

# MSC Guidelines for the Review of Oil Spill Response Vessels (OSRV), Lightship and Stability

Procedure Number: C1-20

Revision Date: 02/02/2011



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## Purpose

This Plan Review Guidance (PRG) explains the requirements for seeking plan approval for stability plans and calculations from the Marine Safety Center (MSC) for Oil Spill Response Vessels between 15 and 500 U.S. gross tons that carry recovered oil in bulk in accordance with the below references. (OSRVs of 500 gross tons or more are regulated as tank vessels under the provision of 46 CFR Subchapter D).

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## References

- a. MVI Policy Letter No. 1-95, dated February 13, 1995
  - b. NVIC 3-89, Guidelines for the Presentation of Stability Information for Operating Personnel
  - c. MSC Marine Technical Note 04-95, Light Ship Change Determination
  - d. 46 CFR 170, Subpart F, Determination of Lightweight Displacement and Centers of Gravity
  - e. NVIC 17-91, Guidelines for Conducting Stability Tests
  - f. ASTM F 1321-92 (Reapproved 2004), Standard Guide for Conducting a Stability Test (Lightweight Survey and Inclining Experiment) to Determine the Light Ship Displacement and Centers of Gravity of a Vessel
  - g. 46 CFR 173. Subpart B, Lifting
  - h. 46 CFR 173 Subpart E, Towing
  - i. Marine Safety Manual, Vol. II, "Oil Recovery Vessels"
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## Disclaimer

These guidelines were developed by the Marine Safety Center staff as an aid in the preparation and review of vessel plans and submissions. They were developed to supplement existing guidance. They are not intended to substitute or replace laws, regulations, or other official Coast Guard policy documents. The responsibility to demonstrate compliance with all applicable laws and regulations still rests with the plan submitter. The Coast Guard and the U. S. Department of Homeland Security expressly disclaim liability resulting from the use of this document.

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## Contact Information

If you have any questions or comments concerning this document, please contact the Marine Safety Center by e-mail or phone. Please refer to the Procedure Number: **C1-20**

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## General Review Guidance:

- ❑ Reference (a) is technically superseded by reference (i), however, portions of reference (a) did not cross over completely. Therefore, portions of reference (a) will still be utilized. A new NVIC on OSRVs is expected to supersede both.
- ❑ Per Figure 10-4 of reference (a), all OSRV's must meet the stability requirements of 46 CFR Subchapter S. Since Subchapter S applies to OSRVs less than 100 gross tons, the intact stability requirements of 46 CFR Subchapter T, Part 178 are generally not applicable, and the simplified stability proof test in that part is not normally allowed as an option to demonstrate adequate stability.
- ❑ OSRV stability reviews generally fall into one of three categories, depending on the method the submitter uses to establish the acceptable range of loading conditions. The greater this range, the greater the operational flexibility, and the greater complexity required in the stability review/guidance. The three most common methods are listed as follows, in order of increasing complexity:
  - ❑ stability letter with a limited number of specific authorized loading conditions
  - ❑ stability letter (simplified) with approved loading diagram(s)
  - ❑ approved T&S Book, with or without an accompanying stability letter
- ❑ Regardless of the type of stability review encountered, the basic requirement is that the submitter must clearly demonstrate that each possible loading condition meets the required stability criteria of 46 CFR, Subchapter S per reference (a). In order to establish a range of acceptable loading conditions, a common technique involves generation of a maximum KG or minimum GM curve. These curves typically plot the maximum KG or minimum GM value on the ordinate axis, against the range of operational drafts on the abscissa. Acceptable curves incorporate values derived from the most stringent governing stability criteria, along with trim considerations.
- ❑ A satisfactory stability review results in operational guidance in the form of a

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stability letter, and approved vessel loading conditions as indicated above. If the T&S book includes sufficient operational restrictions, instructions, and guidance that would normally be included in a stability letter (see reference (b)), then the MSC may return correspondence approving the T&S book in lieu of a stability letter, noting that the operational instructions in the T&S book must be strictly followed.

