# Correspondence Group on Safe Mooring Operations

**\*Consolidated comments following Round 3\***

**Revised 23rd August 2017**

**TOR 3, Draft annex to MSC.1/Circ.1175/Rev.1**

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**ANNEX 3**

**Draft annex to MSC.1/Circ.1175/Rev.1**

**SHIPBOARD EQUIPMENT, FITTINGS AND SUPPORTING HULL STRUCTURES**

**ASSOCIATED WITH TOWING AND MOORING**

Norway:

* Support ‘emergency towing’ throughout the document, in line with the title of SOLAS II/1Reg.3-4.
* Support ‘mooring winch’ throughout the document.

SIGTTO: We agree with the coordinator that this section would benefit from technical discussion in a working group. We just comment on a few items.

**1 Application**

1.1 Under regulation II-1/3-8 of the 1974 SOLAS Convention, as adopted by resolution **[**~~MSC.194(80) in 2005~~ ,**insert appropriate reference for the pending revision of II-1/3-8]***,* new displacement type ships, except high-speed craft and offshore units, shall be provided with arrangements, equipment and fittings of sufficient safe working load **[and mooring lines of sufficient working load limit]** to enable the safe conduct of all towing and mooring operations associated with the normal operations of the ship. The arrangements, equipment and fittings shall meet the appropriate requirements of the Administration or an organization recognized by the Administration.

Denmark: Remove first set of square brackets and remain the second ones (until we can agree on a common term throughout these annexes)

OCIMF: Remove sufficient Working Load Limit and change to ‘and mooring lines with the appropriate MBLSD’

Germany: Retain text in square brackets

SIGTTO: Remove ”sufficient working load limit” and replace with ”and mooring lines with the appropriate MBLSD.

Marshall Islands: Agree with removing both sets of square brackets. However, the text in the second set of square brackets should be changed to “and mooring lines with the appropriate minimum breaking load ship design” or “…MBLSD

Italy: Is of the opinion to remove the text “*sufficient Working Load Limit*” and change it to “*and mooring lines with the appropriate MBLSD*”

ICHCA: remove square brackets and change “sufficient working load limit” to “and mooring lines with the appropriate *MBLSD.*

Australia: Keep text inside square brackets.

IACS: To avoid confusion, the text in brackets “[and mooring lines of sufficient working load limit]” should not be included as this circular only covers shipboard equipment, fittings and supporting hull structures and not mooring lines.

US: We support updating the SOLAS reference, but don’t believe the additional reference to mooring lines is necessary (because mooring lines are understood to be shipboard equipment)

Coordinators remarks: Taking into account that this part of the circular, as pointed out by IACS and the US, (only) deals with shipboard equipment, fittings and supporting hull structures it would be sensible to remove all the text in the second set of square brackets. Being supported by several however it seems that this discussion of principles needs to be taken at SDC 5. This will be reflected in the report.

1.2 [MSC.1/Circ.1175/Rev.1 should apply to ships constructed on or after [date of entry into force]. To ships constructed on or after 1 January 2007 and before [date of entry into force], MSC.1/Circ.1175 should apply /***This circular was originally developed as guidance for compliance with SOLAS Regulation II‑1/3‑8 for normal mooring and towing operations in harbor and sheltered locations; it was intended for ships constructed on or after 1 Jan 2007. This revision (Rev.1) supersedes the original circular for ships constructed on or after [1 Jan 2024].****”*.

Denmark: Prefer the original text; “MSC.1/Circ.1175/Rev.1 should apply to………”

Germany: Prefers the original version.

Marshall Islands: We agree with removing the square brackets; we prefer the first alternative (normal type).

Australia: Support text in bold italic.

IACS: Agree to change but propose rewording as follows: “This circular was developed as guidance for compliance with SOLAS Regulation II-1/3-8 intended for ships constructed on or after 1 Jan 2007. This revision (Rev.1) supersedes the original circular for ships constructed on or after [1 Jan 2024].”.

US: We support the 2nd alternative text (because it provides important background information)

Coordinators remarks: There seems to be no concise preference. Accordingly the text in square brackets remains for further consideration at a later stage.

1.3 This circular is intended to provide standards for the design and construction of shipboard fittings and supporting hull structures associated with **[normal]** towing and mooring **[operations in harbors or sheltered waters]**, which Administrations are recommended to implement. **[*This circular also contains design guidance for fittings for ships that are further intended to be towed by another ship or tug in an emergency under more-exposed conditions. ~~The provisions of this guidance do~~ This circular does]***not require tow lines nor mandate standards for mooring lines onboard the ship. Furthermore, this guidance is not applicable to design and construction of shipboard fittings and supporting hull structures used for special towing services defined as:

Denmark: Remove the two first set of square brackets. Delete the text within the third set of square brackets, however use the text: “***This circular does…”***

Germany: Retain the text in the first and second sets of square brackets, delete the text (except the last three words) in the third set.

Marshall Islands: We agree with removing the remaining square brackets and the proposed text changes.

Japan: The definition of “tug in an emergency” is not clear. Japan proposes to replace it with “other towing/emergency towing” as defined in the paragraph 2.2.

Australia: Suggest delete the words “is intended to” and just say “This circular provides……..”. Do not support any text in the square brackets and suggest deletion of all texts inside all square brackets.

IACS: Agree to proposed changes but would delete “under more-exposed conditions” as it is not further specified for which conditions the tow line as recommended by IACS Recommendation 10 can be considered suitable. It is considered not suitable for ocean towing under sever environmental conditions. Also “e.g.” should be added before “in an emergency” so that the sentence is proposed to say: “This circular also contains design guidance for fittings of ships that are further intended to be towed by another ship or tug, e.g., in an emergency.”.

US: We support including all bracketed text (because it makes clear distinctions between the mandatory SOLAS provisions and discretionary emergency towing provisions)

Coordinators remarks: In general it seems supported to remove the square brackets. Also the clarification provided by Australia seems acceptable. As to the comment by IACS on deleting and clarifying the part on exposed conditions seems to “ease” the reading of this paragraph. This amendment also seems to accommodate the comments made by Japan.

.1 *Escort towing*: Towing service required in some estuaries to control the ship in case of failures of the propulsion or steering system. It should be referred to local escort requirements;

.2 *Canal transit towing*: Towing service for ships transiting canals, e.g. the Panama Canal. It should be referred to local canal transit requirements; and

.3 *Emergency towing for tankers*: Towing service to assist tankers in case of emergency. It should be referred to paragraph 1 of SOLAS regulation II-1/3-4.

1.4 Equipment that is used for both towing and mooring should be in accordance with sections 3 and 4.

**2 Definitions**

For the purpose of this guidance:

2.1 *Normal towing* means towing operations necessary for maneuvering in ports and sheltered waters associated with the normal operations of the ship.

2.2 **[***Other towing* means towing by another ship or a tug, e.g. such as to assist the ship in case of emergency as given in SOLAS Regulation II-1/3-4 Paragraph 2 for ships, not subject to SOLAS Regulation II-1/3-4 Paragraph 1, but intended to be fitted with equipment for other towing ***/“Emergency towing” means emergency towing by another ship or tug, using a high-strength tow line. (Note: SOLAS II-1/Reg 3-8 does not require vessels to be fitted or equipped for such towing)”*]**.

Denmark: Prefer the original text.

BIMCO: *2.2 “Emergency towing” means emergency towing by another ship or tug, using a high-strength tow line.* BIMCO supports the text

OCIMF: Suggests **Emergency Towing** to maintain consistency throughout the guideline and alignment with SOLAS.

Germany: Prefers the original wording.

Marshall Islands: We prefer the text in normal type but suggest “Other” be replaced with “Emergency” for consistency throughout the circular and SOLAS regulation II-1/3-4.

Note: We suggest “emergency towing” be used instead of “other towing” throughout the document.

Italy: Is of the opinion that, to maintain consistency throughout the guideline and SOLAS, to change the words “*Other towing”* in the *“Emergency Towing”.*

ICHCA: Use “emergency towing”

Japan: “Emergency towing” is confusing with “Emergency towing for tankers” in SOLAS II-1/3-4. Japan prefers to other towing.

