Yen Tu
Manufacturing Engineer Intern
Summer 2015

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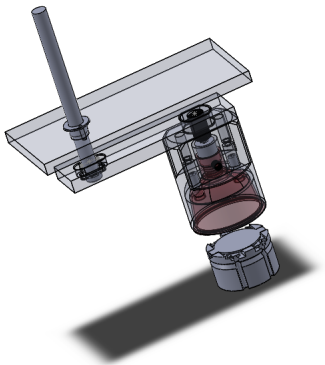
Overview

Knowledge acquired from the internship includes experience with machining tools along with maintenance



- Designed, drafted, and machined unique adapter for press fixture.
- Designed and drafted unique Polyoxymethylene (POM)-base spring.
- Designed and drafted unique Polypropylene (PP)-base collapsible mouse cage.
- Metal-working/machining experience: Produced push brush jig and clamp as well as specific washers using company's machines such as the turret milling machine, lathe machine, and metal-working power saw.
- Maintained and managed various injection machines and molds (injection molding) including machine interface.

Week 1: CAD & Machine Workshop

Description:

Jumped straight into machining and was introduced to turret milling. I began with a drawing of the callouts and dimensions of the part observed for the first two days. Afterwards I began operating the turret milling machine and fabricated the remainder of the jig for the push brush.

Assisted on the locking mechanism design of the mop bucket.

The company's chief engineer assigned me to design a spring for their mouse trap. This spring must be made from only Polyoxylmethylene (POM).

Tasked to also replicate their push-cart on Solidworks. Began with the base.

Programs:

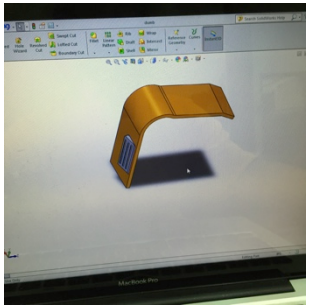
SolidWorks

Machinery:

Turret Milling Machine

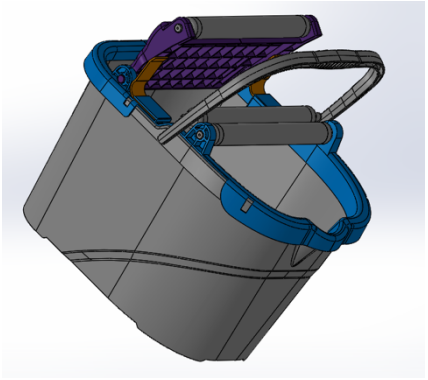
Documentation:

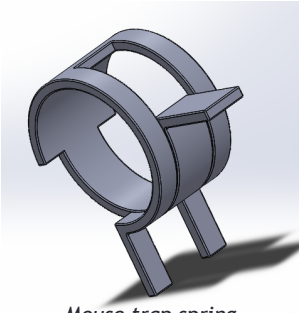
Photos



Mop bucket and spring

Machining the jig





Mouse trap spring

Week 2: CAD & Machine Workshop

Description:

Began finishing and precision cutting the fabricated push-brush clamp and jig. Was given a new task to draft and dimension for a mop jig. Learned how to use the company lathe machine and their power saw to create unique washers for the push brush clamps. Used metal grinder machine to polish tools.

Submitted the mouse spring design and was tasked to also create a collapsible mouse trap that would incorporate the spring. Began researching optimal designs and hinge mechanisms.

Programs:

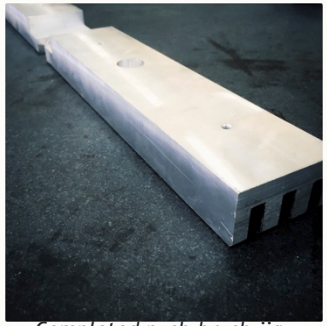
SolidWorks

Machinery:

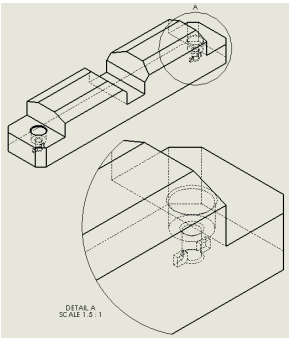
Turret Milling Machine
Lathe Machine
Metal-cutter power saw
Metal Grinder Machine

Documentation:

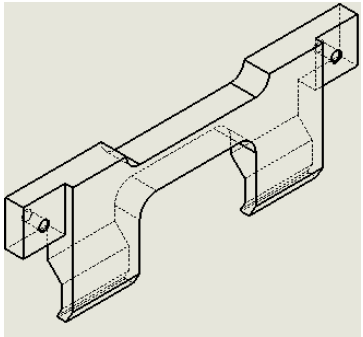
Photos
PDF



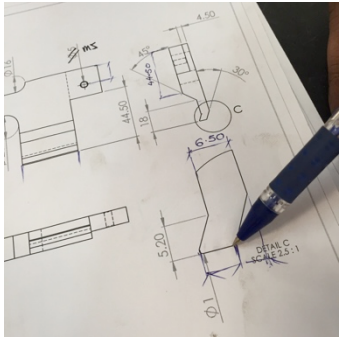
Completed push-brush jig



Isometric view of the new jig



Isometric view of the clamp



Call out drawing of clamp

Week 3: CAD & Injection Molding

Description:

Assembled and tested the push-brush clamp, washers, and jig with some pneumatic cylinders.

