

## **Automatic Casting Device for Handicapped Fishing**

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### **INTRODUCTION**

Because of the needs of persons with disabilities, there is a demand for specialized sporting equipment. The problem faced is to develop a partially automated casting device suitable for use by an individual with a handicap. The casting device with the associated motorized reel will be the first step in enabling a wide range of people with handicaps to fish. This device may then be used in conjunction with various control systems to meet the needs of a specific individual: for example, sip and puff, head switch, or joystick control. The project focused on the design and construction of the casting device.

### **SUMMARY OF IMPACT**

The intention of the project is to design a casting and retrieval system that can be used by an individual with limited manual dexterity. It is important to note that a hands free casting system is not being proposed. The casting as well as the retrieval will require push-button inputs. The individual is able to press buttons, but does not have enough coordination/strength to cast without assistance.



### **TECHNICAL DESCRIPTION**

With the intent of enabling an individual with a handicap to fish independently, our design executes the following sequence of operations. First the user turns on the device and adjusts the desired cast distance using two pushbutton inputs. From this point, the cock input is selected to ready the casting arm for the

cast. Next, the individual presses the cast pushbutton to wind the torsion spring, activate the line release solenoid, activate the trigger solenoid, and then de-activate all components at the appropriate time during the cast. The final step in the operation is to depress the retrieval push button to latch the reel and set the system for fishing. Once a fish is hooked the retrieval button can be used to bring the line in close enough for another cast.

Some of the details of the mechanical portion of the design include a sorbothane bumper and steel main shaft. The main plate, reel holder, bearing blocks and trigger mechanism are 6061-T6 aluminum. The stepper motor is mounted below the main plate, with the drive belt coming through the bottom of the plate. The line release solenoid is mounted on one side of the reel holder with the John's Reel on the other side. A cable connects the two over the top of the reel holder pulley. The trigger mechanism is operated by a solenoid mounted underneath the main plate. The fishing pole holder is mounted on bearings. It is made of aluminum and is allowed to rotate between the bumper and the self-locking trigger mechanism.

The control system will use four user inputs, one limit switch input, and will control four pieces of hardware: stepper motor, push type solenoid, pull type solenoid, and a double digit seven-segment display. The functional block diagram is provided below.

The control system consists of the MC68HC912B32 evaluation board (EVB). The controller accepts five inputs, performs calculations, and then controls the hardware accordingly.

