

HORIZON

The EU Research & Innovation Magazine

ENVIRONMENT

Mopping up oil slicks the easy way

10 March 2015

by Jon Cartwright



Following the demonstration, researchers predict the FORCE7 system could be ready for service in as little as a year. Image courtesy FORCE7

Engineers have successfully demonstrated a new technology to clean up oil spills, which could reduce the environmental danger of drilling for oil in cold, rough seas, such as those in the Arctic.

Many people remember vividly the Deepwater Horizon oil spill in 2010, when nearly five billion barrels of oil were emptied into the Gulf of Mexico. That disaster highlighted the inherent risk of drilling for oil, especially in deep wells and other difficult locations.

But while oil drilling has been finding new frontiers, the technology required to clean up spills has not. Today the most basic method is a primitive one: at least two boats cordon off an area of spillage with long booms, while a third boat moves inside to scoop the oil off the surface.

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The problem is that in rough weather there is a risk of the thick crude oil slopping over the tops of the booms and escaping. Worse, the lengthy booms themselves can break, halting the clean-up process altogether.

To counter these issues, scientists from the EU-funded FORCE7 project have developed a new system for cleaning up oil spills without the need for booms, which consists of a net that is dragged behind a small boat, then squeezed dry.

The new system could make it much easier to clean up oil spills, particularly in choppy water. Since the net rides on the waves, it is not troubled by rough waters and there is no risk of breakage.

The net can also work on a small area in a continuous loop, allowing it to work around troublesome objects such as icebergs – a real danger for prospective Arctic drillers. And tests have shown it to be remarkably efficient, mopping up 90 % of the oil it comes into contact with.

Monitoring dynamics

On 26 February, representatives of FORCE7's partners gathered in Cardiff Bay in the UK to watch a demonstration of the system and monitor its dynamics on the water.

The net consists of several tails that can be dragged over waves by a single boat, collecting oil as they go. Once the net is saturated with oil, it is simultaneously hauled in and wrung dry with two rollers. After the oil is wrung out, the net is reeled out again for another pass.

'The most important point is that it has to follow the waves,' said Federico Meneghello of the Italian engineering firm D'Appolonia, who coordinates the project.

Although no oil was used in this particular demonstration, the fact that the net followed the waves without twisting, buckling or sinking suggested to Meneghello and colleagues that it would indeed work in rough waters. And that is probably thanks to the main research focus of the FORCE7 project: the material.



The tails of the net are dragged over the waves to collect oil, before being hauled back on the boat and wrung dry. Image courtesy FORCE7.

According to James Isley, managing director of the British engineering company OPEC which came up with the idea for the system, the partners experimented with a wide variety of materials during the two-year project, including those based on natural fibres. They tested the textiles' ability to clean up oil in confined tanks by measuring the amount of oil collected in a given time for different oil mixes and textile structures.

In the end two materials did well: one sponge-like material made of polypropylene, which was particularly good at collecting heavy and light oils, and one net-like material made of polyethylene, which was suitably stiff. 'We thought, logically, let's combine the two best performers,' said Isley.

While the nets are not yet ready for market, the success of the demonstration means that the FORCE7 system could be ready for service in as little as one year. That would mean continued development of the system for market, said Meneghello - or they could start investigating other interesting avenues, such as recyclable versions.

'I am personally very pleased because I am a curious engineer,' he added. 'There was an idea and that idea finally came to a product, and that's not something that can happen every day.'

More info

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