



Harmar Mobility EU AL060

Design of a Mobility Lift for European Insider Applications

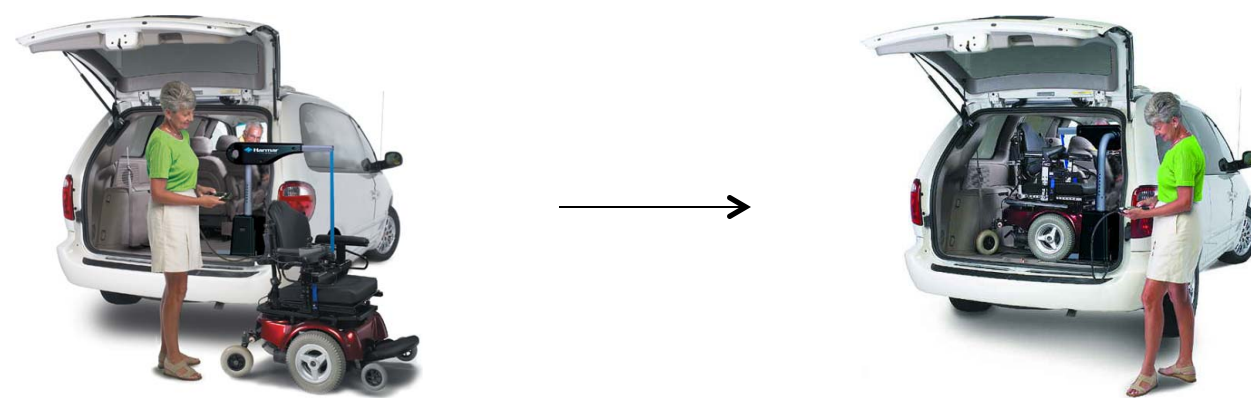
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 Department of Mechanical Engineering
 Representative: Mike Savinsky | Advisor: Dr. Carl Moore



Background

About our Sponsor

Harmar is an innovation and design leader that is dedicated to helping individuals enhance their mobility, independence, and quality of life. Their wide range of accessibility and mobility solutions are all built to offer the highest quality, reliability, and value.



Needs Assessment

Currently, there is a need to provide a solution for individuals in Europe who transport themselves in smaller vehicles. The task is to design a lightweight inside lift to compete in the European market.

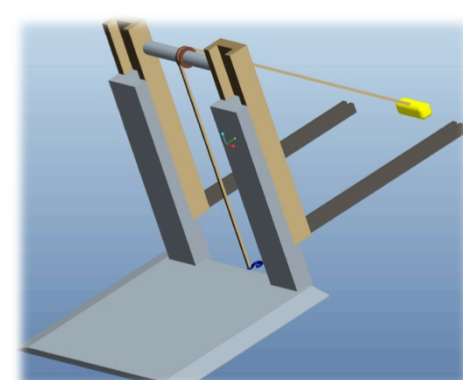
Objectives

- Fit into popular European vehicles
- Standard fold down option
- Capacity of 60kg (≈ 130 lbs.)
- Static load test of 180 kg (≈ 390 lbs.)
- Adjustable arm height and length
- Permanent installation in vehicle

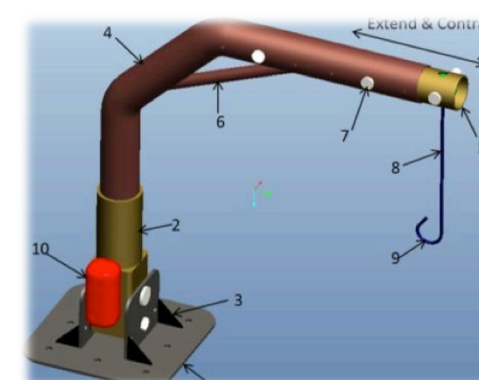


Initial Concepts

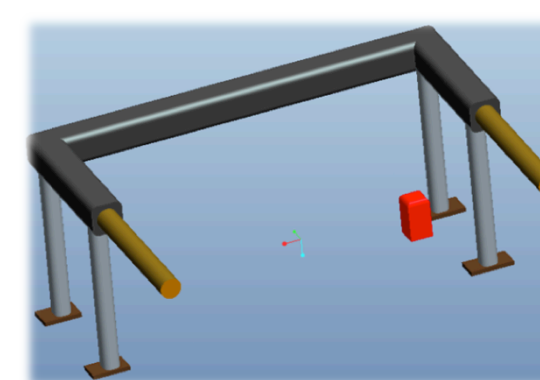
Design A: Fork-lift inspired; Too bulky
 Design B: Traditional crane design; Need for tube bender
 Design C: Drawer-like design; Too complex (bearing sliders)



