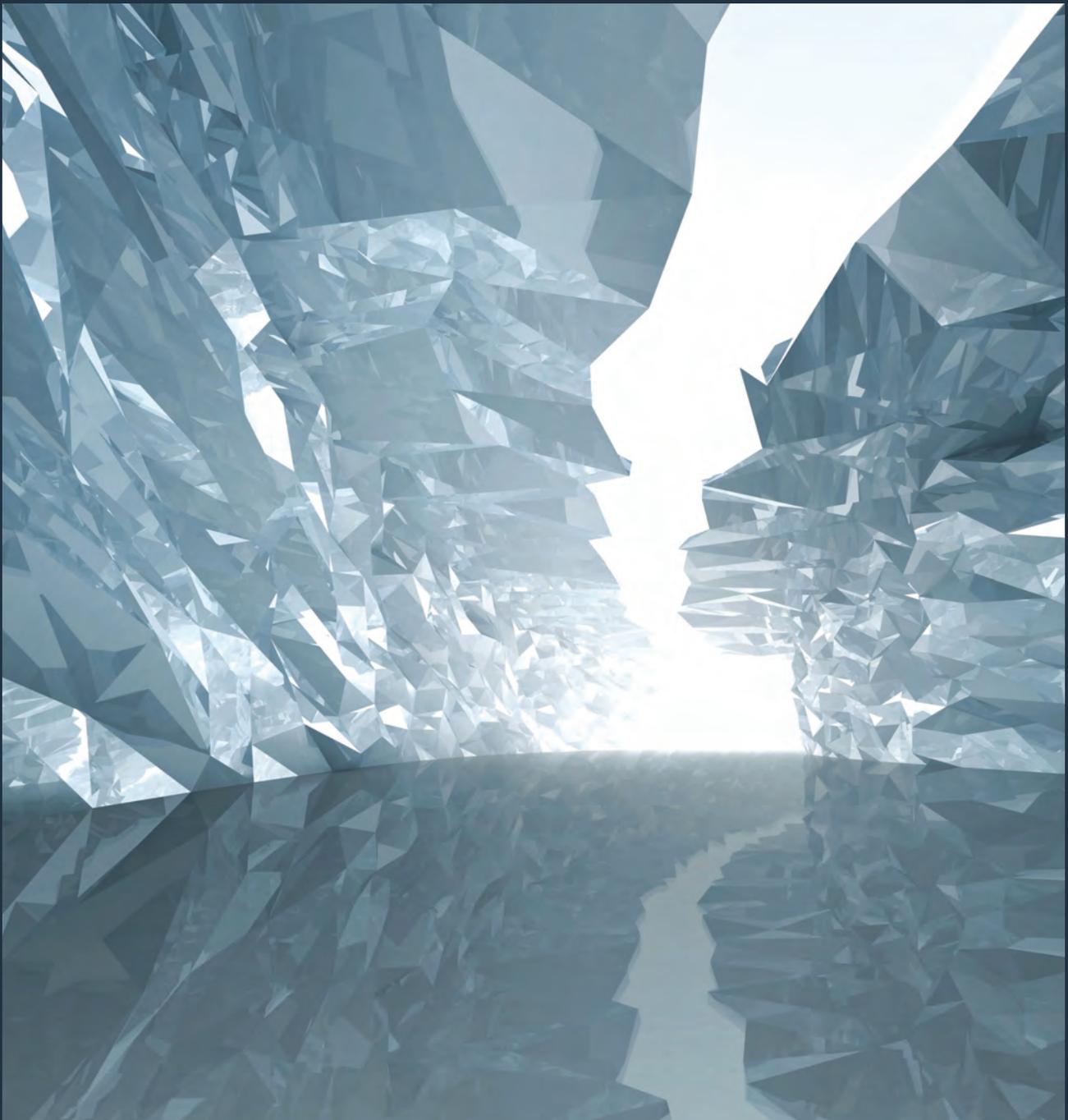


# ARCTIC SHIPPING: NAVIGATING THE RISKS AND OPPORTUNITIES

AUGUST 2014



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## ■ INTRODUCTION

In October 2013, the bulk carrier *Nordic Orion* made the first-ever successful commercial transit of the Arctic's Northwest Passage, delivering a cargo of coal from Vancouver to Finland. The voyage marked a new phase of Arctic navigation, coming just four years after the first international commercial transit of the region's Northern Sea Route. The *Nordic Orion's* journey took around a week less than had it travelled via the Panama Canal, saving the operator both the toll fees and US\$80,000 in fuel costs.