Australia: Support text in italic bold.

IACS: It is not agreed to change “other towing” to “emergency towing” as “emergency towing” is just a possible application case. “Other towing” appliances may also be used for e.g. convey. Additional notes about the non-mandatory equipment for “other towing” are considered not necessary as this is already addressed in 1.3 and 3.1.

US: We support using *“emergency towing”* through-out the Circular (rather than *“other towing”*) because the definition of “other towing” seems to have excluded all other towing except emergency towing.

Coordinators remarks: There seems to be a slight preference for the original text. As to use the term “other towing” or “emergency towing” there seems to be a general support of the latter in this paragraph. Reading through the additional comments underneath, it is however obvious that a more overall decision on this subject needs to be taken at e.g. SDC 5. This will be reflected in the report and for the rest of the draft circular both alternatives will be kept in square brackets.

2.3 **[***Shipboard fittings* mean bollards and bitts, fairleads, pedestal rollers and chocks used for **[**~~normal~~**]** mooring of the ship and similar components used for normal or **[emergency towing/**other towing services**]**of the ship. Other components such as capstans, **[mooring]**winches, etc. are not covered by this guidance. Any weld, bolt or other fastening connecting the shipboard fitting to the supporting hull structure is part of the shipboard fitting and subject to any industry standard applicable to such fitting/ **Shipboard fittings mean bollards and bitts, fairleads, pedestal rollers and chocks used for mooring of the ship and similar components used for towing of the ship. Other components such as capstans, winches, etc. are not covered by this guidance.]**

Denmark: Prefer the original text.

BIMCO: Shipboard fittings mean bollards and bitts, fairleads, pedestal rollers and chocks used for [normal] mooring. Normal should be deleted

OCIMF: suggests the text that is not in bold; however, the sentence ‘Other components such as capstans, **[mooring]**winches, etc. are not covered by this guidance’ should be removed. The definition should simply read:

*Shipboard fittings* mean bollards and bitts, fairleads, pedestal rollers and chocks used for mooring of the ship and similar components used for normal or **emergency towing/**~~other towing~~ services of the ship. Any weld, bolt or other fastening connecting the shipboard fitting to the supporting hull structure is part of the shipboard fitting and subject to any industry standard applicable to such fitting.

Germany: Prefers the original wording.

SIGTTO: We suggest that in either option “other components such as capstans, [mooring] winches, etc. are not covered by this guidance” is confusing; capstans and mooring winches are included in the guidelines – but not in the definition of “shipboard fittings”. We’d prefer the original text with the proposed amendments and the deletion of “other components such as capstans, [mooring] winches, etc. are not covered by this guidance”

Marshall Islands: We agree with removing the square brackets and retaining the text in normal type.

Italy: Supports the comment made and the definition proposed by OCIMF.

ICHCA: Remove square brackets and delete bold text at end.

Australia: Support text in bold.

IACS: Agree to delete “[normal]” as proposed by Australia as there is no “other mooring”. Disagree to use term “emergency towing” instead of “other towing”. Disagree to delete the sentence that the means of attachment of a fitting to the ship structure are part of the fitting. There are provisions given in 3.4.3 and 4.3.4 that address the case that a fitting (and, thus, its attachment to the ship structure) is not selected from an industry standard.

US: The term *“normal”* should be retained, to help distinguish from the emergency towing provisions. The first sentence should end *“…for normal or emergency towing of the ship.”*

Coordinators remarks: The majority prefers the original wording. Further there seems to be a preference for deleting the part on other components. Taking into account that a number of the comments seems to contradict each other, the amended paragraph has been placed in square bracket for further consideration at e.g. SDC 5.

2.4 *Supporting hull structure* means that part of the ship structure on/in which the shipboard fitting is placed and which is directly submitted to the forces exerted on the shipboard fitting. The hull structure supporting capstans, **[mooring]**winches, etc. used for normal or **[emergency towing/**other towing**]** and mooring operations mentioned above should also be subject to this guidance.

Denmark: Prefer the original text.

OCIMF: Proposes to remove all square brackets.

Germany: Delete “mooring” and retain “other towing”. Consequently, we propose to use the term “other towing” in the entire draft.

SIGTTO: Remove brackets and retain text.

Marshall Islands: We agree with removing the square brackets; we prefer the use of “emergency towing.”

ICHCA: Delete square brackets.

Australia: Delete [mooring] and delete “emergency towing” in the second square brackets.

IACS: Disagree to use term “emergency towing” instead of “other towing”.

US: Use *“emergency towing”* instead of *“other towing”*

Coordinators remarks: There seems to be a preference for deleting “mooring”.

[~~2.5 Attachment means the welding which attaches a shipboard fitting to the supporting hull structure.~~]

Marshall Islands: Agree with deleting

IACS: Support deletion of this.

US: We support deleting this definition.

Coordinators remarks: Paragraph is deleted.

2.6 *Industry standard* means international or national standards which are recognized in the country where the ship is built, subject to the approval of the Administration.

**[2.7 Safe working load (SWL)” means the safe load limit of fixed or permanent fittings (e.g., bollards, bitts, rollers, chocks, etc) used for normal towing and mooring operations in harbors or similar sheltered waters, using normal mooring lines.]**

Denmark: Remove square brackets.

OCIMF: Remove square brackets; however, the SWL should also apply to Emergency Towing/Other Towing fittings and/or steel fitting ratings.

Germany: Retain the entire text as proposed.

Marshall Islands: Agree with removing square brackets. The text should be changed to include emergency towing in addition to normal towing.

Italy: Suggests to remove square brackets; however, Italy aligns its view to the comment expressed by OCIMF where is indicated that “the SWL should also apply to Emergency Towing/Other Towing fittings and/or steel fitting ratings”.

ICHCA: Delete square brackets.

Japan: As the paragraph 4.6 explains the concept of SWL, Japan proposes to delete the paragraph 2.7.

Australia: Agree.

IACS: Agree to include this definition here but propose modified wording: “Safe working load (SWL) means the load limit of shipboard fittings and their supporting hull structure used for mooring operations in harbors or sheltered waters, using mooring lines with minimum breaking strength similar to the SWL”. We should keep with “shipboard fittings” as defined above instead of using new terminology like “fixed or permanent fittings”. SWL is still considered for mooring only and not for “normal towing”, the latter was only proposed by U.S. The addition “…using normal mooring lines” is proposed to be replaced by “…using mooring lines with minimum breaking strength similar to the SWL”.

US: We support including these definitions.

Coordinators comments: In general the text seems to be supported. It is noted that some member of the CG wants to include “emergency-/other towing. As to modifying the text this may be taken onboard at a later stage.

**[2.8 Safe towing load (TOW)” means the safe load limit of towing fittings specifically intended for emergency towing by another ship or tug, using a high-strength tow line.]**

Denmark: Remove square brackets.

OCIMF: Remove square brackets and we suggest the inclusion of ‘high strength towline/**wire**’.

Germany: Retain the entire text as proposed.

Marshall Islands: Agree with removing square brackets. It is suggested that “or wire” be added after “tow line.”

Italy: suggests remove square brackets and inclusion indicated by OCIMF and highlighted in bolt “**wire**”

ICHCA: Delete square brackets.

Australia: Agree.

IACS: Agree to include this definition here but propose modified wording: “Safe towing load (TOW) means the load limit of shipboard fittings and their supporting hull structure used for normal or other towing operations”. TOW is still considered for normal and other towing, to limit it to other towing was only proposed by U.S.

US: We support including these definitions.

Coordinators comments: In general the text seems to be supported. Also the addition of “wires” seems supported. As to further modifying the text this may be taken onboard at a later stage.

**[2.9 Fleet angles means a “the angle of change in direction of a line at a fitting, e.g. a chock, fairlead or roller.]**

Denmark: Remove square brackets.

OCIMF: Remove square brackets.

Germany: Retain the entire text as proposed.

Marshall Islands: Agree with removing the square brackets

Italy: Suggests remove square brackets.

ICHCA: Delete square brackets.

Australia: Agree.

IACS: Agree to include this definition but propose to add it directly to 5.2.5.

US: We support including these definitions.

