

TANKER TO BULKER CONVERSION SPECIFICS

In mid-2005 CSL International Inc (CSLI) invited Thordon Bearings to study the existing oil-lubricated sterntube system of its recently purchased 23 year-old tanker *Cabot*. The US-based company, part of Canada's CSL Group, planned to convert the ship into a self-unloading bulk carrier at the Shan Hai Guan Shipyard in China.

A key element of the project specification called for the conversion of the original oil-lubricated white metal propeller shaft bearings into a water-lubricated system guaranteeing zero risk of oil pollution from leaking sterntubes.

After reviewing all the drawings, Thordon prepared a conversion design proposal for CSLI, which then worked with the yard to finalise the project. All preparatory work was carried out while the ship was still afloat, and conversion of the existing system and installation of the Thordon COMPAC water-lubricated propeller shaft bearing system completed during dockings for the forebody conversion.

The new water-lubricated system was



COMPAC bearing cooled in liquid nitrogen and ready for freeze fit



Thordon Water Quality Package installed on CSL Acadian

designed for a propeller shaft diameter of 590mm and a shaft liner diameter of 645mm, the COMPAC bearings having length/diameter ratios of 2:1 aft and 1:1 forward.

Support for the yard, owner and Thordon was provided by Thordon's authorised distributor in China, Proco Marine Technology & Eng. Co. Ltd. Thordon's Manager of Engineering, Ken Ogle, who oversaw the project from start to finish, was also present during the system installation.

The overall conversion project was completed in March 2006, the former 67,208 dwt tanker *Cabot* emerging as the 74,000 dwt bulker *CSL Acadian* and arriving on the US west coast in mid-April.

"Thordon's approach and understanding of this project's needs were first class and their expertise in this field contributed to a smooth and fast turnaround," said Mr. Louis Martel, Vice President Technical Operations of CSLI.

Delivery of the bronze liner, seal and Thordon Water Quality Package took

two months. Based on the *Cabot/CSL Acadian* project, a sterntube conversion could be easily completed in a week to 10 days if all parts are at the shipyard. Projects can be conveniently scheduled to match the tailshaft survey cycle.

In planning conversions from a whitmetal/oil-lubricated system to a COMPAC system, Thordon requires details of the existing sterntube and shaft arrangements, bearing drawings, shaft alignment and loading calculations, and the tailshaft drawing. A typical project calls for:

- assessment of the original bearing loading condition
- conversion design package and work procedure paper
- Thordon COMPAC water-lubricated bearings
- bronze shaft liners
- Class-approved shaft coating
- water-lubricated forward seal
- Thordon self-cleaning Water Quality Package

In a Thordon COMPAC bearing system, sea water is typically pumped by a maintenance-free self-contained pumping set from a sea chest through the Water Quality Package, which removes abrasive solids from the water supply (down to 40-50 microns) and ensures a flow for bearing lubrication and cooling. The flow is monitored by low flow alarms. Water enters the forward seal, flows through the COMPAC bearings and exits at the stern of the ship (there is no aft seal).

Classification Society approved Thor-Coat shaft coating can provide tough corrosion protection for the propeller shaft, extending the period between shaft withdrawals.

Shaft liners are typically produced from gunmetal, bronze, Inconel 625 or stainless steel. Only a forward seal is

COMPAC TO REPLACE OIL LUBRICATED STERN TUBE



COMPAC fitted to stern tube

Among over 460 diverse commercial and naval references for its water-lubricated COMPAC propeller shaft bearings, Thordon highlights:

Seven (+ three on order) Princess Cruises' ships, including *Grand Princess*, equipped since 1998; Chemikalien Seetransport's LNG carrier *Cinderella* (since 1996); Algoma Central Corporation's tanker *Algonova* (since 1997); Gypsum Transportation's bulk carrier *Gypsum Centennial* (since 2000); Disney Cruises' *Disney Magic* and sistership (since 1997 and 1998); two Grimaldi Group cruiseferries (since 2001); four BP Shipping tankers; Moby Lines' ferry *Moby Rider* (since 1997); three Staten Island ferries; and 12 Flinter Groningen-owned feeder container ships. **Nw**

required, which can be a face seal, lip seal or stuffing box.

Operational benefits for shipowners in specifying a Thordon COMPAC water-lubricated bearing system at the newbuilding stage or by retrofit include:

- Zero pollution risk (oil is eliminated from the stern tube)
- Controlled bearing environment using the Water Quality Package, guaranteeing a 10-year bearing wear life
- Reduced seal maintenance costs (forward seal only)
- Ease of maintenance
- No emergency dockings (long predictable wear life)
- Survivability (non-catastrophic failure mode allows ship to get to port).

