

Senior Design Project Description

Company Name	<i>Fontaine Modification</i>	Date Submitted	4/23/2020
Project Title	<i>Adjustable Floor Riser – Phase 2</i> (FONT RISE2)	Planned Starting Semester	Fall 2020

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	4	Electrical	1
Computer		Systems	
Other ()			

Company and Project Overview:

Fontaine Modification is known for modifying trucks from various OEMs to meet customer request or specifications. We have exclusive ship-thru agreements with the leading OEMs to maximize end-user convenience and minimize delivery costs. These ship-thru arrangements expedite final delivery time from orders anywhere in North or Central America and facilitate modification efforts with minimal financial impact. We provide engineering solutions to meet customers' unique requirements and specific applications, all while adhering to federal safety standards. Trucks can be modified for a variety of purposes, some as simple as fleet decals, others more complex. Some examples:





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One of our core modifications is our stand-up dual drive conversion. This can be done on the left, right or both sides of the truck. This modification is performed primarily on the Freightliner M2 platform. The stand-up dual drive application is used primarily in the refuse industry where drivers are continually entering and exiting the truck throughout the day. Trucks equipped with our stand-up conversion reduce the driver's ingress and egress to a standard step height versus climbing the standard two or three steps required from the OEM.



This modification has been performed for 10+ years, and during this time we have kept the same stand-up cab design. In the current configuration the gas and brake pedal are mounted in a fixed position. The scope of this project would be to design a manufacturable solution to allow the gas and brake pedal, as well as the floor to be adjusted up or down to accommodate drivers of varying heights. This would give end users the ability to adjust all necessary driver controls for maximum comfort.

Lastly the floor riser's design must consider the everyday conditions that a refuse truck will undergo. The truck will be subject to cyclical loading due to truck or road vibrations as well as the forces exerted by the driver entering and exiting. Most stand-up applications are also driven with the doors open, allowing dirt, water and road debris to enter the cab of the truck and are used year round from Florida to Canada.

This Phase 2 project will be to take the output of the Phase 1 team and refine the design to achieve the Fontaine specifications. That design will be build tested and demonstrated.

Project Requirements:

The adjustable floor riser must allow the throttle and brake pedal to be adjusted up or down in conjunction with the floor of the box.

This system must work in the current box configuration without any modification to the box design, other than adding holes for mounting purposes.

The result must be a product that can be 100% manufacturable or use standard off the shelf components.

The final version of the manually adjustable floor must have a total material cost of < \$500 per unit. Anything larger will not allow this to be a marketable product.

Trucks equipped with the adjustable floor riser must conform to all Federal Motor Vehicle Safety Standards (FMVSS).

Floor riser's design must consider the cyclical loading a refuse truck will see over the course of 10+ years of use.

The Phase 1 design was a manual only model which was a proof of concept that did not meet all of the spec requirements. The Phase 2 team will refine this design to meet all specs and retrofit the manual powered option with a powered system that can be an add on option for customers who do not want manual actuation. Both designs (manual and powered) to be weather proofed.

The powered floor riser option cannot be operational while the truck is in motion.

Expected Deliverables/Results:

- Complete design of an adjustable floor riser that will work in conjunction with Fontaine Modification's left hand or right hand stand-up dual drive box for a Freightliner application.
- Working Prototype of the adjustable floor riser in both manual and powered configurations.
- Results and conclusions from FEA analysis to verify cyclical loading, and harsh environment usage.
- Proof of all Federal Motor Vehicle Safety Standards product compliance.
- Weather proofed.



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- Quotes from Fontaine Modification's third party, fabrication shop to verify cost of manual option is < \$500 per unit.

Disposition of Deliverables at the End of the Project:

Typical handover following Expo is acceptable

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- None