Coordinators comments: In general the text seems to be supported.

**3 Towing**

Marshall Islands:Agree with removing square brackets throughout this section. See prior comment regarding our preference for using “emergency towing.”

**3.1 Strength**

The strength of shipboard fittings used for normal towing operations[, their attachments] and their supporting hull structures should comply with the provisions of 3.2 to 3.6. Where a ship is equipped with shipboard fittings intended to be used for **[emergency towing/**other towing services**]**, the strength of these fittings and their supporting hull structures should **also** comply with these provisions.

Denmark: Remove square brackets.

BIMCO: The strength of shipboard… We support the Australian section.

ICHCA: Delete square brackets.

Australia: Retain [their attachments], delete “emergency towing” in the second square brackets.

IACS: As elements for attachment are defined as part of the fitting in 2.3 it is considered unnecessary to add “attachment”. Disagree to use term “emergency towing” instead of “other towing”. Agree to shift “also” in the second sentence.

US: Delete *“their attachments”* and *“other towing services”* Agree with *“also”*

Coordinators remarks: In general positions seems to be divided, for which reason the square brackets are maintained. There seems to be general support to include “also” in the last sentence.

**3.2 Arrangements**

Shipboard fittings for towing should be located on stiffeners and/or girders, which are part of the deck construction so as to facilitate efficient distribution of the towing load. Other equivalent arrangements may be accepted (for chocks in bulwarks, etc.) provided the strength is confirmed adequate for the intended service.

**3.3 Load considerations**

IACS:Disagree to use term “emergency towing” instead of “other towing”.

3.3.1 The minimum design load applied to supporting hull structures for shipboard fittings:

.1 for normal towing operations should be 1.25 times the intended maximum towing load (e.g. static bollard pull) as indicated on the towing and mooring arrangements plan;

.2 for **[emergency towing/**other towing services**]** service should be the minimum breaking strength of the tow line defined in Appendix A; and

Italy: Suggests remove square brackets.

ICHCA: Delete square brackets.

US: Use *“emergency towing”* text

OCIMF: Remove square brackets.

.3 for fittings intended to be used for, both, normal and **[emergency towing/**other towing**]**operations, should be the greater of the design loads according to (1) and (2).

BIMCO: Remove square brackets.

Italy: Suggests remove square brackets.

ICHCA: Delete square brackets.

US: Use *“emergency towing”* text

OCIMF: Remove square brackets.

3.3.2 The design load should be applied to fittings in all directions that may occur by taking into account the arrangement shown on the towing and mooring arrangements plan. Where the towing line takes a turn at a fitting the total design load applied to the fitting is equal to the resultant of the design loads acting on the line. However, in no case does the design load applied to the fitting need to be more than twice the design load on the line as specified in 3.3.1 (see figure below).



**3.4 Shipboard fittings**

3.4.1 Shipboard fittings may be selected from an industry standards accepted by the Administration and at least based on the following loads:

.1 For normal towing operations, the intended maximum towing load (e.g. static bollard pull) as indicated on the towing and mooring arrangements plan;

.2 for **[emergency towing/**other towing services**]**, the minimum breaking strength of the tow line according to Appendix A; and

ICHCA: Delete square brackets.

US: Use *“emergency towing”* text. Delete the bracketed text.

.3 for fittings intended to be used for, both, normal and **[emergency towing/**other towing**]** operations, the greater of the loads according to .1 and .2.

ICHCA: Delete square brackets.

IACS:Disagree to use term “emergency towing” instead of “other towing”.

 US: Use *“emergency towing”* text. Delete the bracketed text.

3.4.2 Towing bitts (double bollards) may be chosen for the towing line attached with eye splice if the industry standard distinguishes between different methods to attach the line, i.e. [~~at least one round turn followed by~~] figure-of-eight or eye splice attachment.

Denmark: Retain text in square brackets.

BIMCO: The deletion of text in [] is supported.

OCIMF: Remove square brackets.

Italy: Suggests remove square brackets.

IACS: Agree to the deletion of text in brackets. Industry standards typically do not define the figure-of-eight attachment method in such a way. To rely on a round turn taken before the line is belayed with figure-of-eight is not an option for the design of bitts.

Coordinators remarks: There seems to be no clear positon on the text in square brackets. Perhaps this may be further discussed at DSC 5.

3.4.3 When the shipboard fitting is not selected from an accepted industry standard, the strength of the fitting and of its attachment to the supporting hull structure should be in accordance with 3.3 and 3.5. [~~Towing bitts (double bollards) should at least resist the loads caused by the towing line attached with eye splice.~~]

BIMCO: Deletion is supported.

IACS: If 3.4.2 is kept, the last sentence in brackets should be also kept to specify a relevant assumption for load application. If 3.4.2 is deleted, also the sentence in brackets in 3.4.3 needs to be deleted.

Coordinators remarks: There seems to be no clear positon on the text in square brackets. Perhaps this may be further discussed at DSC 5.

**3.5 Supporting hull structure**

[~~3.5.1 The design load applied to supporting hull structures should be in accordance with 3.3.~~]

BIMCO: We support keeping the text

IACS: Propose to keep 3.5.1 and better delete “Under the design load conditions as specified in 3.3…” in 3.5.4.

US: Delete this sub-section totally & re-number the subsequent sub-sections (not necessary because 3.5.4 points to the design loads in 3.3)

Coordinators remarks: There seems to be no clear positon on the text in square brackets. Perhaps this may be further discussed at DSC 5.

3.5.2 The reinforcing members beneath shipboard fittings should be effectively arranged for any variation of direction (horizontally and vertically) of the towing forces acting upon the shipboard fittings. Proper alignment of fitting and supporting hull structure should be ensured.

US: Restore the original section title *“Arrangement”*

Coordinators remarks: No text in square brackets. Perhaps this may be further discussed at DSC 5.

3.5.3 The acting point of the towing force on shipboard fittings should be taken at the attachment point of a towing line or at a change in its direction. [For bollards and bitts the attachment point of the towing line should be taken not less than 4/5 of the tube height above the base (see figure below).]

[]

Design Load on Line

US: Restore the original section title “Acting point of towing force”. Include the bracketed text.

Coordinators remarks: Square brackets are removed. No text on section title in square brackets. Perhaps this may be further discussed at DSC 5.

3.5.4 Under the design load conditions as specified in 3.3 the allowable normal stress should be taken as 100% and the allowable shearing stress as 60% of the specified yield point for the material used. Normal stress is the sum of bending stress and axial stress with the corresponding shearing stress acting perpendicular to the normal stress. No stress concentration factors being taken into account.

US: Restore the original section title *“Allowable stress”.*

Coordinators remarks: No text on section title in square brackets. Perhaps this may be further discussed at DSC 5.

**3.6 Safe [working load(SWL) and safe] towing load (TOW)**

OCIMF**:** SWL should apply to normal mooring/towing and Emergency/Other Towing. SWL is a term that is used for fixed steel structures regardless of applicability.

Germany: Remove the square brackets.

Marshall Islands: We agree with OCIMF’s comments regarding SWL applying to emergency and other towing as well as mooring and normal towing.

Italy: Supports the comment made by OCIMF.

Australia: Heading – keep texts inside square brackets.

IACS:The intention of introducing “TOW” as marking for the safe towing load was to align UR A2 and MSC.1/Circ.1175/Rev.1 with ISO standards for fittings and to increase safety in mooring operations by making it clear which fittings are intended for which purpose, mooring, towing or both.

Furthermore, as per 3.4.2 bitts (double bollards) for towing may be chosen for eye-splice attachment of the towing line and, thus, need to be distinguishable from mooring fittings as the latter can be used with figure-of-eight attachment of the mooring line. Also, different safety factors used for mooring and towing require different markings for mooring and towing. The beforementioned features would need to be removed if only SWL should be used for mooring and towing operations.

OCIMF, in revising their MEG publication, also intends to align with IACS UR A2 (the mother document of MSC.1/Circ.1175) and ISO standards with regard to the use of TOW as marking for towing fittings.

Coordinators remarks: In general, the text in square brackets seems to be supported.

