12-14-1981

The Backus Patent Tong and Its Potential for Harvesting Oysters Commercially

James P. Whitcomb
Virginia Institute of Marine Science

THE BACKUS PATENT TONG AND ITS POTENTIAL FOR HARVESTING OYSTERS COMMERCIALLY.

By

James P. Whitcomb
Department of Applied Biology

Virginia Institute of Marine Science
and
School of Marine Science,
The College of William and Mary
Gloucester Point, Virginia 23062

December 14, 1981

Marine Resource Report #81-12

The Backus Patent Tong and Its Potential for Harvesting Oysters Commercially.

James P. Whitcomb
Department of Applied Biology

Virginia Institute of Marine Science
and
School of Marine Science,
The College of William and Mary
Gloucester Point, Virginia 23062

December 14, 1981

As a result of a request by the Virginia Marine Resource Commission, VIMS assisted in testing of the patent tongs designed by Jim Backus of Alexandria, Virginia. The VMRC furnished the vessel VIRGINIAN and three marine inspectors headed by Mr. Ben Daniel. Mr. Backus provided a helper and a vessel equipped for demonstrating the tongs. The vessel was a T-Craft measuring twenty-five (25) feet long and with a beam of nine (9) feet powered by a sixteen (16) horse power deisel engine. Mr. Whitcomb and Mr. Oesterling represented VIMS.

Testing was scheduled for Hoghouse Bar near Urbanna Creek in the Rappahannock River. Water depth on the site was eighteen (18) feet and oysters were plentiful on the bottom. Unfortunately, the wind, which was from the west, freshened after we cleared Urbanna Creek making the seas two to three feet.

The tongs were similar in size to commercial tongs. The basket was forty-eight (48) inches wide and the gape was forty-three (43) inches. Each tooth was four (4) inches long and adjacent teeth were separated by, on the average, three and one-half (3-1/2) inches. The tongs are closed and raised by hydraulic power. The bridle included a two to one

(2:1) mechanical advantage furnished by blocks built into the yoke of the gear. The basket was covered by re-enforcing wire.

The system is designed so that power has to be applied to raise the gear prior to power being provided for closure. This theoretically minimizes damage to the bottom. In theory control is maintained over penetration of the bottom by utilizing a cut-off arm with a block riding on the raising line. This same cut-off arm activates the power for closure. The raising line was five-sixteenths (5/16) inch nylon. Hydraulic power comes from an Tecumseh air cooled engine which drives a hydraulic pump. The controls consist of three levers for raising, lowering, closure and two pedals for clutching and braking.

The date of the test was December 8, 1981, and, the first site was in eighteen (18) feet of water. It proved impossible to get the anchor to hold on the hard oyster bottom with the wind and the ebb tide running the the same direction. Three water hauls (empty tongs) were made before moving inshore to get out of the wind.

However, the wind continued to freshen and the more protected site proved to be unsatisfactory after approximately the same number of attempted hauls or grabs. One tong grab contained approximately fifteen (15) quarts of mud in one end of the tong. This type of collection indicated that we had again dragged to the edge of the shelled area. While taking approximately six (6) grabs the raising line fouled the sheave twice, necessitating removal of the sheave each time. The removal and replacement of the sheave pin and retaining pin required at least twenty minutes. On two occasions the reel which retrieves the hydraulic lines became fouled.

Testing was terminated at 10:45 a.m. and the vessel was docked at 11:30 a.m.

Commenting upon the design and operation of the Backus tongs, it is my opinion that, with minor changes, the tongs could be operated and tested on a calm day; however, it would require fundamental changes to test the gear's efficiency against commercial gear.

The tongs close smoothly and maintain the teeth in the same plane while closing. Some minor problems which could be easily corrected in order to rescheduled testing, under specific conditions are as follows: the lack of space between the lowest part of the tongs and the cull board when the tongs are fully raised; the poorly designed sheave at the end of the davit, and the spool that retrieves the hydraulic lines. The sheave fouled twice while testing the tongs. If wire replaced the braided nylon and the sheave were replaced by a correct sheave the raising line would cease to foul. If the configuration of the attachment between the bridle and raising line were reworked it would result in at least six (6) additional inches of space between the gear and the cull board. The spool which retrieves the hydraulic lines is too small to carry lines adequate for thirty foot (30) depths and probably unnecessary for shallow depths. Its capacity should be increased.

More fundamental problems which should be corrected with the tongs are the teeth of the tongs and cut-off arm and their basic design. The teeth are longer than necessary, too widely separated and attached in position for digging rather than scraping. The teeth would be adequate if they were three inches long, spaced so that the point of the attachment

formed a solid bar when closed and attached parallel to the arc produced by the leading bar of the tongs as they closed. The cut-off arm interrupts the power used to close the tongs when there is slack in the raising line. This leads to partial closures when the gear bumps while the vessel is rolling on rough water. The cut-off arm might be more efficient in deep water with a wire raising line but probably would be better replaced by a manually operated closure lever in shallow depths.

When bringing the tongs aboard it is necessary to guide it with your hands. It is impossible to touch the tongs because of the sharp edges on the re-inforcing wire covering the basket. This should be re-designed.

Because the tongs have a design potential for harvesting oysters with little, or minimal damage to the bottom, it is recommended that VIMS continue to encourage and assist Mr. Backus in developing this gear.