STYRELSEN FÖR

VINTERSJÖFARTSFORSKNING

WINTER NAVIGATION RESEARCH BOARD

Research Report No 86

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BREAKING THE UNIVERSAL LANGUAGE BARRIER. A QUALITATIVE STUDY OF THE IMPORTANCE OF COMMUNICATION DURING ICEBREAKER OPERATIONS IN THE GULF OF BOTHNIA.

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Finnish Transport Agency

Finland

Swedish Maritime Administration

Swedish Transport Agency

Sweden

Talvimerenkulun tutkimusraportit – Winter Navigation Research Reports
ISSN 2342-4303
ISBN 978-952-311-035-9

FOREWORD

In its report no 86, the Winter Navigation Research Board presents the outcome of a project: Breaking the universal language barrier. A qualitative study of the importance of communication during icebreaker operations in the Gulf of Bothnia.

At sea, a safe and efficient way to communicate is of utmost importance for the safety of the crew and the vessel. During ice operations, when an icebreaker assists a merchant vessel, this is even more critical as the nature of the operations offer small margins for error. The aim of this study was to examine the communication that takes place during icebreaking operations in the Gulf of Bothnia, and identify the factors that make the communication safe and efficient. To achieve this, a qualitative approach was used to obtain data from officers onboard both icebreakers and merchant vessels. A content analysis was then performed to determine the main themes, which were found to be safety, communicative issues and language use.

The Winter Navigation Research Board warmly thanks Mr. Magnus Boström for this report.

Helsinki and Norrköping

June 2014

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Breaking the Universal Language Barrier

A qualitative study of the importance of communication during icebreaker operations in the Gulf of Bothnia

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Abstract:

At sea, a safe and efficient way to communicate is of utmost importance for the safety of the crew and the vessel. During ice operations, e.g. when an icebreaker assists a merchant vessel, this is even more critical as the nature of the operations offer small margins for error. The aim of this study was to examine the communication that takes place during icebreaking operations in the Gulf of Bothnia, and identify the factors that make the communication safe and efficient. To achieve this, a qualitative approach was used to obtain data from officers onboard both icebreakers and merchant vessels. A content analysis was then performed to determine the main themes, which were found to be *safety*, *communicative issues* and *language use*.

Overall, the communication is found to be satisfactory, but for each of the three themes the result shows areas that can be improved. (1) The safety improvements include more training in ice navigation for a better understanding of what a vessel can expect when entering ice infested waters, as well as better knowledge of the English language. (2) A communicative issue identified was that not all vessels bother to ask for clarification when they do not fully understand a message received from another vessel. (3) With regard to language use, most vessels could make better use of the Standard Marine Communication Phrases (SMCP) as required by STCW.

Recommendations are made to distribute the publication Winter Navigation directly to shipping companies, together with general information about ice navigation. Furthermore it is also recommended to stress the use of the SMCP during ice operations, and to specify what factors make a crew suited for ice navigation.

Acknowledgement

This report is the result of a study performed on behalf of the *Finnish-Swedish Winter Navigation Research Board*, following the 2011 call for projects. The study was carried out by Magnus Boström at Kalmar Maritime Academy, Sweden. It was finalized in February 2013.

The author would like to thank the Research Board for the funding which made the study possible. I would also like to extend my sincere gratitude to the respondents who offered to share their experience, personal and professional views as well as ideas for improvements for the report with me. Most important of all they shared their time. Also, my colleagues at Kalmar Maritime Academy have been invaluable with their support throughout the project, from the initial planning to the final seminar which offered constructive criticism. Finally, the author would especially like to thank Carl Hult and Andreas Åsenholm for their useful knowledge and constant encouragement.

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1. Introduction

1.1. The use of the English language at sea

As shipping is worldwide, it is fundamental that crews have a safe and efficient way to communicate no matter where in the world they are at any given time. Safety is of course the main concern, i.e. to avoid accidents at sea; however, the efficiency of any ship is also dependent on good communication, e.g. in contact with shipping agencies and port authorities. Many studies identify poor communication as one of the most significant factors in accidents at sea (Ziarathi, 2006). What is more, the need for a standardization of the language used at sea has been emphasized and accelerated by a number of disasters at sea where the communication has been ineffective like in the case of *Scandinavian Star*, or in the case of *Estonia* where commands for evacuation were given in numerous languages, resulting in the loss of time, and lives (Katarzynska, 2009). To facilitate this standardization, IMO adopted in 1977 the Standard Marine Navigational Vocabulary (SMNV) stating that a common language should be used for navigational purposes at sea, namely English (IMO, 1977). However, this effort was not enough, and a more comprehensive version of the SMNV was needed. This resulted in the Standard Marine Communication Phrases (SMCP) adopted and implemented in 2001, which in addition to designating English as the key language, also included specific phrases meant to improve communication among and between multi-lingual crews and others involved in the safety of shipping (Katarzynska, 2009).

For the past decade, the SMCP has been taught at maritime training institutes around the world. STCW requires all officers in charge of a navigational watch to have the ability to use the IMO Standard Marine Communication Phrases and use English in written and oral form, as stated in STCW Code A, Section A-II/1 (IMO, 1978):

> /…/ to communicate with other ships, coast stations and VTS centres and to perform the officer's duties also with a multilingual crew, including the ability to use and understand the IMO Standard Marine Communication Phrases (IMO SMCP).

The main purpose of the SMCP is to provide a precise, simple and unambiguous way to communicate. There are a number of main features of the SMCP: a simplified grammar, a glossary with technical and nautical terms and standard phrases covering many situations and conditions at sea (IMO, 2001). Furthermore, depending on nationality, most individuals already have a certain level of English before learning SMCP, and the SMCP is meant to bridge the gap between these different levels. A person speaking at an advanced level will not be understood by a person with very basic English skills. Peter Trenkner (2010), one of the authors of the SMCP gives an example of too advanced English not being interpreted correctly:

> VTS Station: 'What flag do you fly?'
> Answer: 'No flag, it's night.'

With this in mind, it is not only important for seafarers with limited English skills to master the SMCP. It is equally important for those with a good command of the English language to know the SMCP and somewhat simplify the language used. By doing so, two people can meet at a mutual level, and the communication will be successful. By applying the correct standard phrases and terminology, the same message as above has a significant smaller risk of being misunderstood (Trenkner, 2010):

> VTS Station: 'Question – what is your flag state?'
> Answer: 'Answer – my flag state is Germany.'

1.2. The need of safe and efficient communication during ice operations

Assisting a vessel through ice is a delicate business which requires full attention from all involved parties, and both the crew of the icebreaker and the merchant vessel need to be aware of the other vessel's actions. For this to be possible, efficient and continuous communication between the two vessels is needed; safe because the margins sometimes are very small e.g. when breaking loose another vessel, efficient because actions have to be made at once, leaving no time to ask for clarifications. These two factors, the small margins and the time pressure, distinguish ice navigation and ice assistance from many other types of navigation. In an anti-collision situation involving two vessels in open sea, the vessels most likely notice each other earlier, acknowledge any risk of collision earlier, and have much more space available for anti-collision measures; a close situation in open sea might be a distance of a few cables, during ice assistance it might be only a few meters. As long as the margins are maintained no harm is done.

However, to successfully assist a vessel through heavy ice and weather conditions, a short distance between the icebreaker and the assisted vessel is sometimes needed. In unfortunate situations this can lead to accidents, one example being the recent collision between the icebreaker Atle and the general cargo vessel Risoluto. At the time of the collision the icebreaker was assisting the merchant vessel at a short distance, and when the speed dropped the icebreaker was not able to relay this information in time to avoid a collision. The cause was ineffective communication, as the order to reduce speed was received too late (Transportstyrelsen 2012).

Icebreakers and assisted vessels use different means to communicate depending on situation, both verbal communication in oral and written forms, and nonverbal communication. The latter is rarely used, but one example is the two red rotating warning light mounted on the Finnish icebreakers, indicating a reduction of speed. Verbal communication is mostly done as voice communication on VHF, but can also be in written form, e.g. distribution of waypoints via e-mail.

1.3. Structure of the report

After this initial introduction, the aim and main issues are presented in chapter 2. Chapter 3 gives a brief background to the study; this information is essential especially for readers without previous knowledge of the ice service in the Gulf of Bothnia. After that, in chapter 4 the methodology is presented: how the study was performed and some critical aspects that have to be considered when studying the result. In chapter 5 and 6 the data is presented. For simplicity, the data has been divided into two chapters: one for the interviews and the other for the questionnaires. However, they follow the same structure and have the same three sub-headings. These are based on the themes identified during the analysis of the data, the most prominent themes being *safety*, *communicative issues* and *language use*. This way, it is easy to find the same issues presented from both the icebreakers' and the merchant vessels' perspective. Finally there is a concluding discussion in chapter 8, followed by some recommendations laid out in chapter 9.

2. Aim and main issues

This investigation aims to study the communication that takes place during icebreaking operations in the Baltic region, and examine what factors make the communication safe and efficient. To be more precise, the aim of the project entails two main questions: (1) How can the safety be improved during icebreaking activities in the Baltic? (2) Is there in particular a communication problem associated with the Baltic icebreaking activities, with potential to increase the risk of accidents? Furthermore, if found necessary, this study also aims at proposing recommendations that are deemed to be useful for promoting the safety during ice assistance.

The area of interest is the Gulf of Bothnia, the area generally covered by the Finnish and Swedish icebreakers. This is also the geographical limitation of the study.

3. Background

3.1. Icebreaking service

To maintain shipping lanes open all-year round in the Gulf of Bothnia, Sweden and Finland operate a number of icebreakers. The main function of the state-icebreaking is sea ice-breaking; that is to break ice between patches of open water (SMA 2012). Vessels that fulfill certain requirements can receive this service free of charge (SFS 2000:1149).

3.2. Requirements for vessels in ice

For a vessel to be able to rely on state icebreaker assistance, it must comply with the icebreaking service ordinance[1]. This statute states that "vessels suited for winter navigation" can receive assistance. To be considered suitable, a vessel must at least comply with the current ice restriction at any given time, which requires a vessel to have sufficient Finnish-Swedish ice-class (or equivalent) and a minimum deadweight tonnage. These requirements are vessel specific, meaning that they apply to the physical vessel. However, the maritime administration can refuse to give assistance to vessels for a number of reasons, e.g. if devices important for ice operations are inoperable or the hull, engine power or crew is such that it could impose a threat to the safety of vessels (SMA, 2012). These requirements are vessel specific as well, except for the last one, the crew. This means that some requirements can be placed on the individual personnel involved with the safe operation of the vessel. For a deck officer, this could for example include previous experience of ice navigation and/or training in ice navigation. However, these individual requirements are not stated in the previously mentioned statute; it is only declared that the maritime administration organizes the operations[2] and that further regulations are expressed by that same administration[3]. Still, nothing is explicitly stated with regards to what conditions might make the crew jeopardizing the safety of the vessel (SMA, 2012), and as a consequence making the administration refuse to give ice assistance.

3.3. Distance between vessels vs. risk of collision

Assisting a vessel through icy waters can be a risky operation. When an icebreaker is actively assisting a merchant vessel, either by freeing a beset vessel, or escorting a vessel through ice, the risk of colliding is always present. Icebreaking operations are influenced by several factors, but the two most important are ice pressure and ice thickness and these factors affect how the operations have to be carried out. To exemplify, a situation with an icebreaker escorting a vessel through ice can be used. If the track behind the icebreaker remains open and clear, the distance between the two vessels can be large. However, if the ice pressure were to increase, e.g. by increased wind speed, the track might close more rapidly, thus requiring a shorter distance between the icebreaker and the escorted vessel. This in turn increases the risk of colliding (House *et al*. 2010, p. 296).

