

# Busbar Bracket Automation

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## Abstract

The main goal of the project to reduce the need for employee interaction with the busbar bracket assembly process, which consists of driving a fastener through a bracket and into an insulator. The Busbar Bracket Automation project will serve as a starting point for further groups to develop upon, based on the research and development conducted by team 20.

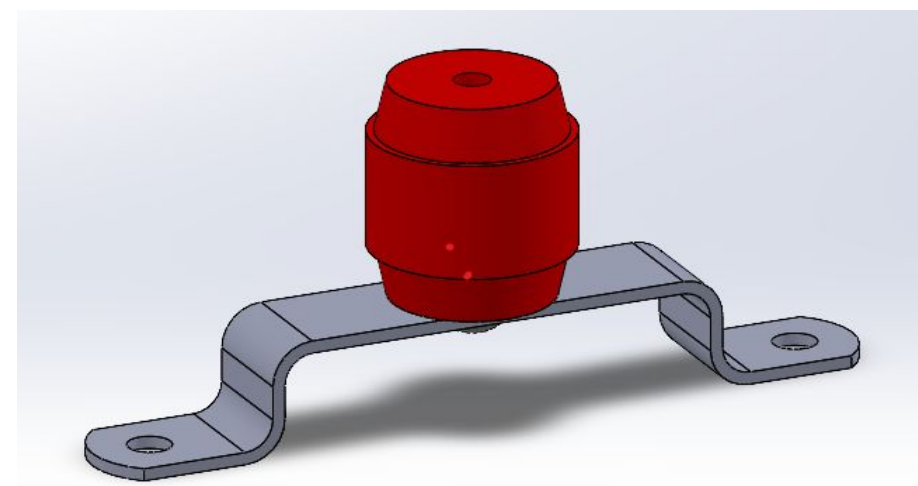


Figure 1: Busbar Bracket

## Introduction

Harger Lightning and Grounding manufactures electrical safety equipment for a variety of industries and applications. A major component of their electrical protection offerings include grounding busbars. These grounding busbars are essentially two busbar subassemblies connected by a copper ground bar. These products serve to carry large amounts of current and to act as a ground.

The goal of the project was to develop an automation based solution for Harger. The goal initially was to create a full automation solution for Harger's needs, but due to supply chain issues following the COVID-19 pandemic, the scope of the project shifted into further research and development.

## Methods and Materials

After careful examination and research, the team concluded, that a rotary indexing table, in conjunction with feeder bowls and tracks, would be the best form of automation for Harger. In essence, a rotating table with a variety of stations would assemble, inspect, and eject subassemblies. These stations were broken down into the following operations; component placement (insulator and bracket), fastener driving, inspection and ejection (bad assembly and good assembly), as well as the controls associated with such processes. The aforementioned assembly process sections would all be performed within a duplicate set of fixtures, specifically made for the sub-assembly automation processes.

