



Company Information

Company Name	<i>Windsor Windows and Doors</i>	Date Submitted	<i>05/01/2023</i>
Project Title	<i>Design of an Indexing Conveyor for Saw Infeed Table (WINDSOR_SAW)</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	4	Electrical	1
Computer	1	Systems	

Company and Project Overview:

About Windsor Windows & Doors

Established in 1946, Windsor Windows & Doors manufactures and markets Pinnacle wood windows and patio doors, Next Dimension vinyl windows and patio doors, Legend cellular PVC windows and Revive pocket replacement windows. Windsor is owned by Woodgrain Millwork, which is the largest U.S. manufacturer of prefinished mouldings and interior pine doors. Windsor operates its divisional headquarters in West Des Moines, IA, and has an additional manufacturing facility in Monroe, NC In their total commitment to customers, Windsor promises quality, service, responsiveness and value. For more information, visit www.windsorwindows.com.



Project Overview

Currently, Windsor Windows operates two specialized saws designed and built by Windsor to produce our casement sash stiles. These saws are equipped with a servo driven pusher that push the 14 ft lineal aluminum extrusion to a position and activates the clamping/cutting cycle. This cycle will repeat until the lineal material is too short to cut another piece, it will then return to the front of the machine, drop the scrap, then go to home position. The current pusher and infeed table requires the operator to load a new piece of lineal into the machine once the pusher is home, and press the cycle start button. Windsor uses nearly 100 pieces of lineal a day and would like to streamline this system so infeed table will automatically load lineal when the pusher is in the home position and start the cycle. This improvement would drastically reduce the time the operator spends tending the machine, allowing them to do their other tasks and increase productivity.

Project Requirements:

Design an infeed conveyor table that will be able to store 6-10 pieces of lineal and index them forward into the pusher. The table should be able to offload the scrap piece into a bin and simultaneously move up the lineal stock into position.

- The infeed table must accommodate our existing linear actuator and existing cable pull e-stop.
- Must have the ability to sense when material is properly loaded into the pusher and provide a signal to the controls.
- Sense the absence/presence of lineal material in the infeed conveyor
- The controls and sensors are to operate on 24-volt DC or air that is supplied to the machine
- Designed life of the machine is 500,000 cycles
- Must be free of pinch points and hazards for the operator



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Figure 1: Current Infeed Table and Pusher



Figure 2: Pusher and Black Lineal Material



Expected Deliverables/Results:

- Technical Drawings for mechanical, pneumatic, and electrical systems
- Functioning conveyor table design ready to be installed/tested on the saw
- Wear parts life cycle estimations

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):

- PLC Programming
- Electrical Schematic Drafting
- Fabrication/welding
- Travel to the Windsor Windows site in Monroe, NC