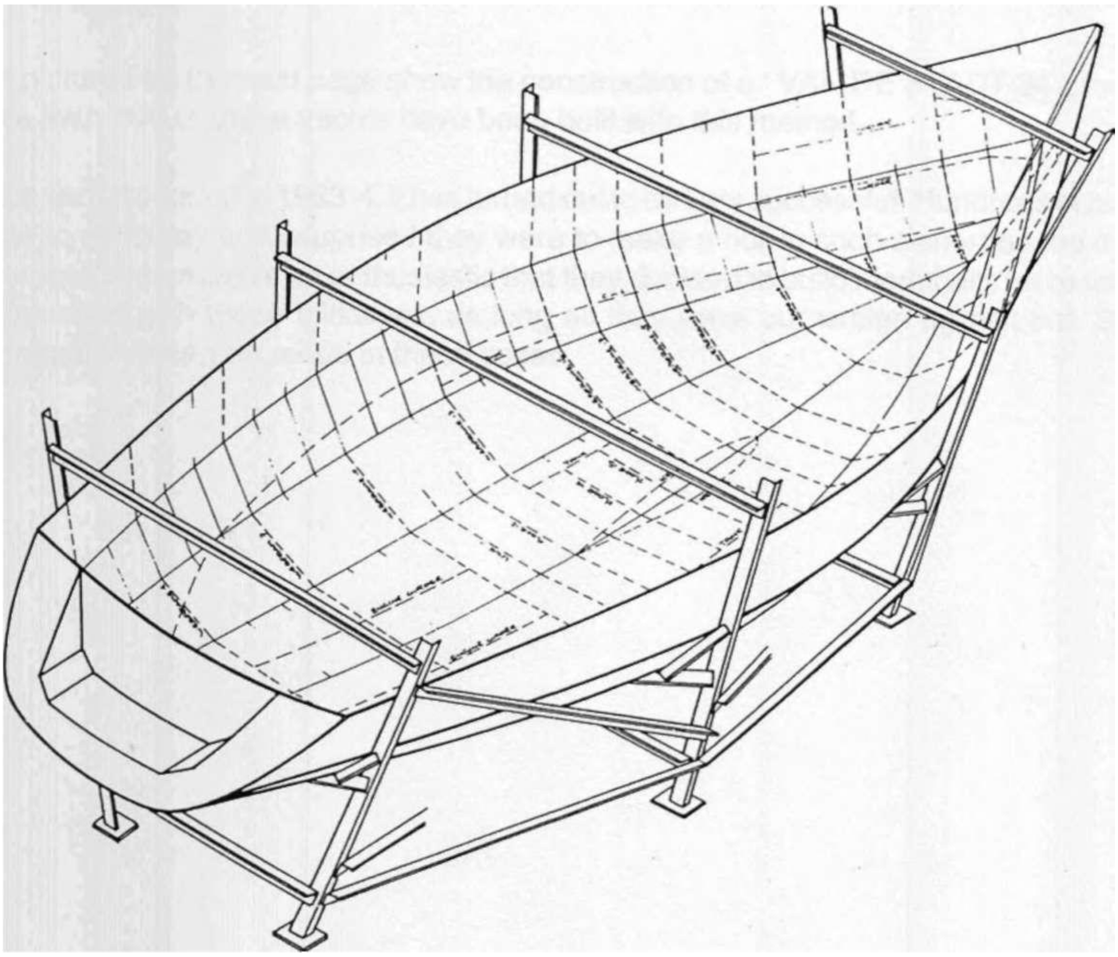
VAN DE STADT DESIGN

E.G. VAN DE STADT & PARTNERS BV
Industrieweg 35
1521 NE Wormerveer - Holland

YACHT DESIGNERS

QUICK ASSEMBLY METHOD

FOR STEEL AND ALUMINIUM



FOREWARD 1988

The working order for this successful building method is:

a. Preparation of the hull sheets

b. Assembly of the hull

c: Mounting of the frames and bulkheads

The chief attraction for this method of working is that there is no frame set-up required for the building of the hull shell, which not only saves a lot of time, but also leads to a smooth clean hull shape. This is called the " frameless fairing " method. However, it also implies that the completed hulls have no frames. In order to prevent any misunderstanding on this point, we have changed the name to 'Quick Assemblage' method.

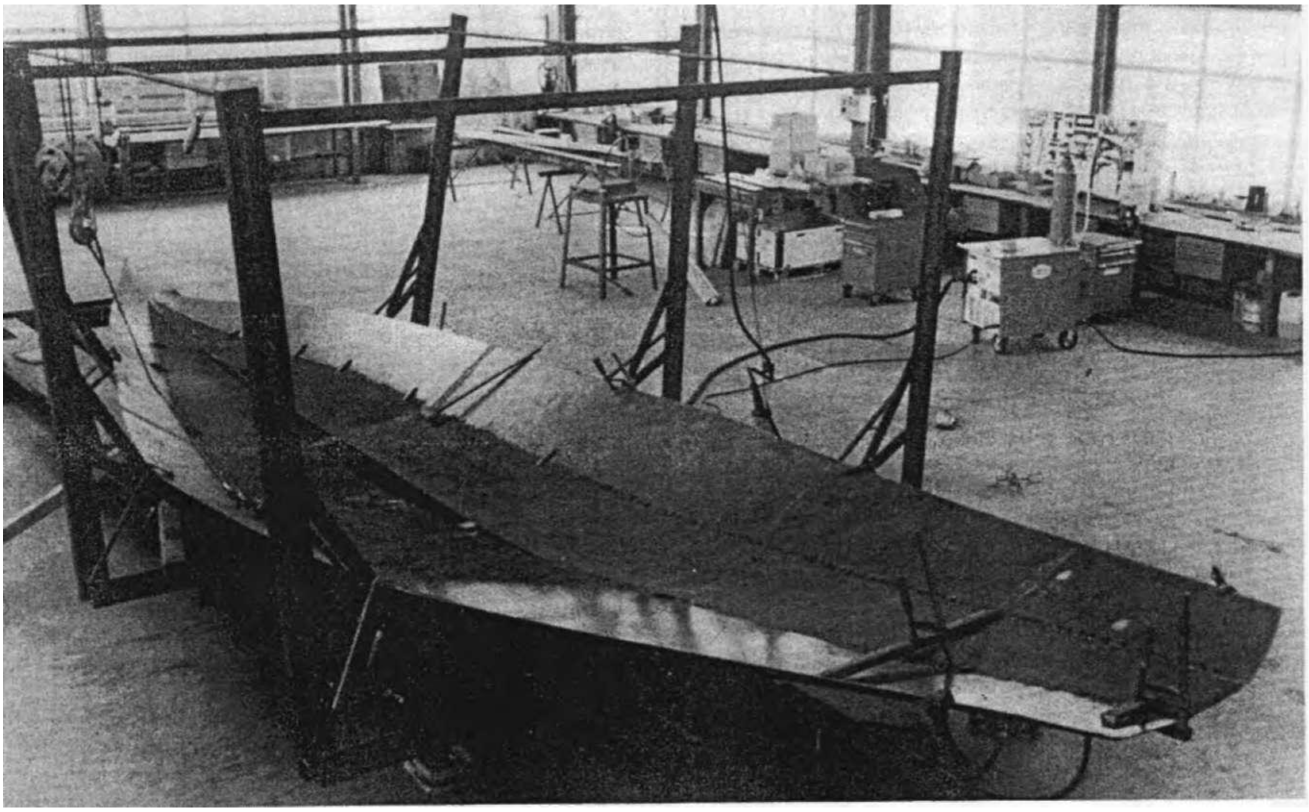
The laying down on the metal hull sheets can now be carried out in two ways:

a: For hulls up to 10.50m (34 ft.) according to the method given on page 5.

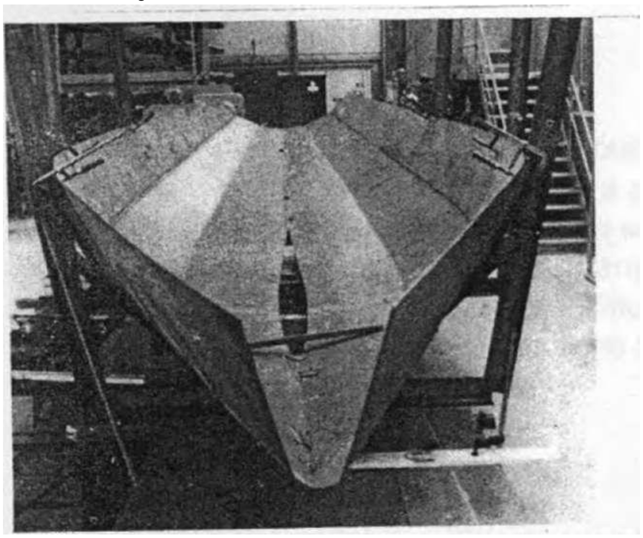
b: For larger hulls, according to the method given on the back page of this manual.

The pictures on the next page show the construction of a ' VAN DE STADT 34 ' steel hull. More than 300 of these yachts have been built with this method.