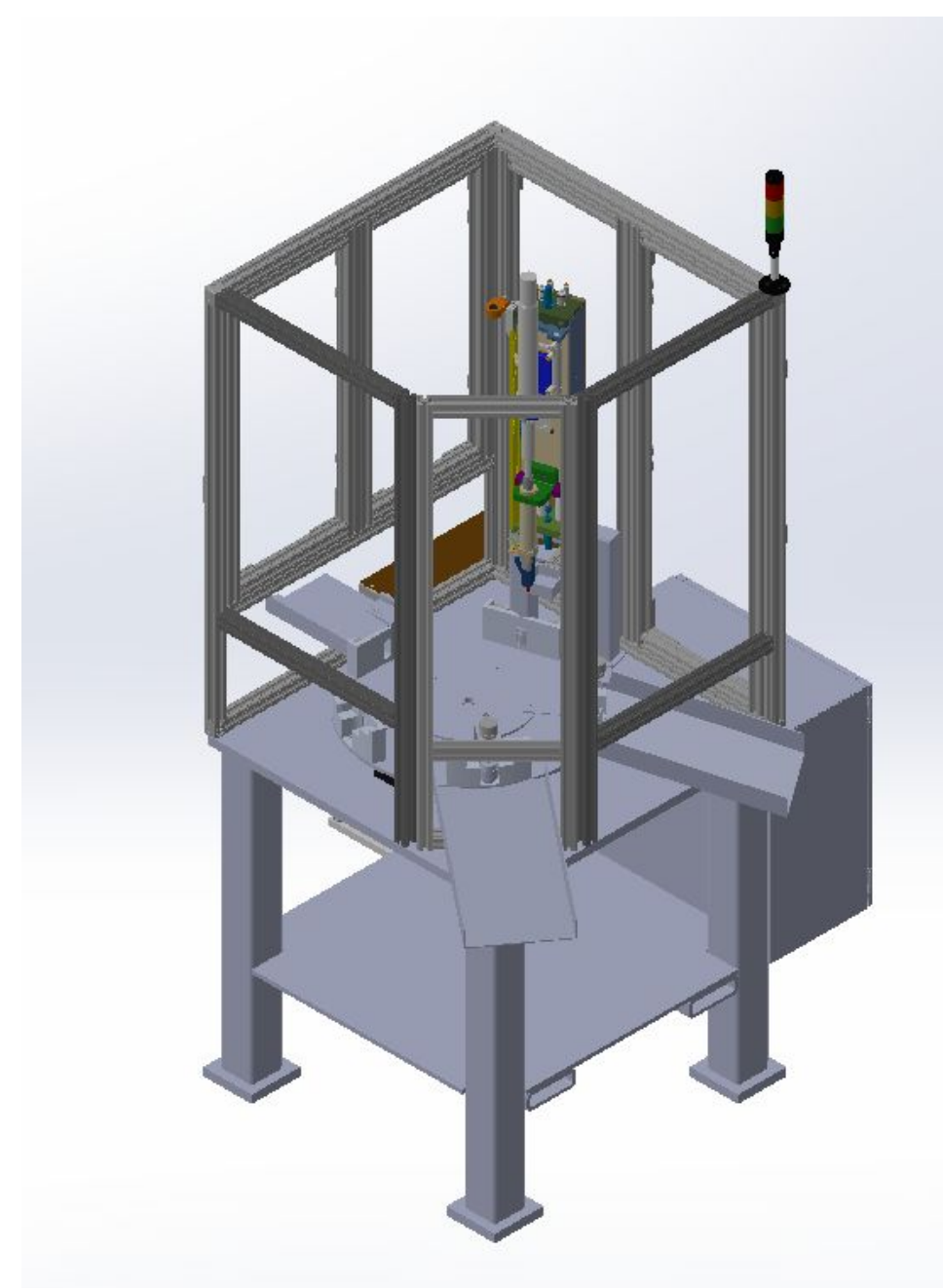


Figure 2: Automation System (Excluding Feeders)

## Conclusions

Due to the change of scope, we adjusted and redefined our outcome for this project. A complete design of the automation machine was designed and modeled. On the control side of the project a PLC program was written using codesys to control the sensors and logic of the machine.

Throughout the different phases of this process the team was able to learn and develop crucial skills related to industry, as a whole. Additionally, Harger was able to build upon their automation knowledge and develop a greater understanding of automating their assembly process.

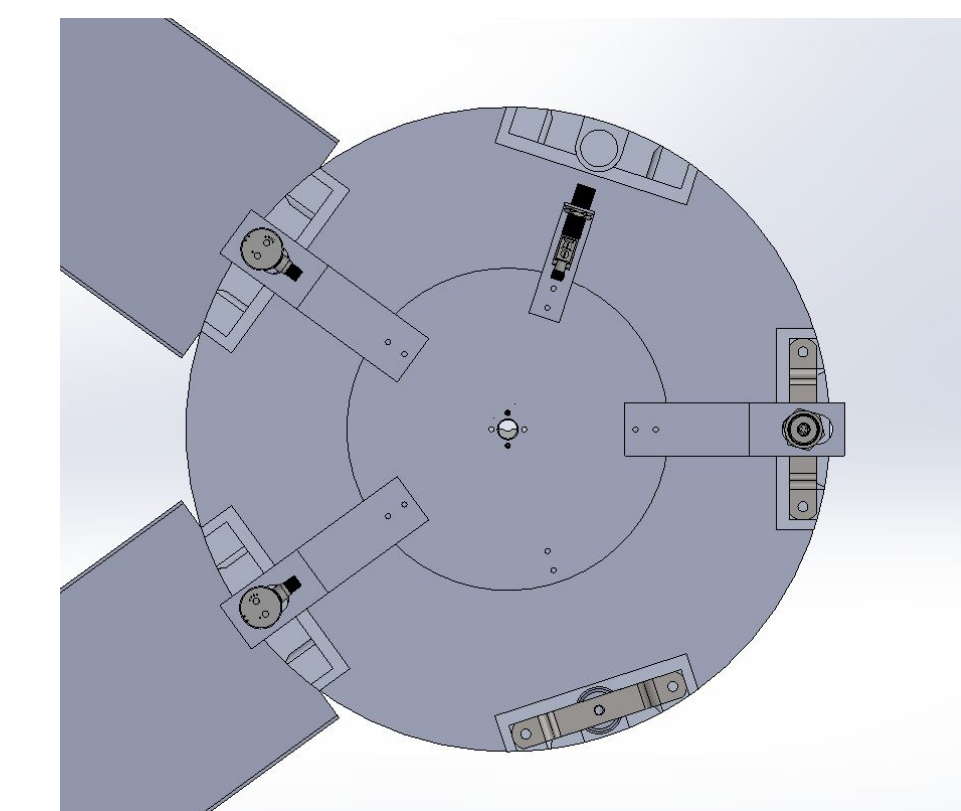


Figure 3: Top-Down View of the System

## Acknowledgements

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