MSC Guidelines for **Review of Passenger Vessel Stability (Subchapters K & H)**

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References

a. 46 CFR 170: Stability requirements for all inspected vessels
b. 46 CFR 171: Special Rules pertaining to Passenger vessels
c. Marine Safety Manual Volume IV – Chapter 6
d. Federal Register, Vol. 75, No 239, "Passenger Weight and Inspected Vessel Stability Requirements; Final Rule," dated December 14, 2010
e. Office of Vessel Activities (CG-543) Policy Letter 11-03, "Implementation of Revised Passenger Weight Standards for Existing Passenger Vessels," dated April 8, 2011
f. Marine Safety Center Technical Note (MTN) 01-93, CH-1, "Intact Stability Considerations for Glass Panels/Windows Located Above the Bulkhead Deck on Subchapter H, K, and T Vessels

Contact Information

If you have any questions or comments concerning this document, please contact the Marine Safety Center by e-mail or phone, referring to Procedure Number: **H2-03**.

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Applicability

This Plan Review Guideline is applicable to stability calculations reviewed by MSC for vessels certificated under 46 CFR Subchapters K or H. If the vessel's stability is being reviewed under Navigation and Vessel Inspection Circular (NVIC) No. 3-97, "Stability Related Review Performed by the American Bureau of Shipping for U.S. Flag Vessels," then MSC review of stability items is not required unless the submittal has been targeted for MSC oversight.

Passenger Weight Guidance

In accordance with reference (d), the current Assumed Average weight per Person (AAWPP) is 185 pounds per person. Guidance on the implementation of the current AAWPP to existing vessels is found in reference (e). All issued stability letters will document the AAWPP value used in the stability evaluation.

Submittal checklist

Check that the following items are included in the submittal package:

a. General Arrangements including deck plans, hold plans (clearly indicating compartmentation and watertight doors), inboard and outboard profiles (clearly indicating potential downflooding points such as vents or windows).

b. Lines and offsets (MSC generates a hull model in GHS to verify calculations). [Additionally providing a computerized hull model (GHS preferred) should expedite MSC review.]

c. Tank Capacity Tables/Plan with Free Surface data

d. Draft mark locations, longitudinal and vertical reference points

e. Stability Test/Lightship results

f. Intact Stability Calculations

g. Subdivision and Damage Stability Calculations

h. Trim and Stability Booklet (if necessary)

Lightship verification

Ensure that lightship characteristics were (or are to be) determined using one of the following methods:

a. Acceptance as a sister to a vessel with known characteristics. (NVIC 14-81)

b. Deadweight survey combined with a conservatively assumed vertical center of gravity (VCG) height (NVIC 17-91)

c. Inclining (full stability test). (NVIC 17-91)

See PRG GEN-02 and GEN-05 for more guidance on conducting deadweight surveys and stability tests

Loading conditions

Ensure that vessel loading conditions cover the entire range of operation. This includes, but is not limited to the following conditions:

a. Full load

b. Mid voyage

c. Arrival (Burned out)

d. "Passengers at refuge", if applicable

Apart from refuge concerns, attention should be given to the vertical distribution of passengers. In general, assuming all passengers are on the uppermost deck will allow no restrictions in the stability letter. However, vessels may be sensitive to carrying a high percentage of passengers on upper decks with few or no passengers carried on lower decks. In these cases, operating restrictions will need to be developed accordingly.

Ensure that loading conditions incorporate liquid free surface in accordance with:

a. For intact stability: 46 CFR 170.285

b. For damage stability: 46 CFR 170.290

Watertight Integrity

Ensure compliance with the appropriate requirements of 46 CFR 171:

a. Openings in Watertight Bulkheads (Subpart E)

b. Watertight Integrity below the Bulkhead Deck (Subpart F)

c. Watertight Integrity above the Margin Line (Subpart G)

d. Drainage of the Weather Decks (Subpart H)

Intact Stability

For each condition of loading, calculations submitted shall demonstrate compliance with the following:

a. Weather Criteria (46 CFR 170.170):

1) Ensure correct use of weather criterion equation variables

2) Ensure available GM meets or exceeds the minimum acceptable value.

