PURDUE UNIVERSITY

CAPSTONE/SENIOR DESIGN EXPERIENCE 2017

Agricultural & Biological ENGINEERING

Austin Gantzert (ASM), Klayton Jasinski (ASM)

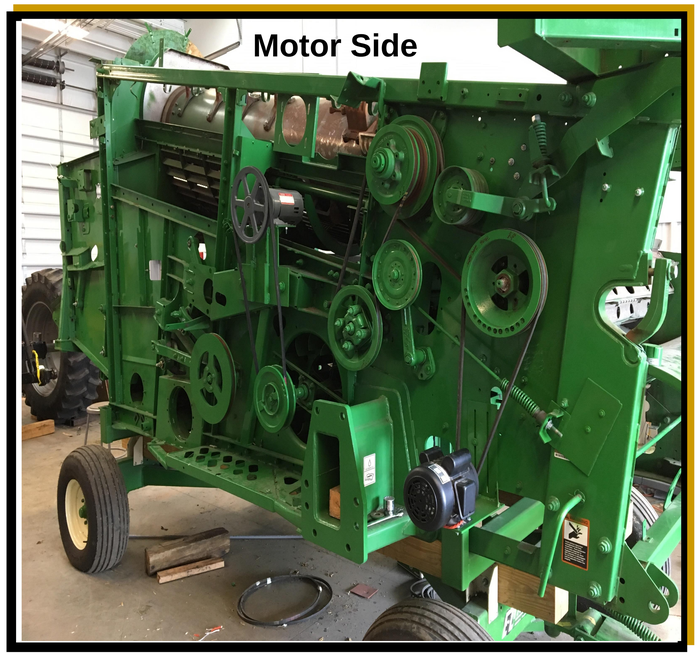
Combine Separator Demonstration Unit

Objective:

Two years ago, the Purdue ABE department received a combine separator unit that had the potential to be converted into a reduced speed, open section, live action demonstration unit. The separator unit is placed on a running gear. The finished demonstration unit will include operating different functions at an appropriate speed, powered by electric motors. For safety, motor covers will be fabricated, and plexiglass will be installed on the viewing side of the unit. In terms of aesthetics, all motor mounts and any other important features will be painted, while lighting will be installed inside the unit to enhance the view.

Background: The unit was donated to Purdue, and this is the second year of it being a capstone project. The first team did much of the deconstruction on the unit, opening up the viewing side of the unit. To gain insight, John Deere shared knowledge of their demonstration unit, located on the Harvester Works floor in Moline, IL.

Tool Utilization: Throughout this project, many of the tools and machines at ADM were put to use. During the deconstruction, impacts with sockets, along with a plasma cutter and grinder, were used to make things more accessible and better overall. For construction purposes, welders, presses, and drills were used to fabricate motor mounts and other essential pieces to the machine.



Final Recommendations: Upon completion, the combine separator demonstration unit will serve to be a vital tool throughout the ABE department for years to come. Hundreds of hours of progress were put forth to achieve that goal this year, but there is still work to do in order to achieve the final product. First, the team recommends finding a way to power the sieves to show the full grain cleaning process. After this, it would be best to fabricate safety covers to go over the current motors and mounts that were built this year. Continuing on the safety topic, plexiglass should be installed on the demonstration side of the unit in order to ensure that no one gets hurt. From an aesthetic standpoint, LED light strips should be installed inside the unit to properly show the functions to the viewers, and paint should be applied in necessary areas, finished off by a thorough cleaning and waxing to bring it to show quality.

Applied Principles: To ensure the team's final solution was adequate for the desired needs, an implementation of engineering, management, and safety principles were used. The team utilized standards and principles learned throughout the ASM program to efficiently modify the unit for educational and demonstration purposes

Societal Impact: The combine separator demonstration unit will be used in many circumstances on campus, such as classrooms for curriculum, tours for prospective students and visitors, and events on campus such as Ag Week and Spring Fest. The unit will demonstrate the different functions of a combine in a slow and safe manner.

Sustainability: Upon completion, the demonstration unit will be mobile, durable, and safe for travel. Thanks to this, it will provide knowledge and first-hand experience to people all over Purdue's campus.

Budget:

Product	Price	Quantity	Total
Paint	$ 4.09	4	$ 16.36
1 1/2" Pulley	$ 10.25	2	$ 20.50
86" Belt	$ 7.99	1	$ 7.99
128" Belt	$ 1.07	1	$ 7.07
PVC Conduit	$ 60.00	1	$ 60.00
Total			$ 111.92

Sponsor:
Mr. Dennis Silver
Front End Equipment Configuration Lead
John Deere

Technical Advisor:
Dr. Daniel Ess

Instructors:
Dr. Robert Stwalley
Dr. Daniel Ess

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John Deere, Co.
Mr. Scott Brand

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