WE MAKE YOU BREAK THE ICE

arctech

ARCTECH HELSINKI SHIPYARD

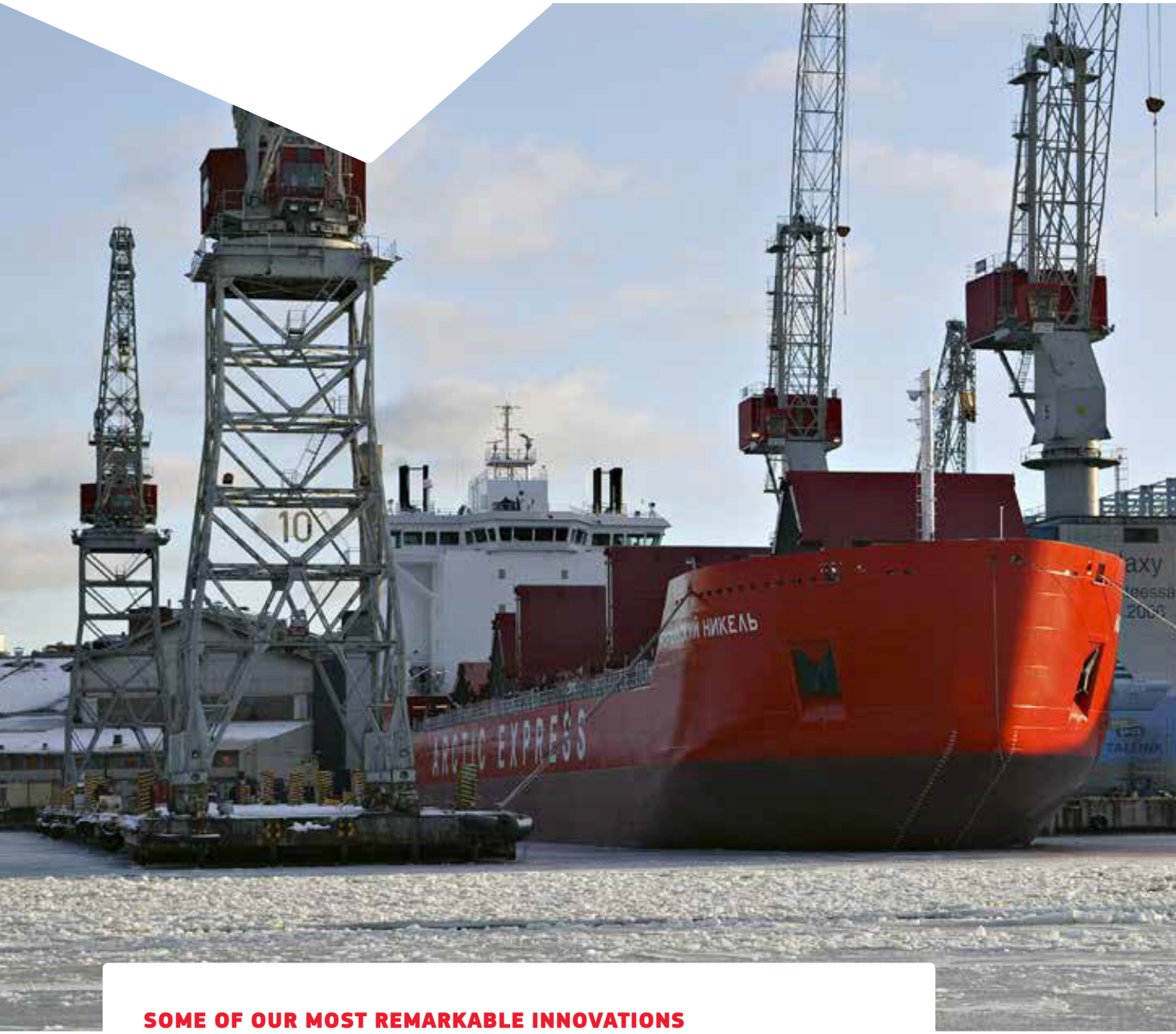
Arctech Helsinki Shipyard Inc. specializes in arctic shipbuilding technology and building of icebreakers, arctic offshore and other special vessels.

Arctech is a joint-venture owned with equal shares by STX Finland Oy and United Shipbuilding Corporation JSC. The company combines the expertise of the two major shipbuilding companies and unites the marine industry clusters of Russia and Finland.

