

Ice Load Monitoring System for detachable icebreaking bow

The self-propelled detachable icebreaking bow, developed for the Finnish Transport Infrastructure Agency (FTIA), will be equipped with Aker Arctic's innovative ice load monitoring system, measuring strength and functionality of both the bow and its integrated propulsion system. The FTIA has procured Alfons Håkans owned tugboat *Calypso* to push the bow.

A few years ago, the FTIA and ILS Oy developed a self-propelled detachable icebreaking bow concept to improve icebreaking capacity on Lake Saimaa, Finland's largest freshwater lake, and the Saimaa Canal. The vessel was contracted and is now under construction at Turku Repair Yard. The developing and building work are done as part of WINMOS II, an EU CEF co-funded project.

Aker Arctic designed and delivered two complete 600 kW shaft lines for the bow unit, with the purpose of improving the bow's icebreaking capability and manoeuvrability.



The self-propelled detachable icebreaking bow was developed to improve icebreaking capacity on Lake Saimaa, Finland's largest freshwater lake, and the Saimaa Canal.

Ice load measurements

The installation of Aker Arctic's Ice Load Monitoring System (ILMS) on the bow is now complete, with commissioning to commence soon. The ILMS will be used to measure the loads at the connection between the bow and the tugboat *Calypso*, and on the two shaft

lines of the detachable bow. In addition, the ice loads on *Calypso's* own two shaft lines will be monitored, which means that all four propulsion lines will be measured and the ice loading compared.

"The self-propelled detachable bow is a new concept, and therefore the Finnish Transport Infrastructure Agency wants to understand the ice loads and evaluate the performance and durability of this innovative product," explains Kari Laukia, Head of Equipment Business at Aker Arctic.

Improved safety

The Ice Load Monitoring System has been developed especially to improve safety in ice, but can also be used for measuring open water loads in harsh seas, as loads can become significant also in open water.

The sensors installed on the hull and the shaft lines send information to a central computer for real-time processing. The information is then displayed on a monitor on the ship's bridge to help the Captain in deciding how to proceed and at what speed.

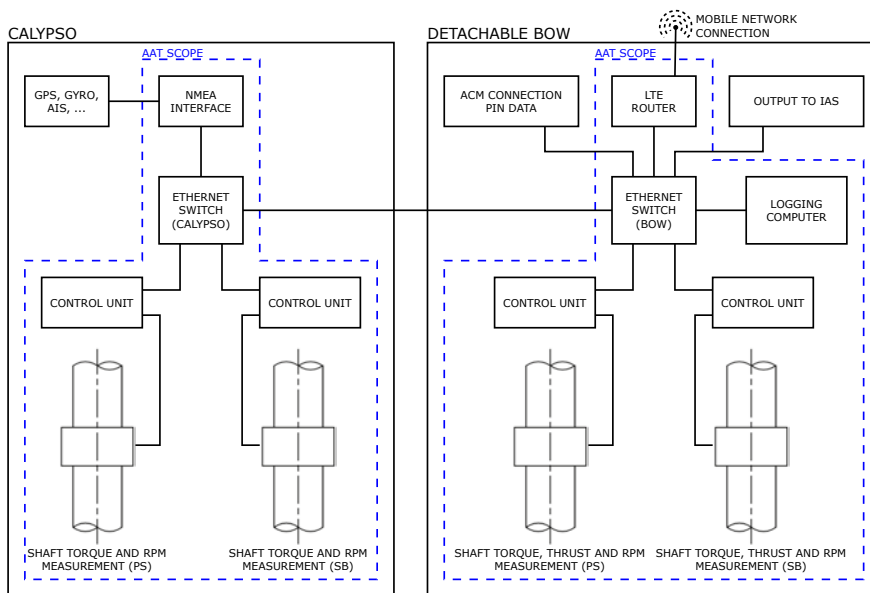
"The information displayed at the monitor can be tailored according to customer wishes about what to follow and how. The information is clear and the tool is easy to use," Laukia adds.

All information is available online and can additionally be monitored from the customer's premises if so desired. It is also saved to a hard-drive for later analyses.

Recommended use

"Typical vessels to benefit from this tool would be larger ice strengthened merchant ships, high speed special vessels and navy ships," Laukia highlights. "Even existing icebreakers wanting to continually monitor ice loads could have it installed for the same cost as they order a one-time special load survey."

The self-propelled detachable bow will be delivered before winter this year with testing scheduled during the coming winter months.



The sensors installed on the hull and the shaft lines send information to a central computer for real-time processing. The simplified measurement system diagram shows the information gathered from shaft lines.



The Ice Load Monitoring System (ILMS) has been developed especially to improve safety in ice.



The ILMS will be used to measure the loads at the connection between the bow and the tugboat *Calypso*, and on the two shaft lines of the detachable bow.

Pictures: Kuvakasvot Oy/TRY/FTIA