

Arctic Passion News

2 / 2010



First in the world in semi-scale modelling
Read more on page 10.



Innovative Oblique Oil Spill Combat Icebreaker

Memorandum of cooperation
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First AARC designed Caspian Icebreaker Tug delivered

Two more on the way and two additional tugs ordered.
Find out more on page 8.



Mikhail Ulyanov enters service

Read on page 4 about the biggest western shipbuilding cooperation project in Russia ever.

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Appointments
at AARC

Juha Heikinheimo
Chairman of the Board. An extraordinary General Meeting was held in July nominating Juha, CEO of STX Finland

Oy to the Board of Directors and Chairman of the Board of AARC, replacing Mr. Martin Landtman.



Rob Hindley
Project Engineer. Rob joined AARC on August 10th, having previously worked in Korea as surveyor of Lloyd's Register.



Teemu Heinonen
Research Engineer. Teemu graduated in June as M.Sc. in Naval Architecture from the Aalto University, School of Science and

Technology after spending his last spring term at UNIS, the University of Svalbard.



Tomi Auvinen
Carpenter. Tomi started last spring in model preparation workshop duties.

Front cover:

After something which can be described as the deepest co-operation ever by any Western organisation with a Russian shipyard the first AARC designed 70.000 tdw Arctic Shuttle DAS™ Tanker M/T Mikhail Ulyanov has entered service from OAO Admiralty shipyards, St. Petersburg. See also story on page 4.

Safety first

From the Managing Director



Aker Arctic's mission is to be the enabler of competitive, sustainable operations in the Arctic by creating technologies and methods for operations that previously were considered impossible. In line with this mission, new transportation systems and export outlets for oil and valuable minerals have already been taken into service in North of Russia. Many things, nevertheless, still remain unsolved, among them methods for oil spill combating and evacuation and rescue of people in the harsh Arctic environment.

This spring the whole world population turned its eyes to the Gulf of Mexico, where a disaster happened in the Mocado deepwater oil field that never should have been possible in the oil industry. Luckily the engineers managed to tap the leak, but far too much damage had happened already.

There are forces, especially the NGOs, who are aggressively fighting against any economic activity in the Arctic regions as e.g. recently when Greenpeace dispatched a ship in an attempt to disrupt offshore drilling in Greenland waters. Our current lifestyle, however, still drives for a need for new natural resources, and the question is how to make it possible within the polar circles. The Antarctic continent

has so far been protected by an international treaty, but the rush towards the North Pole appears to be gaining speed. Like the Finnish Minister of Environment, Ms Paula Lehtomäki, stated in her opening speech in our 5th Arctic Passion Seminar, a compromise has to be reached in order to create ways for sustainable operations and technologies for the exploitation of the Arctic resources.

Sustainable development and responsible solutions are Aker Arctic's policy. This was in an excellent way demonstrated again this summer. The oblique icebreaker concept, which by a young AARC engineers' team in the late 1990's won the Innovation Award within the Kvaerner Group, was selected by major Russian operators as the basis for their future Arctic offshore oil spill combat strategy (see next page). The oblique concept is targeting to find the first practical solution of some level of efficiency for oil spill collection in icy conditions. Another AARC innovation, the "double-acting" concept in heavy ice conditions in turn is the greenest solution available with least carbon footprint in Arctic shipping.

Aker Arctic Technology Inc will participate in the following events. Come and meet us there.

20.-29. September 2010

Icetech 2010
Anchorage, USA

28. -30. September 2010

Sakhalin Oil and Gas Conference
Yuzhno Sakhalinsk, Russia

6.-10. October 2010

KIOGE
Almaty, Kazakhstan

14.-15. October 2010

III Russian Offshore Oil and Gas Development: Arctic and Far East (ROOGD 2010) VNIIGAZ, Moscow, Russia

15.-17. November 2010

Arctic Shipping North America
Montreal, Quebec, Canada

24.- 25. November 2010

Offshore Support Vessel Conference 2010
London, U.K.

6.-7. December 2010

4th Annual Gas Ship Technology Conference
London, U.K.

7.-9. February 2011

Arctic Technology Conference
Houston, Texas, U.S.A.

15.-17. February 2011

Russia Offshore Conference
Moscow, Russia

17.-18. February 2011

The Annual OSJ Conference 2010
London, U.K.

