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| SUB-COMMITTEE ON SHIP DESIGN AND CONSTRUCTION5th sessionAgenda item 10 | SDC 5/10/Add.1DateOriginal: ENGLISH  |

**REVISED SOLAS REGULATION II-1/3-8 AND
ASSOCIATED GUIDELINES (MSC.1/CIRC.1175) AND
NEW GUIDELINES FOR SAFE MOORING OPERATIONS FOR ALL SHIPS**

**Report of the Correspondence Group on Safe Mooring Operations**

**- Part 2 TORs .5 and .6 and others issues -**

**Submitted by Denmark and Japan**

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| **SUMMARY** |
| **Executive summary:** | This document provides the report of the Correspondence Group on Safe Mooring Operations, part 2, regarding TORs .5 and .6, and other issues. |
| **Strategic direction:** | 5.2 |
| **High-level action:** | 5.2.1 |
| **Planned output:** | 5.2.1.1 |
| **Action to be taken:** | Paragraph 44 |
| **Related documents:** | MSC 97/19/2, MSC 97/22, SDC 4/11, SDC 4/11/1, SDC 4/11/2, SDC 4/11/3, SDC 4/INF.3, SDC 4/16 and SDC 5/10 |

Blue texts are the notes by the coordinator, which will be deleted in the final report of the CG.

**GENERAL**

1 Terms of reference, participants and the outline of the work of the CG are set out in part 1 of the CG report, i.e. SDC 5/10.

**DRAFT SEPARATE GUIDELINES ON SAFE MOORING OPERATIONS (TOR .5)**

**Scope of the separate guidelines**

2 In the first round, the coordinator prepared the draft separate guidelines referring to onboard safety management system. In this regard, ICS did not support to refer to onboard safety management system in the guidelines and proposed to include the guidelines in “List of Codes, Recommendations, Guidelines and other Safety- and Security-Related Non-Mandatory Instruments”, i.e. MSC.1/Circ.1371.

3 In the second round, the proposal by ICS was supported. Namely, the group agreed to include the separate guidelines in MSC.1/Circ.1371, instead of referring to onboard safety management system in the guidelines.

4 In the first round, the United States suggested the draft separate guidelines be focused on mooring lines and renamed as “Guidelines for In-Service Maintenance and Inspection of Mooring Lines”, pointing out that the guidelines were a mix of mooring operations (training, pre-mooring inspections, mooring procedures, etc.) and mooring line considerations.

5 In the second round, the proposal focusing on mooring lines was supported by four participants and not supported by three participants. The proposal on renaming was supported, in general, by six participants and not supported by two participants.

6 The results of the discussion can be summarized that the slight majority of those who expressed their views considered that:

.1 the separate guidelines should focus on mooring lines; and;

.2 the name of the separate guidelines should be reviewed.

7 The group noted the necessity of continuation of discussion at the working group at SDC 5. In this regard, OCIMF made the following comments in the second and the third rounds:

.1 There needs to be a large focus on the mooring lines which includes the terminology for safe use. Such terms as Minimum Breaking Load, Working Load Limit, Normal Working Load, etc. have introduced confusion without a consistent and industry recognized definition. This confusion and poor understanding on what MBL means has led to line failures. From the outset of the MEG 4 activities, a requirement has been identified for new strength terminology that can be consistently applied to the critical load levels of a mooring line and related values. The philosophy used in MEG 3, of defining mooring line and fitting loads as a percentage of the line MBL (‘MBLSD’ in MEG 4), will be continued but will be supported by a revised set of definitions, and the new MEG 4 line test regime. With a joint effort of OCIMF, Eurocord, Cordage Institute, and INTERTANKO, the following terminology will be utilized in MEG 4 to ensure a clear and consistent link between tested and rated line performance, operational loads and calculated safety margins:

* Ship Design Minimum Breaking Load (MBLSD);
* Working Load Limit (WLL); and
* Line Design Break Force (LDBF)

; and

.2 We request to continue discussions at next SDC WG regarding this item.

The selection of mooring lines should take into account the following conditions:

.1 the mooring restraint requirements as per IACS UR A2 or Industry Guidance;

.2 the diameter of mooring fittings with respect to the mooring line diameters (D/d ratio) in order to reduce the potential for bend loss of strength;

.3 the compatibility of the MBLSD of mooring lines and the brake capacity of the mooring winches installed on board;

.4 the characteristics and limitations of mooring lines including material properties and environmental operating conditions anticipated during normal operation of the ship;

.5 the anticipated behavior of the mooring line in the event of failure;

.6 the influence on stored energy and the potential for snap-back of low elasticity mooring lines caused by the use of tails;

Inspection and replacement of mooring lines and mooring line tails

.1 In order to prevent the deterioration of mooring lines to a condition which may result in the failure of the line during mooring operations, the periodic inspection of mooring lines, mooring line tails and associated attachments should be included in the on board maintenance plan or equivalent maintenance management system. The maintenance plan may be computer based.

.2 The requirements for inspection of individual mooring lines will be specific to the type of mooring line used on board. In general, on board inspection of mooring lines will be based on manufacturer recommendations and by visual inspection of the outside of the mooring line to identify excessive wear or damage. Such visual inspections should be based on:

.3 The recommendations of the mooring line and/or tail manufacturer, particularly the criteria provided for the assessment of mooring line condition;

.4 Operational experience regarding the performance of the mooring line and/or mooring line tail during previous mooring operations;

.5 The environmental conditions to which the mooring lines and/or mooring line tails are routinely exposed;

.6 Additional advice provided in industry guidance on mooring line and mooring line tail inspections; and

.7 In the case of jacketed synthetic fibre mooring lines, detailed visual inspection of the condition of the synthetic fibre line may not be possible. The condition of the external jacket is not an accurate indicator of the condition of the load bearing synthetic fibre material within the mooring line.

