

Changes in and Recent Experiences from Norwegian Emergency Towing Service (NETS)

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ABSTRACT: The Norwegian Emergency Towing Services (NETS) is managed by the Norwegian Coastal Administration (NCA). In the early days of the NETS, the operational part was sheared between commercial tug companies and the Norwegian Coast Guard (NCG). A major change in the organization of the operation took place from January 1st 2020, when NCG was given the operational responsibility for NETS. This change is briefly described and the vessels in today's NETS are presented. Statistics for drifting vessels in Norwegian waters are presented before some selected recent maritime emergency incidents are highlighted. Actions by the NETS vessels and other NCG vessels will be highlighted. Handling of "FV Nortguider" after the grounding in Hinlopen (Svalbard) and the wreck removal work is one of the cases. The other two are drifting ship represented by the cruise vessel "Viking Sky" and the cargo vessel "Eemslift Hendrika". The final part of this paper discusses ways to ensure knowledge and operational experience sharing for personnel on vessels performing emergency towing tasks.

1 INTRODUCTION

Recent incidents in the Norwegian Exclusive Economic Zone (EEZ) have shown the need for a governmental involvement in building necessary maritime preparedness for oil spill cases. The Norwegian Coastal Administration (NCA) is the governmental unit responsible for the prevention of oil spills. One of its tools to prevent ship groundings is the national Norwegian Emergency Towing Service (NETS). A description of NETS was given at the previous TransNav conference in 2019 [1]. In the early days of NETS, the operational part was shared between commercial tug companies and the Norwegian Coast Guard (NCG). A major change in the organization of the operation took place from January 1st 2020, when NCG was given the operational responsibility for NETS.

2 ORGANIZATION OF OPERATIONAL PART OF NETS – PREVIOUS AND NEW

Based on shipping accidents in Norwegian waters in the 1990s, the government launched a study to map groundings and drifting vessel incidents. Possible means of reducing the number of such cases were investigated. One measure was the establishment of a national emergency towing service to prevent drifting vessels from grounding in coastal waters. From the start in 2003, three vessels (two commercially contracted and a Coast Guard vessel) formed the Norwegian Emergency Towing Service (NETS). Until 2019, commercial vessels have been contracted for 5 years periods in the NETS. Some of these vessels have been offshore vessels with high bollard pull capability.

Utilizing NETS experiences, the government decided that commercial companies contracted for NETS duties should be replaced by vessels from the Norwegian Coast Guard (NCG). This change in the organization of the operational part took place from January 1st 2020, when the NCG become the organization operating all vessels in NETS. The reasons behind this reorganization were partly to improve the operational efficiency of governmental vessels and to increase the governmental emergency towing service along the Norwegian coastline. At present, six of the NCG vessels are part of NETS. These vessels can be ordered to prepare for emergency towing activities if some of the vessel traffic centres (VTC) observe a drifting vessel. They could also be requested to take part in other types of rescue missions if requested by governmental or commercial stakeholders. NETS is governed by NOR VTC (located in Vardø, close to the Russian border). This VTC is responsible for surveillance of the outer sailing zones along the Norwegian Coast, where vessels with the highest environmental pollution potential are sailing. The other VTCs (Horten, Brevik, Kvitsøy and Fedje) monitors ship tracks in their respective coastal areas, see figure 1 for location of Norwegian VTC. In emergency situations where there is a need for the NETS, NOR VTC will alert NCG which will allocate vessel(s) for this specific mission.



Figure 1. Location of Norwegian Vessel Traffic Centres (Courtesy Norwegian Coastal Administration)

The agreement between NCA and NGC includes a risk-based approach to positioning and mobilizing governmental emergency towing units. Together with SINTEF Ocean, the governmental bodies have developed an analytic tool, based on simulations with variation of parameters such as wind speed and direction. The tool includes a continuous evaluation of the risk scenario for specific ship categories with high environmental pollution potential. It makes it possible to run day-to-day analysis of the risk level

along the coastline. Outcomes are used to develop a map for risk levels related to possible incidents, see figure 2. The colour code used goes from low risk (green) to high risk (red). Risk zones size are primarily computed based on forecasted onshore wind (speed and direction). This map is used by NOR VTC to recommend locations for vessels in NETS on a daily basis. Two of the cases discussed in section 5, happened in the western red zone.

