WEA CREEK ORCHARD AND TEAM 60

CIDER PRESS CLEANING

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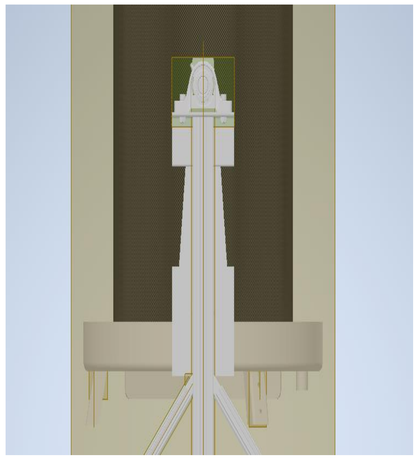
OBJECTIVE

The objective of this project is to design and implement a more efficient system for emptying pressed apples from a cider press. The new system should minimize manual labor, reduce time spent on cleaning out the press, and ensure that the apples are removed thoroughly and safely. The solution must be durable, easy to operate, and easily moveable to multiple locations around the farm.



CUSTOMER PROBLEM AND BACKGROUND

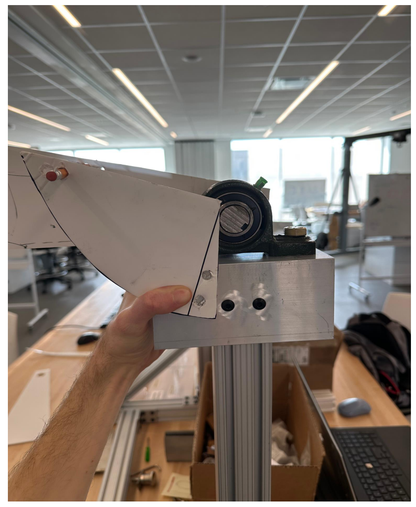
The existing commercial cider press utilized by Wea Creek Orchard features a perforated stainless steel barrel fitted with an inflatable rubber cylinder at its core, which serves to press crushed apples uniformly against the barrel walls. Prior to pressing, operators place a heavy-duty mesh bag inside the barrel and load crushed apple pulp into the bag, ensuring even distribution for optimal juice yield. During operation, the lid is sealed and the central cylinder inflates with water, exerting pressure that efficiently squeezes cider through the barrel's perforations, leaving behind a dense apple mash.

Once pressing is complete, roughly 100 pounds of compacted apple mash remain trapped on the barrel walls within the mesh bag, presenting a significant removal challenge. Operators must lean over the press and painstakingly extract handfuls of viscous, clumped pulp by hand, a time-consuming, physically taxing process that often leads to fatigue and inconsistent mash removal. Furthermore, attempts to simply pull the full mesh bag from the barrel risk catastrophic tearing, as the heavy mass and uneven texture strain the bag's seams, resulting in equipment damage and downtime.

CONCEPTS AND EXPERIMENTATION

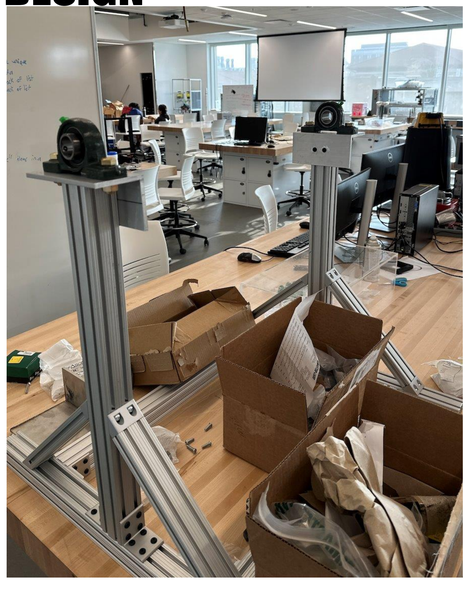
An initial concept we had was to create a system that could pull the apples directly upwards with a tractor with wires, sheet metal, and a tractor. However, we did not implement it because the spot welds required would not likely hold. Instead, we look at real world examples that were already created and found a press that pivoted to let gravity do the work. Our design is based on this and, when complete, will allow the user to easily pivot the stand, lock it into place, and pull the mesh bag of used apple pomace out of the drum.

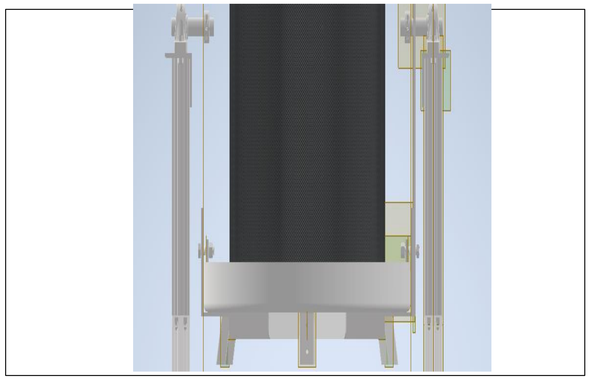
To create our design, we began in CAD to visualize how we would build it. Using 80/20 t-slotted railings would also allow us to modify the design more easily after testing how it performed. Before cutting out the arms to hold the barrel, we prototyped them with posterboard to ensure our dimensions for our locking mechanism would work. Finally, we intend to use L brackets and bolts to hold the drum onto the structure.



REQUIREMENTS AND FINAL DESIGN

The design must be able to support weight of apple mash without worry of tipping over. The rotation locking mechanism must also support the weight and be able to hold it in a locking position. The barrel must be held in place on the press during rotation to prevent all of the contents from falling freely. Rotation must be at an angle that increases the ease of cleaning while also not dumping apple mash where it is not wanted, like into the collected juice below.





CONCLUSION AND RECOMMENDATIONS

Despite starting the project at the beginning of the semester, our team was still able to go through all of the necessary design procedures. We were able to do important research relating to food safety and a variety of different considerations, such as how it would interact with our materials and different constructing methods such as welding vs brazing vs just using screws. All team members were able to contribute to the design of certain parts and how they would come together for a finished product. Our first recommendation for how to improve our design in the future could be to attach wheels for more ease of transportation depending on the desired usage of the press around a farm or other area. We would also recommend that if replicating this design on another cider press, the ability to do more testing on potential designs, as we did not want to make any modifications to our design that could permanently alter it given the price of replacing the press if a major error was made.