

Safety at Sea – a Review of Norwegian Activities

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ABSTRACT: This paper offers a brief review of recent and ongoing Norwegian activities aimed at improving safety at sea, focusing primarily on waters under Norwegian administration. Our discussion of international activities is mostly limited to ongoing IMO Polar Code efforts and Arctic Council search and rescue topics.

1 BACKGROUND

Information from insurance companies and class societies shows that there is rising trend in the number of shipping incidents and accidents. Statistics for vessels in Norwegian waters and vessels sailing under the Norwegian flag confirm this tendency. Data from the Norwegian Coastal Administration list annual 80 – 100 groundings in Norwegian waters. Capsizes and sinkings of small fishing vessels are numerous and result in many losses of life at sea in Norwegian waters. In view of the forecasted increase in traffic volume (Arctic Council, 2009), (Ministry of the Environment, 2006) related to Arctic oil and gas production, export of ores and other minerals and possible commercial use of the Northern Sea Route, the Norwegian authorities have identified a need for greater efforts to raise the level of safety for shipping in Norwegian waters, particularly in the north. This paper first discusses current safety levels for shipping in Norwegian waters using the available statistics on maritime incidents and accidents. Some cases will be described to illustrate situations in which contingency planning resources were able to prevent serious accidents. The “Full City” and “Langeland” incidents in July 2009 are taken as examples of emergency response resources being inadequate to prevent major disasters.

Section 3 focuses on the outcomes of a Norwegian pilot study of reducing the risk of shipping accidents in Norwegian waters. This study is being managed by MARINTEK on behalf of the

Norwegian Coastal Administration and the Executive Committee for Northern Norway. The outcome of this study will provide guidelines for further Norwegian work on safety at sea.

Section 4 discusses follow-up activities in Northern Norway, bilateral collaboration related to the Barents Sea region and the preparation of a Northern North Atlantic collaborative project on safety at sea, which will involve partners from Norway, Iceland, the Faroe Islands, Greenland, Canada and USA.

The final part of the paper relates Norwegian activities to ongoing IMO Polar Code work and initiatives taken by Arctic Council to improve search and rescue operations in the Arctic.

2 CURRENT SAFETY- LEVELS FOR SHIPPING IN NORWEGIAN WATERS

2.1 *Accident statistics*

The pilot project “A holistic approach to safety at sea” reviewed sources for information on marine accidents in Norwegian waters (Berg, Kjersem and Kvamstad, 2010). One important source of information is the statistics prepared by the Norwegian Maritime Administration. Figure 1 provides an overview, with the data divided into three classes: groundings, collision with quays and other types of marine casualties. As can be seen there has been a slight increase in both groundings and quay collisions in the course of the past five

years. Information on maritime accidents in Norwegian waters information has also been collated by insurance companies (CEFOR), Norwegian Sea Rescue, the Accident Investigation Board Norway (<http://www.aibn.no/marine/reports>), Telenor Maritime Radio, the Governor of Svalbard and the Petroleum Safety Authority Norway (accidents involving the offshore petroleum sector). When we compare Norwegian and international statistics, it turns out to be difficult to obtain information about the underlying causes of accidents in most reporting schemes. The pilot project concluded that more effort should be put into drawing up better reporting schemes. The reports of the Accident Investigation Board Norway incorporated learning elements that could be of general interest for shipping companies.

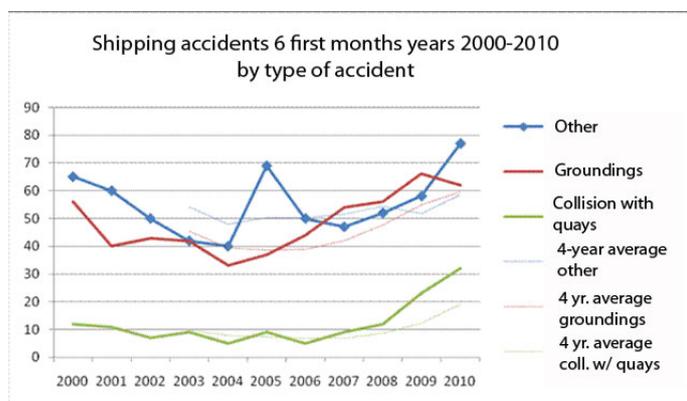


Figure 1. Ship accidents first 6 months 2000 – 2010 by accident types (courtesy of Norwegian Maritime Administration).

