

SUB-COMMITTEE ON SHIP DESIGN AND
CONSTRUCTION
3rd session
Agenda item 15

SDC 3/15/1
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**REVISED SOLAS REGULATION II-1/3-8 AND ASSOCIATED GUIDELINES
(MSC.1/CIRC.1175) AND NEW GUIDELINES FOR SAFE MOORING OPERATIONS
FOR ALL SHIPS**

**Draft amendment to SOLAS regulation II-1/3-8 and associated guidelines on
maintenance of mooring lines for all ships**

Submitted by Japan

SUMMARY

Executive summary: This document proposes draft amendment to SOLAS regulation II-1/3-8 and associated guidelines on maintenance of mooring lines for all ships and to establish the correspondence group on safe mooring operation. The correspondence group would also cover the matter on innovative design features and more appropriate equipment for mooring operation for new ships of SDC 3/15 (Austria, et al.).

Strategic direction: 5.2

High-level action: 5.2.1

Planned output: Output number to be decided by the Council (SDC 3/1)

Action to be taken: Paragraph 7

Related documents: MSC 95/19/2, MSC 95/19/13, MSC 95/22, paragraphs 19.22 and 19.23; and SDC 3/15 (Austria, et al.)

Background

1 The Maritime Safety Committee, at its ninety-fifth session (3 to 12 June 2015), having considered documents MSC 95/19/2 (Denmark, et al.), MSC 95/INF.3 (Denmark) and MSC 95/19/13 (Japan), decided to include a new output on "Revised SOLAS regulation II-1/3-8 and associated guidelines (MSC.1/Circ.1175) and new guidelines for safe mooring operations for all ships" in the 2016-2017 biennial agenda of the SDC Sub-Committee and the provisional agenda for SDC 3, with a target completion year of 2017, in association with the SSE and HTW Sub-Committees as and when requested by the SDC Sub-Committee (MSC 95/22, paragraph 19.23). In document MSC 95/19/13, Japan

pointed out the importance of learning from "good practice" to enhance good maintenance and replacement of damaged or deteriorated mooring lines. In this document, Japan invites the Sub-Committee to consider this important issue. The draft new requirements are set out in the annexes to this document.

Necessity to regulate maintenance of mooring lines

2 According to the statistics of accidents in Japanese ports, more than 90 accidents were reported in the last five years (April 2009-March 2014), including one fatal accident (2 lives were lost), due to broken mooring lines which were in bad condition, as shown in document MSC 95/19/13. Therefore, Japan is of the view that there is a necessity to regulate maintenance of mooring lines, in order to keep them in good condition, and records of maintenance to facilitate port State control.

3 For the development of requirements for maintenance of mooring lines, good practices of many shipping companies should be taken into account.

Draft amendment to SOLAS regulation II-1/3-8 and associated guidelines

4 This document provides draft amendment to SOLAS regulation II-1/3-8 and associated guidelines as set out in annexes 1 and 2, respectively, in order to facilitate the discussion of the Sub-Committee. The draft amendment to the SOLAS regulation stipulates the maintenance and its records of mooring lines, in accordance with the procedures established taking into account the guidelines, as well as keeping them on board. Japan appreciates any comments and inputs on this proposal at the session.

5 The draft guidelines consist of the main body for supplement and explanation of the SOLAS regulation, appendix A to annex 2 on standard forms for procedures and records of maintenance and replacement of mooring lines and appendix B to annex 2 on supplements and technical backgrounds regarding maintenance and replacement of mooring lines. Further consideration is necessary to finalize the draft guidelines and comments and information should be acquired. Improvement of practices of sub-standard ships based on best practices would prevent accidents of breaking of mooring lines.

Proposal of establishment of correspondence group

6 As explained in paragraph 5 above, further consideration is necessary until SDC 4, taking into account the target completion year of 2017. Therefore, Japan proposes to establish a correspondence group on safe mooring operation for consideration of requirements for maintenance of mooring lines for all ships, as well as innovative design features and more appropriate equipment for mooring operation for new ships based on document SDC 3/15 (Austria, et al.).

Action requested of the Sub-Committee

7 The Sub-Committee is invited to consider the above proposal and take action as appropriate.

ANNEX 1

**DRAFT AMENDMENT TO SOLAS REGULATION II-1/3-8
ON MAINTENANCE OF MOORING LINES**

1 The following new paragraph 7 is added after paragraph 6 of SOLAS regulation II-1/3-8, as set out in annex 4 to document MSC 95/19/2:

"7 Notwithstanding paragraphs 1, 3 and 4, on board mooring lines of all ships shall be maintained and recorded taking into account the guidelines developed by the Organization.* The procedures and records of maintenance of mooring lines shall be kept on board ship and shall be available for inspection at all times.

