Training for maritime operations in polar waters-fulfillment of the Polar code

Sergey Aysinov, MBA, PhD, Director of Professional development programmes Institute Head of Makarov training centre
### Historical Background

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Year</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1876</td>
<td>Nautical Classes of St-Petersburg River Yacht Club</td>
<td>1809</td>
<td>Institute of Corps of Engineers of Waterway and Land Communications</td>
</tr>
<tr>
<td>1902</td>
<td>Emperor Peter I Maritime College of Deep-Sea Navigation</td>
<td>1864</td>
<td>Institute of Engineers of Ways of Communications</td>
</tr>
<tr>
<td>1919</td>
<td>Leningrad Technical School of Water Communications</td>
<td>1930</td>
<td>The Leningrad institute of engineers of Waterway Transport</td>
</tr>
<tr>
<td>1944</td>
<td>Higher Engineering College</td>
<td>1959</td>
<td>Leningrad Water Transport Institute</td>
</tr>
<tr>
<td>1954</td>
<td>Admiral Makarov Higher Engineering Marine College</td>
<td>1993</td>
<td>Saint-Petersburg State University for Waterway Communications</td>
</tr>
<tr>
<td>1987</td>
<td>Foundation of Methodological Educational Association for Water Transport Specialties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>Admiral Makarov State Marine Academy</td>
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</tbody>
</table>

**2013**

**Admiral Makarov State University of Maritime and Inland Shipping**
Number of Students (2015/2016 academic year)

Higher Education
- Full time training: 5168
- Distance learning (all Faculties): 2712
- Maritime College (all forms of education): 1376

TOTAL NUMBER of STUDENTS: 9256

High Education (all forms of education): 3317

TOTAL NUMBER all in all: 12573
# Teaching Staff (Higher Education)

<table>
<thead>
<tr>
<th>Role</th>
<th>Full time</th>
<th>Part time</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professors, PH.D.</td>
<td>431</td>
<td>154</td>
<td>585</td>
</tr>
<tr>
<td>Assistant Professors</td>
<td>221</td>
<td></td>
<td>221</td>
</tr>
<tr>
<td>Branches</td>
<td>72</td>
<td></td>
<td>72</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>878</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
International Maritime Activity

The University experts participate in Russian Federation Delegations as well as IALA, ITF delegations to the regulatory organizations: International Maritime Organization (IMO) and International Labour Organization (ILO)

University is a member of:
- Executive Committee of International Association of Maritime Universities (IAMU);
- International Maritime Lecturers Association (IMLA);
- International Sail Training Association (ISTA);
- International Maritime Simulator Forum (IMSF);
- STENA Association of Maritime Institutions (STAMI) acting under the patronage of shipping company STENA (Sweden)
Makarov Training Centre:

- 46 Modern training simulators,
- More than 200 highly professional Engineers, Instructors, Managers, Experts,
- More than 170 training programs,
- 20+ years of operation,

- Approval from Russian Ministry of Transport, Federal Marine and River Transport Agency, other Flag state Administrations, Certification Association “Russian Register”, Russian Maritime Register of Shipping, The Nautical Institute, and others.

- MTC provides professional simulator training to more than **15 000** trainees from 23+ countries annually without any boundaries.
MAKAROV TRAINING CENTRE

ICE NAVIGATION TRAINING

- Start: May, 2003
- Main Sailing Areas – the Baltics:
  - St. Petersburg
  - Primorsk
  - Vysotsk
  - Ust’-Luga
- Number of trainees: 900 +

Unicom (Cyprus) – the first partner
2003-2016. What have been changed?

- Regulatory base – Polar code, SOLAS and STCW amendments.
- Technology- modeling & simulations
- Sailing in ice experience trans-boundary integration and co-operation (NSR, NWPassage, Antarctic)
- Simulator Training Sharing Experience (Norway, Canada, Russia, Finland, Sweden, Chile, Argentina, Denmark etc.)
Polar Waters Navigation Training:

IMPLEMENTATION OF NEW REQUIREMENTS OF STCW AND THE POLAR CODE
POLAR
CODE

EQUIPMENT

WINDOWS ON BRIDGE
Means to clear melted ice, freezing rain, snow, mist, spray and condensation

LIFEBOATS
All lifeboats to be partially or totally enclosed type

CLOTHING I
Adequate thermal protection for all persons on board

CLOTHING II
On passenger ships, an immersion suit or a thermal protective aid for each person on board

ICE REMOVAL
Special equipment for ice removal, such as electrical and pneumatic devices, special tools such as axes or wooden clubs

FIRE SAFETY
Extinguishing equipment able to operate in cold temperatures; portable pumps suitable for personnel wearing bulky and cumbersome cold weather gear

OPERATIONS & MANNING

NAVIGATION
Receive information about ice conditions

CERTIFICATE & MANUAL
Required to have on board a Polar Ship Certificate and the ship's Polar Water Operational Manual

TRAINING
Masters, chief mates and officers in charge of a navigational watch must have completed appropriate basic training (for open-water operations), and advanced training for other waters, including ice

DESIGN & CONSTRUCTION

SHIP CATEGORIES
Three categories of ship which may operate in Polar Waters, based on:
A) medium first-year ice
B) thin first-year ice
C) open waters/ice conditions less severe than A and B

MATERIALS
Ships intended to operate in low air temperature must be constructed with materials suitable for operation at the ship's polar service temperature

STRUCTURE
In ice strengthened ships, the structure of the ship must be able to resist both global and local structural loads

BACKGROUND INFO

THE INTERNATIONAL CODE FOR SHIPS OPERATING IN POLAR WATERS WAS ADOPTED NOVEMBER 2014 BY THE IMO MARITIME SAFETY COMMITTEE

IT APPLIES TO SHIPS OPERATING IN ARCTIC AND ANTARCTIC WATERS

THE AIM IS TO PROVIDE FOR SAFE SHIP OPERATION AND THE PROTECTION OF THE POLAR ENVIRONMENT BY ADDRESSING RISKS PRESENT IN POLAR WATERS AND NOT ADEQUATELY MITIGATED BY OTHER INSTRUMENTS

IMO INTERNATIONAL MARITIME ORGANIZATION
<table>
<thead>
<tr>
<th>Ice conditions</th>
<th>Tankers</th>
<th>Passenger ships</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice Free</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Open Waters</td>
<td>Basic training for master, chief mate and officers in charge of a navigational watch</td>
<td>Basic training for master, chief mate and officers in charge of a navigational watch</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Other waters</td>
<td>Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch</td>
<td>Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch</td>
<td>Advanced training for master and chief mate. Basic training for officers in charge of a navigational watch</td>
</tr>
</tbody>
</table>
ICE SIMULATION - EDGE OF TECHNOLOGY

- 2003
- 2016
COOPERATION WITH KRYLOV STATE RESEARCH CENTRE
THE BRAND NEW MAKAROV-KRYLOV POLAR WATERS ICE NAVIGATION SIMULATOR CENTRE STARTED IT'S OPERATION IN ST.PETERSBURG, RUSSIA
Two full-mission bridges 360 degrees each

Instructor’s station

Offshore Crane operator workstation

Loading master station (Oil rig- shuttle tanker joint operations)

Four 7-channel bridges
New types of ships' models

- Oil tankers
- Oil shuttle tankers with bow loading systems
- Crane vessels
- Nuclear power floating stations
- Oil rigs
- Shallow waters oil rigs
The wide library of icebreakers ship models

- **Ice breakers**
  - Nuclear power Icebreaker
  - Gulf of Finland IB with azimuths
  - SAR ice breaking vessel
  - Ice breaking support vessel
  - Ice breaking port tug (21110 «Rurik»)
  - Multi-function diesel-electric IB (22600)
  - River IB
  - Atomic IB (prj) 22220
  - Diesel-electric IB (21900М)
New Ice Model developed at Krylov SRC

- Interaction between ship and ice 3D model
- Interaction between ice floes modelled
- Thruster wash interactions with ice modelled
- Offshore installations interact with ice
- Iceberg towing modelled
“No matter how you look at a company’s assets, it is people that make things happen.

And it is the right people that make the right things happen”
(www.brostrom.com)
Specialists turned out:  Engineer-Hydrographist

Diplomas issued:  Diploma on Higher Engineering Education
TRAINING EXPERIENCE

Instructors’ stuff

During the course we invite:

- Experienced Ice Masters who worked at the NSR, and in the Great Lakes for many years
- Experienced Ice Breaker Master
- Experienced Ice Pilot
- Makarov SUMIS Arctic Faculty professors
- Makarov TC IceNavSim Instructors
MANDATORY MINIMUM REQUIREMENTS FOR THE TRAINING AND QUALIFICATIONS

- **Basic Training:**
  - Masters, chief mates and officers in charge of navigational watch on board the ships operating in polar waters;
  - Completed the approved basic training for ships operating in polar waters.

- **Advanced Training:**
  - Masters and chief mates on board the ships operating in polar waters with basic training certificate;
  - Performing watch keeping duties, at least two (2) months of approved seagoing service while serving on operational or management level deck position within Polar waters;
  - Completed approved advanced training for ships operating in ice covered waters.
Basic Polar Waters Navigation Training

- Basic knowledge of ice characteristics and areas where different types of ice can be expected in the area of operation;
- Basic knowledge of vessel performance in ice and cold climate;
- Basic knowledge and ability to operate and manoeuvre a ship in ice;
- Basic knowledge of regulatory considerations;
- Basic knowledge of crew preparation, working conditions and safety of operations in ice to be able to apply safe working practices and respond to emergencies;
- Basic knowledge of environmental factors and regulations to ensure compliance with pollution prevention requirements and to prevent environmental hazards.
BASIC Polar Waters Navigation Training

Cold climate survival theory and practice
Oil Spill Preparedness and Response

- Search and rescue
- Ecological issues
- Radar Ice detection systems
- Oil spill response
- Knowledge of voyage planning and reporting, to be able to plan and conduct a voyage in polar waters;
- Knowledge of equipment limitations;
- Knowledge and ability to operate and manoeuvre a ship in ice, to be able to manage the safe operation of vessels operating in ice-covered waters;
- Knowledge of safety, to be able to maintain safety of the ship's crew and passengers and the operational condition of life-saving, firefighting and other safety systems in polar waters.
Advanced polar waters navigation on course includes

**Ice Navigation tactics**
Ice Navigation technique
Navigation within Ice Breaker convoy
2003-2016. What have been changed?

MODEL COURSE
BASIC/ADVANCED TRAINING ICE NAVIGATION IN POLAR WATERS
2016 Edition
CMS Fisheries and Marine Institute Memorial University -draft
- IMO Correspondence Group
- IMO HTW February 2017 - adoption

START OF THE ADVANCED COURSE AT MAKAROV TC IS PLANNED ON JANUARY 2017.
Practical training course

for sailing in ice conditions developed to implement the decisions of IMO to amend the Convention with respect to navigation in the Polar Regions, as well as for the implementation of the provisions of the Polar Code.

The peculiarity of the new course is a combination of theory and practice of ice navigation, meeting with Russian and Finnish experience icebreaking posting.
Joint Russian - Finnish course

Krylov Scientific Research Centre:
- Navigation with ice breaker assistance. Convoy formation, convoy passage, ice specific condition passage.

River Ice Breaker Nevskaya Zastava:
- Ship preparation for ice navigation. Scheduling of ice watch keeping, deck works, proper ballasting and trimming of the ship. Necessary supply requirements. Control of equipment and ship auxiliary systems readiness for low temperature operations. Safe working practice during ice navigation - on board of the Ice Breaker Nevskaya Zastava;
- Maneuvering on board of the river Ice Breaker Nevskaya Zastava in various ice conditions.

PRACTICAL ICE NAVIGATION COURSE
Practical training on board
Ice breaker on Neva river
Unassisted passage in ice
Joint Russian – Finnish course

PRACTICAL ICE NAVIGATION COURSE
MV Katarina
- Safe working mooring practice in cold weather on board;
- Navigation in fast ice field fairway - demonstrated on board.

Aker Arctic
- Ice classes, different class societies;
- Introduction to ice going ship construction and technical development:
  - Icebreakers
  - Commercial vessels
  - Special vessels
  - Double Acting Icebreaking ships (DAS).
- Watching Model test (if available).
Makarov Polar waters ice navigation
training partners and clients -
co-operation without boundaries

- Russia
- Ukraine
- Finland
- Latvia
- Lithuania
- Estonia
- Croatia
- Bulgaria
- India
- Philippines
- Netherlands
- Poland
- Kazakhstan
- Turkmenia
- Montenegro
- South Korea

- Sweden
- Norway
- UK
- Cyprus
- Greece
- Turkey

Russia, Ukraine, Finland, Latvia, Lithuania, Estonia, Croatia, Bulgaria, India, Philippines, Netherlands, Poland, Kazakhstan, Turkmenia, Montenegro, South Korea.
Polar Waters Navigation Partners of Makarov Training Centre
POLAR CODE IMPLEMENTATION NEEDS NEW COMPETENCIES AND NEW CO-OPERATION

THANK YOU FOR YOUR ATTENTION!