



College of Engineering and Physical Sciences

SEISMIC TESTING BED PROJECT



BWX Technologies, Inc.

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Client: BWX Technologies

Table 1: Project Requirements

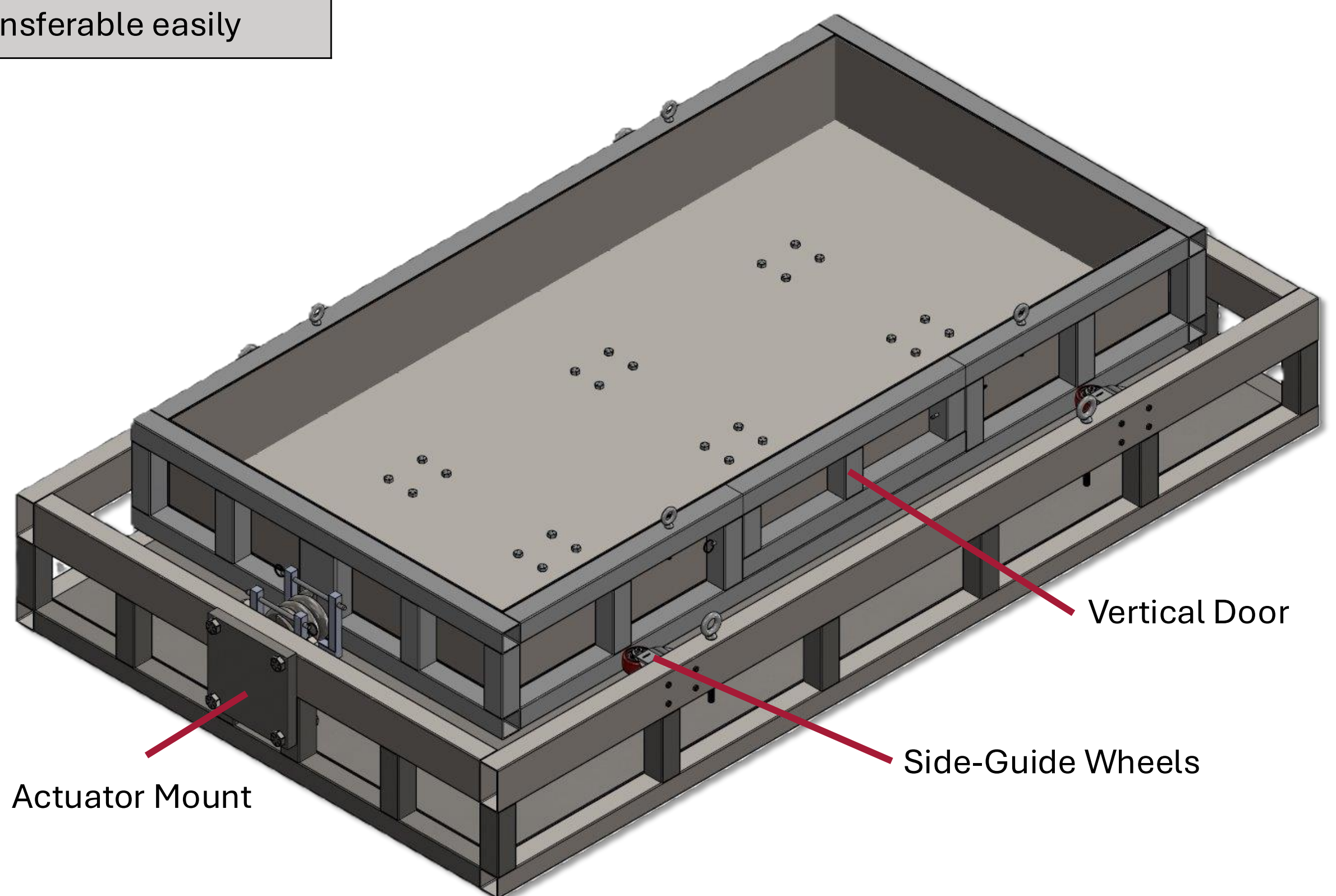
Project Requirements	Desirable Attributes
Inner Bed Volume	9 ft ³
Container Support System	Bear weight of ~1000 lbs
Ability to Change Frequency	Swapable Springs
Linear Actuator	5 Hz input
Sense / Validation System	Measured values into seismic profiles
Vertical Door	Component to empty soil from bed
Portability	Disassembled and transferable easily

