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# TRANSPORT CANADA MARINE SAFETY PROGRAM

REPORT ON THE 2013  
CONCENTRATED INSPECTION CAMPAIGN  
ON STRUCTURAL SAFETY OF GREAT LAKES  
BULK CARRIERS

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## **INTRODUCTION**

Transport Canada has adopted a risk-based approach to marine safety. Accordingly, inspections are carried out on a sampling basis, with a focus on safety-critical systems. Over time, this is expected to raise the level of compliance in those systems. However, there is still a need to examine other aspects of vessel safety. Transport Canada Marine Safety and Security (TCMSS) has a variety of tools at its disposal to carry out this type of oversight.

Internationally, Port State Control employs a similar approach to inspection of ships. The various Port State Memoranda of Understanding (e.g., Paris MOU) have had a significant improvement on the overall level of regulatory compliance through Port State Control inspections. An important addition to this inspection regime is the Concentrated Inspection Campaign (CIC). TCMSS participates in CICs through both the Paris and Tokyo MOUs. As an extension of this approach to the domestic fleet, TCMSS has stated its intent to begin specific CICs on Canadian-flagged vessels. Initiation of a CIC will be as a result of various factors: TSB findings, casualty reports, and results of monitoring inspections, among others.

In 2012, TCMSS began planning for its first domestic CIC. After an examination of a variety of issues, structural safety was identified as the topic for the upcoming CIC. Structural safety was chosen for a variety of reasons, notably public concern over the grounding and subsequent deterioration of the MV *Miner*, and the fact that structural safety had been delegated to Recognized Organizations (ROs) for more than 20 years. The decision was made to focus the CIC on Great Lakes bulk carriers (“lakers”) to make the scope of the CIC more feasible due to resource constraints and also due to some other considerations, such as the fact that lakers are built with reduced scantlings (based on operational considerations and conditions), and that the overall laker fleet is quite old (average age at the time was 40 years).

## **THE LAKER FLEET**

Lakers are unique to North America. Given the restrictive conditions within the Great Lakes and infrastructure limitations (i.e., size of the locks) the SOLAS Convention does not apply to voyages within the Great Lakes. Lakers must be dimensionally adapted to the size of the locks, which limits both their breadth and depth and, of course, they operate primarily in fresh water. However, while there may be less corrosion due to the fresh water operations compared to a sea-going vessel, the continuous off-loading on the east coast and ballasting with salt water for the trip back does take its toll.

These vessels also experience wave conditions that are much different than sea-going vessels. Wavelengths as experienced in the Great Lakes are considerably shorter than

those experienced at sea. Consequently, Class allow lakers to be built to a reduced sectional modulus (i.e., reduced scantlings). The amount of allowed reduction is based on where the vessel operates. If the vessel operates strictly in the Lakes, the accepted sectional modulus may be as low as 51% (Great Lakes and St. Lawrence River – Laker Class) that of a sea-going (SOLAS) vessel. If the vessel travels to the east coast (Nova Scotia Class), as many do, a section modulus of 80% is accepted.

Great Lakes bulk carriers tend to be much older than ocean-going fleets. With respect to corrosion, the fact that these vessels operate primarily in fresh water is a significant factor in their favour. Another significant factor is the annual winter lay-up. Because the St. Lawrence Seaway is out of operation for several months of the year due to ice conditions, most of these shipping companies have an opportunity to carry out “winter works” — a common term for getting some serious structural work carried (replacing wasted steel) without worrying about competition. All three shipping companies involved in the CIC have hull people (superintendents) responsible for the oversight of the structural condition of their vessels on a continual basis. This, and an ongoing schedule of replacing wasted steel, has contributed to an overall improvement in the condition of the laker fleet in general.

Transport Canada is also pleased to note that two of the major operators, Algoma and Canada Steamship Lines (CSL), have begun a significant fleet renewal project, which will significantly rejuvenate the laker fleet. The first of CSL’s Trillium class vessels started delivery in 2012, and Algoma’s Equinox class vessels began delivery in 2013, which will bring 14 new vessels to the fleet. In the interim, TCMSS must continue to ensure that existing vessels remain compliant with regulations.

## **CIC PROCESS**

### **PLANNING**

The CIC was planned to take place during the winter closure of the St. Lawrence Seaway, in order to minimize disruption to the commercial operation of the subject vessels. The list of vessels and their location for lay-up was obtained, and TCMSS’ regional inspection staff made contact with the operational staff of each company. Inspection dates were agreed with each company, and inspections proceeded according to the schedule. In certain cases the conditions found on board meant that a complete inspection could not be carried out. Re-scheduling of the inspections was also done to minimize disruption to commercial service. Accordingly, the final CIC inspection took place in July 2013.

## TARGETING

Vessels in the laker fleet were identified and scrutinized by Marine Safety Senior Inspectors with expertise in this type of vessel. A variety of risk factors were considered, with emphasis placed on salt cargo and time spent in salt water (elevated risk of corrosion) and high tensile steel on vessels greater than 25 years (reduced thickness provides narrower margins for wastage).

In total, 63 vessels met the criteria for consideration as part of the CIC. The responsibility for these vessels is described in Table 1. In all, 15 ships were inspected, which represents approximately 25% of the total.