3. March 2011

6th Arctic Passion Seminar
(by invitation only)
Helsinki, Finland

Innovative Oblique Oil Spill Combat Icebreaker for the Gulf of Finland

Aker Arctic Technology Inc together with STX Finland Oy, Southeast Trading Oy (SET Group), and the Russian companies OAO Sovcomflot and FSUE Rosmorport signed on May 27th a cooperation agreement, with the purpose of developing and building a new type of oil spill combat icebreaker for Sovcomflot, the largest Russian shipping company. The Memorandum of Cooperation was signed during the Finland-Russia Innovation Days in Lappeenranta in the presence of Prime Ministers V.V. Putin and M. Vanhanen. The new innovative type of vessel is a major breakthrough in the icebreaking technology and for the protection of the Baltic Sea. Furthermore, this will represent a big step forward in strengthening the Finnish-Russian cooperation in the field of shipbuilding.

This multipurpose vessel ARC 100, having an asymmetrical hull that is based on the icebreaking technology developed over the recent years by AARC, will be able to use an innovative sideways movement to collect the oil in demanding ice conditions, as well as to break a wide ice channel effectively. The vessel will also be able to solve independently escorting, rescue and emergency towing tasks even for large tankers in the Baltic Sea. The vessel that is equipped with three 2.5 MW azimuthing propeller devices, and is about 75 metres long and about 19 metres wide, will additionally be able to solve a wide range of other tasks. The parties have agreed to further develop a more advanced version for the harsh Arctic conditions, a challenge considered of high priority by all offshore operators after the recent experiences in the Gulf of Mexico. AARC has already initiated this work. ■

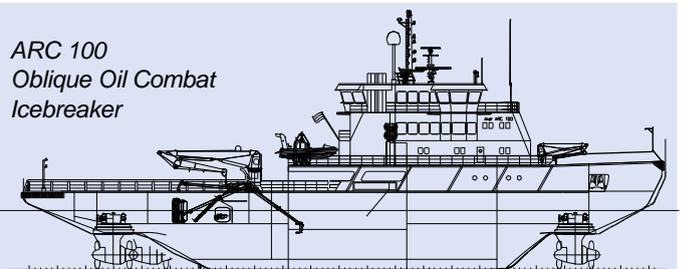


Signing of the Memorandum of Cooperation by Mr. Mikko Niini, President of Aker Arctic and Mr. Igor Rusu, General Director of FSUE Rosmorport in the presence of Prime Ministers V.V. Putin of Russia and Matti Vanhanen of Finland as well as Mr. Sergei Frank, CEO of JSC Sovcomflot.

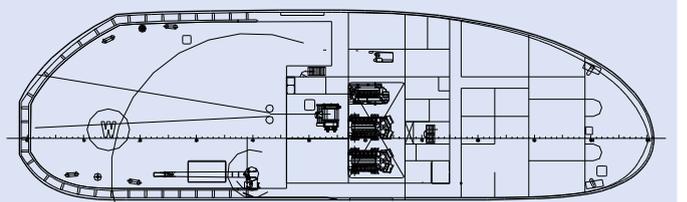


The festive signing ceremony of the Memorandum of Cooperation in Lappeenranta on May 27, 2010. From right Mikko Niini, Aker Arctic, PM Matti Vanhanen, PM V.V. Putin, Igor Rusu, Rosmorport, Kai Paananen, SET Group Oy, Sergei Frank, Sovcomflot and Martin Landtman, STX Finland. The Prime Ministers also signed a 50 year extension on the treaty of the use of the Saimaa Canal.

*ARC 100
Oblique Oil Combat
Icebreaker*



The new 50-year Saimaa canal treaty will create the need to develop year round navigation in the lake of Saimaa and the canal.



Mikhail Ulyanov enters service

M/T "Mikhail Ulyanov", first of the two shuttle tankers AARC has developed and designed for oil transportation in the Russian Arctic, has started trading while waiting for the

oil production platform in Prirazlomnoye to be installed, at the field where the reservoir

exceeds 600 million barrels. This is the biggest shipbuilding cooperation project in Russia ever and an important reference for AARC.



Mikhail Ulyanov is the biggest ship ever built at the Admiralty Shipyard in St. Petersburg and therefore the shipyard had to enlarge the building berth in order to assemble the hull.

"Mikhail Ulyanov" was a famous Russian actor and director. He was born 1927 in Bergamak in the province of Omsk and died 2007 in Moscow. The shuttle tanker "Mikhail Ulyanov" designed to transport oil between the Arctic oil field in Prirazlomnoye and the floating storage "Belokamenka" in Murmansk has been named after him. The sister ship, which will be ready for use in autumn 2010, is named after Mikhail Ulyanov's colleague Kirill Lavrov.

