CRREL assists with testing innovative new concept in oil spill response

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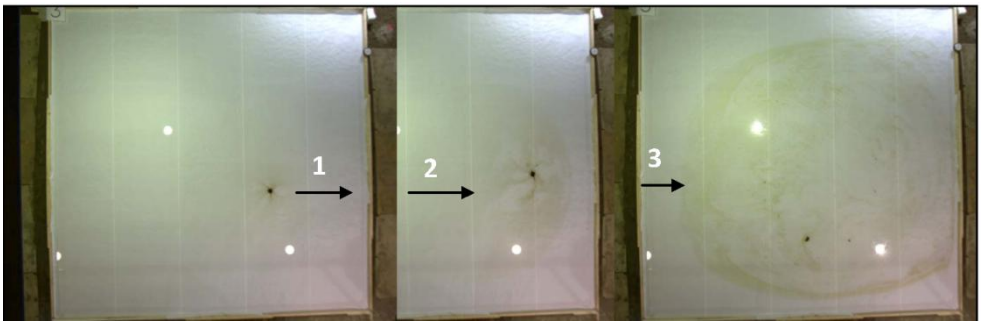
Over the last 10 years, CRREL has been an active participant in testing to detect oil under ice, partnering with major oil companies in an effort to provide a quick and effective means of detecting oil spills using chemicals to herd oil slicks for *in situ* burning and now an innovative and efficient method of helping with natural dispersion and biodegradation of spills.

In above image on left, S.L. Ross Ltd Researcher Ian Buist begins a test by placing a circular metal frame on the pool's water surface. Within the frame he places a small sample of crude oil (the oil spill) and on top he places a few droplets of a spreading agent; he then lifts the frame and waits. CRREL Civil Engineer Leonard Zabilansky assists with testing.

CRREL Research Civil Engineer Leonard Zabilansky, with the laboratory's Ice Engineering Team, recently provided facility and onsite testing assistance to S.L. Ross Environmental Research, Ltd.'s Ian Buist and a researcher representing a major oil company.

"We like to stay in touch with ongoing research," said the oil company representative. "I'm here at CRREL to observe and see how this new concept works, so that we can come up with more options for oil spill response. We are always looking to improve capabilities."



The above sequence of aerial photographs, from left to right, (1) shows that within minutes of setting up, the oil spill has begun to spread out in what appears to be legs; (2) the oil spill continues to spread and the sheen has visibly begun to form; (3) the oil "spill" has decreased in size; while its sheen has increased significantly.

The innovative concept, developed by a retired employee from the sponsoring oil company, involves the application of a silicone surfactant to viscous oil

slick to help spread out the oil to thin sheens. Once this has taken place, natural wave action breaks the sheen into small droplets that can naturally disperse into the water column and eventually biodegrade.

“We are testing a new concept in chemical spill response. The concept is based on adding a surfactant to oil that causes it to spread out to a very thin layer on the water’s surface,” said Buist. “The target oils for this are very viscous, heavy oils and emulsions because typically those types of oils will not spread on water and remain as mats and thick slicks. The idea is to make them spread out.”

Two 30-square-foot saltwater pools, each 1-2 inches deep, were created in CRREL’s Ice Engineering Facility’s Research Area. Ultraviolet lights were placed next to the pools to help visualize the sheens and deployed Web and digital single-lens reflex cameras from the test area’s ceiling, documented the spreading process with high-resolution photographs and video, which will be used for analyzing the testing and enabling customers to view the same.

“By partnering with the oil companies and conducting this type of testing, we are working towards the Corps’ mission of being good environmental stewards,” said Zabilansky. “Testing in the unique Corps’ facilities helps develop confidence in novel mitigation techniques.”