

ES205-Robotics Project

PROSTHETIC ARM

Group No. 12

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INTRODUCTION

The most valuable possession of any human being is their Body. The human hand is a powerful tool for sensing and operating in the environment. When an arm or other extremity is amputated or lost due to combat disease and birth effects, a Prosthetic device, or Prosthesis, can play an important role in rehabilitation. For many people, an artificial limb can improve mobility and the ability to manage daily activities, as well as provide the means to stay independent.

PROBLEM

- Devastating Damage
 - Affects the level of Autonomy
 - Limiting working capability
 - Affects daily life activities
 - Alter social interaction
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Prosthetic Arm helps in

- Restores functionality of Human hand
- Replacing defective biological limbs with Technical Analogues
- Makes one Self-dependent
- Traumatic Injuries, including from traffic accidents and military combat.

SOLUTION

TASK ASSIGNED AND METHODOLOGY

- We had assigned the task to design the elbow part so we have planned to move ahead with 2 DC Servo Motors, one for the rotation along the elbow joint while the other for the rotation along the wrist.

- Dimensions- Elbow - Wrist = 25 cm

Elbow Ellipse = 8 cm, 4.25 cm

Wrist Ellipse = 5 cm, 3 cm

Spur Gear Radii = 3 cm, 1.5 cm

- We have used spur gears to counter the excess torque problem. Two gears with ratio of 1:2.

SPECIFICATIONS

DC servo motor used at elbow is of 60kg-cm torque while that at the wrist is 20kg-cm.

Expected Material Weight = 1kg

Expected Components Weight = .5kg

Torque Req(approx.) = 52.5kg-cm

8-bit microcontroller used is Arduino UNO.

3D material used is PLA (PolyActide)

Power Supply = 7.4V LIPO Battery(1000mAh)

DESIGN (CAD Model)

5 the torque from the servo by a factor of 2.10.

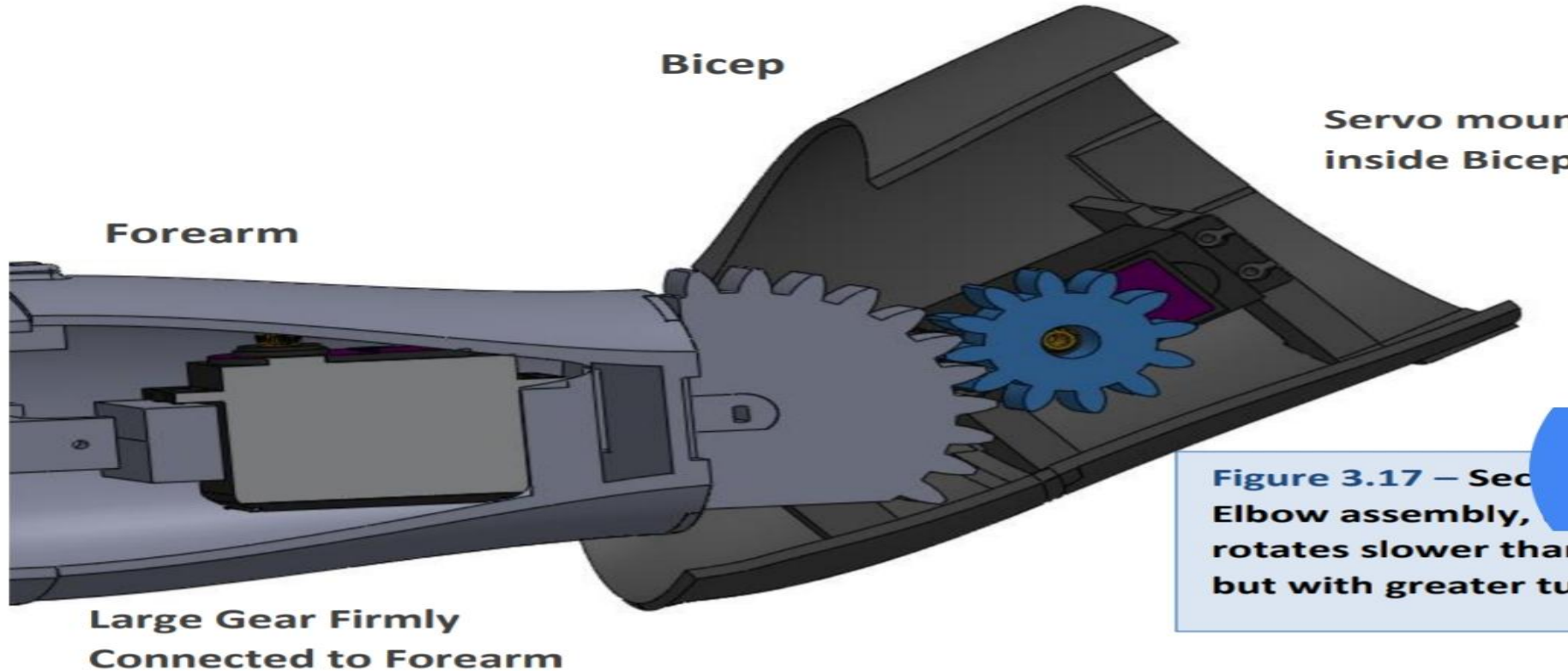


Figure 3.17 – Section of Elbow assembly, rotates slower than forearm but with greater torque

Connecting Arduino UNO to Servo motor(elbow)

