Ohmsett--The National Oil Spill Response Test Facility

The Ohmsett Gazette

Leonardo, New Jersey | Test with oil. Train with oil. | Spring/Summer 2009

Herding Agents Used to Thicken Oil Slicks in Broken Ice

Field tests in the Alaskan Beaufort Sea have shown that deploying a boom and skimmer in broken ice conditions causes severe limitations of conventional containment and recovery equipment. The biggest problem is that when a boom is deployed to collect and concentrate oil for skimming, it also collects and concentrates ice pieces that interfere with the skimmer.

Research was conducted at the SL Ross Environmental Research Ltd. lab in Ottawa, Canada using herding agents to thicken slicks. Data shows that herding agents can significantly contract and thicken oil among ice without concentrating the surrounding ice. Since a skimmer removes oil from the center of a herded slick, the herding agent has the potential to cause the slick to contract towards the skimmer eliminating the need to move the skimmer around to collect the oil.

With this research data, the Minerals Management Service (MMS) funded a two-week test series at Ohmsett in February to explore the capabilities and limitations of using herding agents to thicken oil in loose pack ice for recovery by mechanical skim-

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What's Inside

Skimmer Tested to the New ASTM Protocol at OHMSETT

Evaluation of the CRUCIAL redesigned prototype skimmer head continued at Ohmsett in March 2009. Representatives from the Prince William Sound Shippers observed the project that quantified the candidate skimmer's oil recovery rates and recovery efficiencies while collecting Alaska North Slope (ANS) crude oil.

CRUCIAL Incorporated, a manufacturer of oil spill equipment, modified their skimmer with fiber covered discs and a refined scraper mechanism. This was CRUCIAL's fourth trip to Ohmsett for testing.

"Instead of a smooth surface on the 'keeper' discs that hold the scraper on the ends of the four disc banks, we made them coated. It essentially makes the 80 discs equivalent to 84 discs being scraped," said Wally Landry, president of CRUCIAL, Incorporated. "We also added more strength to the scraper. These are small changes, but they make a big difference in the skimmer's performance. That's the great thing about testing with oil in realistic conditions at Ohmsett, you get to see how your equipment reacts; then improve it," said Landry.

Throughout the testing, representatives from the oil/tanker industry (including the shipping presidents of each company), oil spill cooperatives, Alaskan government and independent observers from the U.S. Coast Guard were present to receive feedback from

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The Crucial prototype skimmer head was tested with fresh and weathered Alaska North Slope crude oil during the test funded by the Prince William Sound Shippers.

Skimmer System Tested

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the test. "They have the final say as to whether we continue to move forward on the process," stated Eric Haugstad, director of Contingency Planning and Response at Tesoro.

In addition to observing the tests, it provided the shippers the opportunity to hold their annual meeting, which is typically conducted via conference calls. "Since we have been doing good work in testing, they wanted to come to Ohmsett to see it," Haugstad said. "They were very pleased with the evaluation testing and impressed with the Ohmsett facility."

The goals of the tests were to determine the oil recovery rate and recovery efficiency of the redesign with additional discs and improved scrapers using the newly adopted ASTM Standard F2709. The standard sets out the accepted protocol for determining nameplate recovery rate of stationary oil skimmer systems.

> *"They not only met, but exceeded the numbers we were looking for."*
> *~ Eric Haugstad, Tesoro Maritime Company.*

Following the guidelines in the ASTM Standard, the tests were conducted in a 9m x 9m boomed off section of Ohmsett's test tank. The test area was filled with 7000 liters of ANS to create a slick 8cm thick. Data was collected as the skimmer recovered oil and the slick thickness diminished from 8cm to 5cm.

"They not only met, but exceeded the numbers we were looking for," commented Haugstad.

The next step will be to conduct sea trials with the CRUCIAL skimmer this summer. "We will test booming configurations and containment systems in the open ocean," said Haugstad.