Moved to the molding department and was shown the company's injection machines. Learned fundamental procedures and commands to operate and maintain molds and injection machines.

Continued research on collapsing hinges and joints for mouse trap and drafted the base, sides, and top panels.

Continued on push cart design. Progressed to the body and drafting the handle.

Programs:

SolidWorks

Machinery:

Easymaster Injection machine

Yizumi A2 Injection machine

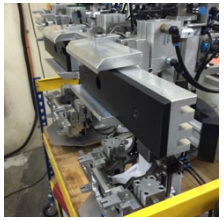
Tederic D600SV injection machine

Documentation:

Photos PDF

Tederic Injection machine

Yizumi SM2 injection machine



Testing the push brush jig and clamp

Week 4: CAD

Description:

Continuation of push cart drafting, extending the body and shape.

Created the front panel, back panel, lever arm, and trigger of the mouse cage. Constructed an assembly and made necessary hinges and constraints to simulate actual product. Made iterations to the front panel and top panel to account for spring, trigger, and lever arm. Also an iteration to design to reduce material and costs.

Another iteration for the door locking mechanism.

Simulated various loads on spring to test flexibility and yielding strength of materials.

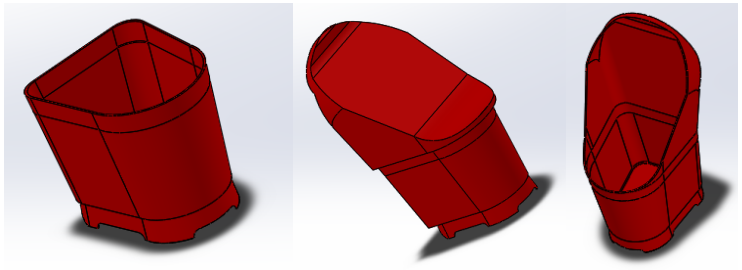
Performed testing and sequencing on the push-brush clamp and jig on the Boucherie brush machine.

Programs:

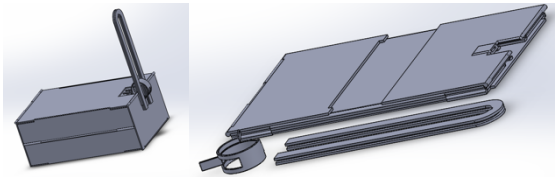
SolidWorks Boucherie Winbrush

Documentation:

Photos



(Left) First, (middle) second, and (right) third Iterations



(left) assembled and (right) collapsed mouse cage

Week 5: CAD & Manufacturing

Description:

Tasked to create an aluminum adapter for an existing pneumatic machine to incorporate various inserts. Began with modeling inserts and piston with precise dimensioning. Additional holes and threads were added into the piston for the adapter and guiding pins. The adapter must house the various inserts and mesh with the piston uniformly with M4 CSK screws. Created drawing with dimensions.

Tasked to also create a support/guide for head press of pneumatic machine. Began making the bush to for shaft to travel through.

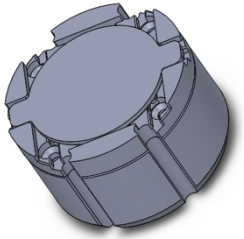
performed another iteration on the push cart to include bridges on the bottom.

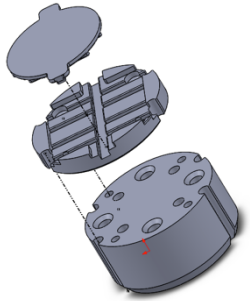
Programs:

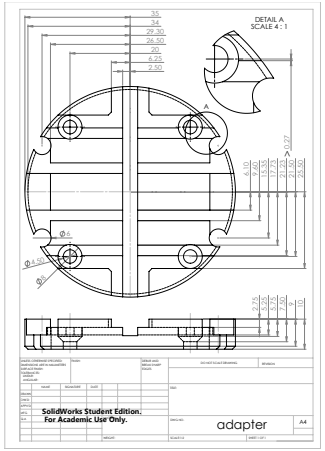
SolidWorks

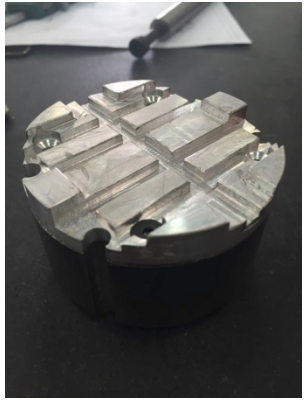
Documentation:

Photos SolidWorks Drawing









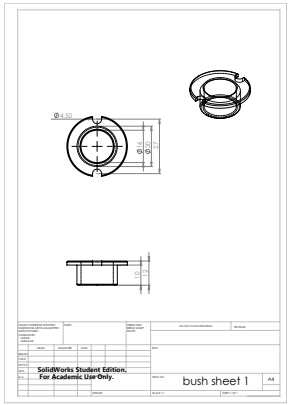
Week 6: CAD & Manufacturing

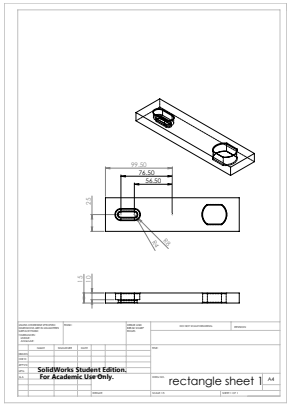
Description:

Continuation with designing the support system for the pneumatic machine. Created replicas of various components to draft alterations. Returned to machine shop for fabrication and adjustments to components.

The bush was too precise and over time will cause too much friction and will wear the pin. I changed the bush to use less material and more clearance for the cylinder to avoid chafe.

Drafted the new machine stamper as an adapter for the mop head.





Programs:

SolidWorks

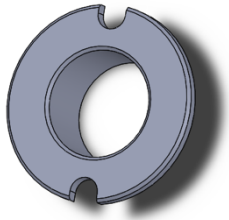
Machinery:

Turret Milling Machine Lathe Machine

Metal-cutter power saw

Documentation:

Photos SolidWorks Drawing



Week 7: CAD & Manufacturing

Description:

The ovular shape of the head stamp is extremely difficult and time consuming to replicate therefore the first iteration was adjusted to accompany another feature to fix the mop head into the stamp. The second iteration involves two crescent shaped adapters that would sit inside the stamp thus replicating the ovular shape. The ovular shapes seem tedious to manufacture so we decided to install two “securing” pins to fix the mop head instead. This would require the manufacturing of the pins and stamp to be more accurate so that they would fit uniformly.

Parts were assembled and dimensioned for fabrication.

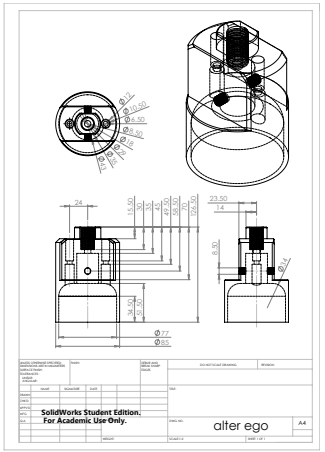
Began final project of creating a new fiber-feeding mechanism for the automated Boucherie brush machine. Drafting began with disassembly of the original fiber feeder and guide.

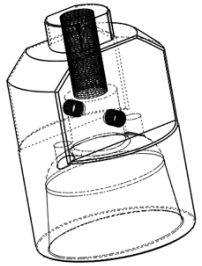
Programs:

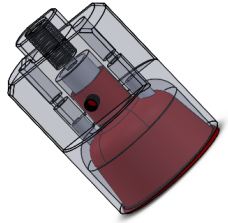
SolidWorks

Documentation:

Photos SolidWorks Drawing







Week 8: CAD & Manufacturing

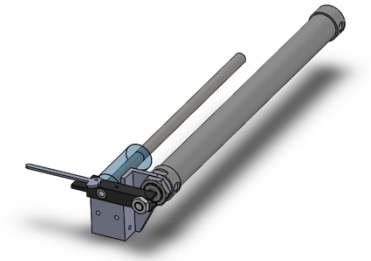
Description:

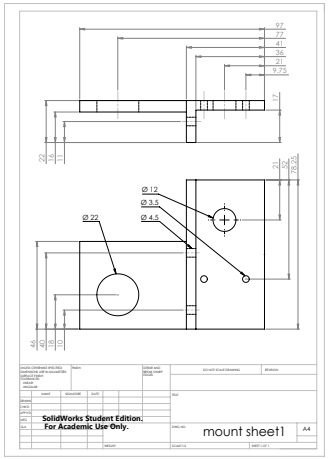
Multiple iterations were made due to limitation of space and confinement. Created mount which secures a two-way pneumatic mini cylinder. Created brace that secures guide rod to the arm and the fiber sickle.

Testing the mop press assembly and requires another component to be mounted to the adapter to properly clamp the two parts together.

Finalized the fiber-feeding mechanism and submitted drawings for approval and manufacturing.

Adapter. Incorporate pneumatic piston with guide. CAD





Programs:

SolidWorks

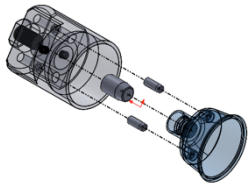
Machinery:

Turret Milling Machine Lathe Machine

Metal-cutter power saw

Documentation:

Photos SolidWorks Drawing



References:

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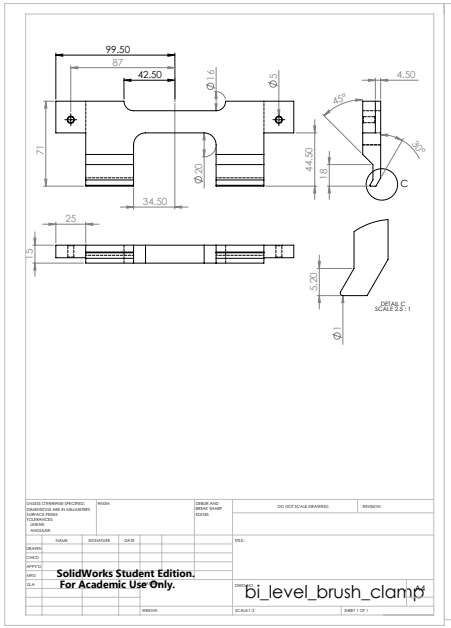
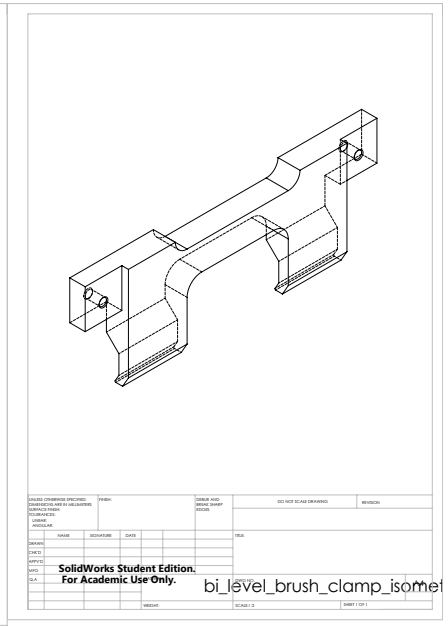
Fax: +60 36-091 9619
Email: rayaco@rayaco.com.my
Website: www.rayaco.com.my

