Hook Pod Update

Department of Conservation *Te Papa Atawhia*

Conservation Services Programme Technical Working Group

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The purpose of this document is to provide a brief overview of the development and at-sea trialling of the Hook Pod to inform discussion about the upcoming trials on multiple vessels in the New Zealand surface longline fleet.

Background

It has long been recognised that a combination of measures is required to effectively reduce seabird bycatch in fisheries (FAO 1999, Løkkeberg *2008*, FAO 2009, Melvin *et al.* 2014). In the case of pelagic longline fisheries this combination of measures reflects the light weight, and inherently slow sinking rate of the gear, which unlike demersal longline is designed to float in the water column. Current best practice mitigation advise for pelagic longline fisheries developed by the Agreement for the Conservation of Albatrosses and Petrels (ACAP) reflects this standard stating that '*A combination of weighted branch lines, bird scaring lines and night setting are best practice mitigation in pelagic longline fisheries'* (ACAP 2014).

However, fishermen, fisheries managers and conservationists have long been trying to identify an effective 'one-stop' measure to reduce seabird bycatch in pelagic fisheries that is

operationally simple to use and does not limit fishing opportunities (e.g. night setting). Despite the development and testing of a range of such mitigation measures none have been refined and scientifically proven to be operationally effective to the point where they have achieved uptake in commercial operations. Therefore, fishermen remain dependent on a combination of measures that are often difficult to deploy, can have limited effectiveness at reducing seabird bycatch under certain conditions and often restrict fishing opportunities.

The concept of the Hook Pod arose from discussions about simplifying operations for fishermen with the development of a single, re-usable mitigation device. The fundamental principle of the Hook Pod is to harness the inherently reliable force of pressure at depth to drive a mechanism that releases the baited hook once it reaches a prescribed depth. From the outset we were guided by the following key principles:

1) a high degree of effectiveness in reducing seabird bycatch;
2) no reduction in catch rate or size of target species; and
3) cost-effectiveness to the end-user (fishermen) and operationally simple

The pod is reusable for several years and latter models had an LED incorporated that was designed to replace disposable chemical light sticks and it therefore has the potential to not only reduce the incidental capture of threatened seabirds but also but also to make a contribution to reducing marine debris associated with pelagic longline fisheries round the world.

The operational characteristics of the Hook Pod are as follows:

Attachment – Hook Pods are attached to each individual branchline using a simple, locking collar mechanism that grips the monofilament at any desired distance from the hook. The collar has spring loaded plastic ball-bearing that applies pressure on the monofilament to hold the Hook Pod in place without damaging the monofilament. The monofilament then passes through an eye at the bottom of the Hook Pod to ensure the branchline remains flush with the pod in order to reduce potential snag points in the setting bin (Fig. 1).

Loading – Once the hook is baited the crew simply holds the Hook Pod and pushes the point of the hook through the spring loaded doors at the terminal end of the pod and hook is

loaded/disarmed (Fig. 2). This operation takes around one second, which is less time than it takes to attach chemical light sticks to the branchline, as is common practice in many pelagic longline fisheries.

Retrieval – During hauling the Hook Pod is returned in an open state and the crew simply closes it using one hand and handles and stores the branchline in the normal manner.

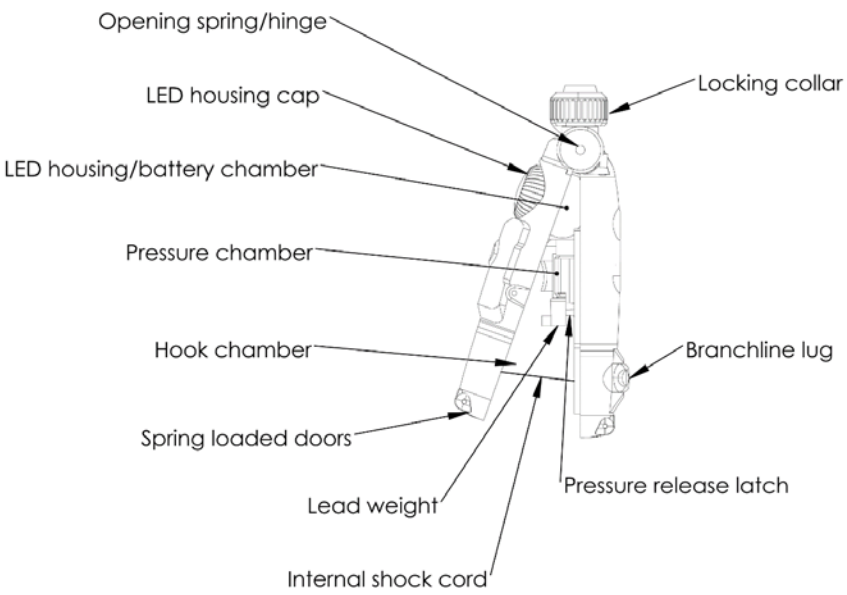

Figure 1. Components of the Hook Pod (NB the diagram depicts a version of the pod with the LED included, the version used in the New Zealand trials (see below) did not contain the LED components)

