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Arctic shipping faces multiple challenges

Unpredictable ice conditions, remote locations and limited search and rescue capacity: the Arctic remains a challenging environment for ship owners and operators, says Capt David 'Duke' Snider, CEO of Martech Polar Consulting Ltd and senior vice president of The Nautical Institute

Given the headlines that have predominated in the media over the past several years, many believe that a stampede of unregulated, potentially environmentally damaging shipping is surging into the pristine Arctic due to rapidly decreasing ice conditions. The reality is quite different. Ship transits of Arctic waters are not increasing dramatically, even though some highly visible resource developments capture the imagination.

But for those who do venture into the Arctic, either routinely or as a newcomer, there are a number of additional challenges to be met. Ships must be designed and built, and crews must be trained and competent, to take on the cold and ice. Many new players in Arctic shipping, expecting an ice-free route ahead, may be ignorant of the additional risks of venturing into this region.

The recent rapid movement by IMO to put in place mandatory Polar Code provisions is an effort to meet the reality of operating in a remote region that lacks support infrastructure and is subject to the dangers of variable ice conditions, requiring mariners to demonstrate additional skills and competencies.

Arctic ice is far different from that found in regions farther south – such as the North Pacific Sakhalin region, the Baltic and the North American East Coast – that are subject only to thinner, less dense, first-year ice, which forms and then melts out completely each year. The Arctic is home to much harder and more dangerous multi-year and glacial ice that survives successive summer melts, gaining in thickness and density as it ages.

There is no doubt that global climate change is occurring, and one of the results is a gradual reduction in sea ice cover in the Arctic. Those experienced in operating in the region have been watching the 'navigation season' – the summer period of least ice (not no ice at all, however) in which shipping concentrates its activities – growing incrementally in length over the past decades. But it is only a small increase, measured in days and not months, over the past decade. Break-up can occur earlier and freeze up later, but that does not mean ice is not present. Ice remains a hazard as conditions change hourly, daily, seasonally and annually.

Even though years of least ice – 2010 and 2007, for example – gain international attention, an unsuspecting ship operator who blindly enters the Arctic realm without preparation can become a victim of their own ignorance.

"Non-ice strengthened ships are still precluded from operating in many areas of the Arctic, even at the height of the summer navigation season"

We still experience 'bad ice years', where ice conditions are such that shipping is negatively affected or even stopped by ice. The summer of 2014 was particularly challenging in Canada's central Arctic, as multi-year and old ice blocked the Northwest Passage from easy ice-free transit. Non-ice strengthened ships are still precluded from operating in many areas of the Arctic, even at the height of the summer navigation season, due to the risk of encountering ice.

And ice is not the only challenge. The Arctic remains a remote region of the globe, and although for the most part the Arctic sea lanes where shipping is and will occur are relatively coastal, the area is not well served with support infrastructure.

▲ *Icebreaker/PSV* **Fennica**, *owned by Finland's Arctia Shipping, was the country's first multi-purpose icebreaker, built in 1993*
Photo: Arctia Shipping Ltd

Whether in the Northern Sea Route (NSR) or the Northwest Passage, there are virtually no deepwater shipyard repair or logistics facilities. On the approaches to the Northwest Passage, only Nuuk Greenland and Dutch Harbor Alaska have any substantial facilities for shipping. Murmansk, outside the limits of the NSR, is the most well developed hub. Elsewhere, it is a distinct lack of facilities that mariners come to expect in most littoral waterways.

Perhaps the most worrisome challenge is the lack of regional search and rescue (SAR) capability. Norway is arguably the most prepared for Arctic SAR capability, but its waters are less ice impacted than those of the other Arctic coastal states.

In the past two years, Russia has made concerted efforts to improve its Arctic search and rescue capability. It has completed construction of three of 10 planned SAR stations, two of six planned SAR/salvage icebreakers and committed to reopening a major Arctic airfield that will support SAR air capability and military aircraft. On the other side of the Arctic, resources are far less well developed.

The US Coast Guard attempts valiantly to increase its Arctic SAR footprint during the seasonal Operation Arctic Shield, but over the past two years has been forced to pull back due to budget limitations.

Canada has not achieved any changes in SAR capability since the 2010 Arctic Council

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announced agreement on Arctic SAR area responsibility. In Canada, SAR air resources must be sortied from RCAF stations in the south, up to 12 hours' flying time from an Arctic incident. In addition, the country's aging icebreaker fleet is increasingly hard pressed to meet summer demands.

With the annual shipping season increasing, the five Canadian Coast Guard icebreakers assigned to summer Arctic operations – and which are the only substantial in-area SAR resource – are generally limited to old arbitrary seasonal operational limits, again due to funding issues.