When the speed of the icebreaker decreases, this has to be communicated to the assisted vessel immediately. If the officer on watch on the merchant vessel is alert, he or she notices this at once and can take appropriate actions. Some icebreakers have special rotating red warning lights, vertically positioned, which indicate that the icebreaker stops or if the speed is significantly reduced. However, it is still crucial that the icebreaker informs the escorted vessel at once, and this is mainly done by VHF communication. For that reason, a good enough command of the English language is needed for successful communication.

[1] Swedish statute SFS 2000:1149
[2] SFS 2000:1149 1§
[3] SFS 2000:1149 5§

3.4. SMCP and ice navigation

Without going into too much detail, the Standard Marine Communication Phrases is a frame work intended to ensure a safe communication between vessels (ship-to-ship communication), between vessels and costal stations (ship-to-shore communication) and onboard vessels. The SMCP consists of four main parts: an introduction, some general guidelines as to how to speak clearly, a glossary with words and expressions relevant to shipping, and standard phrases. The standard phrases make up the bulk of the SMCP and can be further subdivided into two parts: external communication phrases and on-board communication phrases. These phrases are meant to cover most of the common situations at sea where communication is needed. Some of the areas covered are distress situations, meteorological conditions, navigational warnings and pilotage (external communication) and standard wheel and engine orders and berthing operations (internal communication), just to mention a few. Naturally, not all possible situations are covered.

However, ice navigation and icebreaker assistance are represented in the SMCP. The vocabulary can be found in appendix 1 and the phrases have been compiled in appendix 2. Table 1 is a list of topics in the publication Winter Navigation that require some kind of communication, and their respective corresponding parts in the SMCP. The topics represent the chapters in the previously mentioned publication, and can be regarded as relevant since the Swedish Maritime Administration is both the responsible author of the publication and in command of the icebreaker service. The fact that all topics are covered by the SMCP indicates that the existing standard marine phrases offer a good coverage of the situations that are likely to arise during ice navigation and icebreaker assistance.

Table 1. Situations covered by the SMCP.

Topic	**Corresponding part of SMCP**
Reporting	AI/6.1 Phrases for acquiring and providing data for a traffic image[4]
Contact with icebreaker	AI/5.2.1 Ice - breaker request
Vessels travelling in a convoy	AI/5.2.2 Ice - breaker assistance for convoy
Towing	AI/5.2.3 Ice - breaker assistance in close-coupled towing
Wheel orders	AII/1 Standard Wheel orders
Engine orders	AII/2 Standard Engine orders
Weather and ice information	AI/3.1.3 Meteorological and hydrological conditions - Ice

[4] This section is not provided in appendix 2 since it deals with reporting in general and not ice reporting specifically.

4. Methodology

This chapter aims at describing the way that the study was conducted, which also ensures the repeatability of the study. The steps will be described chronologically, starting in spring 2012 and ending in early 2013. In general, two major methodological parts can be identified within this study; the acquisition of data from officers onboard merchant vessels obtained through a questionnaire, and knowledge collected from officers onboard icebreakers obtained through interviews. The idea of attaining two sets of data was considered necessary to get a more comprehensive view of the situation, i.e. to look at the view from both the icebreaker's perspective and that of the assisted vessel.

The criterion for participating in the study was that the respondent had to be working as a deck officer on either a merchant vessel or an icebreaker. The data from the merchant vessels was collected through 9th of March 2012 to 5th of May 2012, and the interviews were performed on 26th and 27th of September and on 22nd and 23rd of October.

4.1. Construction of the questionnaire

An early concern was the matter of how to reach nautical officers onboard merchant vessels. As the icebreaker officers were to be interviewed in person, an early thought was to do the same with the merchant fleet; go to a port and talk to the officers in person. This, however, posed some challenges. The main challenge was time and location; it would have been too time consuming to visit ports along the coast of the Gulf of Bothnia since many ports have infrequent port calls. Too large a portion of the project budget would have been claimed by waiting time and travel expenses.

The process of compiling the questionnaire was aided by personnel at Kalmar Maritime Academy specialized within the fields of scientific methodology, language and nautical science [5]. This group of people consisted of 11 persons in total and was used as a reference group to improve and finalize the questionnaire. The questionnaire underwent the following steps:

1. The first version, created on 24th of February, was commented with regard to general principles of methodology for quantitative research.
2. The second version, created on 26th of February, was commented with regard to actual content and language.
3. The third version, created on 5th of March, was given to two Master Mariners to see how much time was needed to complete the questionnaire.
4. The fourth and final version, created on 6th of March, was distributed on 7th of March.

The final version of the questionnaire can be found in appendix 3.

4.2. Distribution of the questionnaire

The questionnaire was distributed to merchant vessels through their ship brokers. The reason for this was purely practical. The web-site[6] of the Swedish Shipbrokers' Association (Sveriges Skeppsmäklarförening) lists all their member shipbrokers, and all shipbrokers north of and including the city of Gävle, Sweden, were contacted and asked if they were willing to participate in the distribution process. The intention with contacting those northerly shipbrokers was that even if the vessels calling those ports had not encounter ice at that particular voyage when they received a questionnaire, the officers onboard those vessels were more likely to have previous experience of ice.

[5] An associate professor in sociology and maritime science, a senior lecturer in language studies and a number of Master Mariners and lecturers in nautical science.
[6] http://www.swe-shipbroker.se/

A total of 15 ship brokers were initially contacted by e-mail; six of these either did not respond or for some reason did not want to participate. Consequently, nine shipbrokers were engaged.

The participating shipbrokers were then contacted by phone, and informed about the aim of the study and what was expected of them. They were also asked to approximate the number of ships that generally called their area during a four-week period. This was done to estimate how many questionnaires each shipbroker needed. The number of questionnaires each broker received ranged from 5 to 60 copies, and in total 282 copies were distributed.

Each questionnaire was delivered together with an accompanying letter (appendix 4) outlining the study, and a pre-paid return envelope. However, the ship brokers were asked to encourage the respondents to fill out the questionnaire at once and return it to the broker, thus increasing the likelihood of the questionnaire actually being completed. The shipbrokers also received a cover letter (appendix 5) outlining their responsibilities with regard to the questionnaire, as well as contact information if any questions were to arise.

4.3. Collection of the questionnaire

The shipbrokers were asked to hand out one questionnaire to each vessel that called their area. Some vessels were expected to call several ports during the coast, and some vessels were expected to call the same port several times during the winter. Therefore, the shipbrokers were instructed not to give the same vessel or officer more than one questionnaire; they simply asked if the officer had completed the questionnaire previously.

The person completing the questionnaire was informed that he or she could either return the questionnaire to the shipbroker during that same port call, or send it by mail using the enclosed return envelope. For statistically purposes it was interesting to see from which shipbroker a certain questionnaire derived, therefore the questionnaires that were sent to the brokers had different code letters, which made it possible to see in what part of the Gulf of Bothnia the questionnaire was completed. At the end of the study the shipbrokers were again contacted and asked to report or estimate how many questionnaires they had distributed, if not all. As a consequence, together with the code letter, it was possible to calculate the response rate for the different shipbrokers.

4.4. Response rate

It has previously been mentioned that 282 questionnaire were sent to the ship agents for further distribution to the merchant vessels. By counting the number of received forms, one could argue that the response rate could be calculated rather easily. However, there are a number of factors that have to be taken into account for the return rate to be calculated as accurately as possible.

The number of questionnaires that reached the vessels was not necessarily the same as the number of questionnaires sent out. The reason for this is simply that the number of questionnaires sent out was only an estimation of expected vessels for a specific port and for a certain period of time; the actual number of vessels that called a port might have been both higher and lower. Also, an agent might have forgotten to hand out a questionnaire to a vessel, or there was just not enough time to do it. To account for this, a letter was sent to the ship agents after the data collection had been completed, where the agents were asked to report how many of the forms had actually been handed out, either by counting the remaining forms, or by estimating how many had been distributed[7]. To complicate the matter even more, not all agents answered this letter, therefore the estimated return rate has to be used with due

[7] An estimation is of course less accurate, but if the remaining forms would have been discarded, an estimation is the only available option.

care. By assuming that the agents who did not respond to the final letter have distributed all forms, the total response rate can be estimated to approximately 10%. The actual response rate is probably higher, since it is more likely that the agents did in fact not distribute all their forms. Nevertheless, this low value means that the data cannot be used for statistical purposes, and the data should be used only to show the individual views of each respondent, but not as a representation of officers onboard merchant vessels in general.

4.5. Interviews with icebreaker officers

The information obtained from the questionnaires only shows how officers onboard merchant vessels view the safety and communication situation. To get a more complete picture the view of the officers onboard icebreakers was also needed. To obtain that data two methods were considered: either using the same questionnaire as for the merchant vessels, or interviewing the officers. The first option, using the same questionnaire, would have made the comparison easy. However, a more in-depth view was deemed the best option. During off-season, the majority of the Swedish icebreakers are berthed in Luleå, Sweden, and this made it easy to meet and interview a number of officers in person.

A template for the interview (appendix 6) was produced from the questionnaire. This guaranteed that at large the same data would be collected. Furthermore, the template also made it possible for the interviewer to focus on the answers from the interviewee, rather than having to remember all questions by heart. The template was commented and improved by personnel familiar with the methodology of interviews.

A total of seven interviews were completed: two were performed in Kalmar[8] and five in Luleå[9]. At the beginning of the interview the interviewees were informed about the aim of the study, that participation was voluntary, that no answers would be retraceable and that the interviewee at any time could terminate the interview for any reason.

4.6. Method for data analysis

The interviews were recorded on an iPad and afterwards roughly transcribed. This meant that the answers were categorized and paraphrased, and when found necessary exact quotations[10] were also recorded. In more detail, a method called content analysis (also known as textual analysis) was used. This way of analyzing qualitative data is described by Jacobsen (2012) as a way of both simplifying data, but at the same time enriching it. The way the data was analyzed is described below, together with examples of each step.

1. *Thematization*. While the text is read as a whole, the reader tries to simplify it by identifying certain themes. A theme consists of a couple of sentences (or paragraphs) that deal with the same idea, e.g. risks associated with closed-coupled towing.
2. *Categorization, grouping of themes.* Themes are put together into categories with the aim of structuring the text. The theme mentioned in step one could be categorized as safety. Categories could either be derived from the data itself as a result of the interview, or be determined beforehand by the interviewer, as a result of the interview template being used.
3. *Filling the categories with contents.* Quotes from the text are used to exemplify and explain the categories. This could for example be a quote from an interviewee explaining his or her view about a certain operation, whether it is risky or not.

[8] A number of officers from the Swedish icebreakers attended a course in Kalmar, Sweden, and agreed to be interviewed during that time.
[9] The rest of the interviews took place on board the Swedish icebreakers in Luleå, Sweden.
[10] The quotes were translated into English by the author.

4. *Comparing interviews and looking for differences and similarities.* The researcher simply examines a category to see if some, or even all respondents have given similar answers, or if the answers are very diverse, e.g. if they all identify the same safety risks, or have completely different opinions.
5. *Seeking explanations to the differences.* These explanations are sought for in the transcription and quotes from the interviewees.

For this study, an interview template was used, and therefore most of the categories were distinguished in advance. However, some themes rarely occurred, probably because of the open ended questions[11] that let the interviewee skip a question if he had nothing to say on that matter. Hence a few categories are not mentioned in the result section.

4.7. Critical observations

When dealing with communication and language, one has to be careful when examining data obtained from people of different nationalities, and therefore this study has two inherent uncertainties. The first uncertainty deals with the questionnaire. When distributing a form in a certain language, in this case English, there is a risk that people with limited English skills do not understand the questions correctly. This might lead to a situation where they answer the questions incorrectly, or that they simply decline to answer at all; this could be an explanation for the low response rate. As a result, the data will be either incorrect, or will only reflect the part of the population that understands English well enough. The second uncertainty becomes important when comparing the data obtained from the questionnaires and the interview. The respondents of the questionnaire have different native tongues and therefore might have problems understanding some questions. At the same time, they are left on their own not being able to ask for clarifications. The interviewees on the other hand all performed the interviews in their native tongue, Swedish, and also had the possibility to ask the interviewer for clarification if needed. This means that when comparing the two sets of data, one has to remember that the data resulting from the interviews might be more reliable than the data originating from the questionnaires.

