Tasneef®
Life Environmentally Optimized

Rules for the Masting and Rigging of Sailing Ships

Effective from 1 January 2016

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GENERAL CONDITIONS

Definitions:

"*Administration*" means the Government of the State whose flag the Ship is entitled to fly or under whose authority the Ship is authorised to operate in the specific case.

"IACS" means the International Association of Classification Societies.

"*Interested Party*" means the party, other than the Society, having an interest in or responsibility for the Ship, product, plant or system subject to classification or certification (such as the owner of the Ship and his representatives, the ship builder, the engine builder or the supplier of parts to be tested) who requests the Services or on whose behalf the Services are requested.

"*Owner*" means the registered owner, the ship owner, the manager or any other party with the responsibility, legally or contractually, to keep the ship seaworthy or in service, having particular regard to the provisions relating to the maintenance of class laid down in Part A, Chapter 2 of the Rules for the Classification of Ships or in the corresponding rules indicated in the specific Rules.

"Rules" in these General Conditions means the documents below issued by the Society:

(i) Rules for the Classification of Ships or other special units;
(ii) Complementary Rules containing the requirements for product, plant, system and other certification or containing the requirements for the assignment of additional class notations;
(iii) Rules for the application of statutory rules, containing the rules to perform the duties delegated by Administrations;
(iv) Guides to carry out particular activities connected with Services;
(v) Any other technical document, as for example rule variations or interpretations.

"*Services*" means the activities described in Article 1 below, rendered by the Society upon request made by or on behalf of the Interested Party.

"Ship" means ships, boats, craft and other special units, as for example offshore structures, floating units and underwater craft.

"*Society*" or *"TASNEEF"* means Tasneef and/or all the companies in the Tasneef Group which provide the Services.

"*Surveyor*" means technical staff acting on behalf of the Society in performing the Services.

Article 1

1.1. The purpose of the Society is, among others, the classification and certification of ships and the certification of their parts and components. In particular, the Society:
(i) sets forth and develops Rules;
(ii) publishes the Register of Ships;
(iii) issues certificates, statements and reports based on its survey activities.

1.2. The Society also takes part in the implementation of national and international rules and standards as delegated by various Governments.

1.3. The Society carries out technical assistance activities on request and provides special services outside the scope of classification, which are regulated by these general conditions, unless expressly excluded in the particular contract.

Article 2

2.1. The Rules developed by the Society reflect the level of its technical knowledge at the time they are published. Therefore, the Society, although committed also through its research and development services to continuous updating of the Rules, does not guarantee the Rules meet state-of-the-art science and technology at the time of publication or that they meet the Society's or others' subsequent technical developments.

2.2. The Interested Party is required to know the Rules on the basis of which the Services are provided. With particular reference to Classification Services, special attention is to be given to the Rules concerning class suspension, withdrawal and reinstatement. In case of doubt or inaccuracy, the Interested Party is to promptly contact the Society for clarification.
The Rules for Classification of Ships are published on the Society's website: www.tasneef.ae.

2.3. The Society exercises due care and skill:
(i) in the selection of its Surveyors
(ii) in the performance of its Services, taking into account the level of its technical knowledge at the time the Services are performed.

2.4. Surveys conducted by the Society include, but are not limited to, visual inspection and non-destructive testing. Unless otherwise required, surveys are conducted through sampling techniques and do not consist of comprehensive verification or monitoring of the Ship or of the items subject to certification. The surveys and checks made by the Society on board ship do not necessarily require the constant and continuous presence of the Surveyor. The Society may also commission laboratory testing, underwater inspection and other checks carried out by and under the responsibility of qualified service suppliers. Survey practices and procedures are selected by the Society based on its experience and knowledge and according to generally accepted technical standards in the sector.

Article 3

3.1. The class assigned to a Ship, like the reports, statements, certificates or any other document or information issued by the Society, reflects the opinion of the Society concerning compliance, at the time the Service is provided, of the Ship or product subject to certification, with the applicable Rules (given the intended use and within the relevant time frame).
The Society is under no obligation to make statements or provide information about elements or facts which are not part of the specific scope of the Service requested by the Interested Party or on its behalf.

3.2. No report, statement, notation on a plan, review, Certificate of Classification, document or information issued or given as part of the Services provided by the Society shall have any legal effect or implication other than a representation that, on the basis of the checks made by the Society, the Ship, structure, materials, equipment, machinery or any other item covered by such document or information meet the Rules. Any such document is issued solely for the use of the Society, its committees and clients or other duly authorised bodies and for no other purpose. Therefore, the Society cannot be held liable for any act made or document issued by other parties on the basis of the statements or information given by the Society. The validity, application, meaning and interpretation of a Certificate of Classification, or any other document or information issued by the Society in connection with its Services, is governed by the Rules of the Society, which is the sole subject entitled to make such interpretation. Any disagreement on technical matters between the Interested Party and the Surveyor in the carrying out of his functions shall be raised in writing as soon as possible with the Society, which will settle any divergence of opinion or dispute.

3.3. The classification of a Ship, or the issuance of a certificate or other document connected with classification or certification and in general with the performance of Services by the Society shall have the validity conferred upon it by the Rules of the Society at the time of the assignment of class or issuance of the certificate; in no case shall it amount to a statement or warranty of seaworthiness,

structural integrity, quality or fitness for a particular purpose or service of any Ship, structure, material, equipment or machinery inspected or tested by the Society.

3.4. Any document issued by the Society in relation to its activities reflects the condition of the Ship or the subject of certification or other activity at the time of the check.

3.5. The Rules, surveys and activities performed by the Society, reports, certificates and other documents issued by the Society are in no way intended to replace the duties and responsibilities of other parties such as Governments, designers, ship builders, manufacturers, repairers, suppliers, contractors or sub-contractors, Owners, operators, charterers, underwriters, sellers or intended buyers of a Ship or other product or system surveyed.

These documents and activities do not relieve such parties from any fulfilment, warranty, responsibility, duty or obligation (also of a contractual nature) expressed or implied or in any case incumbent on them, nor do they confer on such parties any right, claim or cause of action against the Society. With particular regard to the duties of the ship Owner, the Services undertaken by the Society do not relieve the Owner of his duty to ensure proper maintenance of the Ship and ensure seaworthiness at all times. Likewise, the Rules, surveys performed, reports, certificates and other documents issued by the Society are intended neither to guarantee the buyers of the Ship, its components or any other surveyed or certified item, nor to relieve the seller of the duties arising out of the law or the contract, regarding the quality, commercial value or characteristics of the item which is the subject of transaction.

In no case, therefore, shall the Society assume the obligations incumbent upon the above-mentioned parties, even when it is consulted in connection with matters not covered by its Rules or other documents.

In consideration of the above, the Interested Party undertakes to relieve and hold harmless the Society from any third party claim, as well as from any liability in relation to the latter concerning the Services rendered.

Insofar as they are not expressly provided for in these General Conditions, the duties and responsibilities of the Owner and Interested Parties with respect to the services rendered by the Society are described in the Rules applicable to the specific Service rendered.

Article 4

4.1. Any request for the Society's Services shall be submitted in writing and signed by or on behalf of the Interested Party. Such a request will be considered irrevocable as soon as received by the Society and shall entail acceptance by the applicant of all relevant requirements of the Rules, including these General Conditions. Upon acceptance of the written request by the Society, a contract between the Society and the Interested Party is entered into, which is regulated by the present General Conditions.

4.2. In consideration of the Services rendered by the Society, the Interested Party and the person requesting the service shall be jointly liable for the payment of the relevant fees, even if the service is not concluded for any cause not pertaining to the Society. In the latter case, the Society shall not be held liable for non-fulfilment or partial fulfilment of the Services requested. In the event of late payment, interest at the legal current rate increased by 1.5% may be demanded.

4.3. The contract for the classification of a Ship or for other Services may be terminated and any certificates revoked at the request of one of the parties, subject to at least 30 days' notice to be given in writing. Failure to pay, even in part, the fees due for Services carried out by the Society will entitle the Society to immediately terminate the contract and suspend the Services.

For every termination of the contract, the fees for the activities performed until the time of the termination shall be owed to the Society as well as the expenses incurred in view of activities already programmed; this is without prejudice to the right to compensation due to the Society as a consequence of the termination.

With particular reference to Ship classification and certification, unless decided otherwise by the Society, termination of the contract implies that the assignment of class to a Ship is withheld or, if already assigned, that it is suspended or withdrawn; any statutory certificates issued by the Society will be withdrawn in those cases where provided for by agreements between the Society and the flag State.

Article 5

5.1. In providing the Services, as well as other correlated information or advice, the Society, its Surveyors, servants or agents operate with due diligence for the proper execution of the activity. However, considering the nature of the activities performed (see art. 2.4), it is not possible to guarantee absolute accuracy, correctness and completeness of any information or advice supplied. Express and implied warranties are specifically disclaimed.

Therefore, except as provided for in paragraph 5.2 below, and also in the case of activities carried out by delegation of Governments, neither the Society nor any of its Surveyors will be liable for any loss, damage or expense of whatever nature sustained by any person, in tort or in contract, derived from carrying out the Services.

5.2. Notwithstanding the provisions in paragraph 5.1 above, should any user of the Society's Services prove that he has suffered a loss or damage due to any negligent act or omission of the Society, its Surveyors, servants or agents, then the Society will pay compensation to such person for his proved loss, up to, but not exceeding, five times the amount of the fees charged for the specific services, information or opinions from which the loss or damage derives or, if no fee has been charged, a maximum of AED5,000 (Arab Emirates Dirhams Five Thousand only). Where the fees charged are related to a number of Services, the amount of the fees will be apportioned for the purpose of the calculation of the maximum compensation, by reference to the estimated time involved in the performance of the Service from which the damage or loss derives. Any liability for indirect or consequential loss, damage or expense is specifically excluded. In any case, irrespective of the amount of the fees charged, the maximum damages payable by the Society will not be more than AED5,000,000 (Arab Emirates Dirhams Five Millions only). Payment of compensation under this paragraph will not entail any admission of responsibility and/or liability by the Society and will be made without prejudice to the disclaimer clause contained in paragraph 5.1 above.

5.3. Any claim for loss or damage of whatever nature by virtue of the provisions set forth herein shall be made to the Society in writing, within the shorter of the following periods: (i) THREE (3) MONTHS from the date on which the Services were performed, or (ii) THREE (3) MONTHS from the date on which the damage was discovered. Failure to comply with the above deadline will constitute an absolute bar to the pursuit of such a claim against the Society.

Article 6

6.1. These General Conditions shall be governed by and construed in accordance with United Arab Emirates (UAE) law, and any dispute arising from or in connection with the Rules or with the Services of the Society, including any issues concerning responsibility, liability or limitations of liability of the Society, shall be determined in accordance with UAE law. The courts of the Dubai International Financial Centre (DIFC) shall have exclusive jurisdiction in relation to any claim or dispute which may arise out of or in connection with the Rules or with the Services of the Society.

6.2. However,

(i) In cases where neither the claim nor any counterclaim exceeds the sum of AED300,000 (Arab Emirates Dirhams Three Hundred Thousand) the dispute shall be referred to the jurisdiction of the DIFC Small Claims Tribunal; and

(ii) for disputes concerning non-payment of the fees and/or expenses due to the Society for services, the Society shall have the

right to submit any claim to the jurisdiction of the Courts of the place where the registered or operating office of the Interested Party or of the applicant who requested the Service is located.

In the case of actions taken against the Society by a third party before a public Court, the Society shall also have the right to summon the Interested Party or the subject who requested the Service before that Court, in order to be relieved and held harmless according to art. 3.5 above.

Article 7

7.1. All plans, specifications, documents and information provided by, issued by, or made known to the Society, in connection with the performance of its Services, will be treated as confidential and will not be made available to any other party other than the Owner without authorisation of the Interested Party, except as provided for or required by any applicable international, European or domestic legislation, Charter or other IACS resolutions, or order from a competent authority. Information about the status and validity of class and statutory certificates, including transfers, changes, suspensions, withdrawals of class, recommendations/conditions of class, operating conditions or restrictions issued against classed ships and other related information, as may be required, may be published on the website or released by other means, without the prior consent of the Interested Party.

Information about the status and validity of other certificates and statements may also be published on the website or released by other means, without the prior consent of the Interested Party.

7.2. Notwithstanding the general duty of confidentiality owed by the Society to its clients in clause 7.1 above, the Society's clients hereby accept that the Society may participate in the IACS Early Warning System which requires each Classification Society to provide other involved Classification Societies with relevant technical information on serious hull structural and engineering systems failures, as defined in the IACS Early Warning System (but not including any drawings relating to the ship which may be the specific property of another party), to enable such useful information to be shared and used to facilitate the proper working of the IACS Early Warning System. The Society will provide its clients with written details of such information sent to the involved Classification Societies.

