

Republic of the Marshall Islands

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MARINE SAFETY ADVISORY No. 11-21

To: Owners/Operators, Masters, Nautical Inspectors, Recognized Organizations

Subject: 2021 TOKYO AND PARIS MEMORANDA OF UNDERSTANDING: JOINT CONCENTRATED INSPECTION CAMPAIGN ON STABILITY IN GENERAL

Date: 20 August 2021

The Republic of the Marshall Islands (RMI) Maritime Administrator (the “Administrator”) is providing the following information and advice on likely expectations of Port State Control Officers (PSCOs) when undertaking the joint Concentrated Inspection Campaign (CIC) on Stability in General.

This CIC is very broad ranging and looks in depth at the requirements for test and approval of stability information and instruments. It is strongly recommended that owners and operators examine this Marine Safety Advisory (MSA), identify the issues that are relevant to each ship type, and pass this information to the Master and other relevant officers. It is also recommended that the Administrator’s requirements on stability which are outlined in RMI Marine Notice [2-015-1](#) be reviewed prior to the start of the CIC.

1.0 INTRODUCTION

1.1 The Paris Memorandum of Understanding (MoU) and Tokyo MoU have developed a [joint CIC on Stability in General](#). This CIC will run from 1 September 2021 until 30 November 2021 and be conducted as part of the regular port State control (PSC) inspection process. It will involve PSCOs looking more closely at specific issues related to the vessel’s stability and awareness of the Master and other relevant officers of their responsibilities and obligations in respect to stability.

1.2 Other PSC regimes are also implementing this CIC

1.2.1 While the Tokyo and Paris MoU will combine their data, other PSC regimes will also undertake the same CIC independent of this process. This means a ship may be subject to the same CIC in different PSC regimes noting each will be collecting and reporting information separately. The following PSC regimes will also carry out CICs on Stability during the same period:

- .1 The Indian Ocean MoU (IOMoU),
- .2 The Viña Del Mar MoU

This MSA is evaluated annually by the Administrator and expires one year after its issuance or renewal unless otherwise noted, superseded, or revoked.

- .3 The Black Sea MoU
- .4 The Mediterranean MoU
- .5 The Riyadh MoU

1.3 The purpose of this CIC

1.3.1 The Tokyo and Paris MoU have identified the purpose of the CIC as:

- .1 Confirming that relevant ship staff are assessing the actual stability condition on completion of cargo operations before departure of the ship and at all stages of the voyage;
- .2 Creating awareness among ship staff and owners about the importance of calculating the actual stability condition of the ship on completion of cargo operations and before departure of the ship; and
- .3 Verifying the ship complies with intact stability requirements (and damage stability requirements, if applicable) under the relevant International Maritime Organization (IMO) instruments.

2.0 GENERAL ADVICE IN RESPECT OF THE CIC

- 2.1 When questioned by a PSCO the Master, and other relevant officers, should be able to demonstrate an understanding of the general and specific stability requirements that apply to their ship. Familiarity with the certification carried by the ship and confident responses to the questions posed by PSCOs assures them there is a very good understanding of the requirements. This will generally result in a positive outcome.
- 2.2 To assist, §3.0 of this MSA provides specific guidance for each CIC question. Stability information is likely to be examined. There should be evidence that the information is satisfactory to the Administrator, or Recognized Organization (RO) acting on behalf of the Administrator. The PSCO is also likely to ask for:
 - .1 The stability information for the load and the subsequent voyage;
 - .2 The cargo plan for the port (noting specific ship type requirements); and
 - .3 Previous stability calculations and cargo plans to confirm that the vessel has complied as a matter of practice.
- 2.3 The PSCO may also look at departure conditions to confirm the vessel was not overloaded, irrespective of whether the ship complied with the stability criterion. The criteria in Chapter 2 of the Intact Stability Code 2008 (IS Code) applies in all conditions of loading. Stability calculations need to consider the entire voyage, not just the stability on departure. This is

required to ensure the vessel has adequate stability during cargo operations¹ and the subsequent voyage. PSCOs are likely to confirm compliance.