[11] An open ended question is a question without pre-defined answers, e.g. “What do you consider problematic with this operation?”.

5. Data from the interviews

In this chapter, the data derived from the interviews is presented. To make it easy to follow, it is structured in the same way as the main issues were raised together with the aim of this study in the beginning of the report. Following the initial background of the respondents, the safety issues of ice operations in general are presented together with possible solutions to solve the issues. These are followed by a more in depth look at how the communication works during operations. The quotes in this chapter are used to exemplify the views of the respondents, and were all recorded during the interviews.

5.1. Background of the respondents

The seven interviewees that participated in this study have varying backgrounds. They are all male; however, their ages range between 33-55 years, with an average of 43 years. Furthermore, the number of seasons that they have worked as deck officers on board icebreakers varies from 4 to 19 seasons, with an average of 9 seasons. Consequently, some of the participants have gained most of their seagoing experience from icebreakers, some have gained further experience from the merchant fleet and others have additional experience from other areas of work. The participants' backgrounds, especially their seagoing experience, have to be kept in mind when analyzing the result, since it might influence the responses given to the questions.

All respondents have completed the required course for icebreaker officers. Depending on when they first entered into ice service, the ice officer course they have attended is either the formerly ISOK[12] previously offered by the Swedish Navy, or the present IsBU[13] offered by the Transatlantic Ice Academy. The respondents were asked if, and if so what, was mentioned during the training with regard to communication. The answers range from knowledge about how communication is established, the use of standard phrases during communication and how to apply communication in a practical context. Other respondents mention the need to be clear and act in a correct manner. Another respondent has only received brief information about communication.

> They could have focused a little bit more on the terminology used. In a real situation you use the first words that come up and those are rarely the standard phrases, but the English you know from before.

The following quote gives a similar view, that there is too little emphasis on practical communication, what actually should be said during communication, and not only how the communication link is established.

> Oral communication should be given more focus, both in the IsBU and the Master Mariner program. Too much focus is on technical matters and not so much on routine communication.

5.2. Safety during ice operations

A satisfactory communication might be an essential factor for ensuring a safe operation during icebreaker assistance. However, the respondents were asked if, and if so how the safety could be improved during operation. This could include improvements onboard both the icebreakers and assisted vessels, and was not only limited to communication issues. They were encouraged to think freely, but they were also given a number of ideas to consider. The resulting ideas from the icebreaker officers are here presented in four groups, all with their specific characteristics: technical development,

[12] Isofficerskurs (ice officer's course)
[13] Isbrytarbefälsutbildning (icebreaker officer's training)

training, experience and requirements, language improvements, and finally the one concern or improvement that they believe to be the most critical one.

5.2.1. Technical development

There are a number of technical devices that already have improved the safety and efficiency of ice operations, and if implemented broadly could improve the safety during ice operations even further. The first one is the AIS[14], which is of great help for the icebreakers, since it clearly shows if a vessel is beset in ice (the AIS indicates zero speed) even when there are language difficulties. Furthermore, it indicates the vessel's heading and exact position which is useful information in preparation of the assistance of the vessel. Another navigational tool that would improve voyages through ice for merchant vessels is any ECDIS[15]-system with track keeping capabilities, e.g. the ADVETO system[16]. This function lets the user see the track of any other AIS target, with the possibility to also see what speed the vessel has had for each part of the voyage. This has two great advantages. Firstly it helps greatly when trying to find the opening and follow an ice lead that you know another vessel has followed. Secondly, the speed indicates whether the ice conditions have been tough, i.e. lower speed, or easy, i.e. higher speed. This tool is in use on the icebreakers, but if more merchant vessels were to have the same tool routes could be shared among both icebreakers and merchant vessels, and as a consequence fewer vessels would get stuck in ice, allowing the icebreakers to focus primarily on monitoring of the area.

Another essential piece of equipment needed when travelling in ice is powerful search lights. This was brought up during the interview as a need for both icebreakers and the assisted vessels. For the merchant vessels, this is already a requirement stated in the publication Winter Navigation; however, what is considered powerful enough is a subjective opinion and from the icebreaker perspective, merchant vessels often have too weak search lights.

One more technical device that was mentioned is the two rotating red warning lights, which are in use onboard the Finnish icebreakers but not the Swedish ones. The lights are lit whenever the icebreaker stops unexpectedly or has to make an abrupt reduction in speed. It is the view of one of the respondents that a warning light would be noticed much more quickly than a VHF call, thus improving the safety. Nonetheless, over reliance on such a warning system could be a concern, having the crews of the assisted vessels blindly looking at the warning lights and not assessing the situation themselves. Also, the fact that some icebreakers use it and others not means that the crews constantly have to remember the nationality of the icebreaker they are operating with, and whether or not that icebreaker has this safety device.

5.2.2. Training, experience and requirements

Several of the interviewees mention training and experience to be a concern, and more specifically the lack of it. This is a concern onboard both the icebreakers and the merchant vessels, however, the problems are not the same. Assisting a vessel through ice requires a great deal of experience, which the older icebreaker officers often possess. The problem is that for the younger generation to obtain this experience they have to handle tricky situations on their own, situations that they sometimes cannot handle fully. This dilemma is solved onboard by an allowing atmosphere and a large enough crew, where a more experienced officer can be on watch at the same time as a more junior one.

[14] Automatic Identification System
[15] Electronic Chart Display and Information System
[16] This is a type-approved ECDIS produced by the company Adveto.

On the merchant vessels, the problem is not only lack of experience, but also lack of training, including everything from general principles of ice navigation and the use of radar in ice, to hands-on VHF usage and simply lack of experience. Some vessels are also not aware of the general guidelines for receiving icebreaker assistance, and this shortage of information could be the result of too complicated information channels.

> To stress that the crews read *Winter Navigation*, so that it doesn't just end up on the ship agents' desk. Sometimes the agent might bring it to the ship, but then the vessel receives it only for the outbound voyage, not on the way in. Send it to the shipping company so it can be distributed early.

There is a noticeable difference between those vessels that frequently call ice covered ports, and those who do it rarely. *Experience* is the key difference. All respondents are generally positive to adding more ice training and education to the Master Mariner program, with the aim to increase the safety during ice operations.

> Yes, it [more training] would increase safety and speed up communication.

This addition to the education would not have to be very thorough; a general introduction to ice and the operations one can encounter when dealing with icebreakers would be sufficient, with some simulator training so that the students are familiar with the icebreaker communication. Yet, it is difficult to say how large impact this would have on the overall safety. Two respondents highlight the fact that the problem lies with the foreign maritime academies, one of them expressing it like this:

> More ice navigation training is always good, but since the merchant fleet composition is as it is the focus is not that much on the Swedish maritime training, we have relatively few vessels. The problem is that the foreign academies should have more ice training.

If influencing other academies to make additions to their education is likely to be difficult, requiring them to do so will probably prove to be impossible. Another way to ensure that crews are trained properly is to introduce some kind of ice certificate that, in combination with the vessel's ice class, is required before a vessel can request assistance from an icebreaker. Without dictating the exact requirements for this certificate, the interviewees were asked about their view on this. From a safety perspective, all state that an ice certificate would have a positive effect. Ice navigation is a very special field, and for other special fields there already exist numerous certificates such as for dynamic positioning (DP), crowd and crisis management (CCM) and dangerous goods, so an ice navigation certificate is not that farfetched. On the contrary, the lack of such a certificate is strange:

> Today you can operate a vessel in any way, as long as the vessel is ice classed.

The training for an ice certificate could include basically the same as mentioned above for the Master Mariner program: a brief introduction to ice and ice operations, and a language requirement to ensure safe and efficient communication. The two negative aspects stated during the interviews are purely economic. One view is that such a requirement would affect the national trade negatively by decreasing the number of vessels, thus hampering import and export. Another view is that of the shipping companies. Additional certificates mean higher costs. Nonetheless, from the icebreaker perspective, the training and experience of the crew of the merchant vessel is an essential part.

> A vessel's ice class accounts for 50%, and the other 50% is the crew who operate the vessel, whether or not they are suitable for ice.

5.2.3. Language improvements

When examining the language situation during ice operations, the interview focused on three main themes: the choice of language, whether to use a strict language with predesigned phrases, or to allow a less strict but more fluent language. The first theme, the choice of language, will be discussed thoroughly in another chapter, and will therefore only be looked at briefly here. The language used when communicating with the assisted vessels is always English as soon as at least one of the involved vessels does not master Swedish. When asked, one respondent says that English could be used as well when only Swedish crews were involved, while another strongly disagrees.

> I don't see the point if we are assisting a Swedish vessel. As soon as you switch to another language the risk of misunderstandings increase.

Another exception is when two icebreakers communicate between themselves. In such a situation Swedish is often used for simplicity, but also to avoid that other vessels hear too much information that is not intended for them, information that otherwise could be misinterpreted.

The other two themes dealt with whether to use a strict language or not. In this context, a strict language means a language that is based on prefabricated phrases and that the communication is short and concise. An example of this is the SMCP. All respondents are familiar with either SMCP or SMNV[17], but very few claim to use it on a regular basis. However, this is only half true. The majority of the respondents say that they do not use the set phrases, but by using a simple and brief language and utilizing closed-loop communication, they are in fact making use of some aspects of SMCP. The reasons for not using the phrases differ; some believe that there are no phrases dealing with ice operation, others used the phrases in the past, but the knowledge has slowly vanished over time. But one important reason that hampers the use of the set phrases is the same that makes the interviewees uncertain as to whether a more strict language use would improve the safety; the knowledge of SMCP among seafarers in general is limited, and by using specific phrases there is a risk that they will not be understood.

The problem with communicating with set phrases is that all parties involved need to know them. All deck officers[18] are required to be able to use SMCP, but this is not the case today. Therefore, the main concern is that before the phrases are used more strictly by the icebreakers, they must be made available to the assisted vessel. One suggestion brought up is to include the most common phrases in the publication Winter Navigation, and stress their usage. There is also the fear that too many phrases would impede the willingness to speak at all.

> There mustn't be too many phrases. That would hamper people, by fear of making a mistake. Then there is a risk that you don't speak at all.

Another uncertainty is that people with limited English skills learn the phrases by heart, without fully understanding their meaning. However, that risk exists no matter is you use specific phrases or plain English.

The opposite of using set phrases, to speak less strict but as a result gain a natural flow, was not seen as a feasible alternative.

[17] Standard Marine Navigational Vocabulary was the predecessor to SMCP. Consequently, the respondents who studied before 2001 would be familiar with SMNV, and those who studied later would be familiar with SMCP.
[18] According to STCW, all officers in charge of a navigational watch on ships of 500 gross tonnage or more are required to have the ability to understand and use the SMCP.

> No, it doesn't work, they have to know who is in charge. Clear and unambiguous orders from the icebreaker that cannot be misinterpreted. Not 'if you could please increase a little'. No, 'full ahead'.

The general opinion is that even if the SMCP is not used, the language needs to be brief enough. During some parts of the operations there is no time for misunderstandings, or to repeat everything. A less strict language increases the amount of unnecessary talk, something that could be hazardous during advanced operations. Only one situation was mentioned where free speech could be tolerated, and that is if someone has very limited English skills.

> It's better if they say what they can say, than if they say nothing at all.

However, as both STCW and the rules governing ice assistance stipulate that you need to know both English and the SMCP, it is questionable if a vessel unable of this should be given any assistance at all.

5.2.4. The main concern or improvement

During one part of the interview the respondents were asked what they thought to be the biggest concern regarding communication between icebreakers and merchant vessels, or what the most needed improvement is. All respond either improved communication, better language skills or more ice training.

> The language. The bottom line is that people have to be better at English. Set higher standards.

> Communication is essential. Better communication through either the ice class or other requirements.

> Knowledge and understanding of ice navigation.

There are also some suggestions as to how these goals could be met. Better, or more extensive, education and training at the maritime academies, but not just locally around the Baltic Sea, since many vessels have other flag states. The focus should be at the students who presently are enrolled at the Master Maritime program, or will be in the future. Those who are actively working at sea are much harder to reach. Furthermore, when it comes to English skills, there is a possible trend that younger officers are better at communicating in English. Therefore, if communication and ice navigation get more attention at the academies, these problems might partly be solved by time as new officers leave school well suited for ice navigation.

5.3. Communicative issues

5.3.1. Means of communicating

The way of communicating differs depending on the situation and activity at hand. During icebreaker assistance when direct communication is needed, VHF is exclusively used between the icebreaker and the assisted vessel, to ensure safe and quick messages.

> No VHF contact, no assistance.

Some respondents mention the use of mobile phones, mainly when talking to Swedish or other known vessels; however, this requires either GSM or satellite coverage of the area and can therefore be of limited use.

Technical development and the increased availability of internet onboard vessels have significantly improved the way large quantities of data can be transmitted. General instructions, routes and waypoints can easily be transmitted via either AIS message or e-mail. If more merchant vessels would have the capability of receiving data, e-mail would most likely be the dominating way to communicate this kind of information.

> Waypoints in writing (e.g. AIS) are very good, as they [the other vessel] can print them and bring them to the chart table. Otherwise there is a great risk that something gets missing when you read out loud lots of information.

The use of a VHF radio during ice operation has one unsurpassed advantage; it allows everyone in the vicinity to listen to the conversation. Even if a message is directed at another vessel, the safety will be improved if nearby vessels are briefed by listening to the conversation. Another benefit from using the VHF compared to a mobile phone is the fact that not only the person holding the VHF receiver can hear the message, but everyone on the bridge. If a phone briefing takes place between e.g. an icebreaker and the master of an assisted vessel and the master then leaves the bridge without briefing the rest of the bridge team, the information is lost. Briefing everyone is important, as one respondent explained:

> Listening in on VFH broadcasts on the bridge is important! Think out loud!

On the other hand, it is not always desirable to have other people overhearing one's conversation. A situation where a closed or secret channel might be desired is e.g. for longer conversations or discussions. There was also a possible scenario brought up during the interview where a master of an icebreaker might have to reprimand someone for not following given instructions, and not wanting everyone in the vicinity to hear this.

The view of language choice is very uniform among the respondents. Even though some state that they would prefer to use Swedish, and also do so when all parties involved know Swedish, as soon as one involved vessel or person does not master Swedish, all communication is in English. A typical situation where the English language is used is in a convoy with several vessels being assisted. Almost all respondents mention that the reason for this is to keep other vessels or persons updated about the ongoing operations, even those who are not actively involved. One person also mentions that if a merchant vessel switches to Swedish during such an operation, that person is immediately instructed to switch back to English. The same applies to communication between Finnish and Swedish icebreakers. Even though many officers on board the Finnish icebreakers master Swedish, if they do not speak Swedish then the chosen language will be English.

5.3.2. Issues with voice communication

This section deals with voice communication[19] between icebreakers and merchant vessels. The interviewees were asked how often they encountered problems during voice communication. Here a distinction is made between *hearing* and *understanding*; hearing means the capability to perceive a sound, whereas understanding means to apprehend a message. By this definition it is possible to hear a message without understanding it.

Hearing what the person on the other vessel says does not seem to be a problem. Two persons report that they *sometimes* have trouble hearing over the VHF, but the majority of the respondents state that they *rarely* have any problems, at least not as long as the other vessel is within acceptable VHF range. Special weather conditions can also aggravate the communication, but that is something you can be

[19] This is mainly done by VHF, but could also include MF/HF at rare occasions.

aware of and take into consideration. The same respondent also mentions that modern equipment can be of weaker construction than their predecessor; e.g. modern VHF handsets are not as robust as the old ones made out of Bakelite.

It is more common to hear what the person on the other vessel says, but not being able to understand it. This seems to *sometimes* be the case; some respondents experience it more often, others more rarely. When the message is not being understood properly there is nothing else to be done than to ask the other person to repeat the message, something that happens regularly. Another way to ensure that the exchanged information is being understood correctly is to use closed-loop communication[20]. The interviewees were asked both how often they used closed-loop communication, but also how often they experienced that the assisted vessels used it. From the icebreaker's side the use of this method varies a great deal. One respondent says that he rarely uses it, and that a simple "Good" is enough as confirmation, whereas someone else uses it almost constantly. The latter respondent has two reasons for this:

> Both for them to know that I have understood correctly, but also for everyone on the bridge to hear that I don't make a mistake and so that everyone gets to hear what the communication is about. So it is twofold.

There are two reasons from the icebreaker's perspective for not using closed-loop communication that often. One is simply that during assistance the icebreaker is usually the one giving orders and generally does not receive that much information. Secondly, if several vessels are involved, e.g. in a convoy, there is a risk of too much information and noise on the air.

If the icebreakers are the ones giving orders and therefore seldom have to repeat the received information, then the receiving vessels ought to repeat the orders with closed-loops more frequently. This also seems to be the case. Most of the respondents state that the assisted vessels *often* utilize this method. In those situations where the vessel does not repeat on its own, several respondents say that they ask the vessel to do so if they feel that the situation calls for it. However, this means that it is up to the judgment of the officer on board the icebreaker to decide whether he deems it necessary or not. This judgment is then based on either experience, intuition or the answers you get from the vessel.

> When I feel that they don't understand I tell them to repeat what I have said. That is my receipt that the information has been received.
>
> Sometimes, when I notice that they don't understand. Of course I can be wrong sometimes, but most of the times I don't think I am, you hear quite quickly if they understand or not.
>
> Sometimes, it depends on whom you work with, it depends on the nationality.
>
> When you ask "Please repeat" and you receive "Yes, Sir…". That's not an answer you want to get.

All in all, the closed-loop seems to be frequently used by the vessels being assisted, much to the satisfaction of the icebreaker officers. However, for those who do not use it, there is no fool-proof way of determining whether a vessel should be asked to repeat everything, or deemed to be confident enough in English.

[20] Closed-loop communication is a method where all information is repeated by the recipient, thus confirming to the sender that the message has been received properly.

Finally; if there are problems getting the message across, what is it that makes the voice communication problematic? The respondents seem to agree on the answer: insufficient English skills. This includes both insufficient skills in general, i.e. they do not know English well enough, but it can also be that they in fact know English rather well but have an accent that is difficult to understand. The solution to this problem will be further discussed later in the report, but one solution is suggested by a respondent:

> It helps to have an SMCP with icebreaker focus, but if you have a general knowledge in English you should be able to resolve the situation.

5.3.3. Language use

Even if not all personnel at sea have the same level of English skills, there are a number of things that can be done to facilitate a safe and well-functioning communication. The means used by icebreakers officers can be divided into two categories: means that increase the ability to hear clearly, and means that make it easier to understand the message, especially for people with less knowledge in English. The first category includes means such as avoid slurring, talk slowly and clearly, make sure to firmly press the send button before starting to speak (to avoid the first part of the message to be cut off) and to stress certain words or sentences so to signal when it is the other person's turn to speak (turn taking). In the second category there is one way of improving the chance of a message being understood, that is used by all the respondents, and that is to *keep it short and simple*, by using simple terminology, avoiding too advanced English and not saying too much. This is all summed up by one of the interviewees. However, he also has one more interesting way to improve the communication.

> A clear pronunciation as well as avoiding difficult English words. There is a standard marine vocabulary, but the importance is clarity. Also being humble and polite, since that makes it easier to get a good communication.

This final statement in the quote above indicates that communication is not only a technical and language matter, but also includes elements of sociology.

Nevertheless, the communication is not always kept short and simple, and this can be the case for both icebreakers and assisted vessels. One can simply forget to do it, and talk freely by habit. However, if this is the case and the other vessel does not understand, one is reminded and change to a simpler language. Another situation where the language is more elaborate is when the icebreaker is dealing with a returning customer, someone who frequently visits ports in the Gulf of Bothnia during winter. If such a vessel is familiar with icebreaker assistance in general, they can get a more thorough explanation, thus being able to continue their voyage further on their own. With short and simple instructions, this is not possible. Consequently, the icebreakers *often* use a short and simple language, and *always* when the situation calls for it.

From the other perspective, the icebreaker officers experience that the majority of the merchant vessels *often* use short and simple phrases as well. It depends a little on the type of vessel and nationality of the crew, but mostly it works well. This correlates well to the fact that the icebreakers most frequently give orders and the other vessel only has to confirm and reply, and this is done briefly by nature. One exception can be when a vessel gets beset in ice.

> A vessel that has got stuck in the ice in a dramatic way can be shaken, call for help immediately and talk a lot, but overall the messages are brief.

6. Data from the questionnaires

In this chapter, the data derived from the questionnaires is presented. It follows the same structure as the previous chapter where the data from the interviews was presented. Following the initial background of the respondents, the safety issues of ice operations in general are presented together with possible solutions to solve the issues. These are followed by a more in depth look at how the communication works during operations. The quotes in this chapter are used to exemplify the views of the respondents, and are all taken from the questionnaires, in which the respondents had the opportunity to make additional comments at the end.

6.1. Background of the respondents

The respondents to the questionnaires all work as deck officers onboard a merchant vessel; that was the criterion for taking part in the study. 22 forms were received, and the respondents all have varying backgrounds. They are all male, and their ages vary from 38 to 65 years, the average being 50 years old[21]. They have an average experience of 24 years as deck officers and on average 12 seasons of ice navigation. However, it should be noted that there is a great variation in the latter experience, which ranges from zero to 32 seasons in ice infested waters, whereas all respondents have at least 11 years of seagoing experience. Therefore, it can be stated that they all possess a reasonable amount of knowledge of shipping in general, but some should be viewed as novice ice navigators. In addition to the respondents' personal experiences of ice, the majority, 17 of 22 respondents, work onboard vessels with either Finnish-Swedish ice class IA Super or IA. This indicates that most of the vessels are well suited for voyages in ice infested waters.

The nationality of the respondents is vital knowledge, and even more important is their native language, since one of the main issues of this study is to examine the communication and the language situation. Figure 1 below shows the nationality and native language of the respondents.

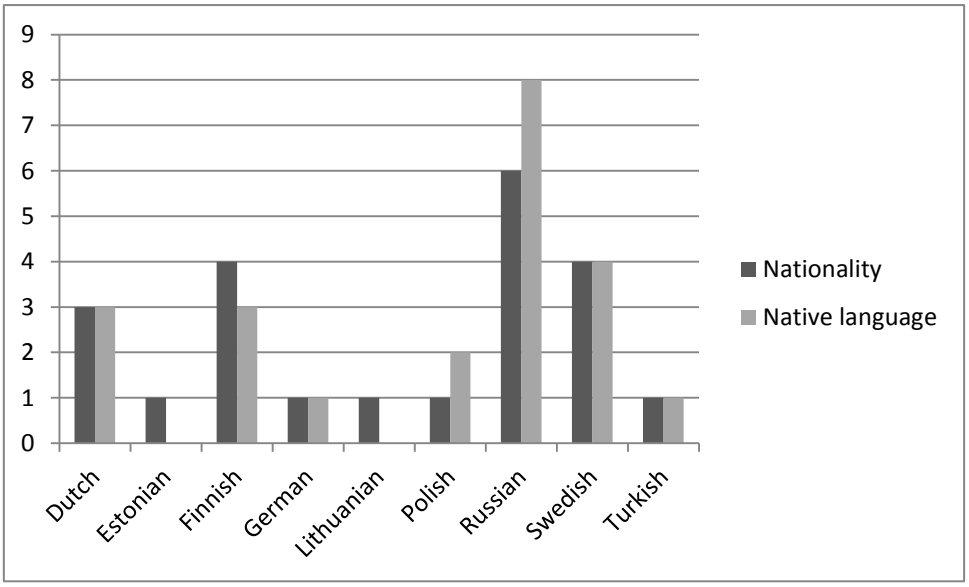

Figure 1. Nationality and native language of the respondents.