.8 The replacement of in service mooring lines which have been assessed as no longer suitable for use should be based on the removal prior to failure and in accordance with criteria provided by the manufacturer, taking into account additional advice provided in industry guidance on removal of mooring lines from service.

.9 Records of inspection of mooring lines and mooring line tails should be available on board. Consideration should be given to control and certification of mooring lines, wires, tails and associated attachments. Manufacturer's test certificates for mooring lines, joining shackles and synthetic tails should be kept onboard and properly linked back to the equipment.

The coordinator is of the opinion that the CG should inform the Sub-Committee of these comments containing important points, taking into account that MEG 3 is now widely used and consistent with the separate guidelines and MEG 4 will be important for industry.

**Cover page of the draft separate guidelines**

8 The coordinator tentatively prepared the cover page of the separate guidelines. The group considered that the cover page should be discussed after the deliberation on the scope of the guidelines and the group has not discussed the cover page yet.

**Name of the draft separate guidelines**

9 The group agreed to invite the Sub-Committee to consider the name of the draft separate guidelines after the deliberation on the scope of the guidelines, noting that the possible names of the separate guidelines were as follows:

.1 Guidelines on safe mooring operations;

.2 Guidelines on maintenance of mooring equipment and safe mooring operations;

.3 Guidelines for In-Service Maintenance and Inspection of Mooring Lines;

.4 Guidelines for Condition Based Monitoring and Maintenance of Mooring Lines; and

.5 Guidelines for Condition Based Monitoring of Mooring Lines and Tails.

**Annex to the draft separate guidelines**

10 Pending the decisions on the scope, the name and the cover page of the draft separate guidelines, the group further developed the annex to the guidelines as mentioned hereafter.

***Purpose***

11 The group tentatively prepared the following text regarding the purpose of the draft separate guidelines, where the text in the square brackets may be deleted depending on the results of deliberation on the scope of the guidelines:

“The purpose of these Guidelines is to provide recommendations and guidance for shipboard personnel to conduct [mooring operations safely including] in-service inspections of mooring lines and tails, criteria for identifying worn-out lines and tails for removal from service before failure, and criteria for selection of replacement mooring lines and tails.”

12 In the third round, the following comments were made on the above mentioned text:

.1 We support including “tails” as part of mooring line discussions throughout the Guidelines;

.2 We propose to replace “shipboard personnel” with “mooring personnel”; and

.3 Removing mooring line from service before failure will result in the safest outcome.

***Application***

13 The majority of the group agreed the following text regarding the application of the draft separate guidelines:

“These Guidelines apply to all ships. Certain provisions are intended for reference by shipboard personnel, and other provisions are intended for shoreside personnel responsible for selecting and procuring replacement mooring lines.”

14 In the third round, the following comment were made on the above mentioned text:

“We propose to add the text “[and all ports and terminals] at the end of the first sentence, since there are reference to both shipboard personnel and shoreside personnel.”

***Terms and definitions***

15 The group noted that the terms and definitions will be reviewed subject to the decision on the contents of the draft separate guidelines. The group further noted that the terms in new MEG 4 may be included in this section. The group tentatively prepared the terms and definitions as set out in the annex to this document.

16 In the third round, the following issues were pointed out:

.1 Definitions in these guidelines should be in line with the definitions in the “design guidelines”, i.e. Annex 2 to this document;

.2 The term “Rotation of mooring lines” is not yet used, while it is defined; and

I put the square brackets for all terms and definitions and included the definition of “Mooring line configuration” as proposed by the United States, in order not to forget the discussion.

.3 The definition of “mooring personnel” does not include the ship crew which is not in line with the definition in the guidelines for mooring arrangement. The definitions should be aligned and subsequent text should address involved parties accordingly.

With regard to the comment on the definition of “mooring personnel”, I would like to draw the attention of the CG on the decision at SDC 4, as mentioned in the next paragraph. I slightly modified the definition of “Rotation of mooring lines”, taking into account the comment by IACS.

17 In relation to the comments .3 in the previous paragraph, the group recalled that the Sub-Committee, at its last session, agreed that the definitions specified FAL.6/Circ.11/Rev.1 should be used, and the group noted that the draft definition of “mooring personnel” is consistent to FAL.6/Circ.11/Rev.1.

***Selection of mooring lines***

18 The group agreed the text in paragraph 2.1 set out in the annex to this document.

19 With regard to paragraph 2.2, in the third round:

.1 the majority of the group agreed the text prepared by the coordinator and OCIMF proposed to add “and original service life expectations may not be obtained” at the end of the first sentence. The proposal by OCIMF was supported by some participants and included with square brackets in the text in paragraph 2.2 set out in the annex to this document.;

.2 the Marshall Islands made the following comment:

“Since this section is addressing the selection of mooring lines rather than their maintenance, the second sentence of the proposed text may not be necessary”; and

.3 Australia suggested reordering of the provision to put what should be done at the front and what at the back, as follows:

“2.2 Ship operators should track the condition of mooring lines through their service so that a line is retired before it fails. It should be noted that when selecting mooring lines that over time in service their strength will decay due to varying environmental conditions.”