Both tankers were ordered by JSC Sovcomflot and built at the OAO Admiralty Shipyards in St. Petersburg. The contract on complete basic design of the Prirazlomnoye Shuttle tankers was awarded to AARC, who managed the work in cooperation with other Finnish engineering offices. It is an important reference project and the first large basic design project for AARC. The project is also the deepest shipbuilding cooperation project in Russia ever involving a Russian shipyard and approvals by the Russian authorities.

The process started already in 2003 with discussions and in 2004 the shipbuilding contract was signed between Admiralty Shipyards and Sevmorneftegas. In spring 2006 JSC Sovcomflot joined as ship operator and owner. The Basic design process of the Prirazlomnoye Shuttle tankers started in Finland in 2005.

Forerunners in Arctic tankers

The "Mikhail Ulyanov" has several interesting features not only regarding its technical solutions but also regarding its design and construction process. "From a technical point of view, the ship hull is designed according to the DAS-concept, i.e. using bow as a bow when sailing in open water and stern as a bow when operating in ice. Another special feature is the Bow Loading system for loading of oil and the Dynamic Positioning System keeping the vessel in safe position while loading. Bow Loading and Dynamic Positioning have been used for tankers in open waters but less for arctic conditions so the Prirazlomnoye tankers are forerunners in this. The ship has two 8.5 MW Azipod® propulsion units and a redundant diesel electric power plant, which is an essential safety enhancing feature," Chief designer Hannu Lehtonen, AARC, explains.

"Everything in the design, i.e. materials, structures and systems, has been chosen for usage and operations in the harsh conditions the ship is going to face in the Arctic. Furthermore, the ship has a dual classification of the Russian Maritime Register of Shipping and Lloyds Register of Shipping. Both classification societies have approved the basic design. This was also probably the first time a foreign engineering company (AARC) did the basic design for a prototype ship built at a Russian shipyard."

"Mikhail Ulyanov" is the biggest ship ever built at the Admiralty Shipyards in St Petersburg and therefore the shipyard had to enlarge the building berth in order to build the ship.

Challenges and Solutions

A shipbuilding process, especially a new design concept, always has some challenges. "Solving arising issues are part of the design and project management. An open mind is the most important asset of a designer," Mr. Lehtonen points out. "In the first open water model tests in Denmark at Force in 2005, we found that the ship speed/power in open water condition was not meeting the agreed specification of the ship. Due to physical limits at the yard the main dimensions of the ship were already fixed so improvements had to be made without adding overall length. Instead the bow design was modified and the water line length stretched a bit."

"Next issue coming up was the lightweight. In 2007 we noticed that the deadweight of the ship was developing to less than specified. In a joint meeting with the Owners, shipyard and designer, it was decided to increase the draft of the ship. This meant a number of design documents were updated followed by a new approval process. The result was that some new steel structures were added to the ship."

"The basic design process took almost five years. This schedule is actually normal for oil and offshore projects in the Arctic. We are very happy that "Mikhail

Ulyanov" is handed over and her sister ship "Kirill Lavrov" will be handed over this fall. Typically shuttle tankers made for some specific task would be finalized and handed over after the oil production platform is taken into use. In this case the delay for the first oil in Prirazlomnoye could have further delayed the ships," Mr Lehtonen says.

"Mikhail Ulyanov" was handed over to the customer end of February this year. As the oil production start-up in Prirazlomnoye has been delayed and the new tentative "on stream" date is in 2011, "Mikhail Ulyanov" has been used for shipping cargo from Muuga terminal near Tallinn to Rotterdam. She has also crossed the North Atlantic already and sailed from Klaipeda to Paulsboro near Philadelphia, USA and back to Europe.

Dual classifications

The project has involved cooperation on many levels and Mr. Lehtonen is very pleased with how things have worked out.

"Mikhail Ulyanov" has a dual classification by Lloyds Register of Shipping and the Russian Register of Shipping. In order to supervise cooperation between them, Joint Working Group meetings were held every month at the time of main design process (2006 - 2008). A Russian engineering office was assisting in supervising the design documentation in compliance with the Russian Sanitary rules and Labour Safety Rules."

"Working with the Admiralty Shipyard went well on a personal level but some challenges came as the people in charge at the shipyard changed. Shipbuilding culture in Russia is also different compared to design practises and principles in Finland so we learned a lot during the project," Mr. Lehtonen tells.