7.3. In the event of transfer of class, addition of a second class or withdrawal from a double/dual class, the Interested Party undertakes to provide or to permit the Society to provide the other Classification Society with all building plans and drawings, certificates, documents and information relevant to the classed unit, including its history file, as the other Classification Society may require for the purpose of classification in compliance with the applicable legislation and relative IACS Procedure. It is the Owner's duty to ensure that, whenever required, the consent of the builder is obtained with regard to the provision of plans and drawings to the new Society, either by way of appropriate stipulation in the building contract or by other agreement.

In the event that the ownership of the ship, product or system subject to certification is transferred to a new subject, the latter shall have the right to access all pertinent drawings, specifications, documents or information issued by the Society or which has come to the knowledge of the Society while carrying out its Services, even if related to a period prior to transfer of ownership.

Article 8

8.1. Should any part of these General Conditions be declared invalid, this will not affect the validity of the remaining provisions.

GENERAL INDEX

NOTES

1 REFERENCE EDITION

The reference edition of these Rules is the edition effective from 1 January 1996.

2 EFFECTIVE DATE OF THE REQUIREMENTS

2.1 - All items in which, due to one or more amendments, new or amended requirements with respect to those contained in the reference edition have been introduced, are followed by a date shown in brackets.
This date is the effective date of the requirements of the item concerned as amended by the last relevant updating.
All items not followed by any date contain requirements, never amended with respect to those contained in the reference edition, whose effective date is 1 January 1996.

2.2 - These Notes provide information on the current status of the requirements of these Rules.
In particular, in item **3** below, which is relevant to the last set of amendments to these Rules, all items containing new or amended requirements with respect to those contained in the preceding edition are listed; for each of the above items, short explanatory notes relating to the amendments or additions made to the requirements are given.
In the above-mentioned item **3**, those items are also listed to which only editorial changes have been made, not affecting the effective date of the requirements contained therein. These items are identified by the wording "(editorial)".

NOTES

3 ITEMS OF THE EDITION EFFECTIVE FROM 1 JANUARY 1996 CONTAINING NEW OR AMENDED REQUIREMENTS WITH RESPECT TO THOSE CONTAINED IN THE PRECEDING EDITION

This edition of the Rules is to be regarded as a "reference edition" for future updating.

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Chapter 1 - GENERAL

1.1 - SCOPE

1.1.1

These Rules apply to the equipment of sailing ships, sailing ships with auxiliary engine and fullpower sailing ships mentioned in Chapter 2, Section A of the "Rules for the construction and classification of ships" (hereafter referred to as "the Rules").

They contain criteria of scantlings, construction and survey of sailing rigging, both fixed and mobile.

For the purpose of the scantlings, construction and survey of the hull, machinery, systems and general installations, the relevant sections of the Rules apply.

For the purpose of the stability, the "Rules relevant to the stability of ships" apply.

In these Rules, sailing ships, sailing ships with auxiliary engine and full power sailing ships are generically called "sailing ships".

1.2 - DOCUMENTATION REQUESTED

1.2.1

The following drawings, fully dimensioned with the materials indicated, are to be sent to the Head Office in triplicate for examination and approval:

- sailing plan, indicating the sail surface values and the associated centres of effort, as well as the layout and scantlings of the standing rigging;
- masts, upper masts and crosstrees;
- yards and their fastenings to masts and upper masts;
- spars for gaffsails with their fastenings to masts and upper masts;
- bowsprits;
- fastenings for standing substructures of masts and upper masts;
- running riggings, where they are subject to forces transmitted by yards, booms, etc.

1.3 - DEFINITIONS

1.3.1 - Types of rig

The sailing rigging considered in these Rules is generally of two types:

- with square sails;
- with fore-and-aft sails.

The masts of ships with square rig are equipped with yards.

The masts of ships equipped with fore-and-aft rig have no yards (this kind of equipment is also called "schooner rig").

Different sailing rigging (e.g. three-cornered sail) will be considered case by case also on the basis of a criterion of equivalence.

Depending on the type of rig employed, sailing ships are classed as:

(a) Square-rigged ships (each mast is equipped with square sails)

They include:

(1) the brig (two masts);

(2) full-rigged ships with three or more masts, completely equipped (e.g. a four-masted ship-rigged vessel).

(b) Sailing ships with mixed rig

They include:

(1) the schooner brig or brigantine (foremast equipped with square rig and mainmast equipped with fore-and-aft rig)

(2) the topsail schooner or barkentine (square rigged on the foremast and fore-and-aft rigged on the mainmast and mizzen-mast)

(3) the three-masted bark (square-rigged fore and mainmast, fore-and-aft rigged mizzen-mast)

(4) the bark with more than three masts (the aftermost mast invariably fore-and-aft rigged)

(5) the square topsail shooner (masts are both square and fore-and-aft rigged).

(c) Schooners (fore-and-aft rig only)

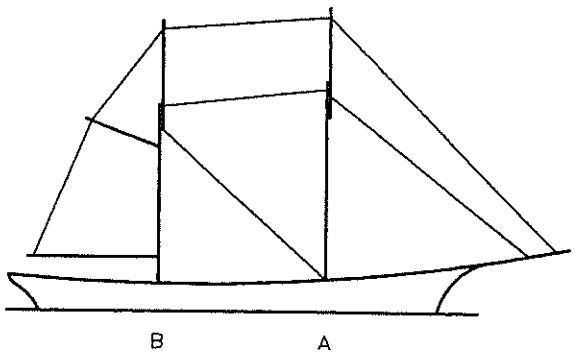
They include:

(1) the two-masted schooner

(2) the fore-and-aft schooner with three or more masts (e.g. a five-masted schooner).

FIGURE 1.1

TWO-MASTED SHIPS

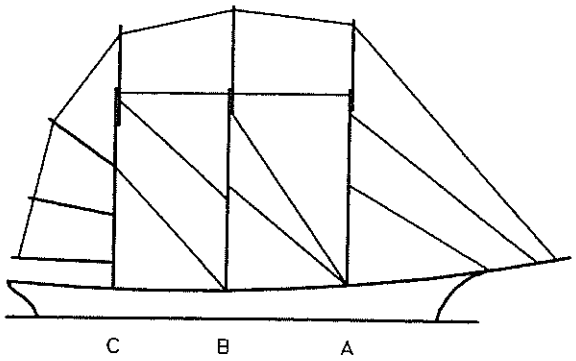


Brigs, schooner brigs and schooners

Irrespective of the type of rig:
A: foremast
B: mainmast

FIGURE 1.2

THREE-MASTED SHIPS

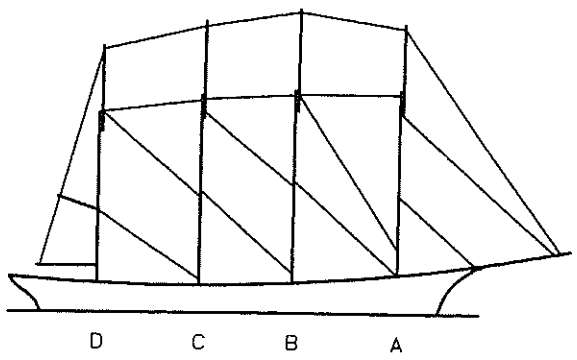


Barks, topsail shooners and ship-rigged vessels

A: foremast
B: mainmast
C: mizzen-mast

FIGURE 1.3

FOUR-MASTED SHIPS

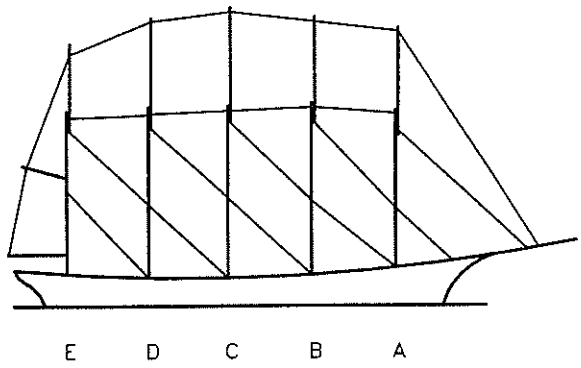


Four-masted barks and ship-rigged vessels

A: foremast
B: mainmast
C: mizzen-mast
D: spanker mast

FIGURE 1.4

FIVE-MASTED SHIPS



Five-masted bark and ship-rigged ships

A: foremast
B: mainmast
C: mizzen-mast
D: jigger mast
E: spanker mast

1.3.2 - Nomenclature of masts

The nomenclature of masts is shown in Figures 1.1 to 1.4.

1.3.3 - Nomenclature of yards and sails

The nomenclature of yards and sails is shown in Figure 1.5.

1.3.4 - Nomenclature of standing rigging

The nomenclature of shrouds and backstays is shown in Figures 1.6, 1.7, 1.8.

1.3.5 - Nomenclature of sails

The sails are divided into three types:
(a) Square sails
(b) Gaffsails
(c) Staysails

The nomenclature of square sails is shown in Figure 1.5.

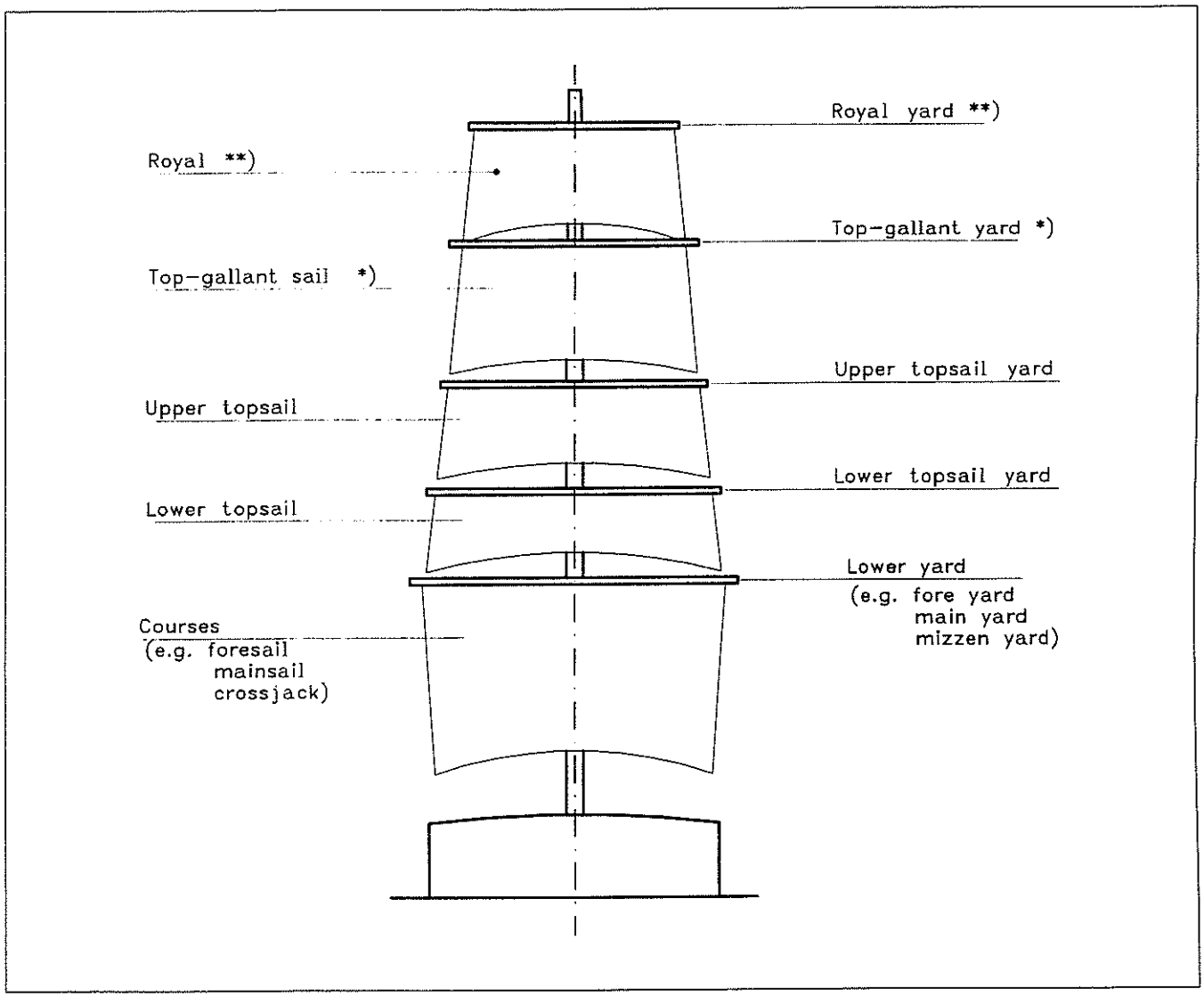
The lower gaffsails are named according to the masts on which they are carried (e.g. gaff foresail, gaff mainsail).