Global climate change — specifically the melting of sea ice — presents opportunities for international marine transportation networks in the Arctic, at least during the summer months. Recent discoveries of oil and the potential financial and time savings are making the Arctic routes more appealing to the shipping industry. Potential Arctic sea routes exist that enable ships to move between the Atlantic and Pacific oceans, thus cutting the distance between East Asia and Western Europe.

Some of these routes offer alternatives to the Panama and Suez canals, but they are not without risk. Extreme climate and weather conditions create unique hazards, including floating ice, thick fog, and violent storms. Despite new safety features, vessels remain vulnerable to ice damage, machinery breakdown, and more. The harsh environment also creates challenges for crews, few of which have been trained for or have experience in such conditions. And, should a vessel run into difficulty, help is likely to be a long way away.

Understandably, the international shipping industry is keen to start maximizing the opportunities afforded by Arctic navigation. Yet the marine insurance industry — whose collaboration is essential to the commercial viability of Arctic transit — holds a host of safety and navigational concerns, meaning that any negotiations will need to be handled carefully by those who have been engaged in the issues of this region for some time already.

**I ARCTIC SEA ROUTES AND HISTORIC AND PREDICTED RECEDING SUMMER ICE CONDITIONS**

■ SEPT 1984    
 ■ SEPT 2013    
 ■ SEPT 2060    
 ■ SEPT 2090



■ **NORTHWEST PASSAGE**

The Northwest Passage (NWP) would reduce the distance from Vancouver/Seattle to Rotterdam (via Panama) from 8,850 nautical miles to 6,950 nautical miles, with commensurate savings in time and bunker costs; able to carry more cargo and avoiding Panama Canal fees.

■ **NORTHERN SEA ROUTE**

The Northern Sea Route (NSR) would reduce the distance from Southeast Asia to Rotterdam (via Suez) from 11,350 nautical miles to 6,900 nautical miles and could cut transit time by 10 to 15 days.

■ **THE ARCTIC BRIDGE**

Starting in Churchill, Canada, the Arctic Bridge will cross the northern Atlantic Ocean, around southern Greenland to eventually end at Murmansk, Russia, dramatically reducing the time and distance from current trans-Atlantic routes.

Sources:

- Reuters.
- Northern Sea Route Information Office.
- National Snow and Ice Data Center, *Lloyd's List*, *The Wall Street Journal*.  
<http://mscconference.wordpress.com/2013/08/29/the-northern-sea-route-is-heating-up>

# ARCTIC NAVIGATION

Environmental changes, especially those linked to climate change, are having an unprecedented impact on the Arctic region. In the past two decades, there has been a loss of mass in the seasonal and multi-year ice in the northern seas, and a subsequent increase in some years in the extent of the retreat of the ice during the summer months. This trend appears set to continue.

## THE NORTHERN SEA ROUTE

Navigation of the Northern Sea Route (NSR), which runs along the Russian Arctic coastline, has been used by Russians for decades, although not on a major commercial or international scale.

Political and economic changes since the 1990s, the formation of the Russian Federation, the development of huge oil and gas discoveries in the region, and the expansion of the Russian nuclear-powered icebreaker fleet of Rosatomflot has opened new opportunities for international operators.

Additionally, ice conditions in recent years have enabled some vessels to navigate the NSR from July until December – albeit with icebreaker assistance. During these months, the ice is more easily broken and moved through and, at certain times, non-existent.

In August 2009, two multipurpose, heavy-lift, project carriers made a journey from Asia to Europe using the NSR. The usual route through the Suez Canal and the Gulf of Aden would have been a distance of 11,000 nautical miles, but by using the NSR they reduced this by approximately 3,000 nautical miles. This resulted in an estimated cost saving of US\$300,000 per vessel (a significant proportion of this was in fuel costs).