The joint venture agreement was signed in December 2010 and Arctech started its operation in April 2011. The shipyard has though a long history. Helsinki Shipyard was established in 1865 and ships have been built in the same location for almost 150 years.

Our vision is to be the leading brand in arctic shipbuilding.

Island of Sakhalin and the Sea of Okhotsk, March 17, 2002. Credit: Jacques Descloitres, MODIS Land Rapid Response Team, NASA/GSFC, Visible Earth



SOME OF OUR MOST REMARKABLE INNOVATIONS

- **The concept of a double acting ship**, optimised to operate bow first in open water and stern first in heavy ice conditions, developed in cooperation with Aker Arctic Technology Inc.
- **Nuclear powered icebreakers** specially designed for the shallow waters of the Siberian river estuaries. The vessels can operate in the most severe conditions in the Arctic.
- **Shallow draft icebreakers** that can operate in arctic rivers or in the shallow waters of the Caspian Sea.
- **Electrical podded propulsion system** developed in cooperation with Finnish Maritime Administration and ABB, today the system is known as Azipod®.

EXPERIENCED AND INNOVATIVE

Helsinki Shipyard is the center of excellence in designing and building of complex arctic vessels. Icebreakers have been built in Helsinki for over 100 years and Helsinki Shipyard has delivered about 60 percent of the icebreakers in operation around the world.

Arctech is a forerunner in developing and applying technological innovations. The shipyard has its own design unit that develops products and services, which are technically advanced and match the customer's business needs. Our skilled design, project management and production staff has broad experience. Senior designers work together with junior experts to achieve the best solutions.

We are able to offer our clients full service from concept development to design and construction of the vessel. Arctech has 400 employees and a stable network within the maritime and offshore clusters in Finland and Russia, which enables effective cooperation, extensive Russian content and reliable production schedules.

Extensive Russian content
with reliable production schedules.

CUSTOM DESIGN SOLUTIONS

At Arctech we cooperate with ship owners and operators to achieve the best solutions for arctic shipping. Customer specific ship concepts are developed on our well proven design platforms, which enable modular ship design and modifications according to the customer's needs with short lead-time.

