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Performance documentation for Desmi and Lamor systems

D 4.13

WP4 Combat of oil spill in coastal arctic water



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Executive Summary

In the summer of 2017 pilot scale oil spill experiments were carried out in Greenland. 1.000 liters of IFO180 were released and burned at sea and 600l of a medium light crude oil was released and burned at the shoreline. For further information on these experiments, please see <https://youtu.be/51ieM7h7yKM>.

Subsequently to the in situ burning at sea the Desmi trawl system was used to trawl the area for residue, as the scale of the project didn't create much residue and the small size of the field test area made it difficult to maneuver it is difficult to determine the effectiveness of the trawl system, it did however show good potential.

The Lamor bucket skimmer system was used subsequently to the in situ burning at the shoreline, but again the small scale of the project made it difficult to determine the effectiveness of the system as there simply wasn't enough residue to collect, in a setting with more residue present it is believed that the bucket skimmer would be very effective.

Status Report

In the summer of 2017 pilot scale oil spill experiments were carried out in Greenland. 1.000 liters of IFO180 were released and burned at sea and 600l of a medium light crude oil was released and burned at the shoreline. For further information on these experiments, please see <https://youtu.be/51ieM7h7yKM>.

Tasks “4.3.2 Pilot scale oil spill field experiment” and “4.3.3 In situ burning of oil at shoreline” were carried out in July 2017. The Desmi fire boom system “Pyroboom” was used to contain the released oil during both tasks.

Immediately after the Pilot scale oil spill field experiment the DESMI A/S trawl system for heavy oils was used in an attempt to collect burn residues. After the in-situ burning of oil at shoreline the Lamor mechanical oil spill response unit, named Bucket skimmer was also tested for picking up residues after burning test.

The trawl system had been tested on 27 June near Nuuk without any oil in order to make sure that GOSR personnel knew how to connect and deploy the system. Prior to the release of IFO180, the trawl system was tested once more and was then moored up in order to secure a fast deployment following the in situ burning. The trawl was after the in situ burning then used to trawl over the area where the burn had taken place and afterwards stored away.

GOSR aided Lamor in the installation of the bucket skimmer onboard the Masik Viking and had a local company adapt the crane adaptor for the system as the system provided by Lamor did not fit the crane on the hired vessel. Lamor was responsible for the deployment and use of the bucket skimmer in connection with the field trials.

Performance

Desmi trawl system

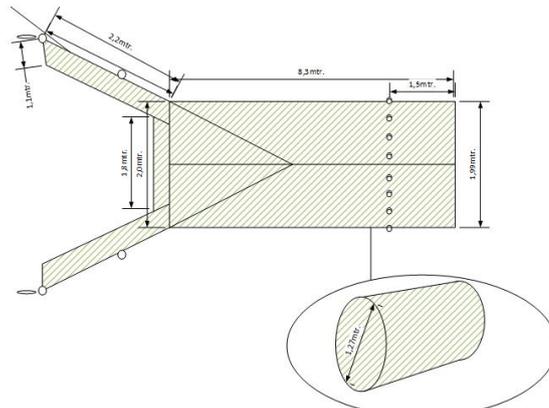
The DESMI RO-TRAWL is a sweeping unit to be used in recovery of heavy oil tar lumps, residuals and other kinds of debris from the sea. It is prepared for use under a wide range of sea conditions. From calm in-harbour conditions up to waves of 2- 3 m on the open sea with the right boom size. To ensure these demands several tests have been carried out in the Danish part of the North Sea.

The trawl is able to collect oil and debris from the surface of the water down to a depth of approximately 1.2 m.

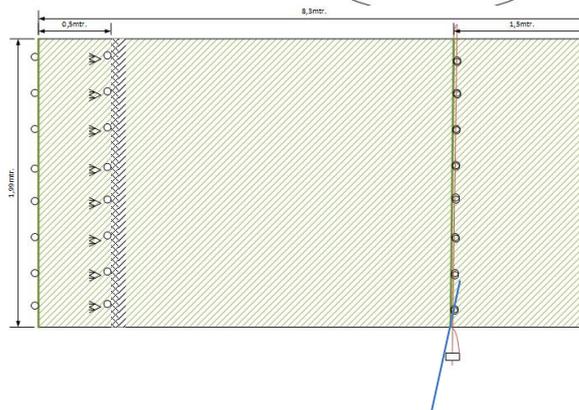
The trawl bags are 2.5 m³. However, depending on the availability of recovery facilities such as cranes, pumps, conveyors, etc., the trawl bag can be delivered and filled up to 10 m³ and then disconnected from the main part of the trawl, and replaced easily by another bag. In handling the trawl, two vessels or a single vessel with Ro-Kite, are necessary. As workboat a rubber dinghy will be sufficient. For towing the trawl, boats of 150 - 200 HP will be sufficient. Even smaller boats can be used.

The following illustration shows the systems entrance net and trawl bag.

ENTRANCE NET



TRAWL BAG 2.5 M³



GOSR found that the trawl system was fairly easy to assemble and deploy, it required little manpower to deploy and operate, which is an appreciated feature in the Arctic where labour is sparse and logistics can only accommodate a limited number of people.

After the burn of the IFO180, the trawl was trawled over the area in order to collect any residue in the water column. There was not much visible residue and the trawl collected approximately 4 kg of residue/oil. It is GOSR's opinion that the trawl would be efficient in a larger setting eg. more residue and larger area to maneuver in. Due to the enclosed test area, the vessels towing the trawl had to turn very often causing the trawl to close/fold up, it is possible that the folding up of the trawl system could maybe be avoided with more practice.



2 July 2017, use of Desmi trawl after in situ burning test at sea

Lamor Bucket Skimmer

The Lamor bucket skimmer was deployed after the burn of the crude oil. Due to the efficient burn there was not much to collect with the bucket skimmer, only a sheen appeared on the water after the burn and the collected residue was not measurable as the intake was mostly water. It is however GOSR's belief that the bucket skimmer would perform well if more residue/oil is present. The system seemed easy to operate and was with a little work adaptable to different crane types, which in a Greenlandic setting is important as there are no dedicated oil spill response vessel and vessels of opportunity would be used.



3 July 2017, Lamor bucket skimmer inside Desmi Pyroboom collecting burn residue

Due to the efficient burn of the crude oil, leaving very little residue for the bucket skimmer to collect, its real potential could not be accurately portrayed. However, the Lamor bucket skimmer (LRB) has been tested before and proven to be very capable of operating in difficult circumstances, heavy oil or residue and ice conditions, and in handling different types of oil under various circumstances.

The Lamor bucket skimmer has been tested two times by SINTEF Materials and Chemistry. The first tests, *Testing of Lamor GT 185 Skimmer and LRB 150 Skimmer in SINTEF ice basin*, were carried out in June 2007 (report No.: 8). And the second tests carried out in May 2008, *Testing and verification of oil skimmers during the field experiment in the Barents Sea* (Report No.: 9).

It has later been tested again in 2013 by BSEE (Bureau of Safety and Environmental Enforcement) at Ohmsett, *Skimmer tests in drift ice*.