

## Client Background

Applied Fabricators (AFAB) is a family-owned business established in 1984 by Bob and Julie Reeves and now led by their son, Brandon Reeve, who took over in 2008.

About 20 people in size, AFAB focuses on **rapid response and streamlined services to facilitate metal ordering** for their clients.

With increasing competition, AFAB is shifting towards automation to **enhance efficiency and reduce costs**, starting with a \$250,000 automated robotic cell for metal bending.



## Problem Statement

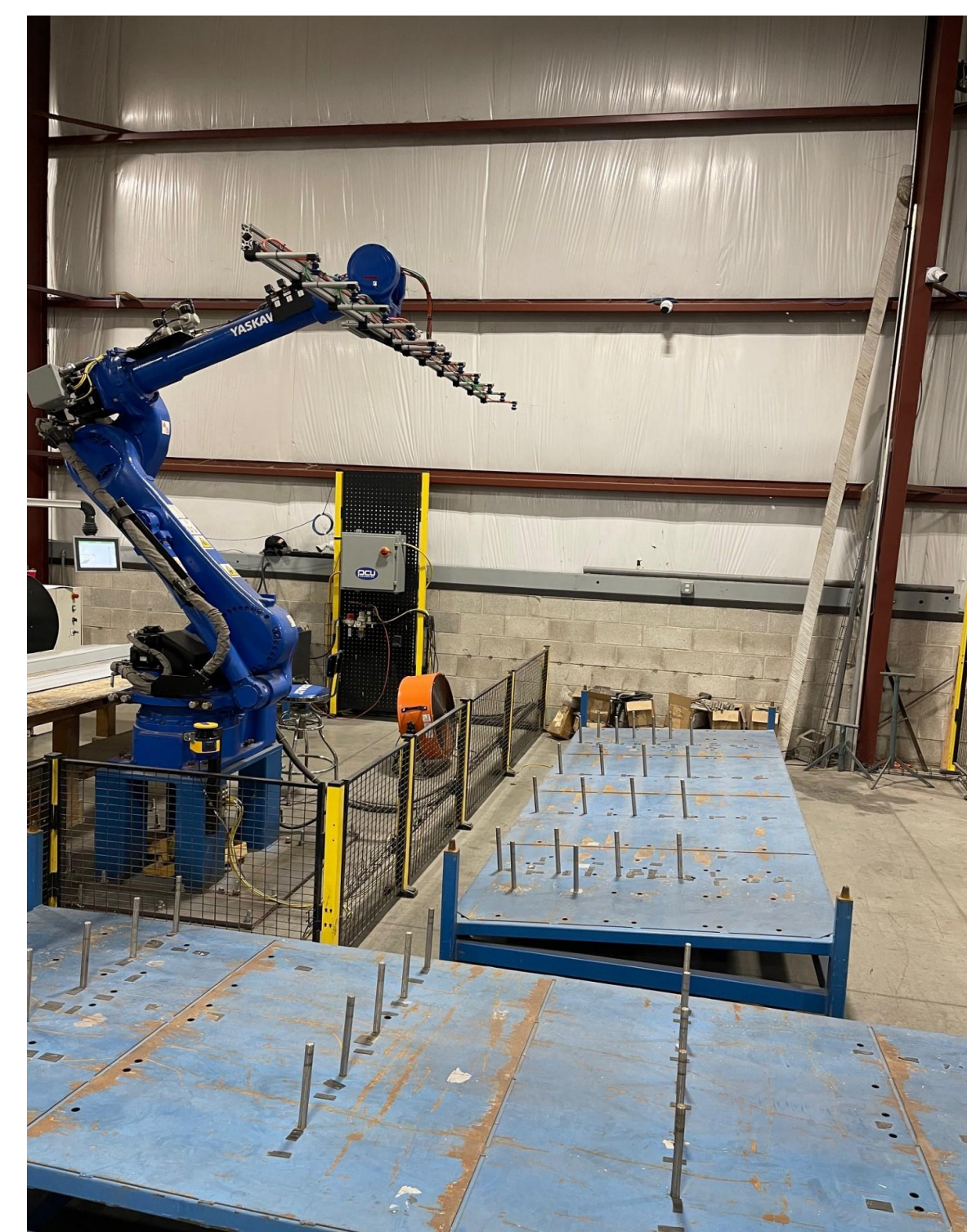
AFAB's current metal slitting process involves **manual handling** of 4x10 metal sheets by **two workers** using a metal splitter. This labor-intensive method with its **ergonomic risks and inefficiencies** causes significant production delays and undermines AFAB's competitive edge.