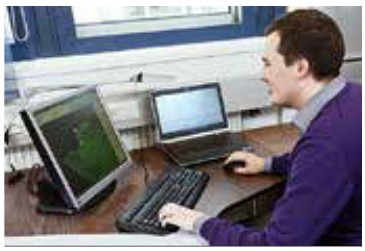
PROTOTYPE – PLATFORM CONCEPT – RANGE OF VESSELS

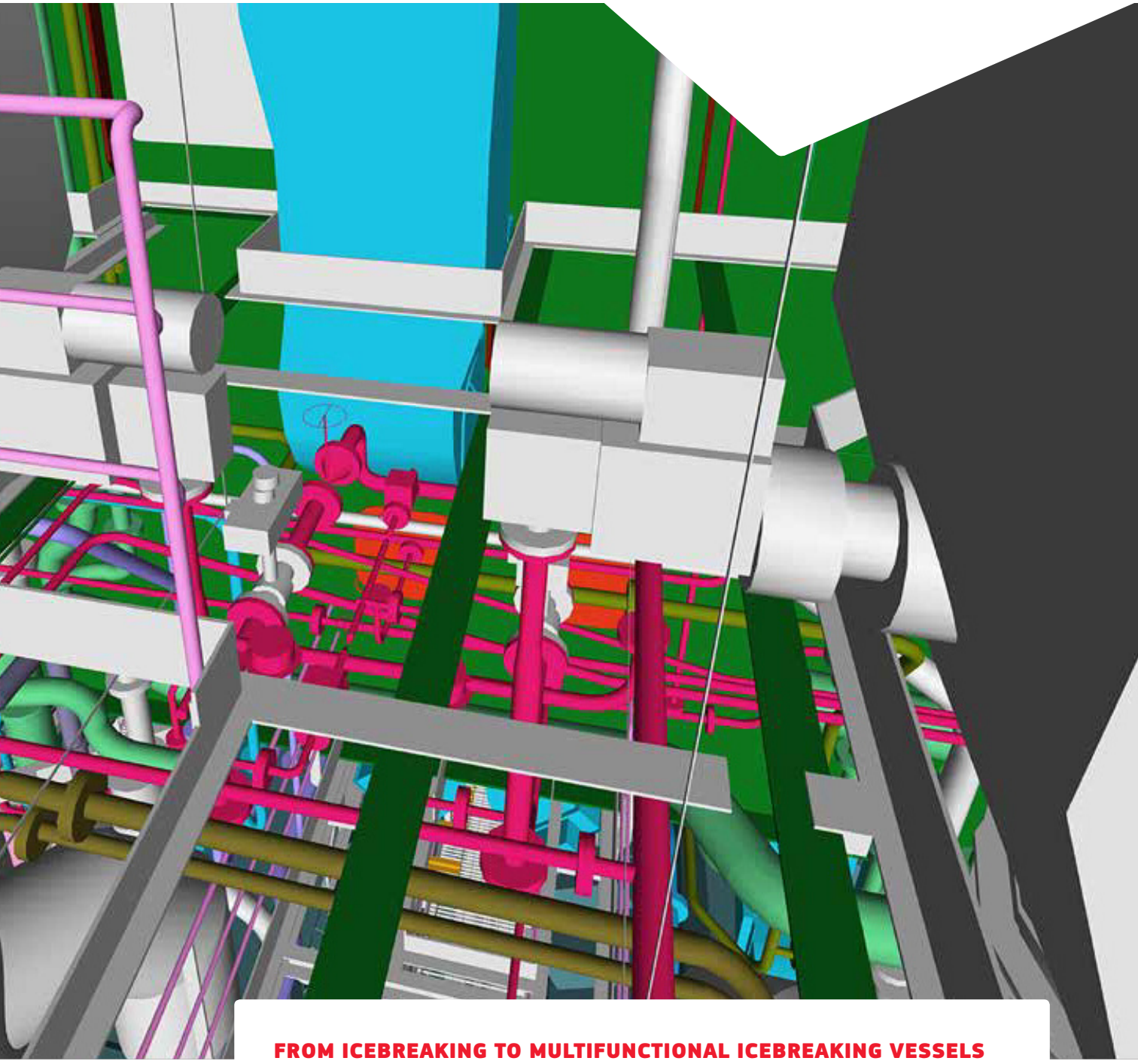
- Technical readiness for different options in propulsion and machinery.
- Hull form selection for optimal vessel performance.
- Modifications in volume and weight of the vessel.
- Applicable with different classification societies.
- Advanced winterization arrangements.
- Cargo arrangements according to capacity requirements.

OPERATIVE FEATURES IN DESIGN

- Azimuth-type propulsion enables excellent maneuvering capabilities in all directions - in open water and especially in all ice conditions.
- Optimal hull form, propulsion systems, controls for efficient operation and excellent fuel efficiency.
- State of the art technology reduces emissions to air and sea.
- Ships are designed to facilitate safe working on the deck even in winter conditions.
- Ship systems are designed to work in ice and at low temperatures.
- Using similar solutions in different types of ships makes the owner's fleet more uniform and thus more flexible for manning.

Optimized solutions
for harsh arctic conditions.



