INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	*Freightliner Custom Chassis*	**Date Submitted**	*11/17/2022*
Project Title	*Design of a Safer Vehicle Transfer Seat* ***(FCCC_SEAT)***	**Planned Starting Semester**	*Spring 2023*

Senior Design Project Description

Personnel

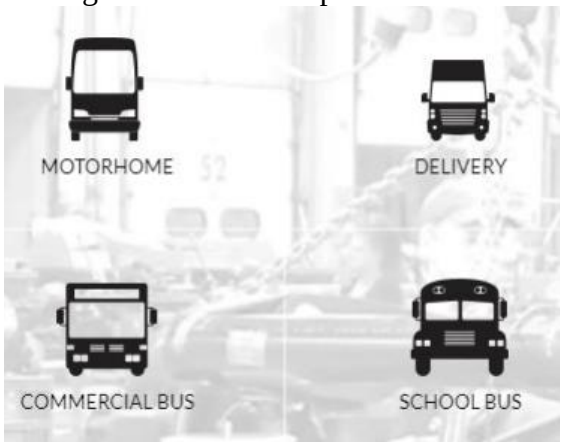
Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

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	
Computer		Systems	

Company and Project Overview:

Established in 1995 and trusted by some of the most respected names in the RV, walk-in van, commercial bus and school bus industries, Freightliner Custom Chassis Corporation (FCCC) is a leading manufacturer of premium vehicle chassis.



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As part of the Daimler family, Freightliner Custom Chassis shares the heritage and engineering excellence of Freightliner and Mercedes-Benz – leveraging expertise in heavy-duty durability and precision performance to infuse each of our chassis with the best of all worlds. Located in Gaffney, South Carolina, FCCC employs more than 650 employees in our manufacturing, customer support and retail facilities. As the world's largest manufacturer of diesel walk-in van chassis, nearly two-thirds of all diesel walk-in van chassis sold today are made by FCCC.

FCCC holds more than half the market in Class A diesel motorhome chassis and more than a quarter of the market in conventional school bus chassis. Freightliner Custom Chassis is committed to delivering superior quality and a key component is operator training for assembly operations. This project will design an improved method for a seat used for chassis and drivetrain transfer from one building to another.

Project Requirements:

For FCCC, the product is delivered as a chassis/drive train subassembly that is sent to a customer to have the vehicle body added on to the chassis/drive train to create their final vehicle product. As example of this is a school bus. FCCC will assemble the vehicle frame, axles, drive train and engine to a sub assembly that is transferred to the Thomas Built Bus facility to have the school bus body added on and create the final vehicle product.

During the subassembly process, the chassis/drive train unit has to be moved between buildings and to the final shipment location. At this point it looks like the solid object in the picture below:

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The units has an engine, drive train, frame, axles, wheels and a steering wheel. It does not have a body with a seat. The unit is drivable and driving it to the next location in the process is the most convenient way to move the units. Since there is no seat the operators clamp a temporary seat onto the frame rail so they can drive the unit to the next station in the process. See temporary seat in the photo below:

The objective of this project will be to design, prototype and test and improved seat to be used for the temporary transport of vehicle subassemblies.

Expected Deliverables/Results:

- Seat system which has the following characteristics:
    - Rugged

- Lightweight (less than or equal to weight of current unit)
  - Current seat weighs 21# 6oz
  - Current DTNA ergonomic standard requirements:

Design Targets Considering Cyclic Work –Production Processes- Force and Distances
1. Two-handed lifting and/or carrying of ≤ 25 lb. (11 kg)
2. Two-handed push or pull of ≤ 40 lb-f. (178 N).
3. One-handed lift and/or carry ≤ 10 lb. (4.5 kg). Use two-handed methods when possible.
4. One-handed push or pull of ≤ 20 lb-f. (89 N). Use two-handed methods when possible.
5. Avoid the handling of loads > 10 lb. below 20 in. (89 mm) and above 54 in. (240 mm)
6. Limit carry distances to 10 ft (3 m) or less

    - Ie., A shoulder strap, backpack harness or handle would help
- Sturdy enough to support an operator weighing up to 400 lbs and withstand impact when moving at a speed of up to 30mph (NOTE: Speed limit around grounds is specified as 10mph outside).
- Time to clamp on the frame less than or equal to the current clamping time
- Support operator during the transit
- Include seat belt for operator safety
- Improve the safety aspect of the design
- Cost per unit to be <$200
- Have demonstrable advantages to the operators so they want to use it

Disposition of Deliverables at the End of the Project:

Students are graded based on their display and presentation of their team's work product. It is mandatory that they exhibit at the Expo, so if the work product was tested at the supporter's location, it must be returned to campus for the Expo. After the expo, the team and supporter should arrange the handover of the work product to the industry supporter. This handover must be concluded within 7 days of the Expo.

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

- Travel to FCC facility in Gaffney SC as required. Mileage reimbursement is available.