20 With regard to paragraph 2.3, in the third round:

.1 the majority of the group agreed the text set out in the annex to this document;

.2 OCIMF expressed the following concern and some participants shared the concern:

“OCIMF members have concerns and sensitivity around the use oil and greases on wire rope moorings. Any grease or oil can create a sheen when in contact with water”; and

.3 the Marshall Islands proposed to modify the text as follows, for the reason that this section addresses mooring line selection:

“2.3 For wire ropes, providing an appropriate means of corrosion protection should be considered.”

21 The group agreed the texts in paragraphs 2.4 to 2.7 set out in the annex to this document. In the third round, the United States proposed to add the following new paragraph 2.8:

“2.8 In-service modifications of a mooring line, such as the addition of tails, may significantly change its elastic characteristics. Any reconfiguration of a mooring line, therefore, should trigger a full safety review of the mooring plan, especially snap-back zones. Updated information should be posted for mooring personnel.”

***Basic requirements for safe use of mooring equipment***

22 With regard to paragraph 3.1, in the third round, ICS was of the opinion that

.1 the text set out in the annex to this document confuses mooring operations (the process of mooring) with the maintenance of mooring lines;

.2 the draft separate guidelines should attempt to keep these two matters separate; and

.3 maintenance of mooring lines is essential and is a pre-requisite of safe mooring but it should be dealt with separately,

and proposed to amended the text as follows, to reflect section 7 of the ISM Code:

“3.1 Companies should establish procedures, plans and instructions, including checklists as appropriate, for mooring operations. Duties and responsibilities during mooring operations should be defined and only assigned to qualified personnel.”

23 With regard to paragraph 3.2, the majority of the group agreed the text on familiarization set out in the annex to this document. In the second round, Japan proposed to add some texts and, in the third round, the majority of the group supported the inclusion of the text, in principle. Thus the text is included in the annex to this document as paragraph 3.2bis with square brackets. In the third round, the following comments were also made:

.1 ICS was of the opinion, and some participants supported, that the draft separate guidelines should not recommend familiarization and should be developed on the assumption that personnel will have been familiarized, because they are required to be familiarized by mandatory requirements in STCW and the ISM Code;

.2 ICS proposed that this matter is covered by paragraph 3.1 and, in more detail, in the proposed further development of paragraph 3.4;

.3 The Marshall Islands did not object at this stage to including the text proposed by Japan while noting that elements of this text may be addressed elsewhere in the Guidelines; and

.4 The IACS was of the opinion that

.1 additional text proposed by Japan is basically agreed to but all the information should not be located on the mooring arrangement plan as required by MSC.1/Circ.1175;

.2 the mooring arrangement plan should mainly inform on the arrangement, purpose and load limits of fittings and winches;

.3 to also add relevant mooring procedures, potential snap-back risk areas as well as information on maintenance and inspection of the mooring equipment, including mooring lines would overload the plan; and

.4 it is proposed to ask for provision of a mooring manual that includes all relevant information a part of which the mooring arrangement plan would be.

24 With regard to the text in paragraph 3.3 set out in the annex to this document, in the third round, the following comments were made, while the majority of the group agreed the text:

.1 The first sentence in the chapeaux has no relevance to the second sentence and should be separated as a stand-alone provision;

.2 Paragraph 3.3 overlaps with paragraph 3.4; and

.3 In the second sentence, it is proposed to add the words “shore-side” before the words “mooring personnel” for clarity.

25 Japan, in the second round, proposed to add the sentence “the mooring equipment should be designed and arranged to ensure that the ship is provided with appropriate information about the mooring arrangement, equipment and its intended use” in paragraph 3.3, in the third round, the majority of the group did not support the inclusion of the proposed sentence, mainly for the reason that the sentence is covered by the other requirement. The following alternative texts were proposed by BIMCO and INTERTANKO in the third round:

.1 “The ship should be provided with appropriate information about the mooring arrangement, equipment and its intended use, as it applies to the specific installation”; and

.2 “The ship is provided with appropriate information including maximum workloads, limits and condition for the port/terminals mooring arrangement including, bollards, fenders and other equipment intended for the safe mooring of the ship. Such information should be provided in good time before arrival allowing the ship to do a proper mooring plan”, respectively.

26 With regard to the text in paragraph 3.4 set out in the annex to this document, in the third round, the majority of the group, noting the importance of the text, agreed, in principle, the text. The following comments were made:

.1 The United Kingdom proposed and the Marshall Islands supported, to add the words “including appropriate use of tugs” at the end of paragraph 3.4.1 with the following comment:

“The report of the UK Marine Accident Investigation Branch into the failure of a mooring line on the LNG Carrier ZARGA concluded that attempting “to reposition the vessel using the spring lines, rather than recalling the tugs, placed the mooring parties in an unnecessarily hazardous position”. Appropriate use of tugs would avoid mooring lines being used inappropriately”;

.2 The United Kingdom also proposed and the Marshall Islands also supported, to replace the text in paragraph 3.4.5.4 with “On no account should additional weights, other than the monkey’s fist or a safe alternative, be attached to the heaving line” with the following comment:

“This has become a serious problem in some ports in the UK. The UK Maritime and Coastguard Agency published a safety alert in 2014, and the Code of Safe Working Practices for Merchant Seafarers includes the following:

“26.3.5 To prevent personal injury to those receiving heaving lines, the ‘monkey’s fist’ should be made with rope only and must not contain added weighting material. Safe alternatives include a small high visibility soft pouch, filled with fast draining pea shingle or similar, with a weight of not more than 0.5 kg. Under no circumstances is a line to be weighted by items such as shackles, bolts or nuts, or twist locks.”

