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BOAT EQUIPMENT
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RIGGING INSTRUCTIONS.

May 1971.

For single spreader mast-head rig stepped on deck.

Includes, in principle, even where mast-step is under deck. We have permission from Sparkman & Stephens to distribute their "Type Plan-111" which concerns wedging (support) of "through-deck" stepping of mast in the deck-plan. A photocopy of this recommendation will be forwarded upon request at a price of Sw.Cr. 10:--.

A. AN IMPROPERLY RIGGED MAST CAN BE A SAFETY HAZARD.

Therefore read carefully the rigging instructions and note how the rig is affected by various stresses upon shrouds and stays under sail. This will give you a better understanding of the function of the rig and thus it is possible to make necessary adjustments for example during hard off-shore sailing.

If you consider these instructions detailed - it is nevertheless advantageous to read them carefully! That material with which you are already familiar can be read quickly, but that with which you are not familiar must be studied carefully in order to prevent a mast failure.

B. GENERAL OBSERVATIONS ON MAST-TOP RIGGING AND REQUIREMENTS FOR HULL.

The rapid development of off-shore racing the past few years made it necessary to design increasingly stronger rigging. For example - in a modern successful "half-ton" racer the forces placed on the rigging, and therefore also on the hull, are approximately 50% more than those of an "average" yacht of the same displacement. This is due in part to an increased beam (which gives extra stability) plus the fact that the shrouds are moved inboard from the gunwale (which gives less support angle and thereby higher compression loads upon the mast). In addition to this is the tendency to have longer unsupported mast sections. The resulting increase of dimensions necessary for the mast and rigging is relatively easy to achieve as compared to the difficulties in strengthening the hull for these additional stresses.

The necessity, however, for careful trimming (tuning) of the rig is exceedingly important and becomes, in our opinion, a more vital safety consideration than an eventual overdimensioned mast profile. In other words: it is often possible to support a weak mast profile with proper rigging - but a strong mast profile can fail due to improper rigging.

The Seldén mast on your boat, with accompanying rig and equipment, is dimensioned in accordance with the latest experience and knowledge. Stock boats built in series, supplied with Seldén masts, are tested for stability - which gives us an excellent basis for calculating the rig dimensions necessary. In conjunction with notifying the customer the results of this calculation we also give the following information:

(B 1) Compression load which the mast step must withstand (this figure is generally between 1.5 to 2.5 times the displacement weight of the boat).

(B 2) Loaded stress for which stay fastenings and chain-plates shall be designed (this is usually near the displacement weight of the boat).

(B 3) Suitable standing rig, where we take into consideration both the sailing loads and how the wire stretch factors affect the mast.

It is necessary that the following design requirements have been fulfilled:

(B 4) The chain plates for the upper shrouds must be mounted on the mast centerline or a maximum of 20 mm (3/4") aft of the mast center (absolutely not forward of the mast centerline).

(B 5) The vertical angle of the forward or after lower shrouds must be at least 5° from the mast centerline (as measured in (B 4)). This requires that the distance forward or aft of the upper shroud chain-plate shall be a minimum of 9 cm (3.5/8") for every meter (39") of the vertical distance between the mast fastening point of the lower shrouds and the deck measured fore and aft.

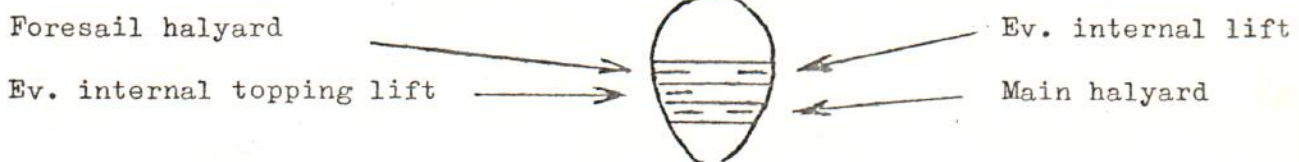
For the forward lower shroud these 5° must absolutely not be reduced.
(To fulfil this requirement the possibility of mounting an inner forestay shall always be considered.) The aft lower shroud angle is not quite so important.

