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## Alaska Department of Fish and Game Tests Twine for Crab Pots Using ADMET eXpert System

*The Alaska Department of Fish and Game (ADF&G) has broad responsibilities including oversight of the crab fisheries in Alaskan waters. A consequence of the pot gear used by the industry is a phenomenon called “ghost fishing,” which happens when functional pots are lost but continue to trap and kill crabs and other organisms. In response, regulations were enacted that require one sidewall of all crab pots have an opening that is secured with a biodegradable 100% cotton twine that would break down over time, fail and allow the trapped organisms to escape.*

*Some in the industry questioned the appropriateness of the twine specifications, claiming that the twine failed on active traps before the pots were retrieved. ADF&G sought to test the time-to-failure by assessing the elasticity and tensile strength of the twine. It required a Universal Testing Machine (UTM) to conduct the tests. ADF&G is using an ADMET tabletop eXpert 5601 to carry out the testing.*

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The Alaska Department of Fish and Game (ADF&G) has a wide portfolio of responsibilities, including the Bering Sea and Aleutian Islands Crab Observer Program, which collects data from the crab fisheries. David Barnard is the Biometrician for the program.

Located in Kodiak, Barnard recently initiated a study of twine that, by regulation, is used to provide a time-release escape mechanism for crab pots.

The regulation specifies that one sidewall on each pot have an opening of at least 18” that is secured with a single length of biodegradable, 100% cotton twine of, at most, 30-thread (AAC 39.145).

The twine, which is expected to secure the pots for approximately 30 days, degrades over time due to biological activity that breaks down the cellulose in the twine. At the end of 30 days, the twine should degrade to the point that it fails so the crabs and other organisms can escape. “Soak time” is the primary determinant of twine failure.

Today, the crab fisheries have fewer vessels that use more pots over a longer period of time. In the Aleutian Islands golden king crab fisheries a typical pot string may have 15-40 pots attached to a long-line that are in the water for an average of 14-23 days. Some fishers have reported lost catches due to failure of the twine and have requested regulatory changes to allow the use of heavier twine.

Explained Barnard, “We have some field studies by onboard observers on active fishing vessels who collect data from pots. The data is observational -- keeping track of individual pots, recording every time they come to the surface and noting when the twine fails. Preliminary data indicate that the twine’s mean time to failure is from 31 to 42 days.”

The ADF&G staff determined that tensile testing the twine under controlled conditions would provide necessary empirical data.

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### **SOLUTION OVERVIEW**

**Industry:** Commercial Fishing

**ADMET Product:** eXpert 5601 with an eP Digital Controller and WinCOM Plus

**Customer:** Alaska Department of Fish and Game

**Application:** Tensile test biodegradable twine used to secure crab pots

## ADF&G seeks data

ADF&G set out to test the twine using a universal testing machine (UTM) to test both 30-thread and 60-thread twine. The study will measure how quickly the twine loses tensile strength and/or elasticity with increased soak times.

Results will be compared to the observer-collected data and the findings will be provided to the Alaska Board of Fisheries, which will review the findings in light of the regulations.

The ADF&G staff considered field-testing twine using actual crab pots, but it would have required a large vessel, been labor intensive, and expensive. Ultimately, they decided to use a controlled study and eliminate as many variables as possible.

Barnard prepared a project proposal and then researched UTM providers.

Barnard found ADMET on the Internet along with other companies, and sent requests for price quotes to about a half dozen.

As it turns out, ADMET had the lowest price and was one of the machines that he preferred because of its size and because it did everything that he wanted it to do without getting too fancy.

Barnard ordered an eXpert 5601 tabletop machine equipped with an eP Digital Controller, communications software and a set of grips. He set

the unit up himself when he received it a few weeks later.

The laboratory study includes 30-thread and 60-thread samples that soak in a tank that is exposed to raw seawater. Another set of samples is soaked on the bottom of a harbor at about a 60' depth.

Barnard is using Cordage Institute ([www.ropecord.com](http://www.ropecord.com)) guidelines for testing wet cordage. He has also been in contact with the major supplier of the twine to the fishery.



Samples are taken once each week during the 8-10-week study. The samples are removed from their soak environments but kept in seawater until they are mounted in the machine for the tensile test.

Barnard runs 20 replicates of each size. He manually records maximum load and displacement, and archives all of the data from each replicate into a spreadsheet on a computer that is connected to the eXpert test machine.

“We'll provide the findings to the Board of Fisheries along with the observer information to help them when they consider the regulatory change request,” said Barnard.

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## For more information:

For more information about ADMET products or services, please call us at 800-667-3220 or 781-769-0850, email [sales@admet.com](mailto:sales@admet.com) or visit our Web site at <http://www.admet.com>.

For additional information on the Alaska Department of Fish and Game, visit <http://www.adfg.state.ak.us>.

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