The United Kingdom further proposed that this additional guidance or something similar could be added to the separate Guidelines.”

.3 ICS proposed the alternative text as set out in the appendix to the annex to this document, which was supported by some participants, for further consideration by the Sub-Committee with the following comment:

“Whilst the content of this section may be changed, depending on the scope of the draft separate guidelines, if mooring operations are to be included, then this is an important section. Consequently, it does need further development to ensure that it comprehensively addresses preparations for mooring arrangements.”

.4 ICHCA, supporting the text set out in the annex to this document, was of the opinion that if it is agreed by the group that alternative mooring systems are to be included then they should also be referenced here.

.5 INTERTANKO provided the alternative text as set out in the appendix to the annex to this document for the case that ICS proposal is not generally supported.

27 The group prepared the text in paragraphs 3.5 and 3.6 as set out in the annex to this document for further consideration by the Sub-Committee. The following comments were made on these paragraphs in the third round:

.1 it may be better to locate paragraph 3.6 in the beginning of section 3;

.2 Regarding paragraph 3.5.2 “Mooring personnel (shore or sea)”, we assume that it’s the bridge/master that can communicate the direction and speed of the main engine to the ship mooring personnel and they in turn can communicate this to the shore mooring personnel. And potentially the master is keen to know about the direction of tugs line and so on. With this in mind, we propose the following altered text for 3.5.2:

“3.5.2 All involved persons in the mooring operation should regularly communicate the current state of mooring lines or tug lines, the direction and speed of the main engine and other relevant information to each other”;

.3 Regarding paragraph 3.5.3, taking into account paragraph 3.4.2.1, if we already have ensured this, is this point needed? and

.4 Consider adding 3.6 to the 3.4 section that is about planning. This could possibly be amended to the new proposed 3.4.1 by INTERTANKO (added in square brackets there)

I picked up square brackets and retained the text of paragraph 3.6, taking into account the support for the text.

28 The majority of the group agreed to include the text in paragraph 3.7 set out in the annex to this document.

I included the new text, taking into account the support for the text.

***Inspection and maintenance of mooring lines***

29 The majority of the group agreed, in principle, with the text in section 4 set out in the annex to this document. On the other hand, the group discussed the text, in the third round, as explained in paragraphs 30 to 34 of this document.

30 The Marshall Islands, supporting the text in principle, suggested amending paragraph 4.4 as follows:

“**4.4 Recordkeeping**

4.4.1 Each mooring line should be individually identifiable by markings or other means.

4.4.2 Results of inspection and maintenance, including rotation and replacement, of mooring lines should be recorded and kept onboard for the period determined by the Company.”

31 ICS was of the opinion that it may be beneficial to include the following text in the draft separate guidelines:

“**Inspection and replacement of mooring lines and mooring line tails**

X.1 In order to prevent the deterioration of mooring lines to a condition which may result in the failure of the line during mooring operations, the periodic inspection of mooring lines, mooring line tails and associated attachments should be included in the on board maintenance plan or equivalent maintenance management system. The maintenance plan may be computer based.

X.2 The requirements for inspection of individual mooring lines will be specific to the type of mooring line used on board. In general, on board inspection of mooring lines will be based on manufacturer recommendations and by visual inspection of the outside of the mooring line to identify excessive wear or damage. Such visual inspections should be based on:

.1 The recommendations of the mooring line and/or tail manufacturer, particularly the criteria provided for the assessment of mooring line condition;

.2 Operational experience regarding the performance of the mooring line and/or mooring line tail during previous mooring operations;

.3 The environmental conditions to which the mooring lines and/or mooring line tails are routinely exposed;

.4 Additional advice provided in industry guidance on mooring line and mooring line tail inspections; and

.5 […].

X.3 In the case of jacketed synthetic fibre mooring lines, detailed visual inspection of the condition of the synthetic fibre line may not be possible. The condition of the external jacket is not an accurate indicator of the condition of the load bearing synthetic fibre material within the mooring line.

X.4 The replacement of in service mooring lines which have been assessed as no longer suitable for use should be based on the removal prior to failure and in accordance with criteria provided by the manufacturer, taking into account additional advice provided in industry guidance on removal of mooring lines from service.

X.5 Records of inspection of mooring lines and mooring line tails should be available on board. Consideration should be given to control and certification of mooring lines, wires, tails and associated attachments. Manufacturer's test certificates for mooring lines, joining shackles and synthetic tails should be kept onboard and properly linked back to the equipment.”

32 With regard to paragraph 4.4 “Recordkeeping”, BIMCO was of the opinion that there must be clear identifying marks on each rope, e.g. by a sleeve at each eye splice that encapsulated a number (usually the company’s order number), which was then also included on the certificate. Alternatively, a colour scheme or electronic chip may be possible to use. BIMCO suggested including the sentence “Each rope should be individually identifiable by markings or the like.” Would it be in order to include some mention of what should be blindingly obvious (but is usually missed completely), that each rope should be individually identifiable by markings on the rope itself?

33 IACS, pointing out that no possible alternative to the visual inspection are given while problems with inspection of jacketed synthetic fibre mooring lines are mentioned in paragraph 4.1.3. expressed its views that:

.1 with regard to paragraph 4.1.1, storage condition (if lines were kept on board) may also require attention; and

.2 with regard to the last sentence in paragraph 4.1.3, solution options should be given for this.