- (B 6) All fastening points for shrouds and stays shall be angled in the direction of pull. (If the chainplates and stay-eyes are of stainless steel, this can often be done by using a large wrench.)
- (B 7) If the mast is stepped on deck, it is essential that the mast step is horizontal. This is to say that the mast cannot be loaded "on the toe" - or forward edge of the mast. (To prevent this we are now constructing our mast base fittings with a slight curvature.)

C. PREPARING THE MAST FOR STEPPING.

- (C 1) When you inspect the mast we ask you to check that the through-bolts in the mast are riveted.
- (C 2) If the mast is delivered unrigged, the running rigging is mounted first and thereafter the stays and shrouds.
- (C 3) On the smaller mast top fittings with two sheaves, it is obvious how the halyards shall be mounted. A topping lift must go over the spacer rivet between main halyard sheave and the backstay block. A strap on the fore side of the mast-top fitting is for the spinnaker halyard bolt. The fore-stay is attached to the forward thwartship rig bolt.
- (C 4) The most common way to use a four sheave mast-top fitting:
- | | | |
|--------------------------|---|---|
| Forward port sheave | = | Jib halyard |
| Forward starboard sheave | = | Reserve jib halyard (ev. messenger line) |
| Aft starboard sheave | = | Main halyard |
| Aft port sheave | = | Topping lift (For ocean sailing it is advisable to schackle topping lift at masthead) |
- (C 5) Normally the halyard is coming out of the mast base fitting according to the following:
(The illustrations show the mast base fitting from above.)

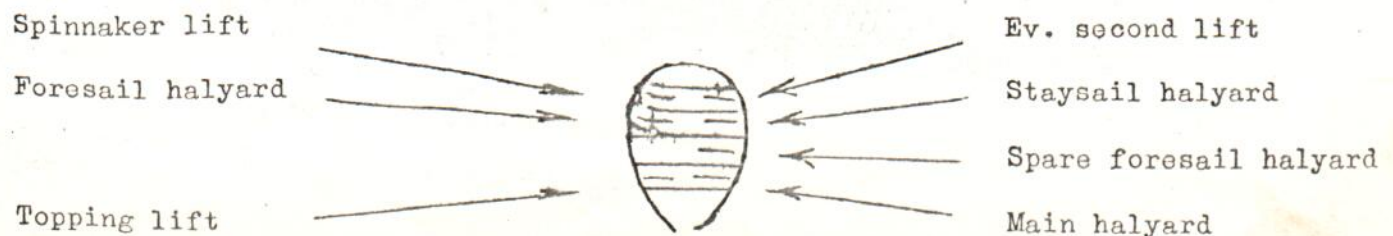
Mast base with provision for 6 sheaves (for mast top fitting with 2 halyard sheaves)



Mast base with provision for 6 sheaves (for mast-top fitting with 4 halyard sheaves)



Mast base with provision for 8 sheaves (for mast-top fitting with 4 halyard sheaves)



(C 6) Mounting of halyards:

In 4-sheave masttop fittings the dividing plate shall be removed to provide more space. If a messenger is fitted, it is fastened to the halyard and taped. Pull the messenger carefully to prevent parting. If there is no messenger line, do as follows:

- If there are other halyards in the mast, these shall be stretched hard -
 - The upper end of the mast should be raised as much as possible in order to feed the halyard through the mast to the base fitting -
 - Control carefully that the halyards are not mounted on the wrong side of the through bolts. From the mast top you can see how the halyard shall pass the bolts -
 - At the mast base the halyard shall come out in such a way that it cannot jamb other halyards -
 - It is easiest to take out the halyard in the mast base with a bent steel wire-
- On mounting the spinnaker halyard be careful that the block swivels freely in all directions.

(C 7) Control that the halyards have the right length. The main halyard schackle shall come close to the top without being stopped at the base by a splice, for instance.

The same is true for a jib halyard with rope through the mast base sheave. When the wire goes directly to the winch drum, it ought to be 4 - 6 turns of wire on the winch when the halyard hook is 30 cm (one foot) from the mast top. With this arrangement you presume that all headsails have equally long luffs by having wire straps attached to the heads, which makes them of equal length.

When one end of the spinnaker halyard is made fast on its' cleat, the other end should be 1.5 to 2 m (5 - 7 feet) past the mast base.

(C 8) When the dividing place between the sheaves is replaced, check that all sheaves are running smoothly, applying grease when necessary.

