INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	Robert Bosch Tool Corporation, Lincolnton, NC	**Date Submitted**	27-Apr 2022
Project Title	Design for Automation of Manual Blade Packing Station **(BOSCH_BLADE)**	**Planned Starting Semester**	Fall 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	3	Electrical	1
Computer	1	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 blade, reciprocating saw blade, and other accessories such as sander belts, Dremel bits and other rotary tools. The PA2 division of the plant, which incorporates the production of reciprocating saw blades, is now starting a new production line called the Oscillating Multi Tool (OMT). This blade type is used to create a plunge cut into materials such as metal, wood, drywall, etc. One of the packaging types of the OMT blade is a 5-piece set which is manually put together at a manual packing station. The manual packing process is a combination of multiple steps and requires a certain amount of operator involvement to maintain the quality standards in the completed final product. Thus, the purpose of semi automating the packing process is to reduce the overall time required to pack one set of OMT blades and consequently, improve the overall output of the manual packing process.

INDUSTRIAL SOLUTIONS LABORATORY

Project Requirements:

Here are some images of the manual packing station and the 5-piece OMT blade set.

INDUSTRIAL SOLUTIONS LABORATORY

The objective of this project is to develop a packing system which can automatically pack the 5 different OMT blades in the case. The blades sit in a black insert tray which is enclosed in an outer case. The operating person can then manually add the remaining items on the case such as the insert card, labels, zip tie etc. and do a quality check. The senior design engineering team will need to spend time on the shop floor in the packaging area to understand the steps involved in the packing of the blade set. In the design of the system, the team should consider Safety, Ergonomics, Quality and Operations as guiding principles.

- Max LxW = 5ft x 3ft. Although max dimensions of space for the system are provided, the team should try to design the system to use as minimum space as possible.
- The packing system should be adjustable to the different blade profiles.
- Bosch will provide sample blades, packaging items for reference.

Expected Deliverables/Results:

- A fully functional prototype of the OMT blade packing system.
- 3D CAD model.
- Complete parts list.
- 2D drawings of mechanical parts

- Electrical schematics and pneumatic diagrams.
- Operating/Work Instructions
- PLC program

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):

- Interest in controls and automation design
- Team will be required to travel to the Bosch facility in Lincolnton, NC. Travel will be reimbursable by following the ISL purchasing procedures.