## LANDMARK NSR TRANSITS

**THE TRANSITS LISTED BELOW WERE THE FIRST OF THEIR KIND FOR EACH TYPE OF VESSEL.**

Source: Northern Sea Route Information Office

DATE	VESSEL'S NAME	TYPE	CARGO	PORT OF LOADING	PORT OF DESTINATION
AUGUST 2011	VLADIMIR TIKHONOV	SUPERTANKER	GAS CONDENSATE	HONNINGSVÅG, NORWAY	MAP TA PHUT, THAILAND
AUGUST – SEPTEMBER 2011	SANKO ODYSSEY	BULK CARRIER	IRON-ORE CONCENTRATE	MURMANSK, RUSSIA	CHINA
OCTOBER 2012	OB RIVER	LNG CARRIER	LNG	HAMMERFEST, NORWAY	TOBATA, JAPAN

## NSR TIME AND DISTANCE SAVINGS

Source: Tschudi Shipping Company A/S

DESTINATION	VIA SUEZ CANAL			THROUGH NORTHERN SEA ROUTE			DAYS SAVED
	DISTANCE, NM	SPEED, KNOTS	DAYS	DISTANCE, NM	SPEED, KNOTS	DAYS	
SHANGHAI, CHINA	(12050)	14.0	37	(6500)	12.9	21	-16
BUSAN, KOREA	(12400)	14.0	38	(6050)	12.9	19.5	-18.5
YOKOHAMA, JAPAN	(12730)	14.0	39	(5750)	12.9	18.5	-20.5



■ CURRENT ROUTE  
■ NORTHWEST PASSAGE



■ CURRENT ROUTE  
■ NORTHERN SEA ROUTE

Sources:

- Hugo Ahlenius, UNEP/GRID-Arendal

Recent discoveries of oil, gas, and other commodities to the north of Russia have given the NSR much more of a commercial imperative. In 2013, 71 vessels were successfully escorted through the NSR by Rosatomflot icebreakers, according to the Northern Sea Route Administration (NSRA). Such escort is currently a requirement of the NSRA for any vessels wishing to make the transit, as is the authority's approval that the vessels are fit to make the voyage. This was a considerable increase over the 2012 figure of 45 vessels, due partly to growing interest among international operators, but also because 2012 had not been a particularly warm summer, and the ice had not receded as quickly or as far. This goes to show that the impact of global climate change cannot be relied upon to improve navigation each year: Some years will be better than others.

## ICEBREAKERS

The Russian nuclear-powered icebreaker fleet of *Rosatomflot* has opened new opportunities for international operators looking to transit the NSR. However, their assistance comes at a cost.

The largest icebreakers can cost up to approximately US\$1billion<sup>1</sup> and take 8 to 10 years to build. Hiring charges vary, but the average cost for escort through the Northern Sea route is approximately US\$200,000.

## THE NORTHWEST PASSAGE

More challenging than the NSR is the Northwest Passage (NWP) along the "top" of North America. Although discovered by Roald Amundsen more than 100 years ago, it is accepted that commercial transiting via the NWP will remain a considerable challenge, even in the summer, notwithstanding global climate change.

Transiting via the NWP rather than the Panama Canal could see distance savings of up to 40%. The first successful commercial transit of the NWP occurred in October 2013 when the 75,000 deadweight tonnage (DWT) bulk carrier *Nordic Orion* carried coal from Vancouver to Finland. The journey took around a week less than it would have taken had it travelled via the Panama Canal and saved the operator US\$80,000 in fuel costs, as well the saving from tolls, which can range from between US\$50,000 and US\$250,000 for a loaded vessel.

And, by avoiding the Panama Canal, the vessel was able to carry 25% more cargo. However, the vessel did incur some additional costs that can be directly related to its transiting the NWP, including the cost of icebreaker support.

It is likely that the degree of risk from ice damage to vessels making such voyages, and the additional costs incurred for icebreaker escorts, will probably preclude the wholesale expansion of NWP transits in the short- to medium-term. It should be noted that two recent publications<sup>2</sup> have suggested that ice melt is now occurring at such a rate that by 2050 ships will be able to navigate the NWP during the summer without the assistance of icebreakers.

## CONSTRAINTS OF ARCTIC NAVIGATION

While there are a number of benefits afforded by arctic transit, these may be constrained by the following:

- The time taken to secure permits and their cost.
- The relatively slow speed of icebreaking transport vessels (where required).
- Insurance costs.
- Refitting costs to prepare vessels for Arctic conditions.

