**Title:** Rolling Drum

**Scope:** Build a dynamic rolling drum for testing of CEW and competitor wheels to allow CEW to better provide Engineered Solutions for our customers.

**Research:** Research industry for various mechanisms that competitors use to test non-pneumatic wheels and compare those to Industry standards to present the best solution for the testing equipment.

**Spend Limit:** $10,000

**Physical Design:**
- **Drum**
  - Drum should have a circumference of 250mm +/- 25mm
    - Will entertain different sizes insofar as there is a possible cleat placement in intervals of 125mm of surface area
  - Material should be inelastic (as little as possible energy absorption)
  - Drum must have at least two installation points of detachable cleats (bumps) allowing interrupted surface area every 125mm
- **Fixture Arms**
  - Must allow up to 400lbs of applicable force to the attached wheel
  - Must allow for the attachment of wheels ranging in size from 4” to 26”
  - Must allow for the attachment of different wheel fixtures such as wheelchair caster fixtures
  - Must be laterally stable (insignificant amount of lateral movement of wheels after interacting with a cleat)
- **Drivetrain**
  - Must be capable of variable speeds ranging from 0-6mph in at least .5mph increments
- **Automation**
  - Automatic shut-off or retraction of fixture arm when introduced to wheel failure (per arm basis would be best)
  - Programmable start and end times (distance traveled and revolutions would be a great bonus) and speed in mph (and rpm would be a bonus)
  - Data collection of speed, run time, revolutions, and number of cleat hits
- **Safety**
  - Safety enclosure around dangerous/moving parts
    - Automatic shut-off if cage is open
    - Either attached to the frame or separate design to go around the machine

**Sponsor:** Custom Engineered Wheels, Inc.