Only 7 of the 22 respondents have received any training in ice navigation after they received their deck officer license. With only one exception[22], the type of training they have received is either an ice

[21] One answer was omitted due to it being uninterpretable.
[22] One respondent had, in addition to an ice navigation course, also attended a one day seminar.

navigation course at an academy or training institute, a computer based training (CBT) or some kind of company organized training. Interestingly enough, none of the respondents has attended the Shipgaz online ice navigation course promoted by the Baltic Icebreaking Management[23].

6.2. Safety during ice operations

One section of the questionnaire dealt with safety issues during icebreaker assistance, and more specifically the factors that affect the safety. The respondents were asked to answer to what extent they agreed or disagreed with a number of statements. There were five possible answers to each statement, which made it possible to categorize the respondent as being positive, neutral or negative about something.

- I strongly agree
- I agree

} positive

- I neither agree nor disagree

neutral

- I disagree
- I strongly disagree

} negativ

The section about safety was completed by 19 respondents, and their answers are compiled below.

6.2.1. Training, experience and requirements

The first two statements dealt with training and requirements. It is evident that training is considered an important factor for promoting safety during ice assistance; the majority of the respondents state that more ice training at the master mariner program would improve the safety (figure 2). One respondent also means that the amount of ice experience among merchant vessels generally is poor:

> Lack of ice navigation training observed on all vessels sailing in ice area.

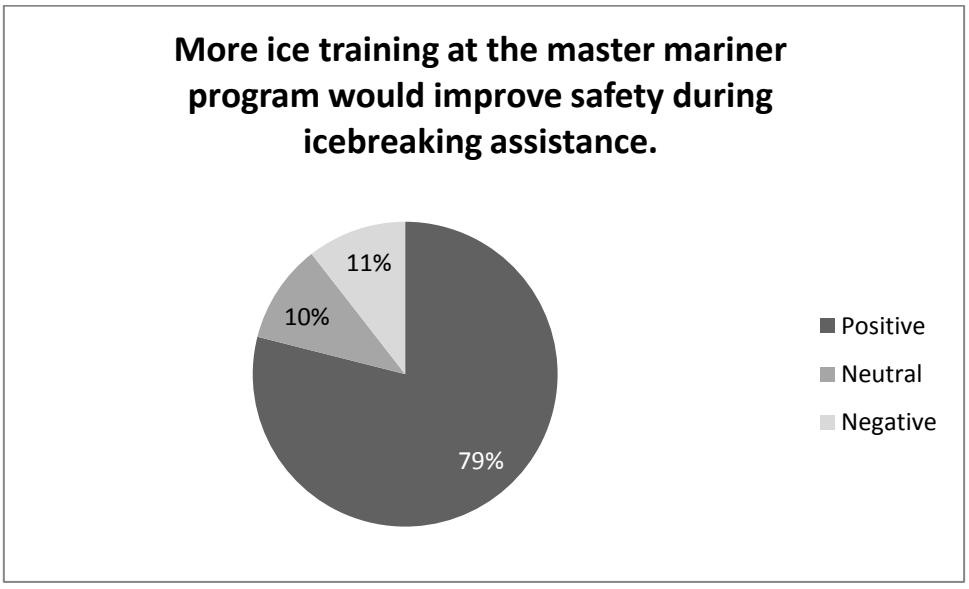

Figure 2. The effect of more training.

The attitudes towards the second statement show more diversity. Even though approximately a third of the respondents do not agree, the majority of the respondents are still positive that an ice navigation certificate would increase the safety (figure 3).

[23] http://portal.liikennevirasto.fi/sivu/www/baltice/dvd

> All masters without practical experience in ice navigation in Baltic Sea area must pass special course/training.

It would be logical to assume that deck officers would have similar attitudes towards the two statements above; if you agree that more training would increase the safety, you are likely to say the same thing about an ice navigation certificate. However, the result indicates that this is not necessarily the case. It is possible that those who disagree have taken another factor into consideration when responding to the latter statement, and that is the economic factor. More training and/or additional certificates would definitely mean another cost for the vessel/ship operator, and that might be the reason why some respondents are negative towards further requirements.

> Enough! No additional course!

> Training ok, one extra certificate not. You already need too many certs.

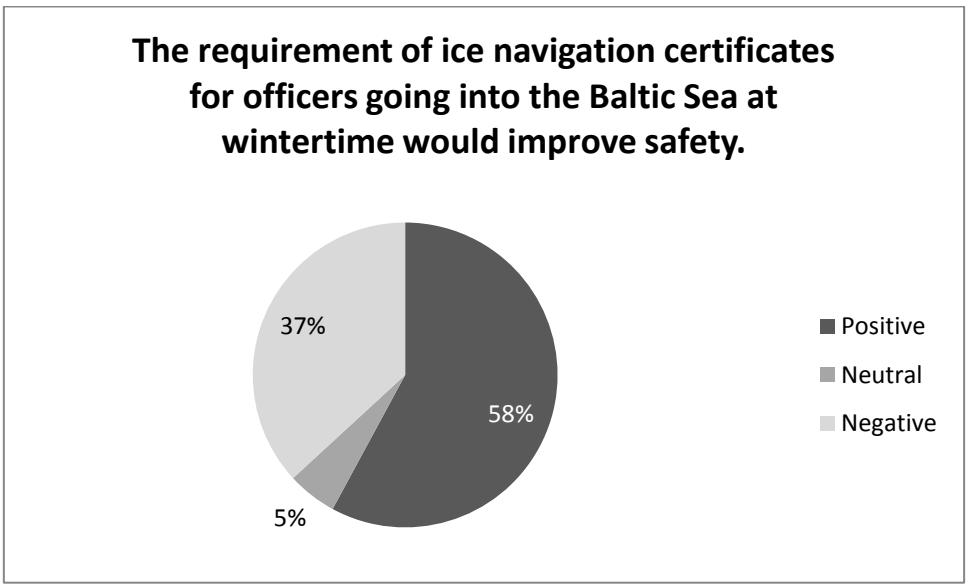

Figure 3. The effect of the requirement of an ice navigation certificate.

6.2.2. Language improvements

Another three statements dealt with language, and to some extent the views of the respondents are very uniform; both the choice of English as the first language and to have and use a set of icebreaker phrases would, in their opinion, improve the safety during assistance (figure 4 and 5).

> English language should be used always[24].

[24] Comment made by an officer whose native language is Finnish.

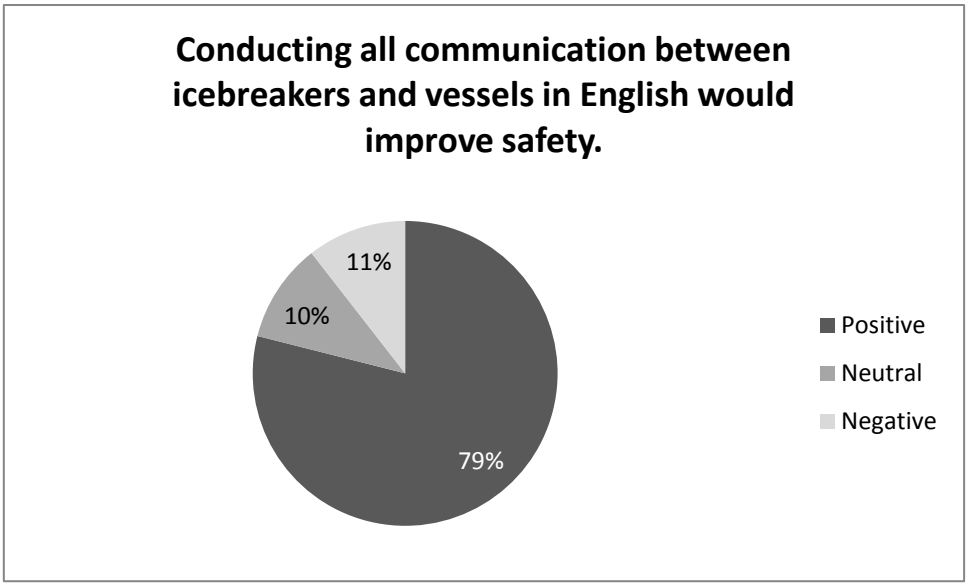

Figure 4. The effect of conducting all communication in English.

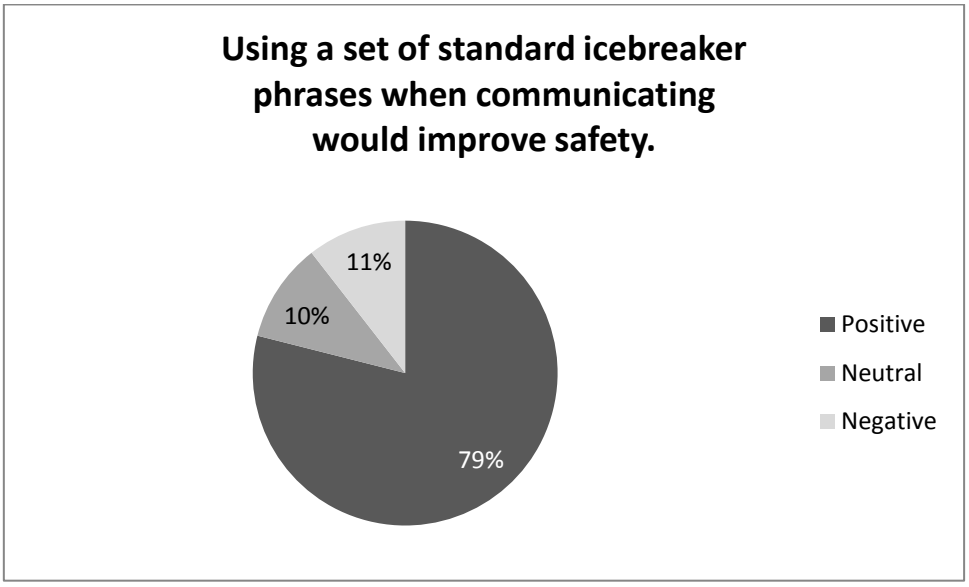

Figure 5. The effect of using a set of standard icebreaker phrases.

It is both interesting and reassuring to learn that a large majority of the respondents believe that specific phrases would improve the safety. As discussed earlier, the SMCP does in fact contain numerous phrases dealing with the activities of ice navigation and icebreaking (se section 3.4). Almost all of the respondents also report that they are familiar with either SMCP or SMNV; only one respondent states that he is not familiar with it[25]. Of those familiar with it, about half state that they use the SMCP during communication, and the other half that they *seldom* or *never* use it.

The final statement was about whether allowing a less strict communication would promote a flow in the communication, thus increasing the safety. Figure 6 shows the attitudes towards this statement. The result is somewhat diverse; a few agree positively that unrestricted communication would be desirable, while the majority of the respondents are either neutral or negative.

[25] Two other respondents had not completed this section of the questionnaire.