Corresponding names are also given to the gaff-top sails (e.g. main, fore and mizzen gaff-top sail). Further details are shown in Figure 1.9.

The nomenclature of stay sails is shown in Figure 1.10.

FIGURE 1.5

NOMENCLATURE OF YARDS AND SAILS



NOTES:

[1] On large sailing ships the top-gallant sail may be divided into an upper and lower top-gallant sail with the corresponding upper and lower top-gallant yards.

[2] On very large sailing ships the sky yard and/or the sky sail will be arranged above the royal yard.

FIGURE 1.6

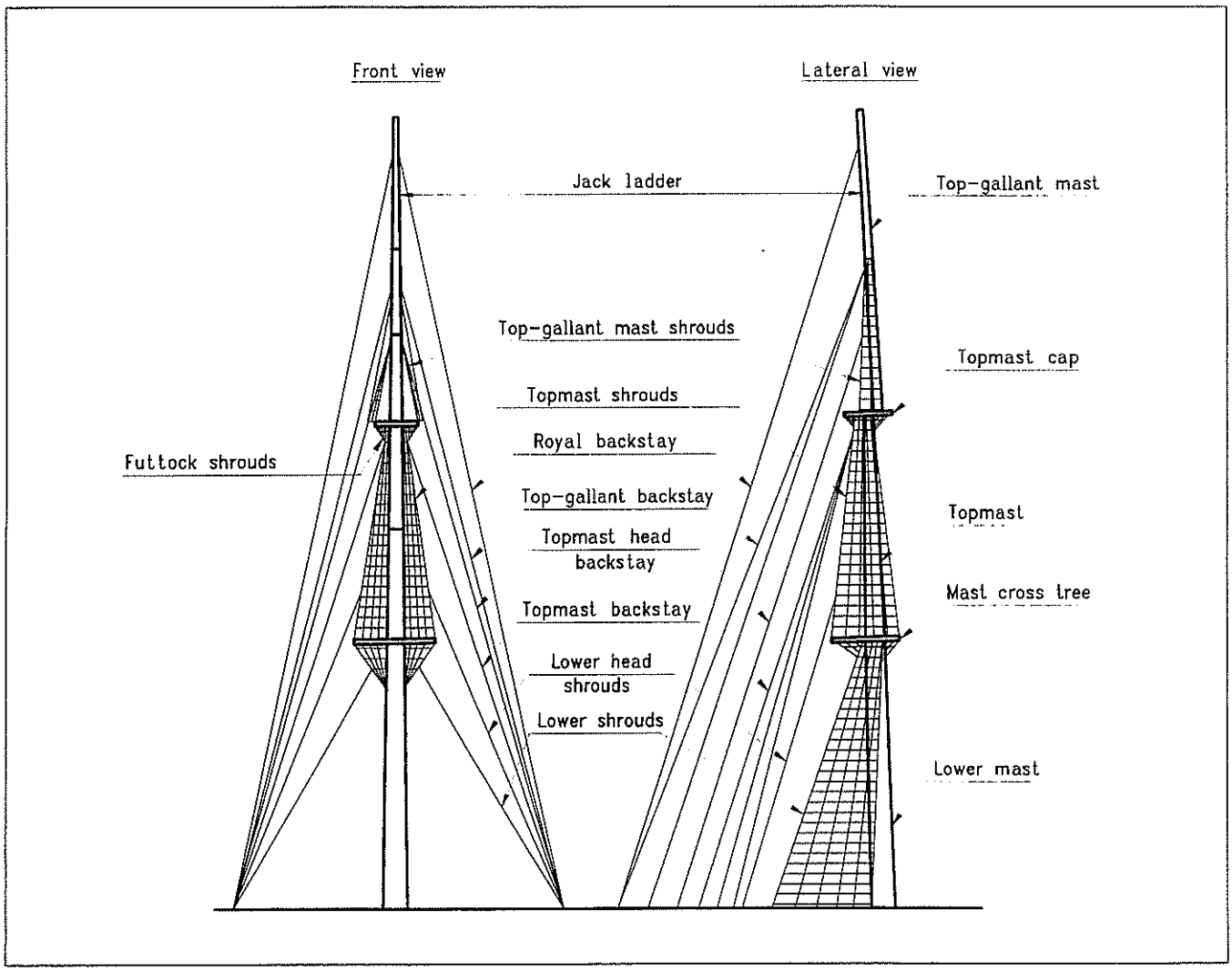
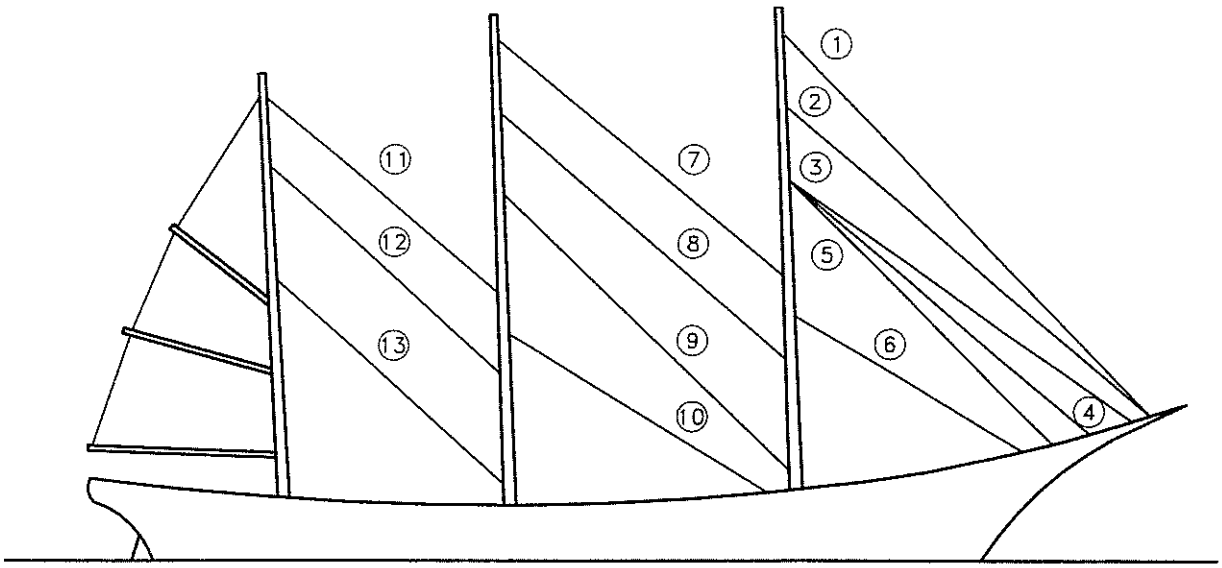

Front view
Lateral view
Jack ladder
Top-gallant mast
Top-gallant mast shrouds
Topmast cap
Topmast shrouds
Royal backstay
Futtock shrouds
Top-gallant backstay
Topmast
Topmast head backstay
Mast cross tree
Topmast backstay
Lower head shrouds
Lower shrouds
Lower mast

FIGURE 1.7



1 fore royal stay
2 fore top-gallant stay
3 outer jib stay
4 inner jib stay
5 fore topmast stay
6 fore stay
7 main royal stay
8 main top-gallant stay
9 main topmast stay
10 main stay
11 mizzen top-gallant stay
12 mizzen top-gallant stay
13 mizzen stay

FIGURE 1.8

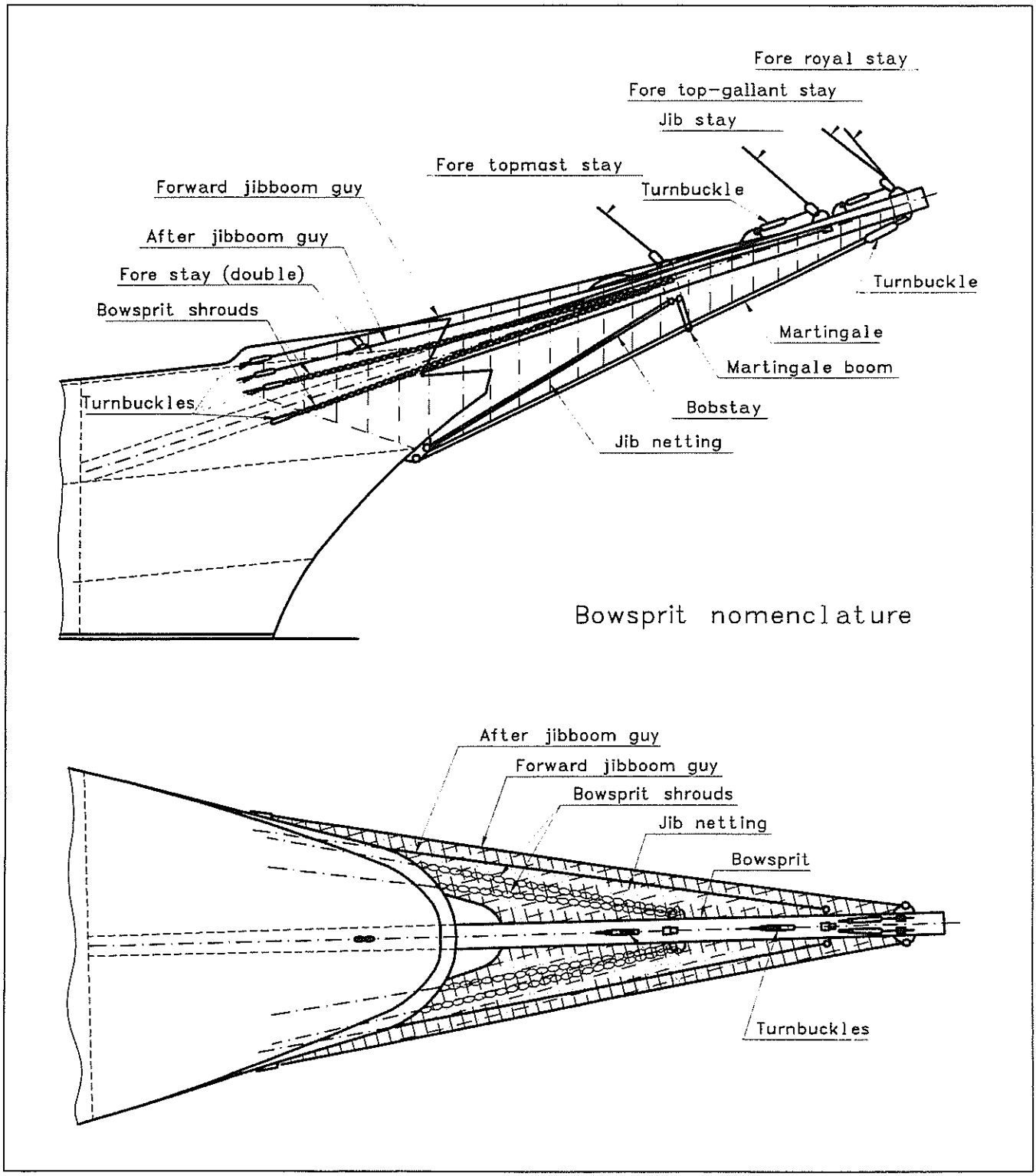

Fore royal stay
Fore top-gallant stay
Jib stay
Fore topmast stay
Forward jibboom guy
Turnbuckle
After jibboom guy
Fore stay (double)
Turnbuckle
Bowsprit shrouds
Martingale
Martingale boom
Turnbuckles
Bobstay
Jib netting
Bowsprit nomenclature
After jibboom guy
Forward jibboom guy
Bowsprit shrouds
Jib netting
Bowsprit
Turnbuckles

