



BALTIC ICEBREAKING MANAGEMENT

Baltic Sea Icebreaking Report 2007-2008



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FOREWORD

This decade the Baltic Sea has witnessed one normal winter in 2003 and one extra mild winter in 2008. This may say a lot about global warming. It is a good thing if we do not need any more icebreakers, as this will save a lot of time in vessel schedules and money in fuel costs. All of us in the Baltic Icebreaking Management (BIM) (www.baltice.org) know that we cannot rely on this. You can never forecast the weather for next winter and that is why our work is still a big challenge.

The number of icebreakers in the world is limited. Many of the old icebreakers are reaching the end of their economic lifetime. What shall we do if the global warming continues; shall we trust that this is the case or shall we renew our icebreaker fleet in case of a hard winter? If we do nothing, the worst-case scenario is that one winter hundreds of vessels will be stuck in ice for weeks. How can we keep icebreakers on standby in the most cost-effective way?

The future trend seems to be that all new icebreakers in the Baltic Sea will be multipurpose icebreakers. This means that they get 25% of their income from the icebreaking business and 75% from the offshore business.

Today the price of a new multipurpose icebreaker is about 120 million euro. This means that the capital cost will increase enormously. The daily cost of icebreaking will reach the daily rate of the offshore business. Nobody will come and break our ice for fun. All member states of the BIM have to work hard to find a joint solution to this problem so that we can use our old traditional icebreakers as long as possible. Is a joint icebreaker fleet in the Baltic Sea a solution in the future?

Another of our big challenges due to the extra mild winters is ice training. How can we maintain the icebreaking skills among officers on the icebreakers and the ship's officers' skills to navigate in ice-infested waters? In addition to this we have to work hard to encourage the charterers to charter good ice-going vessels for the winter season in case there is a need for it!

I wish you all a nice ice winter 2008-2009

Copenhagen 25th September 2008

Ilmari Aro
Chairman of the BIM

1. Short history of the Baltic Icebreaking Management

Baltic Icebreaking Management, **BIM** is an organisation with members from all Baltic Sea states. BIM is a development of the annual meeting between Baltic Sea States icebreaking authorities which have assembled more than 20 years. The member countries of BIM are Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Norway, Poland, Russia and Sweden.

After the difficult winter navigation season of 2002/2003 a project was started up within the framework of HELCOM, aiming at improving the safety of winter navigation in the Baltic Sea. **The Helcom – recommendation 25/7 on the safety of Winter Navigation in the Baltic Sea Area was adopted in March 2004.**

Within the EU concept Motorways of the Sea, which is one priority project in the trans-European network, the Baltic Sea countries established a working group with the aim of creating more efficient winter navigation by cooperation between the Baltic Sea countries. The icebreaking authorities around the Baltic Sea decided in Helsinki meeting 2004 that this work shall continue within the framework of BIM, were also non EU-member states are taking part. BIM should function all year round and that its strategy should be to develop safe, reliable and efficient winter navigation between the Baltic Sea countries. The overall objective of BIM is to assure a well functioning maritime transport system in the Baltic Sea all year round by enhancing the strategic and operational cooperation between the Baltic Sea countries within the area of assistance to winter navigation.

January 10th 2007, the Joint Baltic web service on winter navigation www.baltice.org was launched, see appendix 1.

April 11th 2007, the DVD of training in ice navigation for seafarers was launched, see appendix 2.

15th November 2007, Helcom adopted a new recommendation **28/11 Further measures to improve the safety of navigation in ice conditions in the Baltic Sea**, BIM was acting an “ice advisor” in this recommendation.

One important task of BIM is to inform stakeholders in the maritime sector and policy makers about winter navigation and icebreaking. There is a need for information about winter navigation and icebreaking that covers the whole Baltic Sea region. Several Baltic Sea countries prepare information about the winter navigation and icebreaking in their respective national waters. There has been a need to coordinate this country-specific

information, improve the information and to distribute it to a wider target group by "Joint Annual Baltic Icebreaking Report" is the second of its kind.

This report gives an overview of the winter navigation season **2007/2008** for the Baltic Sea area. National reports can be found on www.baltice.org. The report will also describe organisational changes in the icebreaking authorities or changes in icebreaking resources and provide a progress report of the Baltic Sea Icebreaking cooperation and the development of BIM.

2. Overview of the icebreaking season (2007-2008) and its effect on the maritime transport system in the Baltic Sea region

According to Finnish Institute of Marine Research the Baltic Sea ice season of 2007-2008 could be classified as an extremely mild one. The maximum ice extent reached 49,000 km² (12% of the Baltic Sea was ice covered) in 24 March.

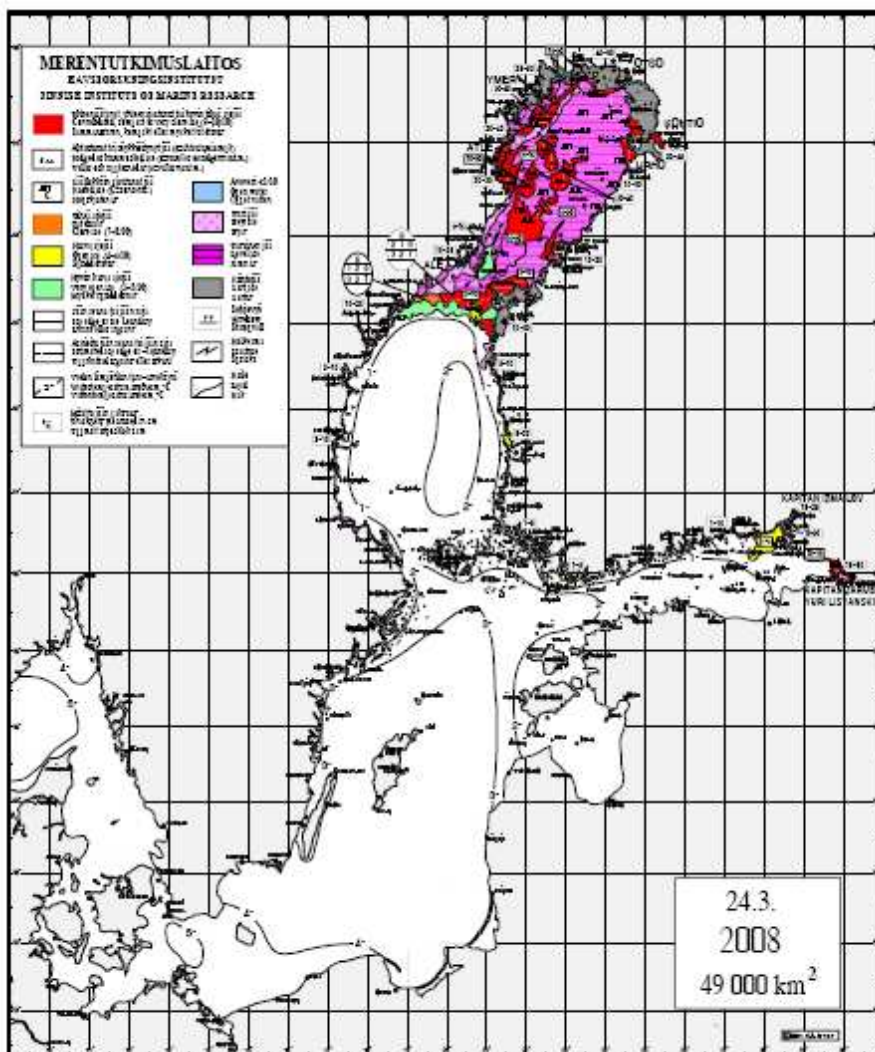


Figure 1. The maximum ice extent in ice season of 2007-2008.