- 2.4 Prior to the CIC commencing (before 1 September 2021) the Master should check that any stability booklet and associated manuals are satisfactory to the Administrator, or RO acting on behalf of the Administrator. If there is doubt, the RO should be contacted to clarify the issue.
- 2.5 Unless specified otherwise, “approved by the Administration,” as used in the CIC questions, means there is evidence of the information or manual being to the satisfaction of the Administrator, or RO acting on behalf of the Administrator, in accordance with Regulation 5-1 of Chapter II-1 of the International Convention for the Safety of Life at Sea (SOLAS). This could be a covering letter or markings indicated the information has been reviewed to an appropriate standard.

3.0 SPECIFIC GUIDANCE ON EACH CIC QUESTION

The CIC questions are provided below as contained in the CIC checklist that will be used by PSCOs for this campaign.

3.1 Question 1 - *Has the ship been provided with approved stability information which can be understood and easily used by the Master and loading officer?*

- 3.1.1 The term “loading officer” or “responsible officer”, as used in the CIC questions, generally refers to the person in charge of cargo operations on the ship. This is usually the Chief Officer but may also be another officer delegated by the Master. This is relevant to Question 4 as well.
- 3.1.2 The PSCO should accept approved stability information as demonstrating compliance with the relevant requirements of SOLAS and the International Load Line Convention (ILLC). However, the attending PSCO will generally check the documents to confirm:
 - .1 That the ship has been provided with stability information as required by Regulation 5-1 of Chapter II-1 of SOLAS and this covers all requirements relevant to the vessel and the cargoes that the ship may carry. This information may be contained in more than one booklet (i.e.: grain stability may be provided in a separate book or annex). The information should be readily available.
 - .2 The stability information can be understood by the Master and person in charge of cargo operations onboard. The Master and person in charge should be able to demonstrate an understanding of how to use the stability information to determine the condition of the ship, demonstrate how the vessel complies, and understands the specific requirements relevant to their vessel (this is relevant to Question 3 as well).

¹ The stability should be calculated to ensure that cargo operations do not result in the vessel exceeding its bending, shear force, and torsional limits as well as remaining stable.

- .3 That the Master, and other relevant officers, can demonstrate that they understand the stability assessment that is applicable to their vessel and the cargo they may be carrying and can demonstrate that the vessel complies as required (grain, dry bulk, and timber deck cargoes all require additional assessment).
 - .4 Where a ship carries grain, there is a Document of Authorization for the carriage of grain issued by the Administrator, or RO acting on behalf of the Administrator, which is accompanying, or incorporated into, the grain Loading manual. The Master and/or the person in charge should be able to demonstrate they can complete the grain calculation and can demonstrate requirements for untrimmed ends.
 - .5 If the structure of the ship has been altered, there is evidence the stability information has been amended to reflect these changes (see Question 2 as well).
 - .6 The vessel draught marks are as required by regulations 10 in Annex I of Annex A of the ILLC and/or §6 in Regulation 5 of Chapter II-1 of SOLAS.
- 3.1.3 Calculations may be carried out using a stability instrument, however an approved stability instrument is not a substitute for the approved stability booklet. The instrument is essentially used as a supplement to the approved stability booklet to facilitate stability calculations (see 4.1.1.2 of Part B of the IS code).
- 3.1.4 Where a ship performs stability calculations using a ‘stability instrument’ the PSCO is likely to seek verification that the requirements of Chapter 4 of Part B of the IS Code have been complied with. This includes:
- .1 Confirmation the software is approved by the Administrator, or the RO acting on behalf of the Administrator.
 - .2 There is an operations manual for the Stability Instrument in the same language as the stability booklet.
 - .3 Evidence that installation testing was witnessed by an RO.
 - .4 Evidence that periodic testing is carried out at each annual survey (this relates to Questions 6 and 8 as well).
- 3.2 Question 2 - *Is the data used in the stability check for departure complete and correct?***
- 3.2.1 It is likely the attending PSCO will examine the stability calculations, any relevant cargo plan, sounding table and records, and the stability manual to confirm that all appropriate values are being used in the calculations. This information should be readily available.
- 3.2.2 Noting the inspection is likely to occur during cargo operations, the PSCO may ask the Master or other relevant officers to demonstrate how they will carry out a stability check of the vessel on departure. The Master may use previous examples and records as evidence of how this is done.

