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## Customer Background

80/20 aluminum is lightweight, high-strength, and features a modular t-slot framing system. This makes it the ideal material for custom structures and is often used in student projects. As such, there is a need to accurately cut and machine the material.

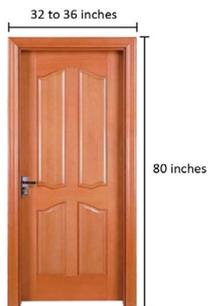


## Problem Statement

The goal of this project is to create a mobile workstation capable of cutting, milling, and tapping 80/20 aluminum. By incorporating all three of these operations into one location, the use of 80/20 becomes more available to students. Its primary use will be within the Bechtel Innovation Design Center, so it needs to include educational materials such as integrated instructions and a spare parts list.

## Requirements

- Compact enough to fit through a doorway
- Stable enough to support 400 lbs. of weight
- Mobile and easily pushed
- Cut, Mill, and Tap up to 13 feet of 80/20
- Cut at angles from 90° to 45°
- Collect aluminum shavings and debris
- Integrated instructions and spare parts list

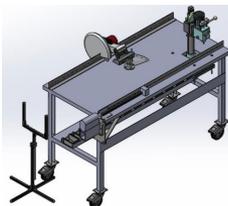


Tolerances

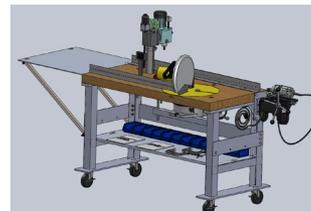
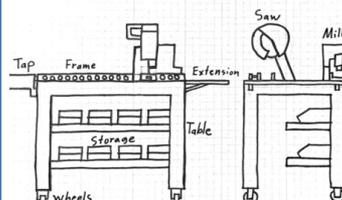
Saw	Saw Angle	Mill	Tap
0.005 in	0.5°	0.001 in	0.001 in

## Experimentation and Concepts

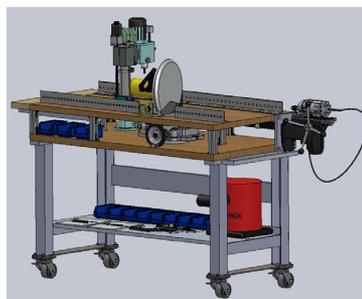
### Original Design



### New Design



## Final Design



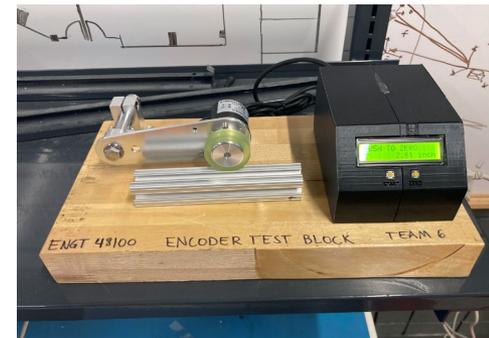
- Table
- Rotary Chop Saw
- Milling Machine
- Tapping Machine
- Rotary Encoder System
- Vacuum
- Power Strip
- Extension
- Caster Wheels
- Handle
- Storage
- Integrated Instructions
- Spare Parts List
- PPE

## Testing

### Rotary Saw



### Rotary Encoder (0.01 in/0.1 mm tolerance)



### Vacuum