The shuttle tanker Mikhail Ulyanov is a forerunner in Arctic tankers with its Bow Loading system and Dynamic Positioning.



"The building of the tankers has been very important for the Russian shipbuilding industry," Russia's Minister of Industry Khristenko stated when he was visiting Finland last April.

Reference project

The oil field at Prirazlomnoye, south of Novaya Zemlya, is located in the Russian Arctic with extremely challenging weather

conditions. Outside temperature can go down to -46°C , wind can be up to 36 m/s and average ice time is 213 days per year. Oil drilling and transportation is initiated in such circumstances. "Our expertise in ships designed for this kind of climate is unique and therefore we want to continue to be part of similar projects in the future. This reference project shows our clients what we can do," Mr. Lehtonen concludes.



Mr. Hannu Lehtonen has more than 40 years of experience in the shipbuilding industry.

Long experience in shipbuilding

Mr. Lehtonen has worked more than 40 years in the shipbuilding industry. After graduating in 1974, he worked at the shipyard in Turku holding various positions within production, project development, sales and marketing and then joined AARC in 2007. He lives in Turku with his wife and

enjoys spending time with his three grandsons. On weekends and holidays he enjoys all that the Finnish nature can offer in terms of weekly orientation games, jogging, sailing and cross country skiing. Last winter he started a new hobby, fishing using nets below the ice.

Arctic Passion Seminar 2010



The 5th Arctic Passion seminar was held in March at AARC premises.

The seminar, which has already become a yearly tradition, included many interesting presentations. Totally 80 arctic and offshore professionals participated this year.

All presentations can be downloaded from our website www.akerarctic.com/news.

Finland's Minister of Environment, Paula Lehtomäki, talked about a sustainable approach in the Arctic.



Finland's Minister of Environment, Paula Lehtomäki, opened the seminar and talked about the necessity of a sustainable approach in any of the industrial efforts in the Arctic Region. The first keynote speaker, Mr. Robert Blaauw, Business Development Manager at Shell International Exploration and Production B.V. talked about oil major's view on challenges in the Arctic. He emphasized today's challenges, which in addition to the technological and environmental aspects has brought a new dimension into the playing arena, the NTR - the Non Technical Risks.

Mr. Robert Blaauw, Business Development Manager at Shell International Exploration and Production B.V. emphasized the need to take into account also Non Technical Risks.



Mr. Bob Derks, Technical Director of Royal Wagenborg, introduced his group's operations and experiences in winter shipping, the main topic being the Group's plans for new Icebreaking Supply Vessels, a task in which Aker Arctic also has had a significant role. The IBSV's ridge penetration performance was also demonstrated in the seminar (right).



Mr. Magne Nygård, Aker Solutions (right), Ms. Catherine Jahre-Nilsen, Statoil and Jon Kristian Holden of STX Europe headquarters were discussing the Norwegian companies' globalisation.

Captain Vyacheslav Konoplev, Fleet Manager, Murmansk Branch Norilsk Nickel reported on the winter experiences of the new five DAS™ vessel fleet operating year round in the Kara Sea and Yenisei river in liner traffic between Rotterdam and Dudinka.



Mr. Derek Buxton, Canadian Coast Guard (right) reported on the Canadian plans for a new Polar Icebreaker and handed over a CCG emblem to Mr. Mikko Niini, moderator of the seminar.

Mr. Erkki Ranki, AARC Senior Project Manager and Mr. Walter Leenes, Thrustmaster Europe B.V. (right) have reached solutions for going ahead in mutual co-operation.



The second keynote speaker was Mr. Peter Noble, Chief Naval Architect at ConocoPhillips. He talked about the unsolved issues and requirements for future arctic technology developments. Mr. Vyacheslav Konoplev, Head of Norilsk Nickel Fleet Operation in Murmansk, reported on the excellent service experience by Norilsk Nickel in the year-round trade on the Northern Sea Route of their five DAS vessel fleet.

Other topics were green shipping in the Arctic, environmental challenges and responses, innovations in icebreakers as well as a discussion about rules and regulations for Polar operations.

The 6th Arctic Passion Seminar will be held on March 3rd, 2011 in Helsinki. ■



Arctic operations are raising many questions for Mr. Niels Peter Elmbo, Maersk Supply Service (left), Mr. Mika Hovilainen, AARC Project Manager, Mr. Mikko Niini, Mr. Han Tiebout, SBM Offshore N.V. and Mr. Torben Ørting Jørgensen, Maersk Broker K/S (behind).

