

MSC Guidelines for the Review of Oil Field Waste Barge (OFWB): General Arrangement, Structures, Lightship, and Stability

Procedure Number: C1-17

Revision Date: February 13, 2014

R. J. LECHNER, CDR, Chief, Tank Vessel & Offshore Division

Purpose

This Plan Review Guideline (PRG) explains the requirements for seeking plan approval for Oilfield Waste Barges (OFWB) from the Marine Safety Center (MSC) in accordance with the below references.

References

- a. 2007 ABS Rules for Building and Classing Steel Vessel for Service on Rivers and Intracoastal Waterways
 - b. 46 CFR 170, Subpart F, Determination of Lightweight Displacement and Center of Gravity
 - c. ASTM F 1321-92
 - d. NVIC 17-91, Guidance for conducting stability tests
 - e. 46 CFR 170, Subpart E, Weather Criteria
 - f. 46 CFR 174, Subpart B, 174.015
 - g. NVIC 7-87, Guidance on Waterborne Transport of Oil Field Wastes
 - h. G-MTH-3 Policy Letter, dated 22 Sep 1989
 - i. G-MTH-3 Policy Letter, dated 12 March 1990
 - j. G-MTH-3 Policy Letter, dated 7 June 1990
 - k. G-MTH-3 Policy Letter, dated 26 February 1990
 - l. G-MVI-4 Policy Letter, dated 29 April 1991
 - m. G-MVI-4 Policy Letter, dated 6 April 1992
 - n. MSC Marine Technical Note 04-95, Light Ship Change Determination
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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.

E-mail: msc@uscg.mil

Phone: 703-872-6731

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

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Background

Oil field waste is oil mixed with water, sludge, petroleum drilling products, and other hazardous liquid materials. It is un-pumpable by conventional means. Oil field wastes may present a wide variety of potential hazards, and have unique transportation and handling problems. The liquid content of the material should be reduced to no more than 40% liquid by volume prior to movement of the oil field waste vessel and it should not contain free oil. In addition, the flash point should be greater than 300 degrees F.

In general, the regulations and applicable provisions for the carriage of oil field waste (including provisions for cargo, route, structures, and stability) restriction are contained in 46 CFR, Parts 30 through 40 (Subchapter D).

However, due to the unique nature of the cargo as a bulk, un-pumpable hazardous material, OFWB's do not fall neatly under the regulations. Therefore the Coast Guard has established equivalent standards, policy letters and inspection guidance for the purpose of environmental protection, and safe transportation (vessels/personnel safety).

General Review Guidance

- ❑ Has an 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 properly?
- ❑ Are all plans to be stamped/returned submitted in triplicate (if submittal is in hard copy) or electronically submitted? If submitted electronically, no stamp is required. Copy of the "Approved" or "Examined" plans and documents to be provided to the OCMI if electronically submitted.
- ❑ Are there any special/unusual requests or a time critical element involved?
- ❑ Is the vessel being reviewed under NVIC 10-82? If **Yes**, then ABS will review structural and structural fire protection plans; these plans may be reviewed by CG under normal oversight procedures. The Coast Guard

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retains review of the General Arrangement Plans; disregard sections for structure and structural fire protection when conducting normal plan review.

- Is the vessel being classed by ABS? If **Yes**, check file for ABS letter/drawings or request from submitter/ABS. As stated in 46 CFR 31.10-1(c), CG considers ABS structural review for class as acceptable for showing compliance with US regulations.

Note: This Plan Review Work Instruction (PRG) is applicable to OFWB's on protected waters routes. The construction standards applicable to OFWB's utilized for other routes must be determined by the Commandant (CG-5212).