The October was warmer than usual with the temperature of the seawater at the end of the month being above the average by one to two and a half degrees Celsius. In the northern Bay of Bothnia and in the Gulf of Finland off St. Petersburg the freezing begun in mid November two weeks later than normal.

In early January the weather got colder with ice forming in coastal regions of the Bay of Bothnia, the Vaasa archipelago and the inner archipelago of the Sea of Bothnia. In the open Bay of Bothnia south-westerly winds formed a brash barrier at the ice edge. In the Gulf of Finland the amount of ice off Vyborg and St. Petersburg increased with thin ice forming in the archipelago of the Kotka-Hamina area. Following a cold spell of about a week the temperature in Finland remained five to ten degrees Celsius above the average until the end of the month with no new ice formation.

In mid-February there was a cold spell with the amount of ice increasing. February ended mild and at the turn of the month only the ice cover in the Bay of Bothnia had increased a little with the open sea areas frozen to the north of the line Raahe–Skellefteå. In the beginning of March the weather became colder with ice forming in the Quark on the fifth day of the month. Round about the tenth day the weather got milder again.

Towards the end of March the weather became colder and **the ice extent reached the winter's maximum on 24th of March with 49,000 km², the all-time low (Fig. 2)**. At that time the Bay of Bothnia and the Quark were frozen. In the northern part of the Sea of Bothnia the ice edge ran from Strömmingsbådan to Sydostbrotten and from there on to Skagsudde. The coastal regions of Sea of Bothnia and Gulf of Finland had a very thin ice cover in places in the inner archipelago. The eastern Gulf of Finland had a thin ice cover in the Bay of Vyborg and off St. Petersburg (Fig. 1).

At the end of March the weather got milder and the thin ice melted quickly away in the first days of April. By the end of the first week of April the ice had become rotten in the Gulf of Finland and the Bay of Bothnia up to the latitude of Kokkola. The Gulf of Finland and the Sea of Bothnia were ice-free on 9th of April and the last ice of the Gulf of Finland, in the Bay of Vyborg, melted away on 19th of April. At the same time the open areas of the Bay of Bothnia were free from ice with the exception of the Swedish northern archipelago. The remaining coastal ice in the Bay of Bothnia disappeared in the beginning of May so that the Bay of Bothnia was ice-free on 15th of May.

Maximum ice extents of the Baltic Sea 1971 - 2008

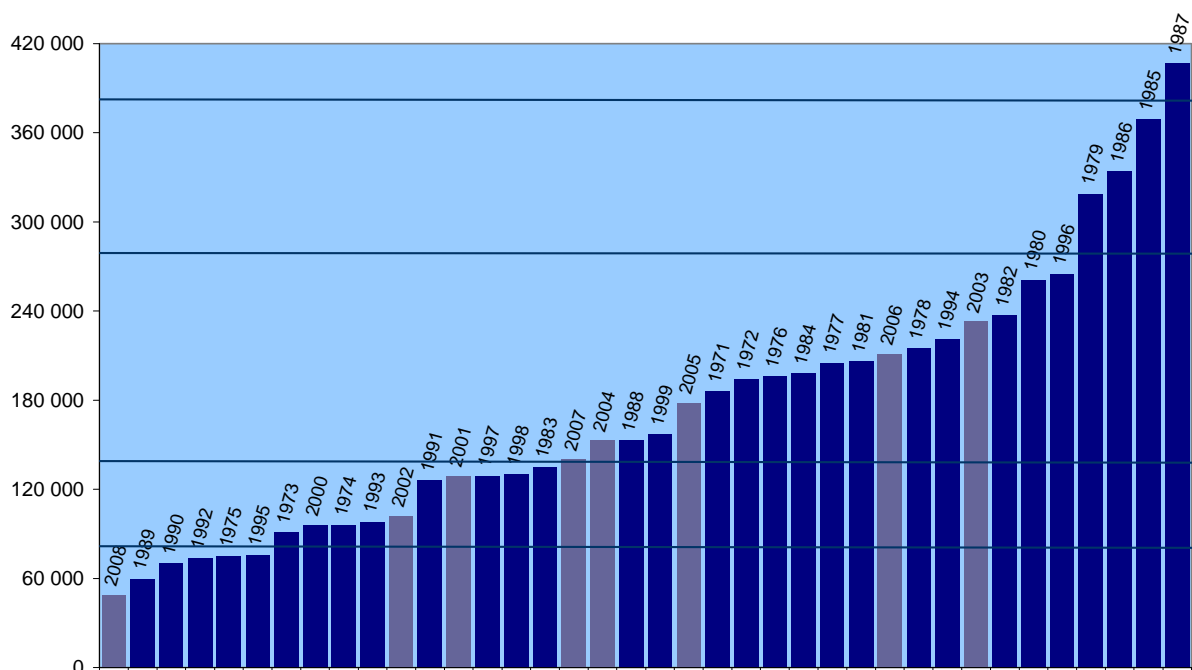


Figure 2. Maximum ice extents of the Baltic Sea for the winters 1970-71 to 2007-08 in the order of magnitude. Dark bars indicate winters 1970-71 to 1999-2000, light bars indicate winter 2000-01 to 2007-08

Since winter 1970-71 all Finnish winter ports are kept open through the winter. Compared that period the last winter was the mildest ever.

THE MAXIMUM ICE EXTENTS OF THE BALTIC SEA FOR THE WINTERS 1971 - 2008

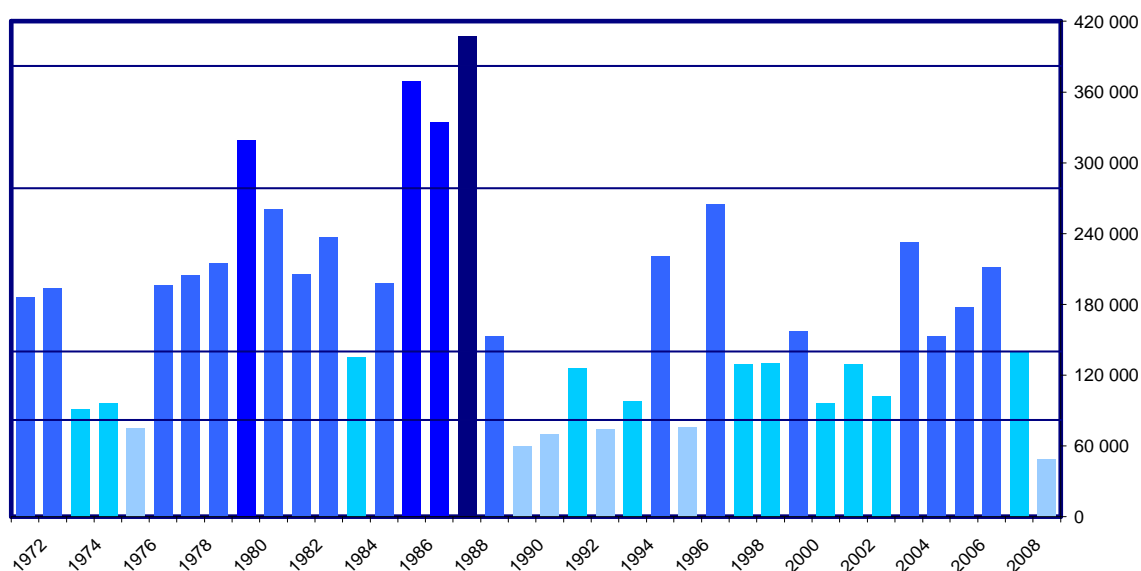


Figure 3. The maximum ice coverage in ice seasons 1971-2008. The median of 1971-2000 is 172 000 km². Severity of season is indicated using colours from extremely mild to extremely severe (lightest blue to darkest blue respectively).

