

Innovative Technologies

to Alleviate Whale Entanglements in Fishing Gear:

Weak Braided Sleeves

Description

How it Works A six-foot-long hollow woven polypropylene sleeve encases two ends of regular buoy line, creating a point of lower breaking strength. Weak links using braided sleeves can be incorporated at multiple points along a buoy line. The breaking strength of the rope at the location of a sleeve is reported to be 1,700 lb or somewhat less, in contrast to the typical breaking strength of approximately 3,700 lb for 3/8 inch three-stranded rope. The sleeves currently available fit 3/8 – 1/2 inch rope.

A piece of buoy line is cut and a six-foot-long section of expandable braided sleeve encases the ends, gripping the cut section so that the ends cannot slide out under tension. To do this, a one-inch slice is made in the sleeve four inches from each end, and one end of the rope is inserted through each slice and guided to the centre point of the sleeve. The four-inch hollow ends of the sleeve, beyond the sliced openings, are spliced to the buoy line. The ideal spacing between sleeves is yet to be determined, though more vs. less weak links in a buoy line are likely to be more effective at releasing an entangled whale.

Cost

Six-foot lengths of hollow braided sleeve cost \$2 USD. A kit with 48 sleeves is \$103 USD. The number of sleeves required depends on the length of the buoy lines, the number of sleeves used, and the amount of gear fished.

Pros

The sleeves are inexpensive and can be manufactured by companies that make braided rope products. A flexible braided sleeve can pass through a plate hauler. They can be placed at multiple intervals along a buoy line, or any other line. Fishers can incorporate braided sleeves into existing gear, which can be more cost-effective than replacing entire buoy lines with rope of low breaking strength. The sleeves will work with a variety of gear types that use buoy lines, such as lobster and gillnets. It takes about five minutes to rig each sleeve.

Cons

Weak links in a buoy line could compromise normal fishing operations, possibly leading to gear loss. In particular, they may lose their functionality in high tide conditions. Currently produced sleeves are limited to gear configurations that haul gear using rope up to and including 1/2 inch diameter. To date, attempts to make a sleeve for rope 9/16 inch or larger, that breaks consistently below 1,700 lb, have not been successful. However, segments of 1/2 inch rope and sleeve could be spliced into 9/16 inch or larger rope.



Figure 1. A sample 6-foot-long section of braided sleeve encasing 3/8 inch buoy line. The hollow ends of the sleeve are spliced into the rope fibres.



Management and Enforcement

The sleeves are visually distinct, which would facilitate monitoring and enforcement.

Availability

Manufactured by Novatec Braids Ltd., Yarmouth, NS.

