



WAGENBORG SHIPPING B.V.



CNIIMF



MERITURVA
Maritime Safety Training Centre



GROWTH Project GRD2-2000-30112 "ARCOP"

D3.7.2 REPORT ON EXISTING COURSES AND FACILITIES

WP3: Integrated transportation system for Arctic oil and gas

WP3.7: Training for Arctic Navigation

Author(s): Anniek Platzer, Wagenborg Shipping
Sergey Rodionov, CNIIMF
Leif Baarman, Meriturva

DELIVERABLE D3.7.2

REPORT ON EXISTING COURSES AND FACILITIES

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PARTNERS:

| | |
|---|-----|
| Aker Finnyards | FIN |
| Royal Wagenborg | NL |
| Hamburg University of Applied Sciences | D |
| Tecnomare SpA | I |
| Merenkulun turvallisuuuskoulutuskeskus | FIN |
| Central Marine Research and Design Institute | RU |
| Arctic and Antarctic Research Institute | RU |
| Hamburgische Schiffbau-Versuchsanstalt GmbH | D |
| Alpha Environmental Consultants Ltd | NO |
| The Foundation of Scientific and Industrial Research at the Norwegian Institute of Technology (SINTEF) | NO |
| Fortum Oil and Gas | FIN |
| Helsinki University of Technology | FIN |
| Nansen Environmental and Remote Sensing Centre | NO |
| Finnish Institute of Marine Research | FIN |
| Technical Research Centre of Finland | FIN |
| Stiftung Alfred-Wegener-Intitut fur Polar und Meeresforschung | D |
| The Fridtjof Nansen Institute | NO |
| Lloyds Register | UK |
| University of Lapland | FIN |
| The Norwegian College of Fishery Science | NO |
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DELIVERABLE SUMMARY SHEET

| Short Description |
|---|
| The purpose of this report is to review the existing training courses and facilities and estimate their capabilities to meet future needs. Each training institute has its own method for training and the courses are based on various rules and regulations, customers' specific requests to train their crews and a need emanating from practical experience. There is no generally accepted practice today. |

| Author(s) | |
|---------------------------------------|--------------------------------------|
| Name | Company |
| Anniek Platzer, Project manager | Wagenborg Shipping B.V., Netherlands |
| Sergey Rodionov, Simulations Lab Head | CNIIMF, Russia |
| Leif Baarman | Meriturva, Finland |

| Internal Reviewing / Approval of report | | | |
|--|--------------------|----------|------------|
| Name | Company | Approval | Date |
| Kimmo Juurmaa | AFY | | 14-06-2005 |
| Bob Berks | Wagenborg Shipping | | 06-06-2005 |

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Attachment 1 Questionnaire

Attachment 2 List of training centres that were asked to complete the questionnaire



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1 Introduction

The development of the Arctic offshore oil and gas reserves and the use the Northern Sea Route as an alternative transportation route for the Arctic oil and gas in general, involves risks and questions, which should be investigated.

ARCOP aims to find the practical solutions to the major problems including the training of crews navigating in ice.

In phase one of this study we determined how shipping companies currently train their crews for navigation in ice.

And in the second phase of this assignment we have investigated the existing training courses and facilities.

The ultimate objective of this study is to create recommendations for the training system needed to run a large-scale Arctic transportation system.

The purpose of this report is to review the existing training courses and facilities and estimate their capabilities to meet future needs. Each training institute has it's own method for training and the courses are based on various rules and regulations, customers' specific requests to train their crews and a need emanating form practical experience. There is no generally accepted practice today.

The information in this report is derived from a questionnaire that Wagenborg sent to some 100 training institutes. Sixteen companies responded and 13 of them currently organise courses, have organised courses in the past or plan to organise courses for navigating in ice.



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2 Available Training and Facilities

To collect information on current available training, we have set-up a questionnaire which was sent to some 100 training institutes and other parties all over the world. See attachment 1 and 2.

The responses -16 in total of which 13 were positive- were received from the well known seafaring countries like Finland, Russia, Germany, Sweden, Canada, Philippines, Netherlands

The training is usually in the language of the country and is mostly held at the training centre's location and in some cases at customer's location. The institutes do not advertise the training very much, which made it very hard to obtain details about the availability.

