

Innovative Technologies

to Alleviate Whale Entanglements in Fishing Gear:

Plastic Weak Links

Description

A plastic weak link is a small connector between a surface buoy and a rope, used as an insert near the surface. It has two rings or 'eyes' and is made of high-density polyethylene plastic (HDPE). One eye is designed to be weaker than the other (Figure 1). Some versions have a swivel built in, to prevent rope twisting. These weak links are made in different sizes, with different breaking strengths.

How it works

The weak point in one eye is created by a notch or a thinner plastic ring. The rope holding the fishing gear is attached to the weaker eye, and the surface buoy is attached to the stronger eye. It is designed so that if the link breaks because of a whale entanglement, the buoy and broken link would be removed from the whale and the remaining bitter end of line may release itself, or facilitate disentanglement by responders. Fisheries that place more stress put on buoy lines during operations would require links with higher breaking strength.

Cost

Plastic weak links cost approximately \$1 USD each, varying by size. They are available in cases of 100, and most fixed-gear fishers would need one to two cases to rig their gear, depending on their license conditions and gear configuration.

Pros

Plastic weak links are inexpensive and simple to manufacture. Fishers can insert them in existing fishing gear at the surface buoys, without hauling gear from the water. This includes fishing gear types that deploy buoy lines, such as lobster, snow crab, gillnet and demersal longline. The plastic weak links are durable under a variety of fishing conditions.

Cons

Plastic weak links only function at the buoy attachment and not at depth because they can't pass through a plate hauler. They can be overridden as weak links by wrapping in rope, increasing their breaking strength over their intended design. Occasional breakage of the link can occur, for example because of entangling debris in extreme tide conditions, or boat traffic that may sever buoy lines at weak links. Accidental breakage is most serious for single traps, as this may increase the occurrence of ghost gear. In contrast a trawl of traps with a broken weak link can be retrieved using the buoy line at the other end of the trawl or by grappling.



Figure 1. A selection of plastic weak links used in US fixed gear fisheries. The upper left link breaks at 1,500 lb and the other three at 600 lb. The lower most is a flat, non-swivel version.



Management and Enforcement

Plastic wink links can be inspected visually at the surface. Potential tampering with additional rope over the weak breaking point of a link would need to be monitored.

Availability

Commercially available through a number of US distributors.



Figure 2. Surface-feeding North Atlantic right whale, Gulf of St. Lawrence, October 2019. Credit: Pete Duley (NOAA).

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

Not field tested in Canada, though many fisheries use similar techniques and practices as in the US, and can be expected to function similarly.

Elsewhere

Required for use in US Northeast fisheries since the early 2000s.

Recommended Research

- Monitor U.S. re-inspection of stored fishing gear taken from entangled right whales to evaluate whether a weak link was present and if so, whether it was broken. It would be advantageous to stay abreast of this study being undertaken by the National Marine Fisheries Service and the New England Aquarium.
- Examine the use of alternative approaches to a plastic weak link at the buoy or other locations in fishing gear.
- Measure the load placed on buoy lines in different fisheries. The Acadian Crabbers Association is conducting this study for the snow crab fishery in the southern Gulf of St. Lawrence and Coldwater Lobster Association is doing this for SW Nova Scotia.