By transforming the **post-slitting phase** into a streamlined and automated operation, this shift aims to **reduce manual labor (from two to one worker)** and enhance safety with a **no-lift environment**.

By implementing a **fully automated system**, AFAB expects to not only improve safety and speed up production but also gain a competitive advantage through faster turnaround times.



\*Current setup for the Tennsmith-Gang Splitter (GSL48-16) and outbound table

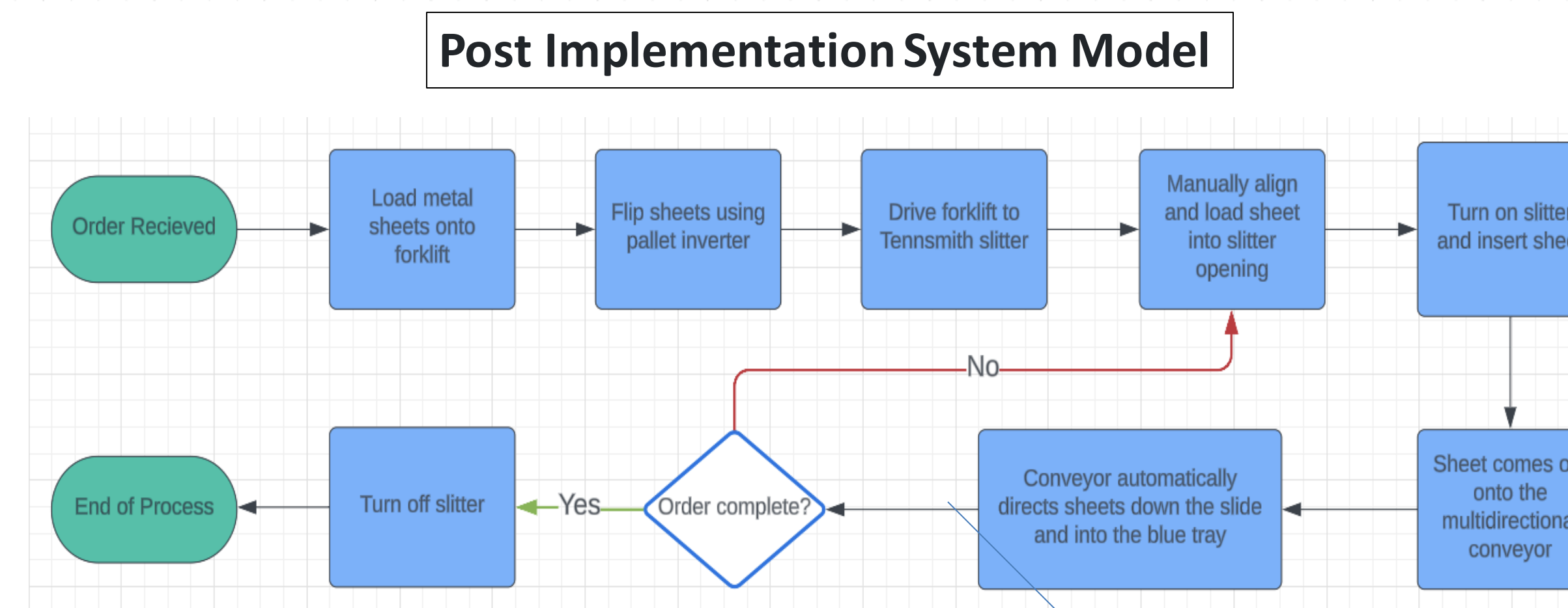
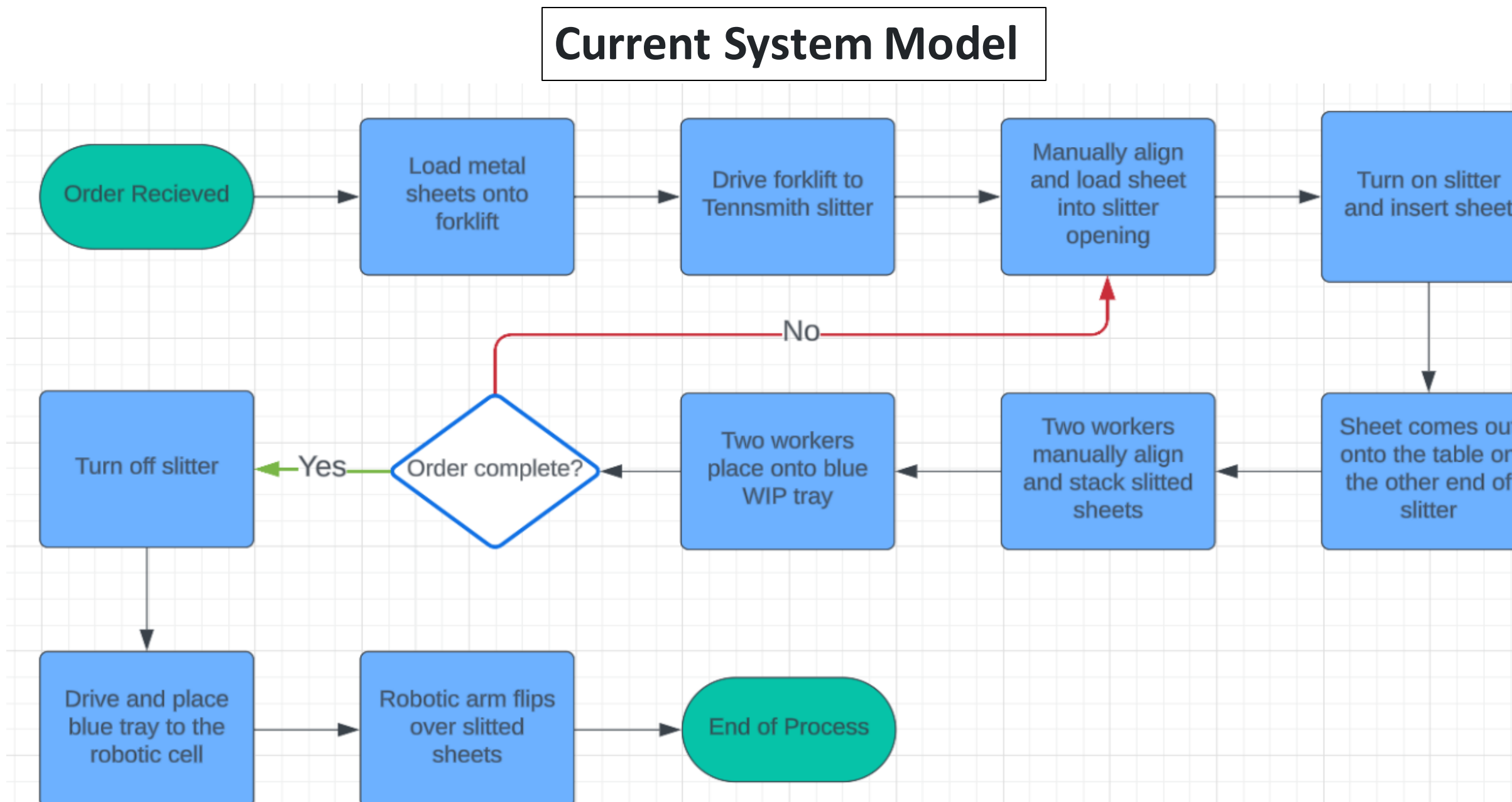


