M2.04 – Compression Mold Design for Post-Consumer HDPE

Drew Lacy, Ryan Robinson, Korbyn Jones, Robert Leija, Jose Guerrero

Faculty Advisor : Dr. Austin Talley

TEXAS STATE
INGRAM SCHOOL OF ENGINEERING

Background

Problem Statement:
To create a mold design process simple enough for any student to come in and make an appealing personal design in under an hour

Customer Requirements:
- Simple and Repeatable
- Process time under an hour
- Easy mold release

Machining

Mold Manufacturing: Mold cavities were cut out of aluminum using the HAAS CNC VF2 and aluminum sheets using the Water Jet.

Mold Inserts: An insert was made on the manual lathe to incorporate our sponsors logo into our designs.
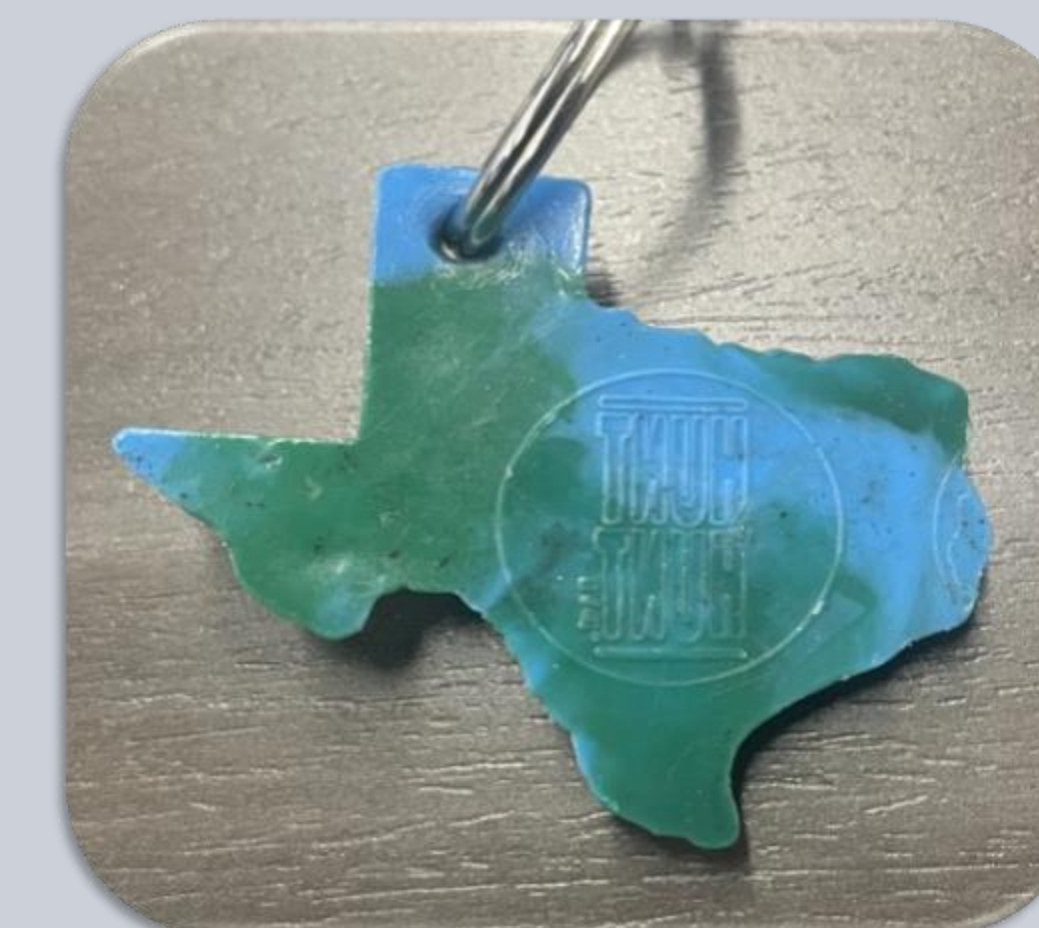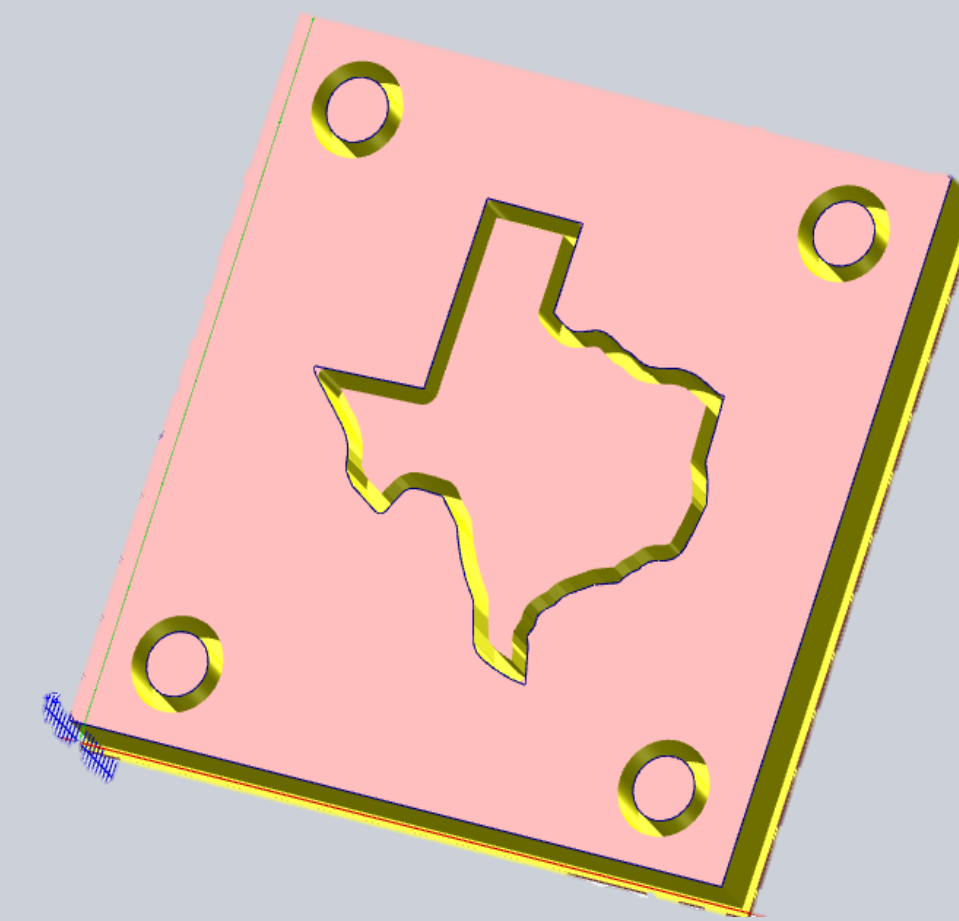

