

## Senior Design Project Description

<b>Company Name</b>	<i>JELD-WEN</i>	<b>Date Submitted</b>	<i>11/30/2020</i>
<b>Project Title</b>	<i>Optimization of Bi-Fold Flow Cell (JELDWEN CELL)</i>	<b>Planned Starting Semester</b>	Spring 2021

### 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:

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	1	Electrical	1
Computer		Systems	3
Other (            )			

### Company and Project Overview:

JELD-WEN is one of the world's leading manufacturers of reliable windows and doors. Our extensive product offering encompasses windows, exterior doors, interior doors, and related building products that are sold globally through multiple distribution channels, including retail home centers, wholesale distributors and building products dealers.

JELD-WEN was founded in 1960, and currently operates 117 manufacturing facilities in 19 countries located primarily in North America, Europe, and Australia. Headquarters are in Charlotte, North Carolina.

A few product examples:





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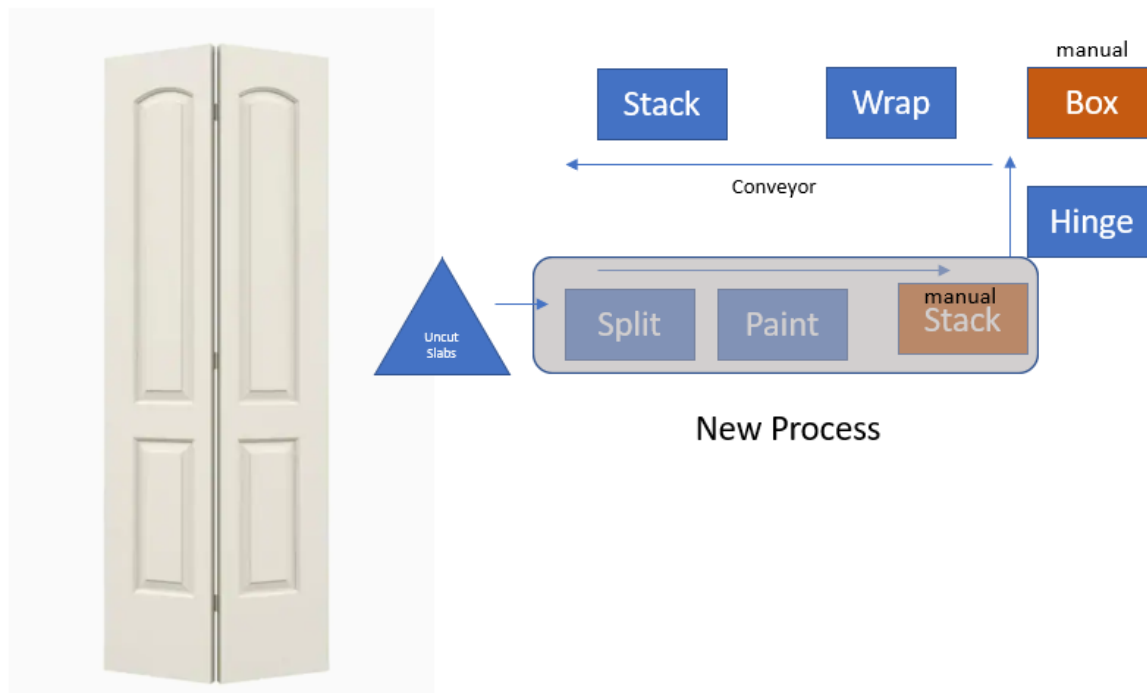
This project will focus on interior bi-fold doors and will work with a large interior door factory in Atlanta, Ga.

Bi-Fold Door Example:



The door slab making process has changed which now requires bi-fold doors to be slit and edge painted at the entry to the hinging cell. In the past they came to them pre slit and painted and they just loaded into the hinger.

The workcell has not been optimized since the addition of the new Split/Paint/Stock section of the workcell and that is the objective for this project. The bi-fold cell needs to be optimized and redesigned for flow, line balancing, optimal staffing, material handling, and ergonomics. The goal is to have designed capacity 15-20% above customer takt and to balance the flow through the cell to avoid inventory or waiting within the cell. (One Piece Flow.). Revamping this workcell will involve electro-mechanical modifications and enhancements to enable the optimized design. These modifications would be mechanical interface components, PLC programming and sensor design for feedback, status and control.



**Project Requirements:**

Imbalance between inline equipment cycle times, feed rates, and manual process create inefficient flow. The current layout requires lifting, stacking, and turning by operators. Cell redesign to balance the throughput and improve machine and operator interface.

**Expected Deliverables/Results:**



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- Rate of output needed to meet customer demand will be supplied. Understand the output of each component of the cell and balance the line throughput to achieve takt rate.
- Determine max capacity of cell after team optimizes.
- Determine staffing needed to optimize line.
- Improve/reduce material handling in the cell.
- Improve layout to reduce non ergonomic movements of operators.
- Write standard work for operation.
- Define process settings to achieve quality and productivity requirements.
- Recommend/redesign the cell layout to meet efficiency and ergonomics.

**Disposition of Deliverables at the End of the Project:**

Turnover to JW engineering and site operations team.

**List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):**

- Line Balancing
- Cell design (Lean Manufacturing)
- Ergonomics
- Conveyors
- Machining
- Ability to travel to Jeld-Wen's Atlanta manufacturing facility (Travel expenses will be paid by ISL)