Redesign of Clay 3D Printer

Overview
The Pennsylvania State School of Visual Arts wants a 3D printer extruder designed to print with clay. Our challenge is to design a functioning extruder and clay holding tank that will be able to print different types of clay, use a start-stop functionality, be transferable to different types of printers, and print with a better resolution.

Objectives
Our objective was to design a functioning system that was able to print clay pieces, make it more reliable than the previous system, and use a mechanical feeder in place of the existing air compressor.

Approach
- Initial meeting were conducted with the sponsor to determine customer needs.
- The clay tank and motor were selected as necessary parts of the design.
- Different concepts of moving the clay through the system were generated.
- A threaded rod-mounted plunger was selected as the best design.
- Testing and analysis led to iterations of this design to arrive at the final prototype.
- Weekly meeting with the sponsor continued through the semester.
  - These allowed for progress updates and changes to the scope to be made regularly.
- The design was made in Solidworks and 3D printed using the sponsor’s machines.
- The final prototype had water jet-cut aluminium form the Learning Factory.
- The prototype was hooked up to the printer to begin final testing.
- Parameters of the 3D printer was matched with the extrusion system.
- Prints were generated using different clay consistencies to ensure functionality.

Outcomes
Finally, list the outcomes for this project making sure to clearly convey their implications for the sponsoring company:
- The 3D printing system is able to produce prints more consistently than the old system.
- The new system is easier to operate and quieter than the previous one.
- The total cost to build the final prototype (not including the cost of a 3D printer) is $372.84.