Conclusion

We have been able to make successful molds for each design we have produced. The main goal to have the entire process in under an hour was met. We are confident that we are within that range after a few months' worth of work. We were also able to create an organized set of tasks (SOP) so that any student can replicate the work we have been doing.

Final Designs
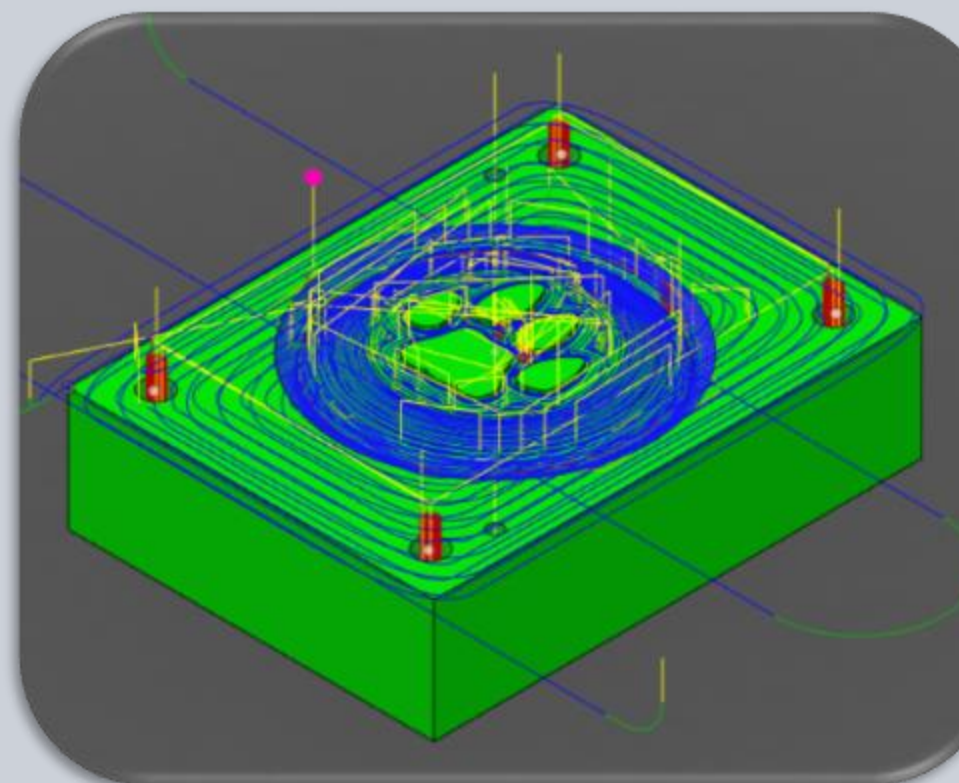
5 Individual Mold Designs

Concept Description:
- Small universal items
- Quick and simple process
- Accessibility and inclusion of other disciplines
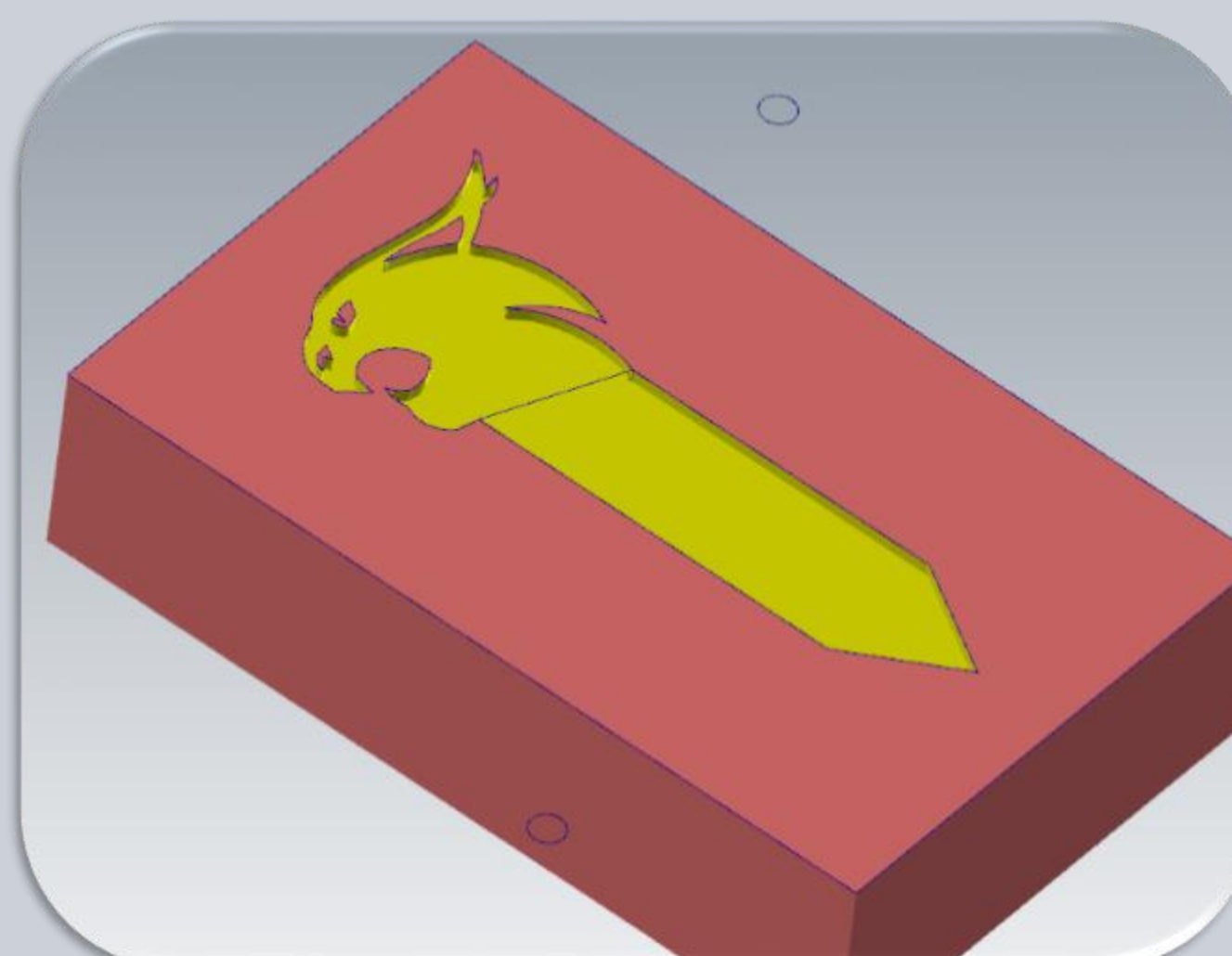- Dimensions – 4x12 Aluminum Billets