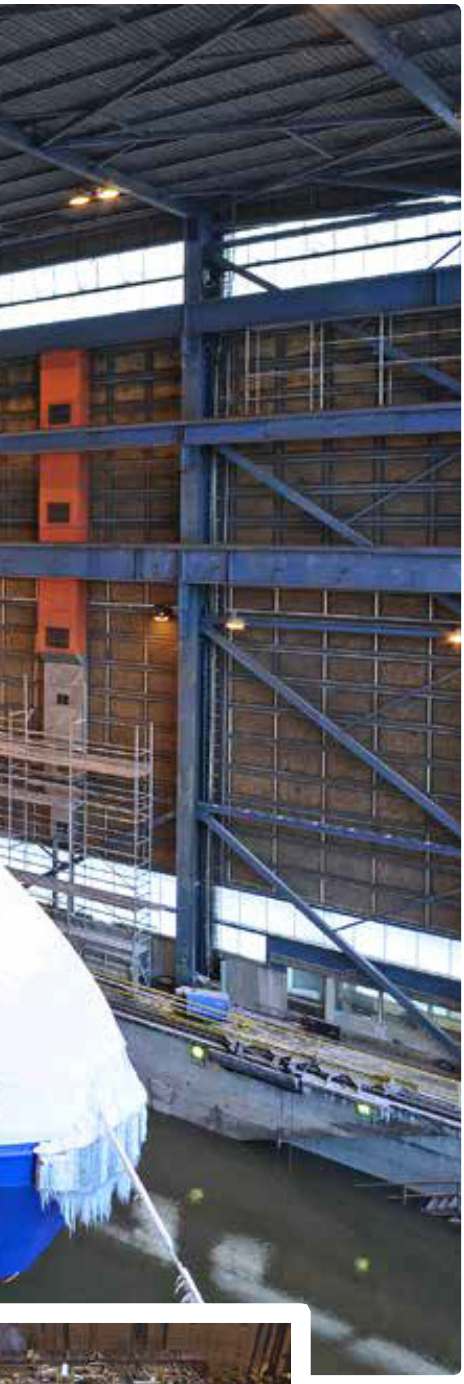


FROM ICEBREAKING TO MULTIFUNCTIONAL ICEBREAKING VESSELS

Until the late 20th century icebreakers were single purpose vessels, which assisted cargo and other vessels in ice conditions. During summer the icebreakers were only used occasionally. Today multifunctional icebreaking vessels are common in the offshore industry and icebreakers are often able to perform other functions such as oil recovery.

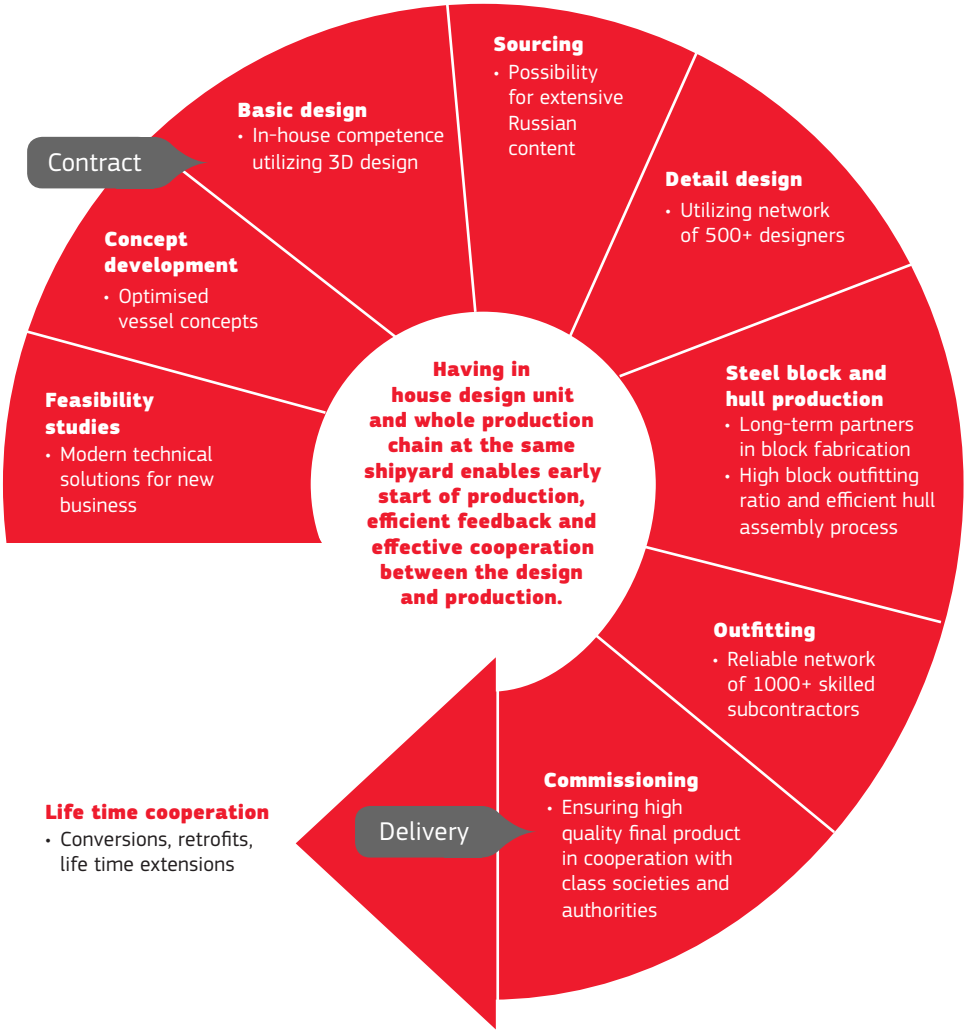
COVERED PRODUCTION FACILITIES

- Covered facilities of 2 million m³
- Covered building dock (280 m x 34 m x 9 m) with max. lift capacity of 500 tons
- Outfitting halls for more than 20 grand blocks
- Four painting halls with controlled ambient conditions and minimized VOC emissions
- Three outfitting quays



HIGH-QUALITY SHIPBUILDING

Arctech provides a complete service from concept development to design and production. We have high quality covered manufacturing facilities enabling effective shipbuilding throughout the year.