Since we introduced in 1983-4, it has turned out to be very successful. Hundreds of builders wrote to us to say how surprised they were to make a hull in such a short period of time. A number of them were so enthusiastic that they decided to build more hulls for resale. We are pleased with these initiatives, as long as they have our written agreement. Special arrangements can be made in these cases.



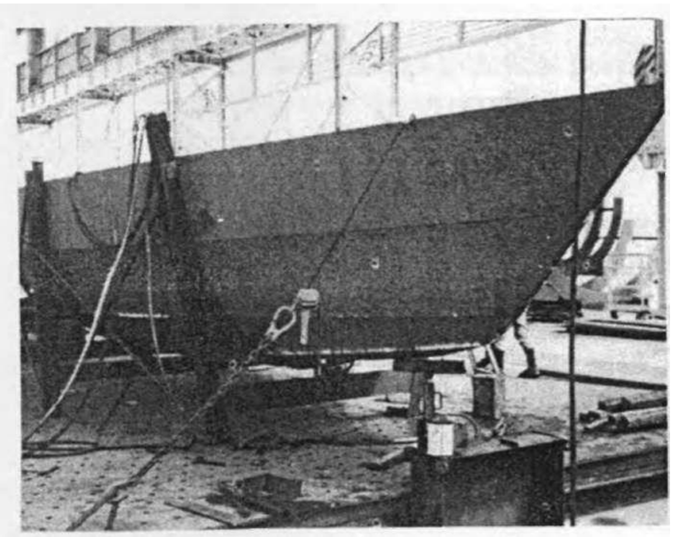
The 'assemblage' method.



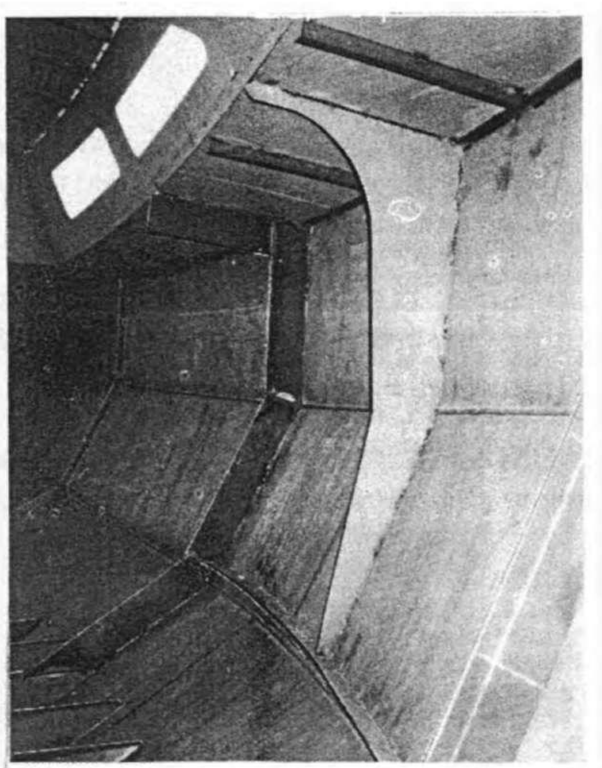
Three sets of hull plates in position. Fitting in the stem-bar between the plates will be the next step. The opening looks over-sized owing to the perspective effect.

Quick-Assemblage method

VAN DE STADT DESIGN



The plating is completed and ready for the final welding.



The picture shows the shroud bracket and some frames and floors of the VAN DE STADT-34-, seen from fore to aft.

BUILDING INSTRUCTIONS FOR STEEL HULLS USING THE VAN DE STADT FRAMELESS FAIRING METHOD.

This is a simplified building method for steel multi-chine yachts which not only reduces building time but also allows the production of remarkably smooth and fair hulls.

PREPARATIONS.

The dimensions of the building materials are given in the bill of materials. In addition to this, 2 sketches show how the various parts can be cut out most efficiently, with the least waste. It would be worthwhile to consider buying pre-shotblasted and primed steel so that shot-blasting of the completed hull can be omitted. Components such as the stem bar and the sole of the box keel are made up of heavier material, which can be ordered from your supplier already cut to shape. Some suppliers will even weld the hull sheets together for a reasonable price. Number the hull sheets as soon as they arrive at the building site, so that when construction begins, one cannot be mistaken for another.

Building site.

In a damp climate, a steel hull should be built under a roof. The edges of the sheets must be free totally from rust in order to make a good weld. To weld the 4mm hull sheets, a 3 phase powered arc welder is required. Arc welding produces power surges which may be noticed by neighbours, so be aware of any problems this may cause. All cables and electrical equipment must be in good condition when working with steel hulls. For your own piece of mind, have the earth connections tested by an electrician before commencing work.

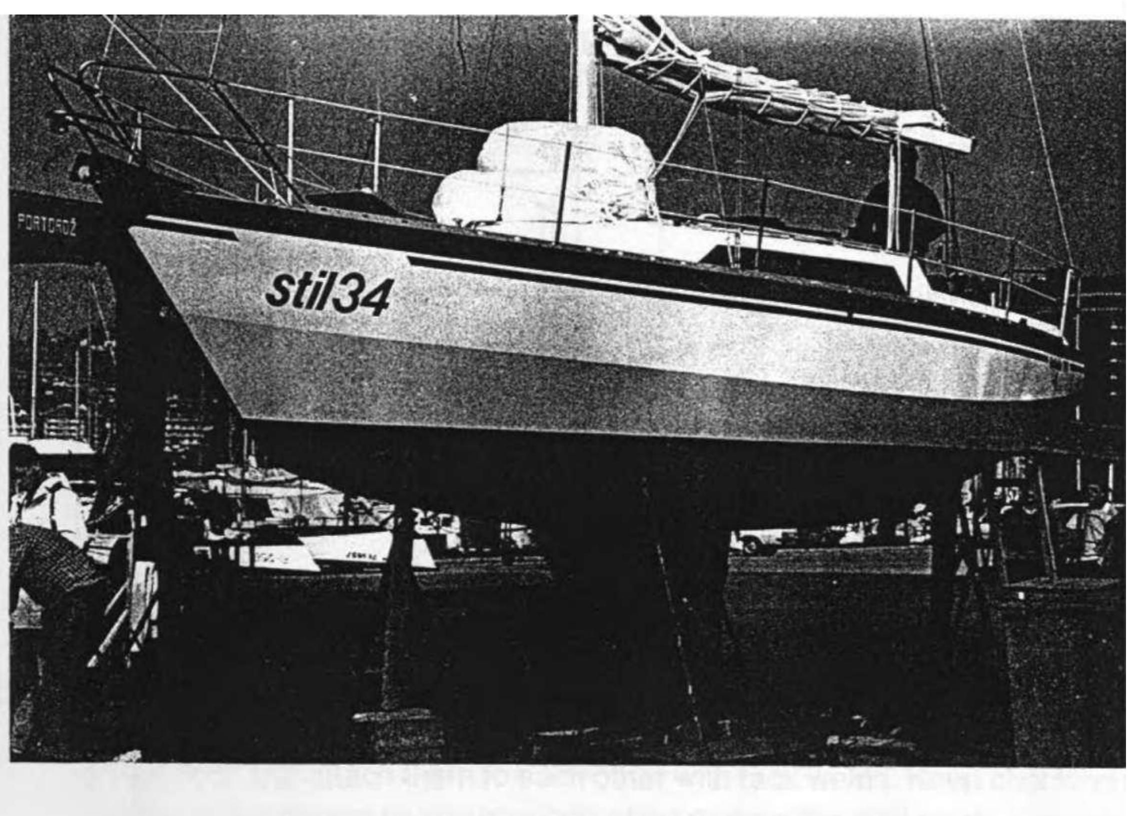
Special tools.

1. AC arc welder of sufficient rating to weld 4mm sheet steel. The welding cables should be long enough to weld inside the hull while the transformer remains on the outside.

2. A nibbler is for all practical purposes the most suitable cutting instrument for amateurs, as it can produce a smooth finished cut. The sheet does not warp as it might when using a cutting torch.

3. A cutting torch is not an absolute necessity, but it comes in handy for cutting angle and flat bars, hatch apertures, rudder and propeller shaft apertures and hole for drains etc.

4. A portable disc sander is essential.



5 A fairing batten of knot-free, straight grained wood, about 50 x 15 mm at least 5 metres long. (Select a nice piece of fir or pinewood at a lumberyard. Have it cut lengthwise and glue to two pieces together with a bevelled scarf and then plane it straight.)

6. Steel scribe, chalk and a chalk line.

THE BUILDING JIG

The construction and setting-up of the jug is not difficult, but it must be done accurately. Angle bar is the most suitable material for the jig. The standing flanges will be on the inside, which makes it easy to reach the welding seams. A different material could be used for the heavier horizontal beam.