[~~3.6.1 The safe towing load (TOW) is the load limit for towing purpose.~~]

IACS: Agree to delete 3.6.1 as definition was added to Section 2.

Coordinators remarks: Text is deleted.

3.6.2 **[The SWL/**TOW] used for normal towing operations should not exceed 80% of the design load as given in 3.3.1 (1) and TOW used for **[emergency towing/**other towing**]**operations should not exceed 80% of the design load as given in 3.3.1 (2). **[The SWL for normal mooring operations is given in 4.6.2.]** For fittings used for, both, normal and other towing operations, the greater of the safe towing loads should be used.

Germany: Prefers the original text.

ICHCA: Delete square brackets.

Japan: Proposes to delete “/TOW”. Japan proposes to replace “4.6.2” with “4.6.”

IACS: Disagree to use term “emergency towing” instead of “other towing”. Disagree to use SWL for “normal towing”. Disagree to add the sentence on brackets.

Coordinators remarks: There seems to be no clear positon on the text in square brackets. Perhaps this may be further discussed at DSC 5.

[~~3.6.3 For fittings intended to be used for, both, towing and mooring, 4 applies to mooring.~~]

IACS: Disagree to delete 3.6.3.

Coordinators remarks: Text in square brackets is maintained in square brackets.

[3.6.4 **[The safe working load SWL, in tonnes/** TOW, in t, of each shipboard fitting**]** should be marked (by weld bead or equivalent) on **[each shipboard fitting/**the deck fittings] used for **[normal harbor towing and mooring operations, and TOW should be similarly marked on fittings specifically intended for emergency towing. Only one safe working load should be marked on any fitting, based on the highest design load for the fitting or hull structure.**/towing. For fittings intended to be used for, both, towing and mooring, SWL, in t, according to 4.6 should be marked in addition to TOW.]

OCIMF: Remove square brackets

Italy: Suggests remove square brackets.

ICHCA: Delete square brackets.

Japan: Proposes to delete “/TOW”.

IACS: Disagree to use term “emergency towing” instead of “other towing”. Disagree to use SWL for “normal towing”. Disagree to use only one safe working load marking on dual purpose fittings.

Coordinators remarks: In general the text seems to be supported. At this stage the text on “TOW” (, other/emergency towing) and the question on single/double marking is kept in square brackets.

3.6.5 The above provisions on TOW apply for the use with no more than one line. [If not otherwise chosen, for towing bitts (double bollards) TOW is the load limit for a towing line attached with eye-splice.]

BIMCO: We support the text in square brackets.

Coordinators remarks: Square brackets are removed.

3.6.6 The towing and mooring arrangements plan described in section 5 should define the method of use of towing lines.

**4 Mooring**

**4.1 Strength**

The strength of shipboard fittings used for mooring operations[, their attachments] and supporting hull structures as well as the strength of supporting hull structures of **[mooring]** winches and capstans should comply with the provisions of 4.2 to 4.6.

ICHCA: Delete square brackets.

Australia: Suggest rewrite for simplicity: “*The strength of shipboard fittings, winches and capstans used for mooring operations, including their supporting hull structures and attachments should comply with the provisions of 4.2 to 4.6”.*

IACS: As elements for attachment are defined as part of the fitting in 2.3 it is considered unnecessary to add “attachment”.

US: Delete *“their attachments”*

Coordinators remarks: There seems to be no clear positon on the text in square brackets “their attachments”. Perhaps this may be further discussed at DSC 5. As to the other text in square brackets “mooring” the comments beneath by Australia is noted, that mooring is contained in the heading, it therefore seems appropriate to delete this text.

**4.2 Arrangements**

Shipboard fittings, **[mooring]** winches, and capstans for mooring should be located on stiffeners and/or girders, which are part of the deck construction so as to facilitate efficient distribution of the mooring load. Other equivalent arrangements may be accepted (for chocks in bulwarks, etc.) provided the strength is confirmed adequate for the service.

OCIMF: Remove square brackets

Germany: Delete “mooring”.

Marshall Islands: Agree with removing the square brackets.

Italy: Suggests remove square brackets.

ICHCA: Delete square brackets.

Australia: Delete [mooring], no need as Mooring is the heading. Also suggest replacing the words “so as to” with “and” for enhancement.

Coordinators remarks: There seems to be no clear positon on the text in square brackets. Noting however the comment by Australia, that mooring is contained in the heading, it seems appropriate to delete the text in square brackets.

**4.3 Load considerations**

[4.3.1 The minimum design load applied to supporting hull structures:]

Australia: Chapeaux – retain.

IACS: This sentence should not be deleted but modified to prevent confusion as indicated by U.S.: “The minimum design load applied to supporting hull structures of”

US: Delete this sub-section totally & re-number the subsequent sub-sections (because 4.3 also pertains to fittings, not just hull structures)

OCIMF: Remove square brackets

Marshall Islands: Agree with removing the square brackets.

Italy: Suggests remove square brackets.

ICHCA: Delete square brackets.

Coordinators remarks: In general deleting the square brackets seems to be supported. Also the small clarification proposed by IACS, which seem to accommodate the comment by US (in this and the following sub-paragraphs), has been included.

.1 for shipboard fittings should be 1.15 times the minimum breaking strength of the mooring line provided in accordance with Appendix A;

 US: Can be re-numbered as 4.3.1, and re-written as: *“The design load applied to shipboard fittings should be 1.15 times the minimum breaking strength of the mooring line provided in accordance with Appendix A.”*

 Coordinators remarks: No square brackets in 4.3.1.1. Perhaps this may be further discussed at DSC 5.

.2 for **[mooring]** winches should be 1.25 times the intended maximum brake holding load, where the maximum brake holding load should be assumed not less than 80% of the minimum breaking strength of the mooring line according to Appendix A; and

Australia: Delete [mooring], no need as Mooring is the heading 4.

US: Can be re-numbered as 4.3.2, and the opening sentence re-written to begin: *“The design load applied to supporting hull structures for mooring winches…”*

Coordinators remarks: Text in square bracket is removed.

.3 for capstans, 1.25 times the maximum hauling-in force.

IACS: Corresponding to the above modification proposal, delete “for” in the beginning of 4.3.1, 4.3.2, 4.3.3.

US: Can be re-numbered as 4.3.3, and the opening sentence re-written to begin: *“The design load applied to supporting hull structures for capstans…”*

Coordinators remarks: .1 - .3 has been clarified as proposed by IACS.

4.3.2 The design load should be applied to fittings in all directions that may occur by taking into account the arrangement shown on the towing and mooring arrangements plan. Where the mooring line takes a turn at a fitting the total design load applied to the fitting is equal to the resultant of the design loads acting on the line. However, in no case does the design load need to be more than twice the design load on the line as specified in 4.3.1 (see figure in 3.3).

US: Can be re-numbered as 4.3.4.

**4.4 Shipboard fittings**

Marshall Islands: Agree with removing the square brackets.

4.4.1 Shipboard fittings may be selected from an industry standards accepted**[**[[1]](#footnote-1)**]** by the Administration and at least based on the minimum breaking strength of the mooring line according to Appendix A.

Norway: Delete footnote to an industry standard acc. to IACS comment.

IACS: It is considered not useful to further specify industry standards in a footnote as there are different standards available (e.g. ISO, JIS, DIN etc.) and the Administration should be responsible for the acceptance of a standard. Furthermore, standards may become outdated or be replaced by others like in the recent past happened for ISO standards.

US: The square-bracketed footnote is not necessary & can be deleted.

Coordinators remarks: Footnote is deleted.

[4.4.2 Mooring bitts (double bollards) should be chosen for the mooring line attached in figure-of-eight fashion if the industry standard distinguishes between different methods to attach the line, i.e. figure-of-eight or eye splice attachment./All shipboard fitting’s (eg: bollards, bitts, fairleads, etc) should be chosen for the mooring line designed to be utilized with them. This means the SWL of the fitting should be equal to or greater than the breaking force of the mooring line./**If mooring lines are utilized having a strength significantly above the minimum breaking strength according to Appendix A, this increased minimum breaking strength should be considered./ This means the strength of the fitting should be equal to or greater than the breaking force of the mooring line.]”**

BIMCO: We agree that this should be discussed in the WG

OCIMF: Remove square brackets; however, the bold text should not be included. ‘/**If mooring lines are utilized having a strength significantly above the minimum breaking strength according to Appendix A, this increased minimum breaking strength should be considered./ This means the strength of the fitting should be equal to or greater than the breaking force of the mooring line.]”** ’Mooring lines stronger than designed should not be utilized on a vessel. This may result in steel structures failing prior to mooring lines causing significant damage and injuries.

