

# M2.05 - Post-Consumer Recycled Bench

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## Background

### Problem Statement:

To create a functional seat or bench out of post-consumer recycled plastic.

### Customer Requirements:

- Incorporates 1 – 3 Texas State inspired details
- Made out 90 % recycled plastic
- Reproducible in under 40 man-hours within the MakersSpace

## Recycling Efforts

### High Density Polyethylene (HDPE)

One of the easiest plastic polymers to recycle, HDPE is a hard plastic often used for milk jugs, shampoo bottles, detergent etc.



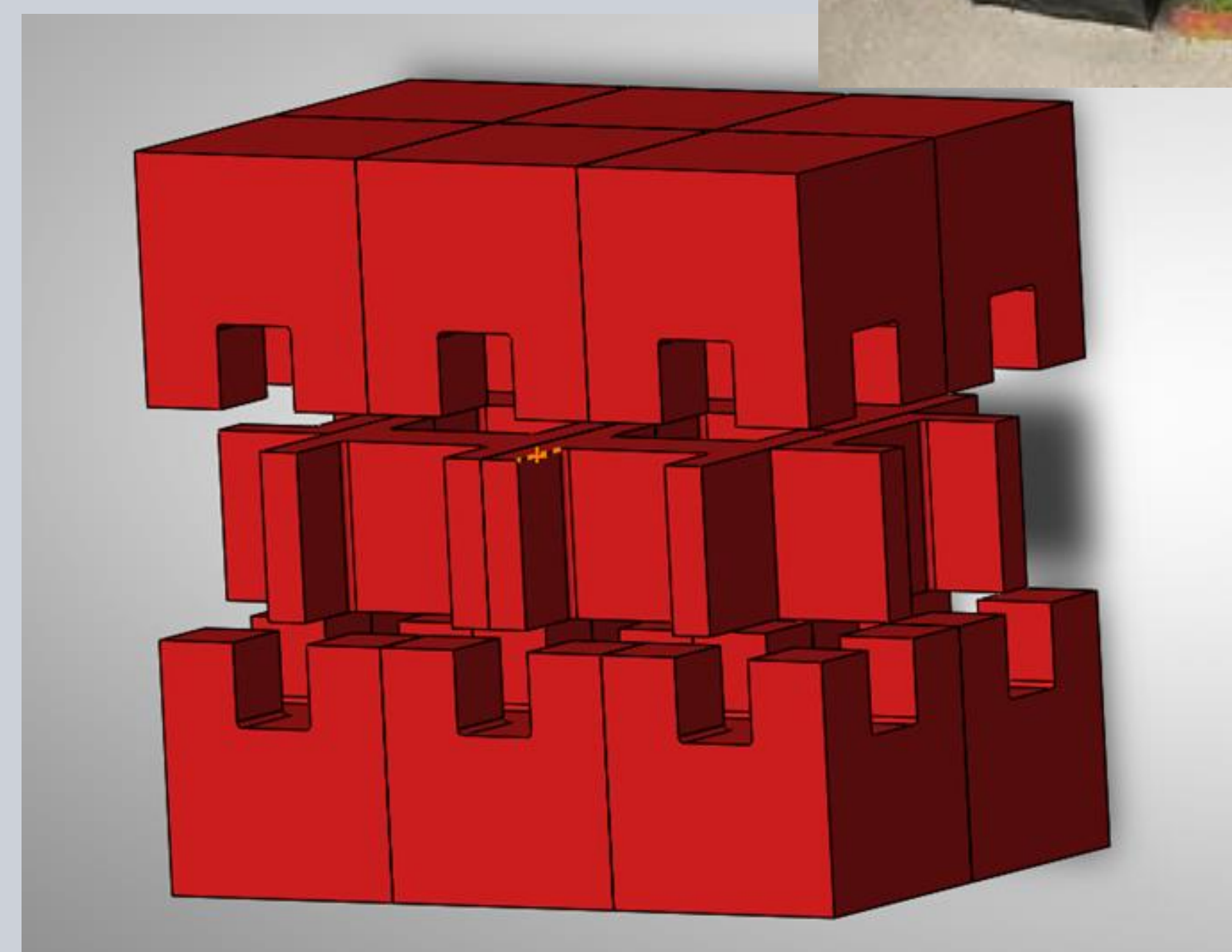
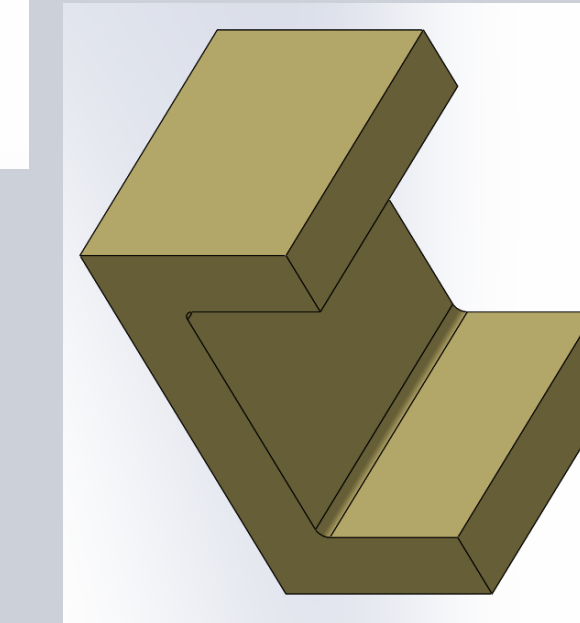
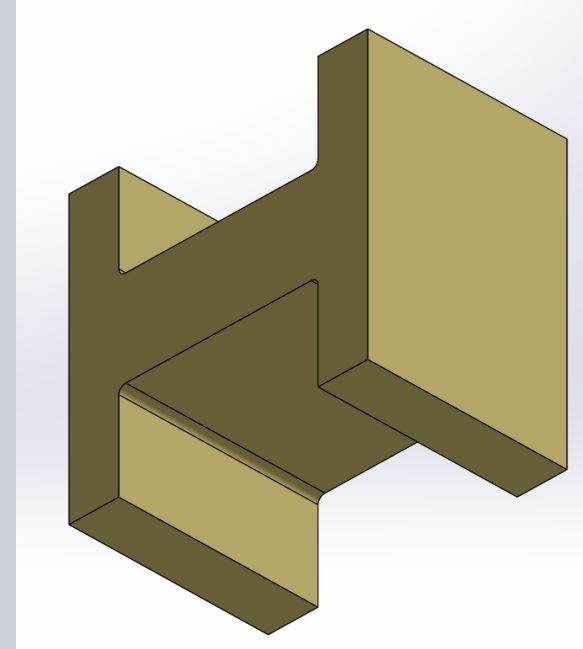
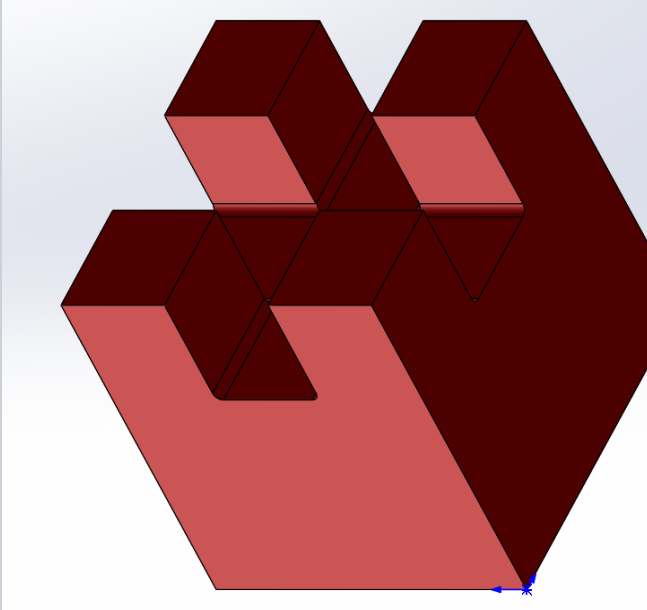
Primary Source:  
Beer Can Toppers

## Plastic Processing

A standardized process for cleaning and shredding plastic was developed to increase efficiency and satisfy the necessary plastic demand needed for each block.