Construction steps;

Transfer the dimensions from fig. 1 (drawing number391-13) in full scale to aflat lofting surface (which could be temporarily made from the future hull plates). These dimensions represent the inside of the three supports, and they are 6mm wider than the hull. (fig.2)

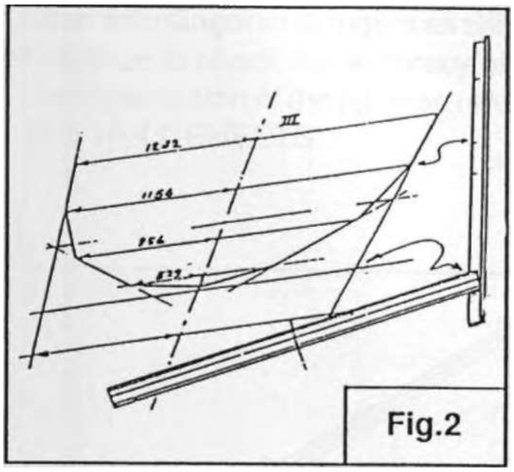


Fig.2

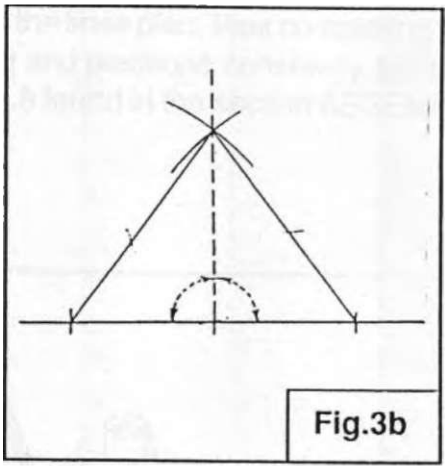


Fig.3b

2. The lengths of all the pieces of angle bar are measured on the three frame outlines. Cut the various pieces to these lengths, then lay them next to the lines on the floor and attach them to each other with tack welds. Keep checking the position of the pieces as you go along when making the final welds. Correct the position if necessary with some hammer blows while the weld is still hot.

3. The legs of the middle support are longer, so that a horizontal beam which will hold the hoist, can be attached. (See ASSEMBLING THE HULL SHEETS.)

4. The horizontal beams must be at an equal height on every support. Indicate the centre line on each beam.

5. Draw a centre line on the shop floor using the chalk line. (See PREPARING THE HULL SHEETS.) Draw the three frame location lines at a right angle to the centre line. Use a large 90 degree triangle (as shown in fig.4) to do this. This triangle can be made from three straight wooden slats on which 3,4 and 5 equal lengths have be marked (as in fig.3a), the so called 3-4-5 triangle.

6. Erect the middle support first. It must be placed a right angles to the the centre line and perpendicular. Check this with two or three plumb bobs. Then make sure that the horizontal bar is level (as shown in fig.4). The liquid level can be made of a bucket and transparent hose long enough to reach all parts of the building jig without moving the bucket. The bucket and hose must be filled with water to the same level as the horizontal beam, 42 cm. above the building floor.

7. When the middle support has been erected and temporarily propped in place, put the other supports into an upright position. They can be propped against the middle support. Check the level of the horizontal beams, using the liquid level and correct it if necessary.

8. When all three supports have been correctly positioned, connect them to each other with diagonal stringers as shown on the lines plan, thus completing the jig. Continue to check the accuracy of the jig and positrons constantly throughout the construction of the jig. Also refer to fig.8 found in the section ASSEMBLING THE HULL SHEETS.

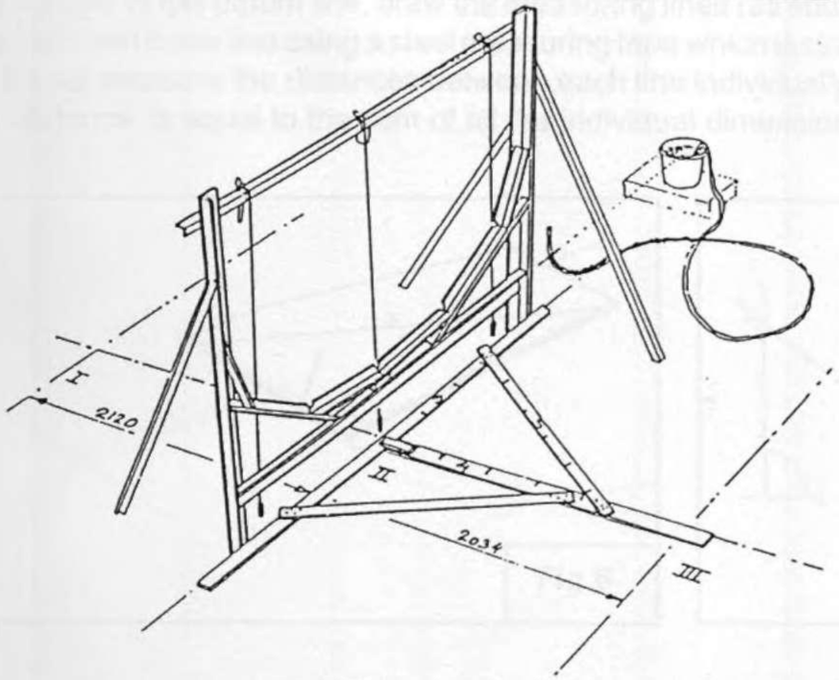


Fig.4

Fig.5

PREPARING THE HULL SHEETS

After the hull plates have been welded together, the outline of the various hull sheets have to be transferred to them. The best tool for drawing these outlines is a steel scribe. This produces clean sharp marking lines. They can be made even clearer by rubbing some chalk into the lines produced by the scribe. A hard pencil or slate pencil may be used, but the marks are not as distinct and are less permanent. Transfer all dimensions to the hull sheet each side of a datum line. Make this straight tine with a chalk line. Ensure the string is long enough, rub it over a piece of chalk and secure it tightly to the sheet in the desired position. Holding this string between the thumb and index finger, pull it up and away from the sheet and allow it to snap back. (See fig.5) Scribe along this line with a straight edge to make it permanent.

At a 90 degree angle to this datum line, draw the measuring lines (as shown in fig. 6) Mark the distances between these line using a steel measuring tape which is stretched the length of the plate. Do not measure the distances between each line individually, and make sure that the total distance is equal to the sum of all the individual dimensions.

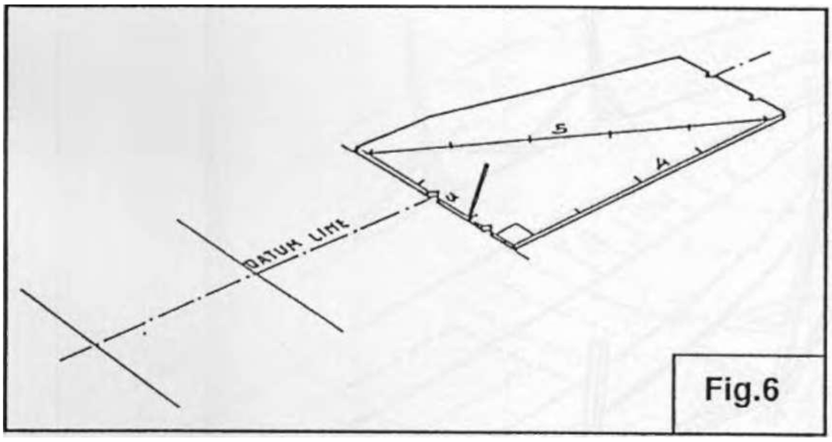


Fig.6

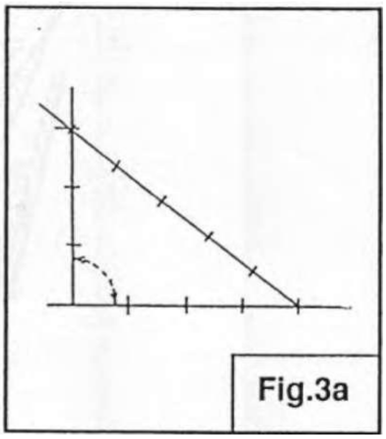


Fig.3a

After all the cross points have been transferred, use a fairing batten to connect them with a flowing line. To secure the batten use weights, extra people or wedges secured under small pieces of angle bar tack welded to the plate. (See fig. 7.) The fairing batten should be at least half the length of the hull sheet. Use some overlap in scribing the sheets in order to avoid irregularities and unevenness in the line being scribed.

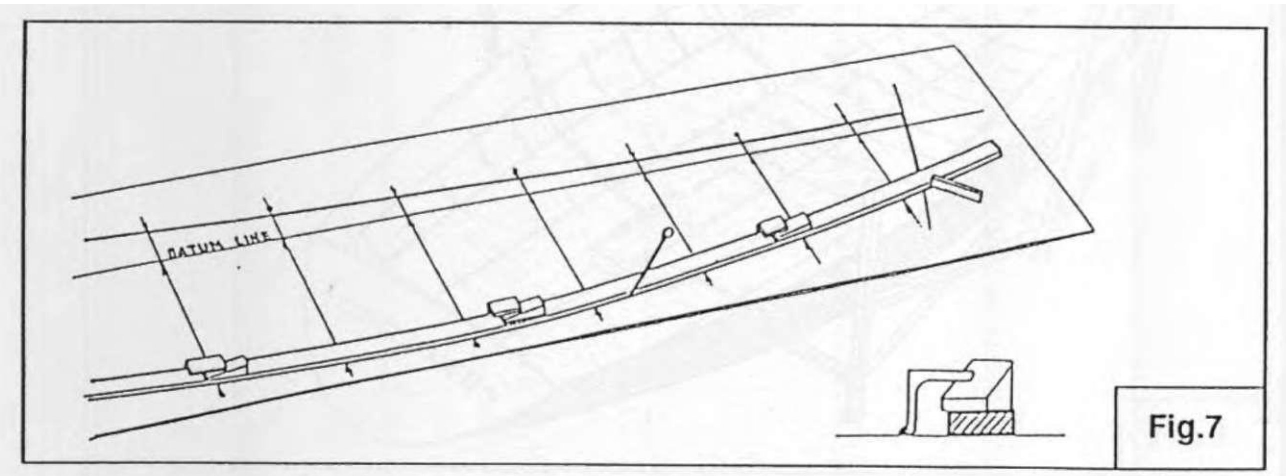


Fig.7

The positions for attachment of bulkheads, floors, stringers etc., are also transferred from the drawing in a way that they remain clearly visible. Make markings with a small chisel, to indicate on which side of the line the part will be attached.