The most important factors for winter navigation are ice extension and wind direction/force. The ice conditions can be very difficult when strong wind creates pressure and ridges in the ice field. In conditions when a large number of vessels require towing assistance by icebreakers, long delays occur.



Figure 4. Ice ridge builds up against shore

Only vessels with ice class are offered assistance from icebreakers when traffic restrictions are issued. Traffic restrictions are necessary for safe and efficient winter navigation. A vessel must have a strong hull that can withstand strain and stress from the sea ice. Sufficient engine power and ability to navigate independently in broken or light ice is important to avoid long delays.

Traffic restrictions 2007-08

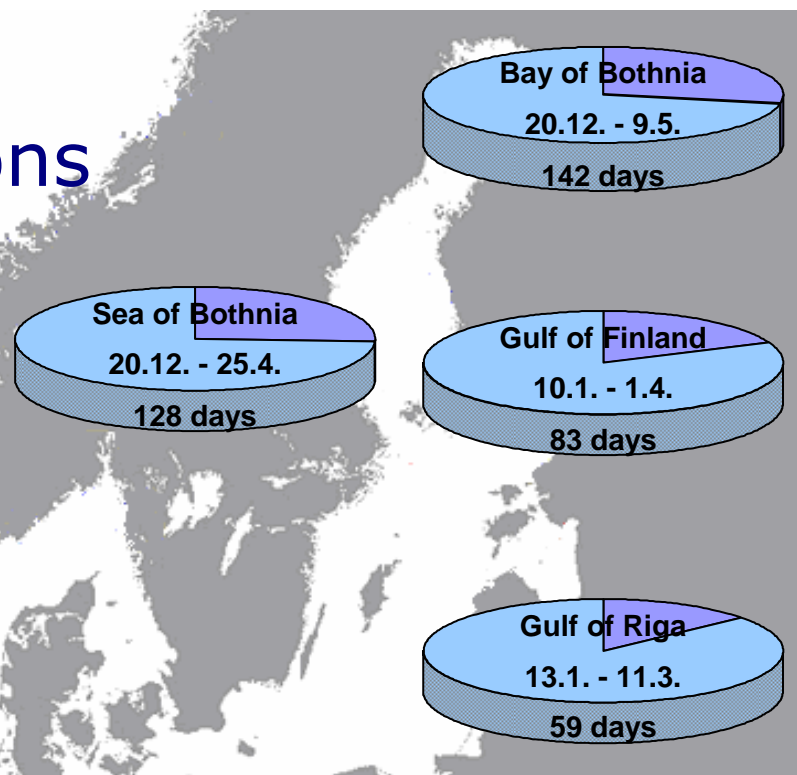


Figure 5. Dates when traffic restrictions were in force in the different areas.

For safety reasons, the Baltic Sea countries have within HELCOM agreed on a joint policy when traffic restrictions shall be issued. For efficiency reasons, the icebreaking authorities can demand a lowest limit on vessels' engine power as well.

<p>The traffic restrictions should be set as follows:</p> <p>When the thickness of level ice is in the range of 10-15 cm, and the weather forecast predicts continuing low temperature, a minimum ice class LU1 or equivalent should be required for ships entering the ports of a Contracting Party.</p> <p>When the thickness of level ice is in the range of 15-30 cm, and the weather forecast predicts continuing low temperature, a minimum ice class IC or LU2 or equivalent should be required for ships entering the ports of a Contracting Party.</p> <p>When the thickness of level ice is in the range of 30-50 cm, a minimum ice class IB or LU3 or equivalent should be required for ships entering the ports of a Contracting Party.</p> <p>When the thickness of level ice exceeds 50 cm, a minimum ice class IA or LU4 or equivalent should be required for ships entering the ports of a Contracting Party.</p>

Figure 6. HELCOM recommendations for traffic restrictions.

Annex. Approximate correspondence between Ice Classes of the Finnish-Swedish Ice Class Rules (Baltic Ice Classes) and the Ice Classes of other Classification Societies

Classification Society	Ice Class				
	IA Super	IA	IB	IC	Category II
Finnish-Swedish Ice Class Rules					
Russian Maritime Register of Shipping (Rules 1995)	UL	L1	L2	L3	L4
Russian Maritime Register of Shipping (Rules 1999)	LU5	LU4	LU3	LU2	LU1
American Bureau of Shipping	IAA	IA	IB	IC	D0
Bureau Veritas	IA SUPER	IA	IB	IC	ID
CASPPR, 1972	A	B	C	D	E
China Classification Society	Ice Class B1*	Ice Class B1	Ice Class B2	Ice Class B3	Ice Class B
Det Norske Veritas	ICE-1A*	ICE-1A	ICE-1B	ICE-1C	ICE-C
Germanischer Lloyd	E4	E3	E2	E1	E
Korean Register of Shipping	ISS	IS1	IS2	IS3	IS4
Lloyd's Register of Shipping	1AS	1A	1B	1C	1D
Nippon Kaiji Kyokai	IA Super	IA	IB	IC	ID
Registro Italiano Navale	IAS	IA	IB	IC	ID

Figure 7. Table for corresponding ice classes.

Smaller vessels like buoy tenders and tugs with strong engines and hull are used as port icebreakers and for icebreaking mission in waters protected from drifting sea ice. In open sea areas that are affected by drifting sea ice with ridges and ice pressure, big sea icebreaker are required.

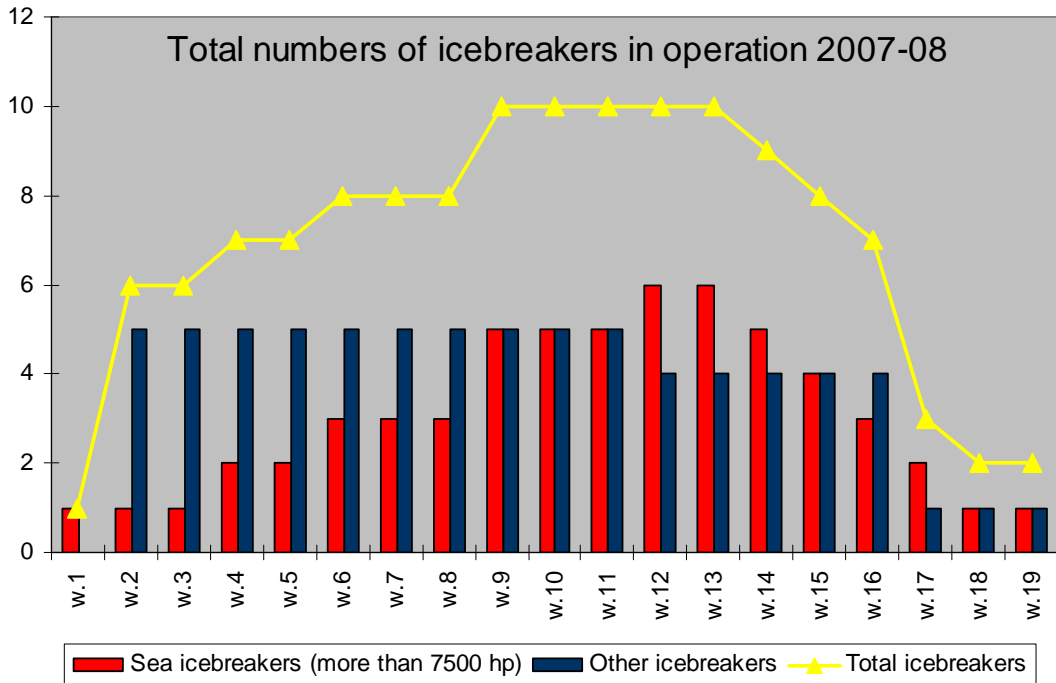


Figure 8. The total number of icebreakers in operation each week in the Baltic Sea during the season 2007/2008.