Germany: In subparagraph .2, Germany prefers the second proposal (“All shipboard fittings […]”)

Marshall Islands: We prefer the text in normal type and the text in bold type should be deleted. As noted by OCMIF the use of mooring lines stronger than the fittings is an inherently dangerous situation and should not be permitted.

Italy: Suggests remove square brackets; moreover is of the view that the comment made by OCIMF on this paragraph shall be taking into account.

ICHCA: Delete square brackets and delete bold text as ships should not use mooring lines with greater SWL than ship was designed for.

IACS: The first option of the bold text in brackets is preferred, but is better placed in 4.4.1 and would then need to be also placed in 4.3.1.1, 4.3.1.2 and 4.6.2. The first sentence needs to be kept to specify the right attachment method of the mooring line.

Coordinators remarks: It seems that the square brackets can be removed. Also the majority of the CG prefer to delete text in bold.

4.4.3 When the shipboard fitting is not selected from an accepted industry standard, the strength of the fittings and of its attachment to the supporting hull structure should be in accordance with 4.3 and 4.5. Mooring bitts (double bollards) should resist the loads caused by the mooring line attached in figure-of-eight fashion.

**4.5 Supporting hull structure**

**[**~~4.5.1 The design load applied to supporting hull structures should be in accordance with 4.3.~~**]**

IACS: Propose to keep 4.5.1 and better delete “Under the design load conditions as specified in 4.3…” in 4.5.4.

US: Delete this sub-section totally & re-number the subsequent sub-sections (because this is addressed in 4.5.4)

Coordinators remarks: There seems to be no clear positon on the text in square brackets. Perhaps this may be further discussed at DSC 5.

4.5.2 Arrangement of reinforcing members beneath shipboard fittings, **[mooring]** winches and capstans should consider any variation of direction (horizontally and vertically) of the mooring forces acting upon the shipboard fittings. Proper alignment of fitting and supporting hull structure should be ensured.

OCIMF: Remove square brackets.

Italy: Suggests remove square brackets.

ICHCA: Delete square brackets.

Australia: Delete [mooring], no need as Mooring is the heading 4

US: Can be re-numbered as 4.5.1. Also, restore original section title of *“Arrangement”*

Coordinators remarks: There seems to be no clear positon on the text in square brackets. Noting however the comment by Australia, that mooring is contained in the heading, it seems appropriate to delete the text in square brackets.

No square brackets on section title. Perhaps this may be further discussed at DSC 5.

4.5.3 The acting point of the mooring force on shipboard fittings should be taken at the attachment point of a mooring line or at a change in its direction. [For bollards and bitts the attachment point of the mooring line should be taken not less than 4/5 of the tube height above the base, see a) in figure below. However, if fins are fitted to the bollard tubes to keep the mooring line as low as possible, the attachment point of the mooring line may be taken at the location of the fins, see b) in figure below.]

OCIMF: Remove square brackets

Italy: Suggests remove square brackets.

ICHCA: Delete square brackets.

Australia: Agree to retain text inside square brackets.

US: Can be re-numbered as 4.5.2. Also, restore original section title of *“Acting point of mooring force”*

Coordinators remarks: There seems to be no clear position on the text in square brackets. No square brackets on section title. Perhaps this may be further discussed at DSC 5.

[]

4.5.4 Under the design load conditions as specified in 4.3 the allowable normal stress should be taken as 100% and the allowable shearing stress as 60% of the specified yield point for the material used. Normal stress is the sum of bending stress and axial stress with the corresponding shearing stress acting perpendicular to the normal stress. No stress concentration factors being taken into account.

US: Can be re-numbered as 4.5.3. Also, restore original section title of *“Allowable stress”*

**[4.6 Safe working load (SWL)**

OCIMF:Please see previous comment about SWL, SWL should apply to the steel structures regardless of service.

Italy: Aligns the view with comment made by OCIMF.

ICHCA: Delete square brackets.

Australia: Agree.

Coordinators remarks: As Coordinator understands the comments, square brackets can be removed.

4.6.1 The Safe Working Load (SWL) is the load limit **[**for fixed or permanent equipment/ ***of******fittings and hull supporting structures]*** for mooring purpose [(e.g. bollards, bitts, rollers, chocks, etc.)**]**.

Germany: In subparagraph .1, Germany prefers “for fixed permanent equipment” and supports the insertion of examples.

Marshall Islands: SWL should apply to all steel structures and fittings, not just those used for mooring; the text should be adjusted.

Australia: Agree.

IACS: 4.6.1 can be deleted here if definition of SWL is included in Section 2.

Coordinators remarks: As noted by IACS, 4.6.1 seems superfluous compared with de corresponding definition in 2.7 above. Accordingly the entire paragraph has been put in square brackets for further consideration at e.g. SDC 5.

**[**4.6.2 The SWL should not exceed the [line design break force/minimum breaking strength] of the mooring line according to Appendix A.]

OCIMF: Line Design Break Force should be removed and the MBLSD should be applied

Marshall Islands: Minimum breaking load ship design (or MBLSD) should be used instead of either line design break force or minimum breaking strength.

Italy: As indicated by OCIMF, Italy is of the view that “*Line Design Break Force*” should be removed and the “MBLSD” should be indicated.

ICHCA: Replace “line design break force” with MBLSD.

Japan: Regarding the square bracket of 4.6.2 "[line design break force/minimum breaking strength]", line design break force is not preferable.

Inconsistencies may occur in other requirements, since the new concept such as "line design break force" has not been considered under development of IACS UR A2.

Australia: Agree.

IACS: Strongly recommend to stick with the term “minimum breaking strength as all IACS documents use this term. For design purpose, this is sufficient. This document is not the place where it should be detailed that the SWL is not a load limit for the mooring line as OCIMF pointed out. We agree to the OCIMF comment but a WLL for mooring lines should better specified in the separate guidelines for mooring operations; this circular deals only with the fittings and their substructures.

Coordinators remarks: MBLSD is not defined in these guidelines for which reason it seems questionable to use this reference. Also IACS points out that this term is not part of the IACS parent document (IACS Unified Requirement (UR) A and IACS Recommendation 10). This will be reflected in our report. At this stage it therefore seems appropriate to keep text in square brackets for further consideration during e.g. SDC 5.

4.6.3 The SWL, in t, of each shipboard fitting should be marked (by weld bead or equivalent) on the deck fittings used for mooring. For fittings intended to be used for, both, mooring and towing, TOW, in t, according to 3.6 should be marked in addition to SWL.**[The safe working load SWL, in tonnes, should be marked (by weld bead or equivalent) on each shipboard fitting used for normal harbor towing and mooring operations, and TOW should be similarly marked on fittings specifically intended for emergency towing. Only one safe working load should be marked on any fitting, based on the highest design load for the fitting or hull structure.]**

OCIMF:Remove square brackets

Germany: Prefers the original wording.

Marshall Islands: Agree with removing the square brackets.

Italy: Suggests remove square brackets.

ICHCA: Remove square brackets.

Japan: Consider that the concept of marked SWL in additional sentence proposed by US are different from the concept of IACS one.

US states that marked SWL should be based on the highest design load for fittings or hull structure.

IACS states that marked SWL should be minimum breaking load of mooring rope which are a load for determining design load for fitting or hull structure.

Japan understands that SWL in IACS UR A2 does not necessarily mean the strength of each mooring equipment.

From this point of view, it had better to query IACS about their concept of SWL marking, and it should be clarified in these Guidelines.

Australia: Agree to text in bold.

IACS: Disagree to use only one safe working load marking on dual purpose fittings; first option is preferred. Dual use fittings may be fitted and as described in our comment to 3.6 different markings make sense as long as different safety factors are used for mooring and towing and towing bitts may be chosen for eye-splice attachment of the towing line which usually allows for higher loads than figure-of-eight attachment.

