PURDUE UNIVERSITY

CAPSTONE/SENIOR DESIGN EXPERIENCE 2017

Tractor Disassembly

Agricultural & Biological ENGINEERING

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Background and Overview

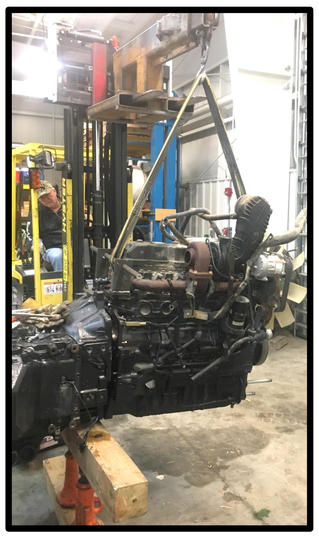
The goal of this project is to disassemble a tractor and construct a display stand for the hybrid transmission. A Case IH Puma 180 was donated to the university along with a servicing manual. Disassembly manuals have be compiled by a previous capstone project and will be used as guidelines during the disassembly process. The components from the deconstructed vehicle will be used to make demonstration units for the department in future years. Instructions for dismantling should include safety concerns, equipment needed, and other notes. This project is a continuation of a 2015 Senior Capstone Project (Continuously Variable Transmission) and a 2016 Senior Capstone Project (Hybrid Transmission). The main component to be secured from the disassembly of the unit is the Continuously Variable Transmission (CVT). Other components include the engine, front and rear axles, operator platform, and the hydraulic system.

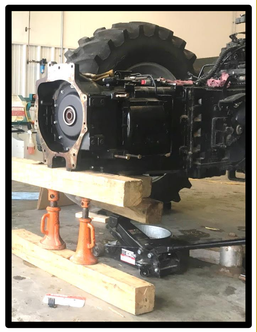
Impact and Sustainability

This project will help improve the quality of instruction in the Purdue Agricultural and Biological Engineering Department. The CVT display allows for hands-on learning of the transmission that is becoming very common in industry today. The remaining pieces of the tractor will be utilized as future Senior Capstone projects. This will help ensure that the Agricultural and Biological Engineering Department at Purdue University continues to remain in high regard around the nation and world, and will continue to provide top level instruction.

Alternative Solutions & Appropriate Tools

Throughout this project, a general guideline of the procedures that should be followed during the disassembly of the tractor was provided. There were times where improvising or fabricating were necessary to complete the task at hand. During the cab removal, the provided manuals did not provide a clear solution to removing the cab from the tractor. As a result, a telehandler was utilized to lift the cab from the tractor, after several other alternatives were considered.



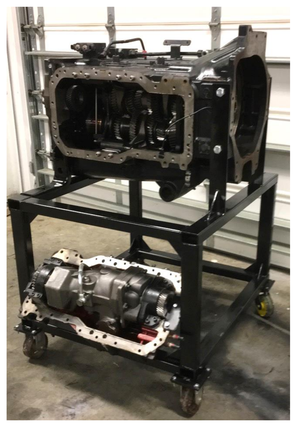


Timeline and Budget

This project was assigned in the Fall Semester of 2016. Review of the disassembly manuals and a general disassembly plan was developed in September and October. Physical work on the tractor began in November. Below is the project timeline that was followed throughout the year. A budget was not given due to the fact that this was a Purdue Agricultural and Biological Engineering sponsored project. All materials were acquired through the department.

	14-Nov-16	21-Nov-16	28-Nov-16	5-Dec-16	9-Jan-17	16-Jan-17	23-Jan-17	30-Jan-17	6-Feb-17	13-Feb-17	20-Feb-17	27-Feb-17	6-Mar-17	13-Mar-17	20-Mar-17	27-Mar-17	3-Apr-17	10-Apr-17	17-Apr-17	24-Apr-17	1-May-17
Remove Hood, Steps, Battery, Fenders																					
Drain Fuel, Remove Fuel Tanks																					
Drain Oil, Remove Exhaust																					
Remove Radiator, Air Cleaner,																					
Remove Cab																					
Remove Electrical and Hydraulic Connections																					
Remove Front Axle																					
Remove Front Weight Carrier and Engine																					
Mid-Term Presentation																					
Remove Transmission																					
Build Transmission Stand																					
Wrap-Up Project Work																					
Poster and Presentation																					
Final Report																					

Final Recommendations



The CVT display stand will be a great hands-on learning tool for students coming through the Agricultural and Biological Engineering department at Purdue University. To further improve the CVT stand, a variable frequency electric motor can be attached to the input shaft as well as the ring gear on the planetary. This will allow students to control the input and ring gear speed and see how it affects the output shaft speed. Pneumatic actuators can also be added to shift gears in the transmission.

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