34 INTERTANKO suggested changing reference in paragraph 4.3 from “OCIMF MEG 4” to “OCIMF Mooring Equipment Guidelines”, latest version.

35 The group tentatively prepared the annex to draft separate guidelines as set out in the annex to this document for further consideration by the Sub-Committee.

**CONSEQUENTIAL AMENDMENTS TO RELEVANT IMO INSTRUMENTS (TOR .6)**

36 The following three IMO instruments were identified as those which may be amended consequentially:

.1 Resolution A.1104(29) “Survey Guidelines under the Harmonized System of Survey and Certification (HSSC), 2015”;

.2 FAL.2/Circ.127-MEPC.1/Circ.817-MSC.1/Circ.1462 “List of certificates and documents required to be carried on board ships, 2013”; and

.3 MSC.1/Circ.1371 “List of Codes, Recommendations, Guidelines and other Safety- and Security-Related Non-Mandatory Instruments”.

**Resolution A.1104(29)**

37 The group noted that the provisions related to “mooring” were as follows:

(CI) 2.1.1.25 examining the calculation and drawings for the sufficient safe working load of towing and mooring equipment to enable the safe conduct of all towing and mooring operation in normal operation of the ship (SOLAS 74/04 reg.II-1/3-8);

(CI) 2.1.3.72 confirming that the towing and mooring equipment is properly marked with any restriction associated with its safe operation (SOLAS 74/04 reg.II-1/3-8);

(CA) 2.2.2.2 examining the anchoring and mooring equipment as far as can be seen. For ships built after 01/01/2007, confirming that the towing and mooring equipment is properly marked with any restriction associated with its safe operation (SOLAS 74/04 reg.II-1/3-8);

(CR) 2.4.2.3 examination of anchoring and mooring equipment for which purpose the anchors should be lowered and raised using the windlass.

38 The group agreed the following consequential amendment to resolution A.1104(29):

(CI) 2.1.1.25 examining the calculation and drawings for the sufficient safe working load of towing and mooring equipment to enable the safe conduct of all towing and mooring operation in normal operation of the ship and related Manufacturers test certificates for mooring lines (SOLAS 74/04 reg.II-1/3-8);

39 With regard to resolution A.1104(29), it was pointed out that the word “restriction” is used in (CI) 2.1.3.72 and (CA) 2.2.2.2, and that consequential amendment to these texts needs to be considered in conjunction with the outcome of the discussion regarding “restriction/limitation” in draft amendment to SOLAS Convention.

**FAL.2/Circ.127-MEPC.1/Circ.817-MSC.1/Circ.1462**

40 The group noted that the table in the annex to FAL.2/Circ.127-MEPC.1/Circ.817-MSC.1/Circ.1462 had the following 12 parts:

.1 “All ships to which the referenced convention applies”;

.2 “In addition to the certificates listed in section 1 above, passenger ships shall carry:”;

.3 “In addition to the certificates listed in section 1 above, cargo ships shall carry:”;

.4 “In addition to the certificates listed in sections 1 and 3 above, where appropriate, any ship carrying noxious liquid chemical substances in bulk shall carry:”;

.5 “In addition to the certificates listed in sections 1 and 3 above, where applicable, any chemical tanker shall carry:”;

.6 “In addition to the certificates listed in sections 1 and 3 above, where applicable, any gas carrier shall carry:”;

.7 “In addition to the certificates listed in sections 1, and 2 or 3 above, where applicable, any high-speed craft shall carry:”;

.8 “In addition to the certificates listed in sections 1, and 2 or 3 above, where applicable, any ship carrying dangerous goods shall carry:”;

.9 “In addition to the certificates listed in sections 1, and 2 or 3 above, where applicable, any ship carrying dangerous goods in packaged form shall carry:”;

.10 “In addition to the certificates listed in sections 1, and 2 or 3 above, where applicable, any ship carrying INF cargo shall carry:”;

.11 “In addition to the certificates listed in sections 1, and 2 or 3 above, where applicable, any Nuclear Ship shall carry:”; and

.12 “Other certificates and documents which are not mandatory”.

41 The group did not agree with any amendment to the table in the annex to FAL.2/Circ.127-MEPC.1/Circ.817-MSC.1/Circ.1462.

**MSC.1/Circ.1371**

42 The group agreed that, depending on the results of discussion under TORs 2, 3 and 5, MSC.1/Circ.1371 may need to be amended as follows:

.1 new guidelines developed under TOR .2 will be added;

.2 subject to the decision on the application of MSC/Circ.1175/Rev.1:

.2.1 MSC/Circ.1175 will be replaced with MSC/Circ.1175/Rev.1; or

.2.2 MSC/Circ.1175/Rev.1 will be added; and

.3 separate guidelines developed under TOR .5 will be added.