2.2 Findings of accidents analysis

Indepth investigations by the Accident Investigation Board Norway provide more information on accident causes and make specific safety recommendations with a view to improving safety at sea based on their findings. These recommendations frequently point to lack of proper crew training, inefficient and/or unclear bridge management, lack of electronic chart system updates and unsatisfactory operating procedures.

2.3 Some illustrative cases

The cargo vessel MV Full City grounded at the Sastein anchorage in Telemark, southern Norway, in the early morning of 31 July 2009 (Figure 2). After arriving at the anchorage anchors were dropped at the position shown in Figure 2. Five shackles (137 m) of the starboard anchor chain were in water when the master reported back to Brevik VTS. The anchor position was 0.9 nautical miles from the nearest shore at a depth of approximately 20 – 22 m. At the time of anchoring the wind was near gale force from

the southwest and it deteriorated during the evening. The nearest weather stations showed severe gale to storm with highest measured wind speeds of 48 – 54 knots. Hindcast calculations indicated a wave height of 6 – 8 m south of Sastein. Around midnight the ship's officers observed that the ship was drifting. It has later been estimated that the vessel was drifting at 2 – 3 knots and was less than 0.3 nautical miles from land when the engine was started. Some six minutes after the engine was started the ship grounded, the engine room was flooded and the main engine stopped. Later investigations showed that both flukes of the anchor had broken off when the vessel was dragging anchor.

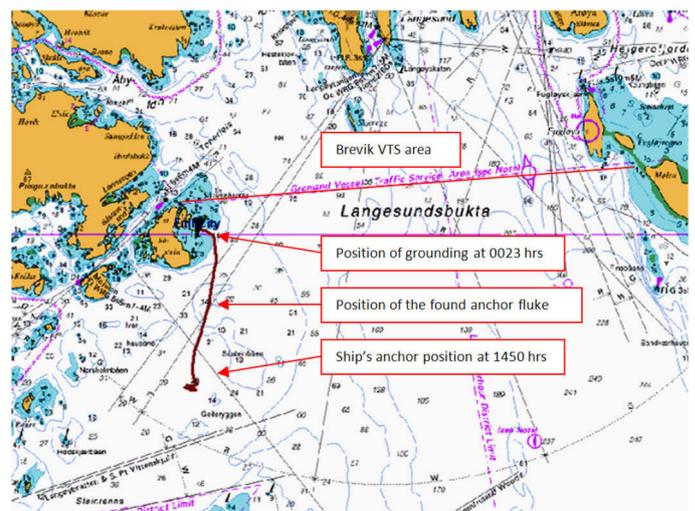


Figure 2. MV Full City grounding during a summer storm in July 2009 (Courtesy of Accident Investigation Board, Norway).

The small cargo vessel MV Langeland got into difficulties in the same storm, en route from Moss in Norway to Karlshavn in Sweden (Figure 3). It was heading for shelter in the Swedish Koster Fiord when communication with the vessel was lost. The Swedish authorities mounted a search and rescue operation. After some time, lifevests and the emergency beacon were found floating in the water. A ROV from the Swedish Navy found the sunken vessel in 108 m of water. Six men lost their lives in this accident.