According to statistics from the Baltic Sea icebreaking authorities, 1368 vessels received assistance from icebreakers this season.

Assisted Vessels

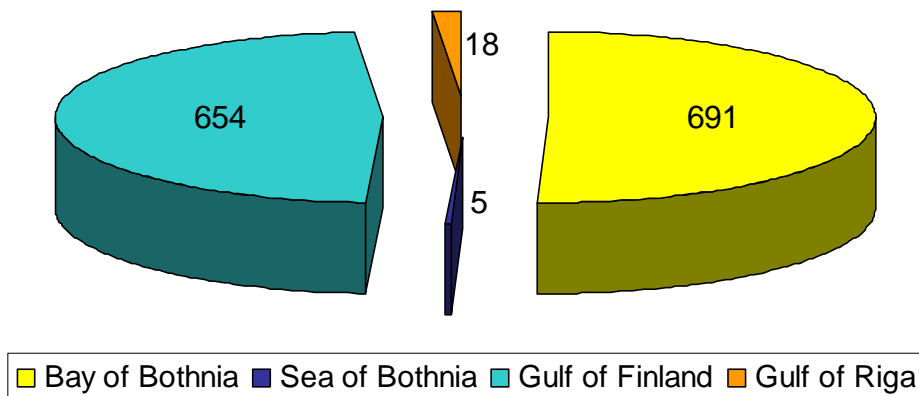


Figure 9. A total of 1368 vessels were assisted by icebreakers during the icebreaking season in the Baltic Sea.

The longest sailing distance in sea ice is to the northernmost ports in the Bay of Bothnia. But due to the big number of vessels in the shorter fairway to the easternmost ports in the Gulf of Finland, the traffic is more affected by sea ice in this area, especially during periods with strong westerly winds when the icebreakers must tow many vessels one by one.

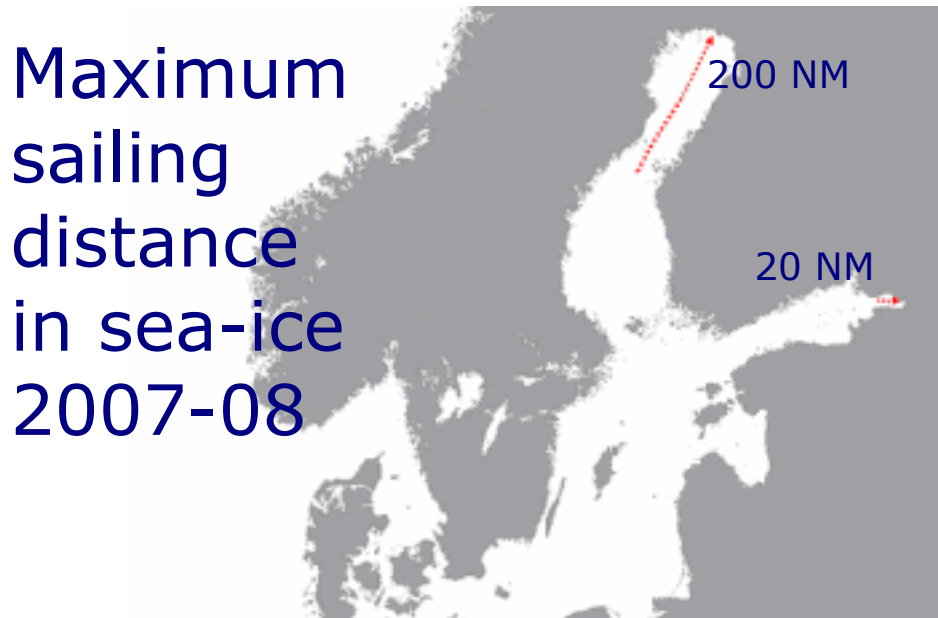


Figure 10. Sailing distance from ice edge during maximum ice extension, 24 March 2008. Kemi 200 nautical miles and St. Petersburg 20 nautical miles.

Crude carriers of Aframax size (100 000 dwt) navigate in the Baltic Sea all year round. In severe ice conditions these large vessels require at least two sea icebreakers due to the wide beam. To support these big vessels the Russian icebreaking service is prepared to send an icebreaker to the Danish Great Belt if required during severe winters.

3. Accidents and incidents in sea ice

The Technical University of Helsinki collects information on accidents related to navigation in ice. Shipowners and others within winter navigation are requested to report accidents, incidents and damages that are ice-related to icedamage@tkk.fi or to:

**Ice Damage Database
Helsinki University of Technology
Ship Laboratory
PL 5300
02151 TKK
FINLAND**

Only some minor damages occurred to merchant vessels during assistance of the icebreakers. In comparison, about 100 vessels reported damages due to the severe ice conditions in the year 2003. Reports of accidents are difficult to get because often damages won't appear until during the next dry docking.

4. Costs of icebreaking services in the Baltic Sea

Winter conditions cause various costs for vessel traffic in the Baltic Sea. The vessels' fuel costs increase since speed is reduced by even half on average due to ice barriers when proceeding in ice at full effect, and approaching the quay can take hours. The harbour costs also increase, since the basin must be kept open by a harbour tug in order for the vessels to reach the quay.

Moreover, heating to keep equipment in working order despite outdoor temperatures below -20 °C adds to the costs. Since it is difficult to estimate other costs, this report comprises only those related to icebreakers.

4.1 Finland

In Finland the cost of icebreakers stand-by in period 2007-2008 were approximately 14 million EUR. This season was extra mild and therefore the operational costs were 5,3 million EUR and fuel costs only 1,6 million EUR. The FMA has also contracts with private tugboat companies for minor operations. The cost of the Finnish icebreaking services varies from 22 to 32 million euros depending on winter.

4.2 Sweden

In Sweden the costs for the stand-by period amount to approximately 10 million EUR, additional operational costs to approximately 4 million EUR, and fuel costs to 2.5-9 million EUR. The cost of the Swedish icebreaking services varies from 15 to 34 million euros depending on the winters' degree.

4.3 Russia

Since January, 01st, 2008 according to the act of Federal Service on Tariffs dd 20.12.07 №552-t/1 rates of icebreaking dues in the Russian ports of the Gulf of Finland are established as follows:

Icebreaking dues:

- 1) Icebreaking dues are applied for incoming, outgoing or transiting the port area.
- 2) For the cargo ships engaged in liner services, which are officially declared, to the rates of the icebreaking dues the factor of 0.8 is applied.
- 3) From icebreaking dues are released:
 - vessels of ice class LU7 (according to classification of the Russian Maritime Register of Shipping or classes of other classification societies corresponding to it).
 - passenger vessels.

- 4) Upon the announcement by the Harbour Master of winter (summer) navigation before the target date, and also after the prolongation of its duration, icebreaking dues are paid as per corresponding rates from the date of announcement to a date of completion (inclusive), corresponding to the period of winter navigation.

