



Current status and future operational models for transit shipping along the Northern Sea Route

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ABSTRACT

The Northern Sea Route (NSR) has received increased international attention during the recent years as an alternative transit corridor for shipping between Europe and East Asia. In 2015, the project “Feasibility and Reliability of Shipping on the Northern Sea Route and Modeling of an Arctic Marine Transportation & Logistics System” was established to perform a comprehensive analysis of the current status and future prospects of NSR transit shipping. The project brought together several partners and numerous participants representing industry, governmental bodies, and research groups from Europe, Asia, and Russia, thus providing a unique and comprehensive overview of the subject. This paper is based on the insights gathered during the project. Firstly, it provides a comprehensive overview of the NSR's current regulations and support services. Secondly, it combines the information on the current status of the route with feedback received from the stakeholders during project discussions for the purpose of establishing several possible future operational models for transit shipping along the NSR. It is concluded that the most probable of the analyzed operational models is a combination of ice-strengthened vessels and independent ice-going cargo vessels. This model requires a decrease in severity of ice conditions to allow for year-round commercial navigation, an increase in bunker prices, further development of maritime infrastructure and icebreaking support, and the development of new maritime insurance models. Additionally, establishing transshipment hubs at each end of the NSR with ice-going cargo vessels sailing between them is also considered to be a viable future option.

1. Introduction

The Northern Sea Route (NSR)¹ presents a potential shortcut for transit shipping² between Europe and East Asia, which can be used in order to save fuel and/or time (see [17] for details about shipping along

the NSR). In recent decades, the reduction of ice extent and thickness in the Arctic resulted in increased international interest in using the NSR for intercontinental shipping ([8]). Specifically, in 2010, Tschudi Shipping and its partners realized the first international transit voyage along the NSR resulting in costs savings ([23]). This event triggered a

List of abbreviations: AARI, Arctic and Antarctic Research Institute; CHNL, Centre for High North Logistics; OM, Operational Model; FSUE, Federal State Unitary Enterprise; H&M, Hull & Machinery; IAL, Institute of Arctic Logistics; IB, Icebreaker; IMO, International Maritime Organization; IP, Influencing Parameter; LNG, Liquefied Natural Gas; MRCC, Maritime Rescue Centre; MRS, Marine Rescue Service; MRSC, Maritime Rescue Sub-Centre; NSR, Northern Sea Route; NSRA, Northern Sea Route Administration Office; NTNU, Norwegian University of Science and Technology; OSP, Oil Spill Preparedness; P&I, Protection & Indemnity; SAR, Search and Rescue

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¹ “The area of the Northern Sea Route means a water area adjoining the northern coast of the Russian Federation, including internal sea waters, territorial sea, contiguous zone and exclusive economic zone of the Russian Federation, and limited in the East by the line delimitating the sea areas with the United States of America and by the parallel of the Dezhnev Cape in the Bering Strait; in the West, by the meridian of the Cape Zhelanie to the Novaya Zemlya archipelago, by the east coastal line of the Novaya Zemlya archipelago and the western limits of the Matochkin Shar, Kara Gates, Yugorski Shar Straits.” (definition adopted from The Federal Law of July 28, 2012, N 132-FZ “On Amendments to Certain Legislative Acts of the Russian Federation Concerning State Regulation of Merchant Shipping on the Water Area of the Northern Sea Route”).

² The term “transit shipping” applies for using the NSR for sailing between continents. Due to the lack of intermediate hubs along the NSR resulting from the lack of hinterland in the Russian Arctic, only cargo going directly from Europe to East Asia (or vice-versa) is considered eligible for transit shipping via the NSR. The NSR can also be used for destination shipping (e.g. supporting energy projects in the Russian Arctic), but that is not the focus of this paper.

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surge of interest for the NSR amongst non-Russian shipowners resulting in a rise in the annual number of commercial transit voyages along the NSR, culminating in 71 transits in 2013 (transit statistics available at www.arctic-lio.com). In the following years, however, the number of transit voyages decreased again due to various reasons, such as reduced bunker prices, geopolitical circumstances, cargo unavailability, ice conditions, etc.

Transit shipping along the NSR has been extensively studied throughout the years. In recent years, several studies have discussed the current status and future prospects of the NSR transit shipping from different perspectives. Marchenko [15] presented an overview of historical development of the NSR together with the current status of various shipping-related aspects. Bekkers et al. [4], Kiiski et al. [12], Pruyt [18] and Zhang et al. [24] discussed future prospects of NSR transit shipping from a techno-economic perspective. Mietzner [11] analyzed the potential of container shipping through the NSR, while Cariou and Faury [7] discussed bulk shipping. Zhang et al. [25] discussed the NSR transit shipping from the shipowners' perspective, while Lee and Kim [14] performed a similar analysis focusing on three South Korean shipping companies. Kim [13] discussed South Korea's Master Plan for the development of Arctic shipping, while Zhao et al. [26] discussed China-EU container shipping network in the context of the NSR. Beveridge et al. [5] discussed general interest of Asian shipping companies in navigating the Arctic.

