# Close-towing helps to keep schedules

Close-coupled towing is common in the Baltic Sea. The icebreaker operates close to the merchant vessel, requiring agility, manoeuvrability, maximum visibility and operational skills.

Winter navigation safety and traffic schedules in the Baltic Sea rely on escort icebreakers to efficiently and promptly assist merchant vessels. This includes opening channels in ice, cutting beset vessels loose, and close-coupled towing.

Over 80% of Finnish foreign trade arrives and departs through our harbours. A well-functioning transportation system, including a sufficient number of efficient icebreakers and adequate merchant vessels, is a prerequisite for the national economy.

"Winter conditions in the Baltic Sea differ from other areas with firstyear ice because we have such a large amount of traffic," says Jarkko Toivola, director of waterways at the Finnish Transport Infrastructure Agency. "Every year, we assist thousands of vessels."

#### **Tight schedules**

Global trade is additionally dependent on tight schedules. These could not be managed in winter without the help of escort icebreakers.

"Compressive ice fields, ice ridges, thick brash ice and strong winds obstruct cargo vessels from advancing. In many situations close-coupled towing is the only possibility," Toivola says.

Icebreakers assisting merchant ships in the Baltic Sea are all equipped with a towing notch in the stern surrounded by rubber fenders. If a vessel cannot be released from ice captivity by other means, or if the vessel slows down too much risking entrapment, the icebreaker will pull the vessel into the notch and tow it through the difficult area, so that the vessel can reach its destination on time.

### **Towing requires skills**

"Close-coupled towing requires a skilled captain and an agile and efficient icebreaker. Additionally, the vessel being assisted needs to fulfil certain requirements and have persons in charge who understand how to handle a towing situation safely," Toivola explains. "Our Finnish icebreakers are from diverse eras and differ in capability, which entails varied safety margins depending on

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the icebreaker."

An additional important feature is visibility. Line icebreakers and research icebreakers have a steering position at the centreline of the vessel because the operator mostly looks forward. However, assistance icebreakers are often navigated from a starboard bridge wing with clear views in all directions to avoid any danger of collision while operating in close proximity to the vessel the icebreaker is assisting.

"A good assistance icebreaker for the Baltic Sea is agile, energy efficient and excellent at close-coupled towing," Toivola adds.

#### Needs will grow

Energy efficiency requirements for merchant vessels have become stricter in recent years and ships are now optimised for open water sailing to minimise their fuel consumption. "These changes contradict ice capabilities, which means that assistance needs and especially towing requests will increase," Toivola says.

"While climate change is shortening winters and possibly lowering assistance volumes, the escort necessity will be even higher when there is ice, because future vessels will not manage in conditions that today are considered ordinary," Toivola continues. "Forecasts additionally predict more winds which will worsen such brash ice situations where no merchant vessel can get through on its own. Close-coupled towing is often the only possible solution."

### **Baltic Sea cooperation**

Toivola emphasizes the benefits reached through the operational agreement which exists for Baltic Sea icebreaking services.

"Finnish and Swedish governmental organisations have developed an excellent model of cooperation to ensure safe and efficient winter navigation. We believe this is a model which could be extended globally," Toivola adds.

## Towing notch design challenges



In an optimal situation, a towing notch is designed to fit perfectly into the bow of the vessel being towed. In practice, this is not possible as vessels have bows of various widths, geometries and inclinations, meaning that a notch fitting one vessel does not necessarily fit another particularly well.

When planning a towing notch, the designer has to study a variety of vessels to be towed in the area of future operations, and then try to find a solution which will work with all the anticipated bow forms.

Vessels built according to the Energy Efficiency Design Index

(EEDI) will streamline bow forms in the future, because these vessels are typically designed with a rather vertical and sharp bow. If most future vessels continue the trend, the notch may be designed with a smaller opening angle allowing for a tighter fit, which helps to keep the assisted vessel coupled with the icebreaker during towing operations. Currently, the challenge is to find a compromise permitting the towing notch to fit both traditionally designed bows as well as sharper EEDI-bows.

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