US: Support the bracketed text (this is consistent with our comment in 3.6.2 above)

Coordinators remarks: There seems to be no clear position on the text in square brackets. The entire paragraph is kept in square brackets. Perhaps this may be further discussed at DSC 5.

4.6.4 The above provisions on SWL apply for the use with no more than one mooring line.

Japan: Considers that it is necessary to add the provisions on how to mark the value of SWL when more than one mooring line are used.

Coordinators remarks: No square brackets. Perhaps this may be further discussed at DSC 5.

4.6.5 The towing and mooring arrangements plan described in section 5 should define the method of use of mooring lines.

**5 Towing and mooring arrangements plan**

ICS: Agree to include any definitions included in Section 5 in Section 2 only.

ICHCA: Agree with deletion and remove square brackets throughout section.

5.1 The SWL **[**~~and TOW~~**]** for the intended use for each shipboard fitting should be noted in the towing and mooring arrangements plan available on board for the guidance of the Master. It should be noted that TOW is the load limit for towing purpose and SWL that for mooring purpose. **[**If not otherwise chosen, for towing bitts it should be noted that TOW is the load limit for a towing line attached [***with eye-splice***]**]**.

Germany: Delete “and TOW” and retain the text in the second set of square brackets.

Marshall Islands: Agree with removing the square brackets.

Australia: Retain [and TOW] and texts inside other two square brackets.

IACS: “TOW” cannot deleted as used as marking for towing fittings.

According to 3.4.2 bitts (double bollards) for towing may be chosen for eye-splice attachment of the towing line. For this case, it is mentioned here that “TOW is the load limit for a towing line attached with eye-splice.” If bitts are chosen for figure-of-eight attachment of the line, the bitts may be used with either of the attachment methods. Thus, as long as there is the option to choose towing bitts for eye-splice attachment of the towing line only, “[with eye-splice]” needs to be retained.

US: The first sentence should begin *“The SWL or TOW for the intended*

Coordinators remarks: In general there seems support to maintain “and TOW” and removing the other square brackets.

5.2 Information provided on the plan should include in respect of each shipboard fitting:

.1 location on the ship;

.2 fitting type;

.3 SWL / TOW;

.4 purpose (**[**mooring/harbour towing/other towing**/normal harbour towing & mooring operations, or emergency towing]**);

OCIMF: Suggests ‘Normal harbor towing & mooring operations, and emergency towing’

Marshall Islands: We agree with removing the square brackets and prefer the text in bold type

ICS: Agree with the US’s alternative text for paragraph 5.2.4.

Italy: Is of the view that the text should be changed in the “*normal harbor towing & mooring operations, and emergency towing*” as suggested by OCIMF.

IACS: Prefer first option as pointed out in previous comments.

 US: Use the second proposed clause *“(normal harbor towing & mooring operations, or emergency towing)”*

Coordinators remarks: The second option seems to be preferred.

.5 method of applying load of towing or mooring line including limiting fleet angles.

IACS: Propose to add the definition of “fleet angles” here as only used here: “method of applying load of towing or mooring line including limiting fleet angles, where fleet angle means the angle of change in direction of a line at a shipboard fitting.”.

Coordinators remarks: No square brackets to be considered. Perhaps proposal may be considered at DSC 5.

[5.3 Furthermore, information provided on the plan is to include**/Information provided on the plan should include in respect of each mooring line]**:

*OCIMF: suggests ‘Furthermore, information provided on the plan is to include’*

Germany: Here further discussion seems necessary. If these paragraphs relate to fixed mooring lines for normal mooring operations only, it could be acceptable.

Marshall Islands: We agree with removing the square brackets and prefer the text in normal type.

ICHCA: Suggest “Furthermore, information provided on the plan should include”.

Australia: Support text in bold in the chapeaux.

US: Include all the expanded lists in 5.3.1 thru 5.3.3.2

Coordinators remarks: The preferred option seems to be the one in “normal text”.

.1 **[**the arrangement of mooring lines showing number of lines (N***)/ Type of material (fiber, wire rope, etc…)*]**;

OCIMF: Remove square brackets and retain all information.

Marshall Islands: Agree with removing the square brackets. We feel that the words in normal and bold type should be retained so that it would read: “the arrangement of mooring lines showing number of lines (N) and type of material (fiber, wire rope, etc.);”

Italy: Suggests remove square brackets and keep all information.

Australia: Agree to keep all texts inside all square brackets from 5.3.1 – 5.3.6.

Coordinators remarks: It seems that the square brackets can be removed at text retained.

.2 **[**the minimum breaking strength of each mooring line (MBL**)/ Configuration (e.g., plain ends, eye splices, etc)]**;

OCIMF:Remove square brackets and retain all information; however, should include the MBLSD

Marshall Islands:Agree with removing the square brackets and retaining the text in bold type.

Italy: Suggests remove square brackets and include also the MBLSD.

ICHCA: (MBL) should be MBLSD.

Australia: Agree to keep all texts inside all square brackets from 5.3.1 – 5.3.6.

Coordinators remarks: It seems that there is a general support to remove the square as well as to add MBLSD. Taking however into account that the safety levels of mooring lines are still unsettled, it seems appropriate to keep this paragraph in square brackets.

***[.3 Length]***

OCIMF: Remove square brackets

Marshall Islands: Agree with removing the square brackets

Italy: suggests remove square brackets.

Australia: Agree to keep all texts inside all square brackets from 5.3.1 – 5.3.6.

Coordinators remarks: It seems that the square brackets can be removed at text retained.

***[.4 Breaking strength]***

OCIMF: should read ‘MBLSD’

Marshall Islands: Agree with removing the square brackets but the text should read “minimum breaking load”

ICHCA: (MBL) should be MBLSD.

Japan: Proposes to delete 5.3.4 as the paragraphs 5.3.2 and 5.3.4 mean the same.

Australia: Agree to keep all texts inside all square brackets from 5.3.1 – 5.3.6.

Coordinators remarks: It seems that preferences are divided and perhaps a bit unclear. Text are maintained in square brackets.

***[.5 Elongation & snap-back characteristics]***

Marshall Islands: Agree with removing the square brackets but the text should read “Elongation and snap-back characteristics of the mooring line and, if fitted, tails”

Note: A lesson learned from the mooring line accident that occurred on board ZARGA was that the ship’s crew did not account for the snap back due to the polyester tails that were fitted on the UHMPE fibre mooring lines.

Italy: suggests remove square brackets.

Australia: Agree to keep all texts inside all square brackets from 5.3.1 – 5.3.6.

OCIMF: Delete/Remove square brackets.

Coordinators remarks: It seems that preferences are divided and perhaps a bit unclear. Perhaps this may be further discussed at a later stage.

***[.6 [Other relevant information]”]***

OCIMF: Is okay to leave, but a discussion would be necessary on examples or what would be captured under ‘other relevant information’

Marshall Islands: suggest that the square brackets be retained so that potential examples can be discussed in the WG at SDC 5 in order to determine if it should be in the final draft.

Italy: Is of the view that the text “other relevant information” is too vague. It is necessary to specify which kind of information should be considered under this paragraph.

ICHCA: What would constitute “other relevant info”.

Australia: Agree to keep all texts inside all square brackets from 5.3.1 – 5.3.6.

Coordinators remarks: It seems that the square brackets should maintained and further discussed at a later stage.

[.2bis the line design break force of each mooring line and the Working Load Limit (WLL);]

OCIMF: can delete what’s included in these square brackets as the core information will be captured in 5.3.2 ‘*MBLSD*’ when MBLSD is added. The WLL (Working Load Limit) and LDBF (Line Design Break Force) is worked from MBLSD.

Marshall Islands: This paragraph can be deleted since both design break force and working load limit are derived from the minimum breaking load, which is captured in paragraph 5.3.4.

Italy: supports the comment made by OCIMF.

ICHCA: Delete.

Australia: Do not support.