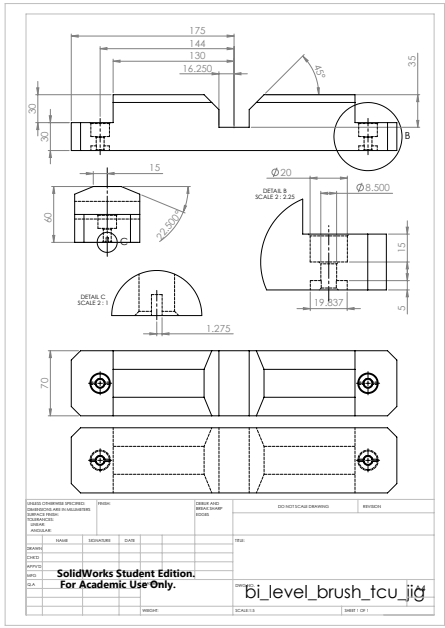
Documentation: Bi-level Brush

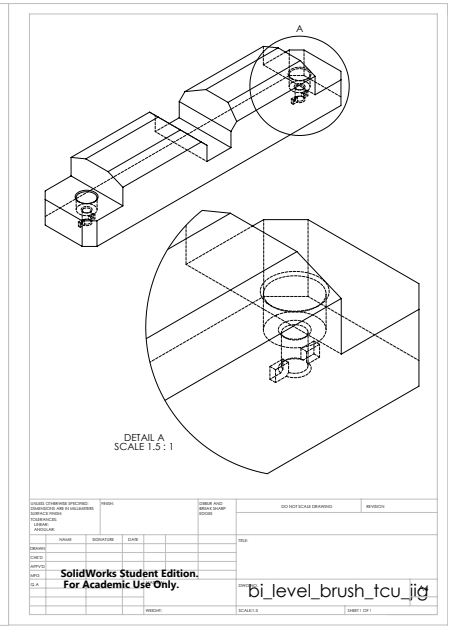
Clamp



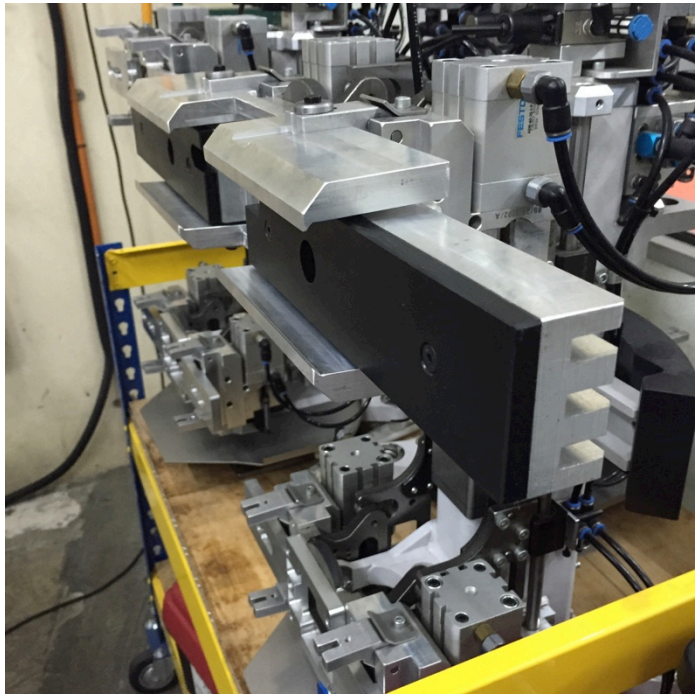


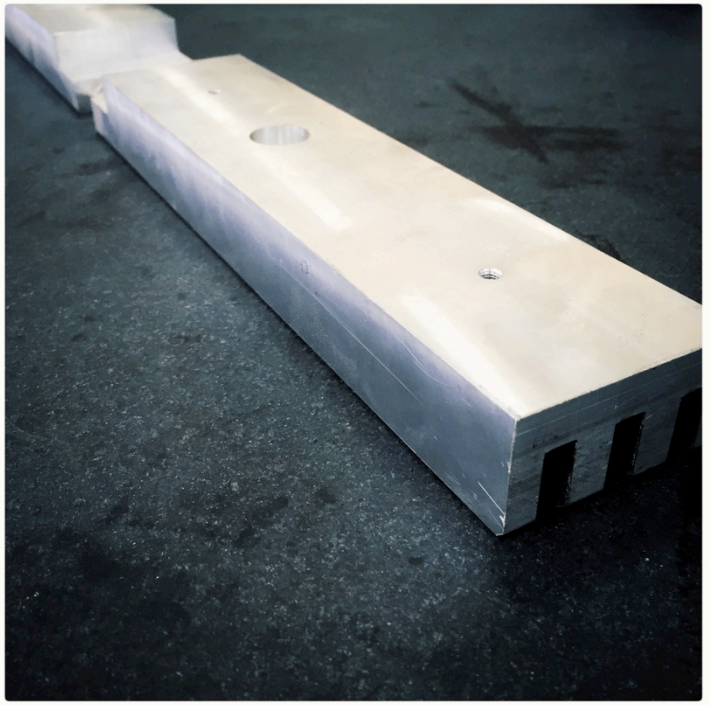
Jig





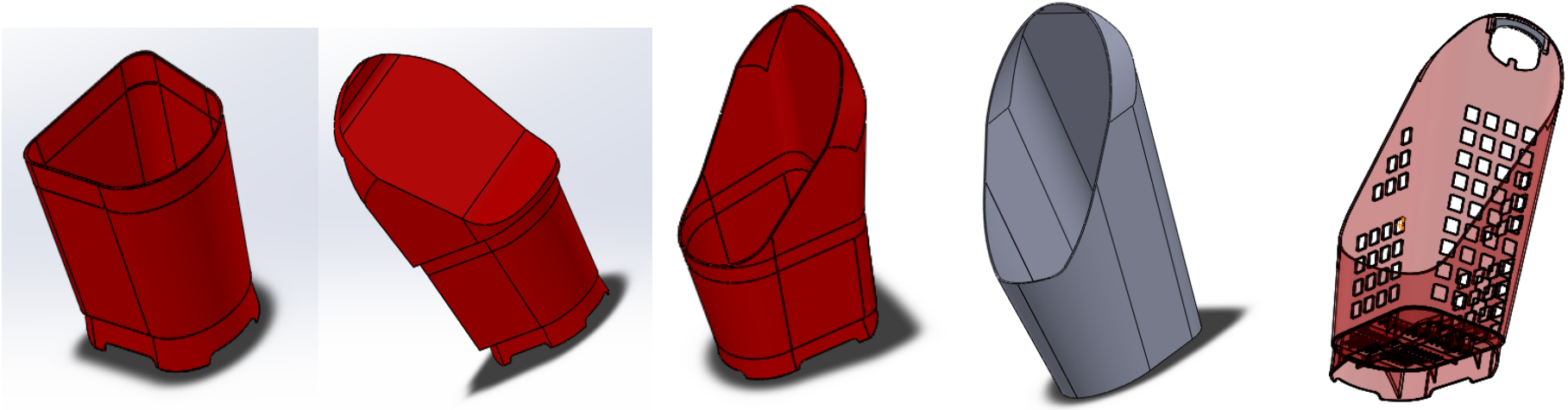
Documentation: Bi-level Brush





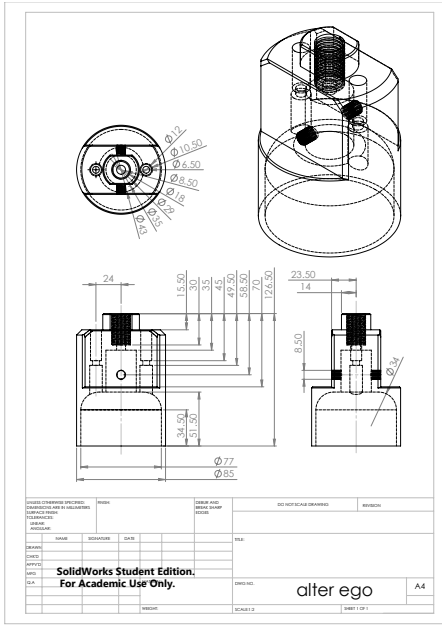
Documentation: Push Cart

