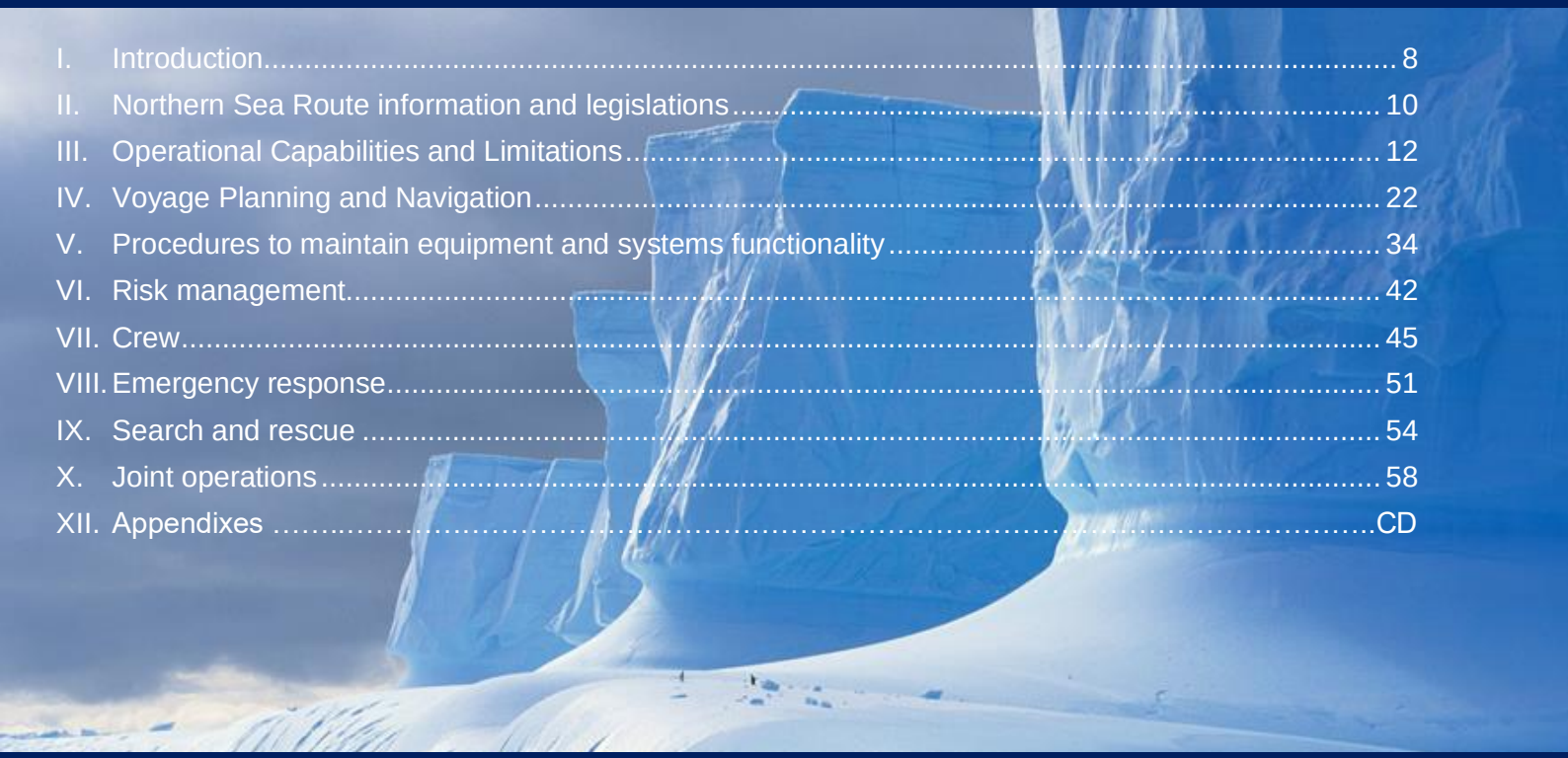
Polar Waters Operation Manual

IMO No. 1 2 3 4 5 6 7

MARSIG Shipping GmbH & Co. KG

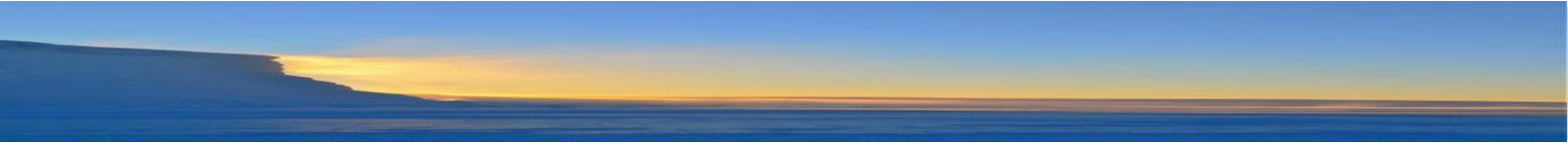


Revision 12.03.2020

prepared by MARSIG

Content

Content



Company / Ship Details

Manager:	MARSIG Shipping GmbH & Co. KG
Address:	Fischerweg 408, 18069 Rostock, Germany
Contact:	Phone: + 49-(0) 381 66 09 64 00 Fax: + 49-(0) 381 66 09 64 00 Mobile: + 49-(0) 172 385 2447 Email: info@marsig.com, www.marsig.com

