

The vessel that changed arctic shipping



In 2006 the first independently operating double acting arctic cargo vessel was delivered. The ship, *Norilskiy Nickel*, proved that operations in the Arctic without icebreaker assistance is possible and changed the entire approach to arctic shipping.

Twenty years earlier in the 1980s, Finnish shipbuilders constructed a total of nineteen SA-15 series multipurpose cargo vessels used by Murmansk Shipping Company, Far East Shipping Company and Sakhalin Shipping Company. With assistance from the powerful icebreakers, *Taymyr* and *Vaygach*, the mining company Norilsk Nickel could transport their products from Dudinka to Murmansk all-year round.

However, in the 1990s the Soviet Union collapsed, Russian industry was privatised and tariffs grew constantly. This increased the already high logistic costs for the mining company. Simultaneously, the azimuthing podded propulsion unit was developed in Finland, which led to the revolutionary Azipod product and the Double Acting Ship (DAS™) concept. Kvaerner Masa-Yards (KMY) developed for ice navigation.

Innovative ideas

KMY and Norilsk Nickel initiated discussions on how to improve efficiency of arctic logistics and lower costs of the operations.



"We believed strongly in the double acting ship concept and began to make simulations with alternative vessel concepts for Norilsk Nickel," says Mikko Niini, previous KMY Sales Director and later Managing Director of Aker Arctic. "We wanted to show how much cheaper the transportation could become with independent vessels."

After many years of discussions, a separate design contract was signed for a revolutionary ship in 2003 with the construction contract signed in 2004. That year Aker Arctic was established and inherited all the arctic technology, staff, know-how and facilities from Kvaerner Masa-Yards, which simultaneously turned into Aker Yards. "As it was an entirely new type of vessel, we agreed to a special clause in the contract. If the vessel would not fulfil design targets in ice trials, Norilsk Nickel could return the vessel," Niini says. "We trusted in our expertise, our ice model tests and fully believed in the design."

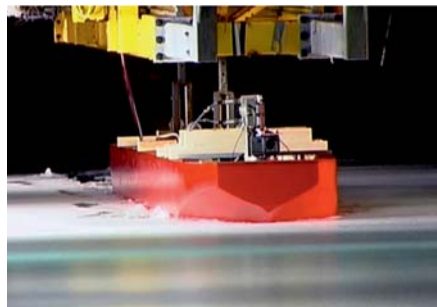
At the time of the discussions, the Helsinki Shipyard was building the first double acting icebreaker, *FESCO Sakhalin*, for FESCO and Exxon Neftegas. In addition the double acting tankers *Tempera* and *Mastera* were already transporting oil for Fortum (today Neste) in the Baltic Sea. This convinced Norilsk Nickel about Aker's ideas.

The revolutionary arctic cargo vessel was designed to break 1.5 metre ice independently without icebreaker assistance while carrying mining products in containers from Dudinka to Murmansk and Rotterdam year-round. The Yenisei channel and Kara Sea are especially challenging areas with thick level ice and brash ice channels. The vessel was at first conceived with a single 9 MW Azipod unit, but in the process of negotiations was increased to 13 MW.

Successful trials

While the new vessel was being constructed at Helsinki Shipyard, Aker Arctic Technology became an independent unit from Aker Yards. The opening ceremony and first Arctic Passion Seminar were held in March 2006 while the Arctic Container Vessel, *Norilskiy Nickel*, was in full-scale trials in Kara Sea and Gulf of Yenisei. "Aker Arctic Test Manager Göran Wilkman was onboard the ship and managed to call us on that very day to report that the vessel had clearly surpassed all performance targets," Niini reminisces.

One year later, Norilsk Nickel participated in the second Arctic Passion Seminar to present their experiences. "The vessel's construction price at that time was double of a similar capacity



Model tests while developing the concept.

conventional vessel. However, Norilsk Nickel representatives told that their calculations showed that the ship would pay itself back in three years," Niini adds.