Progression of iterations

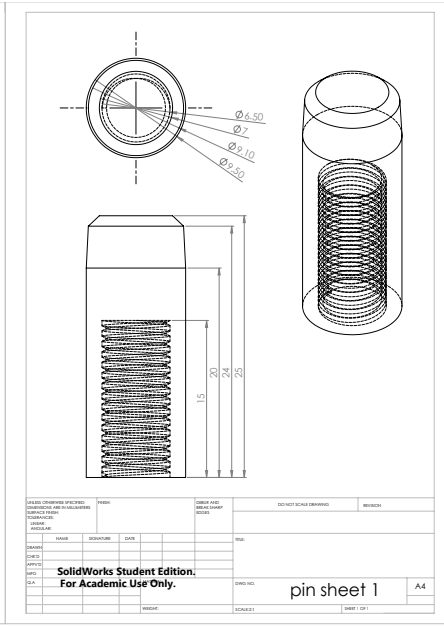


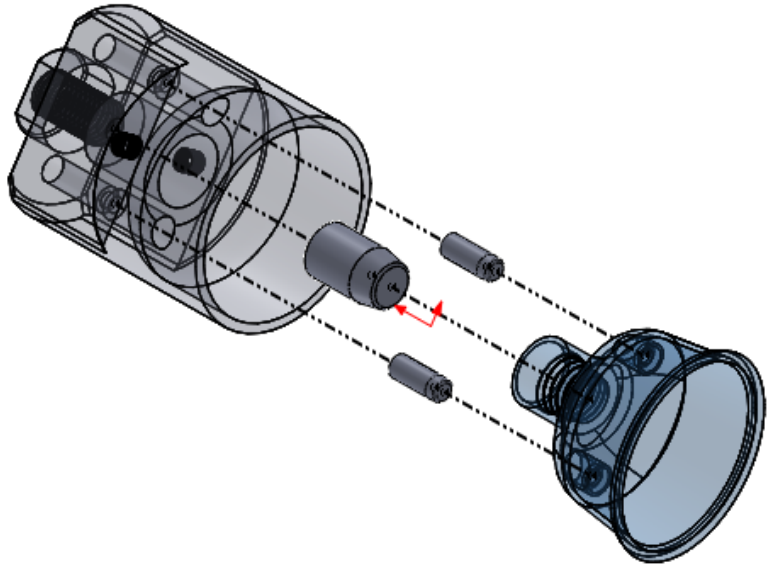
Documentation: Mop Press

Head Press



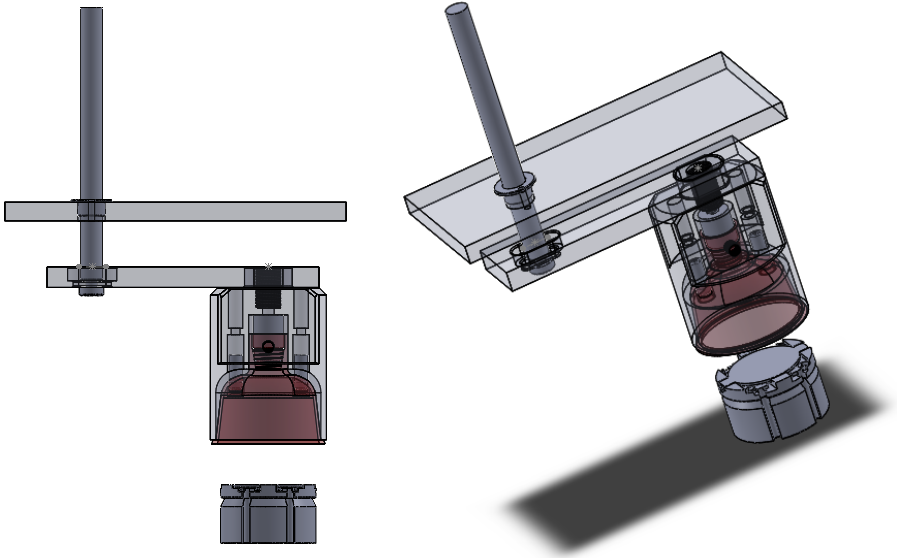
Secure Pin





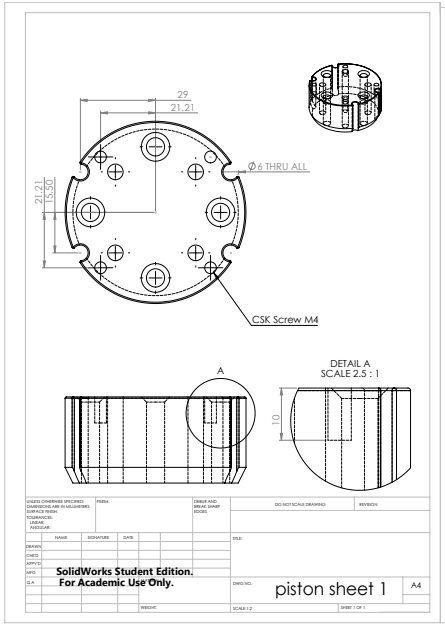
Documentation: Mop Press

Final assembly

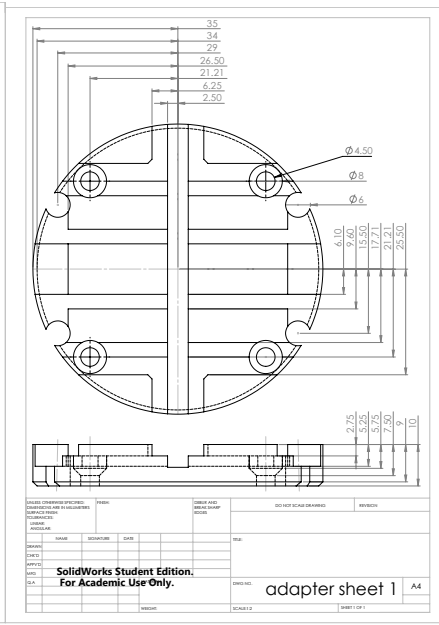