Ship	Details
Ship's Name:	MARSIG ARCTIC
Type	Multi-purpose dry cargo ship
IMO Number:	1 2 3 4 5 6 7
Built:	2010
Crew present / max	27
Call Sign:	Y 5 M H
Flag:	Germany
Port of registry:	Rostock
Class	DSRK
GT	15,549
Load Speed [kn]	17,5
Length over all [m]:	166.15
Breadth [m]:	22.90
Draught summer [m]:	09.50
Main Engine	MAN B&W Diesel, 7L58/64
Rated Power	9800 kW
Auxiliary Generators	3 x Caterpillar/ 3412C / 620 kW
Emergency generator	1 x Caterpillar/ 3412C / 450 kW
Shaft Alternator	1 x LSA 50MG / 900 kW
Bow Thruster	1x Wuxi Huada Motors Y2-ODP355LX-4/800 kW
Propeller	1x controllable pitch propeller
Rudder	Balanced
Rudder angle – max	70° Pt & Stb
Sat-C telex	Inm. 1 - 463725268 & Inm. 2 - 463725267
Fleet Broadband phone / Iridium	+870770964001/ Fax +870770964002/ +88770964003
E-mail	captain@marsig-shipping.com
Radio - Sea Area	A1, A2, A3

Ship	Details
HFO/MDO Capacity	1,454.20 m³ / 218.60 m³ (90%)
Max / Fixed Ballast (DBT 2 & 3 s/s)	6,718.6 m³ / 1,918.9 mt
Hull Construction	Single hull double bottom,
Bridge Equipment operating temp	On deck
Navtex (Furuno Felcom 19)	-25°C
Radar / Arpa (Furuno FR 2117)	indoor -15°C / antenna -25°C
Inmarsat C / GMDSS (Furuno FS 2570)	indoor -15°C, Antenna coupler -25°C
Iridium (Digisat Int. - Iridium Furuno)	Indoor - 5°C to +45°C
Gyro Compass (Raytheon STD22)	indoor position, operation temp. 45°C<T<60°C
Magnetic Compass 1+1 (Cassens & Plath)	-30°C
AIS (Furuno FA-150)	-25°C
GPS (Furuno GP-150)	Antenna -20°C to +70°C / Display -15°C to +55°C
Weather Fax (Furuno)	indoor -10°C to +50°C
VHf Radio Telephone (Furuno)	indoor -15°C to +50°C
Portable VHFGMDSS (Furuno)	-25°C
Cargo Cranes	-55°C
Machinery Specification	
ER operation under closed ventilation	Yes
Grease type temp limits	-20°C
CPP Oil type & temp limits	-20°C
LO limit	-33°C
CW limits	-20°C

Polar Operating Profile and Limitations	Details
Hull	100 A 5 E3
Engine	MC E3 AUT
Ice Class	E3 / 1A
Polar Code Category	C
Ice stability calculation	Yes (part of stability booklet)
NSR icebreaker fairway breadth limit 30m	22,90m - ok
NSR south lane draught limit 12m	09,50m - ok
Operational Area	Northern Sea Route (NSR) - transit voyages
with NSR eastern gateway	Bering Sea with Bering Strait
with NSR western gateway	Barents and Kara Sea
with Yamal Peninsula	Ob Bay *(Port of Sabetta & Nowy Port)*
Summer Season	June – November
Operation in Low Air Temperature	NO – MDLT's for the season > -10°C