Rates for ships engaged in an international trade rub/1 GT

	All vessels except Ro-Ro, Ro-Flow, container ships and bulk carriers	Ro-Ro, Ro-Flow and container ships	Tankers
The summer rate from May, 1st till November, 30th	5.5	3.85	6.03
The winter rate from December, 1st till April, 30th	13,70	9,59	15,02

During the period from May, 1st till November, 30th the following vessels are released from payment of icebreaking dues:

- arriving to the port from inland waterways of Russia or from the Saimaa canal and sailing back within current year;
- arriving to the port from other Russian ports situated in the eastern part of the Gulf of Finland.

During the period from December, 1st till April, 30th the vessels with ice class LU5 and LU6 (according to classification of the Russian Maritime Register of Shipping or classes of other classification societies corresponding to it) are subject to icebreaking dues multiplied by factor 0.75.

4.4 Estonia

In Estonia, the total cost of icebreaking in the 2007-2008 season amounted to approximately 1.5 million EUR, with about 0.5 million EUR accounting for the costs in the Pärnu Bay and 1,0 million for the Gulf of Finland (annual upkeep costs 0.85 million EUR of the IB TARMO and its spare fuel 0.15 EUR). In the Pärnu Bay, the fuel costs during the icebreaking season of 2007-2008 were about 0.06 million EUR and operational costs about 0.44 million EUR. In total, the fuel costs amounted to about 0.21 million EUR and operational costs 0.44 million EUR.

4.5 Denmark

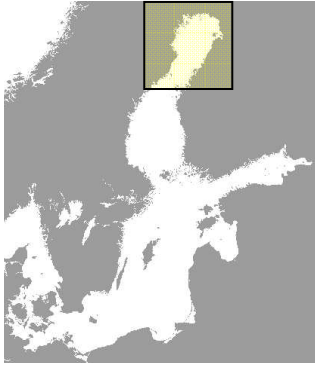
In 2007 the cost of the Danish Ice service was approximately € 2.6 mill. This expense covers stand by costs for the Danish Icebreakers and the running cost of the other parts of the ice service. The cost of the Ice service in an Ice winter is not known, but the average cost of the Ice service the last 5 ice winters was approximately € 8.5 mill. This amount has been extrapolated to 2007 level.

4.6 Latvia, Lithuania, Poland, Germany, Norway

There was no icebreaking operation in this season 2007-2008.

5. Winter navigation in the different parts of the Baltic Sea

5.1 Bay of Bothnia

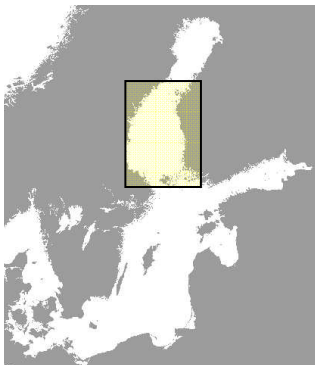


The first traffic restrictions were initiated 20 December and reached their highest level, IA 2000 dwt, in 27 January. The first icebreaker Otso started the icebreaking operations 31 December.

Towards the end of January, the weather turned some colder which required engagement from more icebreakers. In late March, when the maximum ice extension was reached, a total of 6 sea icebreakers and 1 tugboat were engaged in accordance with the joint icebreaking plan.

The icebreakers in the Bay of Bothnia assisted 691 merchant vessels and 42 towing operations were conducted. The average waiting time was 3 hours and 30 minutes. 97 % of all the port visits did not have to wait for icebreaker assistance but 0,3 % of the port visits had more than 4 hours waiting time (the so-called long waiting). The icebreaking season in the Bay of Bothnia ended on 9 May.

5.2 Sea of Bothnia



The mild weather prevailed whole season in the Sea of Bothnia and only in the Quark some vessels needed assistance. The first traffic restrictions were initiated 20 December and 25 April restrictions were cancelled.

5.3 Gulf of Finland



Winter was very light and only in the eastern part of Gulf of Finland occurred some ice formation.

The first traffic restrictions were initiated 10 January in St. Petersburg. These were also the strictest restrictions being only

requirement 2000 kW in horsepower. The restrictions were cancelled 2 April. In Finland and Estonian there were no restrictions during season.

All of the vessels which needed icebreaker assistance 654 were bound for Russian ports. During the largest ice cover the Russian had no sea icebreakers and 3 minor icebreakers in use. The icebreaking season lasted from 10 January to 2 April in the Russian territorial water.

Ice conditions in the eastern part of the Gulf of Finland in 2007-2008

November

The ice formation in the coastal zone of Nevskaya Guba has begun on November, 14th with carrying out shuga from the river Neva, formed in the Bay of Petrokrepost and Ladoga lake. Further shuga arrivals were accompanied with own ice formation. Steady occurrences of ice in Nevskaya Guba have occurred on November, 15–17th and that is before mean annual observations for 6–13 days. In top of the Gulf of Vyborg the ice was formed on November, 20th that is 2 days before the average. Further, within the month the period was marked with slow, but continuous ice formation. By the end of month the continuous drifting partially layered ice up to 10 sm in its thickness was observed over the water area of Nevskaya Guba, and also in top of the Gulf of Vyborg. The edge of dark nilas settled down on a longitude of Tolbukhin light-house.

December

In the beginning of month the ice formation proceeded slowly, but continuously. Then since December, 4th it has stopped and some slow destruction of ice has begun. As a result of the prolonged drift to the east within the second and third decade of the month continuous and partially layered ice of 5–15 sm in its thickness has been concentrated in the eastern part of the water area of Nevskaya Guba to a longitude of Petrodvorets. In the Gulf of Vyborg continuous nilas ice in the thickness of 3–7 sm was observed

January

During most of the first decade of the month, since January, 2nd, a quite intensive ice formation was observed. In Nevskaya Guba along the coast, and also along the northern coast of the gulf around Sestroretsk shallows the fast ice was reformed. The thickness of the fast ice reached 10–20 sm over all the water area of Nevskaya Guba, the fast ice also of 10–20 sm in its thickness was observed near the edge of nilas ice by the end of the first decade and has reached the longitude of Shepelevsky light-house. Since January, 9th the slow ice destruction has stopped and another ice formation has begun. By January, 15th

the fast ice in Nevskaya Guba has completely collapsed and till the end of the month only the fast ice in the thickness of 10–20 sm was observed, the ice edge has receded to the longitude of Tolbukhin light-house. In the beginning of the third decade there was some fast ice breaking around the Sestroretsk shallows and some fast ice of 10–15 sm was observed around Lomonosov, on January, 20th the ice-hole which remained till the end of the month was formed, occasionally becoming covered by ice of initial kinds.

In the Gulf of Vyborg on January, 5th the fast ice was formed which remained till spring. The thickness of ice by the end of the month has grown to 12–18 sm. In Bjorkesund passage the ice formation has begun only on January, 5th, and till the end of the month the fast ice of 5–10 sm in its thickness remained. In Luga and Koporsky areas a short-term formation dark nilas in the beginning of month was observed.

February

During first half of the month there was no ice formation. The quantity of drifting ice slowly was reduced. In Nevskaya Guba continuous drifting partially hummocky and layered ice of 10–20 sm was observed, the ice-hole along southern coast extended. Since February, 15th over the gulf water area some slow ice formation has begun which has lasted only a week. As a result of it around the Lisiy Nose and over the Sestroretsk shallows along the coast again the fast ice was formed in its thickness near 20–35 sm. The thickness of the fast ice in Nevskaya Guba has grown to 15–25 sm, continuous drifting ice in the thickness 5–10 sm has extended to a cape Shepelevsky longitude, but in the course of a few days the ice edge has receded to a longitude of a navigation sign over Krasnaya Gorka. Along the southern coast of Nevskaya Guba the ice-hole filled in with just some rallied ice for about only 10 days in the middle of month and remained.

