

# Prosthetic Foot Assessment Device

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## Abstract

The purpose of this project is to evaluate the ground reaction forces from a prosthetic foot when the examiner loads it during stance. This device is built using parts from a construction stilt which will be used as the examiner's attachment to the device. Load cells will be mounted between a prosthetic pylon and the foot plate for force measurements. Various kinds of prosthetic feet will be able to be tested by attaching to the pylon at the base of the device. The design of this device is meant to be versatile and modular to allow for different configurations.

## Introduction

The prosthetic foot is the most important component of a lower-limb prosthetic as it forms the basis of an effective amputee gait. Lower-limb amputees have identified many issues with current prosthetic technology including mobility and comfort of long-term use. Improving these devices can be difficult without data analysis to base design improvements on. The goal of this project is to build a device that can measure different ground reaction forces throughout the prosthetic and use this data to improve future technology within this industry.

### Objectives:

1. Attachment to examiner
2. Force measurement
3. Transmit data to user interface

## Methods and Materials

The overall design of this device is meant to accomplish certain requirements made by the client. The core requirements for this device are the ability to attach the device to an individual for examination, force measurement, and a user interface to visualize and interpret data.

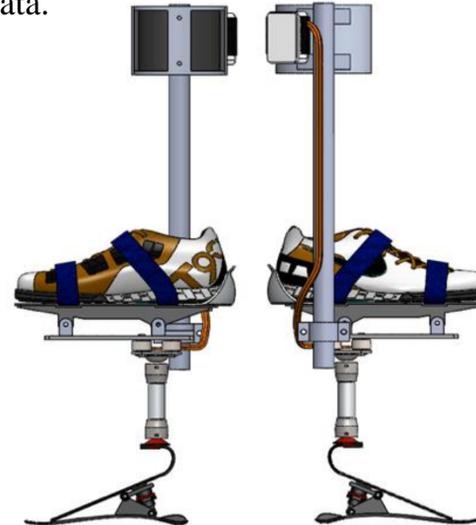


Figure 1: Project Design

**User Attachment:** The core of this design is built around how the examiner will mount to the device. Parts of construction stilts were used for this purpose. The user will step onto the foot plate of the stilt and strap themselves in at the foot and lower leg.

**Force Measurement:** Four tension/compression load cells were used per device in a square configuration. This allows for force measurement in three dimensions.

**User Interface:** LabVIEW is used for this project to read and visualize data.

## Results

The measured data from the load cells will be sent to a National Instruments I/O device. This device transmits the data to a LabVIEW interface where everything can be visualized by the user.

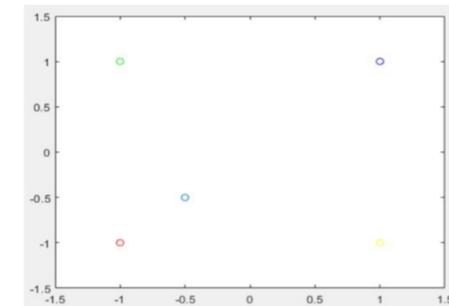


Figure 2: Force location when not all forces are equal

## Conclusions

This device will be used for the assessment of different prosthetic feet by various examiners. The data recorded will be used for educational purposes and studies to help improve prosthetic and orthotic parts in the future. This design is simple and easy to use while being relatively inexpensive.

## Acknowledgements

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