- 3.2.3 If asked to demonstrate that the stability booklet and stability instrument have the same data, it is suggested that one of the saved test conditions be run and compared against the stability booklet.
- 3.2.4 PSCOs may look very carefully at the stability calculations. In addition to light ship data and the correct application of vertical center of gravity (VCG) and longitudinal center of gravity (LCG), PSCOs are likely to check:
- .1 That the correct densities are assigned to liquids on board (include liquid cargoes) and the correct water density is used for location of where the ship is berthed² (noting the density may be fresh water, salt water, or a dock water density).
 - .2 Whether the correct cargo information has been used in the stability calculations. In addition to liquid density this may include:
 - a. Verified Gross Mass of containers;
 - b. Stowage factor for dry bulk cargoes³ and general cargo⁴;
 - c. Number and weight of vehicles (and their VCG and LCG); and
 - d. Number of passengers.
 - .3 Whether the correct tank volumes (cargo and ballast) and accurate information on the contents of those tanks (soundings) have been used. This includes the application of corrections for trim.
 - .4 Where appropriate the effect of the adverse environmental conditions, including icing has been considered in the stability calculation. See §1.2 of Chapter 1 of Part A of the IS code and Chapter 6 of Part B if the IS Code.
 - .5 Whether the vessels ‘constant’ has been properly taken into consideration. The constant should not vary between voyages and the PSCO may check to see if this has occurred. If the constant varies there may be issues with the accuracy of the cargo information presented to the vessel.
 - .6 Whether any likely liquid free surface effect has been considered in the stability calculation and the Free Surface Moment (FSM) properly calculated and applied.

² Ascertaining the water density in ports is important. Ports that are located upstream or where the port is located at the mouth of a river, may have a lower density compared to the typical value for salt water (1.024 kg/m³). Even the value of saltwater density will vary dependent on temperature and atmospheric pressure. A range of between 1.020 to 1.029 kg/m³ may be seen in more extreme conditions.

³ The stowage factor for a dry bulk cargo cannot be an average or range. It must be the density of that package of cargo as variations around an average can have a significant impact on stability and stress to ship structure.

⁴ Stowage factors may be provided for homogenous general cargo (i.e. bagged grains) but any unitised cargo must have an accurate weight declare for each unit.

3.2.5 The free surface calculations are required to be accounted for in all conditions of loading under §2.1.2 of Part A of the IS Code. This includes voyages where the vessel is in ballast. The condition of the ship in ballast should not be ‘assumed’ to be safe and the PSCO should expect to see that FSM is considered.

3.3 Question 3 - *Does the ship comply with the stability criteria as applicable to the ship type?*

3.3.1 The PSCO should accept approved stability information as compliance with the relevant intact stability requirements.

3.3.2 In addition to intact stability requirements the PSCO will also seek to confirm if the vessel complies with damage stability requirements where applicable. The PSCO will check that the stability manual (and any stability instrument) incorporates damage stability.

3.3.3 Tankers (oil, chemical, and gas carriers) are required to have approved stability information and approved stability instruments (Question 5 is also relevant to this issue). The PSCO may ask for confirmation that the loading is consistent with the approved conditions and the Master should be able to produce these conditions if requested. If the load is subject to a specific approval, that approval should be available onboard.

3.3.4 The information provided by the Master should demonstrate the vessel complies with the requirements of the IS Code. If the stability is marginal (only just compliant) it is highly likely the PSCO will seek confirmation that the vessel will remain compliant during the forthcoming voyage. It is recommended that such evidence be readily available in any case as the criteria covers all conditions of loading.

3.4 Question 4 - *Is there evidence to show that the Master or responsible officer can determine the stability of the ship under varying conditions of service using the approved stability information provided on board?*

3.4.1 This question relates to familiarity with essential shipboard procedures, not the qualification of the other relevant officers. The PSCO should accept certificates of competency as evidence the Master and other relevant officers have completed the required training. The PSCO will expect that the Master and other relevant officers can demonstrate that they:

- .1 Understand how to use the stability information to determine the condition of the ship; and
- .2 Understand the requirements applicable to the ship.