CORPORATE RESPONSIBILITY

At Arctech we design and implement products and services in the shipbuilding process ensuring health, safety, and environmental aspects.

OUR HSE TARGETS

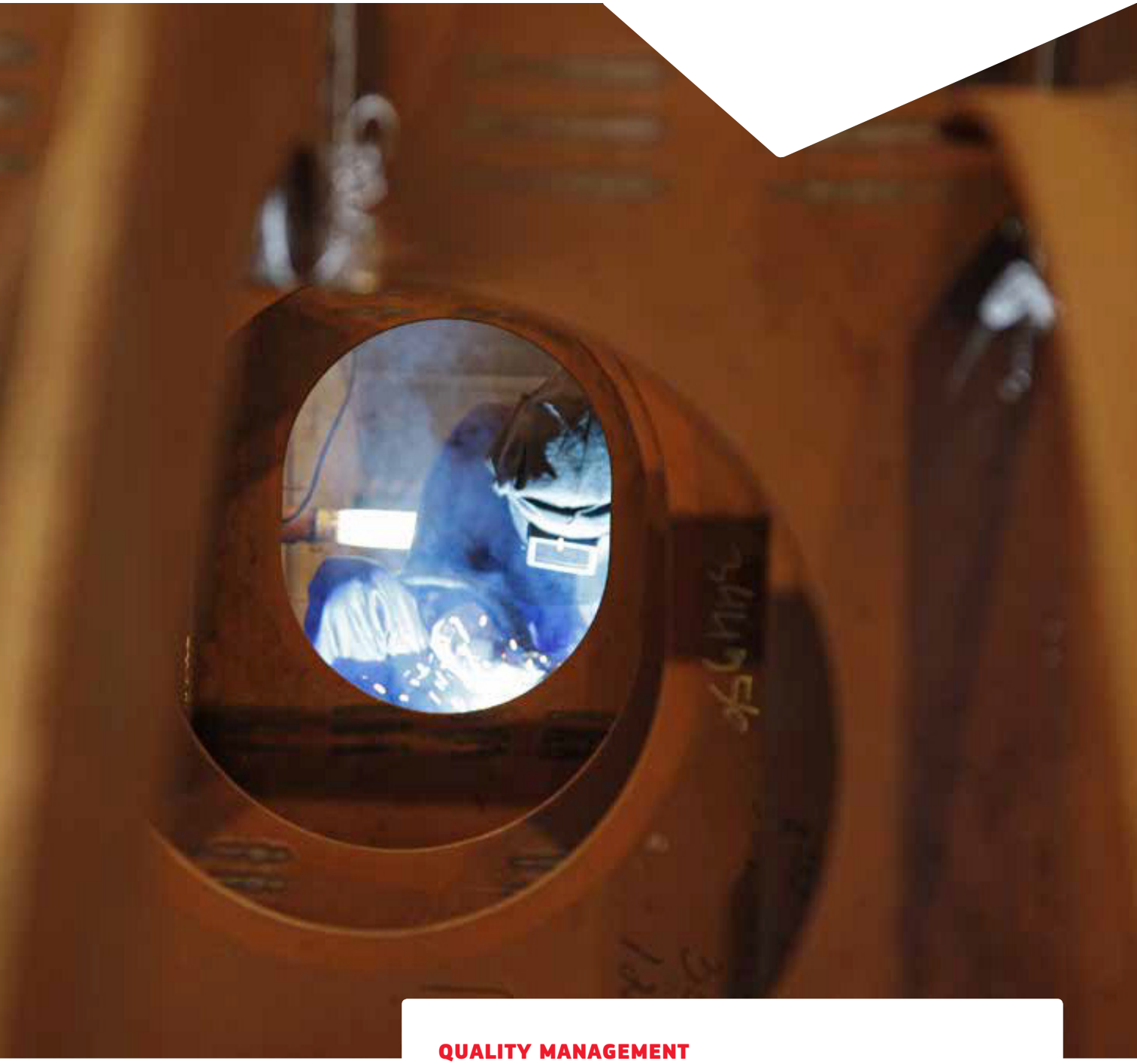
- **No accidents**
- **No occupational or work related illnesses**
- **No start of fires or fires**
- **No abuse to shipyard area and property**
- **No exceptional emissions to environment**

SAFETY REGULATIONS

We stress that it is everyone's responsibility to stop work that is endangering the safety of themselves or others. We are familiar with the safety regulations and environmental impacts of our products and services, and we develop solutions to improve safety and environmental issues.