IACS: This circular deals only with the fittings and their substructures. The purpose of the mooring and towing arrangement plan should be to inform on the fittings and its load limits. The associated mooring lines are given here for reference. Detailed information on mooring lines like WLL should better be stated in the separate guidelines for mooring operations or the mooring manual.

Coordinators remarks: It seems that this text is not supported.

.3 the acceptable environmental conditions as given in Appendix A, A.3 for the recommended minimum breaking strength of mooring lines for ships with Equipment Number EN > 2000:

.1 30 second mean wind speed from any direction (vW or vW\* according to A.3.1.3 or A.3.2.2, respectively); and

.2 Maximum current speed acting on bow or stern (±10°)]

[~~5.4 The information as given in 5.2 and 5.3 is to be incorporated into the pilot card in order to provide the pilot with proper information on harbour and~~ **~~[emergency towing/~~**~~other towing services~~**~~]~~**~~operations.~~]

**[5.4 Information provided on the plan should include the design environment (weather conditions) for the mooring line arrangements [(normal mooring, and “heavy wind” mooring)], similar to the parameters in Appendix A:**

 **.1 Wind speed & direction**

**.2 Current speed & direction Configuration (e.g., plain ends, eye splices, etc)]**

OCIMF: Remove square brackets, information on plan should include to what environmental condition was the mooring arrangement design for. Eg: IACS or OCIMF or other. Existing examples such as ‘heavy wind’ is not quantifiable.

Further, OCIMF would prefer to see the text amended as noted with the underlined text. **Information provided on the plan should include the standard environmental design criteria** **for the mooring line…’**

Germany: Here further discussion seems necessary. If these paragraphs relate to fixed mooring lines for normal mooring operations only, it could be acceptable.

Marshall Islands: Noting that environmental conditions are addressed in paragraph 5.3.3 (the unchanged text following paragraph 5.2bis), we agree with comments previously provided by France, IACS and ICS that 5.4 can be deleted. We do note the comments provided by ICS and others regarding the need to define “heavy wind” in Appendix A.

ICS: Agree with France and IACS that paragraph 5.4 can be deleted.

Do not agree with the US regarding the “heavy wind” amendment to paragraph 5.4. The line configuration which may be necessary to keep a ship safely alongside in strong winds or exceptional tidal streams will largely involve a “doubling up” of existing lines or putting to sea, rather than using an alternative mooring plan. It is therefore unclear what value an additional plan would bring. It might also be necessary to determine some kind of “heavy wind” factor to be applied to the EN which could be problematic without defining “heavy wind”.

Italy: Aligns its view with the comment made by OCIMF.

ICHCA: Remove square brackets, remove “heavy wind” as “wind speed” is included anyway.

Australia: Support text in bold (second option).

IACS: This is disagreed as there is currently no basis for distinguishing “normal mooring” and “heavy wind mooring”. By IACS, there is only one design condition provided for severe wind conditions but not for extreme winds, strong currents or additional waves. The latter cases need to be individually covered if considered appropriate.

US: As a minimum, we believe that this section should detail the environmental characteristics used in developing the “normal” mooring arrangements.

Coordinators remarks: It seems that the “bold” option is the preferred one. As to the content, positions seem to be quite fragmented. At this stage the square brackets are maintained.

**APPENDIX A**

**MOORING AND TOW LINES**

**A.1 General**

A.1.1 The mooring lines for ships with Equipment Number EN of less than or equal to 2000 are given in A.2. For other ships the mooring lines are given in A.3.

A.1.2 The tow lines are given in A.2.

A.1.3 The Equipment Number EN should be calculated in compliance with Appendix B. Deck cargo as given by the loading manual should be included for the determination of side-projected area A.

**A.2** **Mooring lines for ships with EN ≤ 2000 and tow lines**

A.2.1 The minimum recommended mooring lines for ships having an Equipment Number EN of less than or equal to 2000 are given in Table A.1.

A.2.2 For ships having the ratio A/EN > 0.9 the following number of lines should be added to the number of mooring lines as given by Table A.1:

One line where 0.9 <  ≤ 1.1,

two lines where 1.1 <  ≤ 1.2,

three lines where 1.2 < .

A.2.3 The tow lines are given in Table A.1 and are intended as own tow line of a ship to be

towed by a tug or other ship.

**Table A.1 Mooring and tow lines for ships with EN ≤ 2000**

|  |  |  |
| --- | --- | --- |
| **EQUIPMENT NUMBER** | **MOORING LINES** | **TOW LINE\*** |
| **Exceeding** | **Not exceeding** | **No. of mooring lines** | **Minimum breaking strength (kN)** | **Minimum breaking strength (kN)** |
| ***1*** | ***2*** | ***3*** | ***4*** | ***5*** |
| 50 | 70 | 3 | 37 | 98 |
| 70 | 90 | 3 | 40 | 98 |
| 90 | 110 | 3 | 42 | 98 |
| 110 | 130 | 3 | 48 | 98 |
| 130 | 150 | 3 | 53 | 98 |
| 150 | 175 | 3 | 59 | 98 |
| 175 | 205 | 3 | 64 | 112 |
| 205 | 240 | 4 | 69 | 129 |
| 240 | 280 | 4 | 75 | 150 |
| 280 | 320 | 4 | 80 | 174 |
| 320 | 360 | 4 | 85 | 207 |
| 360 | 400 | 4 | 96 | 224 |
| 400 | 450 | 4 | 107 | 250 |
| 450 | 500 | 4 | 117 | 277 |
| 500 | 550 | 4 | 134 | 306 |
| 550 | 600 | 4 | 143 | 338 |
| 600 | 660 | 4 | 160 | 370 |
| 660 | 720 | 4 | 171 | 406 |
| 720 | 780 | 4 | 187 | 441 |
| 780 | 840 | 4 | 202 | 479 |
| 840 | 910 | 4 | 218 | 518 |
| 910 | 980 | 4 | 235 | 559 |
| 980 | 1060 | 4 | 250 | 603 |
| 1060 | 1140 | 4 | 272 | 647 |
| 1140 | 1220 | 4 | 293 | 691 |
| 1220 | 1300 | 4 | 309 | 738 |
| 1300 | 1390 | 4 | 336 | 786 |
| 1390 | 1480 | 4 | 352 | 836 |
| 1480 | 1570 | 5 | 352 | 888 |
| 1570 | 1670 | 5 | 362 | 941 |
| 1670 | 1790 | 5 | 384 | 1024 |
| 1790 | 1930 | 5 | 411 | 1109 |
| 1930 | 2080 | 5\*\* | 437\*\* | 1168 |
| 2080 | 2230 | \*\* | \*\* | 1259 |
| 2230 | 2380 | \*\* | \*\* | 1356 |
| 2380 | 2530 | \*\* | \*\* | 1453 |
| 2530 | - | \*\* | \*\* | 1471 |

\* Information is provided in relation to 3.3.1 and provision onboard of such a line is not necessary under this guidance.

\*\* For ships with EN > 2000 see A.3.

Japan: Proposes to delete the third line (1,2,3,4,5).

Coordinators remarks: Unclear what should be deleted. Perhaps this may be further discussed at DSC 5.

US: Although this table nominally applies only for Equipment Numbers ≤ 2000, it includes tow line breaking strength for ENs up to 2530. We note that the row for EN 1930 to 2080 straddles the 2000 break-point, resulting in awkward values across the row:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1790 | 1930 | 5 | 411 | 1109 |
| 1930 | 2080 | 5\*\* | 437\*\* | 1168 |
| 2080 | 2230 | \*\* | \*\* | 1259 |

 *\*\*For ships with EN>2000 see A.3*

 We suggest a clean break by splitting the row at 2000:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1790 | 1930 | 5 | 411 | 1109 |
| 1930 | 2000 | 5 | 437 | 1168 |
| 2001 | 2080 | \*\* | \*\* | 1168 |
| 2080 | 2230 | \*\* | \*\* | 1259 |

 *\*\*For ships with EN>2000 see A.3*

Coordinators remarks: No text in square brackets. Suggest that this issue is further considered during e.g. SDC 5.