Herding Agents

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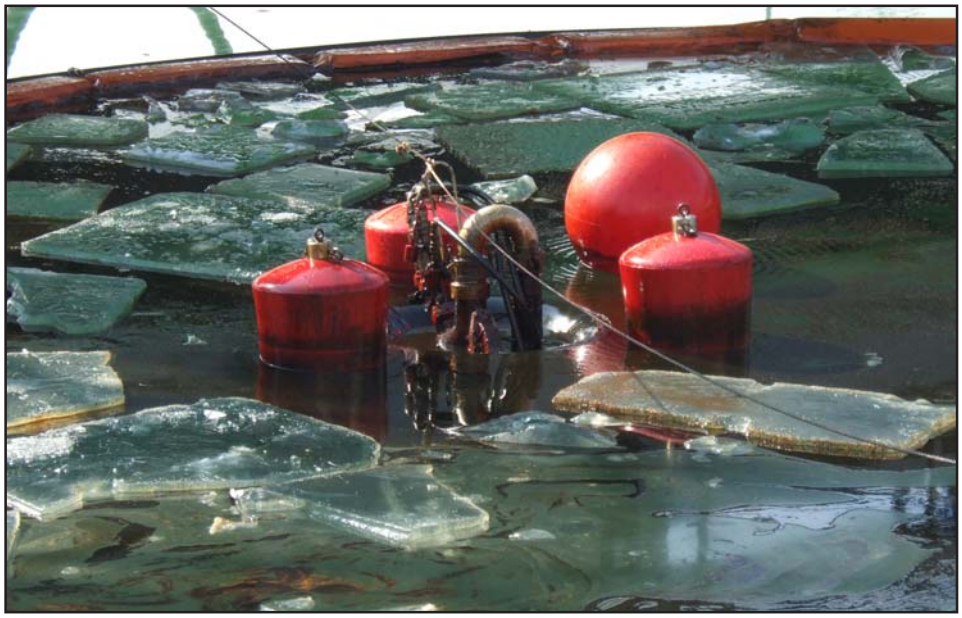
mers.

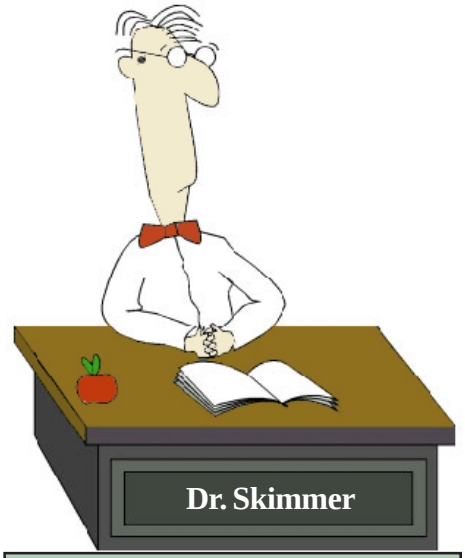
For the series of tests, a 30-foot diameter boomed ring was positioned between the auxiliary bridge and the main bridge to provide a controlled test area and simulate a section of pack ice. The ring was free floating so it could drift, and a wind screen was used to reduce cross winds and maximize test time before the ring drifted into the test wall, which would cause the ice to accumulate on the downwind side of the boom.

Once ice was loaded into the ring, in concentrations of 0%, 10%, and 30%, by area, oil was applied to the water and spread between the ice floes. When the oil had spread to its maximum area, a U.S. Navy (USN) developed herding agent was applied around the inside perimeter of the ring, causing the slick to contract and thicken.

Three types of oil were used: Alaska North Slope (ANS) crude from Alyeska Pump Station #1, Pt. Macintyre crude, and Marine Gas-Oil (MGO). Comparative tests were conducted with a weir skimmer and a disc skimmer and measured Oil Recovery Rate (ORR) and Oil Recovery Efficiency (RE).



After oil and a herding agent was applied to the controlled test area, a skimmer was used to remove oil from the center of the ice-laden herded oil slick.



Schedule a Test Today!

If you would like to test your skimmer system to the new ASTM Protocol, please call us at 732-866-7183 ext. 11

Visit our website at www.ohmsett.com to view the Ohmsett testing and training schedule.