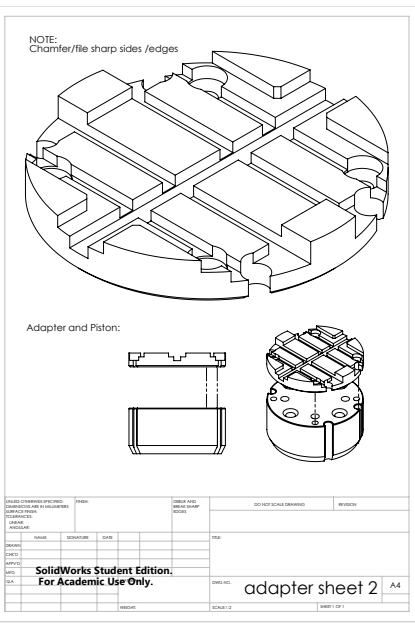
Documentation: Mop Press

Piston

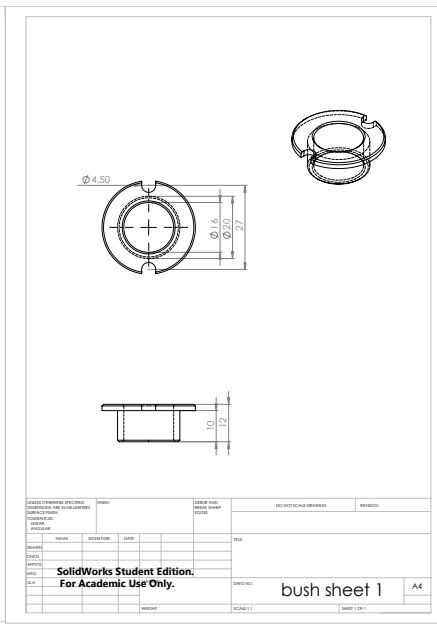


Adapter



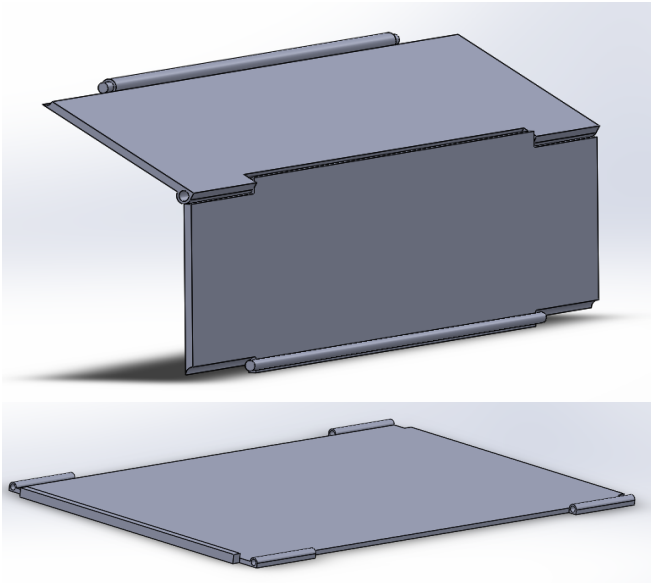


Bush

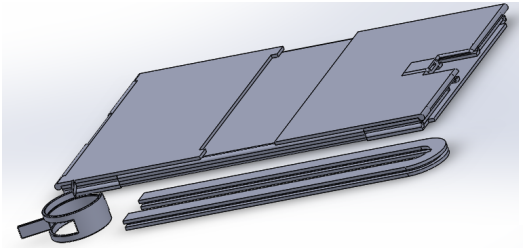


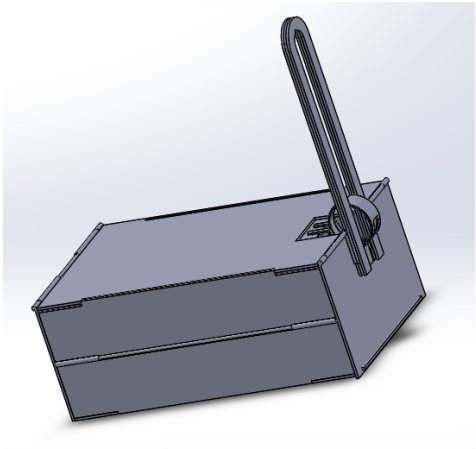
Documentation: Mouse Cage

Progression



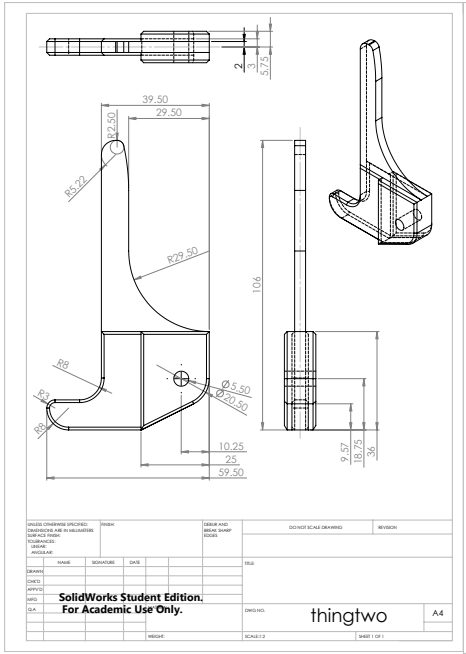
Collapsed and expanded