Definitions

Close Ice	Floating ice in which the concentration is 7/10 to 8/10, composed of floes mostly in contact
Compacted Ice Edge	Close, clear-cut ice edge compacted by wind or current; usually on the windward side of an area of ice
Compact Ice	Floating ice in which the concentration is 10/10 and no water is visible
Compacting	Pieces of floating ice are said to be compacting when they are subjected to converging motion, which increases ice concentration and/or produces stresses which may result in ice deformation
Concentration	The ratio expressed in tenths of the sea surface actually covered by ice to the total area of sea surface, both ice-covered and ice-free, at a specific location or over a defined area
Concentration Boundary	A line approximately the transition between two areas of drift-ice with distinctly different concentrations
Consolidated Ice	Floating ice in which the concentration is 10/10 and the floes are frozen together
Consolidated Ridge	A ridge in which the base has frozen together due to melting or other processes
Dried Ice	Sea ice from the surface of which melt-water has disappeared after the formation of cracks and thaw holes. During the period of drying, the surface whitens
Drift-Ice	Sea ice that is drifting freely
Fast Ice	Sea ice that forms and remains is attached to the coast in late winter
Fast Ice Boundary	The ice boundary at any given time between fast ice and drift-ice
Fast Ice Edge	The demarcation at any given time between fast ice and open water
Firn	Old snow which has recrystallized into a dense material. Unlike ordinary snow, the particles are to some extent jointed together; but, unlike ice, air spaces in it still connect with each other
Flaw	A narrow separation zone between drift-ice and fast ice, where the pieces of ice are in chaotic state; it forms when drift - ice shears under the effect of a strong wind or current along the fast ice boundary
Flaw Lead	A passageway between drift-ice and fast ice which is navigable by surface vessels
Flaw Polynya	A polynya between drift-ice and fast ice
Floating Ice	Any form of ice found floating in water.
Floe	Any relatively flat piece of sea ice 20 m or more across
	<Small ice floe> 20 to less than 100m, <Medium ice floe> 100 to less than 500m, <Big ice floe> 500 to less than 2,000m, <Vast ice floe> 2 to less than 10km, <Giant floe> >10 km
Floeberg	A massive piece of sea ice composed of a hummock, or a group of hummocks frozen together, and separated from any ice surroundings
Floebit	A relatively small piece of sea ice, normally not more than 10 m across, composed of a hummock(s) or part of a ridge(s) frozen together and separated from any surroundings.
Flooded Ice	Sea ice which has been flooded by melt- or river water and is heavily loaded by water and wet snow
Fracture	Any break or rupture through very close ice, compact ice, consolidated ice, fast ice, or a single floe, resulting from deformation processes
Freshwater Icing	When ice form on the ship's surfaces form drops of rain, damp snow or other fresh water source
Friendly Ice	From the point of view of the submariner, an ice canopy containing many large skylights or other features which permit a submarine to surface
Frost Smoke	Fog-like clouds due to the contact of cloud air with relatively warm water, which can appear over openings in the ice, or leeward of the ice edge, and which may persist while ice is forming
Glacier	A mass of snow and fresh water ice continuously moving from higher to lower ground or, if afloat, continuously spreading
Grey Ice	Young ice 10-15 cm thick
Grey-White Ice	Young ice 15-30 cm thick
Grounded Hummock	Hummocked, grounded ice formation. There are single grounded hummocks and lines (or chains) of grounded hummocks

I. Introduction

The goal of this chapter is to provide the owner, operator, master and crew with sufficient information regarding the ship's operational capabilities and limitations in order to support their decision-making process.

1. International Code for Ships Operating in Polar Waters

The International Code for Ships Operating in Polar Waters has been developed to supplement existing IMO instruments in order to increase the safety of ships' operation and mitigate the impact on the people and environment in the remote, vulnerable and potentially harsh polar waters.

The goal of this code 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 of the IMO or other maritime organizations.

The code consists of introduction, parts I and II. Part I is subdivided into part I-A, which contains mandatory provisions on safety measures, and part I-B containing recommendations on safety. Part I applies to ships certified in accordance with SOLAS and which operate in polar waters.

Part II is subdivided into part II-A, which contains mandatory provisions on pollution prevention, and part II-B containing recommendations on pollution prevention. Part II applies to vessels that must comply with MARPOL and which operate in polar waters.

While Arctic and Antarctic waters have similarities and also significant differences, the code is intended to apply as a whole to both Arctic and Antarctic.

2. Polar Waters

In this manual the term “POLAR” is used to indicate the terrestrial area around North and South Pole.

Arctic Area

The arctic water is the sea area north of latitude 60°N with some exceptions near Greenland and Scandinavia (see International Code for Ships Operating in Polar Waters).

3. Risk Based Operations

The level of risk involved within the Polar Regions can vary greatly due to the location, time of year with respect to ice-type, ice-coverage, temperature, hours of daylight etc. Thus, the mitigating measures will also vary from one environment to another.

3.1. Intended operation area

It is expected that the ship will undertake transit voyages along the Northeast Passage from the Atlantic to the Pacific Ocean via the Arctic Ocean, referred to as the Northern Sea Route or NSR, including western and eastern boundaries, detouring through the Kara Sea and Gulf of Ob around Yamal Peninsula with possible destinations like Port of Sabetta & Nowy Port.

Pict 1: Intended operation zone of NSR area with south-western part of Kara Sea

3.2. Intended operation time

The vessel will operate during the usual summer navigation period from June until November, only the approaching of Golf of Ob area could be restricted until October, depending on seasonal temperature. According to the intended operation areas and mentioned operation time from June – November, the vessel will NOT operate in Low Air Temperature.