In the Gulf of Vyborg the fast ice and some drifting ice remained with its thickness up to 12–20 sm. In the beginning of the third decade it has increased to 15–25 sm. In Bjorkesund passage in places some fast ice of 5–10 sm in its thickness remained, continuous ice 5–10 sm in the thickness was observed over the all water area of passage by the end of the month. Over the Luga and Koporsky areas some short-term formation dark nilas was observed.

March

Within the first decade of the month some slow ice formation went on. The maximum development of the ice conditions have reached on March, 7th, the ice edge during this period formed a line between the Cape of Kolgompja and the Island Bolshoy Berezovyy. The fast ice was noted only around the Cape Lisiy Nose and the Sestroretsk shallows along

the coast at its thickness of 20–30 sm. In the Neva estuary continuous drifting, partially hummocky ice of 15–25 sm with some short-term formations of ice-holes was observed.

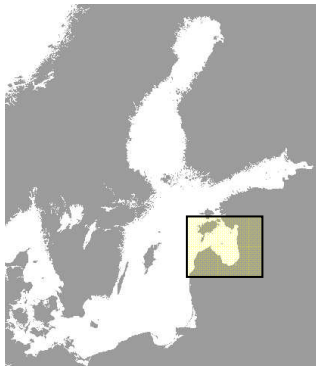
In the second decade ice destruction over all the water area of the Gulf of Finland has begun. The third decade was characterized with repeated, but short ice formations.

In the Gulf of Vyborg within the month the fast ice and some drifting ice of 15-25 sm remained. In Bjorkesund passage some fast ice of 10–15 sm was observed. In the Luga and Koporsky areas there was a short-term formation of dark nilas from time to time.

April

Within the month the fast destruction of ice was observed. Nevskaya Guba and also all main waterways completely were cleared of ice on April, 9th. The waterways to port Primorsk were cleared of ice on March, 10th. Compared to the average the clarification has occurred about 20 days before the norm. For the next few days the small amount of rotten ice remained only in top of the Gulf of Vyborg and in Zelenogorsk area. The complete clarification from ice over the Gulf of Finland was complete on April, 16th.

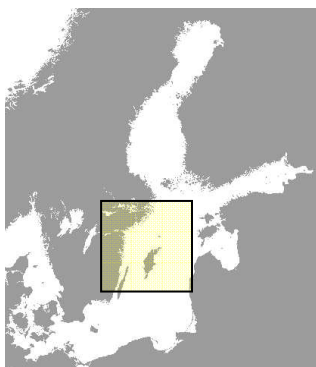
5.4 Gulf of Riga



The Estonian Meteorological and Hydrological Institute assessed the winter of 2007/2008 as moderate. The traffic restrictions were initiated 13 January being IC-1600 kW in Pärnu and were cancelled 11 March. The icebreaking season lasted from 9 January to 11 March and 18 ships were assisted.

The Latvian icebreaker Varma was on stand-by at Riga during this ice season.

5.5 Central Baltic



There was no ice in the Central Baltic in this ice season.

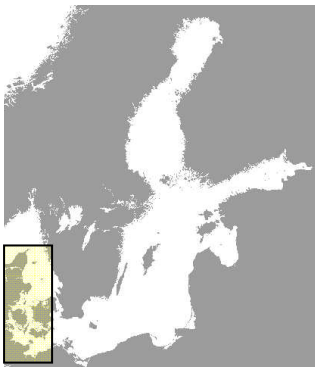
5.6 South Baltic Coastline



The ice season on the Baltic Sea South coast did not cause difficulties to merchant shipping. In Germany, very local restrictions were set only in sheltered inner waters, but there were no restrictions for seagoing vessels. The icebreaking service was not in force.

There was no typical ice-breaker available on East Coast area of Poland. Tugs with ice class are in use for ice breaking service. Air and sea water temperatures were above average through all the winter season. No ice formation was noted. No difficulties to the traffic were reported during whole winter season 2007/2008. It was no necessity to use ice-breakers during whole season.

5.7 Western Baltic, Danish waters



The winter 2007 - 2008 was as mild as the previous winter. The Ice service was not activated.

6. Description of organisations and icebreakers engaged during the season 2007/2008

6.1 Finland

The Finnish Maritime Administration (FMA) is the national authority responsible for the assistance of winter navigation, its coordination, development and management nationwide. The actual icebreaking services have been contracted out.

The FMA develops Finland's icebreaking policy, taking into account the requirements of its clients (mainly the Finnish industry). Essential for the industry are as short waiting times as possible for traffic. The FMA decides on the length of the assistance period, exemptions and traffic restrictions. On inland waterways, the authority and the right to arrange services have been delegated to the FMA Gulf of Finland Traffic Division.

The traffic restrictions are normally made more stringent at a faster pace than the minimum HELCOM safety recommendations, as the objective is to assure an efficient maritime traffic flow. Only vessels fulfilling the criteria of daily traffic restrictions are given assistance.

In 2004 the icebreaking services were purchased from the Finnish State Shipping Enterprise (Finstaship) based on a contract. During a three-year transition period, the FMA has started opening up competition in the field, which will be completely free by the end of the year 2006.

Finstaship is responsible for the management and daily operation of the icebreaking services to all 23 winter ports. The demands as to the standard of service are included in the freight contract. The main requirement is that vessels should not have to wait for an icebreaker for more than 4 hours on an average. Another goal for the Finnish icebreaker service standard is that 90 % to 95 % of vessels navigating in the ice field could get through without delay.

In Finland no special fee is collected for the icebreaker service. All ships pay fairway fees based on ship size and ice class. The fairway dues are used to cover the costs of fairway maintenance and icebreaking services.

Icebreakers engaged by the Finnish Maritime Administration 2007/2008:

Name	Type	Engine power
BOTNICA	Multi-Purpose Icebreaker	15 000 KW
FENNICA	Multi-Purpose Icebreaker	21 000 KW
FREJ	Icebreaker	18 400 KW
KONTIO	Icebreaker	21 800 KW
NORDICA	Multi-Purpose Icebreaker	21 000 KW
OTSO	Icebreaker	21 800 KW
SISU	Icebreaker	18 400 KW
URHO	Icebreaker	18 400 KW
VOIMA	Icebreaker	12 800 KW

Icebreaker Ale was a short period of 8 days in joint chartering with SMA and FMA. Nordica and Botnica were in off-shore operations and Sisu and Voima stayed at Helsinki due to mild winter.

6.2 Sweden

Icebreaking operations are managed by the Icebreaking Division of the Swedish Maritime Administration in Gothenburg and are based on the Swedish icebreaking regulation (2000:1149). It allocates icebreakers to work areas, issues traffic restrictions, monitors the

operational situation and informs the shipping stakeholders of ice conditions and the traffic situation. Sweden controls eight icebreakers, of which the Swedish Maritime Administration owns five and has three on long-term charter from a private shipowner. All icebreakers are manned by a private shipping management company.

Sweden and Finland use a jointly developed IT based on-line system, IB-Net (IceBreaker Net) for coordination of the joint icebreaking operations. IBNet contains information about the weather, ice conditions and traffic situation, and transmits the information between the different connected units (icebreakers, coordination centres, VTS etc.)

In addition to the icebreakers, ice strengthened buoy tenders of the Swedish Maritime Administration and private tugboats are also engaged in the icebreaking service. Helicopters are chartered and used for ice reconnaissance and personnel transport in order to reduce time expenditure for icebreakers. Cooperation with the tugboats in ports is common around the coastline.