Caution:

Both a left and right example of each hull sheet must be made. The markings for bulkheads etc., therefore, must be scribed on opposite sides.

The waterline must be scribed on the outside of the hull sheets. Scribe this line deep enough so that it will remain visible for many years. At this point, very carefully and accurately cut out the hull sheets along the scribed line, the correct hull depends on this accuracy. All the edge of the sheets must be square cut!

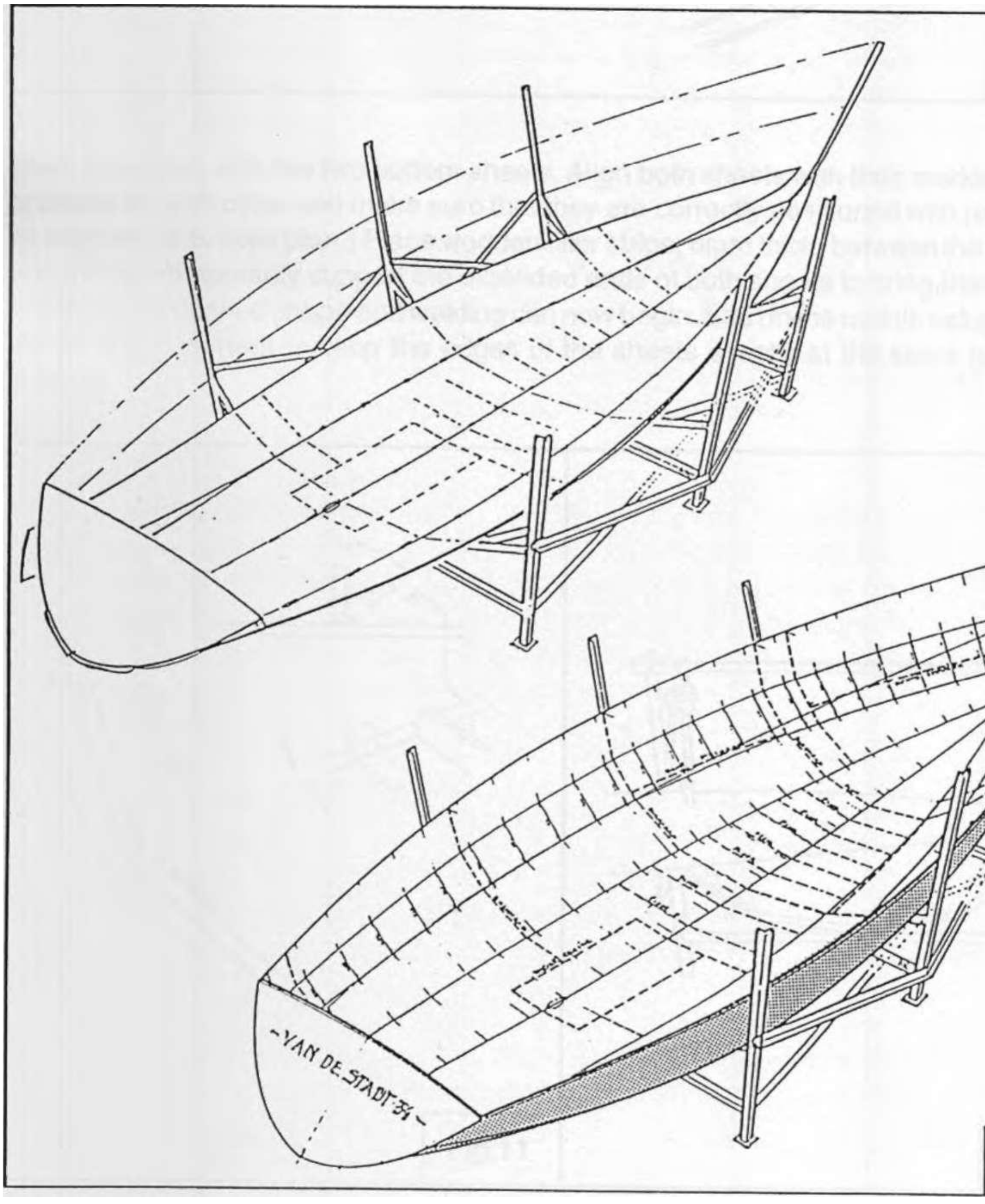


Fig.8

ASSEMBLING THE HULL SHEETS

Fig.8 gives a comprehensive view of the hull sheet assembly. The cut out hull sheets must be pulled into the building jig, one at a time. A 10 to 11 metre hull is composed of sheets weighing about 160 to 170 kg each. If no extra help is available, one person can pull the sheets into the building jig as shown in fig.9.

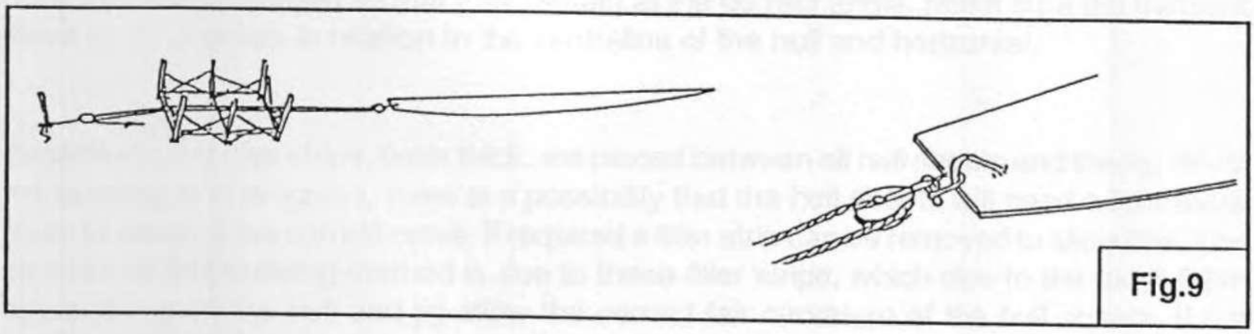


Fig.9

Start, of course, with the two bottom sheets. Align both sheets with their markings exactly opposite to each other and make sure that they are correctly positioned with regard to the jig supports (see lines plan.) Place wooden filler strips, 6mm thick, between the hull sheets and the jig. Temporarily support the extended ends of both sheets to bring them together, this gives the desired shape and welding can now begin. Start in the middle using short tack welds. It is important to keep the edges of the sheets exactly at the same height while