3.3. Operational Assessment

Based on the 'Equipment Operational Assessment' the limitations of the vessel are assessed regarding to:

- operation in low air temperature;
- operation in ice;
- operation in high latitude and,
- potential for abandonment onto ice or land and Expected Time to Rescue (ETR)

The operational assessment has encompassed all navigational, deck & engine machinery and safety equipment. The results of the assessment included in the PWOM and basis for the Polar Ships Certificate (PSC) as limitations of operation for the vessel.

The stated limitations do not relinquish the Master & Officers requirement to perform their own 'Voyage Assessment' and 'Risk Analysis' as soon as orders are received for the vessel to enter polar waters. All RA's, including reviewed RA's, relating to polar region voyages shall be carried out by an experienced Senior Officer They and must be reviewed by the Captain and should be submitted to the Fleet Management.

II. Northern Sea Route information and legislations

1. Shipping in the water area of the NSR

The management of the navigation of ships in the NSR area is realized by the NSR Administration, established as a federal government institution. Applications must be made between four months and two weeks before the planned date of sailing.

The actual management of shipping within the Northern Sea Route is split in two Marine Operational Headquarters (MOHQs). The western sector is under the responsibility of the Murmansk Shipping Company (MSCO) while the eastern sector is under the responsibility of the Far East Shipping Company (FESCO).

The shipowner, representative of shipowner and ship master have to act according to the „Rules of navigation in the water area of the Northern Sea Route“ in the latest issue and as approved by the order of Ministry of Transport of Russia.

2. Communication in the NSR

The shipowner, representative of shipowner and ship master have to act according to the “Recommendations on communication in the water area of the Northern Sea Route“ in the latest issue and as approved by the order of Ministry of Transport of Russia.

These recommendations operating in compliance with the “Regulations of the Maritime Mobile and Maritime Mobile Satellite Radio Service of the Russian Federation“ as well as for coastal radio centres and radio stations, providing radio communication with ships in the water area of the NSR.

Russian domestic law requires ships sailing the NSR to make radio contact with the NSRA every day at noon Moscow time, to inform the NSRA of the ship’s position, ice conditions, and other relevant information about the ship and its surroundings. In addition, ships must make radio contact when passing through predetermined gates or points.

3. Navigation

3.1. Icebreaker assistance

Information about organizations which provide icebreaker assistance available under: www.nsra.ru

Federal State Unitary Enterprise «Atomflot» FSUE «Atomflot»
183017, Russia, Murmansk-17
E-mail: general@rosatomflot.ru, Official Site: http://www.rosatomflot.ru/
Tel: (8152) 553-355, Fax: (8152) 553-300

Federal state unitary enterprise "Rosmorport", FSUE "Rosmorport"
1270556, Russia, Moscow, Suschevskaya St. 19, b.7,
E-mail: hq@rosmorport.ru, Official Site: http://www.rosmorport.ru/
Tel: +7 (495) 626-14-25; Fax: +7 (495) 626-12-39

3.2. Pilotage

If the ship's captain does not have enough experience of navigating the NSR to meet the criteria, the Russian regulations stipulate that ice pilots must be aboard to assist the captain. The ice pilot is certified by the Russian government and provides the captain with recommendations and advices regarding navigation safety and ship handling on the NSR, as well as handling of radio communication.

Information about organizations which provide ice pilotage available under: www.nsra.ru, samples are:

Federal State Unitary Enterprise «Atomflot» FSUE «Atomflot»
183017, Russia, Murmansk-17
E-mail: general@rosatomflot.ru, Official Site: http://www.rosatomflot.ru/
Tel: (8152) 553-355, Fax: (8152) 553-300

Federal state unitary enterprise Murmansk branch "Rosmorport", Murmansk branch of "Rosmorport"
183038, Russia, Murmansk, Portoviy proezd, 19
E-mail: mail@mrm.rosmorport.ru, http://www.rosmorport.com/
Tel: +7 (8152) 550-800, Fax:+7 (8152) 550-850

4. Marine traffic control

For plan to navigate the NSR it is first necessary to apply the NSRA for a navigation permit, in accordance with Russian domestic law. Only in compliance with this Russian domestic law, ships underway on the NSR must comply with its instructions. Further, ships using the NSR must make radio contact with the NSRA at pre-determined locations and times, using the designated method.

