



**U.S. Environmental Protection Agency**



**U.S. Maritime Administration**

This document is one section from the “National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs,” published in May 2006. The reference number is EPA 842-B-06-002. You can find the entire document at <http://www.epa.gov/owow/oceans/habitat/artificialreefs/index.html>.

# **National Guidance: Best Management Practices for Preparing Vessels Intended to Create Artificial Reefs**

## **Solids/Debris/Floatables**

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## SOLIDS/DEBRIS/FLOATABLES

***Narrative Clean-up Goal:*** Remove loose debris, including materials or equipment not permanently attached to the vessel, which could be transported into the water column during a sinking event.

### ***What are solids/debris/floatables?***

Solids, debris, and floatables are loose materials that could break free from the vessel during transportation and placement as an artificial reef, thereby adversely affecting the ecological or aesthetic value of the marine environment or posing a risk to humans or animals. These materials can consist of vessel debris and clean-up debris. Vessel debris refers to material that was once part of the vessel or was generated during vessel clean-up operations and has been removed or disconnected from its original location on the vessel. Clean-up related debris is material that was not a part of the vessel, but rather was brought on the vessel during preparation operations.

### ***What are the potential environmental impacts of solids, debris, and floatables?***

Marine debris consists of solid materials of human origin discarded at sea. Floatable material/debris is any unsecured foreign matter that floats, remains suspended in the water column, or washes up on shore. Floatable materials can travel long distances in the ocean and be deposited far from their source. The degradability of floatable materials and marine debris influences the persistence of these items in the marine environment. Most marine debris does not biodegrade readily. The longer that introduced materials remain in the marine environment, the greater the threat they pose to the environment.



Photo courtesy of Laura S. Johnson

Solids, debris, floatables, and exfoliating paint on a vessel of the MARAD James River Reserve Fleet.

Some potential impacts of solids/debris/floatables to the marine environment include:

- Marine life is endangered by entanglement, ingestion, or both; injury, infection, and death may often occur when marine animals encounter debris of this nature. For example, floating debris may act as an attractant for marine animals that would try to use it as shelter or a food source, thereby potentially causing injury or death and altering behavior and/or distribution of indigenous species;
- Alteration of the ecosystem and its processes may occur throughout the water column as a result of debris introduced into the marine environment. Debris settling on the bottom may change benthic floral and faunal habitat structure, potentially causing a direct deleterious impact on members of the benthic community (i.e., injury or mortality) or indirect impact to other species linked in the benthic food web;
- Recurring clean-up for coastal communities impacted by the debris -- which could be costly; and
- Increasing the risk of spills and other environmental impacts resulting from potential danger to navigation (e.g., hull damage, damage to propellers, and damage to cooling and propulsion systems).

***Where are solids/debris/floatables found on ships?***

Solids, debris, and floatables can be found anywhere within the vessel as well as on the decks.

***How should the vessel be prepared; what are the appropriate BMPs for solids/debris/floatables?***

**Vessel Debris**

All material or equipment that is not an integral part of a permanently attached appurtenance and that could become separated from the vessel during sinking should be removed from the ship prior to sinking. Ship's surfaces (e.g., decks, bulkheads, overheads, and surfaces of appurtenances) should be thoroughly cleaned to remove all dirt, loose scale, trash, exfoliating paint, paint chips, hazardous materials, and other foreign matter (including netting material). Deck drains should be proven clear of debris. Consideration should also be given to the removal of items that could become a floatable over time (e.g., floatable fiberglass insulation, floatable foam).

When assessing vessel debris removal, consideration should be given to the following:

- no vessel debris contaminated with hydrocarbons or hazardous material should remain in the vessel;
- vessel debris that is heavy and/or bulky fitted equipment, and was disconnected or otherwise detached from the structure of the vessel for cleaning or inspection can

remain in its original compartment subject to issues of diver safety. Otherwise, vessel debris should be contained in a sealed compartment or structural tank that is below the waterline of the ship and underneath the largest section of the superstructure;

- vessel debris should not be placed in a compartment or structural tank that will be sealed until both the compartment and the debris have been inspected; and
- vessel debris remaining on the vessel should always be negatively buoyant.

Any vessel debris determined to be acceptable to remain on the vessel for sinking should be cleaned as understood in the context of this guidance.

### **Clean-up Related Debris**

Clean-up debris that was introduced to the vessel solely for cleaning purposes and final preparation of the vessel should always be removed. This would include items such as tools, generators, warning tape, and temporary wooden covers.

### **Introduced Debris**

Foreign material should not be placed on the vessel solely for disposal. However, material needed for the reefing operation (e.g., clean concrete or rock for ballast) or of a commemorative nature (e.g., plaques and markers) is not considered debris for the purposes this document.