The Jaipur Foot

Overview
The Jaipur Foot is a wood-based prosthetic encased in vulcanized rubber. It was created in Jaipur, India, and is intended for patients in developing countries. To improve foot design, the existing foot must be statically tested to assess its mechanical characteristics and limitations. The team must design a static test rig suitable for the Jaipur Foot and in compliance with the International Organization for Standardization (ISO) standard for lower limb prosthetics.

Objectives
Design and fabricate a static testing device (rig) to test the Jaipur Foot in compliance with ISO Standard 10328.

Approach
- Gathered customer needs from sponsor
- Established target specifications from customer needs into measurable metrics
- Reviewed ISO Standard 10328 to understand testing specifications
- Generated test rig design concepts in compliance with the standard for both the frictionless plate and the angle block
- Selected design concepts that met both the standard specifications and the customer’s needs
- Fabricated prototype test rig utilizing steel as the primary construction material
- Tested Jaipur Foot in test rig with MTS machine providing test loads outlined in ISO 10328

Outcomes
The end product consists of a two piece test assembly: The Two Dimensional Frictionless Plate and the Angle Block. The rig successfully tested to the proof load of 2240 Newtons for P5 loading as specified in the standard. Unfortunately, the team was unable to test the rig and foot to the ultimate static test force due to limitations with the MTS machine. For project continuation, future teams will now have a robust rig to continue static testing on Jaipur feet and new foot design prototypes.