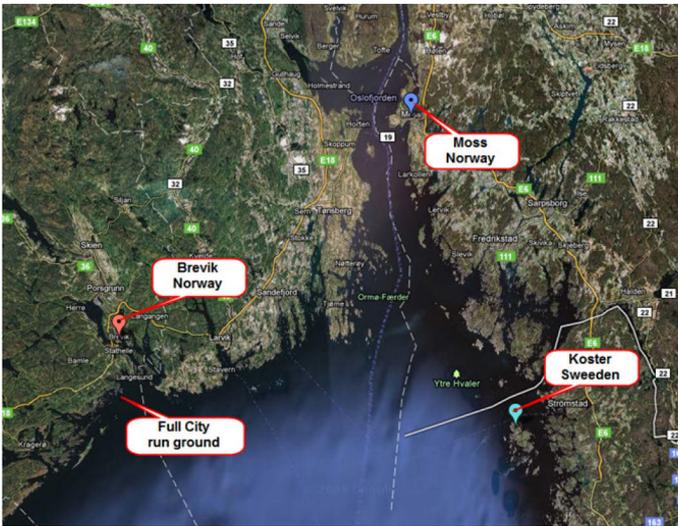


Figure 3. Planned sailing route for MV Langeland

Another illustrative case is the collision followed by grounding of the fishing vessel *Hundvåkøy* (March 2010). The vessel is a 1443 GRT, 69 m Norwegian purse seiner, which was sailing southbound through Finnsnesrenna in Northern Norway, fully loaded with 1,400 tonnes of capelin, when it met *Hordafor 4* in the narrow passage between the Island of Senja and the mainland (Figure 3). *Hordafor 4* is a cargo ship of 65 m, transporting fish feed and raw materials for fish farms along the coast. The vessels collided at 8 am and *Hundvåkøy* suffered major hull damage that flooded the engine room. This produced a significant starboard list and the vessel was grounded some 500 m south of Finnsnes Bridge. The crew abandoned ship and were picked up by a passing fishing vessel. No injuries resulted from the accident. A prompt inspection by the Norwegian Coastal Administration resulted in a decision to patch the large hole in the hull with a Miko plaster. Both of the Coastal Administration vessels attending the incident, *M/V North Crusader* and *M/V Harstad*, were carrying a Miko Salvage Kit from which it was possible to select a six- by two-metre “hat-shaped” patch and, in less than six hours, secure it to the hull to cover the hole. As a result, virtually all of the catch was saved and transferred to other vessels, and the engine room was pumped dry. This enabled the *Hundvåkøy* to be refloated and towed about 15 nm to the NATO quay at Sørreisa for more permanent repairs.

Salvage experts who attended the incident believe that without the patch, the trawler would almost certainly have capsized and sunk. This would have resulted in a costly recovery operation and a risk of pollution in a sensitive Arctic region



Figure 4. *Hundvåkøy* accident (courtesy of Norwegian Coastal Administration).

The last example concerns an offshore towing operation. During the return tow of the Hutton platform legs (Figure 5) from Murmansk to Europe the tow entered encountered harsh weather off the coast of Finnmark in Northern Norway. Towing speed was reduced to around 1 knot against a head sea. After some time the towline broke and one of the Norwegian Emergency Towing Vessels operated by the government was called to assist the drifting unit. They were able to connect an emergency towing line and helped the towing vessel to bring the offshore structure into Honningsvåg to reinforce its sea fastenings before the tow was allowed to continue south along the Norwegian coast.



Figure 5. Towing of Hutton leg structure into port of Honningsvåg for reinforcement of sea fastenings (courtesy Ulf Klevstad, Norwegian Coastal Administration).

3 OUTCOMES FROM A PILOT STUDY OF SAFETY AT SEA

In response to questions on safety at sea in Norwegian waters, MARINTEK was requested by the Maritime Forum North organisation to lead a pilot project that would take a holistic view of safety at sea. The project was sponsored by the Executive Committee for Northern Norway and the Norwegian Coastal Administration. A reference group representing governmental bodies, non-governmental organisations and commercial stakeholders was set up to gather information on known issues of safety at sea and new challenges that could be related to a forecast increase in petroleum and shipping activity in the High North. The study listed five themes that needed to be studied:

- Increased understanding of and insight in accidents at sea
- Surveillance and monitoring of traffic at sea
- National and international efforts on safety at sea
- Contingency planning resources and infrastructure
- Training and education, and increased competence in maritime sector and contingency planning organisations

Some of the main challenges identified for marine operations in the High North were the lack of high-quality charts, lower quality of metocean forecasts compared to North Sea standards, reduced communication availability and lack of emergency response infrastructure. Table 1 lists some of the challenges identified under the five topics.