* Refer to the Guidelines on maintenance of mooring lines (MSC.1/Circ.**)"

ANNEX 2

DRAFT GUIDELINES ON MAINTENANCE OF MOORING LINES

1 Purpose

The purpose of the guidelines is to provide information on maintenance and replacement of mooring lines to prevent breaking of mooring lines during mooring operation and to enhance appropriate communications between crews and shore based workers through learning the best practices.

2 Appropriate maintenance and replacement of mooring lines

2.1 Deterioration of mooring lines varies depending on type and size of ships, environment and frequency of use. In this regard, a procedure for maintenance and replacement of mooring lines for each ship should be established, and records of maintenance and replacement should be kept on board. These procedures and records, if so requested, may be submitted for verification to the Administration or to an organization recognized by the Administration and available on board for inspection at all time. Appendix A provides model forms of procedures and records to be drawn up.

2.2 The procedures could include precautions of deterioration of mooring lines.

3 Appropriate communications between crews and shore workers engaged in mooring

In case that the mooring lines would be in the condition of kink, extremely high tension, shore workers and/or crews should stop mooring operation and communicate with each other by using whistles. In such case, shore workers and/or crews should lose the tension of mooring lines and check the situation.

4 Supplements and Technical Backgrounds

Appendix B is supplements and technical backgrounds of the guidelines to be referred.

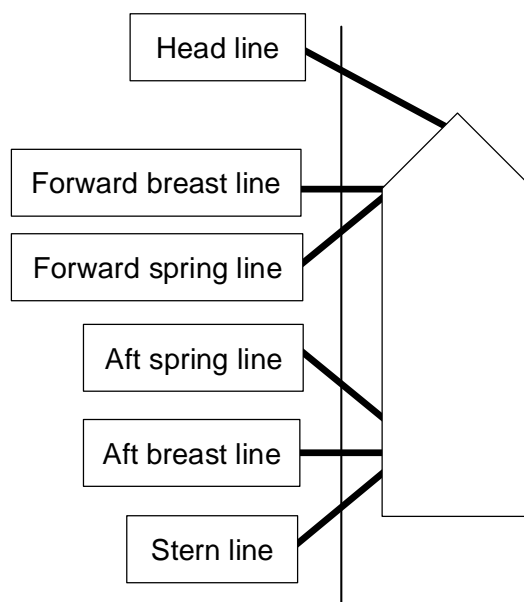
Appendix A

Standard forms for procedures and records of maintenance and replacement of mooring lines

1 Standard form for procedures of maintenance and replacement of mooring lines (Form A)

Procedures for M/V _____

Intervals of Inspection	___ months
Standards for replacement of the mooring line	(1) ___ months since installation or (2) Kink of any one spooling line
Inspected by (___) and endorsed by the master	



(This section is to be specified by the shipowner.)

2 Standard form for records of maintenance and replacement of mooring lines (Form B)

Mooring line No.	_____	
Date of installation	YYYY/MM/DD	
Used for	<input type="checkbox"/> Head line	YYYY/MM/DD to (YYYY/MM/DD)
	<input type="checkbox"/> Forward breast line	
	<input type="checkbox"/> Forward spring line	
	<input type="checkbox"/> Aft spring line	
	<input type="checkbox"/> Aft breast line	
	<input type="checkbox"/> Stern line	
Date of inspection	YYYY/MM/DD	
Condition	<input type="checkbox"/> Good <input type="checkbox"/> Not good	
Measures	<input type="checkbox"/> Nil <input type="checkbox"/> Replacement <input type="checkbox"/> Splice <input type="checkbox"/> Turn over	
C/O signature		
Master signature		
Date of inspection	YYYY/MM/DD	
Condition	<input type="checkbox"/> Good <input type="checkbox"/> Not good	
Measures	<input type="checkbox"/> Nil <input type="checkbox"/> Replacement <input type="checkbox"/> Splice <input type="checkbox"/> Turn over	
C/O signature		
Master signature		
Date of inspection	YYYY/MM/DD	
Condition	<input type="checkbox"/> Good <input type="checkbox"/> Not good	
Measures	<input type="checkbox"/> Nil <input type="checkbox"/> Replacement <input type="checkbox"/> Splice <input type="checkbox"/> Turn over	
C/O signature		
Master signature		

Form B is prepared for each mooring line and Form A and Form B should be kept on board.