(a)



(b)



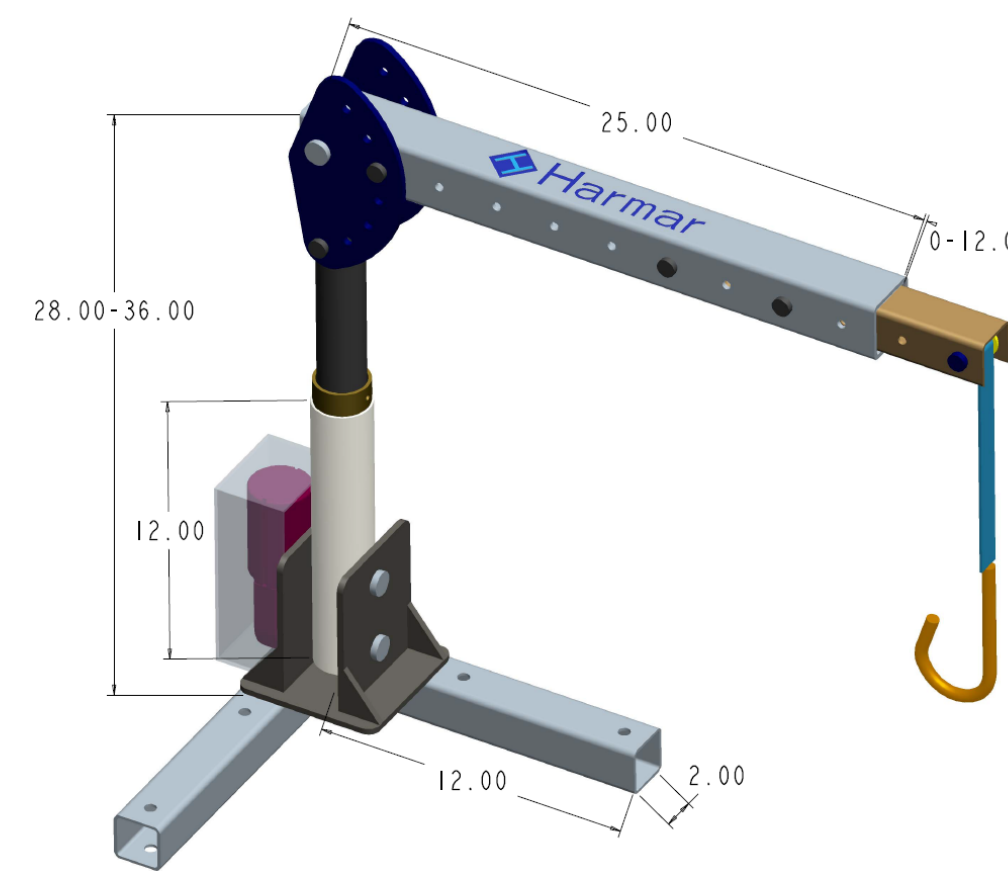
(c)