GENERAL ARRANGEMENT

- (A) Hopper Type
 - Verify that the coaming is at least 3 foot above the surface of the lightest product to be carried, see reference (i). The wall of the hopper may be counted towards the 3 feet, see reference (i).
 - Verify that the vessel is fitted with a breakwater, (which can be the hopper coaming), see reference (j).
 - Verify the total height of breakwater and freeboard is at least 6 feet along the vessel, see reference (j).
 - Verify that the sections of the double hull standards of 33 CFR 157.10d(d) (OPA 90) have been met. See PRG C1-16 for guidance on Tank Barge General Arrangements.
 - Verify the vessel is fitted with watertight bulkheads to reduce the effective of shifting materials, see reference (g).
- (B) Deck Bin Type
 - Verify the double boundary protection of deck bin per 33 CFR 157.10d(d) when the cargo boundary is within 30 inches of the side, reference (j). See PRG C1-16 for guidance on Tank Barge General Arrangements.

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Note 1: Deck bins are typically 4 to 5 feet in depth and divided into four compartments.

Note 2: Open hopper type OFWB's on protected waters routes are not required to be fitted with watertight hopper covers. OFWB's on routes other than protected waters are required to be fitted with watertight hopper covers.

STRUCTURES

□ (A) Hopper Type

Verify that the vessels are constructed as follows:

- The applicable tank barge sections of ABS Rules, reference (a), section 3, shall be used for the vessel structural review. See PRG C1-12 for guidance on Inland Tank Barge Structures.
- Verify that the tank boundary bulkheads meet the standards of ABS Rules, reference (a), Part 3.2.1/19.3 with the specific gravity of 1.05 to the top of the coaming. All other watertight bulkheads shall be reviewed as per ABS Rules, reference (a), Part 3.2.1/19.5 with a full hopper of cargo using highest specific gravity to be carried.

Note: ABS rules for dry cargo barges are not acceptable for OFWB's of hopper type

□ For existing vessels (hopper type),

- Verify the specific gravity to be used for structural purposes is the weighted average of water and highest density cargo, see reference (m)
- Verify that the hopper scantlings meet the standards of reference (a), Part 3.2.1/19.5, with full hopper of cargo using the weighted average specific gravity. See Policy Letter G-MVI-4, date 6 April 1992, reference (m).
- If cargos with specific gravities higher than 1.05 are to be carried, verify that the hopper scantlings meet the non-tank bulkhead requirements

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- (ABS Rules, reference (a), Part 3.2.1/19.5 with the higher cargo density per 46 CFR 151.15-3(c) and reference (h).
 - Verify that cargo density is assumed homogeneous, see reference (h), 46 CFR 174.310(e)(1).
 - Verify that cargo is considered to be liquid for the structural review, reference (i).
- (B) Deck Bin Type
 - Verify that the non-bin structural members meet the standards of ABS Rules, reference (a), Part 3, Chapter 2. See PRWI for Deck Barge Structural Review.
 - Verify that the tank boundary bulkheads (bin boundaries) meet the standards of ABS Rules, reference (a), Part 3.2.1/19.3 with the specific gravity of 1.05 to the top of the deck bin. All other watertight bulkheads shall be reviewed as per ABS Rules, reference (a), Part 3.2.1/19.5 with a full bin of cargo having the specific gravity cargo.
 - Verify that cargo density is assumed homogeneous, see reference (h), 46 CFR 174.310(e)(1).
 - Verify that cargo is considered to be liquid for structure review, reference (i).

STABILITY

In general, OFWB's must meet the stability requirements of 46 CFR Subchapter S. The intact stability requirements of 46 CFR 174.015, with a 10 foot degree right energy requirement and the weather criteria of 46 CFR 170.170, are applicable

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 references (f) and (e).

A satisfactory stability review results in operational guidance in the form of a stability letter, and approved vessel loading conditions.

In addition, stability reviews may be preliminary or final, depending on the basis of the light ship values. Preliminary stability calculations are not

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required, but at the option of the owner/naval architect they may be submitted before the incline 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 incline 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 (n) for further guidance and acceptable ranges).

- When conducting Stability reviews for OFWB's:
 - Verify Lightweight Characteristics utilizing one of the following methods:
 - (1) Does a sister vessel with known characteristics exist?
 - (2) Has an approved procedure and subsequent stability test been performed in accordance with references (b), (c), and (d) and reviewed in accordance with the PRG Gen-02, Submission of Stability Test Results.