Project Description

- This test platform supports research for BWX Technologies and Dr. Saxena at the University of Wyoming on particle dampers for nuclear reactor protection.
- How the bed will be used:
 - Improve accuracy of seismic testing
 - Expand hands-on learning at the University of Wyoming
 - Contribute to safer structural design in academic and industry settings

Design Description

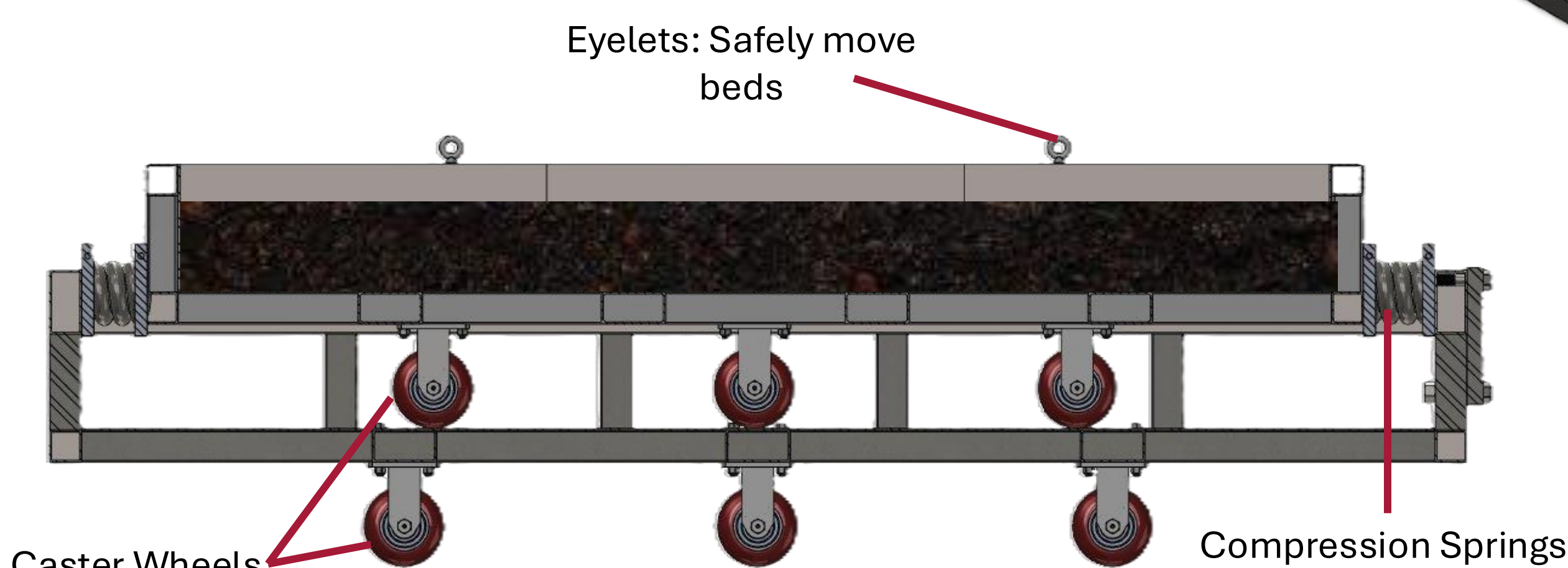
- The platform consists of two nested beds
- Both beds are constrained to one-directional movement with caster wheels
- Beds are connected by compression springs
 - System simulates seismic wave behavior
 - A linear actuator drives the outer bed at 5 Hz
 - Through spring-mass interaction, the inner bed exhibits an amplified response of ~18.5 Hz
 - The maximum system displacement is 0.25 in



Testbed System Isometric View

Outer Bed Design

- Dimensions: 7'-6" x 4'-4" x 12"
- Side guide wheels to keep the inner bed from moving sideways



Testbed Section View

Inner Bed Design

- Dimensions: 6' x 3' x 8"
- Contains 9 ft³ of soil
- Includes a vertical sliding door for easy soil removal
- Accelerometers are mounted on top of the soil to measure motion and collect data for seismic analysis