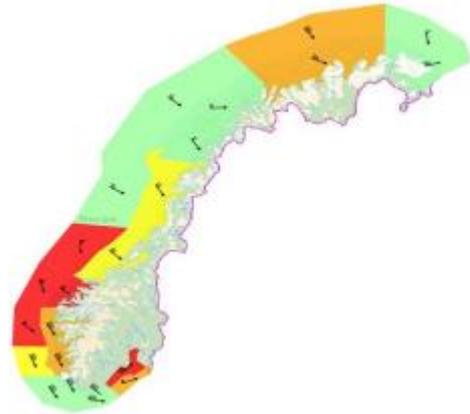


Figure 2. Risk level map for Norwegian coastal areas (Courtesy Norwegian Coastal Administration)

3 VESSELS IN NORWEGIAN EMERGENCY TOWING SERVICES

At present there are six vessels in NETS. Four of the vessels are ordinary Norwegian Coast Guard vessels, while two last two are hired offshore vessels. NCA requires at least a Bollard Pull of 100 tons for vessels in NETS. Table 1 lists the bollard pull of the vessels operated by NCG. The last two vessels in Table 1 are anchor handling tugs, on a five-years lease contract with Boa Offshore. They will be manned by Coast Guard personnel after a transition period of a couple of years. Part of the personnel will be transferred from existing Coast Guard vessels. Based on positive operational experience, the contract for the Boa Offshore vessels may be renewed for another five-years period. Figure 3 presents the different types of vessels allocated for NETS operations by NCG.

Table 1. Vessels in NETS per 2021.01.01

Vessel name	Vessel type	Bollard pull (tonnes)
KV Sortland	Coast Guard vessel- Barentshav class	100
KV Barentshav	Coast Guard vessel- Barentshav class	110
KV Bergen	Coast Guard vessel- Barentshav class	110
KV Harstad	Coast Guard vessel	100
KV Jarl	Offshore vessel (Anchor handling tug) ICE 1C	267
KV Bison	Offshore vessel (Anchor handling tug)	275

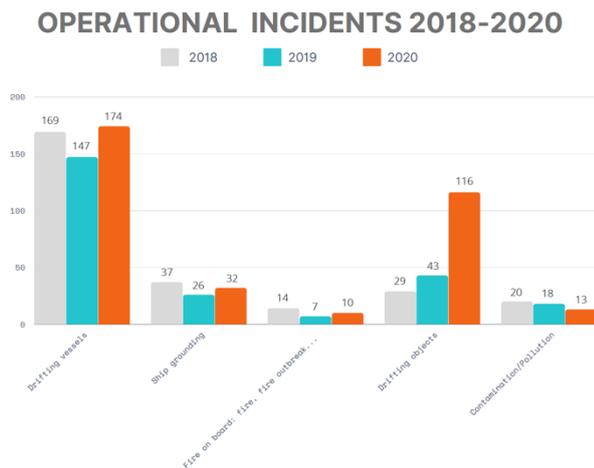


Figure 3. Vessel types in the NETS (upper left KV Harstad, upper right Barents class vessel and lower left new anchor handling tug) – (Photos Norwegian Coast Guard)

4 DRIFTING VESSELS IN NORWEGIAN WATERS 2018 - 2020

NOR VTS collects information on different types of incidents and accidents within the Norwegian coastal waters. In a previous paper [1], data on drifting vessels for the period 2011 – 2018 was presented. Figure 4 presents new data compiled by the Analytic Group of NCA. The number of drifting vessels was smaller in 2019 than 2018 and 2020. But some of the 2019 cases involved major SAR operations to rescue crew (fishing vessel "Northguider" in Hinlopen, northern part of the Svalbard archipelago) and passengers (Cruise vessel "Viking Sky", at Hustadvika) [2].

From figure 4 it should be noted that there has been a large increase in drifting objects. Part of this increase comes from loss of containers from container



vessels.

Figure 4 Incidents in Norwegian waters 2018 – 2020. (Based upon data from NCA)

5 PRESENTATION OF SOME SELECTED INCIDENTS AND TASKS FOR NETS VESSELS

5.1 Fishing vessel "Northguider" – Hinlopen, Svalbard December 2018

The vessel was fishing north of Svalbard, when in Arctic utter darkness it ran aground in the Hinlopen Strait (see figure 5), grounding at Kinnvika in Nordaustlandet, which is a national park. The vessel was flooding and had a heavy list. The Joint Rescue Coordination Centre in Bodø received an emergency call from the master of "FV Northguider". The SAR resources of the Governor of Svalbard were mobilised and two helicopters took off from Longyearbyen. Just two hours after the emergency call, the first ten crew members were rescued and returned to Longyearbyen. One hour later the second helicopter rescued the remaining four crew members. The airborne capacity of the helicopters was fully used in this operation (airborne time remaining at the end of the operation was less than 10 minutes).



