

# CHINA NAVIGATION

NEW CARGO VESSELS CARRY ADDED GREEN ADVANTAGE – SEA WATER COOLING SYSTEMS DESIGNED TO SAVE ENERGY.

## PROBLEM

A commitment to building green, sustainable vessels that save energy and perform efficiently was at the forefront of China Navigation Company's plans for eight new 31,000 deadweight "S" Class multipurpose vessels scheduled to launch in 2013. China Navigation is the deep sea ship owning arm of the multinational Swire group.

The Zhejiang Ouhua Shipyard, Zhoushan, China, is building all of the vessels. Designed for containers, breakbulk and bulk cargo, the first of the vessels, the MV Shansi, launched in mid-April. The innovative vessels will be part of Swire Shipping's multipurpose liner trade that link north, east and southeast Asia to key markets in Australia, New Zealand and island nations of the South Pacific. The new "S" Class vessels are designed for high speed cargo handling and the versatility to carry a wide range of cargo types.

China Navigation has codified its vision for a sustainable future, with operational excellence as the guiding principle. The vision is to be the leading provider of sustainable shipping solutions and to be the customer partner of choice. China Navigation adheres to the industry's 2001 Sustainable Shipping Initiative, a shared vision for the industry to contribute to and thrive in a sustainable future.

New building is a part of that commitment to sustainability. The new "S" Class vessels are designed for best-in-class environmental initiatives, including fuel efficiency and emission reduction to deliver the lowest carbon footprint possible from operations. All areas of the ships have been designed to achieve energy savings and reliability. A long list of examples includes:

- › Reusing exhaust gases from the main engine and generators to make steam to heat the fuel
- › Hull form that combines high cargo capacity and low fuel consumption
- › Wake ducts to improve fuel efficiency cargo cranes that utilize 40 to 50 percent power of traditional cranes



## SOLUTION

### SEA WATER COOLING SYSTEM – CRITICAL COMPONENT WITH HUGE ENERGY SAVINGS POTENTIAL

One specific area identified for energy savings as well as operational and maintenance savings was the sea water cooling system. Controlled by centrifugal pumps and AC motors, the sea water cooling system is a key component on vessels. The system pumps ambient sea water into a circulating loop. This loop provides a heat exchange with the vessel's freshwater cooling system, which works to cool shipboard energy consumers that include the main engines, generators and auxiliary equipment. Once the sea water has taken on heat from the fresh water, it is pumped back into the ocean as cooler ambient sea water is drawn in and introduced to the system.

The sea water cooling pumps on the new "S" Class vessels are arranged in a 2 x 100% configuration, which means that one pump is always active and, in a traditional system, would operate at 100% flow. The second pump is redundant.

But based on cooling level requirements, the operating pump does not always need to run at 100% flow (a worst case scenario is 32° C at full flow). Depending on the area of the world in which the vessel is operating, sea water temperatures may be low enough that a lesser flow would provide sufficient cooling to the freshwater cooling system.

Because of its commitment to sustainability, China Navigation investigated methods of controlling the pump's flow rather than allow it to operate at 100% to save energy. The company selected a new system – CIRCOR Smart Technology CM-1000 Series – to provide variable speed operation for the pumps with the potential of providing up to 80% energy savings per vessel, significantly reducing energy expended and lowering each vessel's carbon footprint.

The Smart Technology system utilizes a smart controller, located in the vessel's control room, to manage the sea water cooling system's pumps and electric motors. The controller is connected to pumps and motors via an Ethernet, and uses sensors to monitor critical characteristics of the system, including system speed and flow. The controller works with frequency controllers to regulate the pump flow based on a preset cooling temperature.

Additional advantages exist in terms of sustainability. By running the pumps at only the level needed to provide preset cooling levels, the effective lifetime of the pumps, motors and related equipment is extended. That means less frequent replacement, and fewer items that require scrapping and/or recycling.



## EXPECTATION

### SAVINGS BEYOND ENERGY – REDUCED MAINTENANCE PROVIDES CREW EFFICIENCY AND LOWER REPAIR COSTS

China Navigation expects an estimated savings of up to 50% annually in terms of maintenance and labor. The CM-1000 provides 24/7 intelligent monitoring to detect pump/motor coupling misalignment, coupling damage, bearing damage, seal damage/leakage monitoring and protection against dry running.

Operating, low-level warning and alarm parameters for each system component are programmed into the system. Monitoring is constant – literally maintenance on demand – which means that a component issue can be detected at a moment's notice. This contrasts with the traditional method of assigning crew members to do regular system and component checks, freeing valuable manpower for other shipboard tasks. Should action be required, yellow warning (action required) or red warnings (immediate action required) indicators on the controller panel are activated. If necessary, the CM-1000 will switch the system from the operating pump to the standby pump to ensure that the essential sea water cooling pumping system remains operational until repairs are made.

Part of the system's value is the ability to expand and add sensors should new equipment be added to the sea water cooling system.

### SUSTAINABILITY AND LONGEVITY ARE KEY

China Navigation will measure success of the systems by the amount of power they help to save, the pump performance, time between system overhauls and the availability of spare parts when overhauls and service is required.

“Sustainability is about having the lowest possible impact on the environment,” said Jerry Chen, Product Manager, China Navigation. “We are confident that the CM-1000 system will perform well. We have worked with CIRCOR for many years, so we have confidence that they will be available for support and spare parts in 30 years' time – the lifetime of these ships.”

FOR ADDITIONAL INFORMATION VISIT:  
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