At-sea trails

The first trials of an early Hook Pod prototype were undertaken in Tasmania in 2009. Since that time the pod has undergone many iterations and modifications. In 2011, we commenced trials on commercial fishing vessels and we have now conduced these in Australia, Brazil and South Africa. The findings of these trials have been submitted to *Fisheries Research* for publication. In summary, during 19 at-sea trips (over 62,000 experimental hooks) conducted in Australia, Brazil and South Africa from 2011-2015 we recorded only a single seabird

mortality on the Hook Pods compared to 24 on the control branchlines of standard gear, a bycatch rate of 0.034 birds/1000 and 0.77 birds/1000, respectively. A generalised linear mixed model indicated no significant differences in catch rate and size of target and non-target fish species between Hook Pod and control treatments (Sullivan *et al*. Submitted).

Agreement on the Conservation of Albatrosses and Petrels (ACAP)

The years of development and at-sea trialling of the Hook Pod in multiple pelagic fisheries and the pending publication of these finding resulted in the 9th Meeting of the ACAP Advisory Committee to adopt the recommendation of the ACAP Seabird Bycatch Working Group to recognise the Hook Pod as a 'stand alone' mitigation measures for pelagic longline fisheries, noting that it meets revised ACAP minimum standards for line weighting. This recommendation provides an excellent opportunity for Hook Pod Ltd to start to work with pelagic longline fisheries around the world to achieve wide spread adoption of the pod to reduce seabird bycatch in pelagic longline fisheries to near zero levels.

Current at-sea trials

In addition to the trials that were conducted in conjunction with the BirdLife Albatross Task Force in Brazil and South Africa, and those undertaken in the Eastern Tuna and Billfish Fishery (ETBF) in collaboration with the Australian Fisheries Management Authority (AFMA) we have also conducted trials in Japan in collaboration with the Japanese Fisheries Agency (JFA). Our first round of trials were undertaken in Japan 2015 and we currently have a batch of pods being tested on a commercial high seas pelagic longline vessel under charter to JFA.

New Zealand trials

In August 2014, we conducted preliminary operational trails (one 5 day at-sea trip) of the pod onboard the *FV Commission*. Only a small number of pods were tested, largely to give the fishermen a sense of how they fitted into their operation. In 2015, we worked with the Ministry of Fisheries and Department of Conservation to fund the development of a pod specifically for trials in the New Zealand surface longline fishery. This version of the pod ('mini pod') had the LED removed to create a pod that is 30% smaller and 25% lighter (45g) than the LED version. The results of trails conducted onboard the *FV Commission* in April

2016 are available in a separate report. In summary, we again recorded no significant difference in catch rate or size of target species. Based on a cost-benefit analysis of the economics of the hook pod for fishermen, we established an *a priori* threshold rate for device failure of 1% per set. During this trial we recorded a total failure rate (broken pods and those that failed to open) of 15 pods from a total of 3320 repetitions at a rates of 0.452, which is less than half our threshold failure rate. In addition we lost 8 pods (assumed to shark bite-offs) which gives a total failure/loss rate of 0.693, which is still well below our threshold rate.

Importantly, the vessel owner, skipper and crew were pleased with the performance of the pods both in terms of catch rate and also their durability and the ease in which they fitted into their fishing operation.

The feedback from these latter trials between industry and government agencies and recent seabird bycatch events has created an opportunity to provide a small batch of pods (30 per vessel) to a significant proportion of the surface longline fleet to enable the industry to understand their operational characteristics and to start to build confidence in their use. It is unlikely that from such a small sample per vessel we will be able to demonstrate their effectiveness at reducing seabird bycatch, but this has clearly been demonstrated this in other fisheries around the world.

Next steps

We currently have 14 vessels who have agreed to trail the pods (30 per vessel) in the coming weeks/months. At today's meeting we hope to discuss and identify the most effective and efficient way to coordinate and manage the trials and ensure we receive the feedback required to maximise the opportunity to explore the potential for the adoption of the pod in the surface longline fishery. A presentation provided in the morning session will address these issues with the input and assistance of all participants.

Dr Ben Sullivan
Fishtek Marine/Hook Pod Ltd
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References

Løkkeberg, S. (2008) Review and assessment of mitigation measures to reduce incidental catch of seabirds in longline, trawl and gillnet fisheries. FAO, Rome.

Melvin, E.F., Guy, T.J. and Read, L.B. (2014) Best practice seabird bycatch mitigation for pelagic longline fisheries targeting tuna and related species. *Fisheries Research* **149**, 5-18.

United Nations Food and Agriculture Organization. (1999) *International Plan of Action for Reducing Incidental Catch of Seabirds in Longline Fisheries*. Rome, pp 33. (Download at: http://www.fao.org/fishery/ipoa-seabirds/en

United Nations Food and Agriculture Organization. Fishing Operations (2009) *Best practices to reduce incidental catch of seabirds in capture fisheries*. FAO Technical Guidelines for Responsible Fisheries No. 1, Suppl. 2. Rome, pp 64. (Download at: http://www.fao.org/3/a-i1145e/index.html