OUR VALUES

- Customer focus
- Operational excellence
- Safety mindset and environmental care
- People respect



QUALITY MANAGEMENT

We are certified to the following standards:

- **Quality management standard ISO 9001:2008**
- **Occupational health and safety management standard OHSAS 18001:2007**
- **Environmental management standard ISO 14001:2004**
- **Quality requirements for fusion welding of metallic materials ISO 3834-2:2005**


ВИТУС БЕРИНГ

OUR PRODUCTS FOR ARCTIC SHIPPING

- Offshore vessels
- Icebreaking special vessels
- Icebreaking cargo vessels
- Icebreakers

OFFSHORE VESSELS

ARCTICABORG & ANTARCTICABORG

Icebreaking supply vessels

Arcticaborg and her sister Antarcticaborg are the first full developments of the double acting icebreaker principle (DAS), perfected at Aker Arctic Technology Inc. These shallow draft icebreaking supply vessels support offshore drilling platforms in the Northern Caspian year-round. They are also equipped for firefighting, pollution control and rescue operations, as well as for towing and anchor handling.

- **Delivery**: 1998
- **Client**: Wagenborg
- **Length**: 65.1 m
- **Breadth**: 16.4 m
- **Draft**: 2.9 m
- **Propulsion**: 3.2 MW
- **Speed**: 13 knots
- **Speed in 0.6 m ice**: 3 knots

FESCO SAKHALIN

Icebreaking supply and stand-by vessel

Fesco Sakhalin, today known as SCF Sakhalin is one of the most sophisticated and versatile ships ever built for arctic operations. The double-acting icebreaker and supply vessel is designed to serve offshore platforms. SCF Sakhalin has been specially designed for the ice management of Sakhalin 1, Orlan field in Far East Russia.

The requirements for the vessel operations and performance in harsh circumstances like drifting ice fields or ice-ridges frozen to the bottom were extremely tough. The design has been very successful in utilizing the DAS-concept to overcome these challenges. In difficult ice conditions the vessel breaks the ice stern first and in open water it is optimized to move bow first.

- **Delivery**: 2005
- **Client**: Far East Shipping Company
- **Length**: 99.9 m
- **Breadth**: 21.2 m
- **Draft**: 7.5 m
- **Propulsion**: 13 MW
- **Speed**: 15.7 knots
- **Speed in 1.5 m level ice**: 3 knots

VITUS BERING AND ALEKSEY CHIRIKOV

Multifunctional icebreaking supply vessels

Vitus Bering and Aleksey Chirikov represent the next generation of multifunctional icebreaking supply vessels. The icebreakers will be used at the Sakhalin-1 Arkutun-Dagi oil and gas field in Far East Russia. The main purpose of the vessels is to supply the oil and gas production platform and to protect it from the ice.

The vessels have been designed for the extreme environmental conditions of the Arctic. The icebreaking capability of the vessels is extremely high – they are able to operate independently in 1.7 meter thick level ice, and break consolidated 20 meter deep ice ridges. The design is based on SCF Sakhalin.

- **Delivery**: 2012 and 2013
- **Client**: OAO Sovcomflot
- **Length**: 99.9 m
- **Breadth**: 21.7 m
- **Draft**: 7.6 m
- **Propulsion**: 13 MW
- **Speed**: 15.7 knots
- **Speed in 1.5 m level ice**: 3 knots

Vitus Bering and Aleksey Chirikov

SCF Sakhalin

Arcticaborg & Antarcticaborg

Offshore construction vessel concept

NEW SHIP CONCEPTS FOR ARCTIC OPERATIONS

Purpose made designs with multiple features for ice-breaking, supply services, offshore construction, research activities, salvage and rescue, environmental monitoring or oil spill combatting.

