

# Automated Sheet Stock Palletization

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## Client Background:



## Problem Statement:

Due to the adoption of a new automated shear, AFAB lacks a material handling solution to facilitate the transportation of sheared blanks.

Manually handling the blanks without extensive modification of the workspace is projected to be ergonomically hazardous and time-intensive.

The goal of this project is to design a material handling solution that falls under a NIOSH Lifting index score of 2 and does not bottleneck production at projected rates.

Applied Fabricators (AFAB) runs a job shop that specializes in formed sheet metal for building exteriors.

They are invested in automating their workforce, with an automated fabrication cell already in use.

They have purchased but have not received an automated metal shear to address the raw material bottleneck for this cell.

## Proposed Solution:

- Dual 3 lane cascading fabric belt conveyors.
- Individual sheared blanks cascade from the upper conveyor to the lower conveyor, and from the lower conveyor to the pallet.
- Upon reaching the pallet, the blanks fall onto hard stops and form stacks.
- Once a stack is complete the lower conveyor retracts to the next indexed position, beginning the next stack.
- Once all stacks are complete, the pallet is removed via forklift and fed into the robotic work cell.

## Solution Model:

Fig. 1: Material Flow

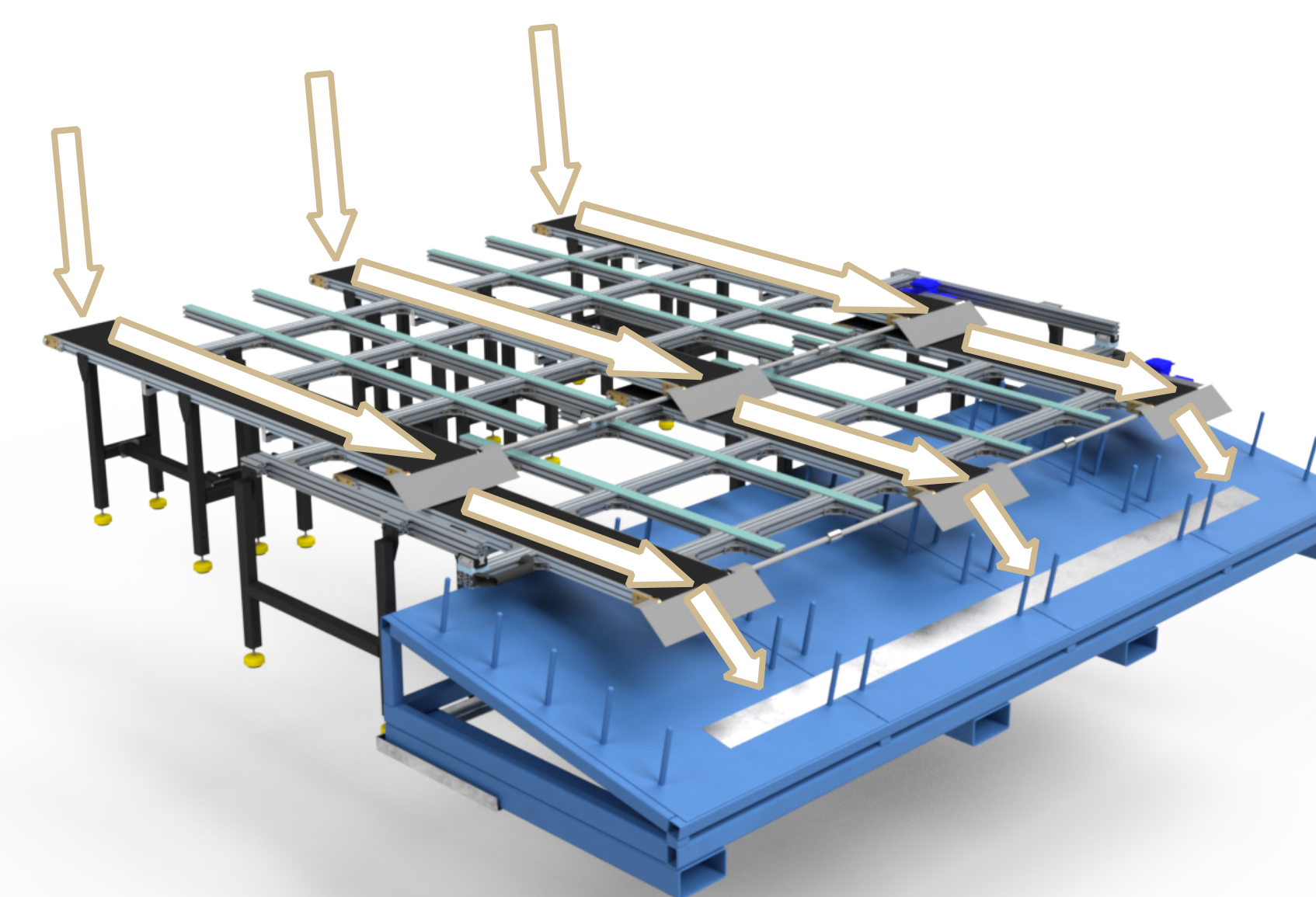
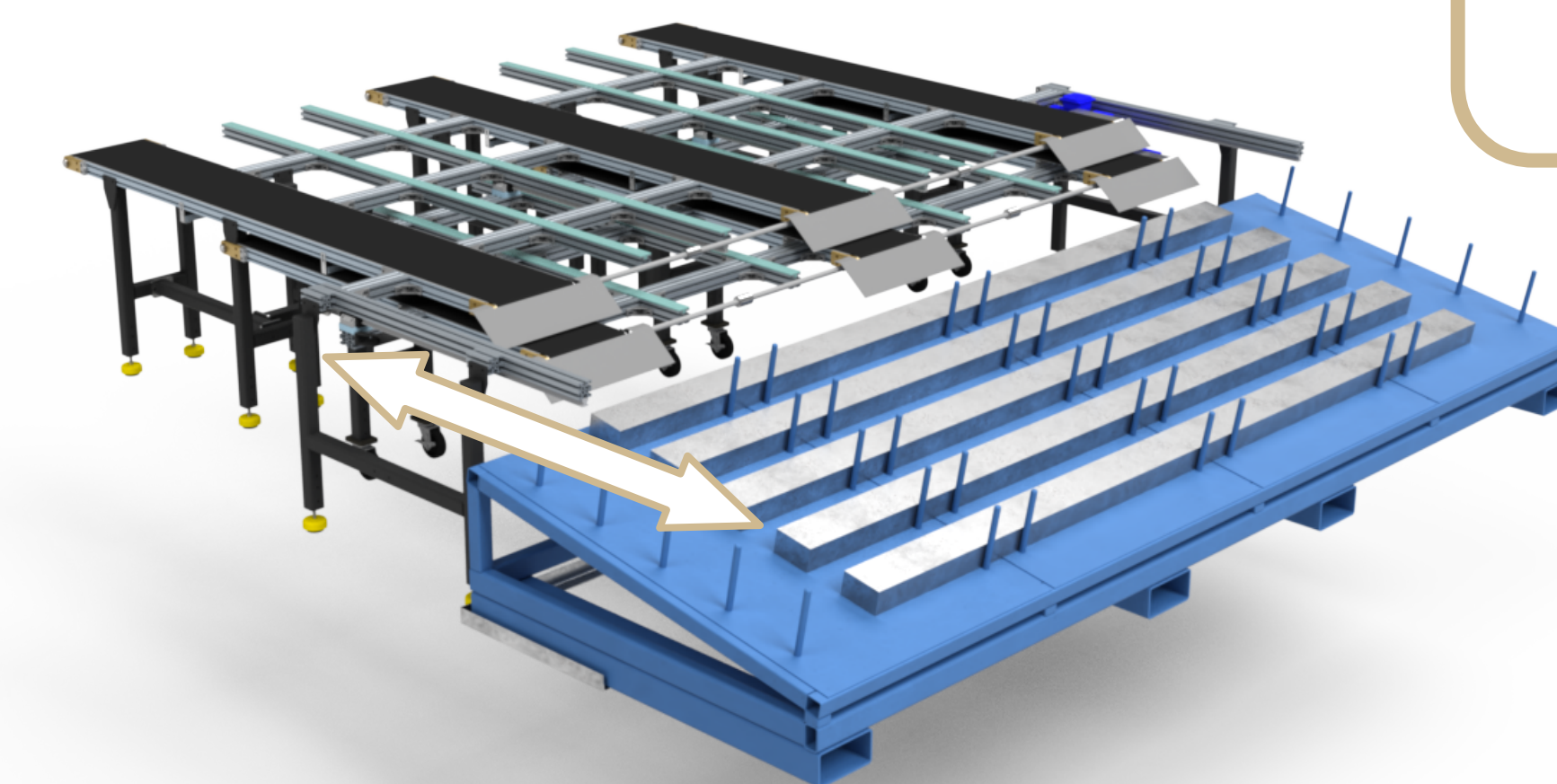


Fig. 2: Conveyor Articulation



View Animation:

## Capabilities:

- Single-user Operation
  - A single operator is able to shear and palletize blanks simultaneously, reducing labor requirements by 50% for the duration of the palletization task.
- Infrastructure Compatibility
  - The palletizer is designed to integrate with the pallets currently in use by the client without modification.
- Time Savings
  - With a palletization speed limited by and concurrent with the shearing process, the solution offers a time savings of 42%.
- Ergonomic Safety
  - The palletizer eliminates the ergonomic hazard associated with palletization by removing operators from the palletization process entirely.