**OTHERS**

**Establishment of a working group**

43 The group agreed the necessity of establishment of a working group at 5th session of the Sub-Committee to progress the work and prepared the following terms of reference for the working group:

“The WG is instructed, taking into account documents [MSC 97/19/2, MSC 97/22 (paragraph 19.15), SDC 5/10, SDC 5/10/Add.1, [SDC 5/10/X, SDC 5/10/X and SDC 5/INF.X], and the comments made and decisions taken in plenary, to:

.1 finalize the draft revised SOLAS regulation II-1/3-8, based on Annex 1 to document SDC 5/10;

.2 further consider the draft new Guidelines for safe mooring operations on all ships, supporting the draft revised SOLAS regulation II-1/3-8, based on Annex 2 to document SDC 5/10;

.3 further review MSC.1/Circ.1175 and the draft new Guidelines, based on Annex 4 to document SDC 5/10;

.4 further consider the draft separate guidelines on safe mooring operations based on the annex to SDC 5/10/Add.1;

.5 consider any consequential amendments to relevant IMO instruments, taking into account SDC 5/10/Add.1;

.6 consider whether it is necessary to re-establish the correspondence group and, if so, prepare terms of reference for consideration by the Sub‑Committee; and

.7 submit a report to SDC 5 by Thursday 25th January 2018.

**ACTIONS REQUESTED OF THE SUB-COMMITTEE**

44 The Sub-Committee is invited to:

.1 with regard to draft separate guidelines on safe mooring operations (TOR .5):

.1 endorse the group’s opinion that the separate guidelines should be included in MSC.1/Circ.1371 (paragraph 3);

.2 note the result of discussion on the scope of the separate guidelines and the cover page, and take action as appropriate (paragraphs 4 to 8);

.3 consider the name of the draft separate guidelines after the deliberation on the scope of the guidelines (paragraph 9); and

.4 further develop the annex to the draft separate guidelines based on the annex to this document (paragraphs 10 to 35);

.2 with regard to consequential amendments to relevant IMO instruments (TOR .6), note the results of the work of the group and take action as appropriate (paragraphs 36 to 42);

.3 establish a working group (paragraph 43); and

.4 approve the report in general.

\* \* \*

**ANNEX**

**Draft separate guidelines on safe mooring operations**

**MSC.1/Circ.????**

**Date**

**[GUIDELINES ON SAFE MOORING OPERATIONS]**

[1 The Maritime Safety Committee, at its [XXX] session [date], having considered a proposal by the Sub-Committee on Ship Design and Construction, at its [XXX] session, and recognizing the importance of safe operation of mooring equipment, mooring lines, and inspection/maintenance of lines [and equipment], approved the [Guidelines on safe mooring operations] [Guidelines on maintenance of mooring equipment and safe mooring operations] [Guidelines for In-Service Maintenance and Inspection of Mooring Lines] , as set out in the annex.

2 Member Governments are invited to bring the annexed Guidelines to the attention of shipowners, ship managers, bareboat charterers and other organizations or persons responsible for operation of ships, for applying the Guidelines.

3 Member Governments are also invited to bring the annexed Guidelines to shipmasters, ships' officers and crew and all other parties concerned, for providing guidance on mooring operation including inspection and maintenance of mooring equipment including mooring lines.]

\* \* \*

**ANNEX**

**[GUIDELINES ON SAFE MOORING OPERATIONS]**

***Note: “\*\*\*” indicates that comment(s) was made in the third round as mentioned in the main part of the CG report.***

**1 General**

**1.1 Purpose**

The purpose of these Guidelines is to provide recommendations and guidance for shipboard personnel\*\*\* to conduct [mooring operations safely including] in-service inspections of mooring lines and tails, criteria for identifying worn-out lines and tails for removal from service before failure, and criteria for selection of replacement mooring lines and tails.

**1.2 Application**

These Guidelines apply to all ships\*\*\*. Certain provisions are intended for reference by shipboard personnel, and other provisions are intended for shoreside personnel responsible for selecting and procuring replacement mooring lines.

**1.3 Terms and definitions**

For the purpose of these guidelines:

[1.3.1 *D/d ratios* means ratio of fixed equipment (chock, bollard, bit, etc.) diameter to mooring line diameter.

1.3.2 *Mooring area* means a local deck area where mooring equipment is installed and line-handling takes place. It also includes deck areas where there is a risk of personnel injury in event of snap-back or other failure of mooring equipment. There may be multiple mooring decks on a vessel.

1.3.3 *Mooring arrangement* means the configuration of the mooring equipment and fittings and other design features of the ships related to the mooring operation i.e. lighting and communication equipment.

1.3.4 Mooring boat means the boat handling mooring lines between the ship and ashore during mooring and unmooring operations and does not include harbour ship assist tugs (see FAL.6/Circ.11/Rev.1).

1.3.5 Mooring equipment and fittings means items such as winches, capstans, bollards, bitts, fairleads, rollers, chocks etc. and also includes mooring lines.

1.3.6 *Mooring line configuration[[1]](#footnote-1)* means all components of an individual mooring line, including tails, eye splices, etc. Any change or replacement of a component is a change to the line’s configuration.

1.3.7 *Mooring operations* means mooring and unmooring of the ship and in-harbour towing operations related to mooring and unmooring of the ship.

1.3.8 *Mooring personnel* means the personnel tasked to assist in the activity of mooring and unmooring ships, either ashore or from mooring boats, carried out within the framework of port marine services (see FAL.6/Circ.11/Rev.1).

1.3.9 *Rotation of mooring lines* means periodical change of mooring lines for respective mooring drums to equalize the wear of mooring lines.]

**2 Selection of mooring lines**

2.1 Appropriate mooring lines should be selected taking into account, at least, but not limited to, the following properties which depend on material (wires, conventional fibres, synthetic fibres) and construction, length and diameter:

.1 breaking strength;

.2 environmental conditions to be used (e.g. temperature);

.3 linear density;

.4 tenacity;

.5 D/d ratios;

.6 compression fatigue; and

.7 elongation.

