

No.60 Intact stability of tankers during liquid transfer operations

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(Rev.1
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Preamble

This recommendation for tankers (i.e. vessels designed to carry liquid in bulk) is developed from MSC/Circ.706 (MEPC/Circ.304) containing recommendations for existing oil tankers. The phenomenon of lolling is considered by IACS to be a safety issue for double hull tankers, as well as for other tankers having exceptionally wide cargo tanks (i.e. having cargo tank breadths greater than 60% of the vessel's maximum beam), which should be solved for every vulnerable tanker. The solutions should not be limited only to tankers subject to MARPOL.

1 This recommendation applies to a tanker which is not subject to MARPOL, Annex I, Reg. ~~25A 27~~.¹⁾

Liquid transfer operations include cargo loading and unloading, lightering, ballasting and deballasting, ballast water exchange, and tank cleaning operations.

2 Every tanker is to comply with the intact stability criteria specified in subparagraphs 2.1 and 2.2 for any operating draught reflecting actual, partial or full load conditions, including the intermediate stages of liquid transfer operations:

2.1 In port, the initial metacentric height GM_0 is not to be less than 0.15m. Positive intact stability is to extend from the initial equilibrium position at which GM_0 is calculated over a range of at least 20 degrees to port and to starboard.

2.2 At sea, the intact stability criteria contained in paragraphs ~~3.1.2.1 to 3.1.2.4 of IMO Resolution A.749 (18), the Intact Stability Code, are applicable~~ 2.2.1 to 2.2.4 of Part A of the 2008 IS Code, or the criteria contained in the national requirements of the flag administration if the national stability requirements provide at least an equivalent degree of safety.

3 For all loading conditions in port and at sea, including intermediate stages of liquid transfer operations, the initial metacentric height and the righting lever curve are to be corrected for the effect of free surfaces of liquids in tanks.²⁾

4 The intact stability criteria specified in para. 2 preferably is to be met by design of the ship, i.e. the design should allow for maximum free surface effects in all cargo, ballast and consumables tanks during liquid transfer operations.

Footnotes:

¹⁾ Alternatively MARPOL, Annex I, Reg. ~~25A 27~~ could be applied as a matter of equivalence.

²⁾ Reference is made to LL61.

Notes:

This recommendation was recategorised from UR L3 in May 2001.

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5 If the intact stability criteria specified in para. 2 are not met through design of the ship alone, the Master is to be provided with clear instructions covering the operational restrictions and methods necessary to ensure compliance with these criteria during liquid transfer operations. These instructions should be simple and concise, and:

- 5.1 in a language understood by the officer-in-charge of transfer operations;
- 5.2 require no more than minimal mathematical calculations by the officer-in-charge;
- 5.3 indicate the maximum number of cargo and ballast tanks which may be slack under any possible condition of liquid transfer, and
- 5.4 provide pre-planned sequences of cargo/ballast transfer operations; which indicate the cargo and ballast tanks which may be slack to satisfy the stability criteria under any specific condition of liquid transfer, including possible range of cargo densities. The slack tanks may vary during stages of the transfer operations and be any combination which satisfied the stability criteria.
- 5.5 provide instructions for pre-planning other sequences of cargo/ballast transfer operations, including use of stability performance criteria in graphical or tabular form which enable comparisons of required and attained stability. These instructions for pre-planning other sequences, in relation to individual vessels, should take account of:
 - i) the degree of criticality with respect to the number of tanks which can simultaneously have maximum free surface effects at any stage of liquid transfer operations;
 - ii) the means provided to the officer-in-charge to monitor and assess the effects on stability and hull strength throughout the transfer operations;
 - iii) the need to give sufficient warning of an impending critical condition by reference to suitable margins (and the rate and direction of change) of the appropriate stability and hull strength parameters. If appropriate, the instructions should include safe procedures for suspending transfer operations until a suitable plan of remedial action has been evaluated.
 - iv) the use of on-line shipboard computer systems during all liquid transfer operations, processing cargo and ballast tank ullage data and cargo densities to continuously monitor the vessel's stability and hull strength and, when necessary, to provide effective warning of an impending critical situation, possibly automatic shut-down, and evaluation of possible remedial actions. The use of such systems is to be encouraged.
- 5.6 provide for corrective actions to be taken by the officer-in-charge in case of unexpected technical difficulties with recommended pre-planned transfer operations and in case of emergency situations. A general reference to the vessel's shipboard oil pollution emergency plan may be included.
- 5.7 be prominently displayed:
 - i) in the approval trim and stability booklet;
 - ii) at the cargo/ballast transfer control station;
 - iii) in any computer software by which intact stability is monitored or calculations performed;
 - iv) in any computer software by which hull strength is monitored or calculations performed.

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