Design

Fall Semester Final Design

- 15 parts with assembly
- 4 DOF
- Adjustable neck
- Pulley housed internally

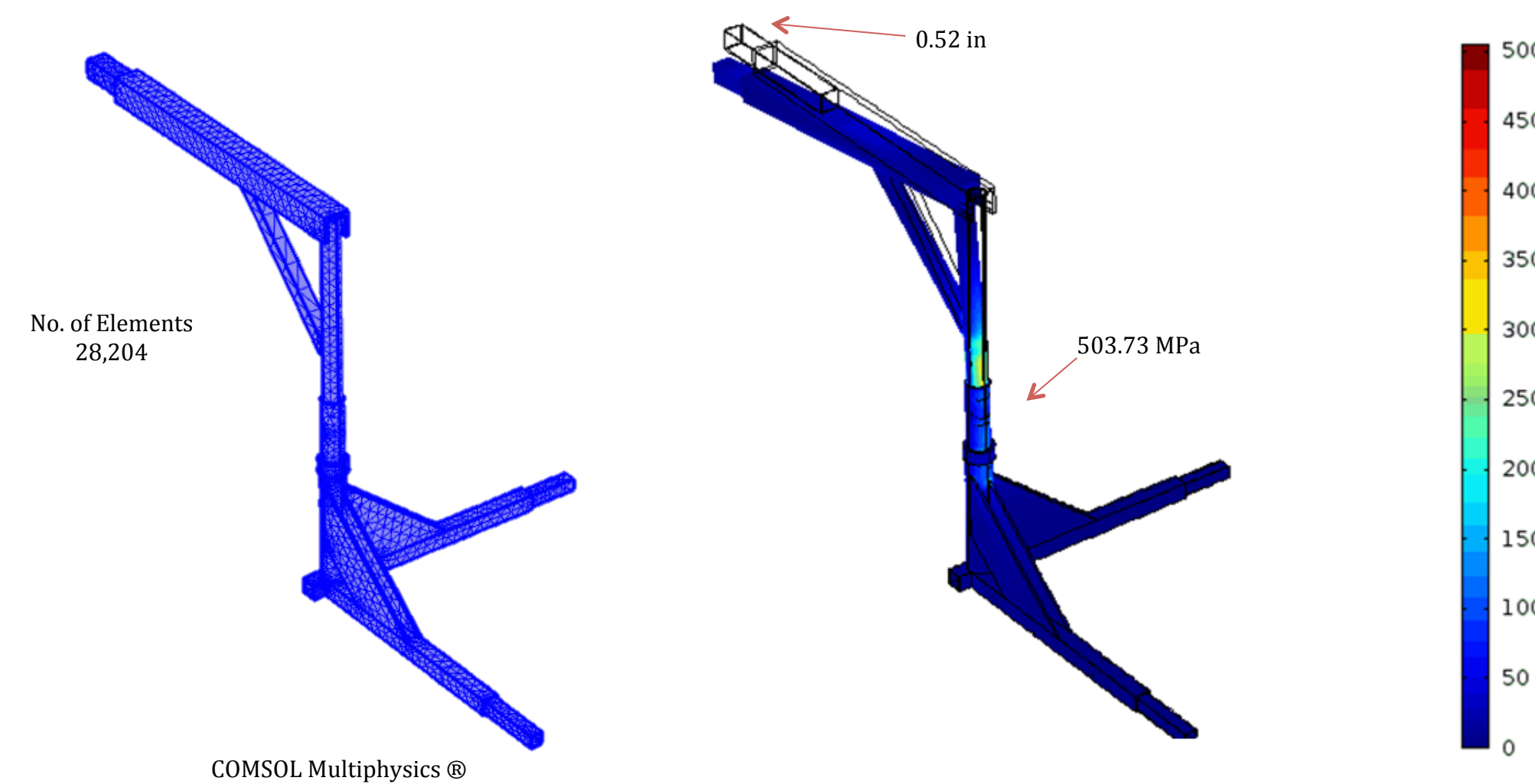
Initially, pre-approved by sponsor. However, after review from European subdivision, certain modifications were suggested.