Table 1. Identified challenges - safety at sea

Topic	Challenges
Increased understanding of and insight in accidents at sea	Today's available statistics do not identify the root of causes for the accidents. Incidents and near accidents which could lead to serious situations are not registered in public statistics.
Surveillance and monitoring of traffic at sea	Communication and tracking systems in the Arctic do not offer sufficient performance and capacity to meet today's and future communication and surveillance requirements. Information exchange often redundant and ineffective. In some cases actors involved in e.g. a search and rescue (SAR) operation owns information which could be of use for other actors who are unaware of its existence.
National and international efforts on safety at sea	Changes in international rules and regulations for safety at sea are mainly made by the International Maritime Organisation (IMO). However due to e.g. difference in national interests the decision-making process is slow. There are many recommendations and guidelines for Arctic operations, but very few mandatory regulations.
Contingency planning resources and infrastructure	Excessive response time and too few contingency planning resources present a crucial challenge in the Arctic. Response time is extremely important due to low temperatures and harsh weather conditions. There is potential for raising the level of service by optimizing the available emergency preparedness resources and infrastructure. Important information for vessels at sea is often poor, such as ocean, meteorological, hydrological and bathymetric data. Poor information input is a poor basis for decision-making.
Training and education, and increased competence in maritime sector and contingency planning organisations	There are no institutions that educate SAR personnel with specific competence in operations in harsh arctic weather conditions. Recruiting is difficult, young people chose other professions. Inexperienced personnel may be incapable of coping with a stress situation.

On the basis of the studies performed and the challenges identified, a detailed list of recommendations for future work and research topics was drawn up. The following list summarises the main recommendations and topics which ought to be followed up after the end of the project:

- Establish a national (Norwegian) forum for working with emergency related issues and improved safety at sea. This forum should be

closely associated with the Norwegian Coastal Administration's competence centre for contingency planning, safety at sea and surveillance.

- Further development, strengthening and modification of contingency planning infrastructures in order to meet future rises in maritime activities in the Arctic.
- Improve the interaction between private and public contingency planning resources.
- Improve the quality of ocean, meteorological and hydrological data for the fishing and merchant fleets.

Figure 6 shows the one-hour sailing time coverage of the Norwegian coast by rescue vessels operated by Norwegian Sea Rescue: some areas of the northeastern coast lack coverage by these vessels. However, the Coastal Administration has chartered emergency response vessels for Northern Norway.

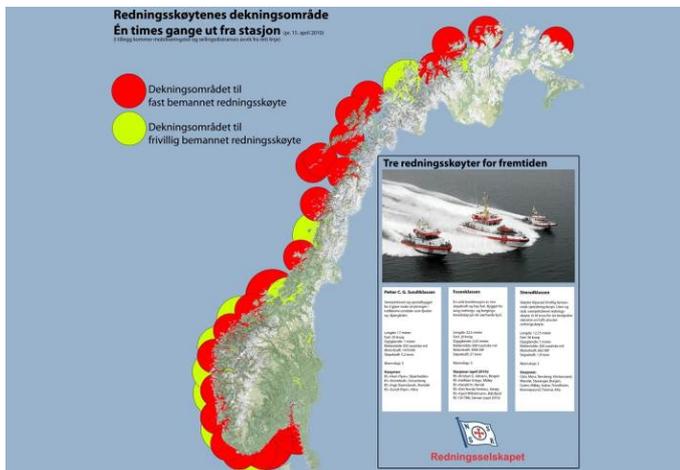


Figure 6. Coverage of vessels operated by Norwegian Sea Rescue (one-hour sailing time). Red areas: Covered by continuously manned rescue vessel. Yellow areas: Covered by voluntarily manned rescue vessel (courtesy of Norwegian Sea Rescue).