Texas Keychain

- Water Jet Mold Design
- Excess Material Channels
- 2 Pre-cut Pin Holes
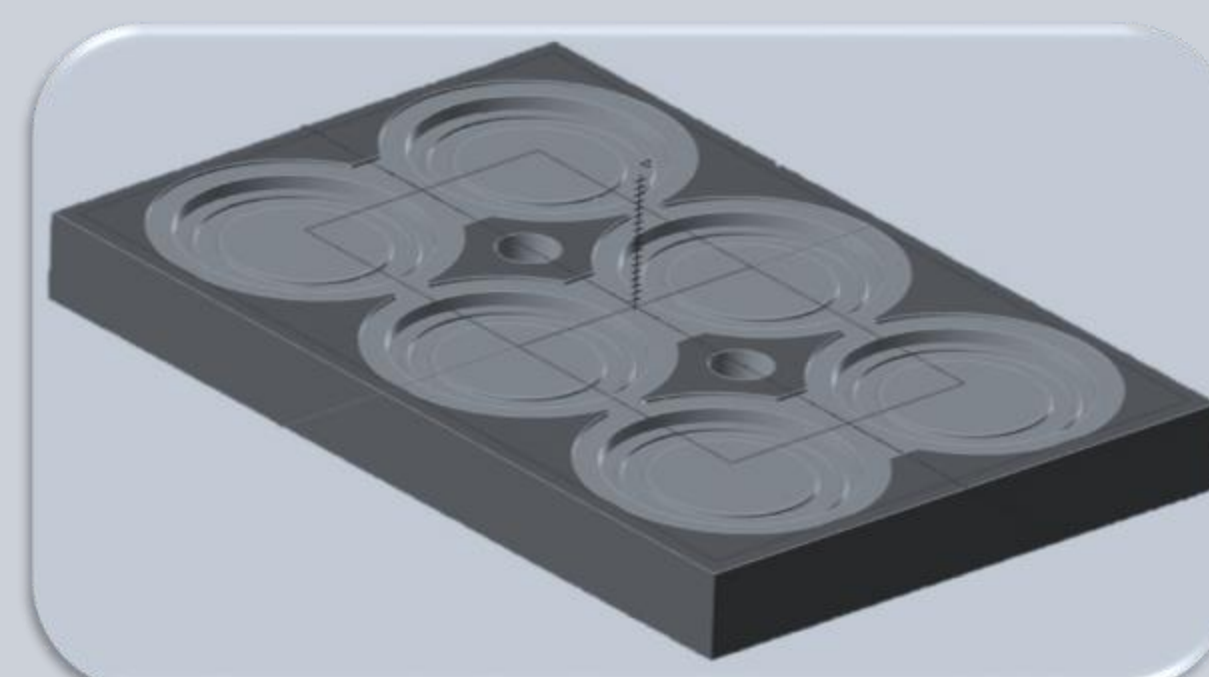- Panhandle Keychain Hole