**Table 1:** Organization responsible for vessels potentially subject to CIC (note that these figures represent the breakdown at the time of CIC planning)

<b>Class Society</b>	<b>Delegated</b>	<b>Non-Delegated</b>
Lloyd's Register	46	7
Det Norske Veritas	2	1
American Bureau of Shipping	1	3
Not in class	n/a	3

Vessel files held by Recognized Organizations were also reviewed in detail, particularly for vessels that were targeted but not attended during the CIC. Thickness Measurements Reports, any existing class notations, and owner-provided details of the most recent steel work were reviewed in case any items of concern were identified. TCMSS was satisfied that the vessels not attended in person did not pose any elevated risk.

## CIC DESIGN

The CIC questionnaire (see Annex 1) was based on a similar campaign on structural safety that had been carried out under the Paris MOU in 2011. Four Senior Marine Safety Inspectors with a variety of expertise were consulted in order to tailor the questionnaire to Canadian requirements and domestic operations.

Inspection during the CIC was particularly focused on the structural condition of ballast and cargo tanks. As much as practicable, inspectors conducted an internal examination of the tanks, and were to observe hydrostatic testing of the tanks (where the tanks are filled with water to a certain level and then checked for structural strength and leaks).

## **CIC RESULTS**

Overall, the CIC found that there were no major issues with structural safety in the laker fleet.

In total, 15 vessels were inspected, 11 in Ontario and 4 in Quebec. This represented 25% of the total number of potential vessels. Not all targeted vessels were seen during the period of the CIC. In some cases, scheduling conflicts around maintenance work and then the start of the Seaway season meant that not all vessels could be seen. One vessel on the targeted list was not inspected as a major renewal project was underway.

Two other vessels were not inspected as the operating company declared bankruptcy. In total, 14 of the 15 vessels were in class with Lloyd's Register, which is a higher proportion than in the fleet. The two targeted DNV vessels were the non-operational ships, and were thus not included in the CIC.

In the course of inspecting vessels, TCMSS found that the vessel repair schedules were not always available through class databases. Specifically, previous and current Conditions of Class did not always reflect the program of work carried out through the life of the vessel. From TC's perspective, it is unclear how involved class was with the repairs, and the extent of survey being carried out. This finding will be reviewed with the class societies involved.

## **THICKNESS MEASUREMENTS**

Generally, the reports show that vessels are in good condition. In some ships, "substantial corrosion" (wastage is within acceptable limits) was found, but not enough to require immediate renewal work. Most of these vessels are under a continuous program of repairs that includes steel replacement.

## **INSPECTION FINDINGS**

As per class records, all ballast tanks were inspected and tested. In order to accommodate the operational schedule of the vessels, TC did not witness any of the hydrostatic testing during the course of the CIC. TC will instead coordinate with class to attend the next scheduled hydrostatic test for a sample of the CIC vessels.

In the experience of Transport Canada's inspectors, the forward #1 tanks regularly suffer damage due to contact with lock walls. Accordingly, this was an area targeted for inspection. Another area subject to a higher rate of damage are the tanks/cofferdams near engine rooms, where corrosion is accelerated due to higher



ambient temperature. These structures will be reviewed as part of the regular risk-based inspection program.

Visibility in some tanks was limited by extent of mud. De-mudding programs are mostly in place, but the possibility of mud in the bottom of tanks should be accounted for in any future inspection program.

## **RECOMMENDATIONS**

Inspectors involved in the CIC identified the following recommendations for consideration by the Marine Safety and Security Executive, by vessel owners, or by Recognized Organizations that class domestic bulk carriers.

### ***Thickness measurements***

Thickness measurements (TMs) are key data for evaluating the condition of the vessel's structure. Vessel owners should keep copies of thickness measurements on board for reference. Vessel owners should also ensure that thickness measurements are made on a more regular basis, as they should be up-to-date (i.e., within a 5-year window) prior to establishing the repair schedule.

### ***Enhanced Survey Program***

International Maritime Organization Resolution A.744(18), adopted on November 4<sup>th</sup>, 1993, launched the *Guidelines on the Enhanced Programme of Inspections During Surveys of Bulk Carriers and Oil Tankers*. As part of compliance with this resolution, bulk carriers are subject to enhanced inspections once they reach 10 years of age. The survey report prepared to demonstrate compliance with this Resolution can be very useful for risk-based inspections on board these vessels. TCMSS should investigate the possibility of adopting a similar program in Canada.

### ***Advance Planning***

TCMSS planned and launched this CIC in a short period of time, after concerns were raised following the grounding of the MV *Miner*. The period allocated to communication with stakeholders, particularly vessel owners, has been noted to have been insufficient. More advance planning and more extensive communication with vessel owners and Recognized Organizations is recommended for any future CIC.

## **CONCLUSION**

The results of this first CIC demonstrate that the laker fleet is in generally good condition. Within the 15 vessels, there were no detentions or any major deficiencies found. Several vessels are undergoing extensive multi-year repair programs, and two of the major owners are in the midst of fleet renewal programs, a strong indication of the efforts being made to maintain this part of the Canadian fleet.

TCMSS would like to acknowledge the cooperation of the Recognized Organizations and vessel owners involved in this campaign. Although inconvenient, this type of inspection campaign does help to encourage owners to remain in continuous compliance with regulation. This helps TC to have an overall view of the condition of the fleet.