



SHIP SAFETY BULLETIN

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**Subject: THE USE OF PASSIVE ANTI-ROLL TANKS (ART) ON
SMALL FISHING VESSELS**

Introduction

The purpose of this Ship Safety Bulletin is to caution the operators of vessels that are fitted with Passive Anti-Roll Tanks (ARTs) about the safety hazards associated with their use.

Within the industry Anti-Roll Tanks are sometimes called "Flume Tanks" or "Stability Tanks". "Anti-Roll Tank" (abbreviated ART) is the preferred name because "Flume Tank" is a registered trade mark of Flume Stabilization Systems Inc. and ARTs reduce stability not increase it as the name "Stability Tank" may incorrectly imply.

Operation

No vessel should operate an ART without a correctly prepared Stability Booklet that has been submitted to Transport Canada Marine Safety (TCMS) for review, stating that the vessel meets all of the TCMS stability criteria. *Where this is not the case and a vessel is fitted with an ART, TCMS will inspect the vessel, review the limitations of operation based on the vessel's stability and where it is considered appropriate and safe issue a restricted operational certificate (SIC 29).*

It is the responsibility of the vessel's Owner to ensure that the vessel, it's equipment, fishing gear, cargo, tank loads, ballast, and operation are consistent with that presented in the Stability Booklet. Vessels having Stability Booklets are not to be modified in any way without TCMS approval. Vessels that have their weight and centre of gravity modified resulting in a significant change to their stability characteristics, require a new or revised Stability Booklet and the ART calibration should also be checked and revised as necessary.

The Master should always minimize the free surface in other tanks (oil, fuel, fresh water, and water ballast) and fish holds as much as practicable. Refrigerated Salt Water (RSW) tanks, and cargoes of capelin and herring are of particular concern. Permanent ballast installed in the vessel must be capped to prevent shifting.

Keywords:

1. Anti-Roll Tanks
2. Stability
3. Operation

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Owners of commercial vessels, registered and licensed, automatically receive Bulletins.

All ART operational information should be included with the Stability Booklet. A copy of the vessel's stability book must be kept in its wheelhouse at all times. For quick reference it is recommended that a summary of the important features of the Stability Booklet and the ART be included on a Bridge Card.

Great care should be taken when using ART together with any other roll reduction device such as Paravane Stabilizers. Using these devices in combination may result in conditions that are adverse to the vessel's safety. The use of roll reduction devices may affect the vessel's handling and manoeuvring characteristics.

Weather has a significant influence on ART operation. The effect of wind and wave speed and direction must be considered and the ART must not be used when the weather conditions are adverse to its safe operation.

The vessel's operating certificate (SIC29) and Stability Booklet must indicate if it is safe to operate the ART during the winter period of December 1st to March 30th. A vessel's stability can be substantially reduced due to increased topside weight resulting from freezing spray and topside icing during this time of year. In cold weather consideration should be given to the consequences of the ART fluid freezing.

Training

The Master and any crewmember standing watch on the vessel should be familiar with all aspects of the ART operation such as: the conditions for which the ART should be dumped; how the ART is dumped; and how long dumping takes. The ART dump valves should be well maintained and an occasional practice dumping should be performed by the Master to demonstrate correct operation of the valves.

"Dumping" of ART fluid refers to overboard discharge of non-polluting substances.

Vessel owners should make arrangements with the ART designer to instruct the vessel's Master in the use of the ART installed on the vessel.

Design

Not all vessels are suitable for Anti-Roll Tank installation. In general ARTs are suitable for vessels with an uncomfortably quick roll period that makes working on the vessel difficult and potentially dangerous for its crewmembers. To make a vessel's rolling motion more comfortable an ART effectively slows down the vessel's roll. This slower roll comes at the cost of reducing the vessel's stability. A well-designed vessel will have a moderate rolling motion and still be safe.

The design of Anti-Roll Tanks is technically challenging and can have a serious impact on vessel safety if installed incorrectly. The most common cause for an improper ART installation is that:

- A) Either the vessel's weight or centre of gravity has been poorly estimated;
- B) The vessel has been modified; or
- C) The vessel's operations have been changed (such as fish type, fishing gear type and arrangement).

Anyone wishing to install an ART system should consult a qualified designer with specialized experience in ART design before making any changes to the vessel. Consideration should be given to placing the ART lower down in the vessel instead of on top of the wheelhouse as the lower decks are normally designed to take higher structural loads. A Stability Booklet and technical drawings for the ART system and its supporting structure should be professionally prepared and submitted to TCMS for review and approval before any construction commences.

The design of an ART is related to each vessel's particular characteristics and the sea state in which it operates. Therefore, the designer should prove the ART operation by trialing the vessel at sea over a range of sea and operating conditions. Adjustments should be made as required as a result of these trials. The designer will calibrate or adjust the ART by either:

- A) Adjusting the fluid level and hence the weight of the fluid; or
- B) Changing the speed at which the water responds to the vessel's rolling motion by installing flow restrictors within the ART.

A fluid level transducer, or equivalent, should be fitted in the ART with a remote read out in the wheelhouse. This will enable the Master to ensure that the proper fluid level is maintained. Phase sensing systems are also available to determine the motion of the ART fluid relative to the vessel's roll.

To ensure that the tank is totally empty the ART dump valves and piping must discharge at the bottom of the tank, and not the side. A tank whose water level is only partially reduced may not have any reduction in free surface and vessel safety may not be improved as intended.

Combining Anti-Roll Devices

Refer to Ship Safety Bulletin No. 15/2000 titled "The Use of Roll Damping Paravane Systems".