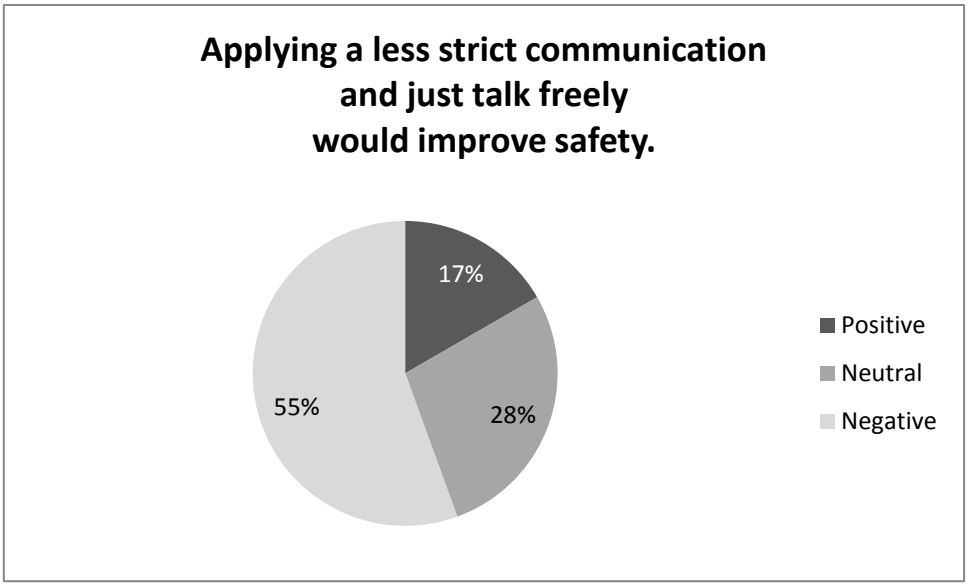

Figure 6. The effect of applying a less strict communication.

6.3. Communicative issues

There were three sections of the questionnaire that focused specifically on the way the merchant vessels communicate during ice operations. Two sections dealt with ship-to-ship voice communication to either icebreakers or other vessels in a convoy respectively, and the third section focused on the actual language used in voice communication.

6.3.1. Issues with voice communication

To ensure a safe and efficient communication with any other ship, hearing and understanding the message is important, as well as using closed-loop communication when in doubt. Just as in section 5.3.2, a distinction is made between *hearing* and *understanding*; hearing means the capability to perceive a sound, whereas understanding means to apprehend a message. Also, closed-loop communication here refers to the act of repeating a received message, to confirm to the sender that it has been understood correctly.

When communicating with an icebreaker, almost all respondents state that they *hardly ever* or *never* have any problems hearing what the icebreaker says and understanding the message. The same goes for utilizing closed-loop communication; approximately 75% of the respondents state that they *always* use it and another 15% use it *often*. This conforms to the statement from the icebreaker officers that the merchant vessels are good at using closed-loop communication. What is more alarming is that not all respondents ask the icebreaker to repeat a message which they have not heard correctly. About half of the respondents do, but a third of the respondents *hardly ever* or *never* ask the icebreaker to repeat the message if needed.

When communicating with another vessel in a convoy, about half of the respondents *sometimes* have trouble both hearing and understanding the message. The rest of the respondents experience the communication problematic less often and do not consider this a great problem. Furthermore, closed-loop communication between the vessels in the convoy is frequently used; only a few respondents state that they *hardly ever* use it, and the majority states that they *always* use it. The frequency the vessels ask others to repeat a message is approximately the same as when communicating with an icebreaker; some always do it, others sometimes do it and a few never do it.

To summarize the issues with voice communication, hearing and/or understanding a message does not seem to be a concern. What is more concerning is the fact that not all officers care to ask the other vessel to repeat a message that has not been fully understood. This behavior is a direct breach of the general guidelines of SMCP, which aims at making the communication safe. What is more, no officer onboard a vessel should want to operate a vessel blindly, which is the case when operating close by an icebreaker, not knowing its intentions.

6.3.2. Language use

Just as the officers onboard the icebreakers were asked what they do to make the language easy for others to understand, the respondents on the merchant vessels were asked about their own efforts. Apart from being asked how often they use *short and simple phrases* themselves, they were also asked how often they think other vessels do the same thing. The answers to these two questions are shown in the figure 7.

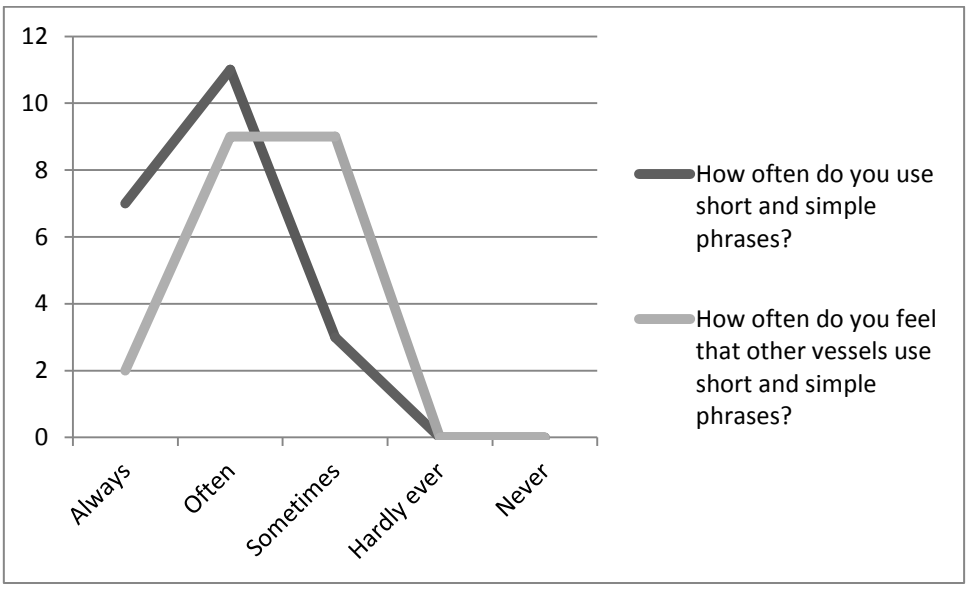

Figure 7. The usage of short and simple phrases.

First of all the figure shows that all respondents use short and simple phrases at least sometimes, and the majority *often* do it. Secondly, the reason for also asking how often others use the same method is to see how well these two factors align. These views are subjective, meaning that the respondents judge how often he and others use short and simple phrases[26]. The alignment of the graphs above indicates how well the respondents judge how frequently short phrases are used. If, for example, all respondents were to state that they always use short and simple phrases, but at the same time feel that others do not, then the grey graph would be further to the right in the diagram, and not aligned with the black one. That is somewhat the case with the respondents; however, their views align rather well.

Another issue brought up was the choice of language. The respondents were asked how often they use English when communicating even though they know that the other person knows the same language, e.g. if a Finn would speak English to a Swede even if they both master the Swedish language. The answers vary greatly; a third of the respondents *always* or *often* use English in such a situation, while two thirds only do it *sometimes* or even *hardly ever*. Furthermore, in relation to the respondents' native tongue, there is no obvious link to the willingness to use English in the described situation. It is rather

[26] For the views to be objective, the observer would have to count how frequently the same is done.

the opposite; within most of the represented native languages there is a wide spread in attitude, so it seems to be based more on personal properties than on the person's native language.

One respondent would prefer the working language to be English during ice assistance. However, his choice depends on the language skills of the person on the icebreaker.

> Better if working language, especially in a convoy would be English. Otherwise I speak Swedish if I notice that crew on icebreaker has bad English. With Finnish icebreaker if not in a convoy I speak Finnish.[27]

Another respondent brought up a problematic situation which made the effectiveness of the communication hampered, with potential to threaten the safety in stressful situations with limited time.

> During trip from Rauma to Kemi in heavy ice with icebreaker assistance and with pilot onboard of own ship, the communication between icebreaker and ship was in Finnish. Crew and bridge team had to wait for pilot's instructions in English[28].

There are clearly situations where a common language that everyone understands is essential for the safety.

[27] Comment made by an officer whose native language is Swedish.
[28] Comment made by an officer whose native language is Dutch.

7. Concluding discussion

This study is based on information gained from interviews with officers on icebreakers and on merchant vessels; however, before making any conclusions based on the data presented in the two previous chapters there are two things the reader has to keep in mind. Firstly, the number of respondents in this study is limited, and therefore the respondents cannot be said to represent the whole population; nonetheless, as individuals they can shed light on the complex communication that takes place during icebreaking operations. Secondly, one has to remember that the information given by the respondents represents their subjective views, and nothing else, and such a view might differ from what an objective observation might find. To give an example, when asked how often a person uses closed-loop communication, the respondent might answer *often*, but that is not an answer based on objectivity, but rather an answer based on the respondent's idea of what the term often means to him or her. If the same respondent was to be observed for a period of time, an observer might come to the conclusion that the respondent actually only *sometimes* uses closed-loop communication, given a pre-set definition of what generally is represented by the terms often and sometimes.

The aim of this study has been to examine if, and if so how the safety during ice operations can be promoted in general, and whether or not the communication during such operations has the potential to increase the risk of accidents. To achieve this, the overall objective has been to try to identify the factors that make the communication safe and efficient.

For the communication to be safe and efficient, there are three factors involved; both parties need to *hear* each other well, they need to *understand* each other and finally the exchange of messages needs to be done *quickly* without too much delay. Out of these three factors, understanding seems to be most problematic. The icebreaker officers sometimes have trouble getting the assisted vessels to understand the icebreaker's intensions, something that gets evident when the assisted vessel is asked by the icebreaker to repeat a message, but is unable to do so. From the other perspective, there are a number of officers on merchant vessels that do not ask the other vessel to repeat a message even when he or she has not understood it fully. It has to be stated that for the majority of the vessels, understanding each other is not a problem; however, at those instances when a vessel's intensions are not satisfactory understood by another vessel, the consequences might be severe and result in an accident.

The fact that the exchange of messages has to be quick is a consequence of the small margins during icebreaker operations. To manage this, the most frequently used method is to keep the messages *short and simple*: to use simple terminology, to avoid too advanced English and not say too much. This is done by all icebreaker officers and almost all officers on the merchant vessels as well. This is in line with the general guidelines of the Standard Marine Communication Phrases, which aim at providing clear and safe communication. However, even though almost all respondents are familiar with the SMCP, only a few utilize the actual phrases. The main reason for this is simply because too few officers use them, and therefore easily become confused in the situations where someone actually uses the phrases, a typical catch-22 situation[29]. To break this bad habit, measures have to be made to firstly increase the awareness of the standard phrases, and secondly to encourage as many vessels as possible to use them. This should not be impossible, since the majority of the respondents on the merchant vessels agree that a set of icebreaker standard phrases would improve the safety, and this attitude is an essential first step towards a broader implementation of the standard icebreaker phrases.

To achieve an absolute safety during ice operations is most likely difficult, at least without infinite economical resources. However, from the data obtained during this study, there seems to be a number

[29] A catch-22 situation is when a problem creates another problem, which in terns leads back to the first one.

of actions that could increase the safety. Two key issues that emerged from the data are training and experience, and English skills.

For any activity to be performed satisfactorily, the person performing the task must possess adequate training or knowledge about the activity, as well as experience. To some extent, a certain amount of training can be a substitute to experience, and the other way around is also possible, where extensive experience can make a person competent even though he or she lacks formal training. But one can safely assume that without any of the two components training and experience, a person is not suited to perform a task. This view is shared by almost all respondents; all icebreaker officers and 4 out of 5 officers on merchant vessels believe that more training, e.g. at the Master Mariner program, would increase the safety during ice operations. The extent of this training was commented by some respondents, and the idea seems to be that it does not need to be very extensive. Basic knowledge of ice navigation, a description of the operations one can expect when being assisted by an icebreaker, and if possible a few simulator exercises where in particular the communication is practiced, would suffice. However, as noted by several of the icebreaker officers, and confirmed by the nationalities of the respondents on the merchant vessels, only a few of the vessels that operate in the Gulf of Bothnia have Finnish or Swedish crews, and therefore the effect of more ice training at Finnish and Swedish maritime academies would only have limited impact on the overall safety in the area. One recommendation that could partly solve this problem is presented in the next chapter.