- ❑ In addition, stability reviews may be preliminary or final, depending on the basis of the light ship values. Preliminary stability calculations are not required, but at the option of the owner/naval architect they may be submitted before conducting the inclining experiment of the vessel, using assumed light ship values. This is often done to facilitate expedited final stability reviews. Preliminary stability reviews are conducted in the same manner as final stability reviews, except that a stability letter is not generated and all returned items are marked “Examined”. Following the inclining experiment of the vessel and calculated results indicating the true light ship of the vessel, a final stability review may be accomplished and a stability letter generated. A new set of stability calculations is not required if the submitter demonstrates that the assumed light ship values closely match those resulting from the incline experiment (see reference (c) for further guidance and acceptable ranges).
- ❑ If the vessel is new and not a sister vessel, has the Application for Inspection been submitted? In general, no plan review may occur until receipt of a copy of the Application.
- ❑ Is it clearly stated what is desired from the MSC? Are all plans requiring Coast Guard review and/or approval submitted in triplicate? Are there any special or unusual requests involved?
- ❑ Ensure the following information have been received (\* as applicable):
  - ❑ General Arrangements
  - ❑ Lightship values based on calculated results of stability test data
  - ❑ Lines, offsets, or computer disk with hull model
  - ❑ Hydrostatic Tables
  - ❑ Tank Capacity Tables\Plan
  - ❑ Ullage & Sounding Tables
  - ❑ Intact stability calculations
  - ❑ Damage stability calculations\*
  - ❑ Lifting calculations\*
  - ❑ Towing Calculations\*
  - ❑ Trim and Stability (T&S) Booklet, Loading Diagrams, or summary loading conditions\*
- ❑ Verify Lightweight Characteristics utilizing one of the following methods:
  - 1) Does a sister vessel with known characteristics exist?

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- 2) Has an approved procedure and subsequent stability test been performed in accordance with references (d), (e), and (f) and reviewed in accordance with the MSC guidelines for review of Stability Test Results?
  - For vessels carrying recovered oil in bulk, verify the applicability of tank vessel intact and damage stability requirements by using the attached Tank Vessel Stability Matrix. Note that OSRVs are exempt from 46 CFR 172 Subpart D per 46 CFR 172.060, 33 CFR 157.01(b), and 46 USC 3702.
  - If the vessel does not carry recovered oil in bulk, refer to other MSC guidelines for review of stability applicable to the appropriate inspection Subchapter of the vessel.
  - Verify the applicability of the weather criterion of 46 CFR 170.173, Criterion for Vessels of Unusual Proportion and Form. The applicability of this criterion is determined by the Marine Safety Center. The MSC generally requires all self-propelled vessels, other than tugboats, towboats, and vessels with barge shaped hulls, to meet this criteria.
  - Ensure that the compliance has been demonstrated for all applicable intact and damage stability requirements ( refer to MSC guidelines for Tank Vessel Stability for further guidance).
  - If the vessel is equipped with a crane, ensure compliance with 46 CFR 173, Subpart B (see MSC guidelines for review of Crane Lifting calculations – PRG C1-3).
  - Ensure that the stability instructions and operating guidance are technically correct and detailed, sufficient, clear, and easy to use, in accordance with reference (b).
  - The following items will be included in the return correspondence from the MSC, and copies will be provided to the cognizant OCMI and ABS (loadline/stability group):
    - Approved light ship weight and location (VCG and LCG)
    - Comment to ABS noting the maximum allowed draft (specify molded or extreme)
    - Comment to ABS to include a statement in the Load Line certificate requiring compliance with the stability letter and approved stability guidance (T&S book, loading diagrams, etc.)
    - If a stability letter is generated, it will contain the appropriate standard phrases and stability instructions (bilges, hull openings, watertight doors, weight changes, slack tank restrictions, etc.). See reference (b) for additional information.

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- ❑ Ensure that the location of downflooding is taken into account for compliance with the stability criteria.
- ❑ If the towing authorization is requested on the stability letter, ensure compliance with the towline pull criteria of 46 CFR 173, Subpart E (reference (h)).
- ❑ If damaged stability criteria apply, ensure that the correct assumptions of space permeability, in accordance with Table 174.207(b).
- ❑ If the unusual proportion and form intact stability criteria is used, ensure that the calculations incorporate the zero trimming moment method, per 46 CFR, 170.173(d)
- ❑ Ensure that the lesser of the stability limiting draft and Geometry Load Line draft is used for loadline draft and freeboard per 46 CFR, Subpart E
- ❑ The following items are indicative of normal MSC plan review:
  - Perform independent calculations to verify values used for free-surface corrections.
  - At respective drafts, compare the displacement and KM values listed in the hydrostatic tables to the values used in corresponding loading conditions.
  - Construct an outer hull model in HECSALV or GHS and generate hydrostatics to compare with those submitted.
  - Independently calculate tank capacities. Compare 100% capacities, and weight loading values and locations to those used in the submitted calculations.
  - Independently generate the required KM or GM curve, using all applicable stability criteria.
  - Construct a full HECSALV or GHS model including compartmentation.
  - Analyze different loading conditions of the vessel and compare stability results from the computer model to the submitted stability

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Definitions

Downflooding Point: The lowest opening on a vessel that allows the entry of seawater into the hull or superstructure of an undamaged vessel due to heel, trim, or submergence of the vessel.

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Attachments

Tank Vessel Stability Matrix