Remote Sensing Technology Tested for Oil Detection

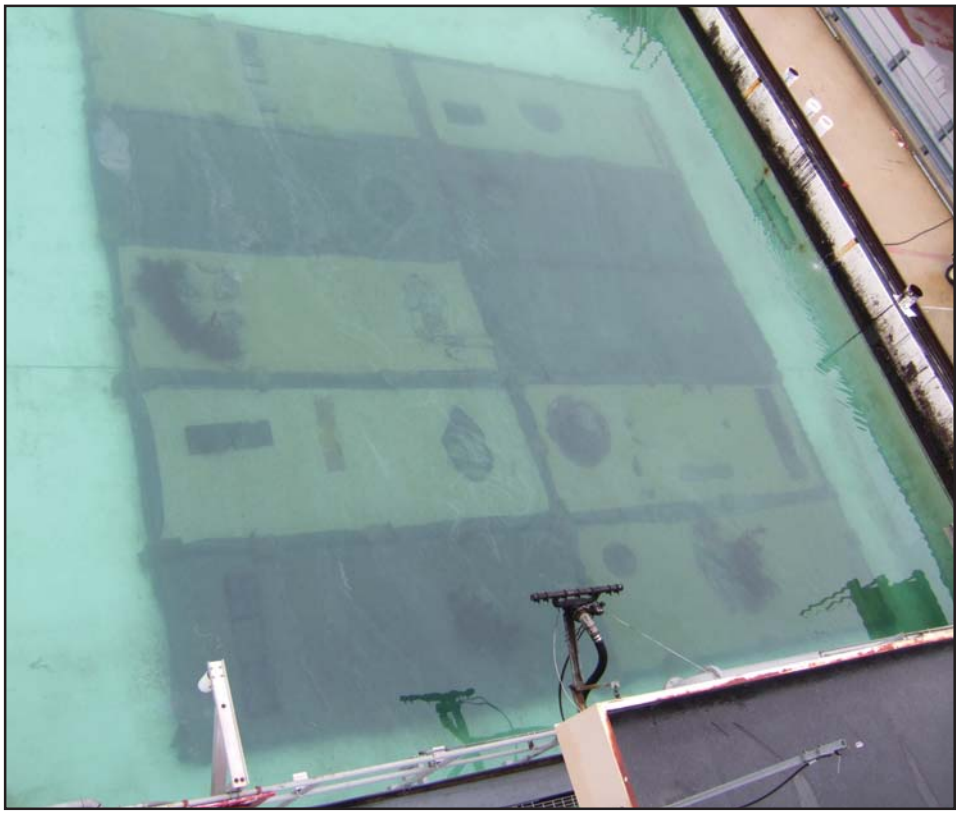
In January, the United States Coast Guard Research and Development Center returned to Ohmsett for phase two of the Subsurface Oil Detection Technology testing. Whether the oil is neutrally buoyant in the water column, or on the bottom, its presence is difficult to detect. The underwater environment poses major problems including poor visibility, difficulty in tracking oil spill movement, colder temperatures, problems with containment methods and technologies, and problems with the equipment's interaction with water.

Based on data from a previous stage of this project, it was determined that response efforts for heavy oils have traditionally not been successful, with low recovery rates and extended response times, and existing Coast Guard systems are inadequate for heavy oil detection and recovery.

This phase of testing conducted at Ohmsett was to evaluate the capabilities of a sonar device (RESON) and a polarized laser fluorometer (EIC). These included USCG-owned imaging sonar from Coda Octopus, a bottom classification-type system from Biosonics, and a pump from Magator to evaluate recovery of very thin patches. In addition, several vendors traveled to Ohmsett using their own funding to take advantage of the arrangement.

In preparation for the tests, Ohmsett personnel constructed an underwater environment by assembling 10 trays to create a 40 foot by 40 foot sea-bed to simulate realistic subsurface conditions. The trays contained various sands, rock, stone, dirt, plants, and seaweed to represent materials likely to be found in river and ocean floors. Different oils were placed in known quantities and thicknesses within the test area. Divers then assisted in placing the sea-bed at the bottom of the Ohmsett test tank.

