Introduction

In 2008, 2009 and 2010, the Fisheries Technology and New Opportunities Program (FTNOP) provided assistance to Quinlan Brothers Ltd. (QBL) to develop a more technologically efficient snow crab butchering machine with the design work to be completed by the Centre of Aquaculture and Seafood Development (CASD).

Background

The snow crab processing industry relies heavily on a large workforce to manually process sufficient volumes of snow crab through a plant. Crab butchering is a labour-intensive process and requires skilled workers. Due to a decreasing labour supply, QBL received support in 2006/07 to engage CASD to develop a more effective, mechanical process for butchering snow crab.

Upon completion of the initial project, a viable prototype concept was conceived. Based on this concept, QBL committed to continue with this project to develop a proof-of-concept prototype that could be operated and tested in a full-scale, industrial processing environment. With the aid of the Department of Fisheries and Aquaculture (DFA), the Canadian Centre for Fisheries Innovation (CCFI), and the National Research Council of Canada (NRC), QBL contracted CASD to develop a snow crab butchering prototype based on the original concept.

Methodology

With the development of an assessed concept of a crab butchering machine, the next stage of development of this project (2008) focused on developing a concept model of the machine, capable of performing the functions currently being manually completed. Butchering requires a skilled worker to remove the mandibles and carapace from the crab before separating it into two sections from which the gills and viscera are removed. All of these functions were incorporated into the concept model.
The project team verified the design concepts of an automated crab-butchering machine were valid by building a virtual model. The completed concept model was presented to QBL and funding agencies with recommendations regarding future directions.

With continued support from QBL, in addition to financial assistance from FTNOP (2009), CCFI, and NRC, a proof-of-concept prototype was fabricated. The prototype functioned fundamentally as it was originally proposed: Crabs were placed on a conveyor system that carried the product through several butchering processes. Test trials were conducted at the Marine Institute’s (processing) pilot plant and yielded high quality, butchered snow crab.

In 2010, the development of a commercial crab-butchering machine was completed, and the machine was fabricated. Test trials were conducted at Quinlan’s processing operation in Bay de Verde plant.

Results

Through the progression of these projects, the design of a snow crab butchering machine was taken from concept to a final commercial design, including fabrication and testing. While the machine met and surpassed expectations, some areas were identified that needed refinement to ready the equipment to meet the needs of the crab-processing industry.

Conclusion

Due to the satisfactory results of the test machine, QBL has expressed an interest to continue to refine the snow crab-butchering machine and manufacture several for full-season, industrial testing and operation during the next commercial crab season.