Even where SAR resources are at hand, the final missing piece of the puzzle is communication. Broadband communications pipelines from geostationary communications satellites familiar to mariners over the rest of the globe are focused on sub-polar regions. A number of low earth orbit systems, such as Iridium, have better Arctic coverage but their low bandwidth makes data transfer slow and costly. Routine MF-HF radio communications are far more subject to atmospheric disturbance in the Arctic. In short, it is not uncommon to lose the thread of communication while operating in the region.

The Arctic is challenging to shipping because of its extremes in cold temperature, the presence and risk of encountering multi-year and glacial ice, the geographical remoteness of the region and the lack of supporting infrastructure.

Regardless, there is a desire for extending our reach in support of resource development, improvement to the standard of living for those who live in the region, and the possibility of more direct ships' routing. Those who venture into the depths of the north must come prepared, physically and mentally.

● Capt David (Duke) Snider is the CEO and principal consultant of Martech Polar Consulting Ltd, a British Columbia-based company providing global ice navigation services and support for polar shipping, ice navigation, polar research, expedition logistics support and ice-related consulting services. A master mariner, he was elected senior vice president of The Nautical Institute in 2014.

Setting the standard for ice navigation

Capt Snider outlines moves by the Nautical Institute and IMO to introduce ice navigator standards for mariners operating in polar regions

For centuries, mariners experienced in sailing in the polar regions have known that it takes special knowledge and experience to build the competence to safely operate vessels in ice. Although it is true that when sea ice retreats during the summer navigational season and many areas 'north of 60' can be ice free, most of the rest of the Arctic is still subject to ice cover. The presence of senior bridge personnel with the knowledge and competence to operate in ice is, therefore, paramount for ice that may be encountered at any time.

Attempts were made by the IMO in the mid-1990s to develop mandatory training and certification standards for ice navigators, but nothing more than vague guidelines resulted. What remained has been a hodge-podge of different regional, national, and sometimes local, guidelines and regulations that attempted to specify needed levels of training and certification.

No international standard existed. Almost anyone could market themselves as an ice master, ice pilot or ice adviser – even the names, the roles and the legal responsibility were open to question. Ship owners, charterers and insurers could not reference a common standard.

With the IMO focused on other matters during the first decade of the century, The Nautical Institute was encouraged by many in the marine industry to begin work to develop international training and certification schemes to ensure that appropriately competent ice navigators could be identified. The Ice Navigator Project was born out of this work.

Since 2010, The Nautical Institute has organised a number of face-to-face workshops, an ongoing internet 'virtual' working correspondence group and conducted research. The initial work focused on determining what regulations, codes, guidelines and courses in ice navigation existed. Having collated the data, a gap analysis was completed to determine what was required to build a comprehensive skills and knowledge matrix identifying what an ice navigator needs to do.

With the draft matrix verified by the working and correspondence groups, an additional layer identifying competencies necessary at a basic watchkeeping level, and at an advanced watchkeeping or management command level, was completed. The Nautical Institute was then prepared to move forward to develop both an Ice Navigator Training Accreditation scheme and an Ice Navigator Certification scheme that together would ensure an international standard of training and competence in the marine industry.

As the final stages of the ice navigator development work were reaching their conclusion, the IMO again began to examine human element requirements related to the newly revived plan to put in place a mandatory Polar Code.

In its role as an NGO to IMO, The Nautical Institute participated fully and proactively in the deliberations to ensure that the highest standards of professionalism and safety management were maintained.

In February, the sub-committee on Human Element, Training and Watchkeeping (HTW) agreed on the minimum standards that would be laid out in Standards of Training, Certification and Watchkeeping (STCW) amendments on sea service, minimum training, revalidation and transitional arrangements for deck officers and masters onboard vessels sailing in polar waters. This was a great leap forward in setting out the mandatory requirements that will come into force in the near future.

The Polar Code/STCW requirements will only apply to deck officers and masters on SOLAS ships operating in polar waters within a broad breakdown of ice conditions.

▲ *Capt 'Duke' Snider is a member of The Nautical Institute/IMO delegation in on-going discussions focused on developing a mandatory Polar Code*

Non-SOLAS ships and those operating in ice outside the geographic footprint of the Polar Code will not be required to meet the same requirements. Because of this, The Nautical Institute intends to sail ahead and continue implementation of the plan to put in place both the training accreditation and certification schemes for ice navigation.

Nautical Institute training accreditation will ensure that maritime training institutions that adhere to the standards are identified as meeting the highest possible standards, with a common focus on identified skills, knowledge and competency outcomes. The accompanying Nautical Institute certificates for Ice Navigator Level 1 Basic and Ice Navigator Level 2 Advanced will not only meet the Polar Code requirements but go one step further and meet the needs for operations in ice-covered waters outside the polar regions.

Together, the two schemes will enable mariners, vessel operators, insurers and others to have a clearly defined product that allows for direct comparison in the quality of training and competence of the mariner, so that operations in ice are conducted safely and efficiently.