



The reality of polar shipping

By Captain Duke Snider FNI

In what seems to be an almost constant barrage in popular media these days, we are informed of massive losses of sea ice in the Arctic and diminishing continental ice in the Antarctic. This past summer witnessed a year of “least ice” in the Arctic, prompting more predictions of “ice-free summers” in our near future. These predictions of open water conditions evoke images of effortless sailing through a benign environment that was once considered an impossible venture. Those less knowledgeable about the reality in the Polar Regions leap to dreams of economic boom through shorter sea routes or access to heretofore inaccessible or certainly accessible only at great cost natural resources. The reality belies those dreams however. The Polar Regions remain today and far into the future extremely challenging and not simply “open for business” to those that do not come prepared.

Certainly the facts clearly indicate that sea ice in general is in decline. Paradoxically, over the last several years, coverage of winter sea ice in the Antarctic has been increasing. Irrespective of the normal ebb and flow of ice conditions that we know anecdotally follow cycles of generally 11- and 50-year peaks and troughs of good (less ice) and bad (more ice) years, there is an ongoing overall reduction in ice cover, and a concomitant increase in a length of shipping season that is based on open water conditions. Hard and fast “first in — last out” dates that held true for most of the past century are

sliding earlier and later respectively. These do not denote ice free conditions, but only that open water coverage of varying degrees is occurring and ending days sooner and later.

Ice cover by its nature is mobile, susceptible to wind and current, making conditions variable. Conditions change hourly and daily as well as seasonally, so that even within an overall trend in reduction of ice coverage there are good and bad periods. As an example, at the beginning of this past Arctic Summer navigational season, polar pack ice remained hard against the Alaskan North Slope, challenging even ice class ships. At the same time in Eastern Canada, ships were damaged by heavier than normal ice conditions in the approaches to Iqaluit. At the other extreme, at the end of the 2012 Arctic navigation season we have experienced the “least ice cover” ever recorded in the Arctic Ocean. However, ice still remains within the Canadian Arctic Archipelago.

Because of the variability of ice conditions, at any time in the Northwest Passage for example, navigation by non ice-strengthened ships can be halted by presence of thick first year or multi-year ice somewhere along the passage. Even today, rarely is the deep water (>11m depth) route open throughout for more than a few days at a time. In fact, the reduction in overall coverage has permitted heavier, thicker multi-year ice that normally would be kept clear of the normal Northwest Passage to enter areas that in the past would

have been considered free of this heavier ice. Multi-year ice is sea ice that has survived at least one summer’s melt and has continued to grow in thickness and hardness as salt leeches out. It becomes progressively harder over subsequent years and, like glacial ice which is extremely dense and hard, poses extreme hazard even to purpose built icebreakers. Unlike single season ice, multi-year and glacial ice are far more dense. One cannot expect an effortless, ice-free passage, but must prepare for unexpected delays due to changing ice conditions.

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As long as Arctic ice exists, it will remain a challenge. Knowing how to identify ice, plan for and execute a transit in ice-infested water, particularly where dangerous multi-year and glacial ice can be encountered, is vital to operations in the Polar Regions. It takes many years of experience to learn how to identify ice and to safely manoeuvre a vessel in ice-infested waters. It is often a lack of experience in operations in ice-infested waters that result in damage or loss. Many that truly know the Polar Regions accept that the skills and knowledge required to operate there is far and above those

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held by the average mariner. A single season transiting the Northwest Passage does not afford a bridge watch officer the knowledge or the skill. Over the past several decades this has been noticed by numerous agencies, jurisdictions and operators who have contact with Polar Ship Operations. There are many different ideas on what skills and knowledge are necessary to actually safely transit ice-infested waters, but to date there has not been any adoption of a clear global standard.