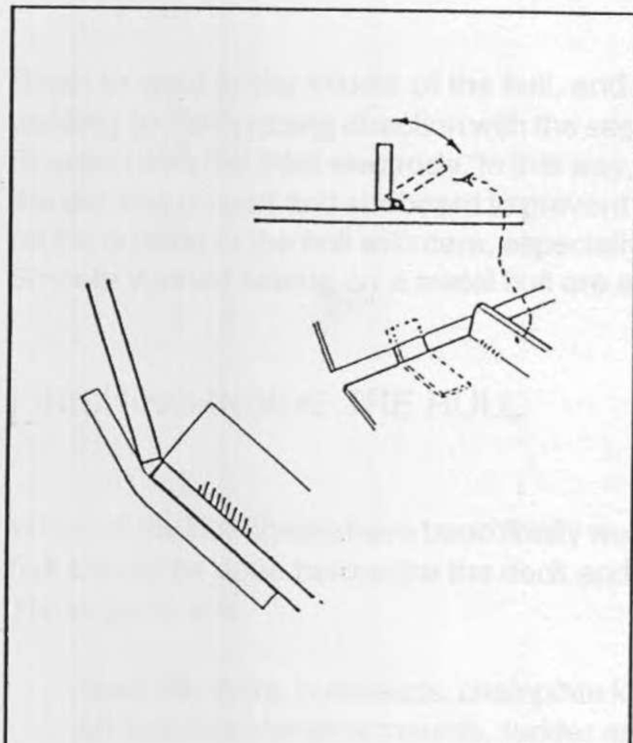


Fig.11

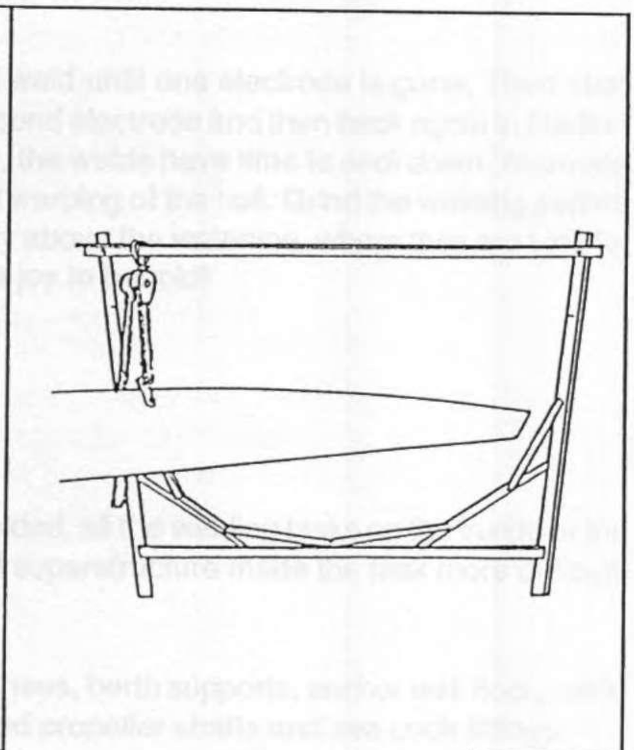


Fig.10

Pull the next sheets into position, preferably with a hoist, which can be suspended to the top horizontal bar of the jig, as shown in fig. 10. In this way, each sheet can be moved and held in position and there is no danger of the sheet sliding out of control I In order to maintain the sheets in their proper position before welding, small steel strips can be temporarily tacked to the lower sheet, as shown in fig. 11. Tack these strips on one side only, so they can be removed with a few taps of a hammer after welding the hull sheet.

Attach the stem bar between the sheets at the proper time. The transom is usually put into position after the first two sheets have been placed on each side. Stem and transom must of course, be supported so that they remain at the correct angle. Make sure the transom stays at 90 degrees in relation to the centreline of the hull and horizontal.

Essentially, the filler strips, 6mm thick, are placed between all hull sheets and the jig. While the building is in progress, there is a possibility that the hull sheets will need a little more room to assume the correct curve. If required a filler strip can be removed to allow this. The success of this building method is due to these filler strips, which due to the extra 6mm space between the hull and jig allow the correct fair curvature of the hull sheets. If the welding seams do not align exactly with the jig in the higher hull sheets, this can be corrected by removing the lower filler strips.

Do not make the tack welds longer than 3-4cm at intervals of 15-20cm along the seam on the inside of the hull. Do not begin the final welding of the outside of the hull until all of the hull sheets and the deck stringer bar along the top of the highest hull sheet have been properly positioned with tack welds. The final seams on the outside of the hull must be filled up completely. First class welding is essential for a strong hull.

Begin to weld in the middle of the hull, and weld until one electrode is gone. Then start welding in the opposite direction with the second electrode and then back again in the first direction with the third electrode. In this way, the welds have time to cool down. Alternate the welding on port and starboard to prevent warping of the hull. Grind the welding seams on the outside of the hull with care, especially above the waterline, where they are visible. Smooth welded seams on a metal hull are a joy to behold!

FINISHING INSIDE THE HULL

When all the hull sheets have been finally welded, all the welding tasks on the inside of the hull should be done before the the deck and superstructure made the task more difficult. These parts are:

> deck stringers, bulkheads, chainplate knees, berth supports, anchor well floor, cabin aft bulkhead, engine mounts, rudder and propeller shafts and sea cock fittings.

Many of the parts have to be welded onto the hull sheeting. To prevent unsightly dents due to weld contraction, always use short tack welding wherever possible. Where it is impossible to avoid a continuous weld, work at intervals, so the weld can cool down in between. Welding distortion is of course, less important below the water line. A vertical seam contraction is far more noticeable than a longitudinal seam on a yacht hull.

Bulkhead parts, knees and floors do not have to fit as accurately when the first short piece of flat steel are welded to the hull. All parts except for the anchor well and chain plate knees are stagger welded as in fig. 12.

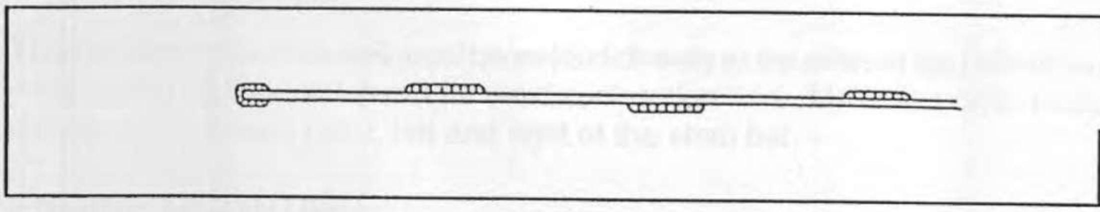


Fig.12

DECKSTRINGERS

The first parts to be welded to the hull are no doubt the stringer bars, because of the flexibility the hull exhibits at this stage. Weld together enough bars to make a complete stringer, and temporarily clamp the bars to the top edge of the hull sheet. Before the first tack weld, stretch a string down the hull from stem to transom to check the hull is still symmetrical. If not small corrections can be made by inserting wedges between the hull and jig.The stringers should be tack welded with the minimum number of welds, and on the underside only (fig. 20 of the section STEEL DECK.) Final welding on the in and outside is not done yet. See also ' the steel deck ' Though the deck stringers are mainly welded square to the hull sheet to meet the camber of the deck plating, at both ends of the hull they tend to be more horizontal.

The top of bulkhead A, the anchor well bulkhead, the chain plate knees and all the deckbeams show the same local camber.

BULKHEADS

Though bulkheads can be built in before, the top fitting with the deck plating can cause problems. The use of flat bar strips along this joint can make things easier. However, builders may prefer to make wooden templates of the bulkheads after the deck is fitted, and weld the exact fitting bulkheads to the hull and deck, without the use of bar straps.

CHAINPLATE KNEES

These must be welded onto the hull without the use of flatbar straps. The correct shape is given on the plans and the upper part will show the correct local camber for the deck plate. Welding is with short staggered tack welds. See fig. 12.

FLOORS

The hull shape at the floor positions is quite simple and the production of hardboard templates will not be difficult. The floors will be welded with staggered welds. The horizontal top flange is fixed with short tack welds and at a bulkhead the flange is connected to it. The floors should not be welded at the future keel location, as this part has to be cut out when fitting the keel. Do not forget drainholes so that bilge water can flow into the pumpwell in the keel.

ANCHOR WELL

The sides of the anchor well must be welded directly to the sides of the hull with a continuous weld on the inside. Watch out for weld contraction here. Make two drain holes in the hull sheets at the lowest point, left and right of the stem bar.

ENGINE MOUNTING

The engine mountings depend on the type of engine and the diameter of the propeller. Make a drawing, or have one made using the general hull assembly plan and the engine installation data. This drawing will show the centreline of the propeller shaft. Attach the propeller strut, making sure there is enough room for the propeller. Attach a piece of angle bar to one of the floor supports in the centre of the hull. Drill or burn a small hole at the cross point of the hull and the centre line of the shaft. Attach a string to the angle bar on one side and the propeller strut on the other side, passing the string though the hole (see fig. 13.) Now enlarge the hole to the size of the propeller shaft housing, making sure the string ends up in the centre of the hole. Insert the propeller shaft housing, align it carefully and weld it to the hull.

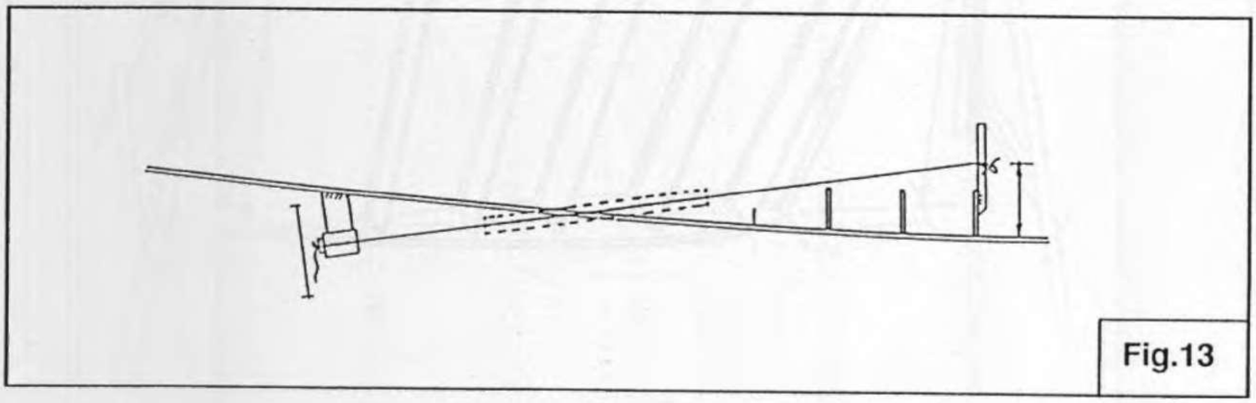


Fig.13

RUDDER PIPE

Pay close attention to the position of the rudder pipe during welding. It has to extend at least 5mm through the hull sheets and be welded all round on the outside of the hull. Tack weld the pipe on the inside before welding on the outside. Be sure to remove the rudder bearings before welding the pipe. Weld at intervals to prevent overheating of the rudder pipe, as this can result in contraction of the pipe.