## THE ARCTIC BRIDGE

A third potential route, the Arctic Bridge, starts in Churchill, Canada and would cross the northern Atlantic Ocean, around southern Greenland, and eventually end at Murmansk, Russia. This route is already open four months a year. However, as the Hudson Bay is frozen over for the remainder of the year, investment into the infrastructure required to make this route feasible has not, as yet, been forthcoming.

<sup>1</sup> [http://www.arctic-llo.com/docs/nsr/tariffs/NSR\\_Tariff\\_Order.pdf](http://www.arctic-llo.com/docs/nsr/tariffs/NSR_Tariff_Order.pdf).

<sup>2</sup> Smith L. C. and S. R. Scott "New Trans-Arctic shipping routes navigable by midcentury" in Proceedings of the National Academies of Science, volume 110, no 13 (2013); and Climate Change 2013: The Physical Science Basis, IPCC, 2013.

## I INSURER CONSIDERATIONS

The transits that have already taken place across the NSR and NWP were, in most cases, one-off voyages that were permitted as extraordinary ventures, and/or government-backed, sponsored, and insured. With the expansion of the oil and gas industry in northern waters already gathering pace, more regular commercial usage is expected in the future, which will require a more focused and consistent approach by the insurance market.

While both hull and protection and indemnity (P&I) insurers have a wealth of information and data on the traditional risks involved in shipping, there are a number of risks associated with Arctic navigation that need to be identified and measured. Limited historical loss records make it difficult for underwriters to establish premium rates, and for insurers to develop comprehensive assessments of the risks involved in sailing through the Arctic. These risks are profiled in detail below.

### HULL CONSIDERATIONS

Despite the introduction of the Polar Ice Class for vessels some seven years ago, and the current international efforts to finalize a “Polar Code” for vessels using these waters, the fact remains that Arctic navigation presents hull insurers with considerable challenges, including:

- ▶ Extreme cold can cause engine problems. For example, water in pipes and pumps, if allowed to freeze, will expand and crack that equipment, along with other seemingly robust gear, rendering it useless.
- ▶ Reduced coverage is available by navigation aids such as GPS and GALILEO.
- ▶ Modern charts and hydrographic surveys may be inaccurate and limited in number.
- ▶ Magnetic compasses are unreliable at such high latitudes.
- ▶ Visibility is restricted due to frequent heavy fog in the region.
- ▶ Weather reports are often inadequate and violent storms can occur at any time.
- ▶ Rogue floating ice, even in summer months, can pose significant dangers.

The aforementioned risks increase the possibility of groundings, strandings, machinery breakdowns, ice damage, heavy weather damage, and even fire should machinery break down, and/or pumps fail to operate.

### POLAR CLASS DESCRIPTIONS AND APPLICATIONS

In August 2006, the International Association of Classification Societies (IACS) released a document, titled the Unified Requirements for Polar Ships, which standardized global ice classification specifications for vessels as follows:

- PC 1 – Year-round operation in all polar waters.
- PC 2 – Year-round operation in multiyear ice conditions.
- PC 3 – Year-round operation in second-year ice, which may include multiyear ice inclusions.
- PC 4 – Year-round operation in thick first-year ice, which may include old ice inclusions.
- PC 5 – Year-round operation in medium first-year ice, which may include old ice inclusions.
- PC 6 – Summer/autumn operation in medium first-year ice, which may include old ice inclusions.
- PC 7 – Summer/autumn operation in thin first-year ice, which may include old ice inclusions.