The instruments being tested were mounted on the main bridge. During each test, the bridge moved over the top of the test field to determine the instrument's ability to distinguish between the oils and the subsurface floor. “It appears that these detection systems can provide quality information under these circumstances,” said Kurt Hansen, project engineer. Divers were deployed with a pipe connected to the pump to try and collect the oil. “They were successful with the lighter oil but not with the very viscous ones,” said Hansen.



Sensing instruments were mounted on the movable main bridge, then passed over the targets to determine the instrument’s ability to distinguish between the oils and the subsurface floor.

An underwater environment was created to simulate realistic subsurfaces conditions. This sea-bed contained various sands, rock, stone, dirt and plants.

Ohmsett Dispersant Training Attracts Multinational Students

Ohmsett - The National Oil Spill Response Test Facility held its first ever Hands-on Dispersant Training Course on April 29 & 30. Students from the United States (including members of the U.S. Coast Guard Strike Teams), Norway, Panama, and the United Kingdom completed classroom and hands-on training in the Ohmsett tank.

Instruction was provided by leading dispersant experts Ken Trudel and Randy Belore from SL Ross Environmental Research Ltd., Ottawa, Canada. The focus of the training was practical experience dispersing oil slicks of crude oil under near-at-sea conditions in the large outdoor Ohmsett wave tank. Training included: a brief refresher on dispersants emphasizing effectiveness and effectiveness monitoring; familiarization with instruments useful in monitoring effectiveness; and a full day of experience dispersing oil slicks in the wave tank and collecting dispersant-treated oil with skimmers.

On the first day students spent the morning in the classroom for a dispersant primer/refresher. The afternoon was spent becoming familiar with and comparing the different oil spill monitoring instruments.

Representatives from Norway, the United Kingdon, the United States, and Panama attended the first every hands-on Disperant Training at Ohmsett. During the tank training, dispersant was applied to an oil slick where the primary emphasis of the training was on visual observations and the visual signs of dispersant-oil interactions.

"The focus of this training was dispersant operations and effectiveness at sea, how do dispersants work, what limits their performance and how best to monitor dispersant effectiveness at sea", said Ken Trudel. "The Ohmsett wave tank offers a unique opportunity to provide oil-spill professionals in the U.S. with practical experience with dispersants that would otherwise be available only in actual spills or sea trials. The difference is that here at Ohmsett we can see what is going on a lot better, we have better control and we do not need a permit to spill oil". He went on to say that parts of the training were designed to meet the needs of USCG Strike Force Monitoring Teams, but the on-tank experience is extremely valuable to any oil spill professional.

Recently tasked with oversight of the Gulf of Mexico emergency response team for BP, Earnest Bush attended this course to increase his knowledge of emergency response technologies. "This is an excellent and very thorough course. It is great to have the background knowledge on dispersant use and also their effectiveness," said Bush.

On the second day, in the Ohmsett tank students observed the interactions of oil and dispersants in the water with waves. They also had the opportunity to set-up and use monitoring instruments, and learn how to record and communicate the monitoring results. At the end of the tank runs, they got to see the effectiveness of using skimmers for oil that was treated with dispersants, but had not been dispersed.

"The primary emphasis was on visual observations and the visual signs of dispersant-oil interactions. The instruments were those the Strike Teams use to monitor effectiveness [the old Turner 10 AU and newer Turner C3] and that are used to measure oil droplet size - the property of the dispersed oil that results in the visual signs that the monitors observe," stated Trudel.

Stale Jensen, an environmental advisor for the Norwegian Clean Seas Association for Operating Companies (NOFO), said dispersants are still rather new and that they are just starting to use dispersants as a response tool. "As we have little experience with the practical use of dispersants in Norway, exercises in the field, with real oil on ocean, tend to have a focus on research of mechanisms, as well as on the plain successfulness of the dispersant application."

Natasha Lippens, a technical advisor representing the International Tanker Owners Pollution Federation Limited (ITOPF) based in the United Kingdom, said ITOPF has used dispersants in the field as a viable response tool; however she has never used any of the instrumentation before. "This is something they could potentially use in the field to interpret results, so it was definitely worth understanding [this part of the training]."

Train With The Experts!

August 10-14, 2009 (En idioma Español)
September 21-25, 2009

The Ohmsett Oil Spill Response and Strategies Training is taught in conjunction with Texas A&M Corpus Christi's National Spill Control School, the leading specialists in hazardous material spill training.

For more registration and information, call the Ohmsett Training Coordinator at 732-866-7183 ext. 12 or email scunneff@ohmsettnj.com.

Dispersant Effectiveness Tests in Low-Doses and Repeat Applications

Many studies, verified by well documented field experience, have provided a greater level of acceptability for the use of chemical dispersants to mitigate waterborne oil spills. In an on-going multi-research program funded by the Minerals Management Service (MMS) and conducted by SL Ross Environmental Research, Ltd., a week long test was conducted at Ohmsett in May to evaluate dispersant effectiveness in low-dose, repeated applications.

The usual practice for the application of dispersant to large oil spills is through large fixed wing aircraft spraying. However, typical spray rates provide for an application ratio of 1:20 dispersant to oil, as applied to a slick thickness of about 0.15 mm. Nevertheless, thick oil patches accounting for 80 to 90 % of the total oil volume can easily be 10 to 100 times thicker than this. The application rate of dispersant from an aircraft hitting oil of this thickness could be in the range of only about 1:200 to 1:2000. The question to be answered in this project is: could multiple low dose applications of dispersant over time achieve an effective dispersion?

The project was conducted at two test scales. The initial test was completed at the laboratory scale test tank operated by SL Ross Environmental Research Ltd. in Ottawa, Canada. These efforts were intended to assess the effect of low, repeated dose applications of dispersant on a number of oils. Once trends were determined, testing was conducted at Ohmsett to verify similar behavior at simulated sea-scale.

Could multiple low dose applications of dispersant over time achieve an effective dispersion?

During the Dispersant Effectiveness Tests in Low-Doses and Repeat Applications, an oil slick was applied to the water and the main bridge was moved over the slick as dispersant was applied in a low dose. Researchers waited a few minutes; then applied another low dose of dispersant.

The research at Ohmsett was to determine if dispersant applied in very low doses (1:1000 to 1:200) will disperse a small fraction of an oil that is known to be amenable to dispersion, or is it simply ineffective until a minimum threshold concentration of dispersant is achieved, possibly through multiple, low-dose applications. In order to do this, researchers had to simulate the way aircraft would apply the dispersant.

For this project, Ohmsett staff changed the configuration of the dispersant spray bar's spacing and nozzle angles to simulate the way the aircraft passes over a slick. An oil slick was applied to the water and the main bridge was moved over the slick as dispersant was applied in a low dose. Researchers waited a few minutes for observation and to obtain a representative wave set; then applied another low dose of dispersant.

Various crude oils were used during testing at the Ohmsett Facility. They included Endicott and ANS, both from the Alaskan North Slope, and Rock Crude. An intermediate fuel oil, IFO 180, was also tested. The dispersant employed during testing was Corexit 9500, which is well known to the industry.

Analysis of the data is still being conducted and should provide a better understanding of dispersant effectiveness in low-doses and repeat applications. A final report will be submitted to MMS and will be made available on their web site www.mms.gov/tarphome/.

UNAM Conducts First Ever Renewable Energy Test at Ohmsett

During the week of March 30, 2009, engineers from the Universidad Nacional Autonoma de Mexico (UNAM) conducted tests of two hydraulic generators in the Ohmsett test tank. The Minerals Management Service (MMS) funded the use of the Ohmsett Facility with engineering and technical support provided by Ohmsett personnel. This was the first test of an ocean renewable energy device at the Ohmsett Facility, and marked the opening of the facility to future testing of marine renewable energy devices and systems.

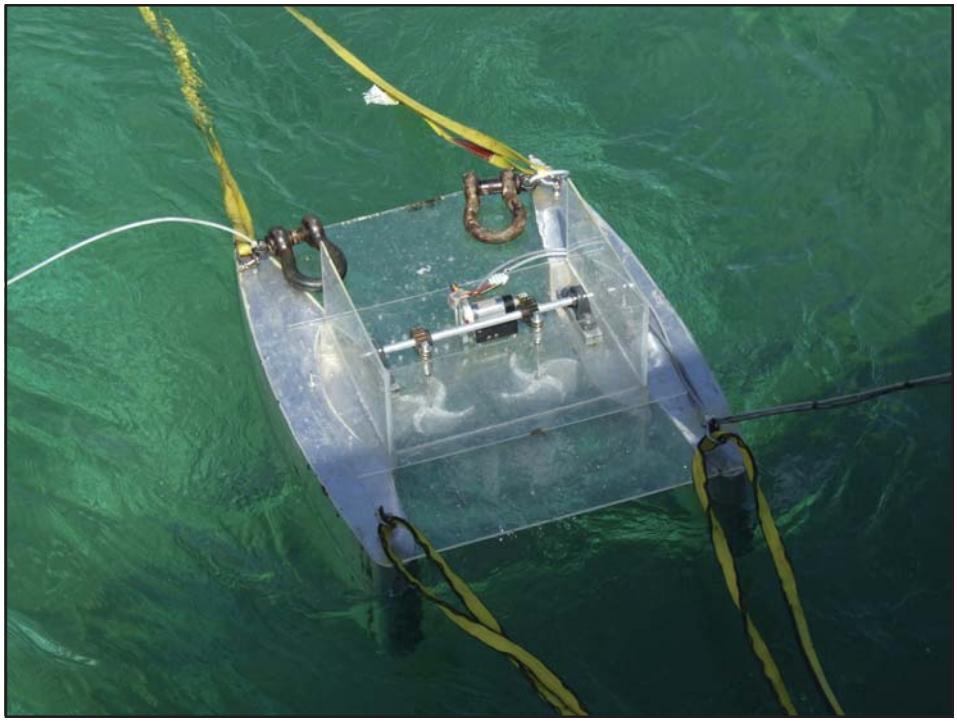
The two prototype hydraulic generators were developed under the UNAM IMPULSA (Investicacion Multidiciplinaria de Proyectos Universitarios y Superacion Academica) project entitled *Desalination of Water with Renewable Energy*. This project is developing several devices aimed at harnessing renewable energy sources, including marine tidal current and wave, wind, geothermal, and biochemical energies.

The object of this test program was to test the capability of the two hydraulic generators for their ability to produce power under varying conditions. Variables included water current velocity, applied torque, trim and ballast conditions, and calm surface verses waves. The smaller device was designed to a nominal output of 100 watts; the larger was designed to a nominal output of 500 watts. Select runs in calm water were compared to runs in waves at the same set of variables.

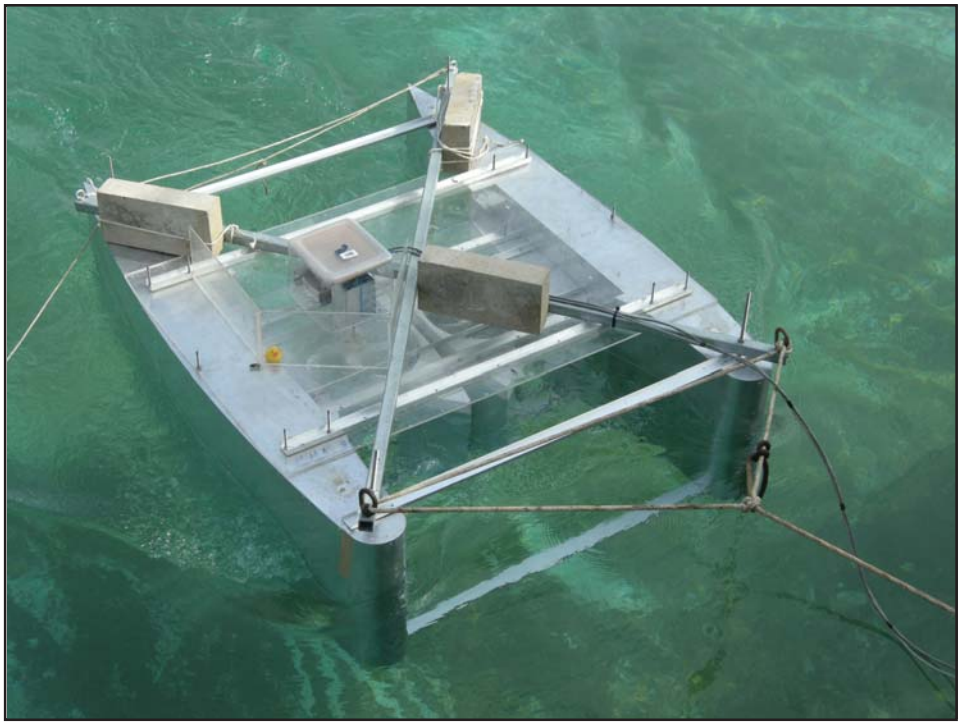
The small (100 watt) hydraulic generator fitted with straight turbines was tested first. Various ballast and towing tests were performed to determine the best angle of attack to provide the most effective fluid flux over the turbines. During these sea-keeping tests it was apparent that the straight turbine would not rotate unless it was provided a "kick-start" in the right direction. These results agreed with previous experience and the straight turbine was eliminated from further testing.