First AARC designed Caspian Icebreaker Tug delivered

While most Finns were spending their summer vacation, workers at STX Braila shipyard in Romania were busy finalizing the first one of a series of three Caspian icebreaker tugs developed and designed by AARC. This also meant that many of the AARC staff was busy joining testing and sea trials during summer.

The icebreaker tug MANGYSTAU-1, named after her home county, was launched on the last day of April. In the inclining tests her weight was verified as correct and her bollard pull was checked to exceed the required minimum 50 tons. This was considered as one of the main challenges in the project as she is designed to manage operations in shallow waters in the Caspian Sea. Later in July the vessel was taken into sea trials and all the system functions were checked as well as the other contracted performance values.

The series of three icebreaker tugs have been ordered by the Kazakhstan-based Caspian Offshore Construction LLC.

Second tug on the way

At the time of issuing this newsletter, the first Tug should already have been handed over and workers should be busy at finalizing the next one in order to ensure hand over before the Canals of Volga are closed for winter. "This is the first complete supply from the Braila shipyard, so a supply time of 16 months for a prototype vessel is an unbelievable achievement," says Mr. Pekka Jaakola, Project Manager, AARC.

"The ice strengthening of the hull has been designed to comply with Bureau Veritas class "Ice Class IA Super, Special service - North Caspian Sea Icebreaker with ice breaking capability up to 0,6 m level ice thickness". The design project advanced according to schedule and construction was able to begin in fall 2009," Chief Designer Mika Hovilainen, AARC, explains. STX has been very happy with AARC's performance.

Main characteristics

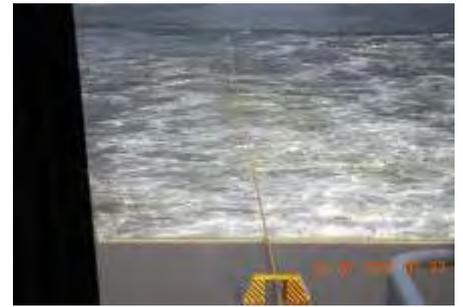
Maximum length	66,0 m
Width	16,4 m
Side height	4,4 m
Draught	3,0 m
Minimum operating draught	2,5 m
Air draught	13,5 m (above waterline)
Bollard pull	more than 50 tons



IB MANGYSTAU-1 marked with brand signs of ship owner Caspian Offshore Construction, STX and AARC. Photo: Lars Lönnberg



Testing firefighting equipment. Photo: STX Braila



Bollard pull test succeeded. Agreed specifications achieved! Photo: STX Braila

Safe area for emergency use

The challenge of these new icebreaking tugs is the 2,5 meter operating draught combined with good icebreaking capabilities. Therefore, for main propulsion three Schottel SPR 2020 azimuthing propeller units with 1 600 kW power each were chosen, so totally 4,8 MW. The tugs are equipped with four Caterpillar 3512 C type 1 790 kW diesel engines working at a speed of 1800 rpm. Total power of the engines is 7 160 kW. The vessels are designed to work at temperatures down to -35°C and a special feature is the over-pressurized indoor area -"citadel" -, where the crew can continue to operate the vessel safely even if a Hydrogen Sulphide blow-out would happen. This safe citadel can fit 300 persons if evacuation from the Kashagan oil production units would be necessary. In addition there is an air bottle system with breathing air for a crew of 12 and for 10 extra persons in case of absolute emergency. ■

Two more Caspian Icebreaker Tugs ordered

Caspian Offshore Construction LLC has been very satisfied with the AARC designed Caspian Icebreaker Tug and has ordered two more Ice-breaking Tugs from STX Norway. The contract was signed in August and the vessels will be delivered in 2011.

Key features in New Coast Guard Vessel designed by Aker Arctic

The Finnish Border Guard commissioned in March the companies Elomatic and AARC for the concept design, feasibility verification and basic design of a new border patrol vessel. The concept design and documentation is now ready for yard tendering and the goal is to have the vessel in operation in 2014. The LNG fuel option included in the task was the first LNG fuelled design AARC has been engaged in.

The Finnish Border Guard and the Finnish Environment Institute (SYKE) launched this project together. The project goal is to improve Finland's year-round rapid response capacity for oil spills, border control and marine safety operations.