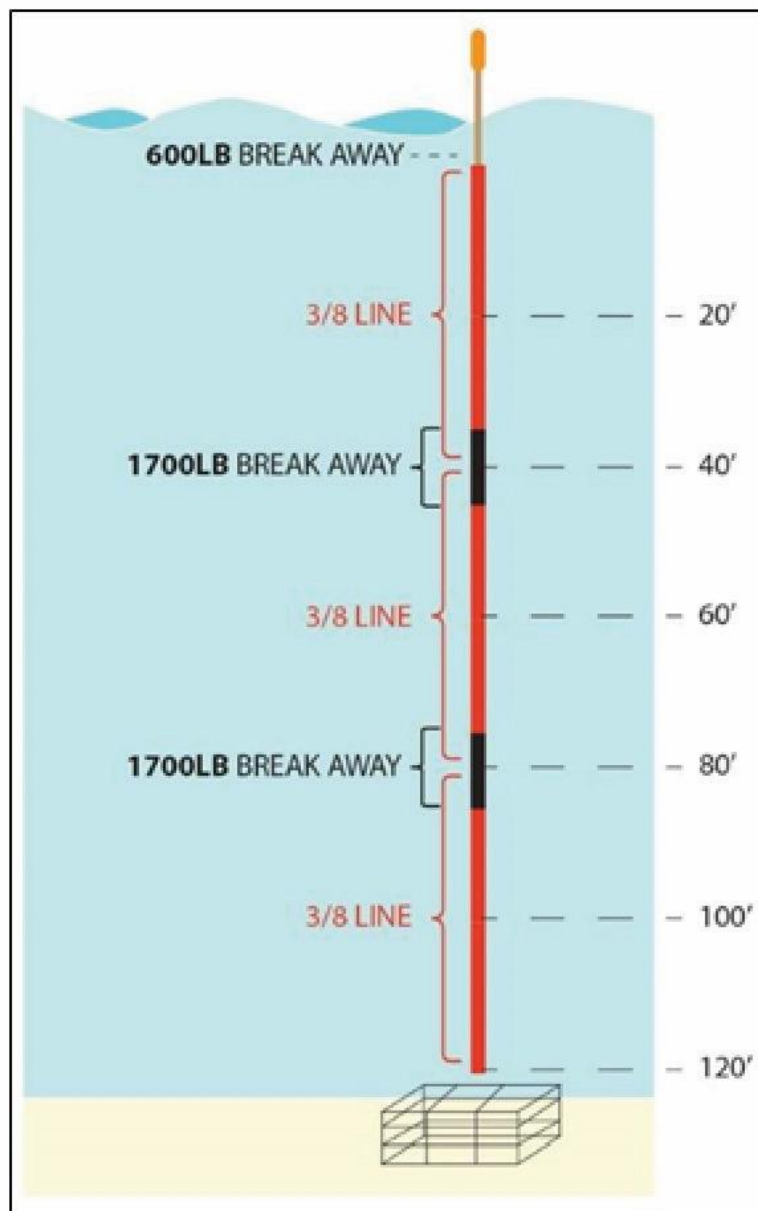


Figure 2. A buoy line can incorporate several sleeves equally spaced along its length. The 600 lb value refers to a plastic weak link used in specified US fixed gear fisheries. Source: South Shore Lobster Fishermen's Association, MA.

This series of handouts provides information about gear modifications that are expected to lessen the severity of whale entanglement in fishing gear, by lowering the breaking strength of conventional vertical line to below 1,700 lb without compromising crew safety or adding to gear loss. Successful methods are expected to vary by fishery. These modifications do not prevent entanglement, rather they increase the likelihood of entangled whales freeing themselves, thus enhancing their feeding success, growth, reproduction and chances of survival. The series may grow as additional methods are developed and refined. Methods developed to date result from the ingenuity of fishers, supportive industries, and entrepreneurs. The Government of Canada is not promoting or endorsing any of these products or methods, but is sharing the information to support fishers' exploration of options.

The Government of Canada, the Atlantic Provinces and the Province of Quebec are providing financial support for trials of fishing gear modifications through the Atlantic Fisheries Fund (dfo-mpo.gc.ca/fisheries-peches/initiatives/fish-fund-atlantic-fonds-peche/index-eng.html) and the Quebec Fisheries Fund (dfo-mpo.gc.ca/fisheries-peches/initiatives/fish-fund-quebec-fonds-peche/index-eng.html).

Field testing

In Canada

Preliminary field tests of Novabraid sleeves were initiated in lobster fisheries in Nova Scotia, New Brunswick and PEI in 2020. In Nova Scotia, using 25 pot trawls the high tide conditions twisted $\frac{1}{2}$ inch buoy lines to the point that the sleeves became non-functional. Results from trials in fishing conditions more similar to those in the US are pending.

Elsewhere

Field testing in the U.S. sleeve assembly, operational efficiency, durability, and breaking strength. The average breaking strength was 1,213 lb, and the highest was 1,550 lb. The sleeve failed 11.8% of the time, compared to 8.5% for regular buoy lines. Most lobster gear breaks occurred when the gear was soaking, possibly due to passing vessels inadvertently towing gear.

Recommended Research

- Experimental trials of 1,700 lb 3/8 and $\frac{1}{2}$ inch sleeves in Canadian fisheries
- Measure the load placed on buoy lines in different fisheries
- Experiment with different sleeve designs to develop sleeves of appropriate breaking strengths for a variety of fishing conditions, and for different rope diameters
- Compare the breakage frequency of 1,700 lb breaking strength buoy lines and regular buoy line fitted with 1,700 lb braided sleeves