The large (500 watt) hydraulic generator fitted with helical turbines was tested for sea-keeping ability and angle of attack in a similar manner to the previous (small) device. Ballast, tow angle, and scope were adjusted accordingly. Tests were conducted in calm water and waves.

The data from this test is still being analyzed, and the final report is pending. However, both devices are conceptual models and would require further design modification and testing.



The UNAM model 1 hydraulic generator designed for nominal output of 100 watts.



The UNAM model 2 hydraulic generator designed for nominal output of 500 watts.

News Briefs

Ohmsett Staff Attends Interspill 2009 Conference in Marseille France

Ohmsett was recently one of more than 100 exhibitors participating at the Interspill Conference and Exhibition in Marseille, France in May.

Interspill was the only major international exhibition for spill prevention, preparedness, response and restoration in 2009. More than 1,000 delegates and visitors gathered to see the latest equipment, to exchange experiences and knowledge, and focus on how to tackle challenges worldwide in years to come.

Ohmsett Mechanical Engineer Paul Meyer presented a technical paper entitled, *Development of an ASTM Stationary Skimmer Test Protocol - Phase 3: Application.*

Ohmsett's exhibit on the conference floor, showcased the latest skimmer protocol testing, full-scale dispersant effectiveness testing, training, and research conducted at the facility.

Ohmsett Program Manager Bill Schmidt and MAR, Incorporated Chairman and CEO Mike Norcio attended the Interspill Exhibition in Marseille, France.

Visit Us At These Conferences!

Clean Pacific Conference & Exhibition
September 14-16, 2009; Portland, OR
Booth #301

Clean Gulf Conference & Exhibition
November 17-19, 2009; New Orleans, LA
Booth #613

The Ohmsett Gazette is published by Ohmsett -The National Oil Spill Response Test Facility to update our readers on activities at the facility.

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U.S. Coast Guard Trains at Ohmsett

The United States Coast Guard (USCG), in partnership with Ohmsett, has developed a comprehensive oil spill responder training (OSRT) program. Four times a year Ohmsett hosts a five-day training course that provides Coast Guard personnel with both classroom and hands-on training using state-of-the-art response equipment currently in use by the Coast Guard. The curriculum includes actual oil spill recovery and viscous oil transfer techniques and procedures used on a variety of Coast Guard oil recovery and ancillary systems. The training is conducted using the test tank and other Ohmsett facilities.

In May 2009 members of the Coast Guard attended classroom training which focused on general Coast Guard oil spill response fundamentals, safety, and specific VOSS/SORS oil spill response equipment systems. They also participated in hands-on practical training where students were divided into groups and rotated through five equipment stations.

One of the stations required the students to complete oil recovery training in the Ohmsett tank. There they practice recovering oil with spill equipment used in the field under conditions that simulate an actual oil spill.

The teams practiced with two wave types; calm and harbor chop. As the students become more proficient in skimming techniques, the training exercises takes on a competitive nature to see who can recover the most oil.

Ohmsett is recognized by the USCG as the premier training facility for providing outstanding hands-on instruction on full-scale equipment in real oil for their OSRT course to train their personnel.

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Test With Oil! Train With Oil!

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