Figure 5. Accident site for "FV Northguider"

"Northguider" had approximately 300,000 liters of fuel on board. Due to the risk of oil pollution in the national park, the NCA in collaboration with the shipowner (represented by a master and two chief engineers) and the emergency preparedness and response company Ardent, immediately started to plan an operation to empty the tanks to prevent a potential oil spill. The main challenges for this operation were: darkness; low temperature; drifting ice; current; and unknown and poorly charted shallow waters. It was impossible to bring the NCG vessel "KV Svalbard" along-side, thus the operation used dedicated tanks installed on RIBs that shuttled between "KV Svalbard" and "FV Northguider". After completing the oil transfer operation, NCA stated that the wreck posed little danger of significant acute environmental pollution.

But because it was in a protected area, the Svalbard Environmental Protection Act mandated the ship's owner to remove the vessel. Smit Salvage was awarded the removal contract, and initiated work to run the operation during the 2019 summer season. Due to local ice and weather conditions, the operation was aborted. Some snapshots showing the faith of the vessel are collected in figure 6.

The operation was restarted in late July 2020, being successfully completed in September 2020. Two barges, their tugs, anchor handling vessels, and vessels able to keep small ice fragments away from the work area were mobilized for the wreck removal. The wreck was cut into fifty small pieces which were lifted onto the barges and towed back to mainland Norway, see figure 7 During the salvage operation, the former Norwegian research ship "Lance" participated as a base for NCA personnel overseeing the operation. This wreck operation was challenging as it took place at 80° north in an area far from normal logistics support services.



Figure 6. Different phases prior to the final "FV Northguider" wreck removal – grounded vessel – initial icing - inspection of wreck (Photo: NCA) work in Hinlopen 2020 (Photos: NCA, NCG – KV Svalbard and Governor of Svalbard)



Figure 7. Salvage of "Northguider" – preparing for dismantling and towing of wreck parts (Photo: Governor of Svalbard, NCA)

5.2 "Viking Sky" incident at Hustadvika – March 2019

The cruise vessel "Viking Sky" was steaming southbound from a Northern Norway cruise late March 2019. Passing the Hustadvika area (figure 8) in stormy weather (wind speeds of 22 – 25 m/s and waves at up to 15 m), the vessel experienced an engine shutdown. The situation quickly got serious due to the uncontrolled motions of the vessel and a drifting motion that would lead to a grounding. The metocean forecasts mean that other traffic in the area was already, to a large degree, cancelled. Such was the case for the coastal express vessels operated by the Hurtigruten company.

At approximately at 2 pm on 23rd March 2019, the vessel sent a mayday call after a blackout on the engines. JRCC SN immediately saw the need for SAR helicopters and tugs. They contacted NOR VTS for information on locations for suitable tugs for supporting the cruise vessel. The vessel started to drift towards the coastline and into waters with shoals and reefs. The large superstructure on cruise ships

resulted in a drifting speed up to 9 knots for "Viking Sky". To prevent grounding, the vessel dropped two anchors. Initially they just dragged along the sea bottom and reduced the drifting speed somewhat. At 3.40 pm the ship crew was able to restart one of the four engines. This, together with the drag of the anchors, stopped the vessel's drifting motion and prevented a possible grounding, see figure 9. At that time, the primary goal of the JRCC and NCA was to tow the vessel out from the coastline. Due to the weather conditions and position of the vessel, it was evaluated that the risk related to prepare for an emergency towing operation was too high under the prevailing weather conditions. The NCG vessel "KV Njord" arrived early at the incident site and was appointed "On-Scene Commander" at 5 pm. Contacts with other vessels in the area and the pilots on board "Viking Sky" were their main responsibility, as initially there were no plans for emergency towing or the evacuation of the vessel. Shortly afterwards, four offshore vessels and a tug arrived at the incident site, followed later by the NETS tug "Boa Heimdal", which arrived and was told to stand by until it was safe to fasten emergency towing lines.