Apart from training and experience, the other main issue believed to improve the safety during ice operation is simply an increased level of English skills among the involved crews. Many crews are already proficient enough in English; nevertheless, an increased lowest level is thought to promote the safety. How this improvement is to be reached is however difficult to answer. All deck officers in charge of a navigational watch should already be able to communicate in English, as required by the STCW. One respondent suggests that stricter language requirements should be required through the ice class. But as the ice class is vessel specific, it might be better to have an individual requirement in the form of an ice navigation certificate. Another respondent is of the opinion that the language problem partly will solve itself, as the younger seafarers are more proficient in English, and as a consequence the younger generation slowly will replace the older one. Whether this is true or not, to increase the general English level is deemed to be difficult. Just as with the training issue, there are a high number of nationalities represented onboard the vessels, and therefore maritime academies and organizations from all over the world would have to co-operate towards a new standard. Therefore, for the safety during ice operations, the language issue has to focus on broadening the awareness and application of the SMCP, rather than increasing the general level of English.

8. Recommendations

The purpose of this study has been to look at the safety of icebreaking operations in general, and more specifically the factors that make communication safe and efficient. Following the discussion in the previous chapter there is material for a number of recommendations that might do just that. Some of the recommendations were suggested by the icebreaker officers during the interviews, others are made by the author following the analysis of the data. Note that no impact analysis has been made on the recommendations. However, they are believed to require only a small amount of economic resources, therefore being cost efficient.

The recommendations listed here are intended for the Winter Navigation Research Board, and therefore directed at the Finnish Transport Safety Agency, the Finnish Transport Agency and the Swedish Maritime Administration.

- *Efficient distribution of the publication Winter Navigation.*
  It is essential that at least the most important information about the ice service reaches the vessels that traffic the Gulf of Bothnia during winter time; therefore, all vessels must be familiar with the publication Winter Navigation before entering ice infested areas. To minimize the risk that the publication does not reach the vessel, or reaches the vessel too late, it is advisable to look into the possibility of distributing it directly to the shipping companies that operate vessels in the Gulf of Bothnia during winter. That way the companies can redistribute it as they see fit, and there is a greater chance that it reaches the vessel in good time.
- *Provide a DVD[30] with the ice training movie by the Baltic Icebreaking Management together with the publication Winter Navigation.*
  This is a simple way of encouraging nautical officers to learn about the ice navigation activities they are about to take part in. Furthermore, it is cost efficient since the movie is already produced, and could easily be distributed together with the publication Winter Navigation. In addition, it is a good way of reaching all foreign flagged vessels, which would not be positively affected by any future additional ice navigation training within the Finnish and Swedish maritime academies.
- *Stress the use of the SMCP and provide information and important phrases in the publication Winter Navigation.*
  The SMCP contains many useful phrases which can, and should, be used during ice operations. As this study indicates, many seafarers know of the existence of the SMCP but still do not use it. Knowledge that is rarely used is quickly forgotten, thus leading to an even more infrequent usage. Therefore, some general information about safe communication, together with some commonly used phrases could be included in the publication Winter Navigation, either in a relevant existing chapter[31] or as an appendix. An example of such an insertion is found in appendix 7.
- *Specify and highlight what factors make a crew competent and ready for ice navigation.*
  By specifying these factors, it would be easier for vessels and shipping companies to see whether or not they fulfill the prerequisites for receiving ice assistance, not only the vessel specific requirements but also the individual requirements for the crew.

[30] Or in any electronic format that does not require an internet connection.
[31] E.g. chapter 3 *Navigating in Ice*.

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Appendix 1: Extract from SMCP - glossary

The following words from the SMCP are related to either ice navigation or icebreaking operations.

Close-coupled towing	A method of towing vessels through polar ice by means of icebreaking tugs with a special stern notch suited to receive and hold the bow of the vessel to be towed.
Convoy	A group of vessels which sail together, e.g. through a canal or ice.
Escort	Attending a vessel, to be available in case of need, e.g. ice-breaker, tug, etc.
Icing	Coating of ice on an object, e.g. the mast or superstructure of a vessel.

Appendix 2: Extract from SMCP - phrases

The following phrases from the SMCP are related to either ice navigation or icebreaking operations. The numbering is the same as the one in the SMCP, to facilitate cross referencing.

AI/1.1.3 Distress communications - Collision

.1 I have collided with iceberg.

AI/1.2.1 Search and Rescue communication - SAR communications

.14.2 Warning! Uncharted rocks / ice / abnormally low tides. mines / ... .

AI/2.3 Urgency traffic - Ice damage

.2.1 I require / MV ... requires

~ tug assistance.

~ ice-breaker assistance / escort / ... .

.3 I have stability problems - heavy icing.

AI/3.1.3 Meteorological and hydrological conditions - Ice

.1 What is the latest ice information?

. 1.1 Ice warning. Ice / iceberg(s) located in position ... / reported in area around ...

. 1.2 No ice located in position ... / reported in area around ... .

.2 What ice situation is expected in my position / area around ... ?

. 2.1 Ice situation is

~ not expected to change in your position / area around ... .

~ expected to improve / deteriorate in your position / area around ... .

. 2.2 Thickness of ice is expected to increase / decrease in your position / area around ... .

.3 Navigation is dangerous in area around ... due to floating ice / pack ice / iceberg(s).

.4 Navigation in area around ... is only possible

~ for high-powered vessels of strong construction .

~ with ice-breaker assistance.

.5 Area around ... temporarily closed for navigation.

.6 Danger of icing in area around ... .

AI/5.2.1 Ice-breaker operations - Ice-breaker request

.1 I am / MV is ... fast in ice in position ... .

.2 I require / MV ... requires ice-breaker assistance to reach ... .

.3 Ice-breaker assistance

~ will arrive at ... UTC / within ... hours.

~ is not available until ... UTC.

~ is available only up to latitude... longitude....

~ is suspended until...*(date and time)*.

~ is suspended after sunset.

~ is suspended until favourable weather conditions.

~ will be resumed at ... UTC.

AI/5.2.2 Ice-breaker operations - Ice-breaker assistance for convoy

Ice-breaker commands applying to all the vessels in a convoy have to be immediately confirmed consecutively by each vessel in turn and executed according to the pattern given in GENERAL 4.6.

Ice-breaker commands applying to a single vessel are confirmed and executed only by that vessel, this applies also for close coupled towing. When being assisted by an ice-breaker it is important to maintain a continuous listening watch on the appropriate VHF Channel and to maintain a proper lookout for sound and visual signals.

.1 Ice breaker assistance for convoy will start now / at ... UTC.
.2 Your place in convoy is number ... .
.3 MV ... will follow you.
.4 You will follow MV ... .
.5 Go ahead and follow me.
.5.1 Do not follow me.
.6 Proceed along the ice channel.
.7 Increase / reduce your speed.
.8 Reverse your engines.
.9 Stop engines.
.10 Keep a distance of ... metres /cables between vessels.
.11 Increase / reduce the distance between vessels to ... metres / cables.
.12 Stand by for receiving towing line.
.12.1 Stand by for letting go towing line.
.13 Switch on the bow / stern search light
.14 Stop in present position.
.15 Ice-breaker ... will escort you.
.16 Ice-breaker assistance for convoy finished.
.16.1 Open water / light ice conditions ahead.
.17 Proceed by yourself (to area ...).

AI/5.2.3 Ice-breaker operations. **- Ice-breaker assistance in close-coupled towing**
.1 Stand by for close coupled towing.
.2 Slack out your anchors under the hawse-pipes.
.3 Pass heaving lines through the hawse-pipes.
.4 Receive towing line on deck.
.5 Lash together the eyes of the towing line with manila lashing.
.6 Fasten towing line on your bitts.
.7 I start to draw your bow into the stern notch of the ice-breaker.
.8 Stand by for cutting the manila lashing if required.
.9 Keep yourself in the centre-plane of the ice-breaker.

AI/6.2.1.1.1 Phrases for providing VTS services - Information service - Navigational warnings
.2 Ice / iceberg(s) in position ... / area around ... .

AII/1 Standard Wheel Orders
1. Midships
2. Port / starboard five
3. Port / starboard ten
4. Port / starboard fifteen
5. Port / starboard twenty
6. Port / starboard twenty-five
7. Hard -a-port / starboard

8. Nothing to port/starboard
9.Meet her
10. Steady
11. Ease to five / ten
12. Steady as she goes
13. Keep the buoy/ mark/ beacon/ ... on port side / starboard side.
14. Report if she does not answer the wheel.
15. Finished with wheel, no more steering.

AII/2 Standard Engine Orders

1. (Port / starboard engines) Full ahead / astern
2. (Port / starboard engines) Half ahead / astern
3. (Port / starboard engines) Slow ahead / astern
4. (Port / starboard engines) Dead slow ahead / astern
5. Stop (port / starboard) engines
6. Emergency full ahead / astern
7. Stand by engine

(Engine-room personnel fully ready to manoeuvre and bridge manned to relay engine orders.)

8. Finished with engines – no more manoeuvring. (Operation of engines no longer required.)

Appendix 3: Questionnaire

A Questions about yourself and your background

A1 What is the date today?

_____
(year) - (month) - (day)

A2 What year were you born?
19_____

A3 What is your gender?

☐ Male ☐ Female

A4 What is your nationality?

_____ (please specify)

A5 What is your native tongue (first language)?

_____ (please specify)

A6 How many years have you worked as deck officer?

_____ years

A7 How many years have you worked as deck officer onboard vessels travelling in ice infested waters?

_____ years

A8 Have you had any education and/or training in ice navigation **after** you recieved your deck officer licence?

☐ Yes ☐ No (⟶ go to section B)

A9 What type of education and/or training have you had?

(x) Please tick one or more boxes

☐ Ice navigation cource at an academy or training institute

☐ Computer Based Training (CBT)

☐ Lloyd's Maritime Academy ice navigation course online

☐ Shipgaz Training for ice navigation course online

☐ Company organized training

☐ Other, please specify_____

A10 Did **any** of the training you have received stress the importance of safe communication between vessels?

☐ Yes ☐ No ☐ I don't remember

B Questions about the vessel

The following questions concern your current ves

B1 What is the type of the vessel?

(x) Please tick one box only

☐ Tanker ☐ Bulk ☐ Container ☐ General cargo

☐ Ro-ro ☐ Ro-pax ☐ Passenger or cruise ship

☐ Other, please specify_____

B2 What is the deadweight (DWT) of the vessel?

_____ metric tonnes

B3 What is the iceclass of the vessel?

(x) Please tick one box only

☐ 1A super ☐ 1A ☐ 1B ☐ 1C ☐ II

☐ Other, please specify_____ ☐ No iceclass

B4 Estimate the number of days for this vessel in ice infested waters during this winter (2011-2012).

(x) Please tick one box only

☐ 0-9 ☐ 10-20 ☐ 21-50 ☐ 51-100 ☐ More than 100

B5 Which system for bridge watch rotation is used onboard?

(x) Please tick one box only

☐ 4/8 (4 hours on - 8 hours off)

☐ 6/6 (6 hours on - 6 hours off)

☐ Other, please specify_____

B6 What is the working language onboard the vessel?

_____ (please specify)

C Questions about navigating through ice

The following questions concern the voyage to this port.

C1 During the voyage **to this port**, did the vessel encounter any ice?

☐ Yes ☐ No (⟶ go to question C3 below)

C2 During the voyage **to this port**, did you get any assistance from an icebreaker (for example did you follow an icebreaker through ice, or did you take part in a convoy)?

☐ Yes ☐ No

The following questions concern your general experience and not a specific voyag

C3 In general, do you **usually** recieve waypoints for a passage through ice?

(x) Please tick one box only

☐ Yes, from an icebreaker

☐ Yes, from a VTS-station

☐ Yes, from _____ (please specify)

☐ No, I usually do not recieve any waypoints (⟶ go to section D)

C4 How do you **usually** recieve the waypoints?