HULL OPENINGS

All openings for drains, cooling water inlets, waste water outlets, echo sounder and speedometer units must be made before shot-blasting the hull. Position them in such a way that they will not be hidden by internal furniture. Also attach bolts for zinc anodes.

THE BOX KEEL

The keel is made separately and welded on later, when the hull is finished. The shape of the keel and especially the front or leading edge, is a major factor for the windward sailing characteristics. It is vital to make this part of the yacht with care. Once made, the shape can never be improved!

Keels are built in the upright position. The heavy pre-shaped keel sole is set up in a level position. On this, the partitions plates and the round bar front member are erected in the positions as given in the drawing (see fig. 14.) The partition plate dimensions are given on the drawing. Be aware of the fact that they are not symmetrical, as all straps get a flat bar strap square to one edge, as clearly shown in fig. 15. All plates have a slot in the middle to allow bilge water to run into the pump well.

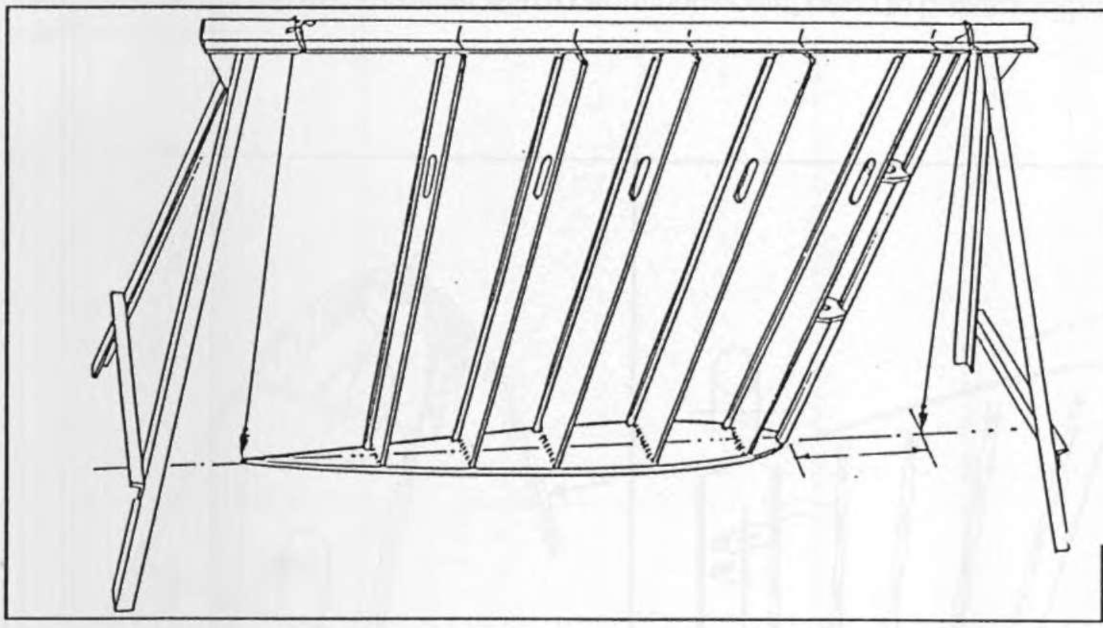


Fig.14

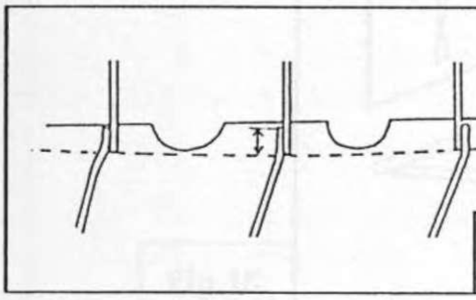


Fig.16

It is the intention of the design, that all keel partition plates meet an can be connected to the floors of the yacht when the keel is mounted. However, it is wise to make the keel partition plates 3-4 cm longer at the top. This will allow the plates to be bent towards the floor plates in case they does not meet exactly in position. This is shown in fig. 16.

After all the partition plates have been set up, take measurements which are needed when making the side plating. The top and bottom of the plates do run parallel. Note that the front edge of both plates will need extra length due to the curvature required to meet the round bar front member correctly. Both these rounded edges can be produced easily as in fig. 17.

Because only one of the plates can be welded from the inside to the partitions, temporarily fit the other one first and transfer the positions of the flat bar partitions to the plating (see fig.18.) When the plate is removed, slots can be between the transferred markings. This can be done with a nibbler. Now weld the first plate on the inside to the partitions, and the other plate from the outside through the slot holes to the partition. Note: one plate is 25mm shorter at the end to obtain a clean sharp trailing edge. (See ST.D steel 12/1, part of the plans set)

The ballast that will be put inside the hollow keel is lead. Mould blocks of lead beforehand into well fitting shapes about 20cms high. These blocks can be made to fit most easily before the second side of the keel is welded into position. After the first layer of blocks has been placed, fill up any remaining space with molten lead. Fill up the spaces in each layer as it is filled, for the molten lead would otherwise solidify before reaching the base of the keel. Seal off the top of the ballast with a bituminous compound to prevent ingress of water into the ballast.

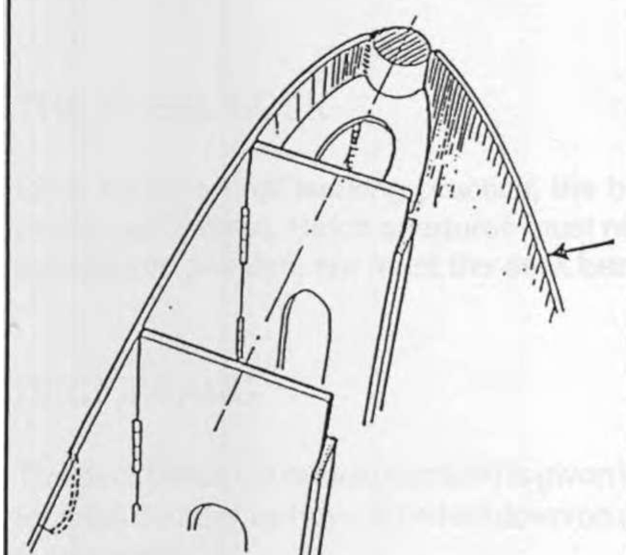


Fig.15

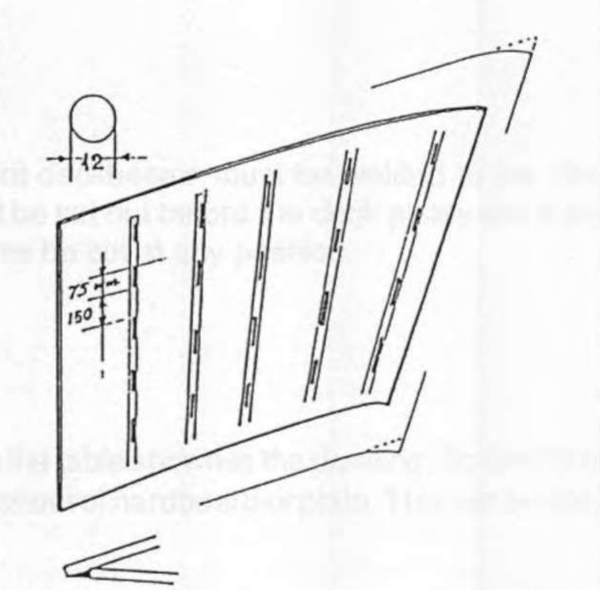


Fig.18

WELDING THE KEEL TO THE HULL

In most cases the keel is welded to the hull not long before launching, as the yacht is more accessible during construction without the keel. Cutting a good fitting aperture is a major problem and the following procedure is recommended:

Transfer the exact outline of the keel onto a piece of hardboard (see fig. 19.) Cut out this pattern along the scribed line and press it against the hull in the correct location, using struts as shown in fig.19. The required aperture can now be scribed onto the hull and cut out. Lowering the hull onto the keel in an upright position is the most suitable way to let the keel meet the hull. First the hull is lifted up high enough the let the keel under the hull. In this position the hull is carried onto two heavy beams each resting on a number of blocks. By removing these blocks one by one, the hull can be lowered slowly onto the keel and one has plenty of time to make corrections and then the final welding can be carried out. Keel partitions are welded to the hull floors, and the keel plating is welded both inside and out to the hull plating. Do not forget to make cut outs in the upper edges of the keel plating to allow a good flow of bilge water into the pump sump in the keel.

