



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

## Senior Design Project Description

<b>Company Name</b>	<i>Caterpillar Corporation</i>	<b>Date Submitted</b>	<i>11/12/2018</i>
<b>Project Title</b>	<i>Re-design of Cab Access System for Front End Loader (CAT_LADD)</i>	<b>Planned Starting Semester</b>	<i>Spring 2019</i>

### 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:

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	4	Electrical	
Computer		Systems	
Other ( )			

### Company and Project Overview:

Caterpillar is the world’s leading manufacturer of construction and mining equipment, diesel and natural gas engines, industrial gas turbines and diesel-electric locomotives. We are a leader and proudly have the largest global presence in the industries we serve. For more than 90 years, Caterpillar Inc. has been making sustainable progress possible and driving positive change on every continent. Customers turn to Caterpillar to help them develop infrastructure, energy and natural resource assets. With 2017 sales and revenues of \$45.462 billion, Caterpillar is the world’s leading manufacturer of construction and mining equipment, diesel and natural gas engines, industrial gas turbines and diesel-electric locomotives.



This project will be with the Clayton (NC) Machine Development Center (CMDC), where more than 200 engineers, prototype technicians and expert operators work to design, build and test machines in one location. The CMDC has dedicated 150 acres for machine development and features a half-mile, high-speed machine track, 10 test and demonstration areas and seven machine

operation areas to prove machine reliability and durability. The Clayton facility manufactures small wheel loaders and serves as a product distribution center for backhoe loaders. This project will be associated with a particular front end loader model.

**Project Requirements:**

The Cat 938M Small Wheel Loader sets the standard for productivity, fuel efficiency and operator comfort. See the photo below:



In certain unique circumstances, the access ladder has been damaged by use. See an example of a damaged ladder in the photo below:





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This project will evaluate the circumstances that has led to this type of damage and redesign the cab access system (currently the ladder shown) to develop a cost-effective, safe system that would avoid this type of damage. Ideally, this would involve a system which would allow for the ladder to retract out of harm's way during operation, while not compromising safety or accessibility when not in operation. The system should be easy to retrofit to equipment in the field.

**Expected Deliverables/Results:**

- Fully documented design for replacement system
- Testing and verification of the design to validate performance
- Prototype of the new design

**Disposition of Deliverables at the End of the Project:**

Provide prototype to the industry supporter at the conclusion of the Expo.

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

- Student team may need to travel to Clayton NC Caterpillar on occasion, all students must be able to make this trip as agreed between team and Caterpillar.
- Students must be US Citizens or Green Card holders