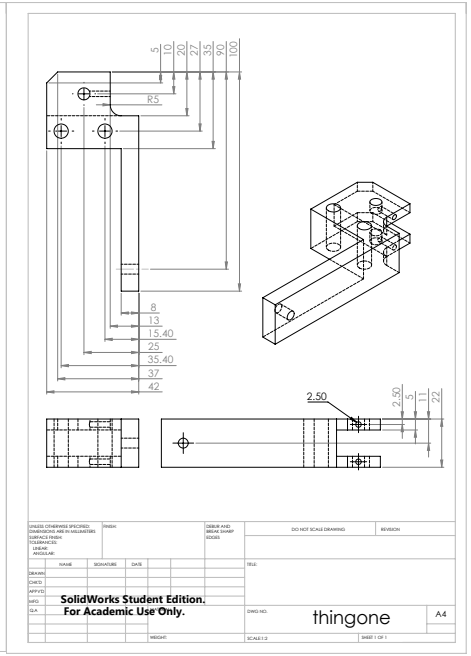




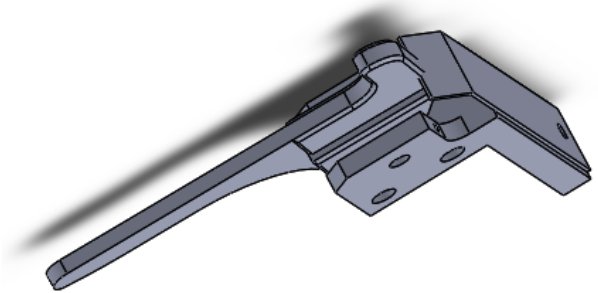
Documentation: Fiber Box Feeder

Progression



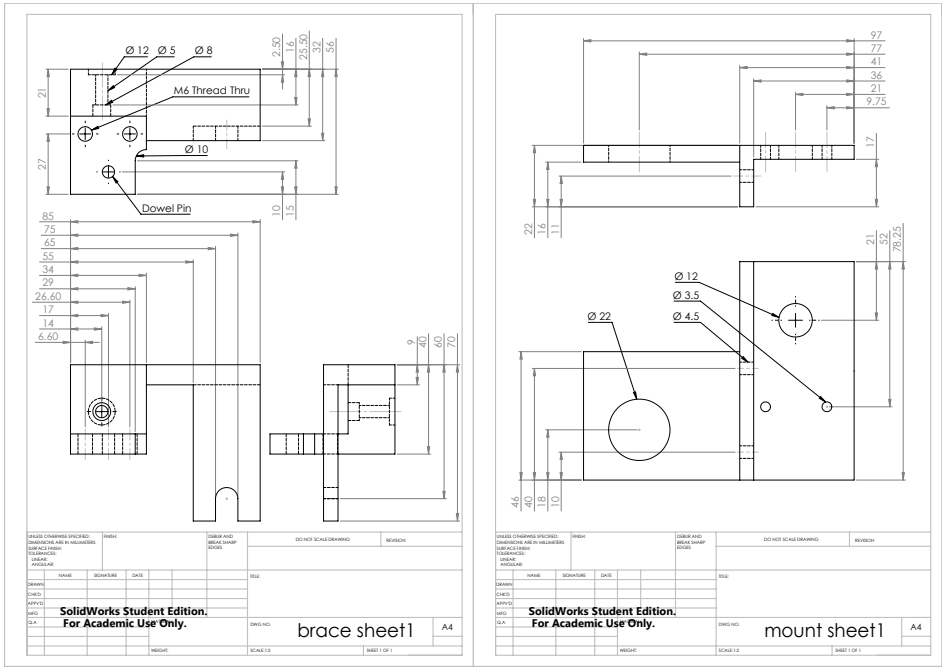


Assembly

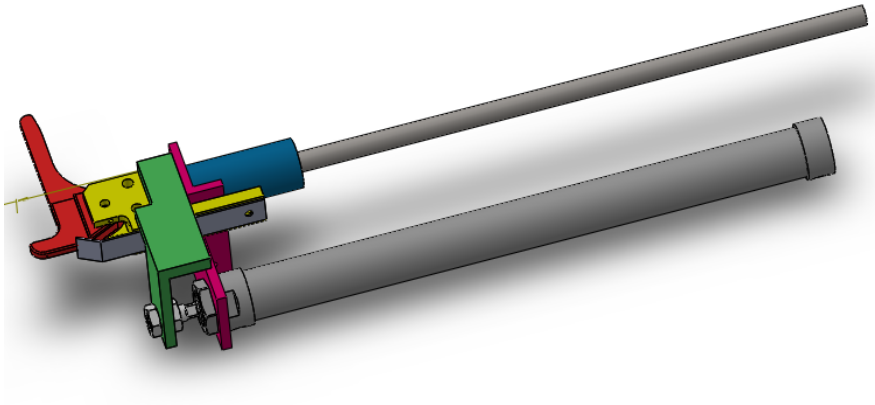


Documentation: Fiber Box Feeder

Progression



Complete Assembly



Documentation: Fiber Box Feeder

Progression