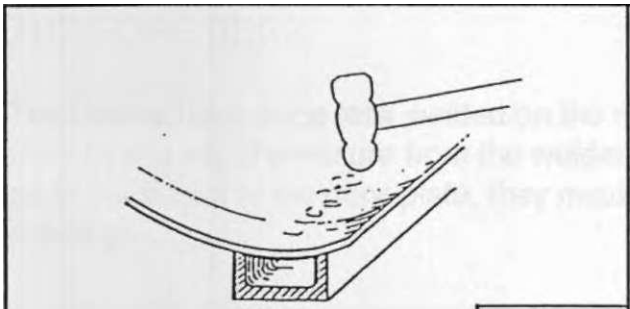


Fig.17

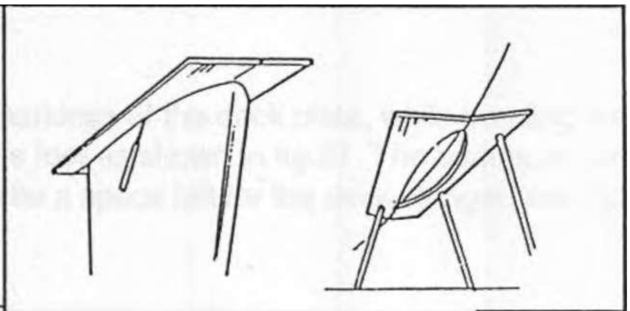


Fig.19

THE STEEL DECK

Contrary to normal working practice, the bent deckbeams must be welded to the deck plates beforehand. Hatch apertures must not be cut out before the deck plates are finally welded into position, nor must the deck beams be cut at any position.

DECK BEAMS

The deck beam curvature (camber) is given in the table shown in the drawing. Scribed lines for each deck beam have to be laid down on a sheet of hardboard or plate. This can be done in two ways:

1. by measuring the given ' heights ' on a straight line and bending a batten along the crosspoints, according to the sketch.

2. by scribing arcs with the radius given in the table. Use a pair of compasses made of a batten with a nail at each end.

The deck beams can be bent by hammering as shown in fig. 22, they must be continually checked against the scribed arcs.

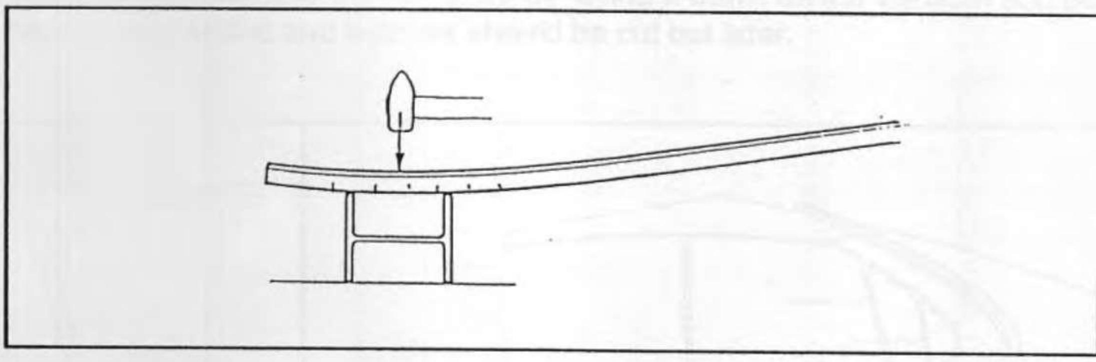


Fig.22

THE FORE DECK

The beams have to be tack welded on the markings of the deck plate, while bending the plate by means of pressure from the welder's foot as shown in fig.21. The beams do not go to the edges of the deck plate, they must be a space left for the deck stringer, see the drawings.

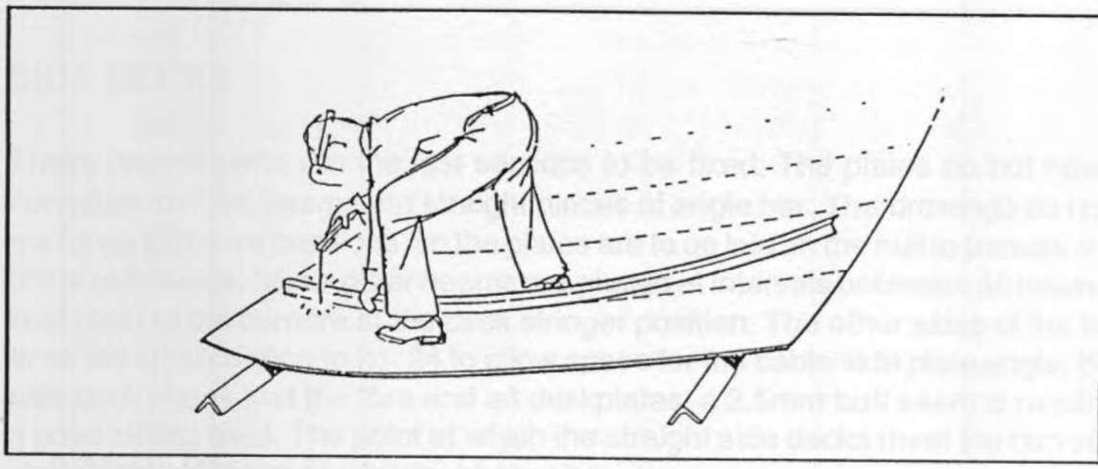


Fig.21

When the deck plate is completed, with all the beams in place, the plate is laid onto the hull exactly on the centreline. This centreline must be checked again with a string between stem and stern. The accuracy of the hull builder will now be seen by the joint between the deck plate and the hull. If the joint is not accurate enough, some correction can be achieved by loosening the deck stringer. This is why the deck stringers have been tack welded with as few tack welds as possible. The width of the deck plate can increased or decreased by pressure on the top or underside of the deck, and then fixing this position with a temporary internal strut. The slope of the deck stringer also may have to be altered to allow the deck to fit properly.

The final welding of the deck plate and superstructure may not be carried out before all the parts fit together correctly.

AFT DECK PLATE

This narrow plate gets it's curvature by laying it down on the transom and bulkhead. No beams are needed and hatches should be cut out later.

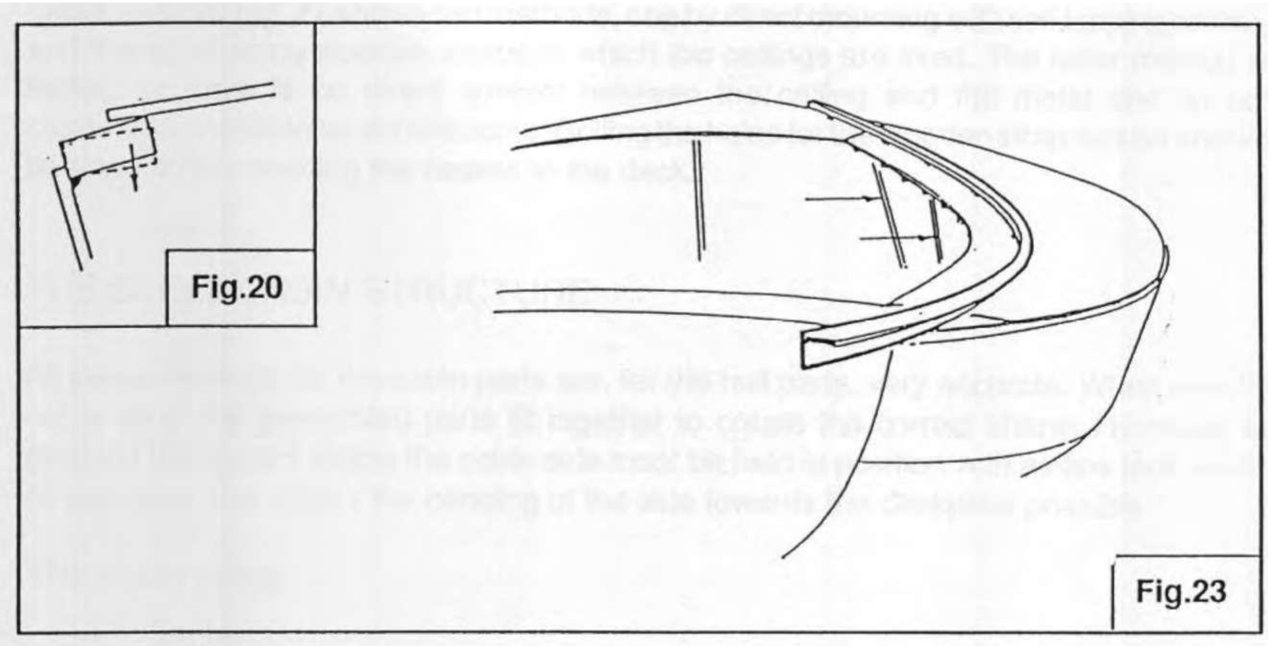


Fig.20

Fig.23

SIDE DECKS

These narrow parts are the last sections to be fixed. The plates do not have any deck curvature and the beams are straight pieces of angle bar. The drawings do not show any markings for beam positions, so the plates are to be laid on the hull to transfer the positions of the bulkheads. Some other beams are placed at intervals between. All beams should be kept clear of the corners at the deck stringer position. The other sides of the beams have to be cut off according to fig. 24 to allow space for the cabin side plate angle. Between the side deck plates and the fore and aft deckplates, a 2.5mm butt seam is required to make a good strong weld. The point at which the straight side decks meet the curved for and aft plating should blend as cleanly as possible.