| Institute | Theoretical Training | Simulator Training | Practical Training |
|--|----------------------|--------------------|--------------------|
| Hochschule Wismar, Warnemunde Germany | no | no | no |
| Marine Institute St. John's, Newfoundland Canada | yes | no | no |
| Swedish Icebreaking Service, Gothenburg Sweden | yes | no | yes |
| Maritime Institute, Terschelling The Netherlands | yes | no | no |
| Meriturva, Helsinki Finland | yes | discontinued | no |
| Maritime College, Rauma Finland | yes | yes | yes |
| Satakunta Polytechnic, Rauma Finland | yes | yes | yes |
| Sydväst Maritime, Turku Finland | yes | no | yes |
| Centre for Maritime Studies, Turku Finland | yes | yes | no |
| Wärtsilä, worldwide | yes | yes | yes |
| IDESS Maritime Centre, Manila Philippines | discontinued | no | no |
| State Maritime Academy, St. Petersburg Russia | no | yes | no |
| Marstar, St. Petersburg Russia | yes | yes | no |
| Far East Maritime Academy, Vladivostok Russia | yes | no | no |
| Maritime College, Arkhangelsk Russia | no | no | no |
| Marine Training Centre, Nakhodka Russia | no | no | no |

2.1 Theoretical training

From the data collected from the questionnaire we may conclude that there are several theoretical courses for navigation in ice training available that last between 1 and 10 days and cost between US\$ 300 and 2000. The basis usually is legislation and rules, which means that in case the course has not yet been acknowledged by a certifying institute, there is a good basis for this. The fact that most courses are also



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based on customer specific request and a need emanating from practical experience indicates that the training centres are flexible and willing and able to develop tailor-made courses.

| Vessel | Trading Area | Country | Language | Position | Goal |
|------------------|---|--|---------------------------------|--|--|
| Icebreakers | Non-specific Gulf of Finland Baltic Sea | Russia Finland Customers location World wide | Russian Finnish English | Navigator Pilots Engineers Ratings | General knowledge and Safety / Basics of icing and stability / (Local) Ice information / Specific skills for navigation in ice |
| Cargo Vessels | Non-specific Gulf of Finland Baltic Sea US waters Canadian waters | Russia Customers' location World wide | Russian Finnish English | Navigator Pilots Ratings Engineers | General knowledge and Safety / Basics of icing and stability / (Local) Ice information / Specific skills for navigation in ice |
| Pax Vessels | Baltic Sea | Customers Location Finland World wide | English Finnish | Navigator Pilots Ratings Engineers | General knowledge and Safety / Basics of icing and stability |
| Tugs | Baltic Sea | Customers Location Finland | English Finnish | Navigator Pilots Ratings Engineers | General knowledge and Safety / Basics of icing and stability |
| Non-specific | Non-specific | Canada Manila Netherland s Finland | English & Dutch & Finnish | Navigators Ratings Pilots Engineers | General knowledge and safety / Economical use and extended maintenance |

2.2 Simulator Training

Simulator training is less available and will take between 1 and 7 days, the cost of which are between US\$ 390 and 1600.

Russian training centres usually use Transas equipment, e.g. Navi Trainer Professional with an ice navigation module, that has the ability to model the activities of cargo vessels and tankers in different ice conditions.

Finnish training centres and institutes are using Transas-based simulator software in the training of ice navigation. The functionality and realistic appearance of the ice field movements and the dynamic interaction between ship hull and ice are restricted to very simple cases such as navigation in level ice, navigation in an opened lead and ship handling during convoy operations. Thus, the ice navigation capabilities of the simulators have mostly been applied to the basic training of deck officer students.



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| Vessel | Trading Area | Country | Language | Position | Basis / Goal |
|------------------|--|---|-------------------------------|------------------------------------|--|
| Icebreakers | Non-specific Gulf of Finland | Russia Finland Philippines USA | Russian English | Navigators Pilots | General knowledge and safety / (Local) Ice information / Specific skills for navigation in ice |
| Cargo Vessels | Non-specific Gulf of Finland Baltic Sea | Russia Finland Philippines USA | Russian English Finnish | Navigators Pilots | General knowledge and safety / (Local) Ice information / Specific skills for navigation in ice |
| Pax Vessels | Non-specific Baltic Sea | Russia Finland Philippines USA | Russian English Finnish | Navigators Pilots | General knowledge and safety / (Local) Ice information / Specific skills for navigation in ice |
| Offshore Vessels | Non-specific Baltic Sea | Russia Finland Philippines USA | Russian English Finnish | Navigators Pilots | General knowledge and safety / (Local) Ice information / Specific skills for navigation in ice |
| Non-specific | Non-specific | Finland | English & Finnish | Navigators Engineers Ratings | General knowledge and safety, Economical use and extended maintenance |

2.3 Training o/b Vessels

Training on board a vessel is least available and will take between 3 and 30 days and will cost around US\$ 2000.

| Vessel | Trading Area | Country | Language | Position | Goal |
|---------------|----------------------------|---------|--------------------|--|---|
| Ice Breakers | Non-specific Baltic Sea | Sweden | Finnish Swedish | Navigators Ratings Pilots Engineers | Improve operations / (Local) Ice information / General knowledge and safety / Specific skills for navigation in ice / Anchor handling |
| Cargo Vessels | Baltic Sea | Finland | Finnish Swedish | Navigators Ratings Pilots Engineers | General knowledge and safety / Anchor handling |