5. Important NSR related documents and websites

Please consider documents as declared in OCIMF document "Northern Sea Route Navigation Best Practices and Challenges" and further documents and websites:

ABS

- Guide for Vessels Operating in Low Temperature Environments
- Low Temperature Operations: Guidance for Arctic Shipping
- Navigating the Northern Sea Route: Status and Guidance

III. Risk management

If the ship enters waters with a lot of ice because of not finding an appropriate diversion and the icebreaker escort did not arrive in time, the fundamental principle is to seek instructions from the marine traffic control centre or icebreaker, or advice from the ice pilot, while determining the ice conditions (concentration, thickness, and hardness of the ice). Independent of this step, the ship has to carry out as effectively as possible a risk assessment as described below before entering the ice, should slow down to a safe speed and sail through the part where the ice is sparsest or thinnest, aiming to reach open water as quickly as possible.

1. POLARIS (Polar Operational Limit Assessment Risk Indexing System)

1.1. Basics

For calculation of the risk for the vessel in ice conditions the IMO has developed a harmonized methodology under MSC.1/Circ.1519, called POLARIS and accepted as risk assessment tool.

The system incorporates experience and best practices from the Canadian AIRSS system and the Russian Ice Certificate concept with additional input provided by other coastal administrations with experience regulating marine traffic in ice conditions.

POLARIS is an evaluation of the risks posed to the ship by ice conditions using the WMO nomenclature and the ship's assigned ice class.

POLARIS assesses ice conditions based on a Risk Index Outcome (RIO) determined by the following calculation:

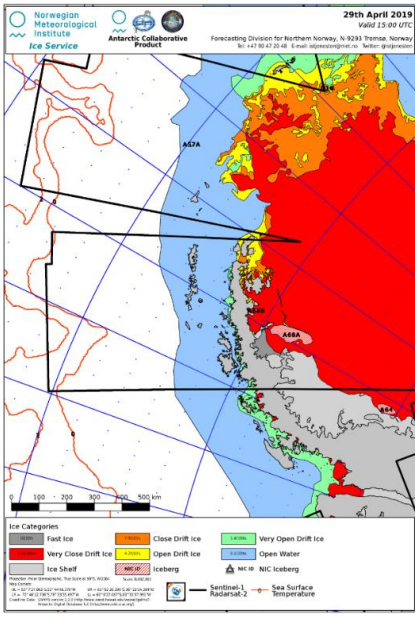
$$\mathbf{RIO = (C1 \times RIV1) + (C2 \times RIV2) + (C3 \times RIV3) + (C4 \times RIV4)}$$

Where:

- C1…C4 – concentrations of ice types within ice regime
- RIV1…RIV4 – corresponding risk index values for a given Ice Class of ship

The *Risk Values (RIV)* are a function of ice class, season of operation, and operational state (i.e., independent operation or icebreaker escort). Risk levels increase with increasing ice thickness and decreasing ice class. POLARIS provides RIVs for the seven IACS Polar Classes, four Finnish-Swedish Ice Classes, and non-ice-classed ships.

The *Ice Regime* defines an area with a relatively consistent distribution of any mix of ice types, including open water. To calculate the Risk Index Outcome (RIO) the concentration of each ice type in tenths (C) has to be multiplied with the Risk Index Value for the ice type (RIV), which depends on the ice class. The result is summed up. All concentrations added together shall be 10, if the amount is correct. Partial ice concentrations (C) of the various ice types in an ice regime are determined from the 'Egg Code' on the ice chart, or by the Watch Officer / Captain on the bridge evaluating (viewing) the ice.



1.2. Sample calculation

A guidance is part of the CD.

STEP 1:

Identify the area of operation.

STEP 2:

Arrange reliable and valid ice charts or ice data. For example:

Valid Ice Chart arrangement under **https://cryo.met.no/**

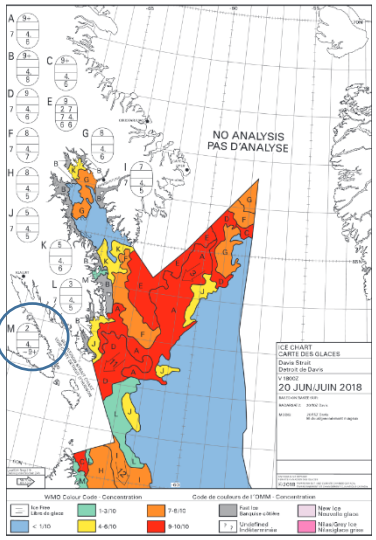
STEP 3:

Identify the prevailing ice conditions:

- Either plot the route on the chart and identify a range of ice conditions present, or
- Use other knowledge from operators and past experience.

STEP 4:

Evaluate relevant and different regions, selected and evaluated according to Voyage Plan. Compile a series of ice regimes based on season variations and this voyage route.



STEP 5:

Use the **Egg Code** according to the WMO system for sea ice symbology in order to determine the partial ice concentrations and ice conditions in the scheduled voyage route.