They were extremely happy with the vessel and ordered four additional cargo vessels with the same concept. These were built at Aker Yards in Germany as the Finnish Aker Yards in Helsinki and Turku were already fully booked. In 2011, tanker *Enisey* was also built for Norilsk Nickel, using the same design concept for the hull form and propulsion.

A new standard

"One person I would like to mention, who helped us many times during those years, is René Nyberg, Finland's ambassador to Russia, who worked in Moscow," Niini says. "The 1990s were turbulent times in Russia and people in charge changed all the time. Nyberg would help to arrange, for example, a sauna meeting when there was a standstill in negotiations. He also assisted in organising a trip to Norilsk and Dudinka and discussions with the company owners, Interros's Vladimir Potanin and at that time CEO Alexander Khloponin. Learning about real -45 °C conditions indeed deepened our understanding of the project requirements."

"Important was also the role of Nikolay Matushenko, former General Director of

Murmansk Shipping Company and Chairman of ZAO Arctic Shipping Service, the operator of the Nemarc pilot Azipod vessels, *Uikku* and *Lunni*, in Arctic waters during 1993-2003, he being one of our counterparts in Norilsk Nickel at the time of negotiations," Niini adds.

Today the double acting technology has become the standard in arctic vessels and there are more and more powerful icebreakers, tankers and LNG carriers for various use in the Arctic, many of them designed by Aker Arctic.

"Icebreakers are nevertheless still a necessity in the Arctic as they help to keep channels open in the most difficult locations, secure safety of navigation and clean the ice around vessels when mooring, for instance," says Aker Arctic Managing Director Reko-Antti Suojanen. "As these special arctic tankers and container vessels can move independently in ice, they significantly reduce the need for the icebreaker support and provide significant cost savings for the overall transport scheme."

Twelve years of service

The Norilsk Nickel arctic cargo vessels have now been operating since 2006. Vyacheslav Konoplev, former Deputy Director, Head of Shipping Division and Director of Murmansk transport branch of Norilskiy Nickel from 2006 to 2015 says:

The conditions during the ice trials in 2006, with temperatures down to -40 degrees and strong wind, when all performance targets were confirmed.

"Twelve years of year-round operation of the vessel in ice conditions fully confirmed the correctness of the company's chosen transportation scheme. During this period the transportation scheme proved its optimality, with the following main advantages:

- Year-round navigation of vessels without icebreaker support on sea routes through Barents and south-western part of Kara Sea, which significantly saves costs for icebreaker assistance. Safety of independent ice navigation is facilitated by an onboard information terminal, developed by AARI, which provides real-time ice forecast and routing.
- High technical characteristics of *Norilskiy Nickel*-type vessels and their good ice performance made it possible to operate the fleet and ports of the company practically on a liner schedule, ensuring regular planned delivery of necessary cargoes to the Norilsk industrial area and export of Norilsk products to customer.
- The technical capabilities of the vessels, as well as the measures taken by the company to speed up their processing in ports, have resulted in a significant reduction in the delivery time of products to customers.
- Voyages of *Monchegorsk* in 2010 and of *Zapolarnyy* in 2011 from Murmansk/Dudinka to south-east Asia have confirmed that ships of *Norilskiy Nickel*-type can operate along the entire Northern Sea Route without icebreaker assistance until January. In other words, the possibility of extending the period of independent navigation in the Arctic by transportation vessels with Arc7 ice class up to 6 months has been proven."

Some modifications to the design have been made along the years, for instance the installation of cargo cranes, changing port diesel generators to operate on heavy fuel grades instead of diesel fuel, increase of container capacity and installation of equipment for ballast water treatment on vessels, to mention a few.

"The delivery of the fifth and last vessel in the series, *Nadezhda*, on February 28, 2009 completed the first investment project in Russia that had no analogues in the world shipbuilding practice; the construction of ships capable of transporting cargo along the Northern Sea Route without icebreaker support," Konoplev highlights.

Arctic shipping had changed. ■