FIGURE 1.9

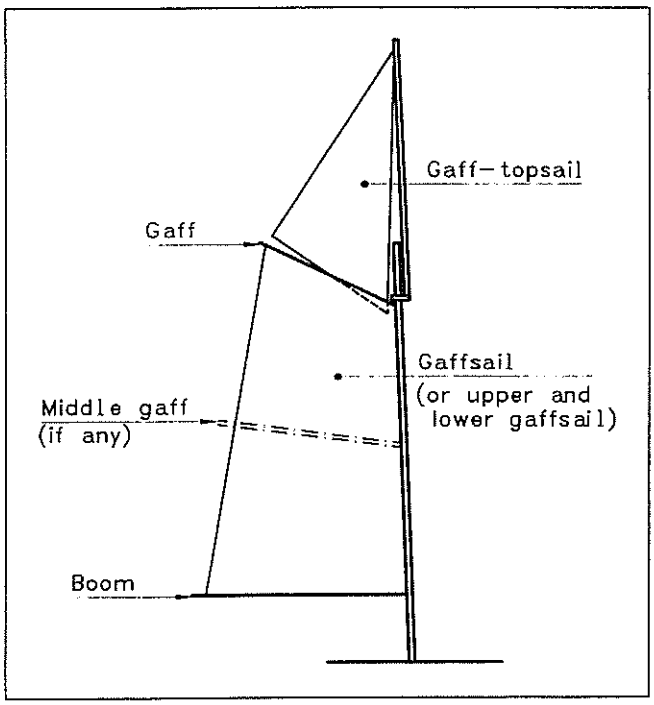
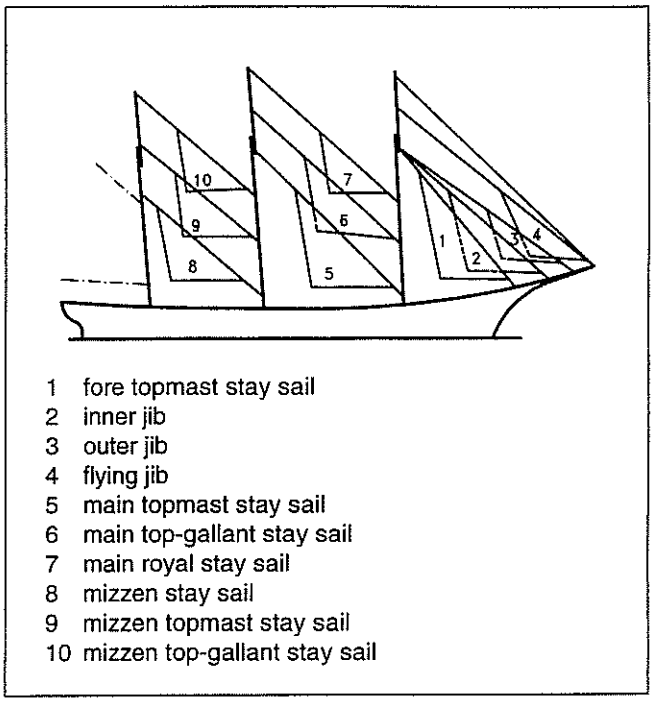


FIGURE 1.10



1 fore topmast stay sail
2 inner jib
3 outer jib
4 flying jib
5 main topmast stay sail
6 main top-gallant stay sail
7 main royal stay sail
8 mizzen stay sail
9 mizzen topmast stay sail
10 mizzen top-gallant stay sail

Chapter 2 - SCANTLINGS OF MASTS, YARDS, BOOMS AND BOWSPRITS

2.1 - GENERAL

2.1.1

The scantlings of the structural parts given in Tables 2.1 to 2.5 are based on steel having a tensile strength of 400÷490 N/mm^2. For fuller details on the materials, see Section G of the Rules.

Where materials of different tensile strength are used, the scantlings given in Tables 2.1 to 2.5 may be modified accordingly.

Solid spars are to be of the diameter specified for the various parts in the text or in the Tables.

All solid spars are to be made of sound and as far as possible unblemished timer free from sapwood and branches.

Timber of twisted growth may not be used.

The reductions in diameter possible for the various grades of timber are indicated in the text and in the Tables.

2.2 - MASTS

2.2.1 - Length and scantlings of the masts

If the mast of a sailing ship is made in three parts (mast, topmast and topgallant mast), the length of the mast may be taken as extending from the top of the floor to the mast lower cap (see Fig. 2.1).

If the mast comprises only two parts (lower mast and upper mast), the scantlings of the lower mast, equivalent to the mast and the topmast in the previous case, are to be based on an imaginary length known as the "Lloyd's length".

This is the distance measured from the top of the floor to a fictitious mast cap situated, for all masts, about 2 m above the mast crosstrees.

The scantlings of this lower part of the mast may be taken from Table 2.1.

The length of the imaginary topmast is the distance from the mast crosstree to the topmast cap.

The top portion of the lower mast above the "Lloyd's length" may be gradually tapered to the diameter of the topmast at the cap as shown in Table 2.2.

The diameter of the masts in the main deck mast-hole need not be greater than 28 mm per running metre of length for square-rigged masts, 25 mm for masts with only one upper mast and only 2 or 3 yards, and 21 mm for masts without yards.

If the diameter of the mast has been determined in accordance with the above, the other scantlings corresponding to this diameter shall be as indicated in Table 2.1.

2.2.2 - Design requirements

At those points on the mast at which the hoisted yards are slung, the diameter and the plate thickness of the mast are to be at least as great as the maximum diameter and the maximum plate thickness of the yard concerned.

The maximum diameter of the wooden masts may be reduced by 10% if they are made of pitch pine or Oregon pine, and by 5% if they are made of pine or larch.

The purpose of the crosstree is to absorb both the vertical and the lower horizontal forces exerted by the upper masts.

The crosstrees provide the bottom support for the upper mast.

The mast cap provides the upper support for the upper mast and absorbs the horizontal forces acting at that point.

Dynamic calculations in respect of both crosstrees and mast cap shall be submitted to the Head Office for examination.

The eye plates needed to fasten the standing rigging to the mast shall be as specified in Table 2.9.

In way of the main deck mast-hole (for a length L approximately twice the diameter of the mast) the masts are to be strengthened (e.g. by using a section with 1.5 times the plate thickness indicated in Table 2.1).

2.3 - UPPER MASTS

2.3.1 - Lengths and scantlings of upper masts

The scantlings of the topmast, when fitted, shall be determined in accordance with Table 2.2 by reference to the actual length.

The scantlings of the topmast shall be those shown in Table 2.2.

For the top-gallant masts of square-rigged masts, a diameter at the heel of 25 mm per running metre of length is sufficient. For fore-and-aft rigged masts 21 mm is sufficient.

If the diameter of the top-gallant mast at the heel has been determined in accordance with the above, the other scantlings shall be those shown in Table 2.2 corresponding to this diameter.

2.3.2 - Design requirements

The upper masts are to be reinforced at the cap, the crosstrees and the sheave-holes (e.g. by using a section having 1.5 times the plate thickness specified in Table 2.2).

At those points on the upper masts at which hoisted yards are suspended, the diameter and the plate thickness of the upper mast are to be at least as great as the maximum diameter and the maximum plate thickness of the yard concerned.

The maximum diameter of wooden upper masts may be reduced by 10% if they are made of pitch pine or Oregon pine, and by 5% if they are made of pine or larch.

2.4 - BOWSPRIT

2.4.1 - Function and scantlings of the bowsprit

The bowsprit is used to secure the lower ends of the various foremast stays (see Fig. 1.8).

The scantlings of the bowsprit shall be those shown in Table 2.5.

The scantlings of the bobstay and bowsprit shrouds shall be those shown in Table 2.6.

The following relationships are also applicable:

- diameter of the martingale = 0.6 x diameter of the bobstay
- diameter of the martingale boom = 1.15 x diameter of the bobstay.

2.4.2 - Design requirements

The distance between the housing at the heel of the bowsprit and the gammon iron at the stem is to be at least 4 times the diameter of the bowsprit.

The maximum diameter of wooden bowsprits may be reduced by 10% if they are made of pitch pine or Oregon pine, and by 5% if they are made of pine or larch.

Strong horses and han beckets as well as a sufficient numbers of cross ropes or nets are to be fitted at the bowsprit.

Ships exceeding 700 GRT are to be provided with nets underneath their bowsprits, extending up to the forecastle.

The bowsprit is to be strengthened in its beddings (e.g. by fitting a section with 1.5 times the plate thickness as indicated in Table 2.5).

2.5 - YARDS

2.5.1 - Scantlings

The scantlings of the yards shall be those indicated in Table 2.4 (a).

The diameter ot the bunt need not exceed 19 mm per running metre of the top-gallant yards or 18 mm per running metre for royal yards.

If the diameter at the bunt has been determined in accordance with the above, the other scantlings shall be those shown in Table 2.4 for this diameter.

2.5.2 - Arrangement of yards

The yards may be of the standing or running type.

The method of fastening a standing yard to the mast is shown in Fig. 2.2.

The yard sling is designed to support and transmit to the mast the vertical force (structural weight and wind pressure component) acting on the yard. It transmits this force to the mast and/or the upper mast.

The design load of the yard sling shall be that specified in Table 2.4 (b).

The arrangement of a running yard is shown in Fig. 2.3.

The tie is used for hoisting and lowering the yard and also takes the place of the yard sling.

The required load of the tie shall be that specified in Table 2.4 (b).

The purpose of the truss (see Fig. 2.2) is to take up and transmit to the mast the horizontal force acting on the yard. It transmits this force to the mast and/or the upper mast.

It shall allow the yard to move as required. The scantlings of the truss shall be those specified in Table 2.4 (c).

2.5.3 - Design requirements

Yard bunts are to be reinforced to beyond the truss fastenings (e.g. by including a section with 1.5 times the plate thickness shown in Table 2.4).

The yards are to be provided with strong horses and with a sufficient number of hand beckets or other handles offering the crew safe support. Horses made from wire ropes are to be coated.

Chapter 2 - SCANTLINGS OF MASTS, YARDS, BOOMS AND BOWSPRITS

2.6 - BOOMS FOR GAFFSAILS

2.6.1

The scantlings of gaff sail booms shall be those specified in Table 2.3.

2.7 - GAFFS FOR GAFFSAILS

2.7.1

The diameters of the gaff are calculated, depending on their length L, according to the following formulas:

- diameter at the mast end: 0.015 · L
- diameter at 1/3 L of mast: 0.021 · L
- diameter at the end: 0.006 · L

The relevant wall thickness is to be determined for the above diameters according to Table 2.3.

TABLE 2.1

MASTS FOR SAILING SHIPS

Length [1]	At heel of mast		At main deck mast-hole [2] [3]		At lower edge of crosstree		At mast-head	
	Diameter	Thickness	Diameter	Thickness	Diameter	Thickness	Diameter	Thickness
m	mm	mm	mm	mm	mm	mm	mm	mm
14	300	5.5	390	7.0	310	5.5	260	5.0
15	320	6.0	420	7.5	330	6.0	280	5.5
16	340	6.5	440	7.5	350	6.5	300	6.0
17	360	6.5	470	8.0	380	6.5	310	6.5
18	380	7.0	500	8.0	400	7.0	330	7.0
19	400	7.5	530	8.5	420	7.5	350	7.0
20	420	8.0	560	9.0	440	8.0	360	7.5
21	440	8.5	580	9.5	470	8.5	380	8.0
22	460	9.0	610	10.5	490	9.0	400	8.0
23	490	9.5	640	11.0	510	9.5	420	8.5
24	510	10.0	670	11.5	530	10.0	430	8.5
25	530	11.5	700	12.5	560	11.5	450	11.5
26	550	12.0	720	13.0	580	12.0	470	12.0
27	570	13.0	750	14.0	600	13.0	490	12.5
28	590	13.0	780	14.5	620	13.0	500	13.0
29	610	14.0	810	15.0	650	14.0	520	13.5
30	630	14.5	830	16.0	670	14.0	540	14.0
31	650	14.5	850	16.5	690	14.5	560	14.0
32	670	15.0	880	16.5	720	14.5	580	14.5
33	690	15.5	900	17.5	740	15.0	600	14.5
34	710	15.5	920	18.0	760	15.5	610	15.0

NOTES:

[1] The length referred to is the "Lloyd's length" (see 2.2.1).

[2] The diameter of the masts of sailing ships in the main deck mast-hole need not be greater than:
- 28 mm per running metre of length for square-rigged masts
- 25 mm for masts with only one upper mast and 2 or three yards
- 21 mm for masts without yards.

[3] The maximum diameter of masts may be reduced by 10% if they are made of pitch-pine or Oregon pine, and by 5% if they are made of pine or larch.