Appendix B

Supplements and technical backgrounds

1 Overview on accidents data

Scope	Period	Number of Accidents	Source
Danish ships	1997 to 2013 (17 years)	402 accidents including 4 fatalities and 43 injuries	MSC 95/19/2
A certain port in Japan	April 2009 to March 2014 (5 years)	90 accidents including 2 fatalities	MSC 95/19/13

2 Reasons for application of Guidelines

Main reasons of accidents are assumed due to the poor maintenance, so that inspection and maintenance for mooring lines should be applied for all ships.

3 Technical backgrounds on maintenance and replacement of mooring lines

3.1 Analysis of breaking of mooring lines

In general, a mooring line is made of 8 spooling lines or 12 spooling lines. It reduces its tensile strength to around three fourth by kink of any one spooling line. Remedy of kink cannot reproduce its strength.

3.1.1 Analysis of number of casualties on break of mooring line in a certain port in Japan

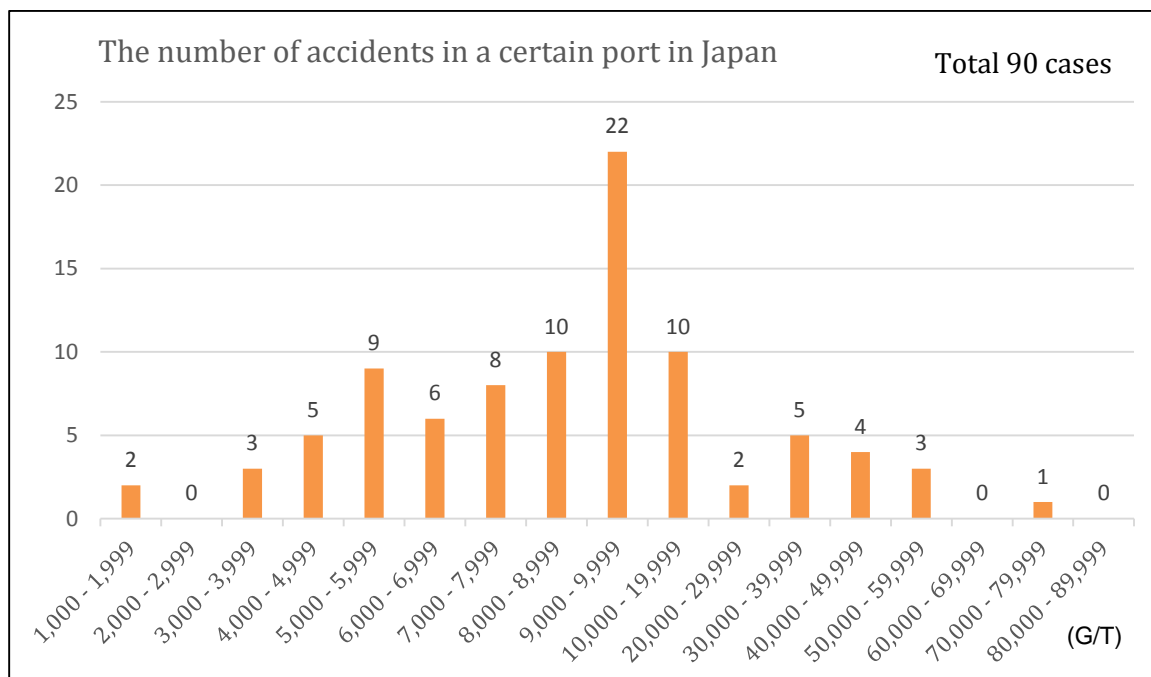


Figure 3.1.1.1 Relations of the number of accidents and the ship size

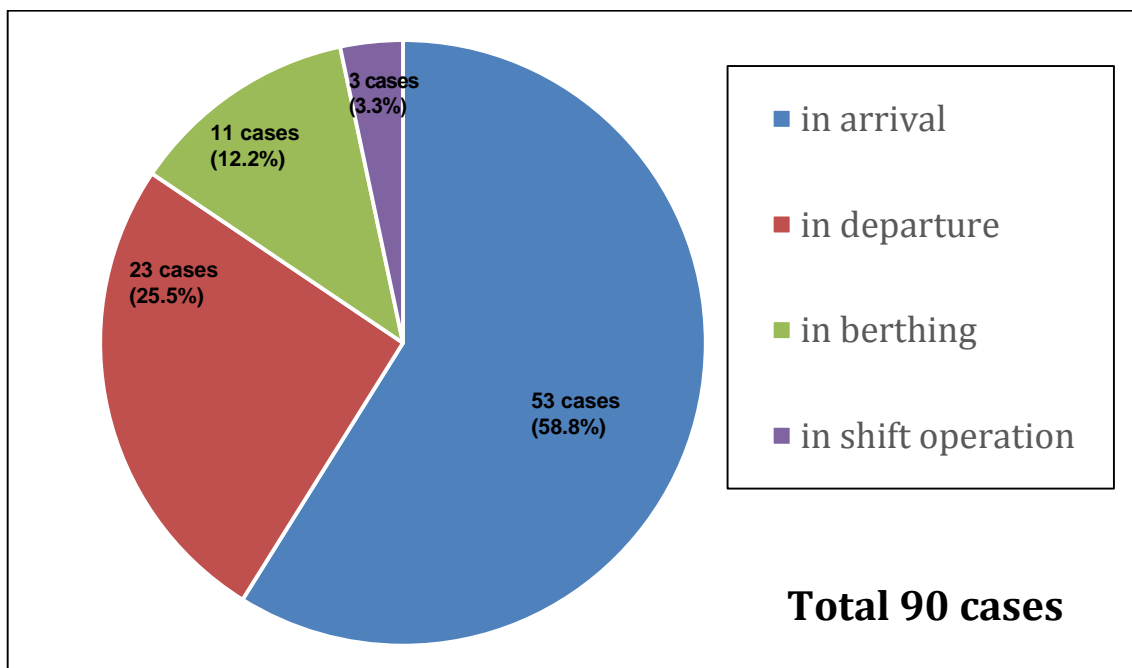


Figure 3.1.1.2 Relations of the number of accidents and the situations

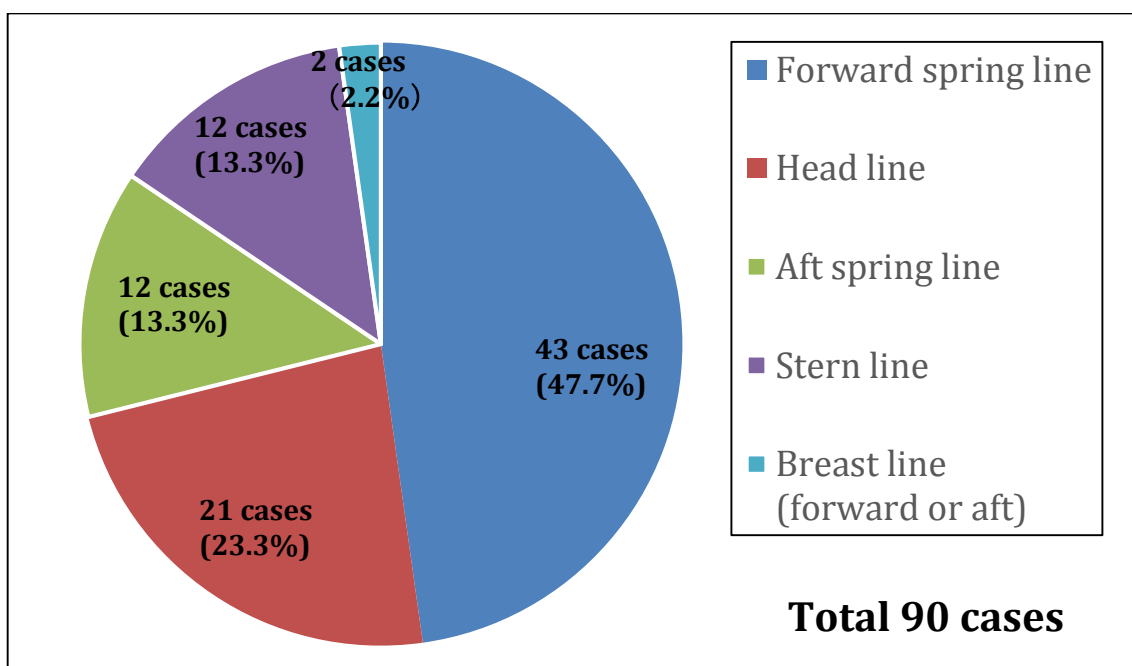