(C 9) Standing rigging.

- All halyards shall be stretched well to prevent tangling -
- Put on all shrouds and stays and check that they are free to move in their load directions. Lock with stainless key rings or cotter pins. Cotter pins shall only be parted about 10° - 20° (for easy service and long life). Protect the sails by taping all cotter pins (since the tape may loosen, it is wise to file down the sharp points of all cotter-pins before taping) and control at the same time that there are no other sharp points on the mast or the rig (for example pressed fittings), which can cause harm to the sails.

Please note that on 4-sheave mast top fittings the forestay and backstay must be mounted in toggles (of which there are different types for single and double stays). Thus it is not allowed to mount the stay directly on the thwartship bolt (which in that case would be given an excessive bending load). Generally speaking, no stay or shroud shall be mounted directly on a rigging bolt which has an inside free length of over 15 mm (5/8").

(C 10) Check that all electrical (and electronic) equipment on the mast is in function.

(C 11) If the yacht is measured under a racing rule control the rigging for this rule.

(C 12) Do not forget the mast-head wind-indicator.

D. PRACTICAL ADVICE FOR STEPPING MAST.

- (D 1) When shrouds are mounted on mast, check each pair carefully and take special note if there is a variance in length exceeding 5 mm (3/16").
Oil the turnbuckles. (Propeller grease is satisfactory - Molykote is better - and water-free lanolin as supplied by a druggist is clean and excellent.)
At the same time grease the roller-reefing gear.
- (D 2) It is very important that the spreaders form an equal angle of the shroud above and below the spreader and that the spreader is firmly fastened at the shroud and at the mast. See the special mounting instructions for the various types of spreaders, which are attached to them at delivery. Should these instructions be missing, all of our types are described in Section M - side 10.
- (D 3) OBSERVE! Sideswaying of mast during stepping can damage the mast - and base fitting.
If the mast step allows various adjustments fore and aft of the mast foot, read (B 4) and (B 5) carefully!
- (D 4) When rig is tightened.
Mount all the turnbuckles with the right-hand threads downwards and check that they can move freely at their angle of tension.
OBSERVE! This is not merely the normal angle of tension as the angles change, for example with someone taking a firm grasp on a shroud. The forestay should allow a 20° angle in all directions due to the various angles of load on this stay under sail. Toggles are recommended wherever there is even a slight risk of bending the turnbuckle.
Note - Superstone turnbuckles are unusually susceptible to bending.
Adjust the rigging by hand and adjust for eventual differences mentioned in (D 1). (Normally it is best to measure from the end fitting of the turnbuckles to the deck, as the deck fittings may vary.)
The mast should be stepped vertically. - See (B 4) and (B 7).
Check instructions for load tensions - (See E 5).
- (D 5) THE PURPOSE IN STAYING THE MAST IS THAT IT SHALL BE STRAIGHT WHEN UNDER SAIL.
When rigging, give the upper shrouds and back stay a tension of about 10 % of the yacht's displacement. This will result in a slightly higher tension on the forestay.
After this the forward lower shrouds and/or the lower forestay are tightened so that the mast begins to bend slightly forward at the spreaders. Then tighten the after lower shrouds. (It is sufficient to do this by hand.)
- (D 6) Tape all cotter-pins and lock rings in the turnbuckle bolts. The lock rings must be taped to prevent a sheet or other line inadvertently opening them.
During the "trimming in" time it is practical, especially if there are three turnbuckles on either side, to lock the turnbuckles by running a line through all of them.
- (D 7) In the event that a shroud or stay does not fit, it is not sufficient to state that it is a given amount too long, or too short. It is necessary to measure the actual length of the stay that does not fit, and also the length from the rig bolt on mast to under side of mast base. All such measurements are taken between load points and measurements must be within a 10 mm (3/8") variance.

E. MEASURING THE LOADS IN THE RIG.

(E 1) BREAKING STRENGTH:

For 19-strand stainless steel wire

(133-strand "halyard wire" has about 25 % less breaking strength.)