2.2 It should be noted that when selecting mooring lines that over time in service their strength will decay due to varying environmental conditions [and original service life expectations may not be obtained]. Therefore, ship operators should track the condition of mooring lines through their service with the desire to retire the line before failure.

2.3 For wire ropes, corrosion protection should be considered.

2.4 For both wire and fibre mooring lines, the acceptable minimum bend radius (D/d ratio) recommended by the manufacturer should be taken into consideration as strength and life expectancy of these lines are directly related to the bend radius they are exposed to in service.

2.5 Where the acceptable minimum bend radius recommendations for a particular mooring line are not achievable, the service life of the line may be less than that stated by the manufacturer and therefore the line may need to be replaced before the end of the service life recommended by the manufacturer. The condition of lines regularly exposed to below the acceptable minimum bend radius should be subject to particular attention during inspections.

2.6 When selecting mooring lines with low elasticity, including wire and high modulus synthetic lines, consideration should be given to the use of synthetic tails in order to reduce peak loading when the ship is secured alongside.

2.7 Consideration of the use of synthetic tails on low elasticity mooring lines should take into account industry and manufacturer guidance and the potential effects of synthetic tails on the stored energy of mooring lines under tension. The use of tails can change the characteristics of a mooring line and its behaviour in the event of failure. Low elasticity mooring lines may exert significant dynamic force and have significant snap-back zones when used with synthetic tails.

**3 Basic requirements for safe use of mooring equipment**

3.1 The Company should establish procedures for mooring operations and maintenance of mooring equipment, including mooring lines. The risk that a mooring line may break suddenly should be considered, taking into account appropriate references[[2]](#footnote-2).

3.2 The ship’s officers and crew should be familiar with:

.1 the mooring equipment of the ship, e.g., type, physical properties and conditions such as wear and tear; and

.2 hazards associated with “Snap-back zones of ropes” and “blind sectors”.

[3.2bis The mooring equipment and the dedicated mooring lines should be maintained in line with the original purpose and concept of the mooring arrangement. This should be established through the mooring and towing arrangement plan as required by the mooring manual which informs upon:

.1 relevant mooring procedures on the specific ship, including potential snap-back risk areas across the mooring deck.

.2 proper maintenance and inspection of the mooring equipment, including parameters on the identification and handling of worn-out mooring lines/the condition monitoring and retirement of mooring lines before mooring line failure. The frequency of inspection and maintenance should be based on the manufacturer's recommendations, ship operator experiences, the conditions the equipment is exposed to and the frequency of use, so as to ensure that excessive wear or damage is identified prior to failure and the equipment remains fit for purpose.]

3.3 Shore-side mooring personnel should comply with the requirements in FAL.6/Circ.11/Rev.1 “Ship/Port Interface, Guidelines on minimum training and education for mooring personnel”. Prior to commencement of mooring operations, all mooring personnel should understand:

.1 the planned operation and sequences; and

.2 the differences in behaviour of wires and different types of synthetic lines.

3.4 Prior to the commencement of a mooring operation, the following steps should be taken:

.1 The mooring operation should be adequately planned;

.2 A safety meeting should be held to ensure that:

.2.1 personal protection equipment (e.g. helmet, safety shoes, gloves, high visibility clothing) is available as required;

.2.2 the roles and responsibilities of all the personnel involved in the mooring operation are clearly defined and understood;

.2.3 all crew are appropriately trained and familiar with their duties; and

.2.4 all risks envisaged with mooring operation have been considered and appropriate controls are in place.

.3 An adequate communication should be established among all the personnel involved in the mooring operation ashore and afloat (fore and aft mooring areas, bridge, engine room, pilot, tug boats and mooring boats)

.4 The condition of the following items should be verified from the shore:

.4.1 bollards, mooring hooks and mooring buoys;

.5 The condition of the following items should be verified at the fore and aft mooring areas on board:

.5.1 mooring lines;

.5.2 bollards, fairleads, mooring chocks and capstans;

.5.3 winches, warping ends, windlass, gear covers and brakes; and

.5.4 no extra weight other than monkey-fist is attached to the heaving lines.”

3.5 During the mooring operations:

.1 communications should be maintained among all related persons, such as master, officers, crew, pilot, crew on tugs and mooring personnel[, in a language understandable by all involved parties. English to be used if a no other common language exists among all parties];

.2 mooring personnel should regularly communicate the current state of mooring lines or tug lines and the direction and speed of the main engine; and

.3 all crew should be equipped with personal protections equipment;

.4 mooring personnel should stay clear of unsafe/unprotected areas as far as possible throughout the mooring operation as well as between mooring and unmooring of the ship.

3.6 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.

3.7 Mooring lines should as far as possible be arranged so that lines in the same service are about the same length between the ship and the shore bollard.

**4 Inspection and maintenance of mooring lines**

**4.1 Inspection of in-service mooring lines**

4.1.1 In order to prevent the deterioration of mooring lines to a condition which may result in the failure of the line during mooring operations, the periodic inspection of mooring lines should be included in the on board maintenance plan or equivalent maintenance management system.

4.1.2 The requirements for inspection of individual mooring lines will be specific to the type of mooring line used on board. In general, on board inspection of mooring lines will be by visual inspection of the outside of the mooring line. Such visual inspections should be based on:

.1 The recommendations of the mooring line manufacturer, particularly the criteria provided for the assessment of mooring line condition; and

.2 Additional advice provided in industry guidance on mooring line inspection procedures.