(see http://www.natice.noaa.gov/products/egg_code.html)

or:

Use the World Meteorological Organization Colour Code.

https://www.canada.ca/en/environment-climate-change/services/ice-forecasts-observations/publications/interpreting-charts/chapter-2.html#concentration-sea

Colour		RGB colour model	Total concentration (definition from WMO Nomenclature)	Number from WMO Nomenclature
alternative	prime			
		000-100-255	Ice free	4.2.8
		150-200-255	Less than one tenth (open water)	4.2.6
▲▲▲	▲▲▲	150-200-255	Bergy water	4.2.7
		140-255-160	1/10 - 3/10 (very open ice)	4.2.5
		255-255-000	4/10 - 6/10 (open ice)	4.2.4
		255-125-007	7/10 - 8/10 (close ice)	4.2.3
		255-000-000	9/10 - 10/10 (very close ice)	4.2.2
		145-000-000	10/10 (compact floating ice)	4.2.1
		150-150-150	Fast ice	1.1.1
		210-210-210	Ice shelf	10.3
	? ? ?	255-255-255	Undefined ice	-
Optional		255-175-255	7/10-10/10 new ice	2.1
		255-100-255	9/10-10/10 nilas, grey ice (mainly on leads)	2.2, 2.4
Areas of No Information are annotated accordingly				

Colour/ Pattern	Stage of Development	Thickness
	Ice Free	
	Ice free (Used at CIS)	
	< 1/10 Ice (Open Water)	
	New Ice	< 10 centimetres
	Grey Ice	10-15 centimetres
	Grey-white Ice	15-30 centimetres
	First-year Ice	>=30 centimetres
	Thin First-year Ice	30-70 centimetres
	Medium First-year Ice	70-120 centimetres
	Thick First-year Ice	> 120 centimetres
	Old Ice	
	Second-year Ice	
	Multi-year Ice	
	Fast Ice of Unspecified Stage of Development	
? ? ? ?	Undefined Ice	
	Drifting Ice of Land Origin (icebergs)	

STEP 6:

Correspondence of Ice Classes *(see http://www.bsis-ice.de/material/table_iceclasses.pdf).*

Caused by different Ice Class notations of Classification Societies it is necessary to compare the own one with the Ice Class notations of Russian Maritime and Lloyd's Register in order to can use Table 9.

Germanischer Lloyd	E4	E3	E2	E1	E
Russian Maritime Register of Shipping(Rules 2007)	Arc 5	Arc 4	Ice 3	Ice 2	Ice 1
Lloyd's Register of Shipping	1SS	1A	1B	1C	1D

Table 1: Correspondence between DNVGL 1A/E3, Russian Arc 4 and LR of Shipping 1A

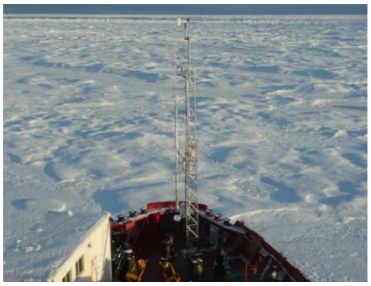
	RISK INDEX VALUES (RIVs) for each Ice Type											
	ICE FREE	NEW ICE	GREY ICE	GREY WHITE ICE	THIN FIRST YEAR 1ST STAGE	THIN FIRST YEAR 2ND STAGE	MEDIUM FIRST YEAR	MEDIUM FIRST YEAR 2ND STAGE	THICK FIRST YEAR	SECOND YEAR	MULTI YEAR	HEAVY MULTI YEAR
PC 1	3	3	3	3	2	2	2	2	2	2	1	1
PC 2	3	3	3	3	2	2	2	2	2	1	1	0
PC 3	3	3	3	3	2	2	2	2	2	1	0	-1
PC 4	3	3	3	3	2	2	2	2	1	0	-1	-2
PC 5	3	3	3	3	2	2	1	1	0	-1	-2	-2
PC 6	3	2	2	2	2	1	1	0	-1	-2	-3	-3
PC 7	3	2	2	2	1	1	0	-1	-2	-3	-3	-3
IAS	3	2	2	2	2	1	0	-1	-2	-3	-4	-4
IA	3	2	2	2	1	0	-1	-2	-3	-4	-5	-5
IB	3	2	2	1	0	-1	-2	-3	-4	-5	-6	-6
IC	3	2	1	0	-1	-2	-3	-4	-5	-6	-7	-8
No Ice Class	3	1	0	-1	-2	-3	-4	-5	-6	-7	-8	-8

Table 2: Risk Index Values (RIV) in relation to Ice Class (DNVGL 1A/E3, LR1A & RMRS Arc4

STEP 7:

Determine input for the RIO.






Pict. 4: Ice free - C1 1st year ice - C2 Second year ice - C3 Multi year ice - C4

and as sample mixed with:

Pict. 5: Possible Ice Regime (Cn)

STEP 8:

Calculate the RIO.