Figure 3.1.1.3 Relations of the number of accidents and the kind of mooring line

3.2 Deterioration of mooring lines

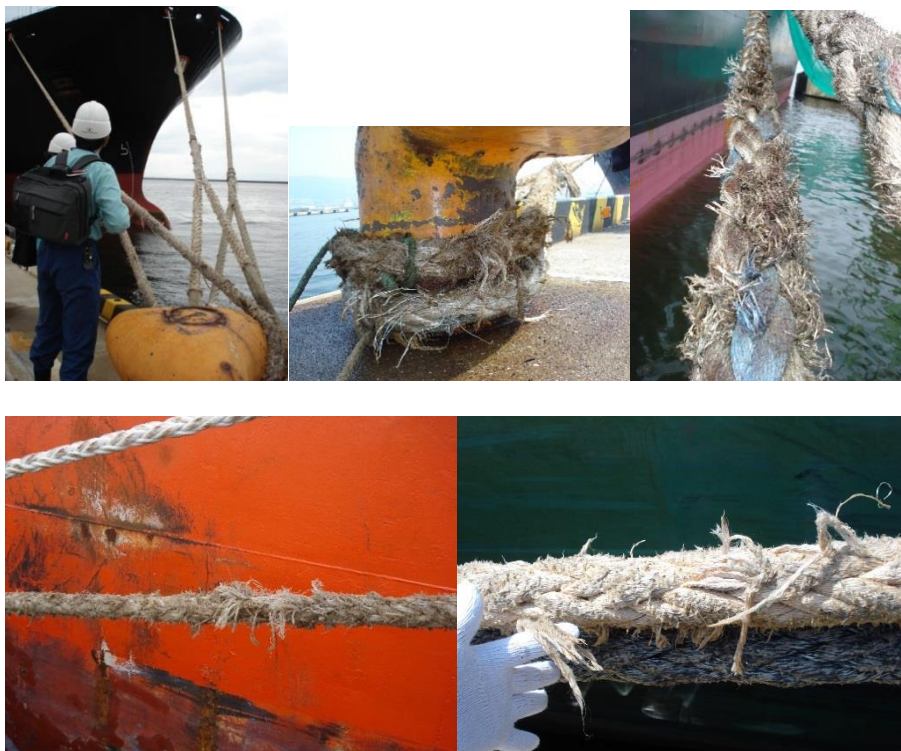


Figure 3.2.1 Examples of the deterioration of mooring lines







It is quite difficult to identify the timing of replacement of deteriorated mooring lines. Since the strength of lines varies according to many factors such as aging, usage, ultraviolet ray, etc. Moreover, not only surface damage but also inner condition affects strength of lines, which cannot be analysed without cutting the rope.

Therefore, it is assumed quite difficult to define unified standards regarding deterioration degree and replacement of the mooring lines.

From that point of view, it is more appropriate to collect best practices of usage of mooring lines from shipping companies and makers to enhance decision of maintenance rather than to establish unified standards.

Some photos showing the appearance condition are provided to assist the measurement of strength of mooring lines and to judge the timing of replacement. These are just examples for assisting judgement, since these photos cannot reveal inner conditions, though these certainly help the inspection and maintenance to avert severe accident resulting from mooring lines.

Table 3.2.1 Examples related to appearance and conditions of mooring lines

Appearance		Conditions
		Brand new
		Retaining Strength : approx. 85% External Abrasion: tiny fuzz
		Retaining Strength : approx. 70% External Abrasion: slightly fuzz
		Retaining Strength : approx. 60% External Abrasion: slight to moderate fuzz
		Retaining Strength : approx. 50% External Abrasion: slightly fuzz In addition, colour fading by ultraviolet ray
		Retaining Strength : approx. 45% External Abrasion: moderate fuzz

4 Appropriate communication between shore and ships during mooring operation

Because a mooring operation may be carried out in limited visibility such as at night or in foggy situations, appropriate communications between the shore and a ship during mooring operation is needed. At a minimum, a sound signal for reduction of tension of mooring lines should be established to prevent overload of the lines. For the sound signal, whistles can be used, for example, blowing a whistle more than six seconds. Shore workers and/or crew will reduce tension of mooring lines immediately when receiving the signal.



Figure 4.1 Example of a mooring line under stuck and high-tensioned condition
