MPC 11

(May 2004)
(Rev.1 Nov 2012)
(Rev.2 June 2016)

Interpretation to MARPOL I/27

Regulation 27

Intact stability

1   Every oil tanker of 5,000 tonnes deadweight and above delivered on or after 1 February 2002, as defined in regulation 1.28.7, shall comply with the intact stability criteria specified in paragraphs 1.1 and 1.2 of this regulation, as appropriate, for any operating draught under the worst possible conditions of cargo and ballast loading, consistent with good operational practice, including intermediate stages of liquid transfer operations. Under all conditions the ballast tanks shall be assumed slack.

.1   In port, the initial metacentric height GM_o, corrected for the free surface measured at 0° heel, shall be not less than 0.15 m;

.2   At sea, the following criteria shall be applicable:

*.2.1   the area under the righting lever curve (GZ curve) shall be not less than 0.055 m.rad up to $\theta = 30°$ angle of heel and not less than 0.09 m.rad up to $\theta = 40°$ or other angle of flooding θ_f * if this angle is less than 40°. Additionally, the area under the righting lever curve (GZ curve) between the angles of heel of 30° and 40° or between 30° and θ_f , if this angle is less than 40°, shall be not less than 0.03 m.rad;*

.2.2   the righting lever GZ shall be at least 0.20 m at an angle of heel equal to or greater than 30°;

Note:

1. This UI is to be uniformly implemented by IACS Members and Associates from 1 April 2005.

2. The damage stability requirements in MARPOL I/28 shall not apply for the purpose of demonstrating compliance with MARPOL Reg. I/27.

3. Rev.1 of this UI is to be uniformly implemented by IACS Societies from 1 July 2013.

4. Rev.2 of this UI is to be uniformly implemented by IACS Societies on ships contracted for construction on or after 1 January 2017.

5. The "contracted for construction" date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. For further details regarding the date of "contract for construction", refer to IACS Procedural Requirement (PR) No. 29.

**MPC
11**
(cont)

.2.3   *the maximum righting arm shall occur at an angle of heel preferably exceeding 30° but not less than 25°; and*

.2.4   *the initial metacentric height GM_o, corrected for free surface measured at 0° heel, shall be not less than 0.15 m.*

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* θ_f *is the angle of heel at which openings in the hull superstructures or deckhouses which cannot be closed weathertight immerse. In applying this criterion, small openings through which progressive flooding cannot take place need not be considered as open.*

2   The requirements of paragraph 1 of this regulation shall be met through design measures. For combination carriers simple supplementary operational procedures may be allowed.

3   Simple supplementary operational procedures for liquid transfer operations referred to in paragraph 2 of this regulation shall mean written procedures made available to the master which:

.1   *are approved by the Administration;*

.2   *indicate those cargo and ballast tanks which may, under any specific condition of liquid transfer and possible range of cargo densities, be slack and still allow the stability criteria to be met. The slack tanks may vary during the liquid transfer operations and be of any combination provided they satisfy the criteria;*

.3   *will be readily understandable to the officer-in-charge of liquid transfer operations;*

.4   *provide for planned sequences of cargo/ballast transfer operations;*

.5   *allow comparisons of attained and required stability using stability performance criteria in graphical or tabular form;*

.6   *require no extensive mathematical calculations by the officer-in-charge;*

.7   *provide for corrective actions to be taken by the officer-in-charge in case of departure from recommended values and in case of emergency situations; and*

.8   *are prominently displayed in the approved trim and stability booklet and at the cargo/ballast transfer control station and in any computer software by which stability calculations are performed.*

Interpretation

For proving compliance with Reg. I/27, either paragraph 1 or 2, below, shall be applied.

1. The vessel shall be loaded with all cargo tanks filled to a level corresponding to the maximum combined total of vertical moment of volume plus free surface inertia moment at 0° heel, for each individual tank. Cargo density shall correspond to the available cargo deadweight at the displacement at which transverse KM reaches a minimum value, assuming full departure consumables and 1% of the total water ballast capacity. The maximum free surface moment shall be assumed in all ballast conditions. For the purpose of calculating GM_o, liquid free surface corrections shall be based on the appropriate upright free surface

MPC 11
(cont)

inertia moment. The righting lever curve may be corrected on the basis of liquid transfer moments.

2. An extensive analysis covering all possible combinations of cargo and ballast tank loading is to be carried out. For such extensive analysis conditions it is considered that:

(a) Weight, centre of gravity co-ordinates and free surface moment for all tanks are to be according to the actual content considered in the calculations.

(b) The extensive calculations are to be carried out in accordance with the following:

1. The draughts are to be varied between light ballast and scantling draught.

2. Consumables including but not restricted to fuel oil, diesel oil and fresh water corresponding to 97%, 50% and 10% content are to be considered.

3. For each draught and variation of consumables, the available deadweight is to comprise ballast water and cargo, such that combinations between maximum ballast and minimum cargo and vice-versa, are covered. In all cases the number of ballast and cargo tanks loaded is to be chosen to reflect the worst combination of VCG and free surface effects. Operational limits on the number of tanks considered to be simultaneously slack and exclusion of specific tanks are not permitted. All ballast tanks are to have at least 1% content.

4. Cargo densities between the lowest and highest intended to be carried are to be considered.

5. Sufficient steps between all limits are to be examined to ensure that the worst conditions are identified. A minimum of 20 steps for the range of cargo and ballast content, between 1% and 99% of total capacity, are to be examined. More closely spaced steps near critical parts of the range may be necessary.

At every stage the criteria described in MARPOL Reg. I/27 paragraphs 1.1 and 1.2 are to be met.

3. In applying θ_f, openings which "cannot be closed weathertight" include ventilators (complying with ILLC 19(4)) that for operational reasons have to remain open to supply air to the engine room or emergency generator room (if the same is considered buoyant in the stability calculation or protecting openings leading below) for the effective operation of the ship.

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