The vessel has been designed to be versatile in order to perform rescue, patrol, security and coastal defense duties. It complies with the client's functional specifications of excellent seaworthiness, sufficient speed (about 18 knots), efficient surveillance and communication capacity, efficient self protection and outfit for the special tasks, ability for oil spill collection also in winter conditions, capacity to collect and carry 1200 m³ of recovered oil/chemicals, capability to operate in a chemical disaster, emergency towing capacity up to 100 tons, provision of helicopter landing facility and launching and lifting of auxiliary craft in demanding sea states.

Special attention has been paid to the vessel's environmental friendliness, low emission level and energy efficiency. With the modern machinery concept it fulfills the strict exhaust gas emission requirements and serves as a way-leader to the marine industries in the Baltic Sea area.

Aker Arctic and Elomatic have in recent times been co-operating in several ice-going vessel projects. AARC has in this project been responsible for the hull form, especially in regard to hydrodynamics, seaworthiness and ice performance, and development of the propulsion concept.

Ice impact measurements on a Double-Acting Tanker



Laser profilometer for measuring the ice

Photo: Esko Huttunen, Reko Suojanen

Last winter, AARC had the opportunity to follow on board one of Finnish Oil Company Neste Oil's Aframax size Double-Acting tanker in order to measure vibrations in ice-conditions.

A team of three AARC employees joined the trip with MT Mastera from Naantali to Primorsk in Russia and back to Sköldvik oil terminal close to Helsinki in the Gulf of Finland.

"Our reason for going on this voyage was to measure the vibrations on a large size double-acting ship in harsh ice-conditions," Reko Suojanen, R & D Manager at AARC explains. "We are in the process of developing ships of similar sizes for trans-polar routes and for transportation of liquefied natural gas (LNG) and one of the general issues often raised is how vibrations in ice-conditions are generated and how they will affect the ship technique so we wanted to gather facts."

The past winter was reasonably cold in Finland with lots of snow and thick ice so the opportunity came after waiting many years for it. The AARC team joining the Neste Shipping's oil tanker was Naval Architect Reko Suojanen, Naval Architect Esko Huttunen and Measurement Engineer Niko Miettinen.

"We boarded the ship in Naantali in Finland and attached instruments with vibration sensors in both the front and the rear of the ship. When ice conditions were getting harsher, the feel on board the ship was very comfortable, not at all the crashing and shaking of smaller icebreakers. That's the great thing about the Double-Acting Ships, they break ice very softly. The crew was very helpful and took some detours on the return trip in order to find ice ridges for us so that we could get good measurements of the vibrations in various conditions on the ship," Mr. Suojanen tells.

"Technically, the measurements were successful and the equipment worked well. Also the results we got were positive and very encouraging as a ship of this size did not vibrate enough to cause problems. The only drawback was that we were hoping to get measurements of vibrations with forward bow movement in thick ice, but when the ice conditions were getting harsher the ship turned to stern-first mode. Therefore the best measurements came from the rear of the ship."

AARC's autumn programs typically include larger field measurement expeditions (see back cover). The team also tested a new laser profilometer for measuring the ice surface profile that has recently been added to AARC's toolbox. This will be useful when analyzing data as data gathering from ice becomes automated and statistical ice measurement is made available. ■

First in the world in semi-scale modelling

AARC has taken a step into a new area of ice modelling by participating in a unique Finnish cooperation project with the objective to develop and implement new numerical and theoretical methods in the modelling of continuous failure of ice. The results can in the future be used for designing more cost-efficient ships and structures. Natural homogeneous ice and a test-structure built by Technip Finland, one of the partners in the project, were used in the unique tests performed at AARC premises.



The real tests performed at AARC used natural ice against a structure created by Technip Finland. The results are used to verify efforts to develop virtual models of continuous failure of ice.

The STRUTSI -project (Ice-structure interaction modelling and simulation) is a two-year project coordinated by VTT, Technical Research Centre of Finland and funded by Tekes, The Finnish Agency for Technology and Innovation and a number of Finnish companies. The objective of the project is to develop and implement new methods in the analytical modelling of continuous failure of ice. The approach is completely new and the methods (FEM Finite Element Method and DEM Discrete Element Method) have never before been used in ice modelling at this accuracy level, one of the features making this project extraordinary.

Natural ice used in tests

"Strutsi covers several areas of ice knowledge applications. We are interested in ice going vessels and ice structures for offshore use," Sami Saarinen, Project manager at AARC, tells.

First a virtual model of ice and structure was created by researchers at VTT and then the action of how ice crushes against a structure was done by computer

simulation. The results were finally compared to what happens in reality.