Figure 8 The Hustadvika area – an exposed sailing area between the Norwegian cities Kristiansund and Molde. Source: Kystinfo (kystverket.no)



Figure 9. Cruise vessel "Viking Sky" - drifting case at Hustadvika, March 2019 (Photo: Torgeir Are Sortehaug)

The ship then kept position approximately 100 m from the coastline and only a few meters from a reef. Vessel motions were significant due to the high waves. Excessive combined heave, pitch and roll motions resulted in injuries to passengers. The waves entered the lower open deck and water started to flow into the ship, with some passengers, especially older people, suffering fear. In collaboration with the "Viking Sky" master, the JRCC Southern Norway decided to start an evacuation procedure (the total number of passengers and crew was 1363). Governmental SAR helicopters were scrambled and one commercial SAR helicopter (with operation base

in Kristiansund) started evacuation of passengers. Due to the weather conditions and sea floor geometry, evacuation to other vessels was deemed to be too risky. In total, the helicopters lifted 466 passengers during the rescue operation.

During the evening, the ship crew were able to restart two additional engines. Only one engine was used for propulsion as the crew feared new engine blackouts. At 9 pm the crew reported problems with lifting the anchors. Finally, they were able to lift one of them. The master then ordered the crew to cut the other. These actions made it possible for the vessel to start heading into open waters. The harsh weather continued through the night. In the morning, the wind gusts were reduced from 25 m/s to 15 m/s. Three of the engines were then operating and the vessel moved slowly forward heading to open water. In collaboration with the pilot, the captain decided to take the vessel into port in Molde as soon as towing vessels were connected. Two tugs, one forward and one aft were connected at 8 am the following day.

While rescuing "Viking Sky" passengers, JRCC Southern Norway received another mayday call from a small cargo vessel, the "Hagland Captain", also sailing in the Hustadvika area. This vessel had another engine blackout. The ship dropped both anchors, which dragged for some time before they took hold some 50 m from an underwater reef. It was decided to evacuate the vessel, due to lack of control and a significant list. The crew were instructed to jump into the sea and were picked up by one of the SAR helicopters taking part in the "Viking Sky" operation. The NETS vessel "Boa Heimdal" was released from duties related to the "Viking Sky" operations and given orders to observe the development. As the ship crew was evacuated, it was not possible to establish an emergency towing connection under the actual weather conditions. As the weather condition improved, a commercial tug was awarded a contract for towing "Hagland Captain" to port, see figure 10.



Figure 10. "Boa Balder" towing "Hagland Captain" to port. (Photo: NCG)

5.3 "Emslift Hendrika" drifting case, April 2021

The vessel was on route from Bremerhafen to Kolvereid in Mid Norway. In rough weather "Emslift Hendrika" had a shift of cargo, followed by an engine blackout in the North Sea west of Stadt on the Norwegian west coast on April 5th. As a result, the vessel started drifting, and reach a significant list

under large ship motions. It was decided to evacuate the ship, see figure 11. First, eight of the crew members were rescued using a Norwegian SAR helicopter. Four crew members stayed on board to try to stabilize the rolling motion and to prepare for the connection of emergency towing lines before they rescued by the helicopter. All crew members had to jump overboard to be picked up. The drifting path was followed closely by NOR VTS using their prediction tool for drifting of ships. From AIS signals NOR VTS could follow the actual drift motions. The NETS vessel "KV Sortland" was on-scene to observe and forward information to NCA. At 6 pm the following day, the vessel was unmanned and drifting 40 – 50 nautical miles west of Ålesund. Figure 12 is a map showing the actual drift track and predictions of future drift path. Weather conditions remained harsh, with waves of up to 15-18 m being observed, wind of 18 – 20 m/s coming from the north, which made it impossible to get specialists onboard the drifting vessel. It was observed that part of the deck cargo, a 24 m aquaculture service vessel, was lost to the sea. One of the deck cranes was also damaged.



Figure 11. "Emslift Hendrika" – early stage of drifting west of Stadt (Photo: CHC Helikopterservice/ JRCC Southern Norway).