Ensure the following items have been received:

- General Arrangements
- Lightship values
- Lines, offsets, or computer disk with hull model
- Hydrostatic Tables
- Tank Capacity Tables\Plan
- Intact stability calculations

(A) Hopper Type

- A Stability study may not be necessary if the vessel meets all the following conditions: (as outlined in enclosure (2) of reference (g))
 1. The maximum specific gravity of the cargo does not exceed 3.0 (12 cu ft/long ton or 25 lb/gal).
 2. The barge characteristics are:

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- Beam/depth ratio exceeding 2.3;
 - a long parallel mid-body with a nearly rectangular cross-section;
 - a cargo hopper recessed into the main deck so that most of the material is carried below the main deck;
 - and buoyant voids surrounding all four sides of the hopper.
3. The cargo hopper must be subdivided with a longitudinal centerline bulkhead and enough transverse bulkheads so that no compartment exceeds $\frac{1}{2}$ the length of the hopper.
 4. When the specific gravity of the material exceeds 2.0 (24 cu ft/long ton or 16.7 lb/gal), the hopper must be subdivided by longitudinal centerline bulkhead and enough transverse bulkheads so that no compartment exceeds $\frac{1}{3}$ the length of the hopper. In specific cases where wing void width is less than 5 feet and the draft to depth ratio (d/D) exceeds 0.6, the hopper must be further subdivided so that each compartment is no wider than $\frac{1}{3}$ of the hopper width.
 5. The maximum allowable draft does not exceed the minimum of one of the following three cases:
 - a. draft = $D - 3$ feet (D = depth of the barge at side (ft.))
 - b. draft = $0.7 \times D$ (D = depth of the barge at side (ft.))
 - c. draft = draft corresponding to a full hopper of cargo having the maximum specific gravity of cargoes to be carried in the hopper. Normally, this draft will corresponds to the maximum load determined from the structural capabilities of the hopper.

If the vessel does not meet the above conditions, the following stability requirements apply:

- Verify that the criteria of 46 CFR 174.015, 10 foot degree righting energy criteria have been met, reference (f). (ensure use of the maximum free surface corresponding to the highest cargo to be carried, see 46 CFR 172.087(b)).
- Verify the criteria of 46 CFR 170.170, GM weather criteria, reference (e) has been met.
- Verify that the minimum freeboard is 3 feet.
- Verify that cargo density is assumed homogeneous for the calculations, see reference (h), 46 CFR 174.310(e)(1).

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- ❑ Verify that cargo is considered to be liquid for stability, see reference (i). (Spillage of cargo is considered acceptable in stability calculations).
- ❑ Verify that the top of coaming is considered downflooding point, see reference (m), breakwater should be fitted, see reference (j).

(B) Deck Bin Type

- ❑ Verify that the criteria of 46 CFR 174.015, 10 foot degree righting energy criteria has been met, reference (f). (using the maximum free surface corresponding to the highest cargo to be carried, see 46 CFR 172.087(b)).
- ❑ Verify that the criteria of 46 CFR 170.170, GM weather criteria has been met, reference (e).
- ❑ Verify that the deck bin has 1 foot minimum ullage, see reference (k).
- ❑ Verify that cargo density is assumed homogeneous for the calculations, see reference (h), 46 CFR 174.310(e)(1).
- ❑ Verify that cargo is considered to be liquid for stability, reference (i).
- ❑ Verify that spillage of cargo occur at or above 5 degrees of heel, see reference (k), (spillage considered acceptable in stability calculations).

All items above plus the following:

- ❑ Construct a full HECSALV or GHS model including compartmentation.
 - ❑ Verify the stability of the vessel using the computer model, including verifying compliance for the SLA.
 - ❑ The MSC may construct a computer model from the lines, offsets, or provided disk, and independently verify the intact stability of the vessel using the model.
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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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Note: For deck bin type OFWB, the top of the bin is considered the down-flooding point.

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 guidance. 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.