The correct slope of these side decks is determined by the chainplate knees and the aft cabin bulkhead, the latter requires the deck plate to be notched in the bulkhead location. In order to prevent sagging between the chain plate knees and the aft bulkhead, an angle bar is laid over the deck to which the deck plate can be welded, to give a smooth deck line. When looking from the transom, this line can easily be checked, any irregularities can be removed by the use of temporary struts as in fig. 23. The plates are now tack welded to the stringers. Connections to the bulkheads must not be made until the cabin is assembled.

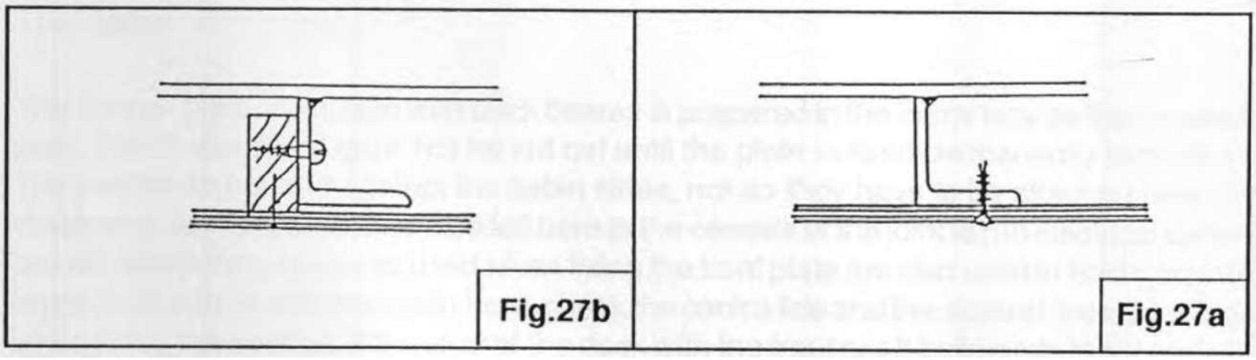


Fig.27b

Fig.27a

When making the deckbeams, it is worth considering how the ceiling will be fixed under the decks later on. Fig. 27 shows two methods, one by direct mounting with self tapping screws and the other using wooden straps to which the ceilings are fixed. The latter method is better, as there is no direct contact between the ceiling and the metal and so not condensation problems should occur. Drilling the holes for the wooden strap screws should be done before welding the beams to the deck.

THE STEEL CABIN STRUCTURE

All measurements for the cabin parts are, for the hull parts, very accurate. When exactly cut to size, the assembled parts fit together to create the correct shape. However, to produce the correct shape the cabin side must be held in position with as few tack welds as possible. This allows the bending of the side towards the deckplate possible.

The cabin sides

When cutting out the plates for the cabin sides the apertures for windows should not be cut out. The ' 30mm ' line along the bottom edge represents the junction of the cain side and the deck plating. The cabin side plates have to be notched over the aft cabin bulkhead, and this bulkhead gives the correct slope when erecting the plate. At the forward end a temporary support on one of the deck beams will keep the sides in position (fig. 24.)

If the deck plate does not meet the cabin side at the ' 30mm ' line, a small change in the deckplate line can be achieved by adjusting the struts under the deck. In general a fair deck line is most important. The bottom line of the window apertures must be in line with the deck line.

The sloping cabin front

The curve of the cabin front is kept by fixing part E2 first. Fitting it onto the cabin sides will require temporary struts welded to both sides as in fig. 25. It is essential to check the centreline and equal slopes of both cabin sides when working on this area. Provisional small tack welds will hold these parts in position.

The cabin deckplate

This curved plate, complete with deck beams is prepared in the same way as the foredeck plate. Hatch apertures must not be cut out until the plate in fixed permanently in position. The beams do not end against the cabin sides, not do they have to be attached later on. Preferably, some space should be left here in the corners of the joint to run electrical cables late on. Temporary struts, as used when fixing the frontplate are also used to hold this plate in position. Just as with the cabin front, check the centre line and the slope of the cabin sides when fixing this section. If the joint of the deck with the front or aft bulkheads is not perfect, the beams near these points can be loosened.

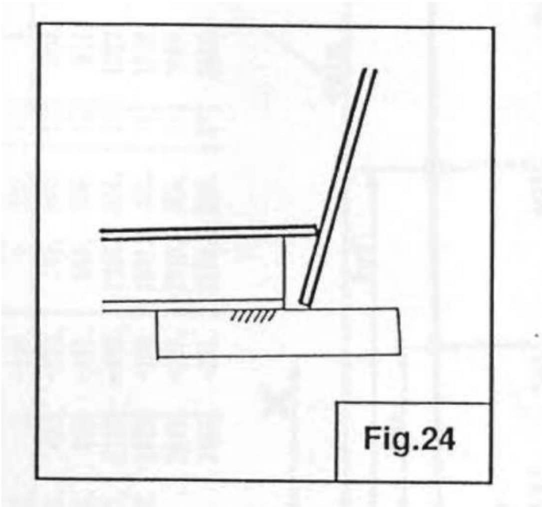


Fig.24

When working on the super structure, it is worth bearing in mind, that the final appearance of the yacht is determined by the lines of the structure. Hatch and window apertures should be cut out last.

The final welding should be left until all the parts of the deck and cabin top are in the correct position. When welding ensure the metal is kept as cool as possible to prevent distortion. Start welding in the middle of a seam with one electrode, and then stop, and start at the other end, to allow the first part to cool. Ensure that all the welded seam are completely filled.

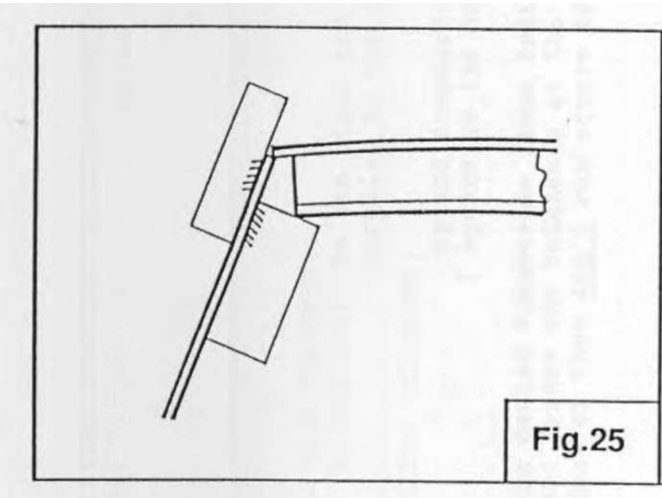


Fig.25

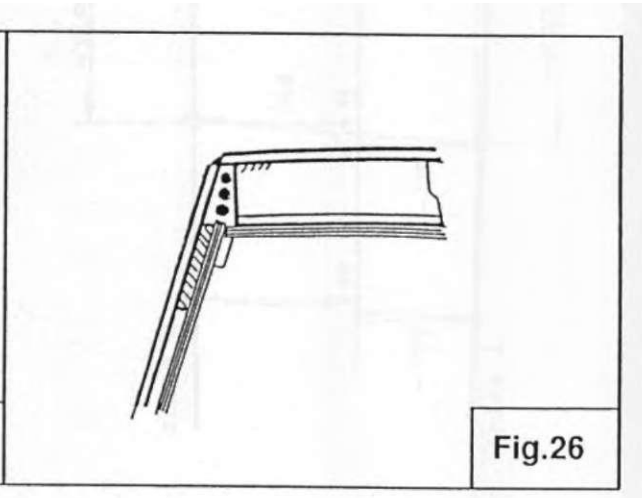


Fig.26

LAYING DOWN THE HULLPLATS OUTLINES of the VAN DE STADT ASSEMBLAGE METHOD
for larger steel and aluminium multi-chine hulls.

LINEA2 MEASURES;
(X) and 1.-X) to the right and left
(parallel to the datumline)

WIDTH MEASURES :
up and downwards
(square to the datumline)

The dashed transverse lines indicate the positions of the frames and bulkheads at the inside of the hull. Most of them <u>don't</u> run square to the datumline.

							chine A		chine B.	
							hor.	vert.	hor.	vert.
-2004.	742.	9.	-200S.	-54.	-2005.	550.	-2006.	-289.	-2004.	354.
¹-1S02.	763.	10.	-IS03.	-56.	-1602.	563.	-1603.	-294.	-1602.	362.
	774.	II.	-1201.	-62.	-1201.	579.	-1202.	-297.	.-1201.	369.
	773.	12.	-801.	-70.	-301.	583.	-801.	-299.	-801.	373.
	47.	13.	-401.	-83.	-401.	578.	-401.	-300.	-401..	386.
		liu	<u>0.</u>	<u>-loo.</u>	<u>0.</u>	<u>563.</u>	0.	-300	<u>0.'</u>	<u>39i.</u>
		IS.	4031	•-122.	403.	540.	'404.	-300.	402.	402.
		16.	808'	-151.	809.	506.	811.	-300.	807.	№ .
		17.	1217'	-187.	•1218.	464.	1222.	-300.	-1215.	.-416.
		9'.	•1629	-230.	1631.	412.	1539.	-303..'	1627./	421.
			2045	-278.	2049.	354.	2060.	-305.	20431	425.
			2454	-331.	2470.	290.	2486.	r311.	2452.	427.