TABLE 2.2

TOPMASTS FOR SAILING SHIPS

Topmasts													
Overall length	At heel		At mast-head		At topmast cap		Overall length	At heel		At mast-head		At topmast cap	
	Diameter	Thickness	Diameter	Thickness	Diameter	Thickness		Diameter	Thickness	Diameter	Thickness	Diameter	Thickness
m	mm	mm	mm	mm	mm	mm	m	mm	mm	mm	mm	mm	mm
9.5	290	6.0	250	6.0	220	4.0	**15.5**	460	8.5	410	7.5	340	7.0
10.0	300	6.0	260	6.0	230	4.0	**16.0**	470	8.5	430	7.5	350	7.0
10.5	320	6.0	280	6.0	240	4.5	**16.5**	490	8.5	440	8.0	360	7.5
11.0	330	6.5	290	6.0	250	5.0	**17.0**	500	9.0	460	8.0	370	7.5
11.5	350	6.5	300	6.0	260	5.0	**17.5**	520	9.0	470	8.0	380	7.5
12.0	360	7.0	320	6.5	270	5.5	**18.0**	530	9.0	480	8.5	390	8.0
12.5	370	7.0	330	6.5	280	5.5	**18.5**	550	9.0	500	8.5	400	8.0
13.0	390	7.5	350	6.5	290	6.0	**19.0**	560	9.5	510	8.5	410	8.0
13.5	400	7.5	360	7.0	300	6.5	**19.5**	570	9.5	520	9.0	420	8.5
14.0	420	7.5	370	7.0	310	6.5	**20.0**	590	9.5	540	9.0	430	8.5
14.5	430	8.0	390	7.0	320	6.5	**20.5**	600	10.0	550	9.0	440	8.5
15.0	450	8.0	400	7.5	330	7.0	**21.0**	620	10.0	570	9.5	450	9.0

NOTE: Regarding the length see 2.2.1.
At those points at which hoisted yards are slung, the diameter at the plate thickness of masts, topmasts and top-gallant masts is to be at least as great as the maximum diameter and the maximum plate thickness of the yard concerned.
Topmasts are to be strengthened at the cap, crosstrees and sheave-holes. Similarly, yard bunts are to be reinforced to a point beyond the truss bands (e.g. by including a section having 1.5 times the thickness of the plate).

TABLE 2.3

BOOMS FOR GAFFSAILS

Length of boom	At the mast		At 1/3 of length from mast		At 1/3 of length from outer end		At outer end	
	Diameter	Thickness	Diameter	Thickness	Diameter	Thickness	Diameter	Thickness
m	mm	mm	mm	mm	mm	mm	mm	mm
7	130	4.0	150	4.0	155	4.0	135	4.0
8	135	4.0	160	4.0	170	4.0	145	4.0
9	140	4.0	170	4.5	190	4.5	155	4.0
10	150	4.0	185	4.5	210	4.5	165	4.0
11	160	4.0	200	5.0	230	5.0	180	4.5
12	175	4.5	220	5.0	250	5.5	195	4.5
13	190	4.5	240	5.5	270	5.5	210	5.0
14	205	5.0	260	5.5	290	6.0	225	5.0
15	220	5.0	280	6.0	310	6.5	240	5.5
16	235	5.5	300	6.0	330	6.5	260	5.5
17	250	5.5	315	6.5	350	7.0	275	6.0
18	265	6.0	335	6.5	370	7.0	290	6.0
19	280	6.0	350	7.0	390	7.5	310	6.5
20	295	6.5	370	7.0	410	7.5	320	6.5

TABLE 2.4 (a)

YARDS

Length	At bunt		1st quarter distance		2nd quarter distance		3rd quarter distance		At yard arms	
	Diameter	Thickness	Diameter	Diameter	Thickness	Diameter	Thickness	Diameter	Thickness	Diameter
m	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
10	200	4.5	195	4.5	180	4.5	150	4.5	100	3.0
11	220	4.5	215	4.5	200	4.5	165	4.5	110	3.0
12	240	4.5	235	4.5	215	4.5	180	4.5	120	3.0
13	260	5.0	255	5.0	235	4.5	195	4.5	130	3.0
14	280	5.5	275	5.0	250	5.0	210	4.5	140	3.0
15	300	5.5	295	5.5	270	5.0	225	5.0	150	3.0
16	320	6.0	310	6.0	290	5.5	240	5.0	160	3.5
17	340	6.0	330	6.0	305	6.0	255	5.0	170	3.5
18	360	6.5	350	6.5	325	6.0	270	5.0	180	3.5
19	380	7.0	370	6.5	340	6.5	285	5.5	190	4.0
20	400	7.0	390	7.0	360	6.5	300	5.5	200	4.0
21	420	7.5	410	7.0	380	7.0	315	5.5	210	4.5
22	440	8.0	430	7.5	395	7.0	330	5.5	220	4.5
23	460	8.0	450	7.5	415	7.5	345	6.5	230	5.0
24	480	8.5	470	8.0	430	7.5	360	6.5	240	5.0
25	500	9.0	490	8.5	450	8.0	375	7.0	250	5.5
26	520	9.5	510	8.5	470	8.0	390	7.0	260	5.5
27	540	9.5	530	9.0	490	8.5	405	7.5	270	6.0
28	560	10.0	545	9.0	505	8.5	420	7.5	280	6.5
29	580	10.5	565	9.5	525	9.0	435	8.0	290	6.5
30	600	11.5	585	10.0	540	9.0	450	8.0	300	7.0

NOTE: The diameter at the bunt of top-gallant yards and royal yards need not exceed 19 mm and 18 mm, respectively, per running metre of length.

TABLE 2.4 (b)

REQUIRED LOADING CAPACITY OF YARD SLINGS AND TIES

Length	Required load of yard sling	Required load of tie
m	kN	kN
10	13.6	11.2
11	16.0	13.1
12	18.5	15.2
13	20.8	17.1
14	23.7	19.4
15	27.3	22.4
16	30.7	25.2
17	34.3	28.1
18	37.9	31.0
19	42.0	34.4
20	46.3	38.0
21	51.0	41.8
22	55.7	45.6
23	60.5	49.6
24	65.8	53.9
25	71.5	58.6
26	77.6	63.6
27	83.3	68.3
28	89.1	73.6
29	96.9	79.5
30	108.2	84.6

NOTE: The scantlings of these parts and of the sheave-holes shall be those specified in the Rules for loading and unloading arrangements and for other lifting appliances on board ships.

TABLE 2.4 (c)

MAIN DIMENSIONS OF TRUSSES

Diameter of yard d mm	a mm	b mm	c mm	e mm	f mm	g mm
200	750	40	56	20	40	95
250	850	45	60	24	45	105
300	1000	54	68	29	52	120
350	1100	58	72	32	56	130
400	1240	64	80	39	61	145
450	1330	68	86	43	65	155
500	1460	75	94	48	71	170
550	1550	80	100	52	74	180
600	1680	89	110	56	80	195

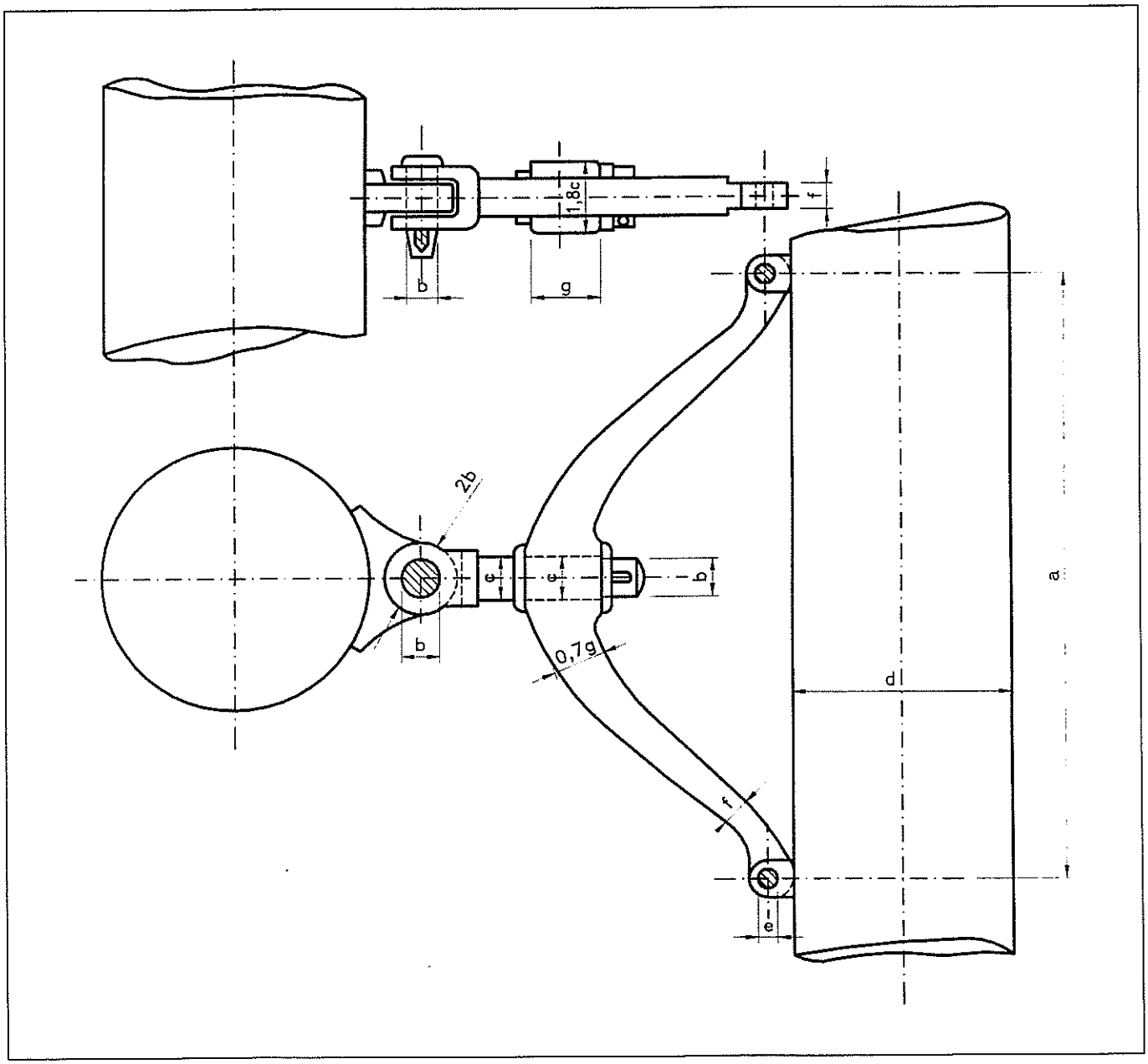


TABLE 2.5

BOWSPRITS

Length beyond bed	At heel		In bed		At ½ distance between bed and end of bowsprit		At end of bowsprit	
	Diameter	Thickness	Diameter	Thickness	Diameter	Thickness	Diameter	Thickness
m	mm	mm	mm	mm	mm	mm	mm	mm
8	280	9.0	350	8.0	310	8.0	150	6.0
9	330	9.0	410	10.0	370	10.0	170	7.0
10	380	10.0	470	11.0	420	10.0	190	7.0
11	440	11.0	530	11.0	480	10.0	210	8.0
12	490	11.0	590	11.0	530	11.0	230	9.0
13	530	12.0	650	12.5	570	12.0	260	10.0
14	570	12.5	700	12.5	620	12.0	280	10.0
15	610	13.0	750	14.0	660	14.0	300	10.0
16	660	14.0	800	14.0	700	14.0	320	10.0
17	700	15.0	850	15.0	750	14.0	340	12.0
18	740	15.0	900	15.0	800	15.0	360	12.0

NOTES:

[1] For bowsprit stays and shrouds see 2.4.

[2] The maximum diameter of bowsprits may be reduced by 10% if they are made of pitch-pine or Oregon pine, and by 5% if they are made of pine or larch.