These studies provide valuable insights from their own perspectives. However, an integrated study comprising of insights from stakeholders from different fields and from all three regions involved – Europe, Asia, and Russia – is currently missing. This is especially true regarding accurate and up-to-date information from the Russian side, which is scarce in the literature.

The project “Feasibility and Reliability of Shipping on the Northern Sea Route and Modeling of an Arctic Marine Transportation & Logistics System” was established in 2015 to address this issue and provide a more complete picture of the current state and future perspectives of transit shipping along the NSR. The project was initiated by Centre for High North Logistics (CHNL, www.chnl.no) of the Nord University in Bodø, Norway and the Institute of Arctic Logistics (IAL) of the Youngsan University in Busan, South Korea. The project was funded by the Ministry of Foreign Affairs of Norway (ARCTIC 2030 Programme) on one side and by the Ministry of Oceans and Fisheries of South Korea on the other. The project lasted from April 2015 until December 2016 as a joint research venture of CHNL and IAL with the following project partners: Federal State Unitary Enterprise (FSUE) Rosatomflot, Murmansk, Russia; Department of Marine Technology at the Norwegian University of Science and Technology (NTNU), Trondheim, Norway; DNV GL, Høvik (Oslo), Norway; and Norwegian Shipowners' Association, Oslo, Norway. The project was organized in a series of six one-day workshops held in Norway and South Korea, with the goal to perform a comprehensive analysis of the current commercial transport and logistics operations, operational efficiency, cargo base, costs,

infrastructure needs, and security and safety of transit shipping along the NSR. At each workshop, project partners presented their research on different topics, followed by the discussions. In addition to project partners listed above, workshops brought together various participants from industry and academia, including representatives of Norwegian academic institutions; international oil & gas companies; Norwegian and Finnish shipowners with experience in NSR sailing; South Korean shipyards; Norwegian Protection & Indemnity (P&I) company; and political authorities of South Korea. Additionally, interviews with several important stakeholders (mainly on the Russian, Norwegian and South Korean side) who were unable to participate at the workshops were conducted by the project partners, insights from which were included in their presentations. Consequently, this combination of partners and participants from different fields and regions of the world – Europe, Asia, and Russia – provided a new and more complete perspective on the subject of NSR transit shipping.

This paper is based on the insights gathered during the project and uses them as a basis for establishing future operational models for transit shipping along the NSR. Section 2 presents an overview of the NSR's current regulations and support services based on the publicly available information and on the knowledge collected during the project. The challenges identified by the project partners and participants are discussed in Section 3. In Section 4, different future operational models for transit shipping along the NSR are studied. Section 5 concludes the paper.

2. NSR's current regulations and support services

During the project discussions, it became apparent that there is still a lack of information amongst non-Russian shipowners regarding various aspects of the NSR transit shipping. This section tries to reduce this knowledge-gap by providing a comprehensive overview of the existing data and adding to it with the information gathered during the project.

2.1. Rules and regulations governing the NSR shipping

2.1.1. Russian rules and regulations

Since the opening of the NSR for international traffic in 1991, the Russian Federation has been continuously developing rules and regulations governing shipping along the NSR (for details on historical development of the regulations see [22]).

The year 2013 marked the beginning of a new era for the NSR, mainly through the implementation of the “New Rules of Navigation on the NSR” [20]. Also, “The Northern Sea Route Administration Office” (NSRA, www.nsr.ru) was reorganized and established in its current form the same year. The aim of the 2013 rules was to simplify administrative procedures and processing of applications for the NSR sailing permit, issued by the NSRA. Table 1 presents an overview of the most important changes to come out of the new regulations and bureaucratic reorganization implemented in 2013.

Table 1
Comparison of NSR regulations before and after 2013.

Before 2013	After 2013
Every vessel intending to navigate through the NSR – either for destination shipping or transit – shall obtain a sailing permit. Ship's master or person replacing him shall be experienced in operating a vessel in ice. Obligatory requirements to have Civil Liability Certificate for oil pollution. Shipowners intending to use the NSR should submit a request for a sailing permit to the Administration of the NSR at least 4 months in advance.	The application for the sailing permit with all necessary documents attached is to be sent to the NSRA via e-mail no earlier than 120 calendar days and no later than 15 working days before the intended date of the entering of the ship into the NSR water area. Ship inspection not needed, only documents sent by e-mail. Flexible system. Admittance criteria dependent on season, ice class, NSR area, and actual ice conditions.
Mandatory ship inspection. Vessel must have at least Arc4 or 1-A ice class (for transit).	IB assistance can be either mandatory or optional depending on prevailing ice conditions. Calculation of IB assistance costs according to tariff tables, which present maximal allowable tariffs. Still, the operator has freedom to reduce the price if deemed justified.
Mandatory icebreaker (IB) assistance. Calculation of IB assistance costs reached through negotiations.	

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