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| | | | | | |
|---------------------|--------------|---------|--------------------|--|--|
| Pax Vessels | Baltic Sea | Finland | Finnish Swedish | Navigators Ratings Pilots Engineers | General knowledge and safety / Anchor handling |
| Offshore Vessels | Baltic Sea | Finland | Finnish Swedish | Navigators Ratings Pilots Engineers | General knowledge and safety / Anchor handling |
| Tugs | Baltic Sea | Finland | Finnish Swedish | Navigators Ratings Pilots Engineers | General knowledge and safety / Anchor handling |
| Non-specific | Non-specific | Finland | Finnish | Navigators Ratings Engineers | General knowledge and safety / Economical use and extended maintenance |



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3 Future Need

The fact that two training centres discontinued their courses might give the impression that there is not much demand for training for navigation in ice, but from Wagenborg experience -and I'm referring to the training that we organised some years ago for the ice conditions in the Caspian- we at Wagenborg know that there is a demand for very specific ice conditions and specific vessels. It is not very likely that training on the job by more experienced colleagues, which is currently the most common method of training, will produce sufficient "ice navigators" for the future, if we look at the developments in this field.

3.1 Increase in activities in areas with severe ice conditions

Increase in activities in areas with severe ice conditions

It can be expected that in the near future there will be an increasing demand for training for specific ice-conditions and specific vessels because of the increase of offshore oil recovery projects in the Sakhalin area and the expected activities in the Barents Sea and the Kara Sea.

CNIIMF has made predictions for the activities in the Arctic Area in their report on "Characteristics of Shipping and Navigation in Arctic Seas".

White Sea: the volume of oil and oil products to be loaded through the oil loading complexes looks promising for the development from 5 million tons at the present time up to 15 million tons in the future. Oil is delivered to the ports of Europe. Partly with the transshipment to large non-ice tankers in the Kola Gulf in the Murmansk area.

Barents Sea: the total volume of oil cargoes shipped through the Arctic oil-loading terminals of the Barents Sea will increase from 800 000 tons now up to 70 million tons and more in the future.

Kara Sea: The construction project of an oil-loading terminal in the region of the Dikson Island (Yefremov Bay) with designed oil loading up to 16-17 million tons of crude oil annually is very promising.

Number of trips and the budget of time for a year on transportations on the periods of summer and winter navigation

| Transportation scheme and point of loading | Cargo volume, ths. t | Type of tanker | Number of trips | | | Vessel-days on transportations | | |
|--|----------------------|----------------|-----------------|--------|-------|--------------------------------|--------|-------|
| | | | summer | winter | total | summer | winter | total |
| White Sea – Murmansk | | | | | | | | |
| <i>Arkhangelsk</i> | | | | | | | | |
| - existing | 2000 | HO-20A | 54 | 54 | 108 | 152 | 163 | 315 |
| - designed | 10000 | HO-40A | 138 | 138 | 276 | 392 | 422 | 814 |
| <i>Vitino</i> | | | | | | | | |
| - existing | 2800 | HO-20A | 60 | 84 | 144 | 219 | 335 | 554 |
| - designed | 6000 | HO-40A | 70 | 98 | 168 | 259 | 396 | 655 |



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| Timan-Pechora – Murmansk | | | | | | | | |
|---------------------------------|-------|------------------------|------------|------------|------------|-------------|-------------|--------------|
| <i>Varandey/Prirazlomnoye</i> | | | | | | | | |
| - existing | 3000 | HO-20A | 65 | 91 | 156 | 247 | 364 | 611 |
| - designed | 24000 | HO-40A, HO-70A | 275 155 | 385 217 | 660 372 | 1056 546 | 1554 803 | 2610 1349 |
| <i>Kolguyev Island</i> | | | | | | | | |
| - existing | 400 | HO-70 | 6 | - | 6 | 16 | - | 16 |
| <i>Kara Sea – Murmansk</i> | | | | | | | | |
| <i>Dikson</i> | | | | | | | | |
| - designed | 15000 | HO-70A, HO- 125A | 80 40 | 160 80 | 240 120 | 522 280 | 1238 633 | 1760 913 |

In accordance with the assessment of the Oil Company “Rosneft”, for the reliable regular transportation of oil from the Prirazlomnoye and Vankorskoye fields the icebreaker assistance will be required:

on line Prirazlomnoye – Murmansk in April-May;

on line Dikson – Murmansk in January-May.

Total number of voyages on routes Prirazlomnoye – Murmansk and Dikson – Murmansk

| | January | February | March | April | May |
|-------------|----------------|-----------------|--------------|--------------|------------|
| 2009 | 4.0 | 4.0 | 4.0 | 9.0 | 9.0 |
| 2010 | 7.0 | 7.0 | 7.0 | 13.0 | 13.0 |
| 2011 | 12.0 | 12.0 | 12.0 | 19.5 | 19.5 |
| 2012 | 16.0 | 16.0 | 16.0 | 24.0 | 24.0 |
| 2013 | 20.0 | 20.0 | 20.0 | 23.0 | 23.0 |
| 2014 | 20.5 | 20.5 | 20.5 | 23.0 | 23.0 |
| 2015 | 20.0 | 20.0 | 20.0 | 22.5 | 22.5 |
| 2016 | 19.0 | 19.0 | 19.0 | 22.0 | 22.0 |
| 2017 | 18.0 | 18.0 | 18.0 | 21.5 | 21.5 |
| 2018 | 17.0 | 17.0 | 17.0 | 21.0 | 21.0 |
| 2019 | 16.0 | 16.0 | 16.0 | 20.0 | 20.0 |
| 2020 | 15.0 | 15.0 | 15.0 | 18.5 | 18.5 |



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3.2 Ice Damage

The Helsinki University of Technology has investigated the Ice Damages that occurred in the Baltic Sea in 2003. Based on ice damages versus port calls they have computed the probability of ice damage per voyage:

About 10% of the ships had some sort of ice damage and damage occurred during 1% of the voyages, based on the following data:

- 1000 different ships visited Finnish ports
- 10000 port call during winter season
- 100 ice damages and damaged ships

When taking into account the ice class of the vessel the following probability of ice damage per voyage is computed:

- Ice class 1A and 1A Super
 $(58\%) / (85\%) \times 1\% = 0,7\%$
- Ice Class II and IC
 $(30\%) / (5\%) \times 1\% = 6,0\%$

This means that vessel with ice class II and IC suffer ice damage about 9 times more likely than vessels with ice class 1A and 1A Super ($6\% / 0,7\% = 8,8$)

Another observation from the Helsinki University of Technology is that most of the damages occurred during early winter.

Unfortunately the relation between accidents and incidents while navigating in ice and the training that the officer on duty has had is not included in the study by the Helsinki University of Technology. And unfortunately so far we have not been able to find any data concerning the relation between accidents in ice and training elsewhere either.

3.3 Rules and Regulations

The Guidelines for ships operating in ice-covered waters published by IMO in 2002 are not yet mandatory and not many Training Centres have indicated that they are concentrating on these guidelines, but when these rules become mandatory we expect that there will be a great demand for training in ice and theoretical training in particular.

Depending on how authorities decide to regulate the transport on the route under investigation in this project there might be an increased demand for training in Arctic conditions.



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4 Conclusions

In order to determine whether the training facilities that are currently available can meet the future need for training for operations in the Arctic Region we need to consider all aspects that influence navigation in the Arctic Region, like ice formation, vessel design, the transport system to be used and how intensive the traffic will be. These issues will form the basis of the third phase of this study in which recommendations for training in ice will be formulated.

Judging from the responses that we received from training institutes I think that they are able and willing to organise tailor-made training for navigation in ice, but they do need information.



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5 References

- Questionnaires completed by several training institutes and additional information received from training institutes.
- Working Paper no 17 Operations Aspects published in 1995 by INSROP (International Northern Searoute Program)
- Working Paper no 91 Operations Aspects Volume 2 – 1994 project work published in 1997 by INSROP (International Northern Searoute Program)
- Working Paper no 101 Operations Aspects Volume 3 – 1995 project work published in 1998 by INSROP (International Northern Searoute Program)
- “Industry Interests in Legal and Administrative Issues” by Kimmo Juurma; Presentation 5th ARCOP Workshop in Helsinki September 2004
- “Characteristics of Shipping and Navigation in Arctic Seas” by Dr. Vsevolod Peresykin; Presentation 4th ARCOP Workshop in Brussels June 2004
- “Maritime Safety Research in the Baltic Sea” by Kaj Riska of Ship Laboratory of the Helsinki University of Technology, Comment in the NTF seminar , March 2004



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QUESTIONNAIRE

PURPOSE OF THE QUESTIONNAIRE

The oil and gas resources of the Arctic regions in Russia are the world's biggest energy reserve outside the OPEC countries. Due to their geographical location they are an important source in meeting the energy need in Europe.

There are a number of alternative routes for conveying oil and gas: direct pipelines, shipments across the Baltic Sea and direct carriage by ships along the Western part of the Northern Sea Route. All of these alternatives must be further developed to increase security of supply and cost-efficiency. The ARCOP project aims to develop an alternative that will make use of the Northern Sea Route.

The ARCOP project is a research and development project supported by the European Union, which is part of the "Competitive and Sustainable Development" programme. It relates to development of the transport of the natural resources, particularly oil and gas, of the Arctic regions in Russia.

Part of the ARCOP project is the work package "Training for Arctic Navigation" (WP 3.7). Wagenborg, being the leader of this WP, would like to ask for your co-operation to review the existing training courses and facilities.

For this purpose we would like you to fill out this questionnaire concerning your experiences with training of crews in navigating in ice.

NAME

COMPANY

POSITION


| | | |
|--|--|--|
| | | |
|--|--|--|

QUESTIONS

| | |
|--|--|
| 1. Does your institute organise training for navigation in ice, developing such a training at this moment or made efforts to organise such a training | |
| <input type="checkbox"/> | Yes |
| <input type="checkbox"/> | Our institute is developing such a training at this moment |
| <input type="checkbox"/> | Our institute discontinued organising training for navigation in ice or stopped the development of such a training |
| <input type="checkbox"/> | No |
| Please indicate below which kind of training | |
| <input type="checkbox"/> | Lectures / studies |
| <input type="checkbox"/> | Simulator training |
| <input type="checkbox"/> | Training real life situations on board a vessel |


In case you are developing a training for navigation in ice at this moment or discontinued or stopped the development of such a training please read the questionnaire in future or past tense.

2. If you institute discontinued organising training for navigation in ice or stopped the development of such a training, please indicate below why and please continue to complete the questionnaire because we would like to receive as much information as possible on the subject.

| | |
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| | | | |
|--|-----------------------|--------------------------|------------|
| 3. For which positions do you organise courses | Lectures / studies | <input type="checkbox"/> | Navigators |
| | | <input type="checkbox"/> | Engineers |
| | | <input type="checkbox"/> | Pilots |
| | | <input type="checkbox"/> | Ratings |
| | Simulator training | <input type="checkbox"/> | Navigators |
| | | <input type="checkbox"/> | Engineers |
| | | <input type="checkbox"/> | Pilots |
| | | <input type="checkbox"/> | Ratings |
| | Training o/b a vessel | <input type="checkbox"/> | Navigators |
| | | <input type="checkbox"/> | Engineers |
| | | <input type="checkbox"/> | Pilots |
| | | <input type="checkbox"/> | Ratings |

| | | | | |
|---|--------------------------|--------------------------|--------------|--------------|
| 4. Does your institute organise different courses for different vessels and for different trading areas | | | | |
| <input type="checkbox"/> | Yes | | | |
| <input type="checkbox"/> | No | | | |
| If yes, please indicate below which type of vessels and which trading areas | | | | |
| Lectures / studies | <input type="checkbox"/> | Ice breakers | Trading Area | |
| | | | Ice Class | |
| | <input type="checkbox"/> | Cargo vessels | Trading Area | |
| | | | Ice Class | |
| | <input type="checkbox"/> | Pax vessels | Trading Area | |
| | | | Ice Class | |
| | <input type="checkbox"/> | Offshore vessels | Trading Area | |
| | | | Ice Class | |
| | <input type="checkbox"/> | Other, namely | Trading Area | |
| | | | Ice Class | |
| | Simulator training | <input type="checkbox"/> | Ice breakers | Trading Area |
| | | | | Ice Class |
| <input type="checkbox"/> | | Cargo vessels | Trading Area | |
| | | | Ice Class | |
| <input type="checkbox"/> | | Pax vessels | Trading Area | |
| | | | Ice Class | |
| <input type="checkbox"/> | | Offshore vessels | Trading Area | |
| | | | Ice Class | |
| <input type="checkbox"/> | | Other, namely | Trading Area | |
| | | | Ice Class | |
| Training o/b a vessel | | <input type="checkbox"/> | Ice breakers | Trading Area |
| | | | | Ice Class |
| | <input type="checkbox"/> | Cargo vessels | Trading Area | |
| | | | Ice Class | |
| | <input type="checkbox"/> | Pax vessels | Trading Area | |
| | | | Ice Class | |
| | <input type="checkbox"/> | Offshore vessels | Trading Area | |
| | | | Ice Class | |
| | <input type="checkbox"/> | Other, namely | Trading Area | |
| | | | Ice Class | |

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| | | | | |
|--|-----------------------|------------|--|------|
| 5. Please indicate the duration of the courses | Lectures / studies | Navigators | | days |
| | | Engineers | | days |
| | | Pilots | | days |
| | | Ratings | | days |
| | Simulator training | Navigators | | days |
| | | Engineers | | days |
| | | Pilots | | days |
| | | Ratings | | days |
| | Training o/b a vessel | Navigators | | days |
| | | Engineers | | days |
| | | Pilots | | days |
| | | Ratings | | days |

| | | | | |
|--|-----------------------|------------|--|-------|
| 6. Please indicate the frequency of refresher courses, if applicable | Lectures / studies | Navigators | | years |
| | | Engineers | | years |
| | | Pilots | | years |
| | | Ratings | | years |
| | Simulator training | Navigators | | years |
| | | Engineers | | years |
| | | Pilots | | years |
| | | Ratings | | years |
| | Training o/b a vessel | Navigators | | years |
| | | Engineers | | years |
| | | Pilots | | years |
| | | Ratings | | years |

| | |
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| | | | | |
|--|-----------------------|------------|-----|--|
| 7. What are the prices of the courses per person | Lectures / studies | Navigators | USD | |
| | | Engineers | USD | |
| | | Pilots | USD | |
| | | Ratings | USD | |
| | Simulator training | Navigators | USD | |
| | | Engineers | USD | |
| | | Pilots | USD | |
| | | Ratings | USD | |
| | Training o/b a vessel | Navigators | USD | |
| | | Engineers | USD | |
| | | Pilots | USD | |
| | | Ratings | USD | |

| | | |
|--------------------------------|--------------------------|----------------------------|
| 8. Where is training performed | | |
| Lectures / studies | <input type="checkbox"/> | at customer's location |
| | <input type="checkbox"/> | at institute's premises in |
| Simulator training | <input type="checkbox"/> | at customer's location |
| | <input type="checkbox"/> | at institute's premises in |
| Training o/b a vessel | Vessel's name | |
| | Owner's name | |

| | | | | | |
|---|-----------------------|------|--|-------|--|
| 9. How long has your institute taught these courses | Lectures / studies | from | | until | |
| | Simulator training | from | | until | |
| | Training o/b a vessel | from | | until | |

| | | |
|--|--------------------------|---------|
| 10. In which languages is the training available | | |
| Lectures / studies | <input type="checkbox"/> | English |
| | <input type="checkbox"/> | Russian |
| | <input type="checkbox"/> | Other |
| Simulator training | <input type="checkbox"/> | English |
| | <input type="checkbox"/> | Russian |
| | <input type="checkbox"/> | Other |
| Training o/b a vessel | <input type="checkbox"/> | English |
| | <input type="checkbox"/> | Russian |
| | <input type="checkbox"/> | Other |
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| | | |
|---|--------------------------|-----|
| 11. Has the training been formalised, i.e. formally acknowledged by a certifying institute | | |
| Lectures / studies | <input type="checkbox"/> | yes |
| | <input type="checkbox"/> | no |
| By certifying institute | | |
| Simulator training | <input type="checkbox"/> | yes |
| | <input type="checkbox"/> | no |
| By certifying institute | | |
| Training o/b a vessel | <input type="checkbox"/> | |
| | <input type="checkbox"/> | |
| By certifying institute | | |

| | | |
|--|--------------------------|---------------------------|
| 12. What is the training based on | | |
| Lectures / studies | <input type="checkbox"/> | Legislation and rules |
| | <input type="checkbox"/> | Customer specific request |
| | <input type="checkbox"/> | Other |
| Simulator training | <input type="checkbox"/> | Legislation and rules |
| | <input type="checkbox"/> | Customer specific request |
| | <input type="checkbox"/> | Other |
| Training o/b a vessel | <input type="checkbox"/> | Legislation and rules |
| | <input type="checkbox"/> | Customer specific request |
| | <input type="checkbox"/> | Other |

| | | |
|---|--------------------------|--------------------------------|
| 13. Does the training have a specific goal | | |
| Lectures / studies | <input type="checkbox"/> | General knowledge and safety |
| | <input type="checkbox"/> | Training a specific skill like |
| | <input type="checkbox"/> | Other |
| Simulator training | <input type="checkbox"/> | General knowledge and safety |
| | <input type="checkbox"/> | Training a specific skill like |
| | <input type="checkbox"/> | Other |
| Training o/b a vessel | <input type="checkbox"/> | General knowledge and safety |
| | <input type="checkbox"/> | Training a specific skill like |
| | <input type="checkbox"/> | Other |

COURSE INFORMATION

In order to be able make a full and complete survey of training we would like to ask you to send us as much information on training Arctic Navigation as possible. E.g. the content of the training programs, information on locations, information concerning training real life situations on board vessels etc.

THANKS

Thank you very much for making the effort to fill out this questionnaire.



Project funded by the European Community under the 'Competitive and Sustainable Growth' Programme (1998-2002)

LIST OF INSTITUTES THAT WERE ASKED TO COMPLETE THE QUESTIONNAIRE.

AUSTRALIA

Australian Maritime College

amcinfo@amc.edu.au

BANGLADESH

Bangladesh Maritime Training Institute

contact@bmti.orgBELGIUM

Antwerp Maritime Academy

info@hzs.beCANADA

British Columbia Institute of Technology

Canadian Coast Guard College [1999]

Fisheries & Marine Institute University Newfoundland

Georgian College

Institut Maritime du Quebec

Marine Institute, St. John's

Transport Canada, Marine Safety

Marine Institute Canada

'Wendy_Hobson@bcit.ca'

'registrar@cg.gc.ca'

'cms@mi.mun.ca'

'skazarian@georgianc.on.ca'

'infosco@imq.qc.ca'

'naomi.krym@nrc-cnrc.gc.ca'

'MarineSafety@tc.gc.ca'

miintl@mi.mun.ca

CHILE

CIMAR Maritime Instruction and Training Center, Valparaiso

'consultas@eula.cl'

CHINA

Dalian Maritime University

Qingdao Ocean Shipping Mariners College

'faodmu@dlnu.edu.cn'

'network@coscoqmc.com'

DENMARK

Danish Maritime Institute

Danmarks Rederiforening

DFDS A/S

Fredericia Maskinmesterskole

Fredrikshavn Maskinmesterskole

Maersk Training Centre

Marstal Navigationsskole

Naval Technical School

Scandlines

Svendborg International Maritime Academy SIMAC

Århus Maskinmesterskole

'kms@dma.dk'

'info@shipowners.dk'

'cmm@dfdstransport.co.uk'

'fms@maskinmester-fms.dk'

'martec@dma.dk'

'cphhrd@maersk.com'

'marnav@marnav.dk'

'tks@tks.svn.dk'

'scandlines@scandlines.dk'

'mail@simac.dk'

'aams@aams.dk'

FINLAND

Kotka Vocational Institute

Kymenlaakso Polytechnic

Meriturva Maritime Safety Training Centre (*)

Rauma Vocational College (*)

Satakunta Polytechnic (*)

Sydväst Polytechnic (*)

University of Turku, Centre for Maritime Studies (*)

Wärtsilä Land and Sea Academy (*)

Åland Polytechnic

matti.sulin@kotka.fi

timo.alava@kyamk.fi

'baarman@cc.hut.fi'

riku.anttila@rao.rauma.fi

heikki.koivisto@samk.fi

per-olof.karlsson@sydvast.fi

paivi.soderholm@utu.fi

timo.aalto@wartsila.com

bengt.malmberg@ha.aland.fi



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GERMANY

Fachhochschule Hamburg
 Hochfachschnle Wismar
 Institut fur Schiffsbetriebsforschung, Flensburg
 MarineSoft GmbH
 STN Atlas Elektronik GmbH, Hamburg

'kommunikation@haw-hamburg.de'
 'postmaster@hs-wismar.de'
 'isf@fh-flensburg.de'
 'training@marinesoft.de'
 'manfred.loewe@sam-electronics.de'

GREECE

Marine and Offshore Engineering SBE College

'sbe@sbe.gr'

GREENLAND

Imarsiornermik Ilinniarfik

'maritim@maritim.gl'

ICELAND

Verkmenntaskolinn a Akureyri
 Marine Engineering College of Iceland

'adam@ismennt.is'
 'mennta@mennta.is'

INDIA

Lal Bahabur Shastri College of Maritime Studies
 Academy of Maritime Education and Training Chennai

'mariner@bom2.vsnl.net.in'
 amet@vsnl.com

INDONESIA

Sinar Poseidon Gupita Training Center, Jakarta

info@poseidon.co.id

ITALY

IMO International Maritime Academy Trieste

imoima@imoima.org

JAPAN

IHI Engineering Marine Co Ltd
 Marine Technical College, Tokyo
 Mitsui Engineering & Shipbuilding Co. Ltd.
 Ship Research Institute Ministry of Transport
 Tokyo University of Fisheries
 Yuge National College of Maritime Technology
 Kobe University of Mercantile Marine Kobe

'webmaster@ihimu.ihl.co.jp'
 'nakazawa@cc.kshosen.ac.jp'
 'soumu@mai.mtc.ac.jp'
 'prdept@mes.co.jp'
 'www-master@www.tokyo-u-fish.ac.jp'
 'webmaster@yuge.ac.jp'
 'gakutyuu@office.kashosen.ac.jp'

KUWAIT

College of Technological Studies

'webmaster@paaet.edu.kw'