1 kg = 2.2 lbs.

| | | | |
|------|------|-------|--------|
| Diam | 2 mm | appr. | 380 kg |
| " | 3 mm | " | 800 " |
| " | 4 mm | " | 1500 " |
| " | 5 mm | " | 2300 " |
| " | 6 mm | " | 3400 " |
| " | 7 mm | " | 4600 " |
| " | 8 mm | " | 6000 " |

- (E 2) Within half of the breaking strength, the stretch in the stainless steel wire is almost linear to the load and the following formula can be used:

$$\frac{\text{Wire stretch (in centimeters)}}{(\text{elongation})} \times \text{wire breaking strength (in kilos)} = \text{wire length (in meter} \times \text{load (in kilos)}$$

Thus a 10 meter long wire is prolonged 5 (five) centimeters when the load is increased from zero to half the breaking strength.

- (E 3) It is mainly the inevitable stretching of stays and shrouds that causes problems in trimming a mast-head rig. The alterations between the loads that occur in the various fastening points also displace these points in relation to each other and they directly alter the straightness of the mast. Rod rigging has appr. 20% less strength than 19-strand wire of the same diameter - but for safety reasons it is not wise to use stainless steel rod for standard rigs (risk for brittleness due to self-hardening). Particularly for salt water use it therefore appears that the 19-strand stainless steel wire is most suitable for standing rigging. (49-strand wire has appr. 20 % more stretch than 19-strand wire of the same diameter.)

- (E 4) It is necessary to get a fairly true idea of how tight one is stretching different shrouds and stays. Compare (D 5), (F 6) and (G 3). We do not know any good instruments for measuring wire loads at lower prices than about Sw.Cr.2000:-. We have two of these instruments, but it is not feasible for each boat owner to have one. We are experimenting with a less expensive aid. Because of the rather considerable stretch in the wire you can obtain good figures of the loads in the rig by using a 2-meter measuring stick.

- (E 5) Load measuring by means of length measuring.

When the wire is properly stretched, but before there is any real load applied, (this occurs between point (D 4) and (D 5) when the yacht is rigged), 1980 mm is marked as accurately as possible on all the stays and shrouds to be controlled. (Use tape or marking pen.)

With the use of the formula (E 2) you find that for every millimeter the measured length (1.980 mm) is stretched, the load in the wire has increased with 5 % of the breaking strength of the wire.

NOTE. 1.985 mm = "critical point", see (F 6).

- (E 6) Check the above values with a good instrument at earliest opportunity.

F. TRIMMING OF MAST.

- (F 1) WE REPEAT - THAT THE PURPOSE OF STAYING THE MAST IS THAT IT SHALL REMAIN STRAIGHT UNDER SAIL.

The mast track must not deviate more than a maximum of 1% of the mast height and as soon as the boat is under sail the rigging must be adjusted in order to fulfil this requirement. Due to the fact that many of the components in the rig will stretch a few millimeters when new, especially the wire, it is not necessary to spend too much time attempting to stay the mast perfectly until the boat has been sailed a few hours with a maximum effective angle of heel. Only after this has been done can an effective trimming of the rig be made - and this is best done during moderate sailing winds. If the upper rig has been set-up as in (D 5) the entire tuning could be done with the lower shroud turnbuckles so that the mast is straight both fore and aft as well as thwartships - and stays straight even in strong winds. This requirement results in the lower rigging, especially the aft lower shroud, often become very loose. This is not incorrect but added loads on the mast step and the chain-plates, can cause irritating slack in the lee shrouds. Shock-cords can prevent excessive movement and wear.