NB-508

ICEBREAKING SPECIAL VESSELS

NB-508

Icebreaking emergency and rescue vessel

NB-508 features a patented oblique design with an asymmetric hull and three azimuthing propulsors, which allow the vessel to operate efficiently ahead, astern and sideways. The vessel can proceed on a continuous mode in 1.0 m thick level ice and in oblique mode she will be able to generate a 50 m wide channel in 0.6 m thick ice. The design is based on ARC 100 concept, developed by Aker Arctic Technology for Arctech.

NB-508 represents a completely new type of oil spill combat technology suitable for operation also in heavy waves. The vessel will be used in the Gulf of Finland.

- **Delivery:** 2014 (ongoing project)
- **Client:** Ministry of Transport, Russia
- **Length:** 76.4 m
- **Breadth:** 20.5 m
- **Draft:** 6.3 m
- **Propulsion:** 7.2 MW
- **Speed:** 14 knots
- **Speed in 1.0 level ice:** 3 knots

Advanced oil spill combatting for ice conditions.

Norilskiy Nickel

ICEBREAKING CARGO VESSELS

NORILSKIY NICKEL

Arctic container vessel

Norilskiy Nickel is the world's first commercial vessel capable of operating independently year-around in the Arctic Ocean without icebreaker assistance. It can move at 3 knots through a 1.5 m multiyear ice field. The prototype vessel Norilskiy Nickel and her four sister vessels have now been operating autonomously in the route for several years. Norilskiy Nickel was delivered in April 2006 in Murmansk after successful ice-trials in Kara Sea and Yenisey River.

- **Delivery:** 2006
- **Client:** OJSC MMC Norilsk Nickel
- **Length:** 169.5 m
- **Breadth:** 23.1 m
- **Draft:** 9.0 m
- **Propulsion:** 13 MW
- **Speed:** 16.1 knots
- **Speed in 1.5 m multiyear ice:** 3 knots

Independent operation year-around in the Arctic Ocean without icebreaker assistance.

ICEBREAKERS

IMPRESSIVE TRACK RECORD

Helsinki Shipyard has built 60 percent of the icebreakers in operation today. The references consist of Baltic, polar, lake, harbor and river icebreakers as well as icebreakers for Antarctic operations. Also several types of multi-functional icebreaking vessels have been developed and delivered.

The impressive track record includes the polar icebreaker class Ermak + 2 sister vessels and Baltic icebreaker Urho + 4 sister vessels built in the 1970's. In the beginning of 1980's river icebreaker Evdokimov + 7 sister vessels were delivered. These vessels have always represented the most advanced technology of their time and each of them has introduced several new innovations. This continuous technical development and operational improvements are still the primary features of the icebreakers built today.

TAIMYR & VAYGACH

Polar icebreakers

Taimyr and Vaygach are the first nuclear power icebreakers that have been built outside Russia. The vessels were built in Finland excluding the reactor power plant that was assembled in Russia after the delivery. These icebreakers are used in the most harsh conditions of the Arctic and their ice-breaking capability is extremely high, 2.85 m.

- **Delivery:** 1988, 1989
- **Client:** Murmansk Shipping Co.
- **Length:** 150.2 m
- **Breadth:** 29.2 m
- **Draft:** 8.0 m
- **Propulsion:** 3 propellers
- **Shaft output:** 32.5/36 MW
- **Speed:** 18.5 knots

OTSO & KONTIO

Baltic icebreakers

Otso and Kontio were the most advanced Baltic icebreakers of their time. These vessels have the world's first cycloconverter controlled diesel-electric machinery and s/s compound hull plating in the ice belt. The vessels differ from the earlier Baltic icebreakers also due to their twin-propeller set up instead of the traditional four-propeller solution. The vessels are still among the most modern icebreakers in the Baltic Sea.

- **Delivery:** 1986, 1987
- **Client:** Finnish Board of Navigation
- **Length:** 98.6 m
- **Breadth:** 24.2 m
- **Draft:** 8.0 m
- **Propulsion:** 15 MW
- **Speed:** 18.5 knots
- **Speed in 0.8 m ice:** 10 knots

Icebreakers to operate in extreme arctic conditions.

Taimyr & Vaygach

Otso

THE FIRST AC-AC ICEBREAKERS

Otso and Kontio were the first AC-AC powered icebreakers in the world. The power transmission and propulsion control systems of modern cruise ships today are mostly based on the same principle.

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