INDUSTRIAL SOLUTIONS LABORATORY

Company Information

Company Name	*Bosch Power Tools*	**Date Submitted**	*5/1/2023*
Project Title	*Design of an Automated Injection Punchout Machine* ***(BOSCH_PUNCH)***	**Planned Starting Semester**	*Fall 2023*

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 focusses 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. This project is related to the production of large diameter (10in and 12in.) circular saw blades.

Project Requirements:

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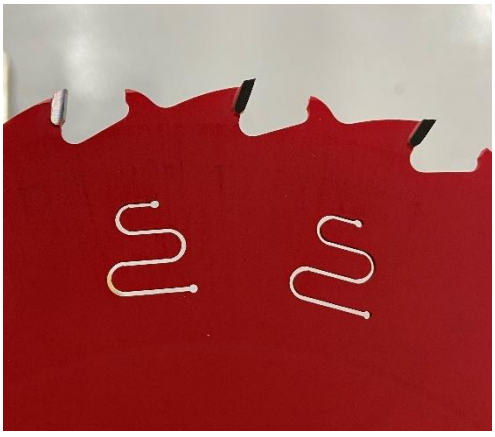
For large diameter circular saw blade production, the blades feature noise canceling, anti-vibrational slots that are plastic injected. The slots are plastic injected using an injection press, but not every blade comes out fully injected. Some on-blade slots will have missing or partial injection which is classified as rework. These rework blades will need all the injected slots emptied and sent back through the process to get injected again. Below are some examples of a blade that is missing injection (image in section 1) and the end goal of the project would be that all slots will have the injection media removed via a manual or automated punchout device (image in section 2). This device is purely for rework and not integrated into production automation.

1. **Missing or Partial Injected Blade:**

2. **Blade Post-punchout Device:**



Expected Deliverables/Results:

- A mechanical design that will remove plastic injection from 10in. and 12in. large diameter blades, that is also capable of being fully automated and will fit on a tabletop.
- A working prototype that is capable of consistently removing all injected slots
- During the cycling, it needs to remove injection in all slots at the same time
- Training video/instruction manual for how to operate and maintain the machine
- All drawings, BOM's and software provided.

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
- Solidworks Design
- Team will be required to travel to the Bosch facility in Lincolnton, NC.