TABLE 2.6 (sheet 1)

STANDING RIGGING OF MASTS WITH YARDS (FULL-RIGGED MASTS)

For foremasts of schooner brigs and barkentines, full-rigged masts of three-, four- and five- masted barks and for all masts of brigs and three-, four- and five-masted full-rigged ships	Length La of the mast from main deck to top edge of topmast crosstrees, in m									
	18 ≤ La < 19		19 ≤ La < 20		20 ≤ La < 21		21 ≤ La < 22		22 ≤ La < 23	
Beam of the ship at main deck in way of mast	<7,2	≥7,2	<7,8	≥7,8	<8,4	≥8,4	<9,0	≥9,0	<9,6	≥9,6
Minimum breaking strength of lower stays, lower shrouds, lower head shrouds, topmast stays, topmast backstays and topmast head backstays, in kN	311	257	371	311	435	371	504	435	504	504
Minimum breaking strength of top-gallant stays and top-gallant backstays, in kN	164	126	164	164	208	164	208	208	257	208
Minimum breaking strength of royal stays and royal backstays, in kN	126	126	126	126	164	126	164	164	208	164
Number of:										
Lower stays	2		2		2		2		2	
Lower shrouds	4		5		5		5		5	
Lower head shrouds									1	
Topmast stays	2		2		2		2		2	
Topmast backstays	2		2		2		2		2	
Topmast head backstays										
Top-gallant stays	1		1		1		1		1	
Top-gallant backstays	1		1		1		1		1	
Royal stays and backstays	1		1		1		1		1	
Bobstay 1) rod diameter, in mm	50		55		60		64		68	
Bobstay 2) bolt diameter, in mm	40		43		46		50		53	
Bobstay 3) chain diameter, in mm	28		30		32		34		36	
Bowsprit shrouds 1) chain diameter, in mm	17		18		19		20		21	
Bowsprit shrouds 2) number	1		1		1		1		1	

NOTE: Only 6x7 and 6x19 standard wire rope construction as specified in Table 3.2 may be used for standing rigging.
A nominal strength greater than 1570 N/mm^2 may not be used.
For square-rigged masts of four or five-masted ships the minimum breaking strength of the standing rigging may be reduced by 5% and 8%, respectively.
For full-rigged ships and barks, the length of masts, except for the aftermost mast, may be taken as the average of the individual mast lengths, and the beam at the main deck may be taken as the average of the deck breadths at the individual masts, provided that standing rigging of equal minimum breaking strength is used for these masts. When masts less than 24 m long carry double top-gallant yards, a topmast head backstay shall also be fitted to the topmast cap. If the angle made by the bobstay and bowsprit with the centre line of the bowsprit is less than 14°, the bobstay and bowsprit shrouds shall be strengthened accordingly.

TABLE 2.6 (sheet 2)

STANDING RIGGING OF MASTS WITH YARDS (FULL-RIGGED MASTS)

For foremasts of schooner brigs and barkentines, full-rigged masts of three-, four- and five- masted barks and for all masts of brigs and three-, four- and five-masted full-rigged ships	Length La of the mast from main deck to top edge of topmast crosstrees, in m									
	23 ≤ La < 24		24 ≤ La < 25		25 ≤ La < 26		26 ≤ La < 27		27 ≤ La < 28	
Beam of the ship at main deck in way of mast	<10,2	≥10,2	<10,8	≥10,8	<11,4	≥11,4	<11,9	≥11,9	<12,3	≥12,3
Minimum breaking strength of lower stays, lower shrouds, lower head shrouds, topmast stays, topmast backstays and topmast head backstays, in kN	658	504	658	658	833	658	833	833	833	833
Minimum breaking strength of top-gallant stays and top-gallant backstays, in kN	311	257	371	311	371	371	435	371	504	435
Minimum breaking strength of royal stays and royal backstays, in kN	208	208	257	208	257	257	311	257	371	311
Number of:										
Lower stays	2		2		2		2		2	
Lower shrouds	5		5		6		6		6	
Lower head shrouds	1		1		1		1		1	
Topmast stays	2		2		2		2		2	
Topmast backstays	2		2		2		3		3	
Topmast head backstays			1		1		1		1	
Top-gallant stays	1		1		1		1		1	
Top-gallant backstays	2		2		2		2		2	
Royal stays and backstays	1		1		1		1		1	
Bobstay 1) rod diameter, in mm	72		76		80		84		88	
Bobstay 2) bolt diameter, in mm	56		59		62		65		88	
Bobstay 3) chain diameter, in mm	38		40		42		44		46	
Bowsprit shrouds 1) chain diameter, in mm	22		22		23		24		25	
Bowsprit shrouds 2) number	1		1		2		2		2	

NOTE: See previous NOTE.

TABLE 2.6 (sheet 3)

STANDING RIGGING OF MASTS WITH YARDS (FULL-RIGGED MASTS)

For foremasts of schooner brigs and barkentines, full-rigged masts of three-, four- and five- masted barks and for all masts of brigs and three-, four- and five-masted full-rigged ships	Length La of the mast from main deck to top edge of topmast crosstrees, in m													
	28 ≤ La < 29		29 ≤ La < 30			30 ≤ La < 31			31 ≤ La < 32			32 ≤ La < 33		
Beam of the ship at main deck in way of mast	<12,7	≥12,7	<13,1	from 13,1 to 14,0	≥14,0	<13,5	from 13,5 to 14,3	≤14,3	<13,9	from 13,9 to 14,6	≤14,6	<14,3	from 14,3 to 15,0	≤15,0
Minimum breaking strength of lower stays, lower shrouds, lower head shrouds, topmast stays, topmast backstays and topmast head backstays, in kN	1029	833	1029	1029	833	1245	1029	1029	1245	1245	1029	1245	1245	1245
Minimum breaking strength of top-gallant stays and top-gallant backstays, in kN	504	504	658	658	504	658	658	658	833	833	658	833	833	833
Minimum breaking strength of royal stays and royal backstays, in kN	371	371	435	371	371	504	435	371	504	504	435	658	504	504
Number of:														
Lower stays	2		2			2			2			2		
Lower shrouds	6		6			6			6			6		
Lower head shrouds	1		1			2			2			2		
Topmast stays	2		2			2			2			2		
Topmast backstays	3		3			3			3			3		
Topmast head backstays	1		1			1			1			1		
Top-gallant stays	1		1			1			2			2		
Top-gallant backstays	2		2			2			2			2		
Royal stays and backstays	1		1			1			1			1		
Bobstay 1) rod diameter, in mm	92		96			100			103			105		
Bobstay 2) bolt diameter, in mm	71		74			76			78			80		
Bobstay 3) chain diameter, in mm	48		50			52			54			56		
Bowsprit shrouds 1) chain diameter, in mm	26		27			28			29			30		
Bowsprit shrouds 2) number	2		2			2			2			2		

NOTE: See previous NOTE.

FIGURE 2.1

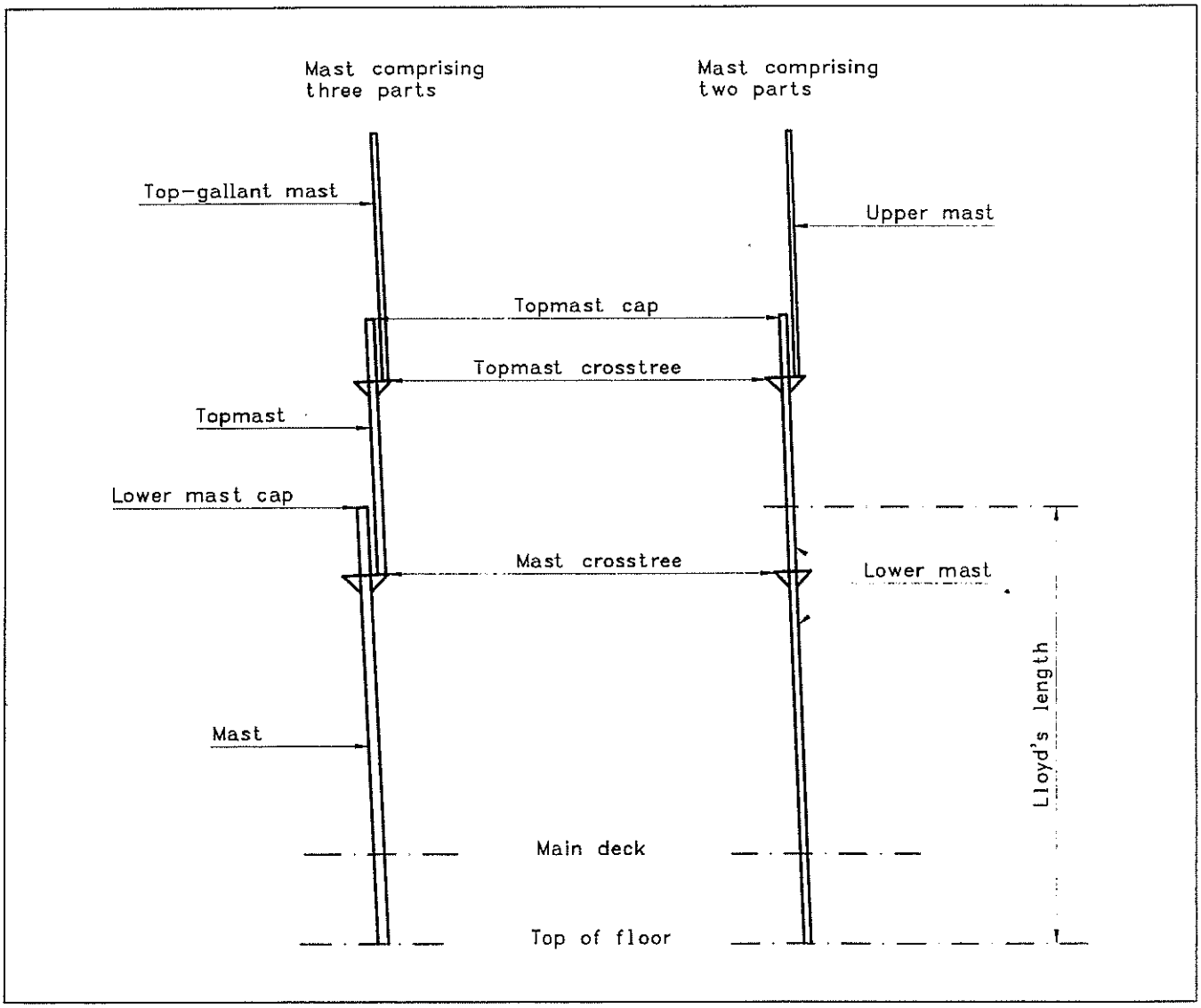

Mast comprising three parts
Mast comprising two parts
Top-gallant mast
Upper mast
Topmast cap
Topmast crosstree
Topmast
Lower mast cap
Mast crosstree
Lower mast
Mast
Lloyd's length
Main deck
Top of floor

FIGURE 2.2

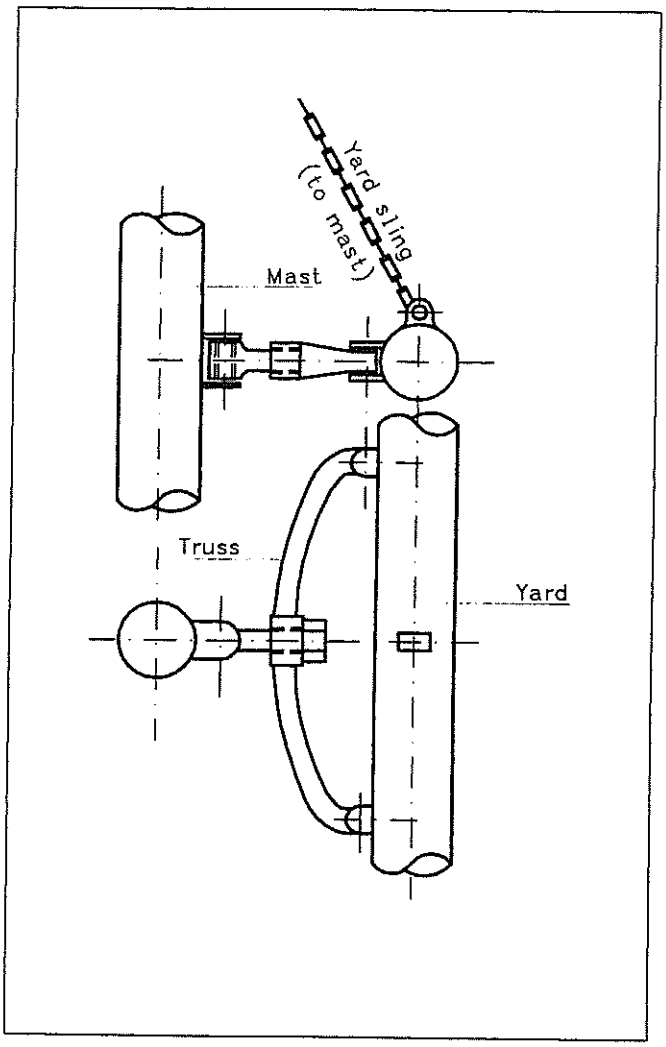
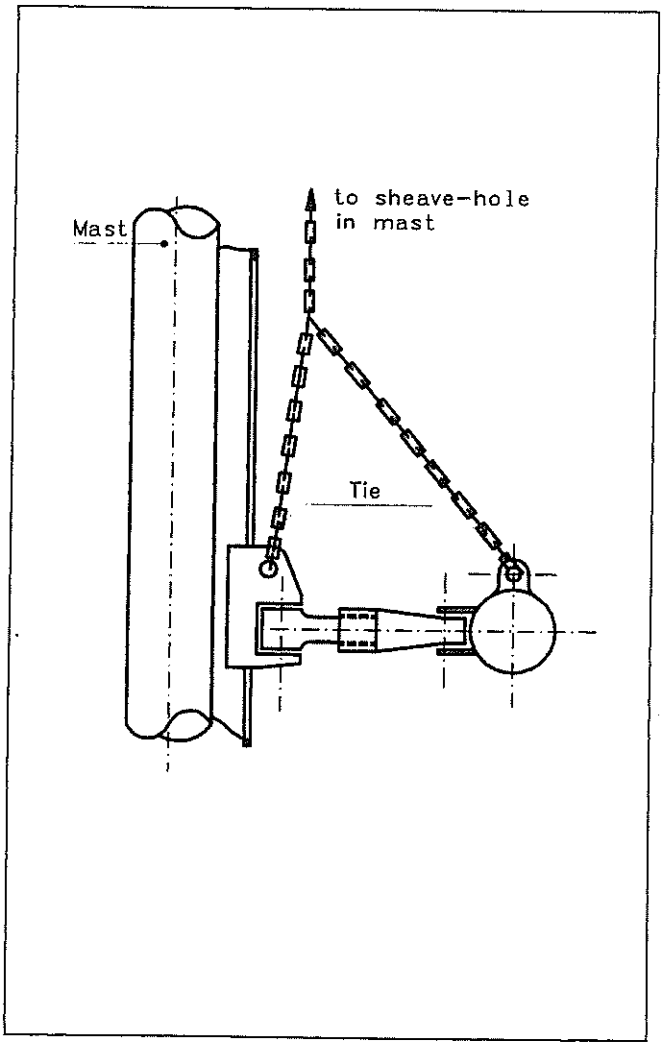


FIGURE 2.3



Chapter 3 - STANDING RIGGING

3.1 - STANDING RIGGING

3.1.1

The scantlings of standing rigging and its fastenings shall be those specified in Table 2.6 of Chapter 2 and in Tables 3.1 to 3.4.

