

## **Automated Splicing and Cutting Machine Abstract**

The purpose of this project is to design and develop an automated system for cutting and splicing plastic film for company A, a leading provider of flexible packaging solutions. The project aims to replace the current manual process with an efficient, cost-effective, and safe solution that meets the company's high-volume production needs.

This project entails a detailed overview of the project's objectives, functional requirements, limitations, and relevant codes and standards that apply. The functional requirements include the ability to cut and splice plastic film, operate continuously for extended periods, and have built-in safety features that prevent accidents and injuries to operators or other personnel. Additionally, the limitations of the project include the need to comply with OSHA regulations and use food-grade and metal contact surfaces. The project team has conducted extensive research and analysis to identify the most suitable technologies and materials for the automated system. Initially, a design with a heated splicing mechanism was created. However, after thorough material and acceptance testing, it was found to be an inefficient method of joining the two pieces of plastic together. The final design of the prototype includes a piston-driven hot wire cutting mechanism and a piston-driven roller splicing mechanism with ease of installation, maintenance, and disassembly. Rigorous testing and validations were conducted to ensure the system met the project's functional requirements and safety standards. The implementation of this machine not only significantly increases the safety of the process, but also decreases the waste produced by company A. It is estimated that the machine will create a 70% decrease in waste per day, which will drive more production for company A, produce more profit, decrease environmental footprint, and create a safer work environment.

In summary, this project offers an innovative solution to automate the cutting and splicing of plastic film for company A. The proposed system meets the company's high-volume production needs while ensuring compliance with safety regulations and industry standards. The project team's diligent research and analysis, combined with rigorous testing and validation, provide a solid foundation for the system's success.