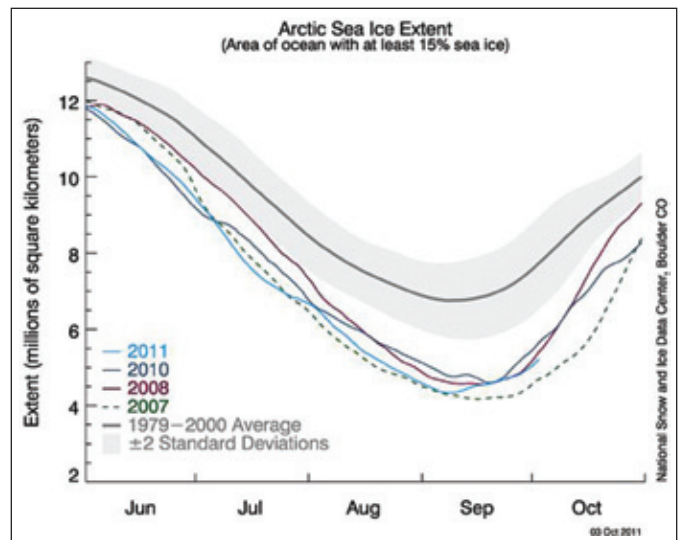
It is certainly not just ice that poses a challenge for those who endeavour to operate at the poles. Certainly ice may be the most visible difference, being just one manifestation of the extremes of weather experienced north and south of 60 degrees. And certainly the presence of ice and the extreme cold of winter has contributed to other great challenges, the remote nature of these areas and the resultant lack of infrastructure that mariners come to expect elsewhere on the globe.

Only the hardiest of humans have ventured into the Polar Regions over the past centuries. In the Antarctic Region, until late in the 19th Century humankind had never been present. Today, the only human presence is associated with research stations permitted under the Antarctic Treaty. Around the circum-Arctic however, human presence has gone back many centuries but never in larger numbers as seen in more temperate climes. Over the last century, human presence has grown incrementally, and at times cyclically, as efforts to extract valuable natural resources have come and gone. Nonetheless, the region remains extremely difficult to travel around in winter months and any substantial centres of habitation must be the hardiest on earth. North American Arctic population centres count inhabitants generally in the hundreds. In the Russian and Norwegian Arctic, larger population centres may exist, but do not provide appreciable support to maritime shipping, unless related to a specific resource extraction enterprise.

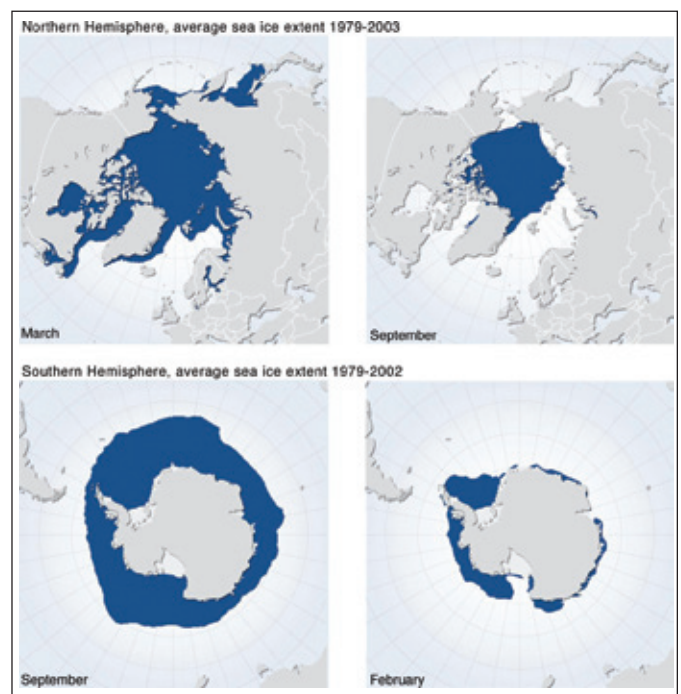
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The result of the reduced human footprint at both poles is that infrastructure that can support shipping for either re-supply or repair is virtually non-existent. In the Antarctic NOTHING exists to support shipping. At least in the Arctic some repair facilities exist in locations such as Nuuk, Greenland; Dutch Harbor, Alaska; and Russia. However, there are no convenient ports for taking on stores or supplies, and even government efforts to establish "port facilities" for support of their own vessels are extremely limited. Canada's own establishment of a facility at Nanisivik on Baffin Island (the site of the abandoned Nansivik mine loading facility) remains rudimentary in scope and would only be available to Naval or Coast Guard vessels, even if well established in the future. Small vessel "harbours" exist, and during periods of active extraction, load and discharge, "ports" have existed at or near mine sites, but these have never seen development or use past the life of the associated mine, such as like that on Little Cornwallis.

