



Company Information

Company Name	<i>Eli Lilly & Company</i>	Date Submitted	<i>6/12/2023</i>
Project Title	<i>Film cutting device for pallet & load separation (LILLY_PALLET)</i>	Planned Starting Semester	<i>Fall 2023</i>

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	5	Electrical	
Computer		Systems	

Company and Project Overview:

More information about our company can be found here: [About Lilly | Who We Are | Eli Lilly and Company](#)

Lilly is in the process of building a new pharmaceutical manufacturing facility in Concord, NC. This facility will have an extensive amount of automation which requires some unique requirements for material handling for some of the automation to work properly.

This project is to design and build a tool that will assist an operator with cutting stretch film from a pallet of material while on the conveyor platform during the receiving process. The intent is to be able to separate the load (i.e. freeing the unitized pallet goods from the wooden pallet it was shipped on) from the pallet while keeping it unitized by the upper stretch film. This is required so that all loads that are received on wood pallets can be exchanged to plastic/system pallets that flow through the manufacturing areas, while the load stays unified for safe movements through the warehouse operations.

See this video to see how a pallet exchanger works: [Wood to Plastic Pallet Exchange](#)

To have an operator do this manually exposes the employee to ergonomic and safety risks of bending/crouching for extended periods of time while using a knife/hand tool. Therefore, the objective of this project is to create a new method of doing the separation of the load from the wood pallet that avoids these risks.

Photo below is for reference only:



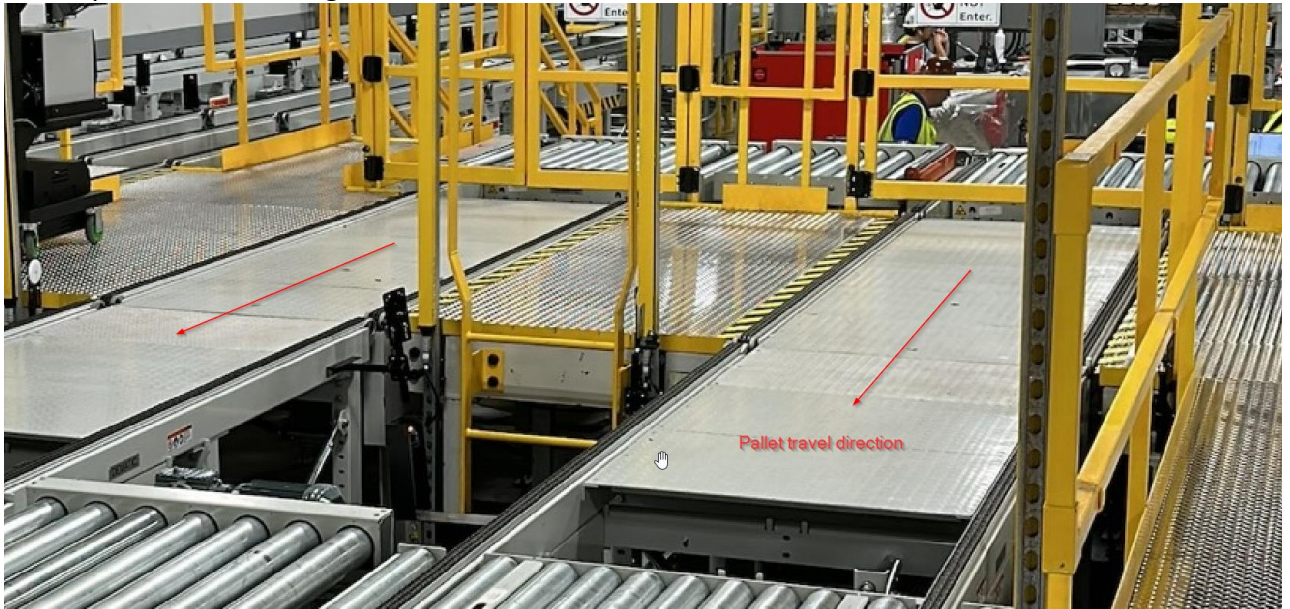
Project Requirements:

- Design a mechanical solution to assist in the cutting and separation of the film around the base of a pallet
- All four sides of the pallet must be cut to properly separate the load from the pallet.
- Device must have proper guarding when not in use to protect operators from any sharp/cutting surfaces
- Tool should be comfortable to use and not require any bending or stooping.
- Time to separate the pallet must be the same or less than the current time
- Typical pallet dimension for this solution is 48" x 42".
- The cutting height will be variable, between 6-8" from the bottom of the pallet.



INDUSTRIAL SOLUTIONS LABORATORY

- The cutting mechanism must not damage the product underneath the wrap.
- The platform that the pallets will travel through is integrated with a chain conveyor and must be considered during the design of the device (see image below)
- The cross-functional team will work together to identify any engineering standards that are required for the design.



- The mechanism used for cutting must be replaceable once it becomes dull.

Expected Deliverables/Results:

- At least 1 fully functioning prototype along with any accompanying drawings required to source production devices (6 units required to fully support production)
- Validation testing will be conducted at the Concord facility.
- Any documents created during testing that define tested limitations, requirements, etc.
- Full detailed bill of materials along with part numbers and source of supply for any purchased components

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):

- Travel to the Eli Lilly Concord NC facility