LATVIA

Latvian Maritime Academy

lma@lama.lv

NORWAY

Axenz
 Det Norske Veritas
 Høugesund Maritime Videregående Skole
 Høugsolen i Tromsø
 Høugsolen i Vestfold
 Høugsolen i Ålesund
 Kristiansand Tekniske Skole
 Kongsberg Maritime Ship Systems AS
 Marintek, Norwegian Marine Technology Research Institute
 ResQ Høugesund
 IDESS Brevik

'post@axenz.no'
 'ucuno141@dnv.com'
 'mail@hmtvs.no'
 'postmottak@hltos.no'
 'maritim@hive.no'
 'postmottak@hials.no'
 'kadm@kts.va.no'
 'office@kongsberg.com'
 'info@marintek.sintef.no'
 'post@resq.no'
hch@idess.no



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 Growth' Programme (1998-2002)**

Poseidon Training Centre Lofoten
 Alesund College
 Ship Manoeuvring Simulator Cente AS Trondheim
 The Norwegian Shipping Academy

tclofoten@poseidon.no
postmottak@hials.no
 anniken@smc.no
 shipping-academy@bi.no

PERU

Escuela Nacional De Marina Mercante

'informes@enamm.edu.pe'

PHILIPPINES

Philippine Center for Advanced Simulation and Training
 Philippine Transmarine Carriers
 IDESS Manila

'info@mtc.gov.ph'
 'ptccom@philtransmarine.com.ph'
mail@idess.com

POLAND

Maritime University, Szczecin
 Gdynia Maritime University

'rektor@wsm.szczecin.pl'
intercol@wsm.gdynia.pl

REPUBLIC OF SINGAPORE

Singapore Maritime Academy

sma@sp.edu.sg

ROMANIA

Merchant Maritime Institute, Constantza

'dcarp@mail.imc.ro'

RUSSIA

CNIIMF
 Primorsk Shipping Corporation, Nakhodka
 Centre of additional professional education, Archangelsk
 Makarov academy, St.Petersburg
 Training Centre "MARSTAR", St.Petersburg,
 FarEastern Marine Academy of Nevelskoy Vladivostok

mortic@cniimf.ru
 pac@prisco.ru
 amu@arh.ru;
 web@gma.ru
 marstar@mail.wplus.net;
 Pismenny@msun.ru;

SLOVENIA

University of Ljubljana

'student.office@uni-lj.si'

SOUTH AFRICA

South African Navy

'info-centre@mil.za'

SWEDEN

Chalmers Lindholmen
 Höskolan i Kalmar
 World Maritime University

'oller@chl.chalmers.se'
 'kma@hik.se'
info@wmu.se

THE NETHERLANDS

Maritime Institute Willem Barentsz
 Maritime Institute Amsterdam
 Maritime Institute Rotterdam
 Maritime Academy IJmuiden
 Maritime Insitute De Ruyter Vlissingen

scheepst@mi.nhl.nl
studievoorlichting@hva.nl
studievoorlichting@hro.nl
gmeems@novacollege.nl
 sic@mail.hzeeland.nl

TURKEY

Istanbul Technical University

'gemi@itu.edu.tr'



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 Growth' Programme (1998-2002)

UKRAINE

Odessa State Maritime Academy
Kerson Seafarers Training Center, Kherson

'info@ma.odessa.ua'
office@stc.kherson.ua

UNITED KINGDOM

Institute of Marine Engineers
Lloyd's Register of Shipping
Marine Engineering College
National Sea Training Centre
South Tyneside College
Warsash Maritime Centre
Royal Institute for Navigation Plymouth

'technical@imarest.'
'marine-training@lr.org'
'information@southampton-city.ac.uk'
'krs@engin.umich.edu'
'alampkin@engin.umich.edu'
'wmc@solent.ac.uk'
rindir@atlas.co.uk

UNITED STATES OF AMERICA

ARCO Marine
Buffalo Computer Graphics
California Maritime Academy
Georgia Institute of Technology, Atlanta
Marine Safety International
Massachusetts Maritime Academy
MEBA Engineering School
Simulation Based Design Center
The Landing School
Transas Marine USA
U.S. Coast Guard National Maritime Center
U.S. Coast Guard Research & Development Center
U.S. Merchant Marine Academy
Evans & Sutherland Salt Lake City
Elkins Marine Training International (EMTI) Santa Rosa
Great Lakes Maritime Academy Michigan

'arco@arcomarine.com'
'walters@buffalo.edu'
'cme@csum.edu'
'erik.hall@rotc.gatech.edu'
'info@marinesafety.com'
'gillis@mma.mass.edu'
'mebahq@d1meba.org'
'postmaster@nrotc.tulane.edu'
'info@landingschool.edu'
'info@transas.com'
'admissions@cga.uscg.mil'
'mkendall@rdc.uscg.mil'
'info@usmma.edu'
euro_support@es.com
info@elkinsmarine.com
maritime@nmc.edu



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