



Company Information

Company Name	<i>Siemens Energy Inc.</i>	Date Submitted	<i>05/16/2022</i>
Project Title	<i>Design of an Automated Vertical Boring Machine Guarding System (SIEM_VBM)</i>	Planned Starting Semester	<i>Fall 2022</i>

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	-

Company and Project Overview:

Siemens Energy Inc. is responsible for manufacturing and servicing of steam and gas-powered turbine units and auxiliary systems. The company is the OEM supplier for power generation customers within and outside the U.S.A., dealing with both nuclear and fossil fuel units. This project will be conducted in the Small Assembly & Machining department of the Steam Turbine division. This department is responsible for service refurbishment and manufacturing of steam turbine valves, which are primarily involved with supplying steam to the turbine and re-heat units.

This project involves creating an automated guarding for our Vertical Boring Machines, which will serve as a critical safety improvement for shop personnel involved with operating this machine.

Project Requirements:

The project will involve designing and fabricating a functional automated/semi-automated guarding that will allow access to the workpiece when the machine is stopped and restrict access partially or completely when the machine is in operation.



- The current idea is to have telescopic sheet metal paneling that will border the worktable (approx. 6' in dia.). It should surround the table such that when it is operational, there is minimal access available to the operator.
- It will need to be extended/operated using a (simplistic) control panel that can be accessed away from the worktable.
- It can be operated using pneumatic/electronic telescopic jacks that could be attached to the top of the telescopic panel, that will actuate and lift the panels to 2 different heights based on visibility requirements.

Expected Deliverables/Results:

- The above is a basic idea of what the guarding may look like, however, based on the discussion during the term of the project, the scope can be changed based on feasibility and opportunities for improvement.
- A functional telescopic paneling that will guard the operator while the VBM is in operation and prevent access to the worktable, with 2 different height settings.
- The telescopic paneling should not be extremely heavy and should be actuated to allow semi-automated operation.

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):

- Machine design
- Pneumatic / electronic actuation
- Basic to intermediate Circuit board and wire harness design skills
- PLC
- Travel to Siemens Charlotte facility. Mileage will be reimbursed per ISL purchasing policy.