**A.3** **Mooring lines for ships with EN > 2000**

**A.3.1 General**

A.3.1.1 Breast lines provide the maximum transverse restraint and spring lines the maximum longitudinal restraint against vessel movement in athwart and in fore-aft direction, respectively. Head and stern lines are much less effective for these purposes. The applied mooring layout should follow these principles, as far as possible with respect to the port facilities and as far as reasonable with respect to the vertical line angles.

IACS: Propose to put the above paragraph at the end of A.3.1.1.

Coordinators remarks: As a matter of structure, it seems sensible to move the text as proposed by IACS.

The following is defined with respect to the purpose of mooring lines, see also figure below:

.1 Breast line: A mooring line that is deployed perpendicular to the ship, restraining the ship in the off-berth direction.

.2 Spring line: A mooring line that is deployed almost parallel to the ship, restraining the ship in fore or aft direction.

.3 Head/Stern line: A mooring line that is oriented between longitudinal and transverse direction, restraining the ship in the off-berth and in fore or aft direction. The amount of restraint in fore or aft and off-berth direction depends on the line angle relative to these directions.

Breast line

Stern line

Spring lines

Head line

Breast line

IACS: Propose to add here and delete above: “Breast lines provide the maximum transverse restraint and spring lines the maximum longitudinal restraint against vessel movement in athwart and in fore-aft direction, respectively. Head and stern lines are much less effective for these purposes. The applied mooring layout should follow these principles, as far as possible with respect to the port facilities and as far as reasonable with respect to the vertical line angles.”

Coordinators remarks: Text from A.3.1.1 has been has been moved to here.

A.3.1.2 The strength of mooring lines and the number of head, stern, and breast lines for ships with an Equipment Number EN > 2000 are based on the side-projected area A1. Side projected area A1 should be calculated similar to the side-projected area A according to Appendix B but considering the following conditions:

.1 For oil tankers, chemical tankers, bulk carriers, and ore carriers the lightest ballast draft should be considered for the calculation of the side-projected area A1. For other ships the lightest draft of usual loading conditions should be considered if the ratio of the freeboard in the lightest draft and the full load condition is equal to or above two. Usual loading conditions mean loading conditions as given by the trim and stability booklet that are to be expected to regularly occur during operation and, in particular, excluding light weight conditions, propeller inspection conditions, etc.

.2 Wind shielding of the pier can be considered for the calculation of the side-projected area A1 unless the ship is intended to be regularly moored to jetty type piers. A height of the pier surface of 3 m over waterline may be assumed, i.e. the lower part of the side-projected area with a height of 3 m above the waterline for the considered loading condition may be disregarded for the calculation of the side-projected area A1.

.3 Deck cargo as given by the loading manual should be included for the determination of side-projected area A1. Deck cargo may not need to be considered if a usual light draft condition without cargo on deck generates a larger side-projected area A1 than the full load condition with cargo on deck. The larger of both side-projected areas should be chosen as side-projected area A1.

A.3.1.3 The mooring lines as given here under are based on a maximum current speed of 1.0 m/s and the following maximum wind speed vw, in m/s:

vw = 25.0 - 0.002 (A1 – 2000) for passenger ships, ferries, and car carriers with 2000 m2 < A1 ≤ 4000 m2

 = 21.0 for passenger ships, ferries, and car carriers with A1 > 4000 m2

 = 25.0 for other ships

A.3.1.4 The wind speed is considered representative of a 30 second mean speed from any direction and at a height of 10 m above the ground. The current speed is considered representative of the maximum current speed acting on bow or stern (±10°) and at a depth of one-half of the mean draft. Furthermore, it is considered that ships are moored to solid piers that provide shielding against cross current.

A.3.1.5 Additional loads caused by, e.g., higher wind or current speeds, cross currents, additional wave loads, or reduced shielding from non-solid piers may need to be particularly considered. Furthermore, it should be observed that unbeneficial mooring layouts can considerably increase the loads on single mooring lines.

**A.3.2 Minimum breaking strength**

A.3.2.1 The minimum breaking strength, in kN, of the mooring lines should be taken as:

MBL = 0.1 · A1 + 350

A.3.2.2 The minimum breaking strength may be limited to 1275 kN (130 t). However, in this case the moorings are to be considered as not sufficient for environmental conditions given by A.3.1.3. For these ships, the acceptable wind speed vw\*, in m/s, can be estimated as follows:

$$v\_{w}^{\*}=v\_{w}∙\sqrt{\frac{MBL^{\*}}{MBL}}$$

where vw is the wind speed as per A3.1.3, MBL\* the breaking strength of the mooring lines intended to be supplied and MBL the breaking strength as recommended according to the above formula. However, the minimum breaking strength should not be taken less than corresponding to an acceptable wind speed of 21 m/s:

$$MBL^{\*} \geq \left(\frac{21}{v\_{w}}\right)^{2}∙MBL$$

A.3.2.3 If lines are intended to be supplied for an acceptable wind speed vw\* higher than vw as per A3.1.3, the minimum breaking strength should be taken as:

$$MBL^{\*} =\left(\frac{v\_{w}^{\*}}{v\_{w}}\right)^{2}∙MBL$$

**A.3.3 Number of mooring lines**

A.3.3.1 The total number of head, stern and breast lines should be taken as:

n = 8.3·10-4 · A1 + 6

A.3.3.2 For oil tankers, chemical tankers, bulk carriers, and ore carriers the total number of head, stern and breast lines should be taken as:

n = 8.3·10-4 · A1 + 4

A.3.3.3 The total number of head, stern and breast lines should be rounded to the nearest whole number.

A.3.3.4 The number of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the strength of the lines. The adjusted strength, MBL\*, should be taken as:

MBL\* = 1.2 · MBL · n/n\* ≤ MBL for increased number of lines,

MBL\* = MBL · n/n\* for reduced number of lines

where n\* is the increased or decreased total number of head, stern and breast lines and in the number of lines for the considered ship type as calculated by the above formulas without rounding.

A.3.3.5 Vice versa, the strength of head, stern and breast lines may be increased or decreased in conjunction with an adjustment to the number of lines.

A.3.3.6 The total number of spring lines should be taken not less than:

Two lines where EN < 5000,

four lines where EN ≥ 5000.

A.3.3.7 The strength of spring lines should be the same as that of the head, stern and breast lines. If the number of head, stern and breast lines is increased in conjunction with an adjustment to the strength of the lines, the number of spring lines should be likewise increased, but rounded up to the nearest even number.

**APPENDIX B**

**EQUIPMENT NUMBER**

The equipment number (EN) should be calculated as follows:

$$EN=∆^{^{2}/\_{3}}+2.0hB+\frac{A}{10}$$

where:

= moulded displacement, in t, to the Summer Load Waterline

B = moulded breadth, in m

h = effective height, in m, from the Summer Load Waterline to the top of the uppermost house; for the lowest tier ‘h’ should be measured at centreline from the upper deck or from a notional deck line where there is local discontinuity in the upper deck, see figure below for an example

h = a + hi

a = distance, in m, from the Summer Load Waterline amidships to the upper deck

hi = height, in m, on the centreline of each tier of houses having a breadth greater than B/4

A = side-projected area, in m2, of the hull, superstructures and houses above the Summer Load Waterline which are within the equipment length of the ship and also have a breadth greater than B/4.

Summer Load waterline

a

h1

h2

h3

Notional deck line

Upper deck

***NOTES:***

*1 When calculating h, sheer and trim should be ignored, i.e. h is the sum of freeboard amidships plus the height (at centreline) of each tier of houses having a breadth greater than B/4.*

*2 If a house having a breadth greater than B/4 is above a house with a breadth of B/4 or less, then the wide house should be included but the narrow house ignored.*

*3 Screens or bulwarks 1.5 m or more in height should be regarded as parts of houses when determining h and A. The height of the hatch coamings and that of any deck cargo, such as containers, may be disregarded when determining h and A. With regard to determining A, when a bulwark is more than 1.5 m high, the area shown below as A2 should be included in A.*

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*4 The equipment length of the ships is the length between perpendiculars but should not be less than 96% nor greater than 97% of the extreme length on the Summer Waterline (measured from the forward end of the waterline).*

1. Include a corresponding footnote [↑](#footnote-ref-1)