Mini Frisbee

- Offset Mold Design
- Excess Material Channels
- Flashing Ring
- Can fly Up to 60 Feet
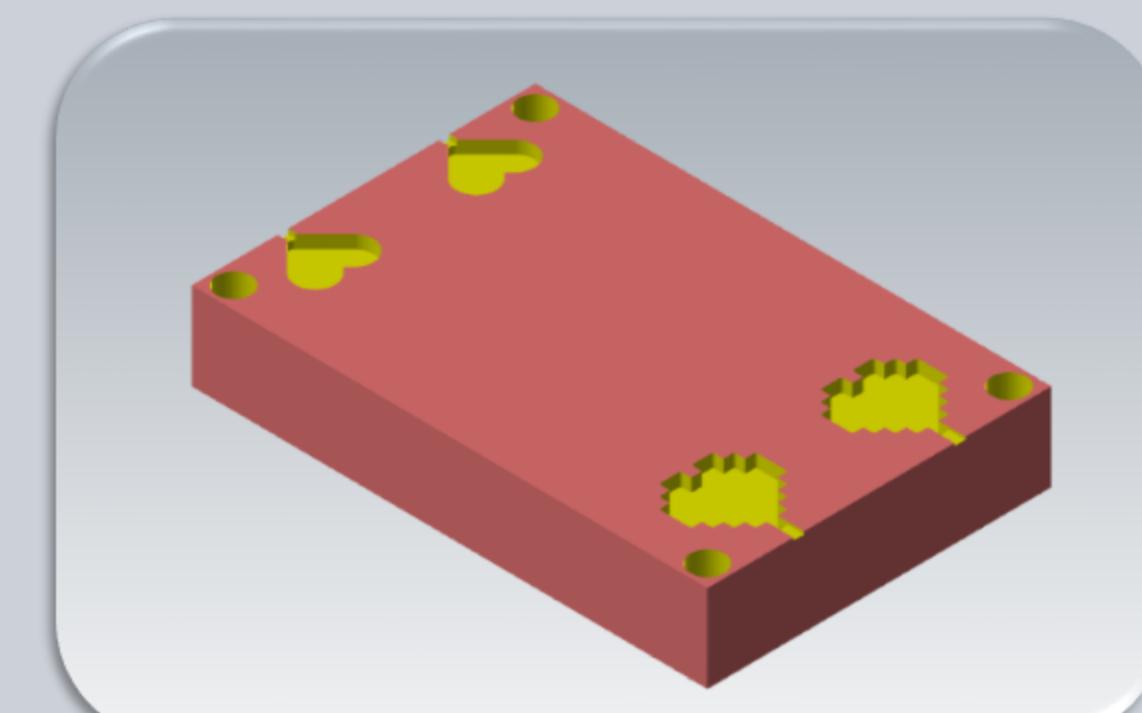
Bobcat Bookmark

- 2 Locating Pins
- Small Amounts of Plastic Used
- Rapid Process
- Define Details

Player Chip

- Cone Shaped Alignment Pins
- Thicker Mold for Heat Retention
- Flashing Ring
- Creates up to 6 chips

Earrings

- Multiple Designs for Earrings
- Design for batch processing
- Surface Finish Prioritized

Testing

All plastic melting was done on the griddle.

Mold cavities are heated in a ninja oven.

The hydraulic press was used to press together our mold cavities and form our designs.

Silicon gloves and other PPE was always worn.

Failures

Carbon Build Up   **Splitting**