

# MSC Guidelines for the Review of Mobile Offshore Drilling Unit (MODU) Stability Calculations

Procedure Number: C2-33

Revision Date: 10/18/2016

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## Purpose:

The purpose of this document is to provide guidance and information regarding the submission of MODU stability calculations under Subchapters N and I-A.

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## References:

- a. 46 CFR Subchapter I-A, Part 107 Subpart C – Plan Approval
  - b. 46 CFR Subchapter S, Part 170, Subpart F – Determination of Lightship Displacement and Centers of Gravity
  - c. 46 CFR Subchapter S, Part 170, Subpart I – Free Surface
  - d. 46 CFR Subchapter S, Part 173, Subpart B – Lifting
  - e. 46 CFR Subchapter S, Part 174, Subpart C – Special Rules Pertaining to Mobile Offshore Drilling Units
  - f. 33 CFR Subchapter N, Part 143
  - g. Marine Safety Manual, Volume IV, Section 6.E.4
  - h. CG-ENG Policy Letter 01-13, “Alternate Design and Equipment Standard for Floating Offshore Installations (FOI) and Floating Production, Storage and Offloading (FPSO) Units on the U.S. Outer Continental Shelf,” dated June 26, 2013
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## Contact Information:

If you have any questions or comments concerning this document, please contact the Marine Safety Center (MSC) by email or phone, and refer to Plan Review Guide Number C2-33.

Email: [MSC@uscg.mil](mailto:MSC@uscg.mil)

Phone: 202-795-6731

Website: <http://homeport.uscg.mil/msc>

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## Responsibilities:

Using applicable portions of references (a) through (h), the submitter shall provide sufficient documentation and plans to indicate compliance with the requirements. The submission shall be made electronically to the above email address or, if paper, in triplicate to the MSC’s address found on the above website. To facilitate plan review and project management, all plans and information specified in these guidelines should be submitted as one complete package through a single point of contact for the project.

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## General Guidance:

- ❑ Is the MODU's stability being reviewed under NVIC 3-97? If yes, then MSC review of stability items is not required.
- ❑ If the vessel is new and not a sister vessel, has the Application for Inspection been submitted? In general, plan review may not occur until a copy of the Application is received.
- ❑ Does the submission include all necessary information to demonstrate compliance with the applicable requirements? At a minimum, submissions should include the following:
  - Hull Model – we will generate a hull model from the lines, offsets or provided computer disk using computer software (GHS or HECSALV are preferred) to verify the stability of the vessel using the model.
  - General arrangements and profile drawings
  - Hydrostatics or curves of form
  - Tank capacity tables
  - Maximum KG curve or table
  - Calculations of lightship values from stability test data
  - Sample loading conditions
  - Location of downflooding points
  - Damage stability calculations
- ❑ The basic requirement for the stability 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).
- ❑ Does the submission clearly state what is desired from MSC?
- ❑ Are all plans requiring Coast Guard review and/or approval submitted in triplicate (if submittal is in hard copy)?
- ❑ Are there any special/unusual requests or a time critical element involved?

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## Specific Topics:

- ❑ MODU's are required to have a load line, and are required to comply with the provisions of 46 CFR, Subpart E.
- ❑ In lieu of meeting the requirements of 46 CFR Subchapter S, Floating Offshore Installation (FOI) or Floating Production and Storage Offloading (FPSO) units may meet the requirements of reference (h).

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- Wind tunnel testing is not specifically approved. However, wind tunnel testing may be performed to augment the calculation requirements of 46 CFR 174.045. Use of wind tunnel testing will be at the discretion of the MSC, per reference (g). The MSC will consider wind heeling moments derived using wind tunnel testing provided that they are as conservative as those calculated in accordance with 46 CFR 174.055.
  
- Intact Stability Requirements (46 CFR 174.045):
  - Intact stability calculations should be submitted for each of the MODU's normal operating conditions using 70 knots winds and for each of its severe storm conditions using 100 knot winds.
  - Maximum KG curves or tables must account for worst case or specific load case trim.
  - Maximum deck loads from sample loading conditions shall be equal to the maximum deck load specified in the vessel's leg strength calculations (if Jack-up).
  - Sample load case VCGs shall fall below the resultant maximum allowable KG curve.
  - Submitted maximum KG values in the intact condition shall be equal to or less than the maximum values determined by software.
  
- Damage Stability Requirements (46 CFR 174.065):
  - Damage stability calculations should use 50 knot winds in the submittal.
  - Submitted maximum KG curves or tables (normal operating condition(s) and severe storm condition(s)) are a composite of the maximum KG curve determined from intact stability plus the maximum KG curve determined from damage stability for each of its normal operating conditions and severe storm conditions.
  - Submitted KG values for the MODU in the damaged condition should be equal to or less than the resultant maximum allowable KG curve determined by software.
  - For Self-Elevating Units, ensure damage stability calculations are submitted for each compartment within 5' of the hull, between two adjacent watertight bulkheads, the bottom shell and the uppermost continuous deck (46 CFR 174.080(a)).
  - For Column Stabilized Units, ensure damage stability calculations are submitted for watertight compartments that are outboard of, or transverse by, a plane which connects the vertical centerlines of the columns on the periphery of the unit, and within 5' of an outer surface of the column or footing on the periphery of the unit (46 CFR 174.085(a)).

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## **Definitions:**

Downflooding Point: The lower edge of an opening through which progressive flooding may take place.

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## **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 guidance 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 MSC, the unit responsible for implementing this guidance.

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