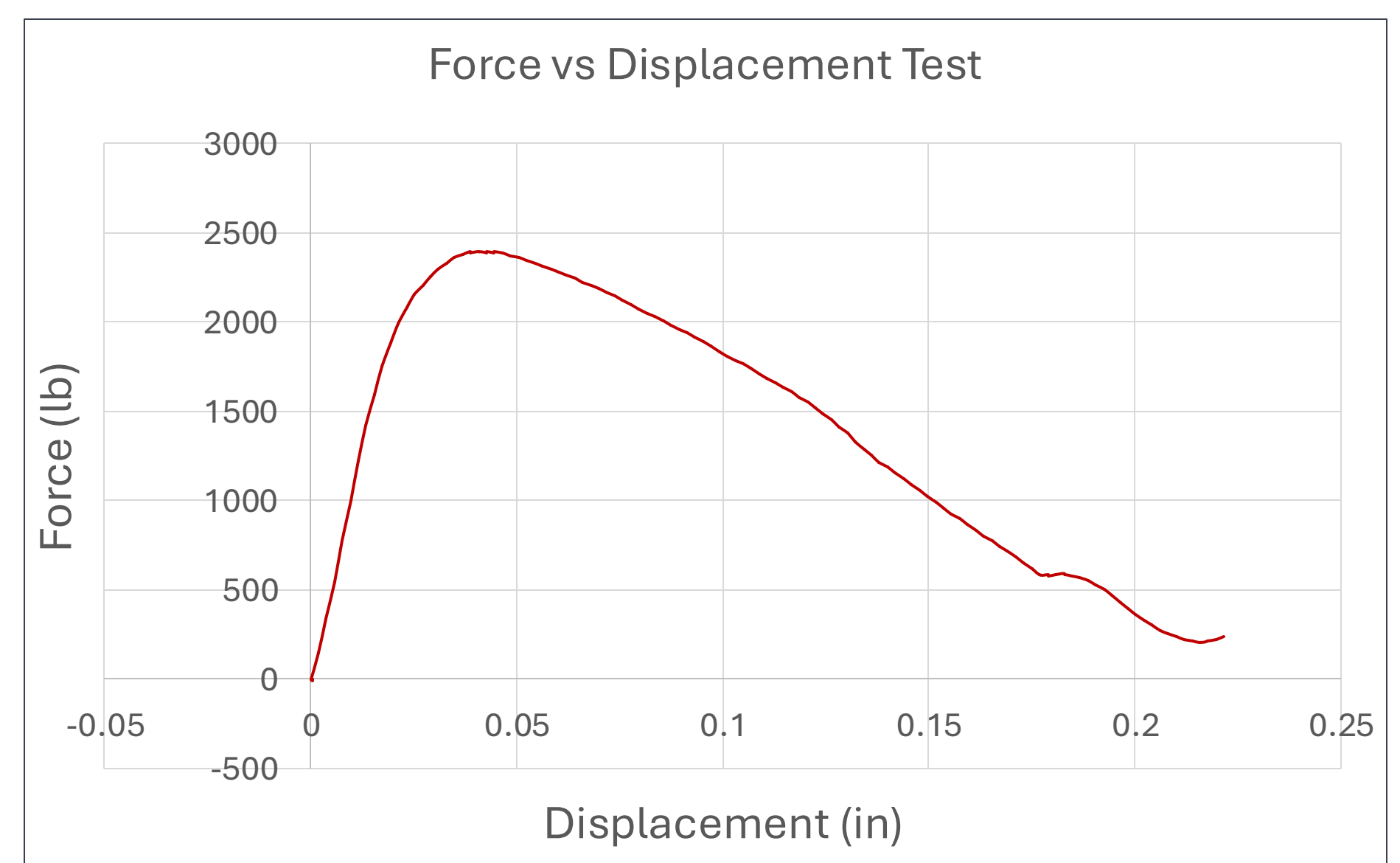
Testing Apparatus Setup

Testing Description

A compression test was performed to determine the strength of the sheet metal and pin on the door feature against the normal force from the dirt.

Testing Components:

- The graph shows the force vs. displacement data from the compression test
- The goal was for the door to withstand a yield force of 175 lb.
- The yield point of the door component was 2395 lb



Test Data Graph