Much has been made in the last year about the declarations of the Arctic nations in support of improving search and rescue capabilities in the far north. International agreements are now in place that have defined METAREAS and NAVAREAS that now cover all Arctic Waters. These require the responsible governments to have in place communications facilities and capabilities that will enable timely and effective dissemination of MET warnings and receipt and action with respect to distress communications. The struggle now is to actually put in place effective systems. Satellite coverage remains problematic, the swath covered



Changes in the extent of sea ice since 1979.



The seasonal variations in the extent of sea ice for both Northern and Southern Hemispheres (1979 to 2002-3). Comparing this to the graph above, one can see the change occurring.

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by traditional marine communications satellites stops well before the poles and radio communications can be negatively impacted by susceptibility to solar activity more prominently experienced at either pole. In some polar regions, radio coverage is highly “seasonal”, communications centres being opened during only the more traditional “shipping seasons”.

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In the Arctic, the ability to affect actual rescue relies primarily on the presence of various government icebreakers that are assigned to the regions for summer operations. The United States has only one operational polar icebreaker at this time (though USCG has begun repositioning air assets to northern Alaskan operating areas in summer months to support SAR), Canada assigns up to five icebreakers to Arctic operations, and Russia operates several nuclear and conventional icebreakers. Denmark and Norway operate ice-strengthened naval vessels, but not heavy icebreakers. At any given time, any of these ships may be many hours or days away. Salvage capable tugs may be weeks away.

The challenge to shipping in the Polar Regions remains. The challenge

Photo credit: Canadian Coast Guard



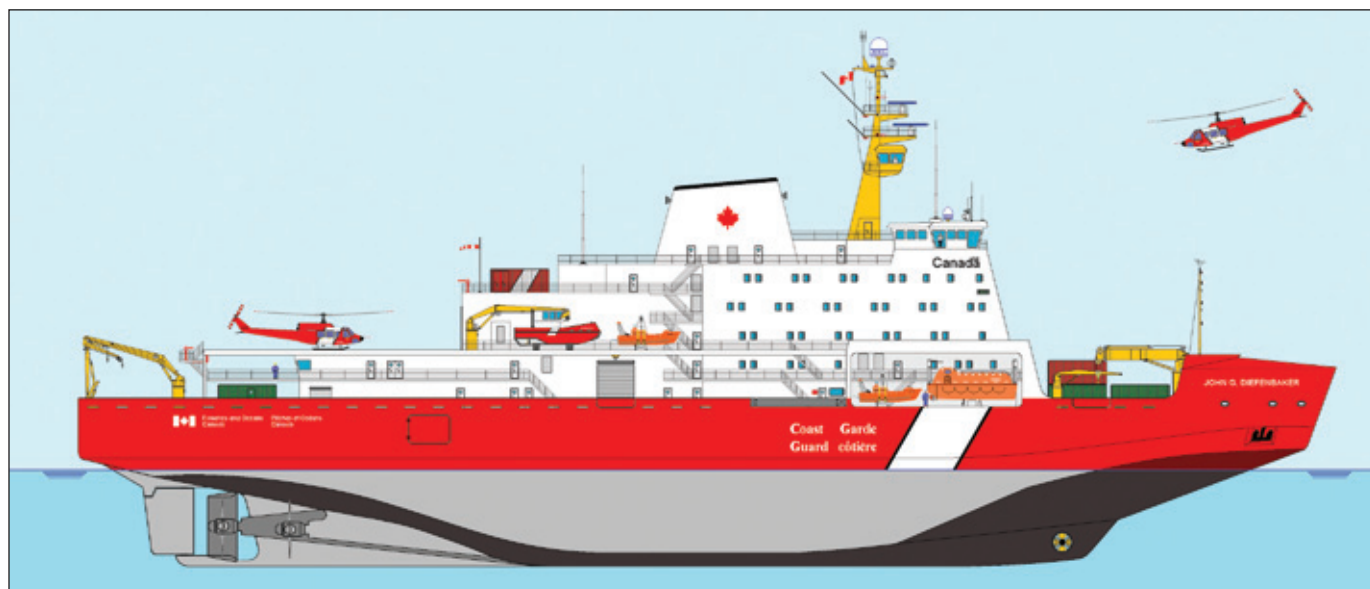
The Henry Larsen, Canada's newest icebreaker.

to operators to have the skills and knowledge required in addition to that normally accepted for operations elsewhere on the globe, the extremes of weather with presence of ice and the hazards it represents, the remote nature of these regions and the accompanying lack of infrastructure to shipping all combine to still make voyages into these areas fraught with risk and challenge.