### SALVAGE

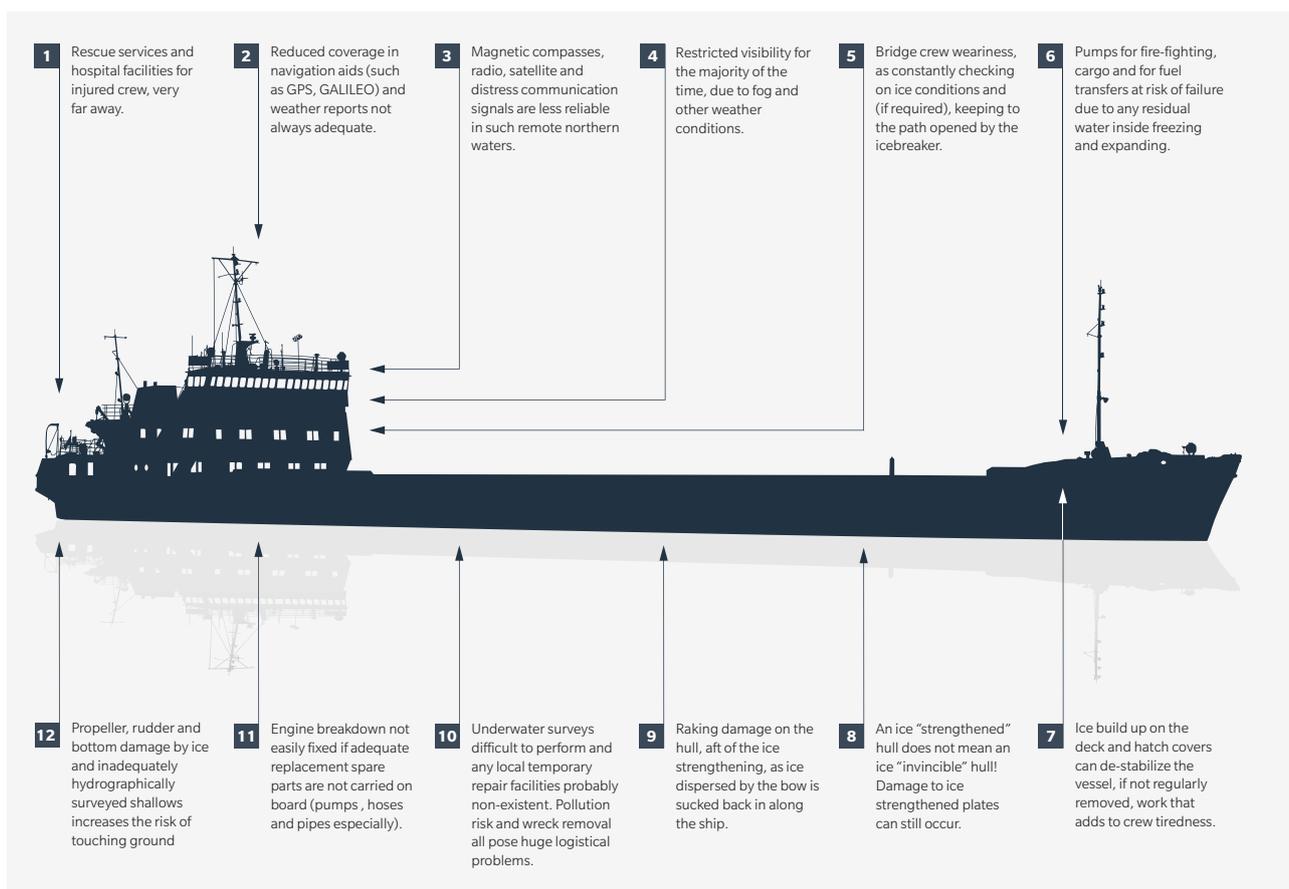
The Polar Ice Class and proposed Polar Code, while providing some comfort, will not ease concerns over the human element. Accounts of human error – which are so often part of the proximate cause of marine accidents – are only likely to increase in a region where previous experience is limited and demands on the crew to remain vigilant for long periods will take their toll. If a vessel does suffer an incident, there are serious concerns over the distance to adequate salvage services or repair facilities, especially in the eastern part of the NSR.

What might start as a small incident could quickly escalate if adequate assistance is unavailable or thousands of kilometers away. Even along the NSR, where nuclear-powered Russian icebreakers are deployed, it should be remembered that they are not designed to perform salvage operations. Any incident will also face a ticking clock as winter inevitably returns, potentially creating catastrophic consequences for a stricken vessel that cannot be removed quickly.

Even if equipment could be employed in this region, performing salvage work in often dark and inhospitable conditions would be a major challenge for a number of reasons, including:

- ▶ Underwater surveys of damage will be dangerous, if at all possible.
- ▶ Pumps and other equipment may not operate in such conditions.
- ▶ Lightering (the process of transferring cargo from one vessel to another) will probably not be an option.
- ▶ Temporary repair facilities are non-existent.
- ▶ Time pressures would be more important and sensitive than ever.

