Agreement on the Conservation of Albatrosses and Petrels

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Progress report on the BS30 Underwater Bait Setter for pelagic longline fisheries

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Background

Following four years research and development a prototype version of the underwater bait setter (Figure 1) was trialed in the Uruguayan swordfish fishery in September/October 2010. The project was a collaboration between Amerro Engineering, the Australian Antarctic Division, the Direccion Nacional de Recursos Acuaticos (DINARA) and Golden Star Fisheries S.A (Uruguay). This fishery was chosen because the waters of Uruguay are frequented by large numbers of seabirds (from South Georgia/Islas Georgia del Sur, the Falkland Islands/Islas Malvinas and Tristan da Cuhna), including white-chinned petrels and black-browed albatrosses. In 35 days fishing 15,000 hooks were set by hand and 15,000 hooks set underwater with the bait setter. Seabird catch rates and catch rates of target and non-target fish species were compared head-to-head.

There were no statistical differences between setting methods in catch rates of target and non-target fish. Two birds were caught by underwater setting compared to11 seabirds caught by hand setting. Both birds caught by underwater setting were a consequence of secondary interactions. The prototype version of the machine set hooks no deeper than 4-6 m (depends on sea state), which obviously was not deep enough to deter deep diving petrels and shearwaters. Still, the experiment accomplished what was intended, which was to give the machine a thorough workout in real fishing operations against difficult-to-deter seabirds. Operationally, the prototype performed well, indicating the design concepts and build quality were up to the standard required for the South Atlantic.

Improvements

The prototype version trialed in Uruguay arrived back in Australia in January this year. Since then we have been working to improve its performance based on the lessons learnt in Uruguay. The changes are designed to:

a) attain depths deeper than 6 m while at the same time reducing the cycle time,

b) cushion the capsule holding unit when it reaches the end track during the descent,

c) eliminate branch line hook-ups in the capsule on the descent, and

d) maximise the sink rate of the capsule.

Our most recent sea trials in Australia reveal that the maximum depth has been extended to 10 m with an 8 second cycle time (c.f. 6 metres/10.5 seconds for the prototype trialed in Uruguay). It is hoped that this depth will eliminate white-chinned petrel mortality. The improvements were achieved by doubling the output from the hydraulic power pack and “powering out” the spectra rope on the decent phase in order to eliminate drag. It is expected that the cycle time will be further reduced when the final version of the capsule is incorporated into the machine.

The impact of the capsule holding/docking device at the bottom of the track has been solved by fitting a water cushioning piston to the bottom of the track. This robust, virtual maintenance free device is highly effective in absorbing the shock generated at the bottom of the track.

Branch line/capsule tangles occur when the sections of the branch line momentarily foul the bottom of the track when the capsule is fired. Our preferred option to solve this problem is to cut slits in the fabrication at the back of the track to allow water to flush through and clear loose sections of monofilament. The second option is to cover the lower sections of the track in a shroud. Both ideas will be tested on our next sea trials. Regards the capsule design, we are currently building a new, more hydrodynamically efficient version with a much faster descent rate compared to the existing version. As well as the improved sink rate, the new version eliminates the possibility that bait can be flushed out the top section of the capsule during the rapid descent.

The next steps

The intention is to complete the modifications mentioned above and quantify their contribution to the improved performance with sea trials commencing in July this year. The underwater setter will then be deployed into production fishing operations in the Australian tuna fishery for nine months to identify (and rectify) any issues that might emerge. We aim to return to Uruguay in April 2012 to complete the proof-of-concept experiment that was commenced last year. In the southern spring on 2012 a scientific paper will be written on the results of the experiment.

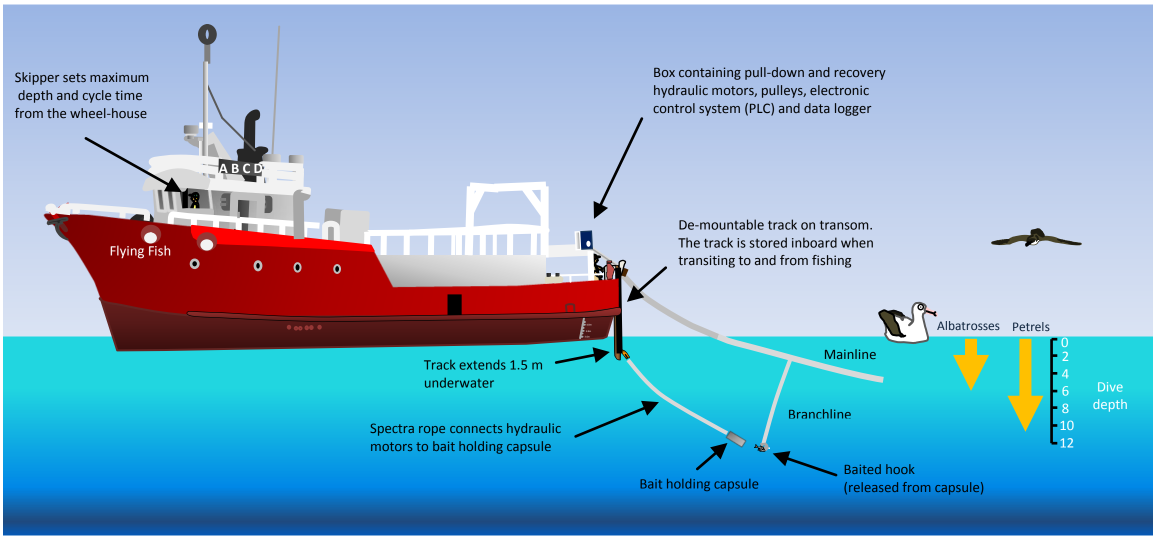

Figure 1. Stylised version of the BS30 underwater bait setter showing the key design features.