



Company Information

Company Name	Robert Bosch Tool Corporation	Date Submitted	11/13/2023
Project Title	Design of an Automated Unload System for Hammer Drill Bit Straightening Machine (BOSCH_UNLOAD)	Planned Starting Semester	Spring 2024

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	3	Electrical	2
Computer		Systems	

Company and Project Overview:

The Power Tools Division of the Bosch Group is the world market leader for power tools and power tool accessories. Bosch Tool Corporation’s plant in Lincolnton, NC focuses primarily on the manufacturing of power tool blades such as circular saw blades, reciprocating saw blades, and other accessories such as sander belts, Dremel bits and other rotary tools. This project focus will be in our Shelby, NC facility where we produce hammer drill bits and router bits. The hammer drill bit value stream is a new value stream for North America which recently started production late this year. This project involves carbide tipped hammer drill bits which are sold at The Home Depot and various distributors under the Bosch brand “Diablo”.



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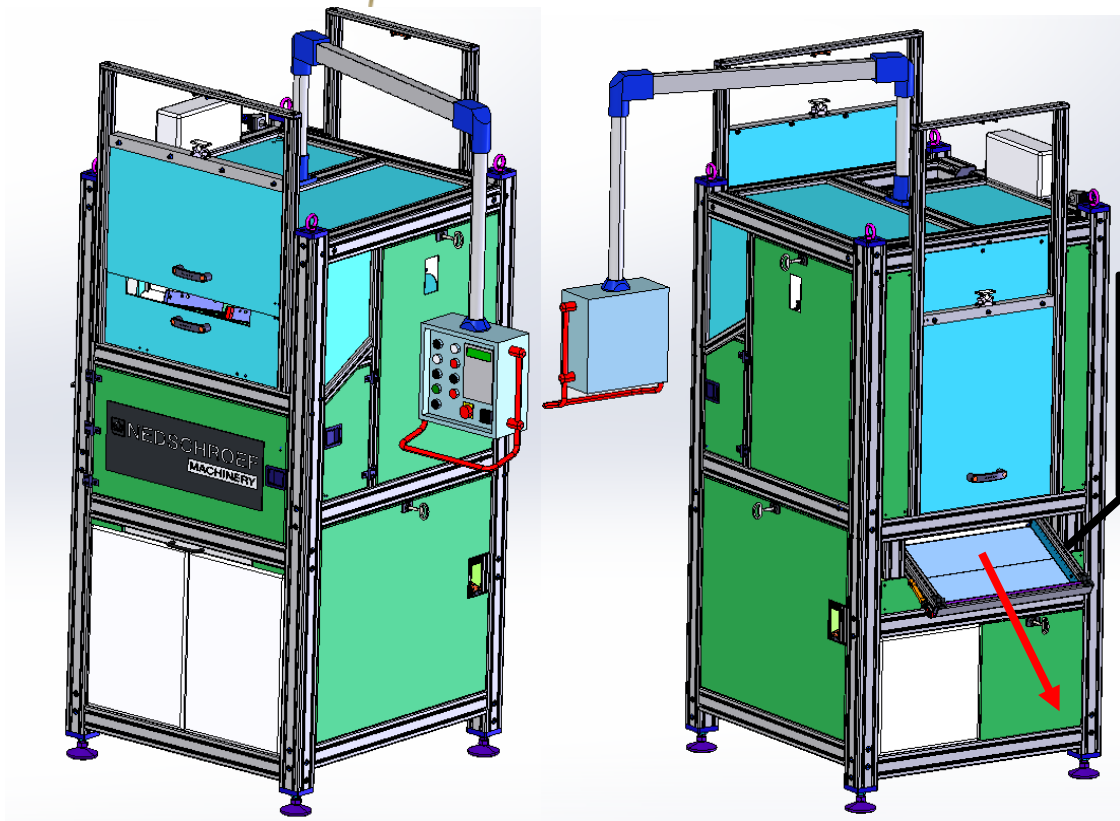
This project's main objective is to create, build and integrate an automated unloading system for our roll straightening machine. The roll straightening machine is a new machine that will be critical to maintain production capacity and throughput of the manufacturing process. Throughout the hammer drill bit manufacturing process, the bits are handled in plastic totes with a specified number of bits in them. Currently the straightening machine does not have the capability to unload the drills in a specified quantity into the plastic totes.

Project Requirements:

Students will design, build, program, and integrate a functioning tote unloading system for the existing roll straightening machine. The unloading system needs to be capable of controlling how many drills the machine outputs into each tote and maintain the machine cycle time while transferring between full and empty totes. The unloading systems will also have appropriate safety controls and measures.



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Machine
output where
unloading
system is
needed.

Current Roll Straightening Machine Front and Back

Close up view of plastic totes:



Empty totes would be loaded into the machine and once the specified number of drill bits were ejected into the tote, the full tote would be cycled out and an empty tote put into place.

Project Deliverables

- Functioning unloading system
- CAD Models of all components
- Assembly Drawings and BOMs
- Electrical and controls diagrams
- PLC/HMI programs
- Work instructions on how to use unloading system

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):

- CAD Design/Mechanical Design
- PLC Programming
- Controls Design/Integration
- May require travel to Bosch Shelby, NC location