Practical Considerations and Testing of Escape Panel Material in Fish Traps

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RESUMEN

Los Consejos de Administración de Pesquerías, en sus planes de procedimientos en la pesquería de peces de arrecifes (coros) en el Caribe y Golfo de México, recomiendan utilicen paneles de escape "auto-desintegrables" en las nasas para peces a fin de reducir la incidencia de pesca con "nasas fantasmas." A petición del Consejo del Caribe, el Centro Pesquero del Suroeste del Centro Nacional para el Servicio de Pesquerías Marinas efectuó una serie de pruebas en materiales para tales paneles.

Debe tenerse en cuenta las varias condiciones para la selección de material aceptable como "auto-desintegrable": el material debe ser barato, localmente acequible, facil de reemplazar y tener una determinada durabilidad.

Tanto fibras naturales (yute y sisal) como alambre corrientemente disponible (calibre 16 y 22) se usaron en paneles de prueba, bajo condiciones estáticas (pruebas en tanque) como en condiciones de flotabilidad (muelles).

En la condición de libre flotabilidad, el yute no-engrasado y la cuerda de sisal duraron 42 días antes de deteriorarse y separarse. Ambos calibres de alambres se encontraban aun intactos al final de los 120 días, bajo ambas condiciones de prueba. En la condición estática, hubo variabilidad entre la fibra de sisal que duro 89 días y la de yute no engrasado que se separó después de 65 días. La amplitud de la temperatura durante el experimento fue de 18.5°C-22.5° C y la salinidad varió de 33.3-35.9 ppt. El costo de la fibra natural fué menos de 1/2 centavo por pie, y el costo del alambre varió entre 1-1/2 centavo por pie, según el calibre y la cantidad adquirida.

Traps or pots are the primary methods of fish harvest throughout the Caribbean and are responsible for 65% of the inshore fish production (Munro, 1974a). In the U.S. Virgin Islands over 80% of the fishermen use only fish traps (Olsen, Dammann and LaPlace, 1978) and in Puerto Rico over 52% of the inshore catch is from fish pots (Juhl and Suarez-Caabro, 1973).

Movements of fish in and out of traps reflect the behavior and response of various species to the traps. Several authors (Dammann, 1969; Munro, 1974b; Allan Craig, Florida Atlantic University, 1978, personal communication) have observed egress from open-mouthed traps. Escapement may reach 50% in 7-10 days of soaking (Munro, 1974b). Conversely, some species will perish in traps and others will be unharvested if the trap is lost (Thompson and Munro, 1974).

The continuing harvest of non-retrievable traps has been called "ghost fishing." An issue of the Marine Fisheries Review (Vol. 40: No. 5-6, May-June, 1978) was devoted to articles discussing various aspects of ghost fishing. The area and fisheries covered were northern and temperate and primarily invertebrates. One major study from this publication (Blott, 1978) examined four release of catch methods: degradation of webbing, corrosion of lid hooks, degradation of trap material (wood laths), and opening of a door with

Table 1. Results of durability testing of release panel material (80 Observations)

Material	Duration (days)	
	Static	Free-flowing
Un-oiled jute twine	65	42
Parcel post sisal twine	85	42
16 gauge galvanized wire	120+	59+
22 gauge galvanized wire	120+	59+ (42)*

*First failure of test wires

a time release mechanism.

The Spiny Lobster and Shallow-Water Reef Fish Management Plans of the Caribbean Fishery Management Council contain recommendations for the incorporation of a self-destruct escape panel, lasting no more than 3 months, in the traps utilized in these fisheries in the Fishery Conservation Zone. The Gulf of Mexico Fishery Management Council has recommended in their Reef Fish Management Plan that degradable or other self-destructing panels be incorporated into fish traps with a durability of 5-15 days. The Snapper-Grouper Fishery Management Plan of the South Atlantic Fishery Management Council proposes the inclusion of a 12x12 inch degradable panel on the side or end of the trap. General regulations for such a panel are in effect for the territorial waters of the U.S. Virgin Islands.

Several criteria for an acceptable self-destruct panel are proposed: the panel and material must be inexpensive, available locally, simple to replace and have some predictable durability.

A series of experiments was conducted to determine the durability of materials that would meet the above criteria for a self-destruct device. Both natural fibers (un-oiled jute and sisal) and commonly available galvanized wire (16 and 22 gauge) were used in the testing. Panels were made up of the materials with equal length strands under equal tension and were subjected to static and free-flowing marine conditions. Identical panels were placed in seawater tanks and suspended from docks at the Virginia Key Marine Science Complex, Miami, Florida. There was a total of 4 replicates resulting in 80 observational units. The temperature range over the length of the experiment was 18.5°C-22.5°C and the salinity varied from 33 to 35 ppt.

In the free-flowing dock situation the un-oiled jute and sisal twine lasted 42 days before deteriorating and separating. Both gauges of wire were still intact at the termination of testing at 120 days. Under the static tank condition, there was a difference in fiber durability with sisal lasting 85 days and un-oiled jute separating after 65 days. Table 1 summarizes the results of durability testing.

Limited use has been made of galvanic couplings with a short prescribed life span in conjunction with trap harvesting. Richard (1971) reviewed galvanic coupling and related temperature, salinity and anode-cathode relationships. Galvanic couplings with a life span of up to 14 days were

Table 2. Cost of release panel test materials (Retail Purchase)

Un-oiled jute twine	0.3¢ per foot (69¢/200 ft)
Parcel post sisal twine	0.5¢ per foot (79¢/135 ft)
16 gauge galvanized wire	1.6¢ per foot ($1.79/110 ft)
22 gauge galvanized wire	1.1¢ per foot (99¢/85 ft)

available, and presently 7-day durability couplings are available commercially in Miami at $0.40 per coupling. An anode-cathode wire could be fabricated if demand made manufacturing economically feasible. Cost of the natural fibers was less than one-half cent per foot and wire costs were about 1 cent per foot. Table 2 compares the cost of materials used in our tests.

Short-term degradable panels (measured in days) have not been readily accepted by fishermen because of possible catch losses and time lost repairing or replacing panels. Use of panel materials lasting up to 6 months has not been readily accepted by some fishing groups (Blott, 1978). If seasonal restrictions were in force for the pot fishery, the life span of the panel could be correlated with length of season. If the self-destruct panels were replaced at regular intervals with materials of a known life span, the fishermen would reduce their possible catch losses and still carry out the principle of the self-destruct panel. The panel should be designed to prevent or reduce ghost fishing without reducing the efficiency of the trap, fisherman's harvest or significantly increasing the cost. The inclusion of a self-destruct panel during the initial construction of the presently used trap designs would ensure an additional escape route from the trap should the traps be lost or abandoned. The final establishment of the life-span of the self-destruct panel may be more dependent on fishing efficiency than on biological considerations.

In conclusion, it should be emphasized that several additional materials should be evaluated under actual harvesting conditions, and self-destruct panel configurations should also be tested.

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