## I POLAR SHIP RISKS



## PROTECTION AND INDEMNITY (P&I) CONSIDERATIONS

P&I insurers face similar, though somewhat different, concerns. Whereas hull insurance is limited to an insured ship, P&I insurance extends coverage to include wreck removal, pollution, salvage (environmental, Article 14 SCOPIC awards), and crew injury and hospitalization, among others.

## WRECK REMOVAL

With the Nairobi Convention (see sidebar) coming into force in April 2015, there will be an obligation on vessel operators to remove wrecks – something that the Russian Federation, in particular, is likely to enforce in the NSR. Yet with the lack of adequate salvage equipment and search-and-rescue capabilities in the both the NSR and the NWP, such a task could prove extremely costly, if at all possible.

### ■ THE NAIROBI CONVENTION

The Nairobi International Convention on the Removal of Wrecks is due to come into force on April 14, 2015, 12 months after Denmark's ratification. The following states have ratified the Convention:

- Bulgaria.
- Denmark.
- Germany.
- India.
- Iran.
- Malaysia.
- Morocco.
- Nigeria.
- Palau.
- United Kingdom.

As of that date, it will be necessary for ships of 300 GT and over flagged at registries in the above states, or calling at ports and terminals in the above states to have certificates evidencing sufficient insurance cover for wreck removal in accordance with the convention.

## POLLUTION

The risk of pollution in the Arctic is perhaps the greatest concern for P&I insurers, as oil reacts differently in cold temperatures where it is less responsive to chemical dispersants (if such dispersants are even permitted to be used there). Oil is likely to get trapped under or within ice, making it extremely difficult to locate and handle.

And, for large periods of the year it is almost constantly dark in the Arctic region, making it difficult, even by air, to spot and locate pollutants.

## CREW COMPETENCY

If crew members are injured or become ill, hospitalization could be a major challenge due to the remoteness of the Arctic routes. Another major issue is that the international and national standards required for crew members and ice navigators in the NSR and NWP are limited. As such, there is the potential for many crews to be in the Arctic with limited training and experience when, due to the need to operate in darkness and at low temperatures, they arguably need to be more trained and experienced than ever.

## FUTURE CONSIDERATIONS

The major concerns for knowledgeable hull and P&I underwriters regarding Arctic navigation focus not only on the ice and climate, but on the added costs associated with salvage, support, and repair facilities. Faced with a request to insure such a voyage, the first response of a prudent underwriter is to question its feasibility and enquire about its planning. Without any hard facts on preparedness, it will be difficult, if not impossible, for underwriters to put a price on an insurable risk with confidence, or even to agree to cover a voyage in the first place.

Were this problem to be resolved, it is safe to assume that hull underwriters, knowing the record of hull damage that such voyages have resulted in to date, will ask for extensive surveys of the vessels before permitting Arctic transit under the insurance. It is also likely that deductibles for ice and/or ice-related damage – such as when ice heights build up from the bow and rake the vessel further along leading to plate buckling and deformation damage – may be considerably increased for the duration of the voyage.

A requirement to carry large numbers of spare parts could also be a featured condition, particularly pumps, pipes, and other equipment likely to be at risk from ice damage. Although not normally a hull insurers immediate concern, the competence and the experience of the officers and crew operating in these waters may be another factor affecting insurers appetite for accepting the risk.

## CONCLUSION

As things currently stand, the majority of ships and their crews are not ready, the support service facilities are not in place, and the risks involved are not understood at a level to enable underwriters to price insurance for Arctic transit with either clarity or certainty.

Use of the NSR accounts for a comparatively small percentage of the total global marine transport activity, and to date the NWP has only been used by a few vessels. Nevertheless, these levels appear set to increase significantly over the coming years, especially with discoveries of huge mineral resources in the north of Russia, extending out into the Arctic Ocean, Kara, Pechora, Laptev, and East Siberian Seas.

Add to this the increasing finds of oil and gas deposits north of Alaska, Canada, and around Greenland, and it is perhaps inevitable that hull and P&I insurers will be more frequently asked to consider allowing vessels to navigate the northern waters. However, underwriters' concerns surrounding remoteness, lack of salvage support services, and other risks means that it is by no means certain that they will accommodate such requests. If and when they do, such negotiations will need to be handled carefully by those who have been studying and engaged in the issues of this region for some time already.

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