Project I Description

Project Name: Improved Exoskeleton Design for Paralyzed Athlete

Sponsor: Phoenix Industries – LAU – Michael Haddad

Team Size: 3 MEE Students

Project Overview

Michael Haddad is a T4-T5 paralyzed athlete suffering several drawbacks from his existing exoskeleton, namely the low energy efficiency and large impact forces. Experimental results with Michael demonstrated that he requires approximately 15 times more the energy/distance compared to normal persons. Also the results demonstrated that he is experiencing micro-shocks on the order of 16G when descending stairs. This project focuses on the design and testing of a passive energy recovering system with shock absorption. The system that is made of springs and dampers should be lightweight, safe, and reliable.

Project Areas and Majors needed

- Kinematics/CAE (2 MEE Student)
- Vibrations (1 MEE Student)

Project Deliverables

Design and Build the following component of the exoskeleton system:

- Design using multi-degree of freedom analysis the optimal values of the springs and dampers
- Using CATIA or SolidWorks, properly add the springs and dampers to the carbon fiber exoskeleton system
- Using computer simulations, make sure that the system will not destabilize the user
- Design the components for Manufacturing at Phoenix Industries
- Test and redesign when needed the components on Michael