- (F 2) A normal angle of the upper shroud to the mast is 10° to 11° . (This is 175 - 195 mm (7 - 7.3/4") length of spreader for each meter (39") of distance between the upper shroud fastening on the mast to the spreader.) With this angle it is often necessary to place more tension on the upper shrouds. (We definitely advise against angles of less than 10° due to the increased stress on the rigging - and above all the extreme necessity of exact trimming.) Note: If the rig is adjusted under sail it is essential to avoid placing excessive strain on the windward turnbuckle, especially if it is of stainless steel! Naturally, it is not advisable to continue taking up turn after turn of slack in the lee turnbuckles without checking to see why there is so much slack.
- (F 3) In order to keep the mast straight when sailing to windward in heavy weather it is necessary to tighten the backstay. If the backstay is equipped with a "take-up lever" this adjustment can easily be made with a small block and tackle attached to this arm - or by the use of a "handy-billy". (The height of the split backstay triangle should be at least double the base.)
- (F 4) The most usual difficulty in hard weather sailing is that the top of the mast bends forward and leeward of the spreader fastening. When trimming in a moderate wind it is therefore advisable to tune the mast top slightly aft and to windward.
- (F 5) The only deviation from the "1 % - rule" (F 1) that can be tolerated is when the mast, when maintaining a straight line thwartships, has an even curve from the mast step to a slightly stern-raked mast top. This deviation can then be as much as 2 % at the middle of the mast if this curve is controllable, that is, if any additional bend - when the boat is thrashing in heavy seas - is unnoticeable (less than 1/2 %) and "elastic" - not "jerky".
- (F 6) If the prestretch tension in a shroud or stay exceeds 25 % of the maximum load of the wire, it is advisable to increase the wire dimension due to excessive stretch, (and not so much due to the risk of wire failure). The increased wire gives less stretch and thus easier trimming of the rig.
- (F 7) In the event the mast bends or sways more than the tolerances given in (F 1) and (F 5) even though the rigging instructions have been carefully followed, LOCATE THE CAUSE AND REMEDY.
- (F 8) Should the mast tend to curve into an "S" or a figure "3", the extrusion profile could be too weak - in which case you should contact us immediately. This can also be the case if the section between the spreader and the mast top is straight but the mast is bent below the spreaders.
- (F 9) The most common indication that the mast section is correct, but that the rigging is improper, is that the mast is straight from the step to the spreader but thereafter bends. Even though the mast top is bent slightly to windward in light wind (F 4) it bends excessively to leeward in heavier winds. If it is not possible to stay the mast-top properly despite added tension on the upper shroud, and eventual increase of wire dimension of the upper shrouds (F 6), it is possible the mast the mast step or the chain-plates that are moving. This is also true in principle if the mast top moves in a fore and aft movement, but this can also be caused by movement of the spreader region due to improper staying of this area, (B 5). It is especially serious if the mast top has a tendency to bend forward in hard weather and this cannot be remedied by increasing the tension in the forward lower shrouds (and/or the lower forestay) plus added tension on the backstay. The flexibility of the mast step can easily be determined (on deck stepped masts) with a pole which is appr. 5 cm (2") shorter than the distance between the keelson (in bilge) and the underside of the deck or cabin trunk at mast step and carefully measure the distance when lying at moorage as compared with the distance when hard pressed under sail.
- (F 10) If it becomes necessary to move the mast in order to trim the balance under sail, control (B 4) to (B 7) - as well as checking that the mast is properly supported in the new position (B 1).
- (F 11) All guarantees are void if the shrouds have been moved inboard or the spreaders have been shortened (F 2) without our written approval.

G. DIVERSE INFORMATION AND ADVICE.

- (G 1) Mark the halyards so that you know how much they normally shall be stretched - just to prevent overstretching. When setting-up a halyard, especially with a winch, it is important to check that the halyard is not fouled in a spreader or other impediment, which can cause damage. It is also essential to avoid having sails fouled in the spreaders when jibbing but in this case it is usually the sails that are damaged. (Use kicking strap.)
- (G 2) When leaving the boat see to it that no halyards are slatting. This causes unnecessary chafing and noise. On most of our masts the spreaders are fitted with hooks for the halyards. It is also very practical to tighten the halyards to the shrouds with Shock-cord.
- (G 3) CONSTANT STATIC LOAD.

We are aware that a boat rigged in accordance with these recommendations can be exposed to rather strong stresses even when not under sail. To our knowledge there has been no research regarding the effect of these tensions to the hull. Every boat owner should become acquainted with the tensions of his rigging while lying at moorage. Add the sum of the tensions in stays and shrouds (obviously all of these forces do not pass directly to the mast, especially not those in the fore and back stays, but the exact sum of these forces is not necessary). And, if one considers that the total of these sums is transposed to the base of the mast, it is not unreasonable to assume that every boat should withstand these tensions, provided they do not exceed half of the yacht's displacement. It is not possible to state exactly where the margin of safety should be drawn. An excellent rule, however, is to slack the back stay when mooring the yacht, and this should always be done when extra tension has been "set up" under sail. Releasing somewhat on the tension of the upper shrouds whenever the yacht is not used for longer periods, is also advisable. A wooden yacht that has been laid up and is dried out should not be subjected to heavy stress during the first few days following launching.