## Performance Impact:

Fig. 3: Cumulative Time Savings, Minutes per Pallet

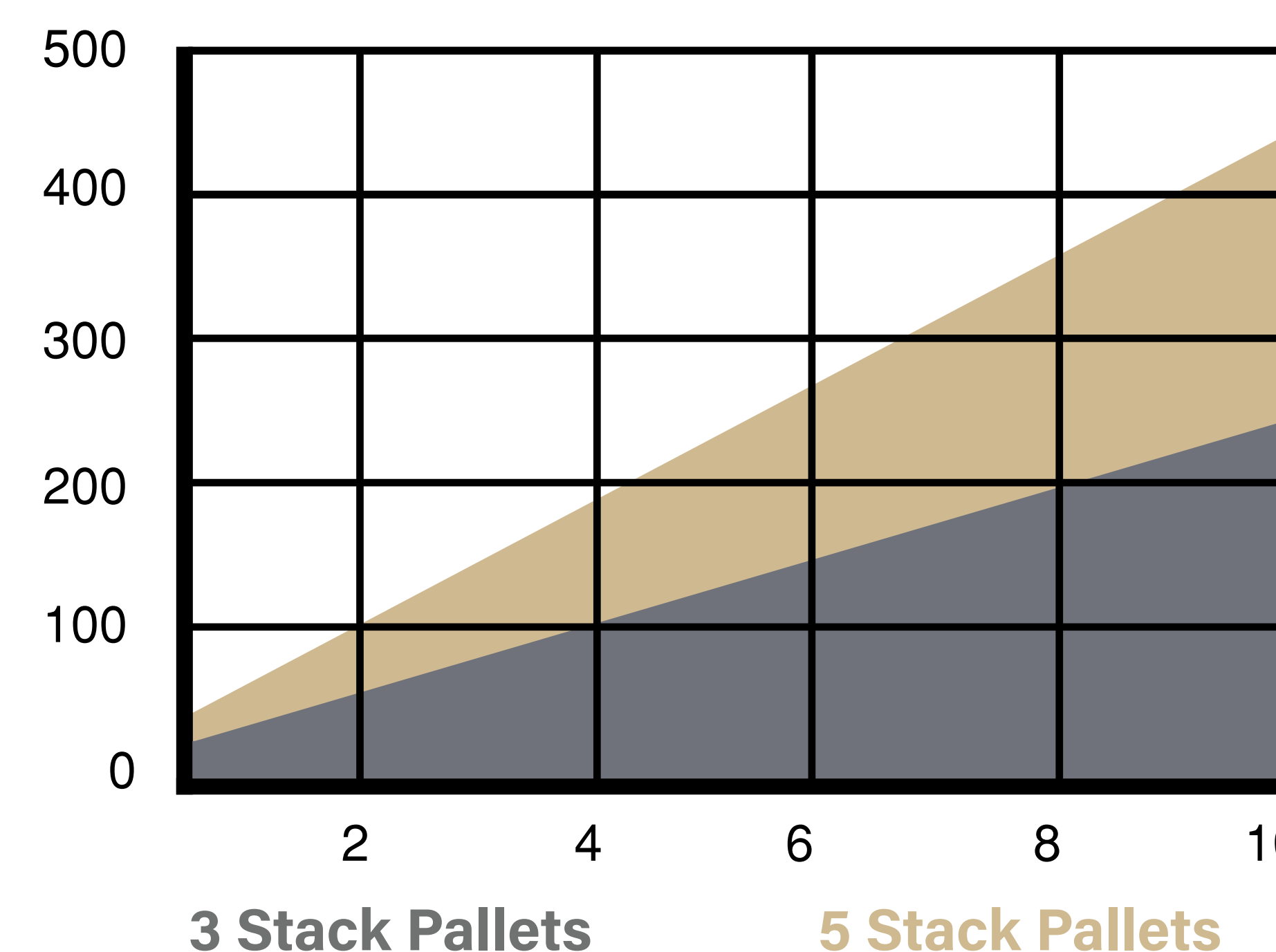


Fig. 4: NIOSH Lifting Index Scores