The governmental fairway dues cover the costs for the icebreaking operations and no vessel that receives assistance from icebreaker is charged.

Icebreakers engaged by the Swedish icebreaking service 2007/2008:

Name	Type	Engine power
ALE	Icebreaker	3 500 KW
ATLE	Icebreaker	18 400 KW
FREJ	Icebreaker	18 400 KW
ODEN	Icebreaker	18 000 KW
YMER	Icebreaker	18 400 KW
BALDER VIKING	Icebreaker	13 500 KW
TOR VIKING II	Icebreaker	13 500 KW
VIDAR VIKING	Icebreaker	13 500 KW

6.3 Russia

The icebreaker assistance in the eastern part of the Gulf of Finland is regulated by the Harbour Master of the Port of St. Petersburg (according to Direction of Ministry of Transport BP-113-p, 30.11.2001). The Harbour Master of the Port of St. Petersburg has the power to impose any shipping restrictions in the area for the traffic bound to or from Russian ports, based on actual ice conditions (according to article Nos. 74 & 76, Russian Federal Law No. 81-FZ, Russian Merchant Marine Code, 30.04.1999).

The ice navigation assistance is conducted by the state-owned or state-chartered icebreakers and covers the ports of St. Petersburg (including merchant cargo-handling

areas in Kronstadt, Lomonosov and Vasileostrovsky cargo area), Primorsk, Vyborg, Vysotsk and Ust-Luga. The state-owned icebreakers assist the inland transit navigation via Symens canal both ways.

The ice-breaker fleet consists of the following ice-breakers:

Name	Type	Engine power
CAPTAIN SOROKIN	Icebreaker	18 300 KW
ERMAK	Icebreaker	30 400 KW
SEMEN DEZHNEV	Icebreaker	4 000 KW
IVAN KRUZENSTERN	Icebreaker	4 000 KW
CAPITAN IZMAILOV	Icebreaker	3 940 KW
CAPTAIN ZARUBIN	Icebreaker	4 650 KW
CAPTAIN DRANITSIN	Icebreaker	16 200 KW
MUDJUK	Icebreaker	9 100 KW
KARU	Icebreaker	6 450KW
TOR	Icebreaker	10 000KW
YURI LISYANSKY	Icebreaker	4 000 KW
CAPTAIN PLAKHIN	Icebreaker	4 650 KW

The icebreaker assistance, as a rule, is conducted as follows:

1. Individual icebreaker assistance behind an icebreaker;
2. Icebreaker assistance in a convoy;
3. Independent ice navigation following icebreaker recommendations and strictly under her supervision.

Icebreaker assistance is given to the ships which do not fall under the acting restrictions in the ports of their destination. Icebreaker assistance for the traffic coming from the sea is conducted from the point where the convoy is formed to the inner road of the port, and the ships leaving the port are assisted from the inner road to the area next to the convoy forming point (CFP).

All the ships coming from the sea are prohibited from entering the ice east of the convoy forming point (CFP) without permission of the icebreaker. The Masters of the ships sailing independently upon receiving the permission of the icebreaker are to report to the icebreaker while passing the established control points of the recommended route and inform of the ice situation in the area. If such a ship gets stuck, the icebreakers are to release them and correct their recommended route or get them in the convoy for further motion. The Masters of the ships are not recommended to rely on data regarding recommended routes received from other ships and not confirmed by the Master of the icebreaker.

When the ice thickness over the approach fairways leading to Russian ports in the eastern part of the Gulf of Finland becomes considerable, the Harbour Master of St. Petersburg imposes restrictions on ships the ice class and the main engine capacity of which are not sufficient for navigation under prevailing circumstances.

The permission to enter the port or the icebreaker assistance to ships under restrictions due to their ice class is granted in exceptional cases, after detailed study of their ice certificates ("Ice passport" or "Provisional recommendations on ice safety") issued by a recognized institution. The permission to enter the port or icebreaker assistance to a ship under restrictions due to her main engine capacity may be granted in case her ice class meets the requirements. The ships whose age exceeds 20 years, as a rule, are not permitted entry in case they are under restrictions.

In case such permission is granted to a ship falling under one of the restrictions established, a particular icebreaker is allocated for her assistance and the Master of that icebreaker has the authority to determine the best way to render such assistance.

6.4 Estonia

The responsible organization for icebreaking in Estonia is the Estonian Maritime Administration. The Director-General of the Estonian Maritime Administration decides on traffic restrictions and directives on winter navigation. The icebreaking coordination center consisted of 13 members in 2008, chaired by the Head of the Maritime Safety Division of the Maritime Administration, and acts as an advisory board for the Director-General in icebreaking issues.

Ports that are serviced by state ice-breakers are Muuga Harbour, harbours of Tallinn and Kopli Bay, Paldiski North Harbour, Paldiski South Harbour, Kunda Harbour, Sillamäe Harbour and Pärnu Harbour.

Currently, Estonia has one icebreaker, TARMO, to operate in the Gulf of Finland area, and the multi-purpose vessel EVA 316 to operate in the Pärnu Bay. Icebreaking to the port of Pärnu was carried out by multi-purpose vessel EVA 316.

Icebreakers engaged by the Estonian Maritime Administration 2007/2008:

Name	Type	Engine power
EVA 316	Multi-Purpose Vessel	3 x 1 717 KW

6.5 Latvia

Latvia has three international sea ports: Riga, Ventspils and Liepaja. There is one icebreaker, the VARMA, which is owned and operated by the Port of Riga, for approximately 10 years. VARMA mainly operates in the Irbe Strait. The icebreaking in Ventspils and Liepaja is carried out by tugboats. There are plans to replace the VARMA with a new icebreaker.

The estuary to the Port of Riga is affected by silting and maintenance dredging is essential to keep the depth in the fairway. A combined icebreaker/dredger should be a good solution when such investment is useful every year.

Name	Type	Engine power
VARMA	Icebreaker	10 165 KW

6.6 Lithuania

The port of Klaipeda is the northernmost ice-free port in the eastern Baltic coast. Klaipeda State Seaport Authority (KSSA) is the responsible organisation for icebreaking in Klaipeda harbour waters. The Lithuanian fairways are open all year round.

There are no demand and necessity for icebreaking service in the Lithuanian coastal waters, to the border to the port area or in Butinge Terminal. During severe winters, private tugboats carry out icebreaking. In total, 11 tugboats operate in the port of Klaipeda.

6.7 Poland

In Poland the access to main seaports is the responsibility of the Maritime Administration on behalf of the Minister of Maritime Economy.

The Polish coast is presently divided into three parts, and Directors of Maritime Offices in Gdynia, Szczecin and Slupsk respectively are responsible for keeping approaches to their ports navigable and safe, also in winter season.

Since Poland has no icebreakers in the State service, the icebreaking on the approaches, roads and anchorages of the main and selected smaller ports is carried out by strong port tugs contracted from commercial tug companies.

Harbour Masters of Gdynia and Szczecin and an especially designated officer from the Maritime Office in Slupsk are responsible for the operational level of the task. Before winter season come the Harbour Master's notes from the operators of tugs on their readiness to render icebreaking service. And during winter season they receive reports from harbours in their respective regions, and give orders to start or stop icebreaking.

The information on the ice situation can be reached on the page of the Meteorological Institute in Gdynia, www.imgw.pl, also in English. This information is also sent to a number of subscribers.

During severe winters small ports are not "protected" and their fishing vessels operate from the bigger ports.