3.4.2 When looking at the familiarity of the Master and other relevant officers with their ship, the PSCO may check:

- .1 That all relevant officers have been familiarized with the stability arrangements on board and the relevant manuals and supporting information. Where the calculation is carried out using a stability instrument, the Master and other relevant officers should be familiar with its use and outputs.
- .2 Where the ship is required to comply with the stability requirements of Part B of the IS Code, that:
 - a. Damage stability information has been provided which gives the Master a simple and easily understandable way of assessing the ship's survivability in all damage cases involving a compartment or group of compartments⁵; and
 - b. The Master can demonstrate understanding of this information and how it is used.
- .3 That the Master and other relevant officers can explain the standard conditions of loading and how they are used. It is recommended that the Master and other relevant officers on cargo ships familiarize themselves with the standard conditions relevant to their ship type as detailed in §3.4 of Part B of the IS Code.

3.5 Question 5 - *If the ship is provided with a Stability Instrument, is it approved by the Administration?*

3.5.1 Ship types where a stability instrument is required are specified in:

- .1 **Oil Tankers** – Regulation 28 of Annex I of the International Convention for the Prevention of Pollution from Ships (MARPOL).
- .2 **Chemical Tankers** – §2.2.1 of the Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (BCH Code) and §2.2.6 of the International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code) as applicable.
- .3 **Gas carriers** – §2.2.4 of the International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (GC Code) and §2.2.6 of the International Code of the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code) as applicable.
- .4 **Bulk Carriers** - Regulation 11 of Chapter XII of SOLAS

⁵ The need for specific damage stability information comes from §4 of Regulation 19 (Damage control Information) of SOLAS II-1.

- .5 **Passenger Vessels** - Regulation 8-1.3.1 of Chapter II-1 of SOLAS requires a system that provides operational information for safe return to port (SRtP). Existing passenger ships constructed before 1 January 2014 are required to comply not later than the first renewal survey after 01 January 2025.
- .6 **Special Purpose Ships carrying more than 240 persons** are also required to comply with the SRtP regulations in accordance with the Special Purpose Ship (SPS) Code – 2008 as chapter 2 requires that SPS carrying more than 240 persons be treated as a passenger ship for the purpose of regulation 8-1. In section 2.2.1 of the SPS Code, special personnel are treated as passengers and the reference to ‘persons’ relates to all onboard. The application of Regulation 8-1 of Chapter II-1 of SOLAS is determined by the number of persons on board.

The PSCO may seek evidence of approval and the Master should have copies of approval documentation readily available.

- 3.5.2 Oil tankers operating under the conditions described in paragraph 6 of Regulation 3 of Annex I of MARPOL may be granted a waiver from the need to carry a stability instrument, The waiver will be reflected in the supplement to the IOPP certificate (Form B).
- 3.5.3 Ships such as chemical carriers and gas carriers may also have been issued a waiver from the need to carry a stability instrument. This should be reflected in the Certificate of Fitness. The Master should be able to demonstrate that the conditions of the waiver are being complied with (i.e. the approved load conditions can be provided or the Master can prove there is effective shore planning of loads).
- 3.5.4 Where a ship is not required to have a stability instrument but has one installed, this stability instrument must be approved where the stability instrument is used to determine, or assist in determining, the condition of the ship. If an unapproved system is on-board then the required calculations should be carried out relying solely on the approved stability booklet. If an unapproved system is used, the PSCO is likely to issue a deficiency.

3.6 Question 6 - *If the ship is provided with a Stability Instrument, does the type of stability software in use meet the requirements for the relevant ship type?*

- 3.6.1 Software type is defined in §4.1.3 of Chapter 4 of Part B of the IS Code. There are four software types which are applicable to different ship types or situations.
 - .1 **Type 1** - Software calculating intact stability only (for vessels not required to meet a damage stability criterion).
 - .2 **Type 2** - Software calculating intact stability and checking damage stability on the basis of a limit curve or previously approved loading conditions (ships subject to SOLAS II-1, Part B-1 damage stability calculations – see §4.3.3 above).