Noting a lack of overall shipping industry knowledge with respect to the challenges of operating in the Arctic, and the increasing interest in pushing shipping into the ice-infested Polar Regions, The Nautical Institute embarked on two projects to fill the gap. The first was the publishing this past April of *Polar Ship Operations* — a

Practical Guide which outlines the various challenges facing ship operations in these remote and challenging areas and serves as a primer on ship navigation and operation in the ice-infested waters of both poles.

The second was the commencement of the Ice Navigator Project, noting the absence of a global standard for and definition of Ice Navigator. This project has collated information from the varied regional and company standards for ice navigation, and combined reviews of the various ice navigation courses that exist via multi-user consultation with ship operators, ship owners, insurers, classification societies and others. With a gap analysis now complete, the Ice Navigator Project will present its draft Ice Navigator skills,



Proposed Canadian polar-class icebreaker.

Photo credit: Canadian Coast Guard

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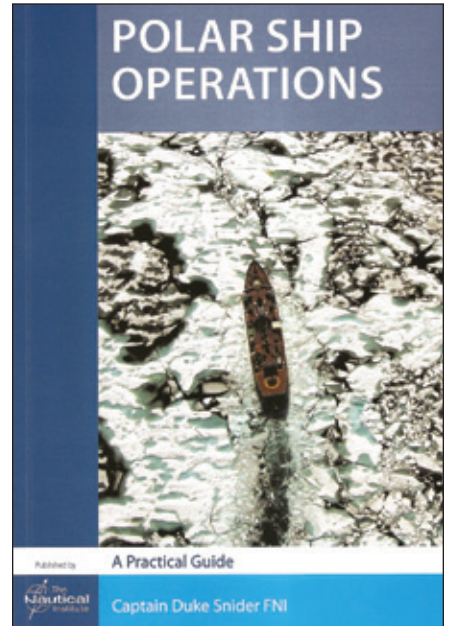
knowledge and competency matrix for discussion at a half day seminar in conjunction with the Arctic Shipping Forum North America in Montreal 31 October in Montreal. With an acceptance of the matrix, the intent will be to present these to IMO under The Nautical Institute's status as an NGO for adoption under STCW (Standards for Training, Certification and Watchkeeping). Pending the adoption under STCW, The Nautical Institute is prepared to champion adoption of the standard outside IMO as has been done with Dynamic Position Officer Standards. In the DP case, The Nautical Institute completed a similar multi-user consultation, gained broad band acceptance for the standards and now maintains these standards on behalf of many flag states, accredits training institutions and provides certification of DP officers to a global standard outside the often more cumbersome IMO change and ratification process.

There is a future for expansion of shipping in the Polar Regions, but

those looking forward must be aware of the challenges that will face them for many years to come. Today, a voyage into either Arctic or Antarctic waters remains a "come as you are" effort. One must be prepared to deal with all emergencies and eventualities on their own.

Captain Duke Snider has amassed a broad range of seagoing experience over the past 30 years in naval, commercial and Canadian Coast Guard shipping, much of it in the ice-covered waters of the Arctic, Gulf of St. Lawrence and the Baltic. He is presently the Regional Director Fleet Pacific for the Canadian Coast Guard, serving in Victoria, B.C.

Captain Snider was the lead author of the Ice Navigator Standards developed for Transport Canada for submission to the IMO for inclusion in the Polar Code. He also assisted in the writing of an Arctic Passage Planning guideline that is now incorporated in the Canadian Coast Guard publication, Ice Navigation in Canadian Waters. He is the chair of The Nautical Institute's Ice Navigator Working Group.



Captain Snider's latest book, *Polar Ship Operations — A Practical Guide*, can be purchased through The Nautical Institute's website (www.nautinst.org) or through Nautical Mind Bookstore (www.nautical-mind.com).



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