b. Passenger Criteria (46 CFR 170.050):

1) Ensure correct use of passenger criterion equation variables

2) Ensure available GM meets or exceeds the minimum acceptable value.

c. Righting Energy (46 CFR 170.173): – for vessels under 328 feet in length:

1) Ensure stability characteristics meet the minimum requirements for the appropriate service (protected, partially protected, exposed) and that all criteria are addressed

2) Ensure that these calculations correctly reflect submergence of any potential downflooding points

Subdivision

Ensure the submission of the appropriate Subdivision calculations (Type I or II as per 46 CFR 171.060) and that the appropriate requirements, including bulkhead locations and spacing, are met for either:

a. Type I

1) factor of subdivision (46 CFR 171.065)

2) permeability calculations (46 CFR 171.066)

3) Stepped or recessed bulkheads (46 CFR 171.067)

b. Type II

1) standard of flooding (46 CFR 171.070)

2) permeability calculations (46 CFR 171.072)

3) Stepped or recessed bulkheads (46 CFR 171.073)

Ensure the correct placement of the margin line (46 CFR 171.015)

Ensure that the applicable sections of 46 CFR 171 Subpart D have been addressed.

Damage Stability

Ensure calculations do not incorporate the emptying of tank contents (run-off) for any damaged tanks other than those carrying permanent (locked-in) liquid ballast.

For each condition of loading, calculations submitted shall demonstrate compliance with the following: (46 CFR 171.080)

a. Existing vessels: as defined in 171.080(d), shall ensure that damage stability calculations meet or exceed the standards required in 171.080(e).

b. New Vessels: as defined in 171.080(d), shall ensure that damage stability calculations meet or exceed the standards required in 171.080(f) and correctly reflect:

   1) The location of all potential downflooding points

   2) Permeability calculations in accordance with 171.080(c)

Definitions

Downflooding: The entry of seawater through any opening into the hull *or superstructure* of an undamaged vessel [or portion of a vessel] due to heel, trim, or submergence of the vessel.

Downflooding Point: Any opening in the hull or superstructure of the vessel that cannot be closed watertight and through which downflooding can occur. (Generally speaking for openings which remain above the static waterline, weathertight closures are sufficient to prevent downflooding and are accepted as such.)

Weathertight: Water will not penetrate into the vessel in any sea condition. This also means being able to resist boarding seas. As addressed in reference (f), windows are not accepted as weathertight closures and, without the provision of deadlight covers, must be considered as potential downflooding points. Ball check valves used in tank vent lines are generally accepted as weathertight closures.

Watertight: Capable of preventing the passage of water through the structure in any direction under a head of water for which the surrounding structure was designed.

Special Consideration for Specific Vessel Types

Vehicle Ferries:

Special attention must be given to assigned vehicle weights proposed by submitters. If it cannot be shown that the ferry can be safely loaded without vehicle weight restrictions, then stability letters will designate a maximum weight and/or distribution of vehicles allowed. Weights of individual vehicle types must be supportable if a quantity of vehicles is also cited in the stability letter.

Catamarans:

Special attention must be given to the increases over time in the full load displacement of catamarans. The majority of catamarans are designed in accordance with one of the Class Society's High Speed Craft Rules which generally results in a structurally driven maximum displacement. Operation at displacements in excess of this Structural Design Limiting (SDL) displacement shall not be authorized in the stability letter without first assessing their acceptability with respect to structural requirements. If appropriate, draft restrictions written for the purposes of maintaining a vessel under its SDL, should explicitly cite that displacement.

Fixed Ballast

Ensure that all fixed ballast, if installed, is located and documented in accordance with 46 CFR 170.235.

Disclaimer

This guidance is not a substitute for applicable legal requirements, nor is it itself a rule. It is not intended to nor does it impose legally-binding requirements on any party. It represents the Coast Guard's current thinking on this topic and may assist industry, mariners, the general public, and the Coast Guard, as well as other federal and state regulators, in applying statutory and regulatory requirements. You can use an alternative approach for complying with these requirements if the approach satisfies the requirements of the applicable statutes and regulations. If you want to discuss an alternative, you may contact The Marine Safety Center, who is responsible for implementing this guidance.