Spring Semester Final Design



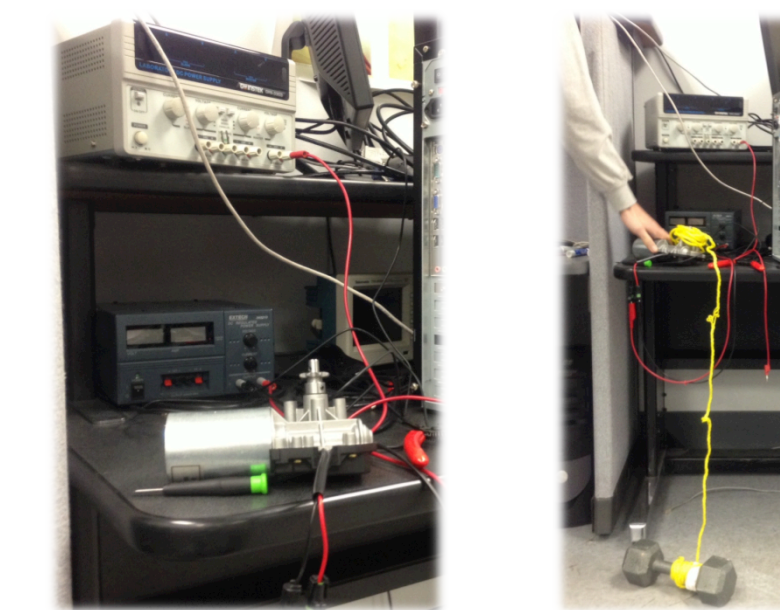
FEM Analysis



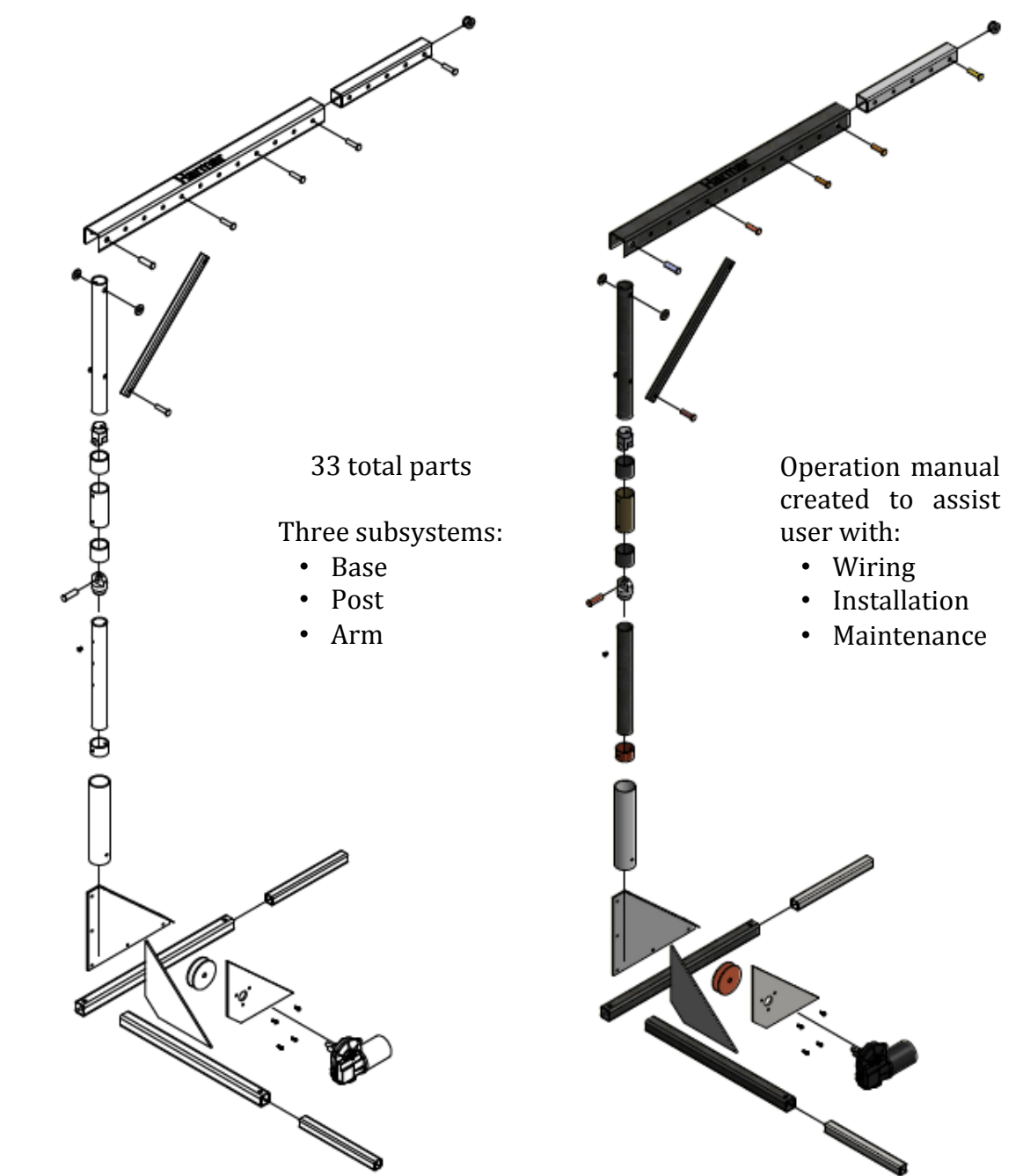
COMSOL Multiphysics ©

Simulation & Testing

Motor



CAD Package



Prototype