$RIO = C_1 \cdot RIV_1 + C_2 \cdot RIV_2 + \ldots + C_n \cdot RIV_n$

RIO = 4*3 + 4*(-3) + 1*(-4) + 1*(-5)

RIO = -9

RIO ship	ICE Class PC1 – PC7	Ice Class below PC7 and ships not assigned in an ice class
RIO >=0	Normal Operation	
-10 < RIO < 0	Elevated operational risk	Operation subject to special consideration
RIO < -10	Operation subject to special consideration	Operation subject to special consideration

In case of Icebreaker escort

Escorted operations should be reconsidered if the icebreaker RIO < 0 or if the escorted ship is in a regime where operations are subject to special consideration.

For voyage planning purposes, if an icebreaker is being used, the RIO for the escorted ship may be given a +10 bonus. This +10 bonus is for voyage planning purposes only and, when in operation, the escorted ship must still evaluate the actual ice regime it encounters (a combination of the icebreaker's broken tracks and surrounding ice conditions).

STEP 9:

Evaluate RIO.

The outcome is '*Operation subject to special consideration*' and only applicable to ice classes below PC7 like this ship.

Normal operations:

Not explicitly defined but implied that due caution and good seamanship are used. It is a recommendation to proceed but not to proceed blindly!

Elevated operational risk:

More caution should be use and a speed reduction is recommended (recommended speed limits are included) other mitigation methods can also be employed. A recommendation to proceed more cautiously.

Operations subject to special consideration:

Extreme caution to be used. Suitable procedures for reducing the risks including re-routing, further reduction in speed etc. For voyage planning ice regimes where the RIO identifies operations subject to special consideration should be avoided, icebreaker assisstant to be used. A further recommendation not to proceed.

STEP 10:

Take mesaures to reduce the risk. Speed according to POLARIS should be 3 knots. A speed reduction is probably the most useful immediate tool for the operator. Additional watchkeeping and use of escort icebreakers, are also appropriate mitigation methods.

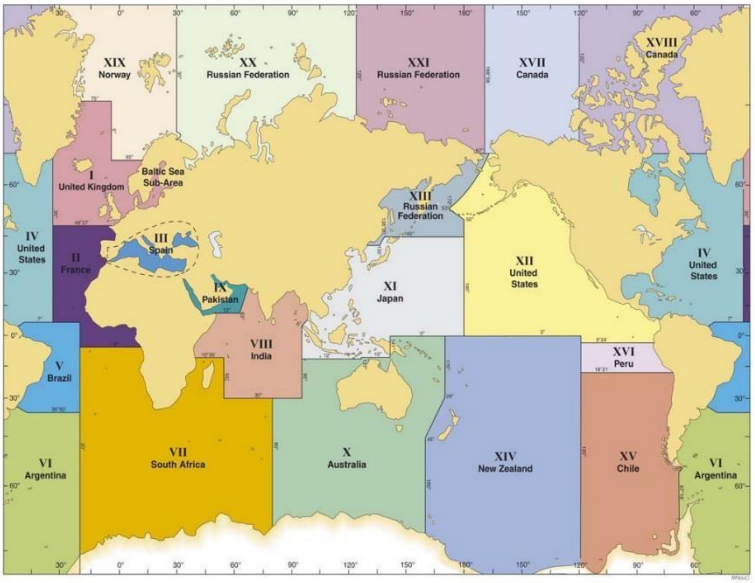
Ice Class	Recommended Speed Limit
PC1	11 knots
PC2	8 knots
PC3-PC5	5 knots
Below PC5	3 knots

IV. Search and rescue

1. Navigational Areas

The International Convention on Maritime Search and Rescue provides a system for the rescue of persons at sea and cooperation among states, including rescue coordination centres, ship position reporting systems and advanced entry of rescue units into territorial waters of the states.

Arctic state parties of the SAR Convention shall coordinate SAR incidents in their respective areas, make sure that rescue services are available during shipping season and cooperate with each other



NAVAREAs are Navigational Areas selected for the issue of navigational warnings, provide traffic services, broadcast meteorological forecasts and related maritime safety information.

NAVAREA warnings; are issued by a NAVAREA coordinator and include information required by ocean-going mariners for safe navigation.

They are principally affecting main shipping routes and offshore areas within GMDSS Sea Areas A3 and A4, so they are not broadcasted via NAVTEX system but only via satellite SafetyNET system.

2. Maximum expected time of rescue

The maximum expected time of rescue for the intended operation in the Arctic Sea / NSR is less than 5 days. The ship is prepared according to the requirements of the Polar Code for minimum 5 days expected time of rescue.

V. Joint operations

1. Escorted operations

The master has to consider the vessel´s limitations before agreeing on any conduct of escort or convoy operations. Coastal State´s regulations have to be obeyed.

