

# Trimaran icebreaker family grows

One of the latest innovations in icebreaking is the use of a trimaran concept. Tests have shown that a trimaran is more efficient in breaking ice than a conventional icebreaking vessel of the same width. It is also lighter and uses less power to create a wide channel. Aker Arctic has now developed three different sizes of the trimaran concept.

The icebreaking trimaran family has grown and includes now three different sizes: a Baltic Sea icebreaker, an Arctic icebreaker and an Icebreaking harbour tug. The earlier developed concepts are the Baltic Sea icebreaker and the Arctic icebreaker with the most recent addition being the smaller icebreaking harbour tug, which has been developed up to concept design stage.

## Icebreaking harbour trimaran

This vessel is intended for year round operation in e.g. the Baltic Sea, to work as an escorting icebreaker tug assisting cargo vessels mainly in areas with first-year ice. It is planned to be an ice management vessel in harbour brash ice conditions, servicing fairways in open water conditions, oil recovery and fire-fighting, as well as acting as a multipurpose salvage tug. The vessel has a main centre hull and two pontoons on the sides. The main icebreaking direction is in ahead mode and it can create a channel about 27 metres wide, which makes it excellent for assisting wide cargo vessels in ice.

Due to the large deck area, the vessel is suitable for large light deck cargoes. Its stability makes it excellent also for maintenance work. The vessel is 45 metres long and 25 metres wide with ice-breaking capabilities of 0.4

metres at 7 knots. Theoretical icebreaking capability is about 1.2 metres.

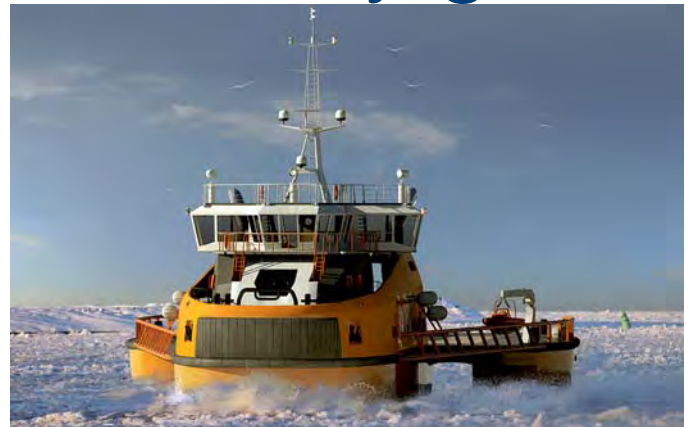
## Further testing of trimaran concept

"Last year, we performed extensive model tests in our testing basin for the harbour icebreaker; we measured loads and verified the calculated ice loads when the vessel encounters large ice features, such as ridges. The results showed that nothing dramatic happened and that loads were slightly lower than expected. This proves that the concept is feasible from a structural viewpoint and good for icebreaking," Structural Engineer Ville Valtonen says.

"We also researched the optimal width for icebreaking purposes. The results indicated that a width of up to 50 metres worked best. The original trimaran is 40 metres wide. Tests also showed that the trimaran breaks ice more efficiently than a conventional ship of the same width, because of the construction with a centre hull and two pontoons on the side." In August open water tests were performed in order to verify calculated loads, slamming loads and research on the wave conditions in which the vessel's motions are such that working on the vessel is still possible.

"The test went very well and results are promising. We will present the results in more detail in the next issue of Passion News," Mr Valtonen promises.

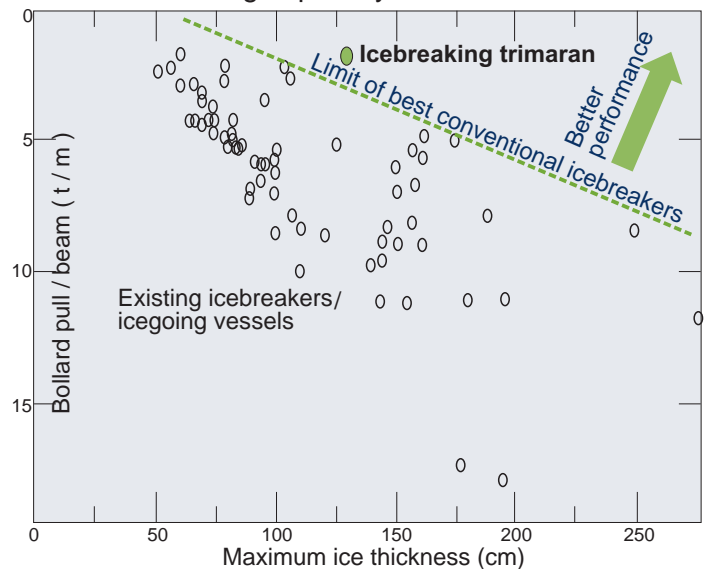
*The side hull encounters an ice field with micro cracks caused by the middle hull. These micro cracks work for breaking the ice between the hulls. Furthermore, the ice edge caused by the middle hull is freely supported whereupon the inner side of the bow of the side hull breaks the ice between the hulls with radial cracks using little energy. The outer side of the bow of the side hull breaks the ice traditionally with circumferential cracks, which often propagate all the way to the free edge caused by the middle hull.*



A smaller sized trimaran harbour icebreaker is the latest addition to our icebreaking trimaran family.

## Trimaran icebreaking capability

### Level icebreaking capability



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