For the square-rigged masts of four- and five-masted ship-rigged ships, the minimum breaking strength of the standing rigging may be reduced by 5% and 8%, respectively.

For ship-rigged vessels and barks, the length of the masts, except for the aftermost mast, may be taken as the average of the individual mast lengths, and the beam at the main deck may be taken as the average of the deck breadths at the individual masts, provided that standing rigging of equal minimum breaking strength is used for these masts.

Where masts less than 24 m long carry double top-gallant yards, a topmast head backstay shall also be fitted to the topmast cap.

If the angle made by the bobstay and bowsprit shrouds with the centre line of the bowsprit is less than 14°, the bobstay and bowsprit shrouds shall be strengthened accordingly (see Figure 1.8 in Chapter 1).

The scantlings of the turn buckles are shown in Table 3.4.

The scantlings of the other parts of the fastenings may be determined by reference to the current regulations for cargo gear.

3.2 - DESIGN REQUIREMENTS

3.2.1

Where shrouds are secured to the mast by shackles, a separate shackle and eye is required for each shroud.

Wherever possible, standing rigging shall be secured directly to the sluer strake.

Where sail - carrying stays (e.g. those fastened to the bowsprit) are led through fairlead sheaves, the diameters of the grooves in the fairlead sheaves are to be equal to at least 5 times the nominal diameter of the stay concerned.

Stays shall be arranged such that the forces are properly transmitted between the masts, also in fore-and-aft line of the ship.

Futtock shrouds may also be constructed in the form of round steel bars.

TABLE 3.1 (sheet 1)

STANDING RIGGING OF MASTS WITHOUT YARDS (FORE-AND-AFT RIGGED MASTS)

For the aftermost mast of three-, four- and five-masted barks, for the mainmast of barkentines, for the foremast and mainmast of three- and four-masted topsail schooners and for the foremast of schooners, including three-masted schooners	Length L_a of mast from main deck to top edge of crosstrees, in m											
	$L_a \geq 11$ $L_a < 12$	$L_a \geq 12$ $L_a < 13$	$L_a \geq 13$ $L_a < 14$	$L_a \geq 14$ $L_a < 15$	$L_a \geq 15$ $L_a < 16$	$L_a \geq 16$ $L_a < 17$	$L_a \geq 17$ $L_a < 18$	$L_a \geq 18$ $L_a < 19$	$L_a \geq 19$ $L_a < 20$	$L_a \geq 20$ $L_a < 21$	$L_a \geq 21$ $L_a < 22$	$L_a \geq 22$ $L_a < 23$
Minimum breaking strength of lower stays and lower shrouds, in kN	257	311	371	435	435	504	504	658	658	658	833	833
Minimum breaking strength of topmast stays and top-mast backstays, in kN	208	208	257	257	311	371	435	435	504	504	658	658
Minimum breaking strength of top-gallant stays and top-gallant backstays, in kN	126	126	165	165	165	208	208	257	257	311	371	371
Number of:												
Lower stays	2	2	2	2	2	2	2	2	2	2	2	2
Lower shrouds	4	4	4	4	4	4	4	5	5	5	5	5
Topmast stays	1	1	1	1	1	1	1	1	1	1	2	2
Topmast backstays	1	1	1	1	1	2	2	2	2	2	3	3
Top-gallant stays	1	1	1	1	1	1	1	1	1	1	1	1
Top-gallant backstays	1	1	1	1	1	1	1	1	1	2	2	2

NOTE: Only 6x7 and 6x19 standard wire rope constructions as specified in Table 3.2 may be used for standing rigging. A nominal strength greater than 1570 N/mm^2 may not be used.

TABLE 3.1 (sheet 2)

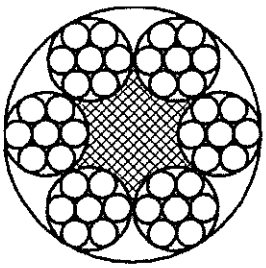
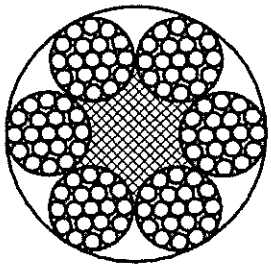
STANDING RIGGING OF MASTS WITHOUT YARDS (FORE AND-AFT RIGGED MASTS)

For the mainmast of schooners, including three-masted schooners, for the mizzen-mast of four-masted topsail schooners, the mizzen-mast of barkentines, three-masted schooners and topsail schooners, the jigger mast of four-masted topsail schooners, and for the masts of fore-and-aft schooners, luggers, tjalks and cutters	Length La of mast from main deck to top edge of crosstrees, in m											
	La ≥ 10 La < 11	La ≥ 11 La < 12	La ≥ 12 La < 13	La ≥ 13 La < 14	La ≥ 14 La < 15	La ≥ 15 La < 16	La ≥ 16 La < 17	La ≥ 17 La < 18	La ≥ 18 La < 19	La ≥ 19 La < 20	La ≥ 20 La < 21	La ≥ 21 La < 22
Minimum breaking strength of lower shrouds, in kN	257	311	311	371	435	504	504	658	658	833	833	833
Minimum breaking strength of lower shrouds, in kN	165	165	208	208	257	257	311	371	371	435	435	504
Minimum breaking strength of topmast stays and topmast backstays, in kN	126	126	165	165	165	208	208	257	257	311	371	371
Minimum breaking strength of top-gallant stays and top-gallant backstays, in kN	41	41	64	64	93	93	126	165	165	165	208	208
Number of: Topmast stays and top-gallant stays	1	1	1	1	1	1	1	1	1	1	1	1
Lower shrouds	3	3	3	3	3	3	4	4	4	4	4	4
Topmast backstays	1	1	1	1	1	1	1	1	2	2	2	2
Top-gallant backstays	1	1	1	1	1	1	1	1	1	1	1	1

NOTE: See previous NOTE.

TABLE 3.2

STANDING RIGGING - WIRE ROPES GALVANIZED

Nominal strength		1570 N/mm2	1570 N/mm2
		 Round strand wire rope 6x7 Constr. 6(6+1) + jute core	 Round strand wire rope standard 6x19 Constr. 6(12+6+1) +jute core
Nominal diameter of rope mm	Circumference mm	Nominal breaking strength kN	kN
8	25	33,4	30,9
10	32	52,2	48,2
12	38	75,1	69,5
14	44	102	94,6
16	51	134	124
18	57	169	156
20	64	209	193
22	70	252	234
24	76	300	278
26	83	353	326
28	89	409	378
32	102	534	494
36	114	676	625
40	127	835	722
44	140	-	934
48	152	-	1110
52	165	-	1300
56	176	-	1510

NOTE: The values shown in the table are applicable to ropes with a jute core. Where ropes of the same construction but with a steel wire core are used the nominal breaking strength may be increased by approximately 8%.

TABLE 3.3

ROUND EYES AND SOCKETS FOR TENSILE LOADS [1]

(Weldable material with a tensile strength of at least 410 N/mm2)

Nominal size	Permitted load [2]	b_1	b_2	b_3	d_2	d_3	r_1	r_2	t	Bolt		s_1	Fillet weld a
										d_1	thread		
	kN	mm	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm
1	10	16	19	8	18	17	17,5	5	23	16	M 12	6	4
1,6	16	20	23	11	22	21	22,5	5	28	20	M 16	6	4
2	20	22	26	12	24	23	25	6	31	22	M 20	6	4
2,5	25	25	29	13	26	25	27,5	6	34	24	M 20	8	5
3	31,5	28	32	14	30	28	30	6	36	27	M 22	8	5
4	40	30	35	15	33	31	32,5	6	39	30	M 24	8	5
5	50	35	39	18	39	37	37,5	8	46	36	M 27	10	6
6	63	40	45	20	42	40	42,5	8	51	39	M 30	10	6
8	80	45	49	23	48	46	47,5	8	56	45	M 36	12	7
10	100	50	58	26	52	50	55	8	63	48	M 39	14	7
12	125	55	64	28	56	54	60	10	70	52	M 42	14	8
16	160	60	70	30	66	62	65	10	75	60	M 48	16	8

NOTES:

[1] See Fig. 3.1.

[2] The permitted load of round eyes and sockets is found by applying the formula:

$$\text{Permitted load} = \frac{\text{Nominal breaking strength of ropes (Table 2.6 and Table 3.1)}}{10}$$

FIGURE 3.1

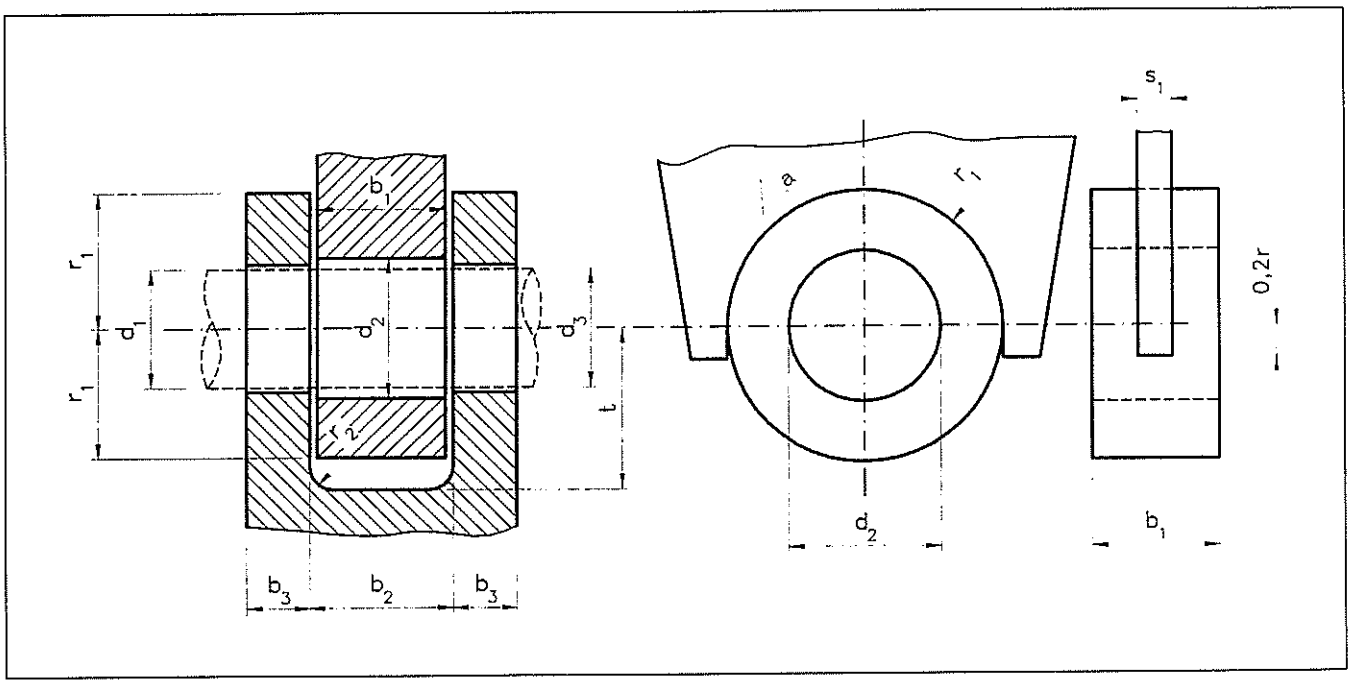


TABLE 3.4 (a)

TURNBUCKLES FOR THE STANDING RIGGING: SLEEVES [1]

(Material with a tensile strength of at least 360 N/mm2)

Nominal size	Permitted load [2] kN	d_2 x s mm x mm	d_3 mm	l_1 mm	Thread
1	10	31,8 x 4,5	25	220	M 18
1,6	16	38 x 5,6	30	240	M 22
2	20	42,4 x 5,6	33	260	M 24
2,5	25	44,5 x 6,3	37	280	M 27
3	31,5	51 x 6,3	41	300	M 30
4	40	57 x 8	46	320	M 33
5	50	63,5 x 8	50	340	M 36
6	63	70 x 8,8	57	380	M 42
8	80	76,1 x 10	63	420	M 45
10	100	88,9 x 10	72	460	M 52
12	125	88,9 x 11	78	500	M 56
16	160	108 x 12,5	90	540	M 65

NOTES:

[1] See Fig. 3.2.