The real tests were performed at AARC in cooperation with Technip Finland. "We had the idea to use specially prepared homogeneous ice. This was unique as nothing similar has been done before and the measuring methods represent the most modern technique available. A massive test-structure built by Technip Finland was brought into our ice model basin and used in the test," Mr. Saarinen explains. "The tests generated new information about ice crushing against a structure. This project is a great example of high-level Finnish national cooperation, with companies and organisations with cutting edge knowledge and technology joining forces."

"There are many standards and ways to calculate how ice moves and behaves against structures but none of them are fully reliable as they all give more or less different answers," Mr Saarinen continues. "The most reliable answer we can get today is through ice-model testing, which is one of our core businesses at AARC."

Cost savings for ship and offshore industry

"Recent developments in computer technology have made possible the creation of more exact virtual models explaining natural phenomena so it is likely that soon in the future modelling of ice-structure interaction can be made virtually as well. But this development work is only in its first stages and will probably take many years," Mr. Saarinen emphasizes. "The Strutsi-project is the first concrete step in this direction. The first reports were given at the IAHR Conference this summer and the project ends by the end of 2010 so the final report will be available early next year. ■"

Arctic offshore expert



Sami Saarinen enjoys going on ice-expeditions, this time to Yamal Peninsula for monitoring of stamukhas (in the background) and other prevailing ice conditions.

Sami Saarinen joined the company ten years ago after finishing his studies in Arctic Marine Technology at the Helsinki University of Technology. The past years he has worked in AARC almost exclusively with arctic offshore projects for different oil and gas companies. From time to time he also joins ice-expeditions, the most recent one to Yamal peninsula. In his leisure time he goes boating and fishing with his two teenage sons. "This summer's highlight was watching the World Championship in soccer. Unfortunately my favourites Holland and Argentina didn't meet in the finals," he says.

Visitors at AARC



Russia's Minister of Trade and Industry Viktor Borisovitch Khristenko paid a visit to AARC during his official visit to Helsinki on April 9th. He was accompanied by his Finnish colleague, Mr. Mauri Pekkarinen, Minister of Economic Affairs, hosting the program. The discussions with Mr. Khristenko at AARC focused on

Mr. Brian Simpson, Chairman of the Transport Committee in the European Parliament, made an official visit to Finland to learn about the nation's logistic challenges during the winter periods. He also visited AARC on March 31st with a high interest in the European Union's Arctic strategy and the Union's potentials in the development of new Arctic shipping trades.



the Company's recent achievements in the Russian Arctic and especially on the practices on creating an innovative spirit within a design team. Various options for co-operation with the Russian shipbuilding industry were also touched upon. Mr. Khristenko is directly responsible in Russia for the state-operated shipbuilding units. "The building of the Sovcomflot tankers "Mikhail Ulyanov" and "Kirill Lavrov" has been very important for the Russian industry," he stated. In the picture Mr. Khristenko is in the center, his Finnish host Minister Mauri Pekkarinen and Mr. Arto Uuskallio, AARC Marketing and Sales Manager staying behind. Left from Mr. Khristenko Mr. Leonid Vasiljevitch Strugov, Head of the Ministry's Department for Shipbuilding and Offshore Technology.

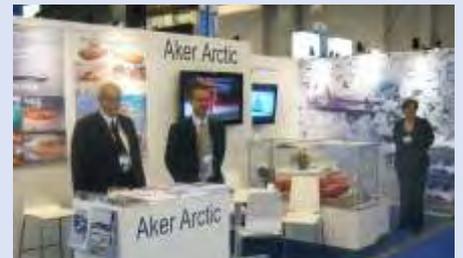
AARC out in the world



Seatec 2010 Exhibition and Conference in Helsinki was the place for the launching of the Naviquantum Ice Simulator to the market. AARC has developed a software package that can be tailored to any ice conditions and any vessel for ice navigation training. "The simulator will become an important ship design and operation tool for AARC," said Ms. Kirsi Rosenström, AARC Manager, Finance and Administration.



Neftegaz 2010 in Moscow focused on the recently signed MoC for the Oblique Icebreaker as well as the Arctic DAS™ Shuttle Tankers "Mikhail Ulyanov" and "Kirill Lavrov" being built at the Admiralty Shipyards, both key conceptual developments of Aker Arctic, as stated in the picture by Arto Uuskallio, AARC Manager of Marketing and Sales.