For this vessel and the intended operational area, the Northern Sea Route Administration is in charge. Due to the vessels' ice class it belongs to the category Arc 4. Subitem *III.1.1.3 "Criteria for permission to navigate in ice"* Table 2 shows when the vessel needs ice breaker assistance and when it may navigate on its own depending on the meteorological information by Roshydromet (copy see below).

Ship ice reinforcement class	Ice navigation mode	Navigation in the period January to June and in December in the:						
		Kara Sea		Laptev Sea		East Siberian Sea		Chukchi Sea
		South-west part	North-East part	Western part	Eastern part	South-West part	North-East part	
		S M L	S M L	S M L	S M L	S M L	S M L	S M L
Arc 4	IN	– – +	– – +	– – +	– – +	– – +	– – +	– – +
	IS	– – +	– – +	– – +	– – +	– – +	– – +	– – +

Ship ice reinforcement class	Ice navigation mode	Navigation in the period July to November in the:						
		Kara Sea		Laptev Sea		East Siberian Sea		Chukchi Sea
		South-west part	North-East part	Western part	Eastern part	South-West part	North-East part	
		S M L	S M L	S M L	S M L	S M L	S M L	S M L
Arc 4	IN	– + +	– + +	– – +	– – +	– – +	– – +	– + +
	IS	+ + +	+ + +	– + +	– + +	– + +	– + +	– + +

IN : Independent navigation
IS : Navigation with icebreaker support

S : Severe ice conditions
M : Moderate ice conditions
L : Easy ice conditions
+ : Navigation is allowed
– : Impermissible service

Copy Table 2: Operational restrictions for Russian Class Arc 4

Reporting for ice breaker assistance in dedicated areas has to be done in accordance to the coastal State´s regulations. The forward station has to be ready and cleaned up before towing operations to reduce hazards to personnel.

Ships operating in Arctic waters should be equipped and ready to tow or be taken in tow at short notice. Towing at long stay can be difficult because ice, if there is any present, can get between the ships involved. Some ice-breakers are equipped with a notched stern, suitably padded, in which the stem of the ship to be towed can be secured. Ships with high freeboards, however, are unsuited for this method.

Communication between ice breaker and vessel are essential for notch towing operation. Towing at short stay can be undertaken though the ship towed should not use its engines because of the risk of overrunning and striking the towing vessel.

2. Ship handling in frozen waters when under icebreaker escort

The icebreaker will determine the appropriate distance between ships, course, and speed, based on a comprehensive assessment of the surrounding ice conditions, visibility, weather conditions, and the capabilities and ship-handling ability of the ship being escorted. Comply with its instructions.

The distance between ships required to follow the icebreaker's movements exactly and get through the lead opened up by the icebreaker before it closes up again, while also maintaining enough of a distance to avoid a rear-end collision is usually around three times the length of the icebreaker, which is about 2.5 cables (approximately 460 meters) or more, up to a maximum of a mile (1,852 meters).

If the ship goes off course, there is a risk that it could veer off the lead opened up by the icebreaker and collide with the ice edge beside the lead. Use the icebreaker's wake as a guide so that you can follow its stern exactly, without veering off course.

Icebreakers sometimes activate their sprinklers, to reduce frictional resistance between the ice and the hull. Bear in mind that the wake will be easier to see in this situation. At night, at dusk, or when visibility is poor, the icebreaker will switch on its rear searchlight, so use this as a guide when following it.

Monitor the icebreaker's movements with the naked eye at all times. In addition, continually monitor your distance from the icebreaker and the icebreaker's speed by radar and Doppler log and follow its stern exactly.

When sailing at a reduced speed while being escorted through frozen waters by an icebreaker, for example, the main engine operates in low load mode for long periods. Depending on the nature of the main engine, non-combusted fuel oil or lubricant oil could accumulate in the exhaust manifold and ignite. Do not neglect such routine maintenance tasks as inspecting and cleaning the exhaust manifold.

3. Convoy operations

The ice breaker decides the order of convoy. All orders from the ice breaker regarding minimum and maximum distances have to be obeyed. Communication between vessel and convoy is to be ensured at any time.

The vessel shall always be aware of sudden speed changes and course alterations of herself and her partners. During convoy the own speed may increase when the vessel is shortly in ice-free area and the speed of vessels in front may decrease suddenly due to thicker ice. Therefore, high alertness is necessary at all times.

If the vessel gets stuck during convoy operations it shall keep the engine running ahead to try to escape. If another vessel gets stuck the following vessel shall as appropriate run astern with respective rudder angle and steer with the effect of the propeller into the ice edge to reduce the stopping distance.

PWOM
MARSIG Shipping GmbH & Co. KG
Phone: + 49-(0) 381 66 09 64 01
Mobile: + 49-(0) 172 385 2447
Email: info@marsig.com

prepared by MARSIG