4 FOLLOW-UP WORK ON SAFETY AT SEA IN HIGH NORTH WATERS

4.1 Further work in the MARSAFENORTH project

Maritime Safety Management in the High North (MarSafe North) is an ongoing safety related project where MARINTEK is project manager. Kongsberg Seatex is project owner and the project is financially supported by the Research Council of Norway. It will be finalized in autumn 2011. The project aims to improve safety at sea by identifying users and user needs in transport and advanced marine operations in the shipping and petroleum sectors. The project has also identified technologies for communication, navigation, tracking and surveillance that are capable of meeting current and future user requirements. MarSafe North has

identified a number of challenges for marine operations in the High North which will be the basis for recommendations for future efforts. The final phase of the project will include work on ice drift measurement and modeling, communication system analysis, information modeling and feedback to relevant national and international organizations and institutions

4.2 Barents Secretariat project

In collaboration with Maritime Forum North, the Norwegian Coastal Administration and the research company Ocean Futures, MARINTEK has obtained support from the Norwegian Barents Secretariat to start a collaborative pilot project with Russian Federation stakeholders on safety at sea in the Barents Sea. The first workshop was held in Kirkenes in mid-January 2011. The aim of the workshop was to define the state of the art and specify areas in which improvements to safety at sea could be obtained. Potential topics for future collaboration included:

- Preparing data, information, knowledge and expertise for the new Knowledge Centre for Emergency Response and Oilspill Contingency Planning that has been established in Vardø by the Norwegian Coastal Administration
- Improving search and rescue capabilities in the Barents Sea
- Providing input to IMO's efforts on the new Polar Code, especially dedicated competence requirements and the development of training tools for safe operation of ships in the Barents Sea region.

The second project meeting will be held in the Russian Federation in March/April 2011.

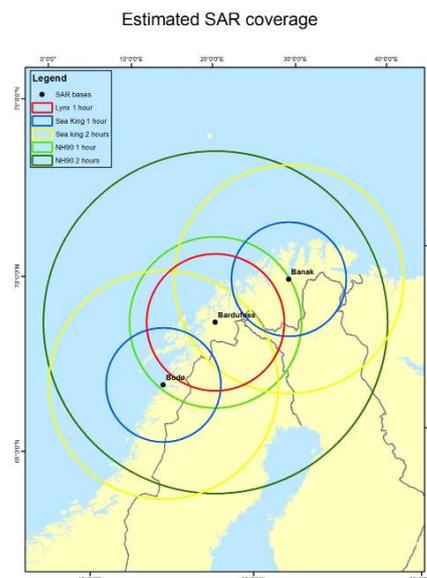


Figure 7. Estimated SAR coverage with shore based helicopters in Northern Norway (Courtesy of Rescue Coordination Centre, Bodø)

Figure 7 shows SAR areas covered by shore-based helicopters in Northern Norway. The Sea King helicopters are operated by the Royal Norwegian Air Force. They have passed their original expected lifetime and the procurement process for new SAR helicopters has been initiated. Norwegian SAR helicopters have been involved in marine rescue operations in the Russian sector of the Barents Sea.

4.3 *Nordic Atlantic Cooperation project*

The Nordic Atlantic Cooperation (NORA) has approved a project on safety at sea in the Northern North Atlantic region. MARINTEK is leading a consortium of partners from Norway, the Faroes, Iceland, Greenland, Canada and the USA. A revised project description will be drawn up in early 2011 and the first project meeting is scheduled to take place in May. The main areas of focus for this project will be:

- Improving operational competence for personnel involved in proactive and reactive emergency response activities
- Optimising the use of the existing emergency response infrastructure across national borders
- Reducing response time to reaching a ship in distress in the Northern North Atlantic (as for the North Atlantic Bridge route from Churchill (Canada) to Murmansk (Russian Federation))

Part of the work of this collaborative project will be based on the outcomes of the Arctic Council working group on search and rescue in the Arctic region; see section 5.2 for more information..

