

The Iron Hand, Year Four

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This project was developed to fabricate a low cost, effective forearm and hand prosthesis for amputees to assist them in daily activities. After researching and collaborating with Lubbock Artificial Limb and Brace, the variables were compiled, and the design of the prosthetic hand was created. Using past designs to build upon and implementing new techniques the hand design was made to mimic a human hand. The prosthetic arm will be tested for its efficiency in terms of its ability to perform detailed daily activities, cost-efficiency, strength, and battery life. To further mimic the human muscles that move the fingers, Muscle-wire will be tested and compared to another motor, a Futaba 3003 Servo, to evaluate which actuator would be the best contributor to the prosthetic. To test the actuators, Muscle-Wire, and the Servos, they would be implemented into two prostheses of the same design and complete a series of tasks designated to test the capabilities of the actuators including gross motor movement, strength and battery life. After researching, it was hypothesized that Muscle-Wire would outperform the Servos. Testing for gross motor movement involved having the hand grasp and hold a selected object, resulting in either a failure or success. Durability and battery life tests were concentrated upon through an endurance test of opening and closing the hand, as well as a strength test of lifting a 10lb weight. The hypothesis was proved wrong as the Servos outperformed the Muscle-Wire in every field other than cost and weight between the arms.