

Automatic robot to save labor in longline fishing with control engineering

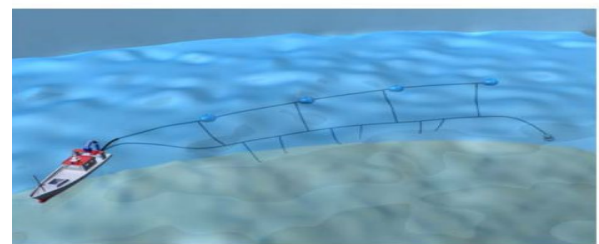
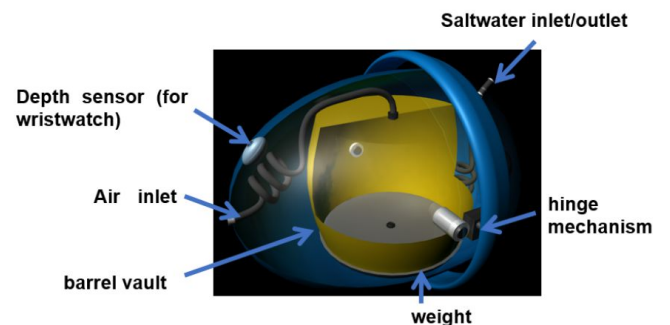
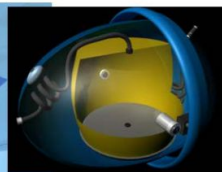
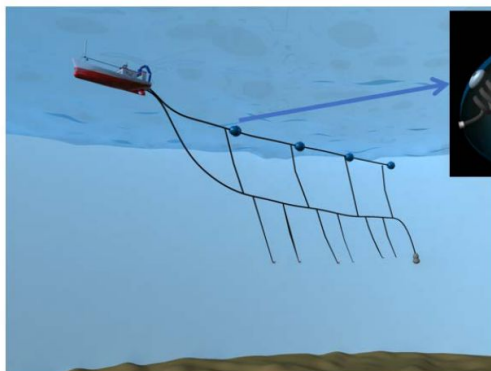
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Abstract

Most of the fishing currently practiced in Japan is done by small vessels with a small number of fishermen (one or two). One of the most common fishing methods is longline fishing. However, this method requires the vessel to operate at a constant low speed because the depth of the hook must be kept constant while adjusting the speed of the fishing boat to the tidal current. In addition, because the vessel must maneuver and fish at the same time, automation is desired. Thus, we propose a robotic system that can control the depth of the trap at a constant depth even when the speed of the vessel and the current change, and that can successfully fish without the need for skilled fishermen. Fishing can be conducted regardless of the speed of the vessel, whereas currently it is controlled by the speed of the vessel and the tidal current. Therefore, it may contribute to proposing new fishing methods as well as the existing ones. This can contribute to the shortage of successors to the fishing industry and to the revitalization of the fishing industry.



Conclusions

We surveyed fisheries in Japan to understand the specifications required for longline fishing. In addition to a buoyancy regulator, a lift regulator was added. A simple and inexpensive system was devised to achieve these structures. The system uses the surface of the water as a piston and circular wings as a mechanism to raise and lower the trap. First, when the fish finder responds, target values for vessel speed and depth are set. Next, the average value of the signal acquired from the depth sensor attached to the main unit is fed back, compared with the respective target values for vessel speed and depth, and signals are sent from the controller to the buoyancy regulator and the motor of the circular wing system. Linking this system to a fish finder is within the feasible range of modern technology and is considered feasible well within the limits of the law. The authors hope that this system will greatly improve labor savings for future fishermen.