United States
Coast Guard

COMDTPUB P16700.4
NVIC 4-92
02 Apr 1992

NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 4-92
Electronic Version for Distribution on the World Wide Web
Subj: Recommended Intact and Damage Stability Design Criteria for New Tank Vessels.

1. PURPOSE. The purpose of this Circular is to provide guidance to the marine industry for stability design criteria for new tank vessels, designed and constructed to comply with the Oil Pollution Act of 1990 (OPA 90).

2. BACKGROUND.

   a. Congress enacted OPA 90 in response to several marine pollution incidents. Section 4115 of OPA 90 requires tank vessels constructed under contracts awarded after June 30, 1990 to have double hulls. NVIC 2-90 has promulgated recommended standards for dimensions of double hulls.

   b. OPA 90 does not specify any standards or design criteria for the acceptance of double hull designs that are required by section 4115. The absence of standards has created a difficult situation where owners desiring to construct new vessels do not currently have guidance on stability criteria that the Coast Guard will accept as meeting the double hull requirements of OPA 90.

   c. The guidance for stability criteria is currently under discussion at IMO with a view towards obtaining consistent domestic and international regulations.

3. DISCUSSION.

   a. Recommendations This Circular recommends the use of the following intact and damage stability criteria in the design of new tank vessels of 20,000 tons deadweight and above.

   b. Intact Stability. The weather criterion for intact stability as specified in 46 CFR Part 170 Subpart E is applicable. Additionally, it is recommended that the following criteria be satisfied and maintained, particularly during all loading and ballasting operations. The righting arm curve should be corrected for free-surface for all intermediate conditions during loading and ballasting operations.

      (1) The righting energy should not be less than 0.055 meter-radians (10.3 feet-degrees) up to 30 degrees of heel and not less than 0.09 meter-radians (16.9 feet-degrees) up to 40 degrees of heel, or the down-flooding angle, if that angle is less than 40 degrees. Additionally, the righting energy between 30 degrees and 40 degrees (or between 30 degrees and the downfboding angle, if that angle is less than 40 degrees) should not be less than 0.03 meter-radians (5.6 feet-degrees).

(2) The righting arm at an angle of heel equal to or greater than 30 degrees should be at least 0.20 meters (0.66 feet).

(3) The maximum righting arm should occur at an angle of heel preferably exceeding 30 degrees, but not less than 25 degrees.

(4) The initial metacentric height should not be less than 0.15 meters (0.49 feet).

(5) The above criteria (paragraphs (1) through (4)) are based on International Maritime Organization (IMO) Resolution A.167 (ES IV), a copy of which may be obtained from the International Maritime Organization, 4 Albert Embankment, London SEl 75R.

c. Damage Stability. Regulation 25 of Annex I of MARPOL 73/78 (also 46 CFR 171.080 and 33 CFR 157, Appendix B) contains the design criteria for subdivision and damage stability that take into consideration collision and grounding type damage that results in significant penetration of the hull. In addition to these criteria, it is recommended that the following criteria be satisfied in the design of tank vessels to which this NVIC applies.

(1) Tank vessels of 20,000 tons deadweight and above should be designed to sustain raking type damage and comply with after-damage criteria of Regulation 25(3) of MARPOL 73/78 - Annex I.

(2) The extents of bottom raking damage to be used were approved by the 32nd Session of the IMO Marine Environment Protection Committee, March 1992; as part of new Regulation 13F to Annex I of MARPOL 73/78. The damage extents are as follows (the symbols L and B are defined in MARPOL 73/78, Annex I, Regulation 1):

Raking Bottom Damage

(a)	Longitudinal extent -	
	ships of 75,000 tons deadweight and above:	0.6L from the forward perpendicular
	ships of less than 75,000 tons deadweight:	0.4L from the forward perpendicular
(b)	Transverse extent -	B/3 anywhere on the bottom.
(c)	Vertical extent -	breach of the outer hull.

d. Domestic Regulations. Domestic stability regulations are being developed from the discussions being held at IMO. The formation of these domestic regulations will be influenced by the discussions at the IMO as well as input received during the regulatory process.

4. IMPLEMENTATION

a. This Circular does not in any way modify existing stability regulations for a freight vessel or offshore supply vessel carrying oil in bulk. This Circular should be used as guidance in the design of double-hull tank vessels, pending the development of final regulations for double hull tankers.

b. Vessels built under designs approved in accordance with this guidance, prior to the effective date of any future regulations, will be deemed to be in compliance with the design criteria requirements as they relate to the stability of double hull tankers in section 4115 of OPA 90.

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