[2] The permitted load of the turn buckles is found by applying the formula:

Permitted load = $\frac{\text{Nominal breaking strength of ropes}}{10}$

TABLE 3.4 (b)

TURNBUCKLES FOR THE STANDING RIGGING: SOCKET EYEBOLTS [1]

(Material with a tensile strength of at least 360 N/mm2)

Nominal size	Permitted load [2] kN	b_1 mm	b_2 mm	b_3 mm	Thread	d_3 mm	r_1 mm	Round nut d_5 mm	Round nut m mm	Fastening bolt diameter mm
1	10	10	19	8	M 18	17	17,5	27	15	16
2	20	13	26	12	M 24	23	25	36	18	22
2,5	25	14	29	13	M 27	25	27,5	40	20	24
3	31,5	17	32	14	M 30	28	30	45	22	27
4	40	18	35	15	M 33	31	32,5	50	25	30
5	50	22	39	18	M 36	37	37,5	55	28	36
6	63	24	45	20	M 42	40	42,5	65	32	39
8	80	28	49	23	M 45	46	47,5	70	35	45
10	100	31	58	26	M 52	50	55	80	40	48
12	125	34	64	28	M 56	54	60	85	44	52
16	160	36	70	30	M 64	62	65	95	50	60

NOTES:

[1] See Fig. 3.3.

[2] The permitted load of the turn buckles is found by applying the formula:

Permitted load = $\frac{\text{Nominal breaking strength of ropes}}{10}$

TABLE 3.4 (c)

TURNBUCKLES FOR THE STANDING RIGGING: ROUND EYEBOLTS [1]

(Material with a tensile strength of at least 360 N/mm2)

Nominal size	Permitted load [2] kN	b_1 mm	Thread	d_2 mm	d_3 mm	Round nut d_5 mm	Round nut m mm	Fastening bolt diameter mm
1	10	16	M 18	18	35	27	15	16
2	20	22	M 24	25	50	36	18	22
2,5	25	25	M 27	27	55	40	20	24
3	31,5	28	M 30	30	60	45	22	27
4	40	30	M 33	33	65	50	25	30
5	50	35	M 36	39	75	55	28	36
6	63	40	M 42	42	85	65	32	39
8	80	45	M 45	48	95	70	35	45
10	100	50	M 52	52	110	80	40	48
12	125	55	M 56	56	120	85	44	52
16	160	60	M 64	65	130	95	50	60

NOTES:

[1] See Fig. 3.4.

[2] The permitted load of the turn buckles is found by applying the formula:

Permitted load = $\frac{\text{Nominal breaking strength of ropes}}{10}$

FIGURE 3.2

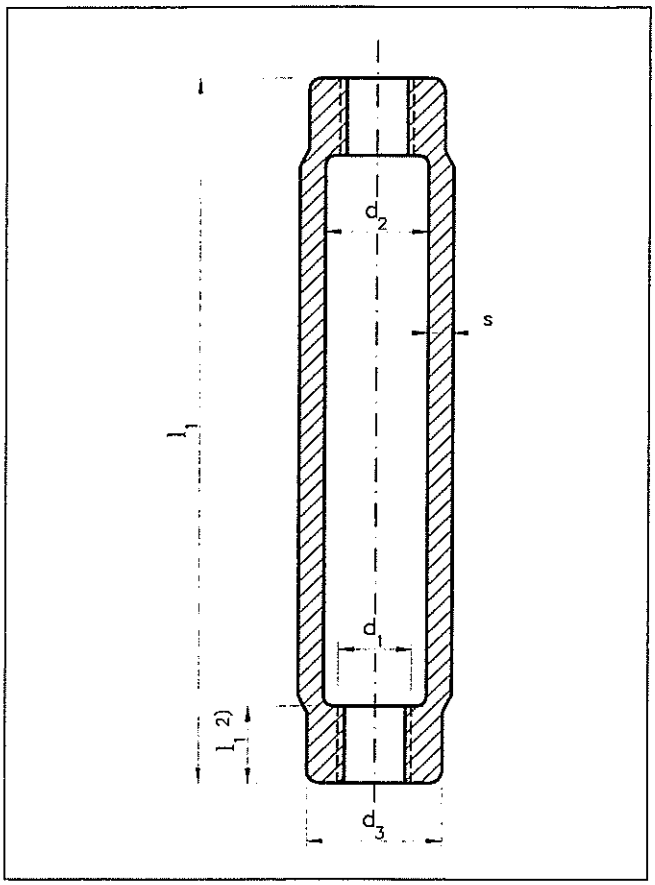


FIGURE 3.3

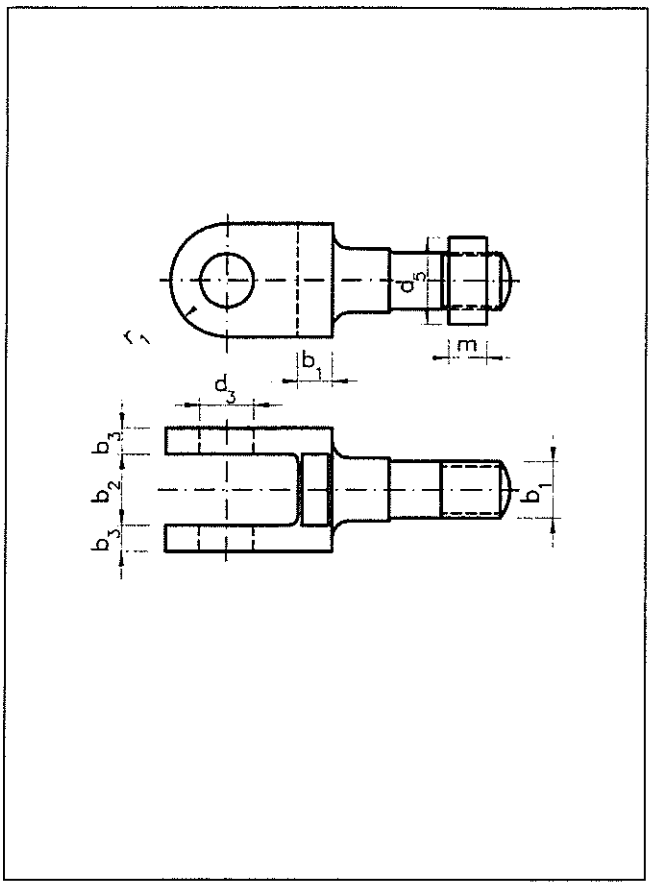
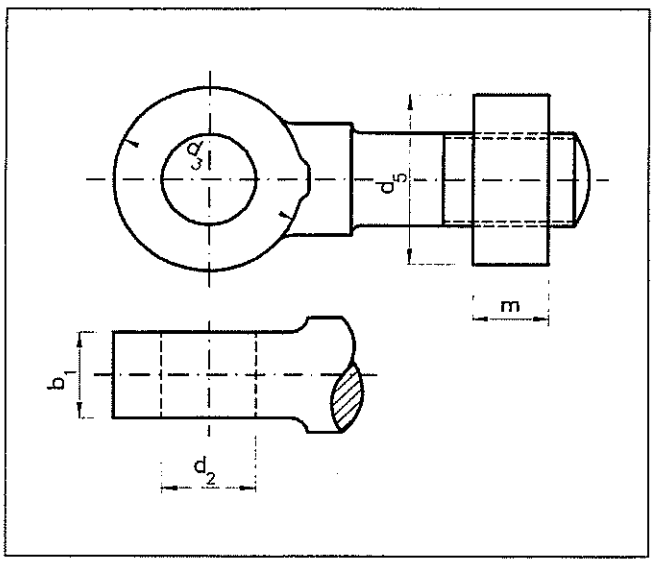


FIGURE 3.4



Chapter 4 - MISCELLANEOUS

4.1 - COMPONENTS

4.1.1 - Non-interchangeable components

Where not specified in the tables, the scantlings of these components shall be determined in accordance with the loads imposed by reference to the current Rules for loading and unloading arrangements and for other lifting appliances on board ships.

It is not necessary to test each component under load. The testing of randomly selected samples using the standard test loads (see regulations for cargo gear) is sufficient.

The extent of the tests shall be determined by the Surveyor. In each case, not less than 20% of all components should be tested.

4.1.2 - Interchangeable components

These components shall be dealt with in accordance with the current Rules mentioned in 4.1.1.

4.2 - RUNNING RIGGING

4.2.1

Only those parts of the running rigging to which forces are transmitted by the structural components covered by Chapters 2 and 3 form part of the classification.

Both fibre ropes (vegetable or chemical fibres) and steel wire ropes may be used for running rigging.

Running rigging shall be constructed to the satisfaction of the Surveyor.

4.3 - SPARE PARTS

4.3.1

In light of the fact that the provision of spare parts on board ship is connected with varied needs, a single list of spare parts may not be suitable for all requirements.

It is therefore left to the Owner's discretion to decide which spare parts are to be carried on board.

The Owner shall also take account of any relevant regulations issued by the Administration of the State whose flag the ship is entitled to fly.

Chapter 5 - SURVEY REGULATIONS

5.1 - GENERAL

5.1.1

The surveys of the masts and the sailing rigging are carried out during the first classification survey and, periodically, during ordinary surveys, intermediate surveys and special surveys, in accordance with Section A of the Rules.

5.2 - FIRST CLASSIFICATION SURVEY

5.2.1 - Ships built under the supervision of RINA

The survey consists of supervision during construction, in the course of which checks are carried out concerning in particular:
(a) compliance with approved plans, diagrams and specifications;
(b) compliance with testing documentation;
(c) workmanship and welding; non-destructive examinations;
(d) sea trials carried out in such wind condition as to test the whole sailing rigging;
(e) general check of sailing rigging both fixed and mobile, after sea trials.

5.2.2 - Ships not built under the supervision of RINA

The eligibility of the sailing rigging to be classed is evaluated on the basis of substantial compliance with the applicable requirements of these Rules taking into account the following:
(a) examination of documents relevant to both fixed and mobile sailing rigging, including certificates issued by the former Classification Society;
(b) a first classification survey carried out specially with an extent adeguate to each case;
(c) sea trials carried out in such wind condition as to test all sailing rigging.

Where appropriate within reasonable limits, a proven service record of satisfactory, performance during a period of adeguate length may be used as a criterion of equivalence.

5.3 - PERIODICAL SURVEYS

5.3.1 - Survey during the Ordinary and Intermediate Survey

The survey consists of a general check of the sailing rigging, in order to verify that it is in a satisfactory and efficient condition.

Checks and tests are performed to verify the absence of defects which might reduce the safety, the satisfactory conservation and the suitable maintenance of the rigging.

In general disassembly is not required unless there are visible signs of deterioration.

In addition to the masts and sailing rigging, both fixed and mobile, those parts of the hull involved in the fitting of shroud plates are also to be carefully checked.

5.3.2 - Survey during the Special Survey

Special Survey shall include examination and checks sufficiently extensive to ensure that the masts and the sailing rigging both fixed and mobile, are in such condition as to allow the new period of class to be assigned. To this end, a complete examination is performed of all the equipment and arrangements, with disassembly as required; in particular, the wedges of the masts are to be removed and renewed as necessary.

At the end of the checks a sea trial is to be carried out in such wind condition as to test, as far as possible, the whole sailing rigging.