NOTE: We must point out that we do not consider ourselves specialists in questions regarding hull construction of yachts, and that the points regarding constant static load (G 3) should be confirmed by the designer of the yacht.

The tensions prior to and under sail due to these rigging instructions have been caused by the designer's choice of rig.

Special phenomena.

- (G 4) Related to the above mooring stress problems are the vibrations, which under certain circumstances can occur in a mast, especially when under strain, and which can only be remedied by adjusting the mast's staying through experimentation. Because this problem generally occurs only when not under sail, the remedy is usually to release some of the tension in one or more of the shrouds or stays. There is a risk for fatigue if the vibrations are continued over a long period.
- (G 5) Due to the aerodynamic profile of our masts it is possible that boats can begin a rolling motion when lying at moorage and in certain cases this rolling motion can become annoying. A permanent remedy is to place two thin plastic strips (window strips "Tosamoll" are very practical of quality No. 700, width 9 mm and thickness 4 mm) from the spreaders to the mast top on both sides of the mast, and attached to the after side of the mast, midway between the sail slot and the mast centerline. Clean the mast and do not stretch the tape when applying.

- (G 6) It has occurred that customers have complained about sail slides (of our own manufacture as well as other brands) tend to stick in the mast track. It has been determined that the trouble is caused by the slides being attached to the sail in such a manner that they cannot move freely.

Special warnings.

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- (G 7) Always have the headsails attached close to the deck. A storm jib flying high on the forestay - to give better sight - greatly increases the strain on the rig when it is trimmed in hard.
- (G 8) On a small boat with powerful sheet winches it is essential to not overload the rigging.
- (G 9) No skipper sails intentionally aground at full speed, but a warning is probably advisable concerning the tremendous stress a sudden stop involves. (In this case the modern GRP-hull probably withstands more than the rig.)
- (G 10) If, for some reason you have a rig that is under-dimensioned and have accepted this, for instance due to the fact that you normally sail under light conditions, it may be important to remember a few "words of wisdom" in the event you are caught in heavy weather:
It is the combination of forces, due to high speed and hard heeling in heavy seas that causes the excessive stresses to rigging and hull. When sailing in heavy seas with a rig that one does not rely upon under such conditions, it is vital to avoid maximum effective heeling and high speed, preferably reducing both of these factors. A 20 % reduction in both factors can be vital in preventing rigging failure. When a yacht has much equipment (for instance for long trans-ocean passages) the normal displacement is increased and this can cause excessive rigging tensions.

H. MAINTENANCE INSTRUCTIONS.

Precautions (before stepping the masts)

- (H 1) It is a good thing to cover all anodised surfaces with lanolin or paraffin oil to keep the high finish on the surface.
- (H 2) Grease where oxidation is likely to occur. This is specially important for the electrical connections.
Deck plugs have to be opened and greased - preferably with vaseline - at least once a year.
- (H 3) Wax the sail track and all other sliding surfaces, for example boom and spinnaker slides.

Annual overhaul.

- (H 4) When the rig is off the boat, all halyards and especially the parts which are running inside the mast and normally not visible, shall be carefully checked. Normally this can be done without taking the halyards out of the mast. Should this be necessary, replace the halyard with a messenger line. If you find any abnormal chafe, this has to be analysed and remedied.
- (H 5) Before the mast and boom are stowed, wash and shower with fresh water, so the salt crystals are removed. This is most important at the mast base, where the mast is most likely to corrode. Also not forget to flush the inside, as the anodising is less effective there. (More detergents contain substances which can cause harm to aluminium alloy and it is therefore important to remove them.)
- (H 6) Carefully observe that the mast or boom has to be dry and clean before it is eventually packed. Never put a mast or boom in plastic or other air-tight material before it is carefully cleaned in accordance with above instructions and that it has had ample time to dry completely.
- (H 7) Mounting of smaller fittings.
To avoid corrosion it is necessary to insulate between spar and fitting with vaseline, zincchromate primer or rubber compound. The same is valid for bolts and screws. We always use bolts and screws in best stainless material and pop rivets of monel (as we have not found usable aluminium alloys for this purpose). Self-tapering screws shall be used as little as possible as they are more likely to cause corrosion than other fastenings and also to damage the internal halyards.
Fittings of brass and other copper alloys shall under no circumstances be used on the aluminium alloy spars. The larger the stainless steel fittings, the more care must be taken to insulate properly.
- (H 8) You can rent pop-riveting tools from us.