Icebreaking in the ports is the responsibility of the harbour or terminal authorities. Icebreaking outside the approaches to the ports may be rendered on request, on a commercial basis.

6.8 Germany

In Germany the Ice Service is under the responsibility of the Waterways and Shipping Administration on behalf of the Ministry of Traffic, Building and Housing. The German Ice Service is divided into two parts, ice information and icebreaking.

The German hydrographical office BSH deals with ice observation and information service, and the Waterways and Shipping Directorate North organises the icebreaking service for the harbours, coastal and sea regions in the German part of the Baltic Sea.

The German ice service plan is set up annually by the responsible authority, listing all available vessels which are able to break ice, giving information on the respective areas of icebreaking service, the expected ice situation, etc.

For missions of icebreaking on the coastal and sea area different vessels are available:

Name	Type	Engine power
NEUWERK	Multi-Purpose Vessel	8 400 KW
MELLUM	Multi-Purpose Vessel	6 620 KW
ARKONA	Multi-Purpose Vessel	3 700 KW
BÜLK	Emergency Tug	2 320 KW

In addition to that, a number of smaller tugboats and river-icebreakers are available for the inner coastal waters and harbours.

Because the ice situation in Germany does not call for icebreaker assistance every year, the operation of multifunction vessels capable of icebreaking is most useful. With "Neuwerk", "Mellum" and the new multifunction vessel "Arkona", Germany has a good combination between effective environmental protection and icebreaking during the wintertime along the coast and the affected international waterways.

6.9 Denmark

The Danish Ice Service is the responsibility of the Minister of Defence. On behalf of the minister the Danish Ice Service is managed by the navy. The Ice service is divided into two parts, ice reporting and icebreaking.

One naval officer deals with ice matters on the operational level, supported during winter by Admiral Danish Fleet Operations centre, which takes care of reports from the ice observers. The ice reporting service consists of 110 observers along the Danish coastline and about 25 observers on board ferries. They report to the Admiral Danish Fleet whenever there is ice in their respective areas. The ice observations can be accessed on Admiral Danish Fleet homepage, and they are still sent by fax to a number of subscribers. The expense of the ice service is paid for by harbours inside the Skaw with a water depth larger than 5m and shipping calling on Danish ports during winter period, from 15 December to 31 March.

The Danish Navy presently operates 3 icebreakers referred to as navy icebreakers as follows:

Name	Built	Engine Power
DANBJØRN	1965	8 700
ISBJØRN	1966	8 700
THORBJØRN	1980	4 700

DANBJØRN and ISBJØRN are expected to be in service until 2015, while THORBJØRN is expected to be in service until 2010. Apart from its own icebreakers the Ice Service also makes use of tug boats which are hired on a case to case basis. For icebreaking on the Limfjorden west of Aalborg the Ice Service has an agreement with a Danish tug boat company who keeps a tug boat on 24-hour notice during the period from 15 December to 31 March. Each winter period from 15 December to 31 March 1 navy Icebreaker are kept on 48-hour alert. The other 2 navy icebreakers are kept on 5 days alert. Apart from a small maintenance crew the navy icebreakers are not fully manned continuously. If they are activated they will be crewed by naval personnel from other services within the navy.

7.0 Norway

In Norway the government, by Norwegian Coastal Administration, is responsible for icebreaking in open waters and in the main fairways along the coast. In the fjords and the approaches to the ports the harbour/port are responsible for the ice breaking.

The Norwegian Coastal Administration operates only 2 buoy tenders that can be used for minor ice breaking operations:

Name	Type	Engine power
VILLA	Motor Vessel	Total Bhp 1 250 Total Kw 920 Kw
HEKKINGEN	Motor Vessel	Total Bhp 1 250 Total Kw 920 Kw

The ports operate tugboats which are used as ice breaker in the harbour and their approaches. These tugs are old and we don't see any renewal of the ice breaking equipment.

The winter 2007/2008 was very mild and ice coverage less than normal. Norwegian Coastal Administration did not perform any ice breaking by own or hired ice breakers.

PRESS RELEASE
10.1.2007
For immediate release

Joint Baltic web service on winter navigation www.baltice.org launched

A joint web service on winter navigation in the Baltic Sea area has been launched on January 10th. The purpose of the web service is to provide seafarers and the whole shipping industry with information on winter navigation and the conditions prevailing in the Baltic Sea in winter. The capability of vessels to navigate in ice has constantly improved but, due to lack of experience, the know-how of ship's crews has decreased. Furthermore, traffic volumes have increased. The aim of the free website is to give the best conceivable information on winter conditions in the Baltic Sea in order to prevent accidents and damage to vessels and to enable vessels to manage as far as possible without icebreaker assistance. The information presented on the website was formerly difficult to access as it was scattered on the websites of various organisations.

The web service contains ice reports, an up-to-date ice chart, an ice thickness chart, reporting instructions for vessels, information on traffic restrictions, icebreaker operating areas and ice navigation courses for seafarers. Data is collected from the organisations responsible for winter navigation in the Baltic Sea area.

The idea to create an ice data portal originates from Baltic Icebreaking Management (BIM) and is part of the Baltic Sea Winter Motorways project, which is led by the Finnish Maritime Administration. BIM, which was founded in 2004, consists of the icebreaker managements of the Baltic Sea countries, i.e. Finland, Sweden, Denmark, Norway, Germany, Poland, Estonia, Latvia, Lithuania and Russia. The whole project was carried out in Finland and Finland will continue to coordinate it in the future. Moreover, Baltic Icebreaking Management will be chaired by the Finnish Maritime Administration for the next two years. The project has been financed by Finland, Sweden, Denmark, Estonia, Russia and the EU.

AffectoGenimap has been in charge of the technical implementation of the project. During the website's first year of existence, ice information will be provided by the Ice service of the Finnish Institute of Marine Research.

The address of the website is www.baltice.org.

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PRESS RELEASE
11.4.2007
For immediate release

Training in ice navigation for seafarers

The Baltic Sea states wish to enhance safety and the efficiency of vessel traffic also by means of instruction. The video guide "Ice Navigation and Baltic Ice Conditions", which has only just been released, is intended especially for those seafarers who lack experience in ice navigation.

Traffic in the Baltic is constantly increasing. Although ships' capability of navigating in ice has improved, know how on board has deteriorated owing to lack of experience. This is why it was felt that there was a need for a winter navigation guidance video. Training material of this kind has not been available before. The English language video deals with matters crucial to winter navigation: the ice situation and the various types of ice, ships' capability of navigating in ice, means of avoiding icing of ships and equipment, voyage planning and operation in ice. The video can be watched free-of-charge at www.baltice.org (Ice Training Movie).

The project has been financed by the Finnish Maritime Administration and the European Union, the Swedish and Estonian Maritime Administrations, the Danish Ministry of Defence and St. Petersburg Port Authority, which all distribute the video on DVD in their own countries. In Finland, copies of the DVD have been sent to the maritime colleges. The Finnish Maritime Administration has been responsible for the realization of the whole project.

Guidance for seafarers is also provided by the joint Baltic Sea web service www.baltice.org, which was launched in January this year. Both the web service and the video have been produced by Baltic Icebreaking Management (BIM), a board for various joint projects realized by the icebreaking authorities of the Baltic Sea states.

The web service and the video are part of a EU financed project called Baltic sea Winter Motorways. A third project included is the report 'Study on frequent lines – Differences in running costs between an icebreaking cargo vessel and a vessel that needs icebreaker assistance', which has been published by the Finnish Maritime Administration (Merenkululaitoksen julkaisu 7/2006).

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