OTC, Offshore Technology Conference 2010 in Houston is the venue for AARC's regular participation at the Finnish national pavilion. This year's objectives was Ice Management in Arctic seas. "The interest was definitely high", said Mr. Göran Wilkman, an AARC veteran and Manager for Research and Testing Services, Capt. Jukka Salminen, Chartering Manager (center) and Ms. Sari Kanerva, Vice President, Arctic Offshore Oy.

and AARC in remote places

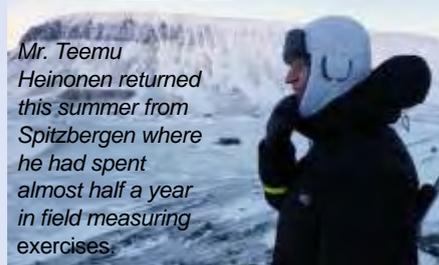
Offering quality services to remote destinations require from AARC staff good knowledge and experience in the local conditions.

Mr. Mikko Niini, President of AARC together with Alexander V. Nemchinov, STX Europe Area Manager for Russia, visited recently Novyj Urengoy for discussions with Novatek and Gazprom Dobycha Nadym (right top).

In September talks were held with the Administration of Nenets Autonomous Okrug. Mr. Yan Berlin, Vice Governor on Infrastructure Development of the Okrug leading the hosts in the city of Naryan Mar (far right).



Mr. Teemu Heinonen returned this summer from Spitzbergen where he had spent almost half a year in field measuring exercises.



Harsh environment survival training

At AARC Health, Safety and Environment (HSE) is regarded as utmost important. Therefore the staff is led every season to various exercises involving simultaneous important training into actual AARC work topics.

Just prior to the seas freezing the whole AARC staff made an excursion by a high speed SAR vessel to the Finnish Navy base in Porkkala and the Gulf of Finland marine situation room as well as to the training centre of the Finnish Lifeboat Institution in

a former Coast Guard Station at Bågaskär in the middle of Gulf of Finland. At the training centre everybody took on a survival suite, jumped into the zero-cold water and was taught team survival practices. Each one also had to release a fire extinguisher on burning oil.



ICE DAY without polar bears

The annual AARC winter outdoor exercise and teambuilding day was held this year on the Gulf of Finland ice outside the Vuosaari Harbour in Helsinki. The purpose of the day was

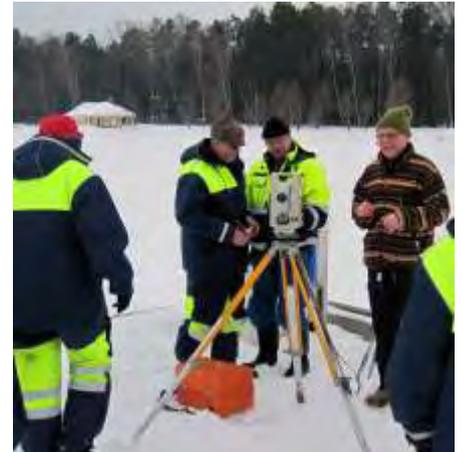
to familiarize all employees with the field work taking place on ice expeditions and at the same time enjoy a fun day together.



Ms. Jana Vamberova measures the ice to be 70 cm thick.



It's all about ice! Mr. Sami Saarinen and Mr. Jukka Pekka Sallinen show how to use a thermal drill.



Mrs. Ann- Cristin Forsén, Mr. Göran Wilkman, Mr. Pertti Kannusmäki and Mr. Arto Uuskallio are calibrating the tachymeter.

On a sunny winter day in March, AARC employees gathered outside the office for the ICE DAY expedition. No icebreaker was needed for this expedition as the tough ice-conditions the team would face was on walking distance by the harbour.

During the afternoon session, all AARC employees were trained to use field equipment. This is important because only a few of AARC staff gets the chance to go on exciting expeditions and still it is useful for everyone to know what the work is all about.

Everyone was taught how to drill a hole into ice with a motor driven auger and measure its thickness, how to drill a hole into ice with a thermal drill and measure its thickness, how to survey surface profiles, how to take ice core samples and how to perform a uniaxial compression test. Everyone tested also how to perform the actions in reality.

"I really enjoyed getting hands-on experience in field work as I sit in the office all days," says Ms. Jana

Vamberova, Management Assistant, AARC. The equipment worked well and everybody succeeded in the activities. Those who had never used any of the equipment got a good impression what it really is like in tough ice-conditions. The only difference to a real expedition was the air temperature, the good visibility and the lack of polar bears.

The Ice Day-expedition is an annual event with varying scope of equipment.

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