This is a combination of our different spreader mounting-instructions, and if you use them it is best to mark the different points that refer to your spreaders. (Those rigging instructions to be used if the separate instructions which are attached to all spreaders at delivery are missing.)

M. MOUNTING OF SPREADERS.

THE IMPORTANT RULE IS THAT WHEN THE MAST IS STEPPED, THE SPREADERS SHALL POINT SO THAT THE ANGLES BETWEEN SHROUD AND SPREADER ARE EQUAL ABOVE AND BELOW THE SPREADER. (THE SPREADER BISECTS THE SHROUD.)

| POINT | PROFILE SPREADERS | TUBE SPREADERS WITHOUT SUPPORTING STRAPS | TUBE SPREADERS WITH SUPPORTING BANDS | SUPPORTING SPREADERS |
|-------|-------------------|--|--------------------------------------|----------------------|
| 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 4 | 6 | 14 |
| 3 | 3 | 5 | 7 | 15 |
| 4 | 9 | 7 | 8 | 16 |
| 5 | 10 | 9 | 9 | 17 |
| 6 | 11 | 10 | 10 | 18 |
| 7 | 12 | 11 | 11 | - |
| 8 | 17 | 13 | 13 | - |
| 9 | 18 | 17 | 17 | - |
| 10 | - | 18 | 18 | - |

- 1) Mark the shroud where the spreader shall be mounted - REMEMBER THE ANGLES.
- 2) Starboard resp. portspreaders are distinguished by the self-tapering screw which locks the spreadertop fitting. The head of this screw shall be turned upwards. To prevent the halyards from slatting when not in use the spreaders are normally fitted with a hook on the forward and aft side.
- 3) The spreader is mounted to the mast fitting with two rig bolts which are secured with key rings or cotter pins. The protective rubber-hose is put over this joint. Check that nothing can be caught in the assembly.
- 4) Push the spreader over the expanding-rubber fitting on the mast and lock the spreader in this position with the self-tapering screw directly into the rubber.
- 5) Turn the spreader clock-wise until it is firmly attached (the rubber expands).
- 6) Push the spreader over the expanding-rubber fitting on the mast and turn the spreader clock-wise until it is firmly attached (the rubber expands).
- 7) Starboardspreader shall have the signal halyard hook directed aft and the port-spreader shall have this hook directed forward. The signal halyard fitting has an open hook on the outside in which the halyards should be placed in order to prevent slatting when not in use.
- 8) The bolt is pushed through both the straps and the spreader. It is locked with a special Loc-Xing nut with nylon locking material in it. As an extra safety measure these bolts should be taped.
- 9) Loosen the spreadertop fitting from the spreader.
- 10) Make certain that the spreadertopfitting is drilled for the correct shroud dimension i.e. the wire has the same outer-diameter as the hole diameter (the halves not together). If the holes in the spreadertops are too large or too small - Exchange the tops or take the following necessary steps:
Too small hole - Drill the hole to the accurate wire size and see to it that the two halves have some clearance during this operation.
Too large hole - "Increase" the wire diameter with tape. Make sure that the spreader cannot be moved. Normally extra lashing and whipping must be done. Exchange the spreadertops to proper size at first convenience.
- 11) Open the spreadertop and place the wire in the slot. It is obvious from the construction that it does not matter if the spreadertops are parted into two pieces by breaking in the inner end.
- 12) Push the spreadertop fitting back into the spreader and lock with the self-tapering screw. Fasten the jamb-screw securely.
- 13) Push the spreadertop with screwout back into the spreader and fasten the jamb-screw securely.
- 14) Place the shroud in the slot under the screw-head at the spreadertip and fasten it by screwing the spreader.
- 15) Attach the spreader to the mast by placing it on the stainless steel strap fitting and lock it by turning the spreader 90° (Laynet-fastening.)
- 16) Turn the spreadertip carefully.
- 17) Make sure that the spreader is mounted at the correct angle and that the spreadertip fastens at the shroud is firm.
- 18) Control the angles of the spreaders during the season. Adjust the rigging if necessary and correct this if needed.