(x) Please tick one box only

☐ VHF (voice communication)

☐ Phone

☐ Mail

☐ Other, please specify_____

D Interaction with icebreaker

Answer section D if you have communicated with an icebreaker during the last 5 years.

*When communicating with **an icebreaker** , how often…*

	(x) Please tick one box on each line	Always	Often	Some-times	Hardly ever	Never
D1	…do you have trouble **hearing** what the icebreaker says?	☐	☐	☐	☐	☐
D2	…do you have trouble **understanding** the message from the icebreaker?	☐	☐	☐	☐	☐
D3	…do you ask the icebreaker to **repeat the message** if you did not hear it correclty?	☐	☐	☐	☐	☐
D4	…do you **reply by repeating** the information recieved to confirm the message?	☐	☐	☐	☐	☐

E Interaction with other vessels in a convoy

Answer section E if you have taken part in a convoy during the last 5 years.

*When communicating with **another merchant vessel in a convoy** , how often…*

	(x) Please tick one box on each line	Always	Often	Some-times	Hardly ever	Never
E1	…do you have trouble **hearing** what the other vessel says?	☐	☐	☐	☐	☐
E2	…do you have trouble **understanding** the message from the other vessel?	☐	☐	☐	☐	☐
E3	…do you ask the other vessel to **repeat the message** if you did not hear it correclty?	☐	☐	☐	☐	☐
E4	…do you **reply by repeating** the information recieved to confirm the message?	☐	☐	☐	☐	☐

F Language use

The following questions concern communication with other vessels all-year-round, and not necessarily in ice infested waters.

*When communicating with **any other vessel** , how often…*

	(x) Please tick one box on each line	Always	Often	Some-times	Hardly ever	Never
F1	…do **you** use short and simple phrases to make the communication easier to understand?	☐	☐	☐	☐	☐
F2	…do you feel that **other vessels** use short and simple phrases to make the communication easier to understand?	☐	☐	☐	☐	☐
F3	…do you speak English to a vessel even when the person you speak to knows your own language?	☐	☐	☐	☐	☐

G Factors that affect the safety during icebreaker assistance

For each of the statements below, indicate how much you agree or disagree with it.

	(x) Please tick one box on each line	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
G1	More ice training at the master mariner program would improve safety during icebreaking assistance.	☐	☐	☐	☐	☐
G2	The requirement of ice navigation certificates for officers going into the Baltic Sea at wintertime would improve safety.	☐	☐	☐	☐	☐
G3	Conducting **all** communication between icebreakers and vessels in English would improve safety.	☐	☐	☐	☐	☐
G4	Using a set of standard icebreaker phrases when communicating would improve the safety.	☐	☐	☐	☐	☐
G5	Applying a less strict communication and just talk freely would improve the safety.	☐	☐	☐	☐	☐

H IMO's standard phrases

H1 Are you familiar with IMO's Standard Maritime Communication Phrases (SMCP) and/or Standard Marine Navigational Vocabulary (SMNV)?

☐ Yes, and **I use it** during communication ☐ No

☐ Yes, but **I seldom use it** during communication

☐ Yes, but **I never use** it durng communication

I Comments

I1 *If you have any other comments you wish to make, please use this space. This can be anything relating to this questionaire, e.g. language use at sea, communication with icebreakers, ice navigation or the survey itself.*

Thank you very much for your help!

Please return this questionaire as soon as possible to Kalmar Maritime Academy, either with the enclosed pre-paid envelope or by giving it to the

Appendix 4: Accompanying letter to the questionnaire

6th March 2012

Dear Sir or Madam,

This survey is part of a project called *Breaking the universal language barrier*, carried out by Kalmar Maritime Academy, Sweden, on behalf of the Finnish-Swedish co-operation within the *Winter Navigation Research Board*. The aim of this project is to investigate how the communication between icebreakers and assisted merchant vessels works. The underlying reason behind this project is the assumption that language misunderstandings often lead to human error mistakes, therefore good communication should enhance the safety during icebreaker assistance.

I hope that the themes presented in this survey will be of great interest to you, and that you can find time to complete the survey. Your participation is of course voluntary; however, it will only take 15-20 minutes of your time and your individual contribution is essential to the validity of this project.

The collected material will only be used for research within the field of nautical science. All information from the survey will be handled anonymously and there is no risk of any answer being linked to an individual person.

I truly hope that you will make time to participate in this research project, and I thank you for your contribution. If you have any questions you are very welcome to contact me at magnus.bostrom@lnu.se or +46 (0)480-497656.

Yours faithfully

Capt. Magnus Boström

Project Manager
Kalmar Maritime Academy

Appendix 5: Accompanying letter to the ship brokers

7 Mars 2012

Till skeppsmäklare längs norrlandskusten

Hej!

Mitt namn är Magnus Boström, jag är sjökapten och lärare vid Sjöfartshögskolan i Kalmar, där jag genomför ett projekt på uppdrag av svenska och finska sjöfartsverket. Du får detta utskick eftersom du har gått med på att distribuera en enkät till de handelsfartyg som trafikerar ditt område.

Med detta brev får du ett antal enkäter komplett tillsammans med svarskuvert. Antalet enkäter motsvarar ungefär det antal fartyg som du möter under två månader. I och med att du har fått detta brev kan du med en gång börja dela ut enkäten till fartyg.

- Ge en enkät med svarskuvert till varje enskilt fartyg du har hand om. Fartygets eller besättningens nationalitet spelar ingen roll. Om ett fartyg redan har fått en enkät, antingen av dig vid ett tidigare tillfälle eller i en annan hamn, behöver fartyget **inte** få en ny enkät.
- Uppmuntra gärna fartyget att verkligen fylla i enkäten, helst på en gång. Detta beräknas ta max 15-20 minuter.
- Ta helst tillbaka enkäten under samma fartygsanlöp och post detta i svarskuvertet. Alternativt så postar fartyget det själva i nästa hamn, men då ökar risken att enkäten blir liggande och inte ifylld.
- Enkäten har ingen egentlig deadline, utan jag ber dig dela ut den tills exemplaren är slut.

Jag hoppas att du/ni känner att detta är genomförbart för er del, och det är min yttersta förhoppning att det ska bli så lite merarbete för er som möjligt.

Har du några frågor är du mycket välkomna att kontakta mig via e-post (magnus.bostrom@lnu.se) eller telefon (0480-497656).

Med vänliga hälsningar

Magnus Boström
Projektledare
Sjöfartshögskolan i Kalmar

Appendix 6: Interview template

Intervjumall

Information om undersökningen, deltagandet, anonymitet etc.

Bakgrund:

Notera dagens datum och plats för intervju

Deltagarens namn (offentliggörs ej), (kön), födelseår, nationalitet, modersmål

Antal år som bryggbefäl och antal år (säsonger) i is (på isbrytare/handelsfartyg)

Har deltagaren fått någon vidareutbildning i isnavigering UTÖVER sjökaptensutbildningen

Vad? Innehåll? Hur omfattande (antal dagar)

Nämnde träningen (SÄKER) KOMMUNIKATION?

Vad betonades?

Nämndes konsekvenser vid bristfällig kommunikation?

Fartyget:

Vilket fartyg? (Namn, offentliggörs ej) Typ?

DW? Om okänt, notera namn/call sign och kolla upp.

Isklass?

Antal dagar FÖR FARTYGET, resp. FÖR DIG i isen vintern 2011-2012

Antal dagar FÖR FARTYGET, resp. FÖR DIG i isen ”en vanlig vinter”

Vaktsystem på bryggan?

Hur upplevs detta med hänsyn till sömn, trötthet?

Upplever du någon skillnad på natt resp. dag-vakt? Vad?

Problem med kommunikation sent på vakten/natten? Skillnad mellan början/slutet?

Vad är arbetsspråket ombord?

Om flera språk finns ombord: formellt/informellt arbetsspråk?

Gång genom is:

Isbrytare – i allmänhet, hur kommunicerar du med handelsfartyg?

Vid delgivning av WP, vid direkt assistans, annan kommunikation?

Isbrytare – i allmänhet, hur kommunicerar du med andra SVENSKA isbrytare?

Isbrytare – i allmänhet, hur kommunicerar du med FINSKA isbrytare?

Är det några svårigheter och i sådana fall, vad beror dessa på?

(RÖST)kommunikation med andra fartyg:

Hur ofta har du svårt att höra/uppfatta vad fartyget säger?

Hur ofta har du svårt att förstå vad fartyget säger?

Hur ofta ber du fartyget repetera om du inte uppfattade meddelandet ordentligt?

Hur ofta upprepar du det fartyget sagt för att bekräfta? Closed-loop communication

Alltid – Ofta – Ibland – Sällan – Aldrig

Om så är fallet, vad är det som gör kommunikationen problematisk?

Gemensam nämnare?

Konvojkörning:

Upplever du några ytterligare svårigheter vid kommunikation med flera fartyg (konvoj)?

Mellan isbrytare – fartyg

Mellan fartyg - fartyg

Språkanvändning:

Vad gör du för att (röst) kommunikationen ska vara tydlig?

Hur ofta använder DU korta/enkla meningar? Ett meddelande per mening…

Hur ofta upplever du att ANDRA FARTYG använder korta/enkla meningar?

Hur ofta pratar du engelska med en person som du vet talar ditt språk (svenska)?

Varför, varför inte?

Säkerhet vid assistans:

Hur tror du att säkerheten vid assistans kan förbättras?

Mer isträning inom sjökaptensprogrammet?

Krav på is-certifikat för gång i Östersjön vintertid?

All kommunikation sker på engelska vid assistans?

Använda särskilt utformade fraser/meningar framtagna för isbrytar-assistans?

Att prata mindre strikt men mer flytande?

Håller verkligen med – Håller med – Varken eller – Håller inte med – Håller verkligen inte med

Hur tror du att säkerheten vid konvoj-körning kan förbättras?

Standardfraser:

Känner du till SMCP eller SMNV (Standard Marine Navigational Vocabulary)?

Använder du dessa fraser?

Övrigt:

I din mening, vad är den största risken/bristen/problemet när det gäller kommunikation mellan isbrytare och handelsfartyg? Eller var finns den stora förbättringspotentialen?

Appendix 7: Recommended insertion into Winter Navigation

The following is an example of what could be included in the publication Winter Navigation, for example under section *3.3 Icebreaker contacts*:

The standard marine communication phrases (SMCP) is a standardized way of ensuring that the voice communication is as safe and efficient as possible. Whenever contact has to be established with an icebreaker or another vessel in a convoy, the communication should be *as short and simple as possible*. In addition to this, there are a number of things to remember when contacting another vessel:

- Always use the English language unless otherwise advised by the icebreaker. There might be other vessels nearby that are not familiar with your native language, and therefore miss important information, e.g. when travelling in a convoy.
- Do not say too much information at once. Instead, use several short phrases; this will help the other vessel understand the message.
- When answering a question, answer "Yes/No,…" followed by the appropriate phrase in full.

In addition to the recommendations above, there are a number of specific phrases that can be used during ice assistance. The phrases below are categorized according to type of situation:

Reporting to an icebreaker

I require ice-breaker assistance.
What is the latest ice information?
What ice situation is expected in my position?
I am fast in ice in position…

Receiving orders from an icebreaker

Your place in convoy is number...
You will follow MV...
Follow the icebreaker.
Proceed along the ice channel.
Increase / reduce your speed.
Reverse your engines.
Stop engines.
Keep a distance of ... metres /cables between vessels.
Increase / reduce the distance between vessels to ... metres / cables.
Stand by for receiving towing line.
Switch on the bow / stern search light
Stop in present position.
Ice-breaker assistance for convoy finished.

Standard wheel orders

Full ahead / astern
Half ahead / astern
Slow ahead / astern
Dead slow ahead / astern
Stop engines