## Design



### Concept Selection:

- Bench composed of 15 interlocking blocks
- Each base block contains 18.5 lbs of plastic, each I block contains 9 lbs
- Dimensions – 27" L x 18" W x 18" H

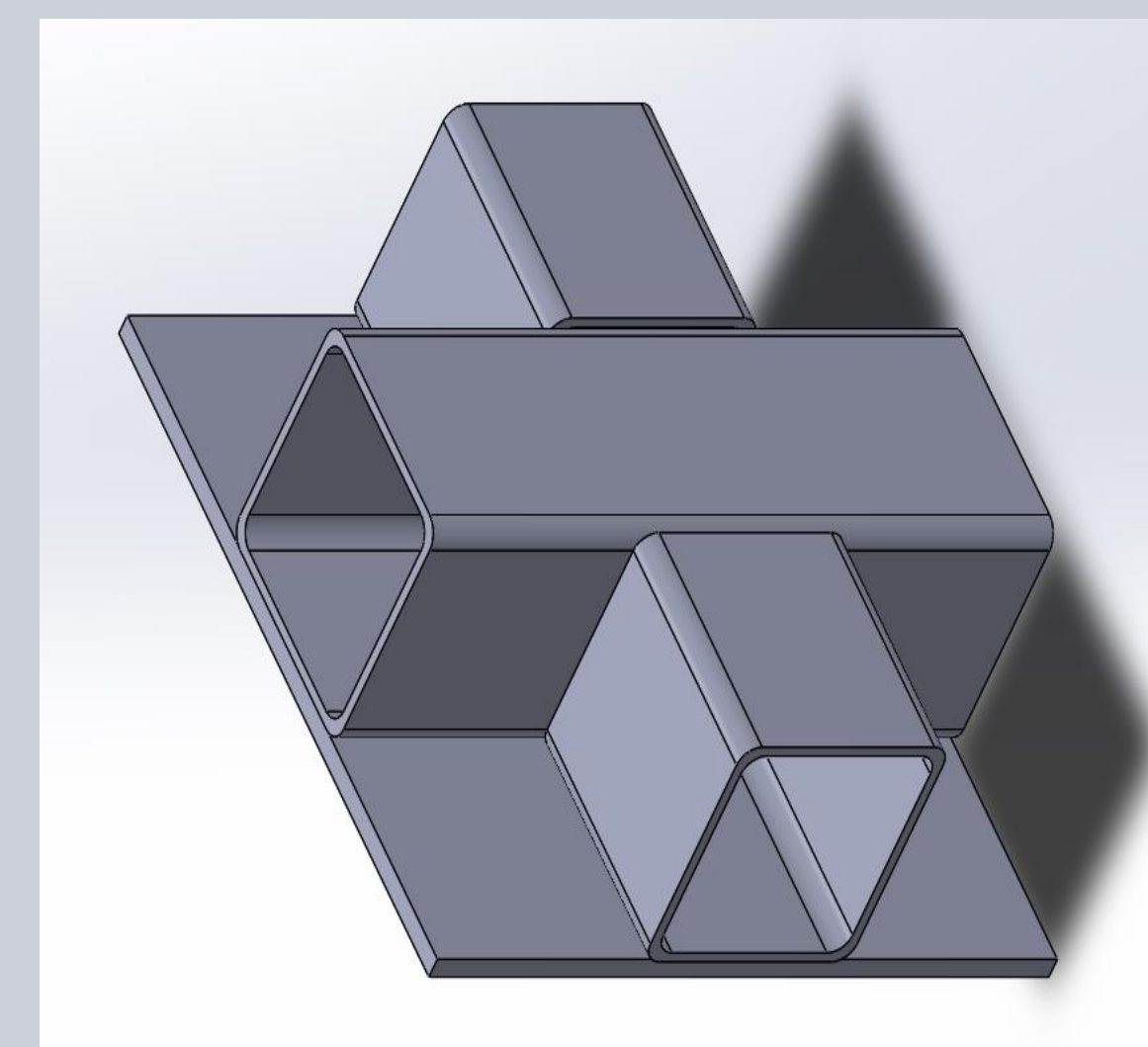
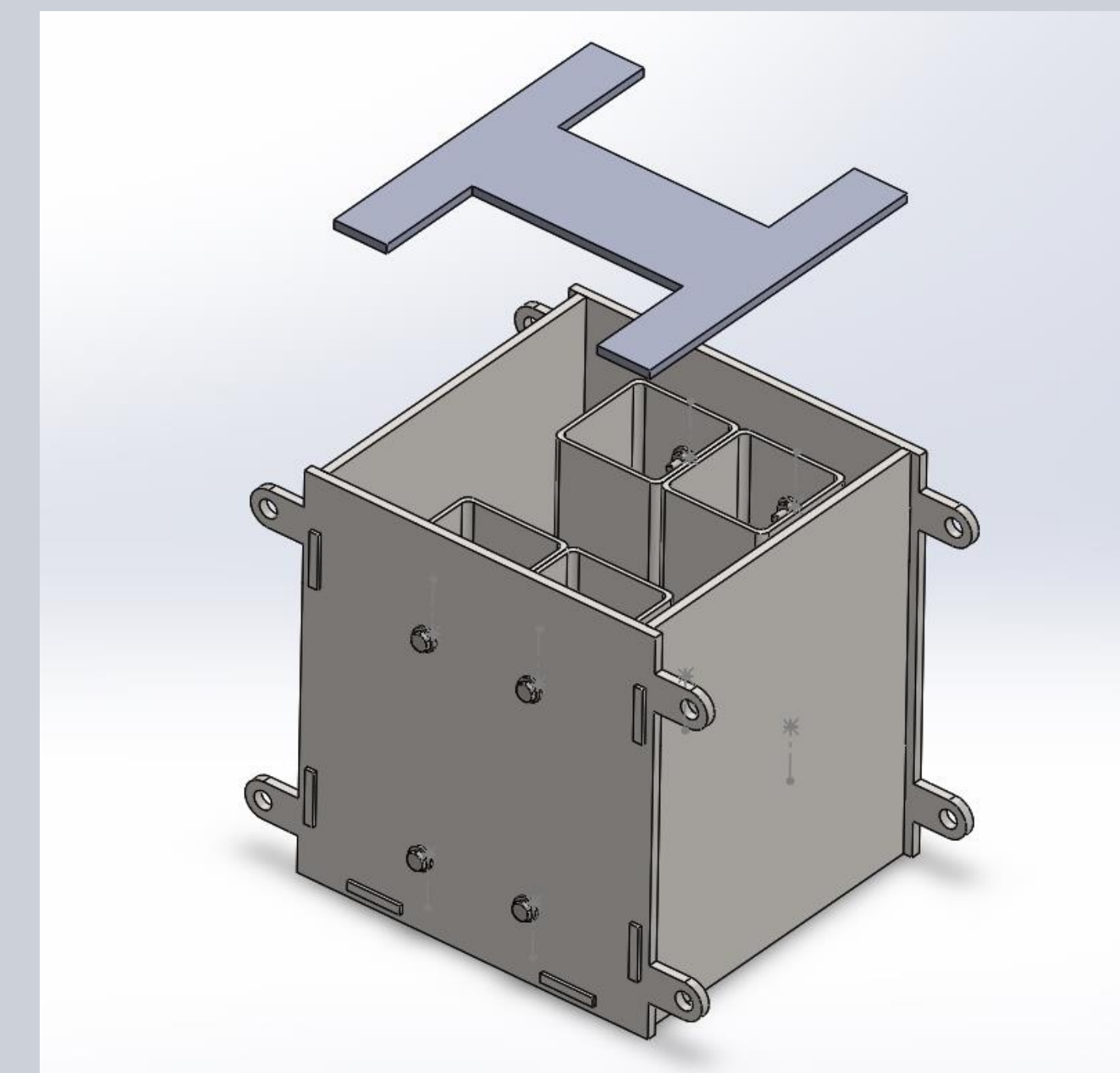
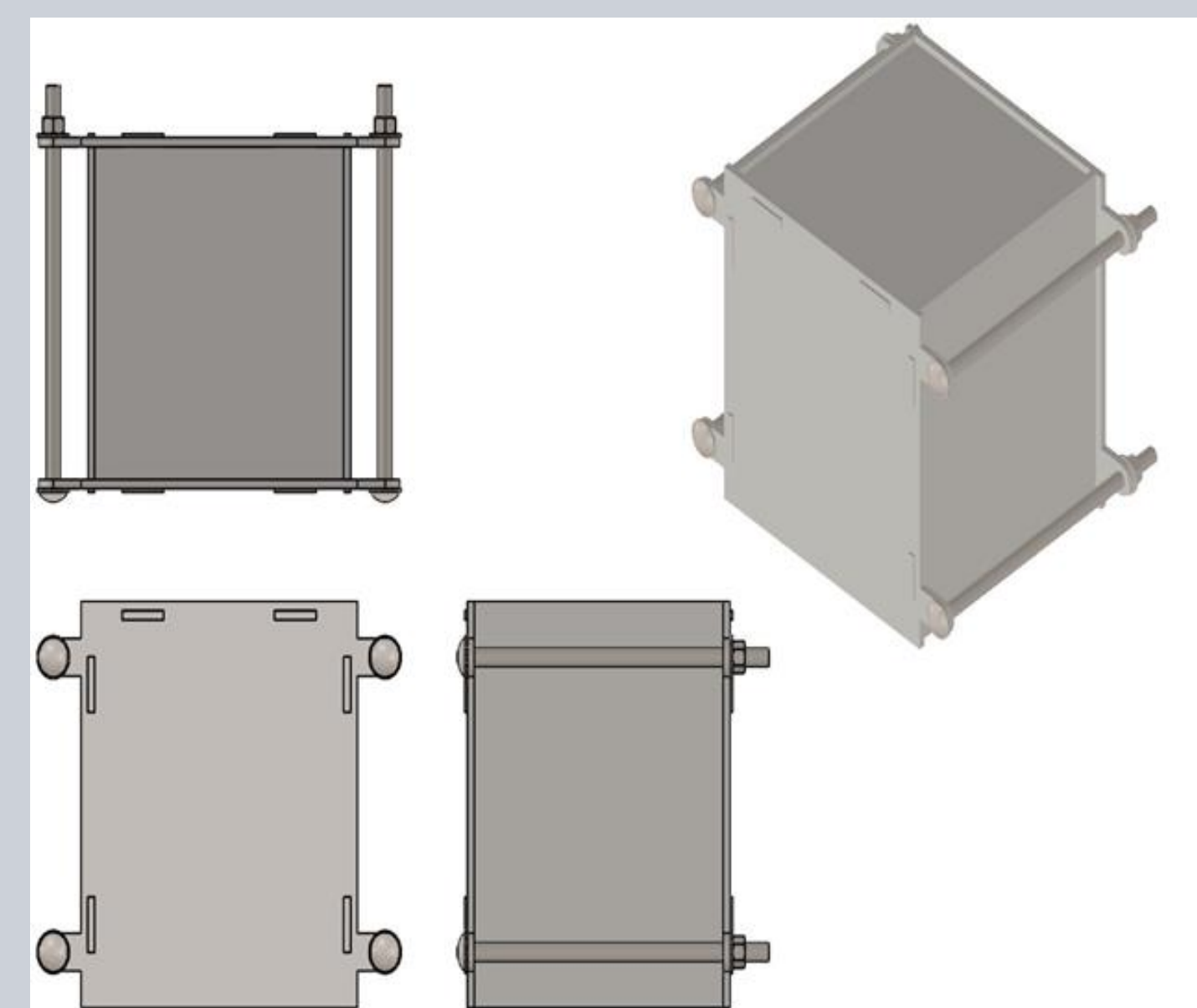
**BENCH IS COMPRISED OF OVER 5,000 CAN TOPPERS (250 lbs)**



**Mold Design:** Design accounts for shrinkage, ease of removal, heat conductivity, ease of removal, repeatability, and design flexibility

### Mold

**Manufacturing:** Molds are cut out of sheet stock using the water jet



## Processing

1. Reservoir is filled with shredded plastic and placed back in oven at 375F and filled every 2-3 hours (see schedule below)

2. Plastic is left in the oven overnight at 315F

**TOTAL MELT TIME: 28 hours per block**

3. Filled reservoir is removed from oven and top plate is placed on top

4. Hydraulic press is used to compress top plate into reservoir

5. Reservoir is dismantled, and block is removed

### Failures:



### Ideal:

