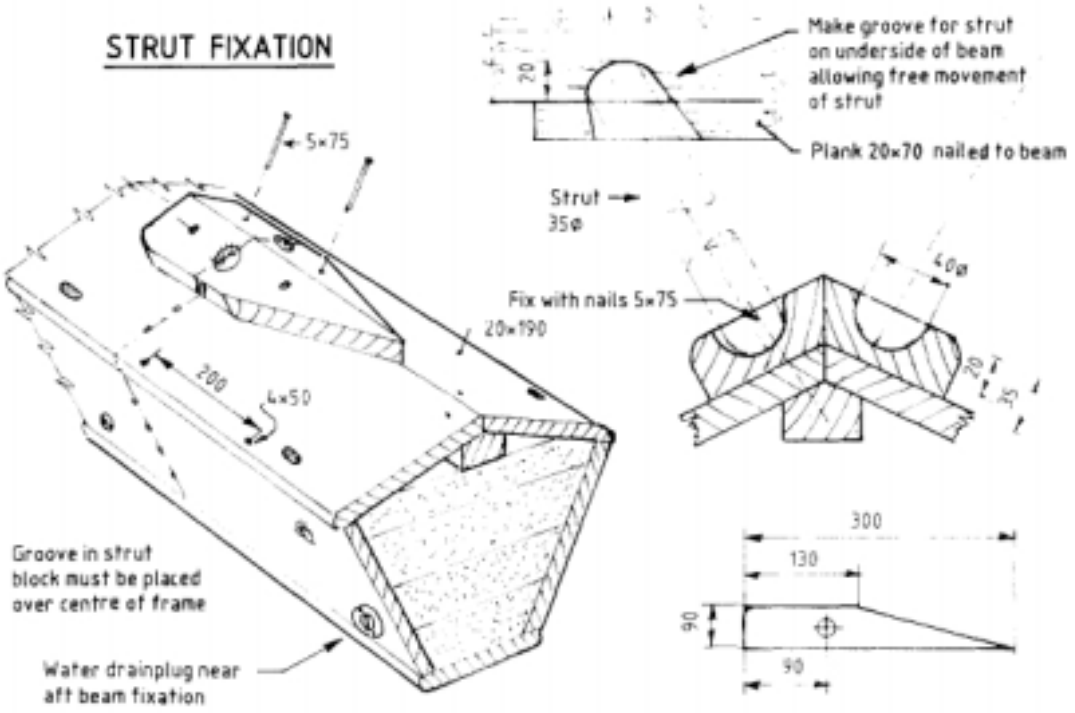
SINGLE OUTRIGGER

ROPE FIXATION



STRUT FIXATION



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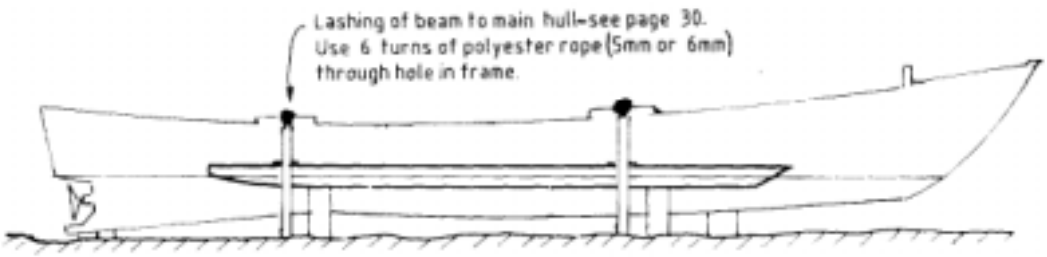
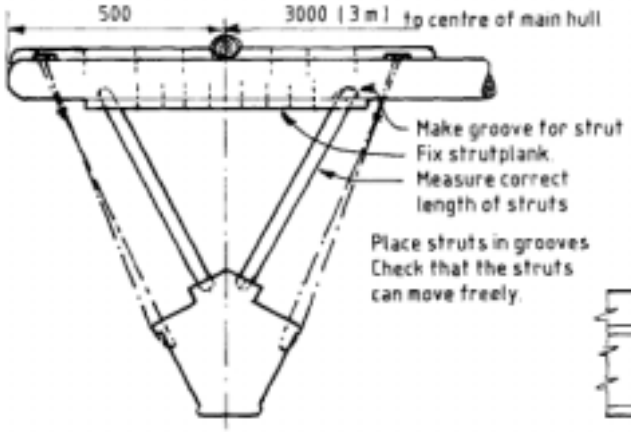
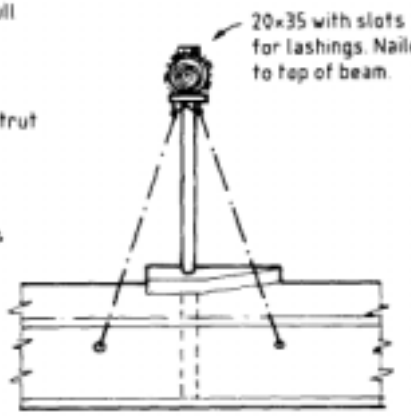
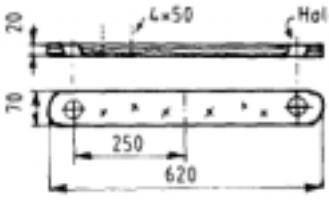
SINGLE OUTRIGGER

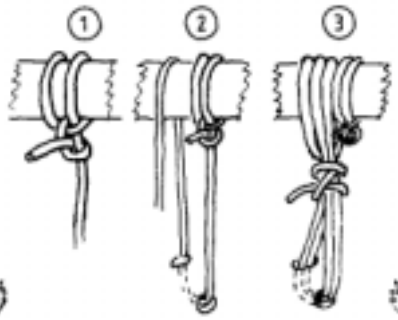


Support the main hull so that the expected waterline is horizontal. Check with spirit level.
Support the beams so that they are level. Support the outrigger in a level position.
Check that the centre distance between the main hull and the outrigger is 3 m.



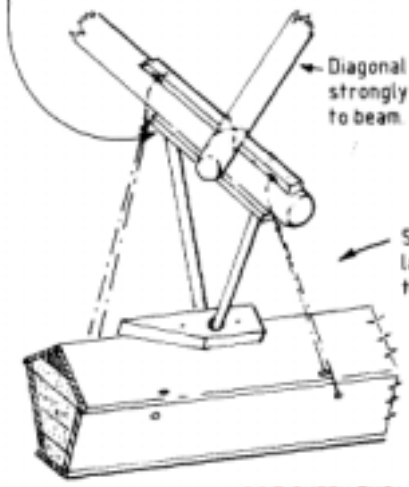






For all lashings use polyester (Terylene) rope, preferably braided, of 5 mm or 6 mm

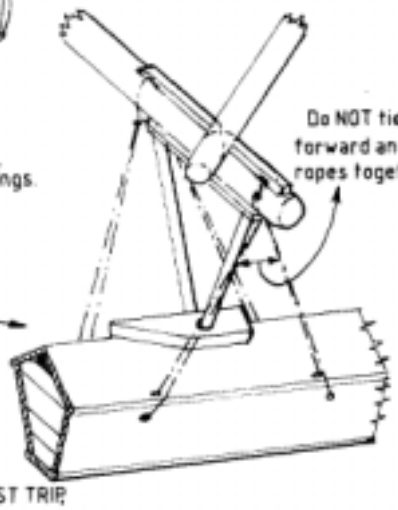
1. Secure end with a clove hitch and a half hitch
2. Tie twice through lashing hole in outrigger.
3. Secure end with two half hitches.



Use four separate ropes for the lashings.

Start by tying these two lashings first. Check that the struts stay vertical.

Finish with the two remaining lashings.



RE-TIGHTEN THE LASHINGS AFTER THE FIRST TRIP

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INDEX

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BOBP/MAG/12

Fishing Technology

Dug-out outrigger canoes, traditional fishing craft found from Madagascar in the west to Indonesia and the Pacific Islands in the east, are made from tree trunks of adequate diameter. But logs for construction of large canoes are becoming difficult to find and construction is consequently becoming more and more expensive. Dug-out construction also wastes a lot of timber. For each dug-out canoe, two or three planked canoes can be built. The Bay of Bengal Programme (BOBP) undertook a project in Nias Island, Sumatera, Indonesia, and Shri Lanka to design and construct planked outrigger canoes that would provide an answer to the problems now being faced in building the traditional outrigger canoes.

The outrigger canoe developed by BOBP was fully tested and found acceptable by fisherfolk in several villages of North Sumatera. This manual, describing the design and construction of this BOBP-designed canoe, is presented in a simple 'how-to-do' format that can easily be used by any boat-builder or carpenter with a little experience. The manual shows, step by step, how to build the main hull of the 8.6 m-long INS-5 canoe using sawn planks. The same methods of construction may be used for canoes from 7.5 m to 10.8 m length.

Though this manual has been prepared specially for small-scale carpenters with basic tools, engaged in the construction of small timber craft in remote villages, it could also be useful for trainers teaching in fisheries schools and extension workers in small-scale fisheries.

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