- .3 **Type 3** -Software calculating intact stability and damage stability by direct application of pre-programmed damage cases for each loading condition⁶ (Used for some tankers etc.).
- .4 **Type 4** – Software calculating damage stability associated with an actual loading condition and actual flooding case, using direct application of user defined damage, for the purpose of providing operational information for safe return to port (SRtP).

The stability instrument approval document should detail the type of software installed and it is recommended the Master ascertain what type is installed in case they are asked by the PSCO.

- 3.6.2 Ships required to comply with damage stability requirements should have either Type 2 or Type 3 software installed.
- 3.6.3 Type 4 software is only required by passenger ships and Special Purpose Ships carrying more than 240 persons. It is only relevant where the owner and operator chooses to fit a stability instrument⁷ to comply with the SRtP requirements of Regulation 8-1 of Chapter II-1 of SOLAS. Existing ships (built before 1 January 2014) are required to comply not later than the first renewal survey after 01 January 2025.

3.7 Question 7 - *Is there evidence on board to show that the Master/loading officer confirms that the “calculated” displacement and trim corresponds with the “observed” draughts?*

- 3.7.1 The CIC checklist suggests that Questions 7 and 8 are for data collection purposes only. The Master should still expect that a deficiency may still be issued where non-compliance is detected.
- 3.7.2 **Draught marks** - Regulation 5.6 of Chapter II-1 of SOLAS requires all passenger ships⁸ and cargo ships constructed on or after 1 January 2009⁹ to have scales of draughts marked clearly at the bow and stern. In the case where the draught marks are not located where they are easily readable, or operational constraints for a particular trade make it difficult to read the draught marks, then the ship shall also be fitted with a reliable draught indicating system by which the bow and stern draughts can be determined.
- 3.7.3 **Recording of draughts** - The Master should ensure that the draught of the ship is recorded for each departure in accordance with regulation 28.1 of chapter V of SOLAS. The PSCO may request the Master or other relevant officer calculate the displacement at the time of the inspection to determine if there is a discrepancy. The PSCO may also examine information including recorded draughts and stability calculations at previous ports to determine if there are any discrepancies. The Master should ensure such records are available.

⁶ The results of the direct calculations performed by the stability instrument could be accepted by the Administrator even if they differ from the required minimum GM or maximum VCG stated in the approved stability booklet.

⁷ In lieu of the option of on shore support.

⁸ Due to a change adopted in the 1998 amendments to SOLAS as adopted by IMO Res.MSC.12(56).

⁹ Due to changes adopted in the 2008 amendments to SOLAS as adopted by IMO Res.MSC.216(82).

- 3.7.4 **Disparity between calculated and actual draught and trim** - The Master should be aware that some port States will examine the vessel's draught and trim to confirm this matches the calculated displacement and trim. Any disparity between the calculated displacement and trim and the actual observed draughts and trim may suggest the calculation does not accurately determine the condition of the ship. If there is evidence the assumed stability of the ship may not be accurate (i.e: a significant deviation between the calculated draught and trim and the actual draught and trim) and it appears that a serious risk may exist, the PSCO may ask for this to be resolved.
- 3.7.5 To avoid such situations the Master and the other relevant officers should regularly monitor draught and trim of the ship.
- 3.8 Question 8 - *If the ship is provided with a Stability Instrument, has the accuracy of the stability instrument been verified periodically by applying at least one approved test condition?***
- 3.8.1 As noted in Question 1, where a ship performs stability calculations using a 'stability instrument' the PSCO is likely to seek verification that the requirements of §4.1.9 of Chapter 4 of Part B of the IS Code have been complied with. This includes evidence that periodic testing is carried out at each annual survey.
- 3.8.2 Responsibility for this test rests with the Master and it is suggested the Master confirms this verification has been carried out. If the verification is due during the period of the CIC it must be completed on time. Using a stability instrument that has not been subject to periodical testing is inconsistent with the IS Code and may result in a deficiency.