4.4 *RCN pilot project*

In collaboration with Maritime Forum North and the research organisation Ocean Futures, MARINTEK has asked for support for a pilot project to prepare a major research proposal for the MAROFF research programme (Research Council of Norway, RCN) on safety at sea in the High North. The main topics in this proposal will be:

- Collaborative activities on knowledgesharing for High North emergency response operations
- Additional competence requirements for seafarers operating in polar waters
- Specification of transnational infrastructure for search and rescue operations in polar waters.

The main project proposal will be delivered to RCN in mid-February 2011

5 NORWAY'S PART IN INTERNATIONAL SAFETY AT SEA EFFORTS

5.1 *IMO's Polar Code*

Norway plays an important part in IMO's ongoing efforts to draw up an updated Polar Code. At the 54th session of the Sub-Committee on Ship Design and Equipment, a working group under Norwegian chairmanship worked on the development of a mandatory code for ships operating in polar waters. It has been agreed to utilise a risk-based/goal-based approach including defined goals and functional requirements supported by prescriptive provisions where necessary. A correspondence group was set up to provide input to DE 55, which will take place in March 2011. The main activity of the correspondence group was to review the hazard matrix presented in the DE 54 document (IMO 2010 a). The report of the correspondence group was finalized in mid-December 2010 and forwarded to IMO as a paper for DE 55 (IMO 2010 b). The revised hazards matrix comprises four main elements: Environmental conditions, High latitudes, Environmental sensitivity and Human element. The report recommends that a new working group should be established at DE 55. Guidance has been requested from the DE Sub-Committee on how to understand the concept of "additional hazards" in the context of the Code to be developed. It is assumed that the consequences of any hazard will have to be investigated to determine the potential gaps in the current Conventions and Codes to obtain the same safety level for shipping in polar waters as in other international waters.

5.2 *Arctic Council's Search and Rescue efforts – based on publish information and phone calls with Norwegian delegation leader*

The Arctic Council Ministerial Meeting in Tromsø (April 2009) decided to establish a task force "to develop and complete negotiations by the next Ministerial Meeting in 2011 of an international instrument on cooperation in search and rescue operations in the Arctic". The USA and the Russian Federation co-chair this task force (Arctic Council, 2010). Work is under way to develop a legally binding document. The task force is at the stage of full intergovernmental negotiations in which "nothing is agreed until everything is agreed. Even though the most complex issues are left to the very end, the co-chairs plan to prepare the agreement for signature at the Nuuk (Greenland) meeting in May 2011.

6 CONCLUDING REMARKS AND RECOMMENDATION FOR FUTURE WORK

Safety at sea in Arctic waters introduces extra challenges. Remoteness and lack of contingency planning infrastructure are among the causes of some of these additional challenges. It is therefore important that Arctic and Antarctic coastal nations should improve surveillance of all types of marine traffic in their waters in parallel with improving infrastructure and drawing up bilateral agreements for training and infrastructure use. As the consequences of an accident may be more severe in Arctic waters the frequency of incidents must be reduced to keep safety at sea at a given level.

It is important to support the IMO's ongoing efforts to develop a mandatory Polar Code. The next DE55 meeting in March 2011 will discuss the hazard matrix, and it is possible that there will be a new correspondence group after this meeting. Norway is prepared to take a leading role in this work.

The ongoing Arctic Council task force on search and rescue collaboration is scheduled to deliver its draft for a legally binding document at the Ministerial meeting in May 2011, specifying the responsibilities for SAR operations in Arctic waters. However, it is important to note that operators in the Arctic region must take precautions to reduce the level of risk of their operations by reducing the frequency of accidents and mitigating the consequences of accidents that do happen.

On the basis of ongoing work in Norway we recommend further work on:

- Improving regional collaboration to in order optimize the efficiency of existing arctic contingency planning resources
- Developing additional qualification requirements for seafarers operating in arctic waters

- Developing specific training offers combined with knowledge transfer from personnel with cold-climate shipping experience
- Strengthening meeting places for knowledgesharing for senior officers operating ships in arctic waters.

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