4.1.3 In the case of jacketed synthetic fibre mooring lines, detailed visual inspection of the condition of the synthetic fibre line may not be possible. The condition of the jacket is not an accurate indicator of the condition of the synthetic fibre line.

**4.2 Maintenance of mooring lines**

The Company should establish the maintenance procedures as required in paragraph 3.1 of these guidelines. The maintenance procedures should specify replacement of in service mooring lines and may include the rotation of mooring lines.

**4.3 Criteria for condemning worn-out mooring lines**

Determining when a mooring line should be replaced is vital for safe mooring operations. Requirements for when mooring lines should be removed from service should be based on recommendations from the mooring line manufacturer and applicable industry guidelines such as OCIMF MEG 4.

**4.4 Recordkeeping**

Results of inspection and maintenance, including rotation and replacement, of mooring lines should be recorded and kept onboard for the period determined by the Company.”

**Reference**

(1) Oil Companies International Marine Forum (OCIMF), “Mooring Equipment Guidelines, 3rd Edition”, ISBN: 9781905331321, 2008

(2) Walter Verloesem AMNI, “The Nautical Institute, Mooring and Anchoring Ships Vol.1, Principle and Practice”, ISBN: 9781906915934, 2009

(3) Walter Verloesem AMNI, “The Nautical Institute, Mooring and Anchoring Ships Vol.2, Inspection and Maintenance”, ISBN: 9781870077941, 2009

**Appendix: Alternative texts**

**1 Proposal by ICS on paragraph 3.4**

3.4 Prior to the commencement of a mooring operation:

.1 The mooring operation should be planned based on company specific procedures for planning and conducting mooring operations, taking into account:

.1 The anticipated wind and tidal conditions at the berth, and the proximity of adjacent ships and/or structures;

.2 The number and position of mooring lines required, including the results of any mooring analysis undertaken;

.3 The availability of the required number of mooring lines in a condition which means that they are fit for their intended use;

.4 The availability and use of tugs, mooring boats and linesmen;

.5 Any hazards particular to the mooring operation and the actions required to minimize the risks associated with such hazards; and

.6 […]

.2 Shipboard personnel involved in the mooring operation should attend a pre-arrival safety meeting. The meeting should address, but not be limited to, the following matters:

.1 the roles and responsibilities of all the personnel involved in the mooring operation. These should be clearly defined and understood by all personnel involved;

.2 the timings for the mooring operations, in particular the time by which all preparations for mooring should be complete;

.3 the anticipated mooring line arrangement at the berth, with particular reference to any additional lines to be used;

.4 the sequences of events during the mooring operation, including the order in which lines are anticipated to be passed;

.5 the anticipated use of tugs and mooring boats and the hazards and precautions associated with their use;

.6 hazards, including snap-back, line handling and hazards specific to the particular mooring operation;

.7 safety precautions, including the wearing of appropriate personal protective equipment (PPE), which should observed on the mooring deck at all times throughout the operation;

.8 the action to be taken in the event of a dangerous situation developing and the verbal and/or hand signals to be used to indicate such danger to all other personnel;

.9 agreed means of communication between the navigation bridge, the mooring decks, shipboard personnel and mooring personnel ashore; and

.10 […]

.3 All personnel involved in the mooring operation should be provided with appropriate PPE for their role during the operation. Such equipment should be worn throughout the mooring operation, and when tending or monitoring lines at the berth;

.4 All mooring equipment, fittings and mooring lines required for the mooring operation should be checked to confirm that it is ready for immediate use during mooring. This should include, but is not limited to, checking that winches controls, winch drum brakes, roller fairleads and communications equipment operate correctly;

.5 Mooring lines, including tails, if used, should be checked and laid out ready for use. Mooring lines on drums should be checked to confirm that the line is not trapped on the drum;

.6 Mooring decks should be cleared on unnecessary equipment, mooring lines and any other sources of clutter or tripping hazards;

.7 Heaving lines should be prepared. No extra weight, other than a monkey-fist, should be attached to the throwing end of a heaving line; and

.8 Any preparations required by the port or terminal should be complied with, unless to do so would compromise the safety of personnel involved in the mooring operation. In such cases, the Master should inform the port or terminal of such concerns; and

.9 […]

**2 Proposal by INTERTANKO**

Propose a rewording and the deletion of 3.4.4 & 3.4.4.1. In square brackets is the coordinators proposal for 3.6, but added here instead.

.1 The mooring operation should be adequately planned and a mooring plan including a mooring layout should be produced for the specific berth taking into account;

.1.1 information received about the specific berth as laid out in 3.3 above. (refer to the INTERTANKO proposal in paragraph 25.2 in this document)

.1.2 the ships mooring arrangement and equipment

.1.3 [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]

.1.4 the condition of mooring lines and mooring equipment onboard

.1.5 the metrological and hydrographical condition at the berth

.1.6 any other information relevant to the safe mooring of the ship

3.4.4 Suggest deleting this part to amend 3.4.1 as laid out here above

3.4.5 Suggest the following change since there may be other mooring areas than fore and aft: “The condition of the following items should be verified on all mooring areas on board:”

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The reason for adding this definition is that the ZARGA investigation determined that the failed mooring line had an in-service history of 3 configurations: as originally furnished, addition of 11m tails, and then replacement with 22m tails. [↑](#footnote-ref-1)
2. For example references (1) and (2). [↑](#footnote-ref-2)