THE WILLIAM STATES LEE COLLEGE OF ENGINEERING

Company Information

Company Name	*DTNA – Mt. Holly Truck Plant*	**Date Submitted**	*11/26/2021*
Project Title	*Design of an Improved Air Leak Test Process for Pneumatic Components During Truck Assembly* **(DAIM_AIR)**	**Planned Starting Semester**	*Spring 2022*

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	1
Computer		Systems	1
Other ( )			

Company and Project Overview:

Daimler Trucks & Buses is one of the world's largest commercial vehicle manufacturers, with more than 35 primary locations around the world and around 100,000 employees. The company brings seven vehicle brands under one roof:

Mercedes-Benz (light, medium and heavy trucks as well as city, intercity and touring coaches) and Setra (intercity, long-distance and premium coaches) are our traditional European brands; our U.S. brands Freightliner Trucks (trucks in weight classes 5 to 8 for a wide range of commercial vehicle applications), Western Star (heavy trucks for specialized and long-haul transports) and Thomas Built Buses (light- to medium-duty buses); and our Asian brands BharatBenz, based in Chennai, India (trucks in the weight classes 9 to 55 t and medium- and heavy-duty buses) and FUSO, headquartered in Japan (trucks and buses for Asia, Middle East, Africa, Europe and Latin America).

The Mount Holly Truck Manufacturing plant produces the full line of Freightliner medium-duty Business Class® M2 / SD models as well as an ecoated cab for the Western Star units built at the Cleveland and Portland Truck Plants. See photos below of product:

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Project Requirements:

Most trucks in the heavy duty truck market are equipped with pneumatic brakes and other air powered accessories like suspension systems, axle controls, horns and fans. Nearly all the airline fittings are manually installed into the various components manually in sub-assembly areas of the truck plant. Once the truck is completed, full vehicle air leak testing is performed. At this stage, there are multiple failure modes, of which final testing does not make a distinction of root cause. This project should develop methods and processes to reliably perform air leak tests on the various components during a normal assembly takt time (5 min or less).

Expected Deliverables/Results:

- Evaluate best method to install fitting and plugs, all NPT threaded.
- Determine means to seal open fittings and ports
- Apply approximately 120 psi air pressure to leak check all threaded connections and airlines inserted into fittings if applicable.
- Record results by serial number in a local database

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):

- For Systems student: SEGR 4141 (Engineering Experimental Design), SEGR 4170 (Total Quality Management)