

Innovative Technologies

to Alleviate Whale Entanglements in Fishing Gear:

Polyethylene Weak Rope

How it works

Weaker rope increases the likelihood that a whale may free itself from an entanglement, thus preventing prolonged entanglement resulting in injury, stress, and possibly death. Examination of rope removed from entangled North Atlantic right whales suggests that they can break free from rope of 1,700 lb breaking strength or less.

Description

In 2018, Tufropes Pvt Ltd. of India produced a “weak” rope from 100% polyethylene. The fibres of this rope have a circular cross-section, unlike the elongated flattened fibres of commonly manufactured polyethylene rope. They fabricated the rope in five rope sizes (3/8, 7/16, 1/2, 9/16, and 5/8 inch) with the strength corresponding to the diameter. The rope is bright red, because red and orange are reported to be more readily detected by North Atlantic right whales. The manufacturer continues to refine its product.

The breaking strength of the 3/8 to 5/8 inch rope ranges from 642 to 1,630 lb, providing options for operation-specific use within gear configurations, and across fisheries using different gear and operating under different conditions.

Different minimum tensile strengths are needed for different situations. One location in gear may be able to accommodate 650 lb, whereas in another, the lowest operational value may be close to 1,630 lb. For example, lobster fisheries that use single or double traps may be able to haul gear using weak rope, without breakage. In contrast, weak rope through the entirety of a buoy line may be less likely to function effectively to haul longer trawls of 10 to 40 pots. In long trawls or single pot snow crab gear, which when full of catch could weigh up to 800 lb, weak rope could possibly be used in the upper 30-50% portion of buoy lines. Hauling speed may also be slowed to accommodate fishing gear with weak rope.

Weak rope also may work as head rope in demersal gillnet panels, as this location does not take on very high tension during hauling, but contributes to entanglement risk as it may be ~3 to 4 m off the bottom.

Potential gear configurations for heavy loads

- *A weak rope buoy line hauls up the anchor or first lobster trap in a trawl, with the rope between the anchor and first trap (or first and second trap) slightly longer than the water depth, and normal lengths of regular groundline between the other traps*
- *Weak rope as the upper segment of buoy line, and the remainder is regular strength rope. Together they are long enough that the weight of the gear is supported by the spliced-in regular rope.*
- *Weak rope could act as a ‘tag line’ to haul up regular rope stored on the bottom, next to the set gear.*

Cost

Likely similar in price to currently used polyethylene rope.



3/8 inch red ‘weak’ rope made by Tufropes Pvt Ltd., India and distributed by Enterprise Shippagan, NB



Pros

Likely a working option for many fishing operations. Red rope may be more visible to North Atlantic right whales. Provides low breakage points along a longer segment of the buoy line (vs. weak points or links).

Cons

If applied incorrectly, weak rope can break, resulting in lost gear. Availability is limited. To date, a non-lead negatively buoyant version has yet to be developed.

Management and Enforcement

The red colour is unique at this time in Atlantic Canadian fisheries. Colour tracers may be added during manufacture to support colour marking requirements.

Availability

The rope is made by Tufropes Pvt Ltd., India and is being distributed by Enterprise Shippagan (www.entship.ca). If a demand exists, other companies may also develop their own version of weak rope.

Field testing

In Canada

Red polyethylene weak rope was tested in 2019-2020 with snow crab gear in the southern Gulf of St. Lawrence, during the commercial fishery. The weak rope was successful as entire buoy line, when accompanied by a set limiter to slow or halt hauling at a pre-set load limit. Results with lobster gear in the Bay of Fundy over two seasons also are encouraging.

Elsewhere

In the US, preliminary tests are underway.

Recommended Research

- Test reliability and ease of use as buoy line in pot/trap fisheries.
- Match the weakness (diameter) of the rope to particular fishing situations based on load cell tests and field trials.
- Develop a non-lead, sinking weak rope
- Field test as head rope of gillnet panels.



Figure 2. North Atlantic Right Whale breaching.

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).