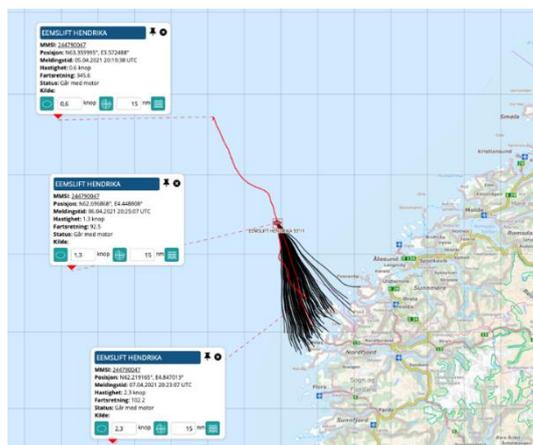


Figure 12. Observed and predicted drifting path for "Emslift Hendrika" (Courtesy NCA)

The Dutch shipowner hired two commercial tugs to start an emergency towing operation. At 1 pm on April 7th it was decided to postpone this operation to the next day. The weather was still too rough for a safe transfer of Smitt Salvage specialists to the drifting vessel. At this time, it was assumed that the operation could start the next morning as the weather would improve. However, later that day it was observed that the drifting part changed leading to possible grounding in about 8 hours. Then NCA called for a governmental activity involving mobilizing oil spill

protection resources in the area and prepared for a NETS operation. A SAR helicopter was allocated to attempt to bring Smit Salvage specialists to the drifting vessel. This operation was successful, and the salvage crew prepared equipment for emergency towing, both at bow and stern. Two commercial tugs ("Normann Drot" and "BB Ocean") were able to connect, and the emergency towing started, see figure 13.



Figure 13. Preparing for emergency towing of "Eemslift Hendrika" (Photo: Norwegian Coast Guard – "KV Bergen")

6 KNOWLEDGE SHARING FROM EMERGENCY TOWING OPERATIONS

Until 2018 NCA arranged an annual two-day workshop on emergency towing. The objectives for these workshops were mainly to present recent emergency towing operations from Norwegian waters. These workshops were open for all parties involved in emergency towing. For some of these workshops, experts from international towing companies (such as Smitt Salvage) and Nordic coast guards presented recent emergency towing operations. Due to the "Helge Ingstad" incident, the 2019 workshop was cancelled. As NCA was working on the reorganization of NETS in 2020, it was decided to cancel that year's workshop as well. However, NCA run mandatory courses for senior officers on all vessels in NETS on a regular basis. SINTEF Ocean researchers gave presentations in these courses.

In 2018 SINTEF Ocean, in collaboration with Norwegian University of Science and Technology, Kongsberg Maritime Advisory and Training, Port of Trondheim and Norconsult, develop an open forum for advanced shiphandling. As a result of the cancellation of NCA's workshop, the forum arranged shorter workshops on topics related to ocean and emergency towing. In November 2019 the topic was towing operations in coastal waters and ports and in November 2020 (2 hours web-based meeting) on the topic ocean and emergency towing.

7 MODIFICATION OF TRAINING SYSTEM

Transfer of the operational part of NETS from NCA to NCG required a change in the previous training program for officers and crew on the six NCG vessels allocated for the NETS. A revised training plan was

developed based on the previous training system presented at TRANSNAV 2019 [1]:

- The content in the phase 1 course (two days) was adapted to specific needs for NCG personnel with respect to the background of NETS. New examples of recent emergency towing operations were added. The topic "Selection of emergency towing gear to be used for various ship types/sizes, condition of drifting vessel, present and forecasted weather conditions were strengthened". Finally, improvements of NCG systems for sharing of knowledge and experience from completed emergency towing operations were discussed.
- The onboard practical training course was modified to include a more thorough review of the ship's own towing gear, connecting emergency towing lines to drifting vessels (manned or unmanned). The selection of future training scenarios was discussed in the debriefing part of the course.

Further, it has been discussed if the previous simulator-based training course for emergency towing should be revised and adapted to the Coast Guard vessels. The cost/benefit of such work was found to be too low and available resources should be used on the practical onboard course.

8 FUTURE NORWEGIAN ACTIVITIES RELATED TO EMERGENCY AND OCEAN TOWING

Based on investigation reports prepared by the Norwegian Directorate for Civil Protection, it is stated that there is a need for a complete list of Norwegian towing vessel resources and their characteristics. This list could be used when NCA calls for a governmental maritime emergency operation.

Operational experience from the "Eemslift Hendrika" case shows that there still is a need to improve tools for prediction of ship's drift and training of operators using such tools for different types of vessels and in an ongoing salvage operation.

The way of sharing national experience from emergency towing operations is presently under discussion. Forum for advanced shiphandling will arrange an annual two-hour web-based workshop. At the same time, the need for the two-day physical workshop will be investigated by NCA, NCG and SINTEF Ocean this spring. Based on industrial feedback, a decision will be made if such a workshop should be arranged late 2021.

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