\*Blue tray that is used to transport WIP and finished goods (slitted and sorted metal sheets)

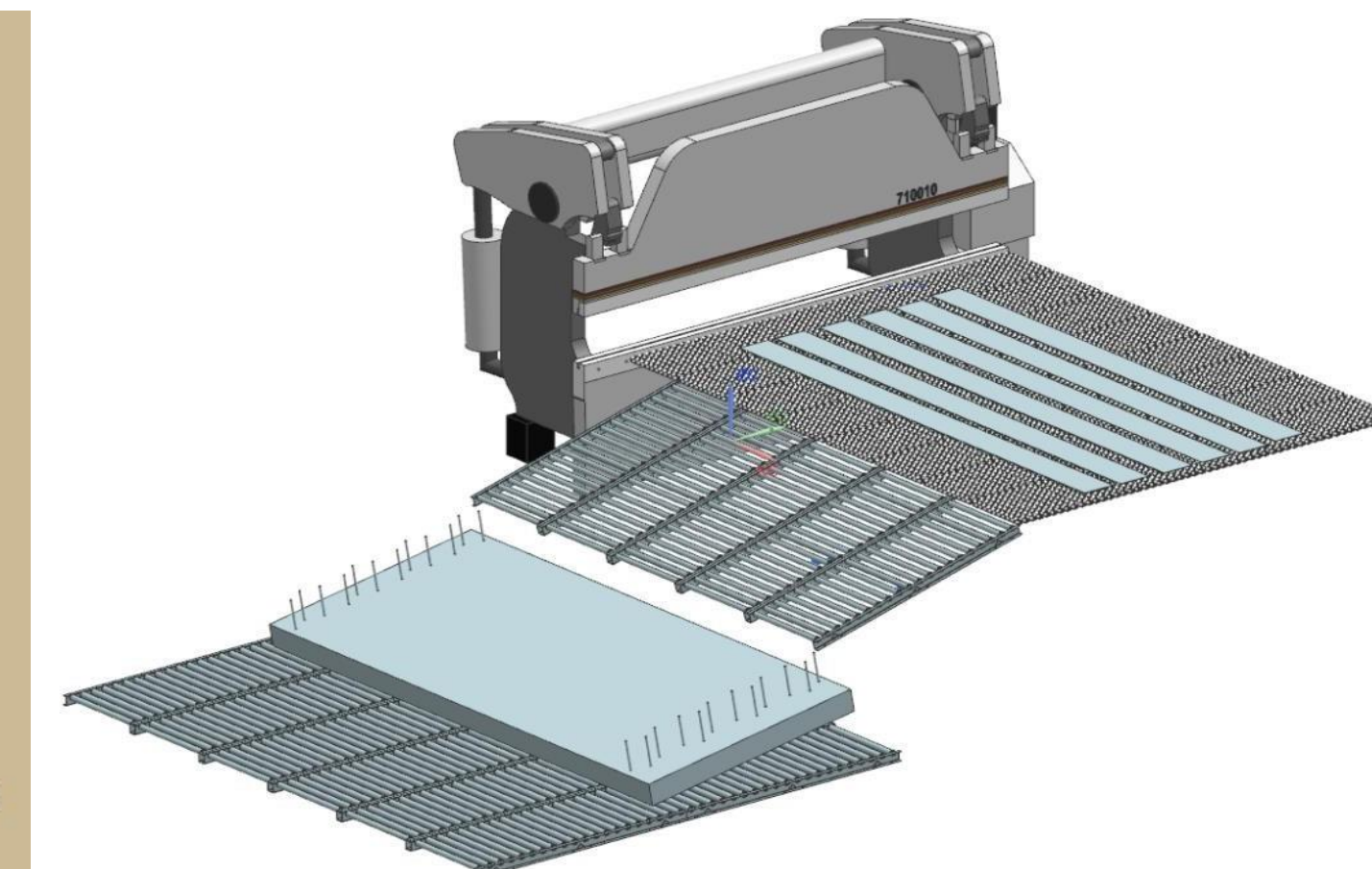
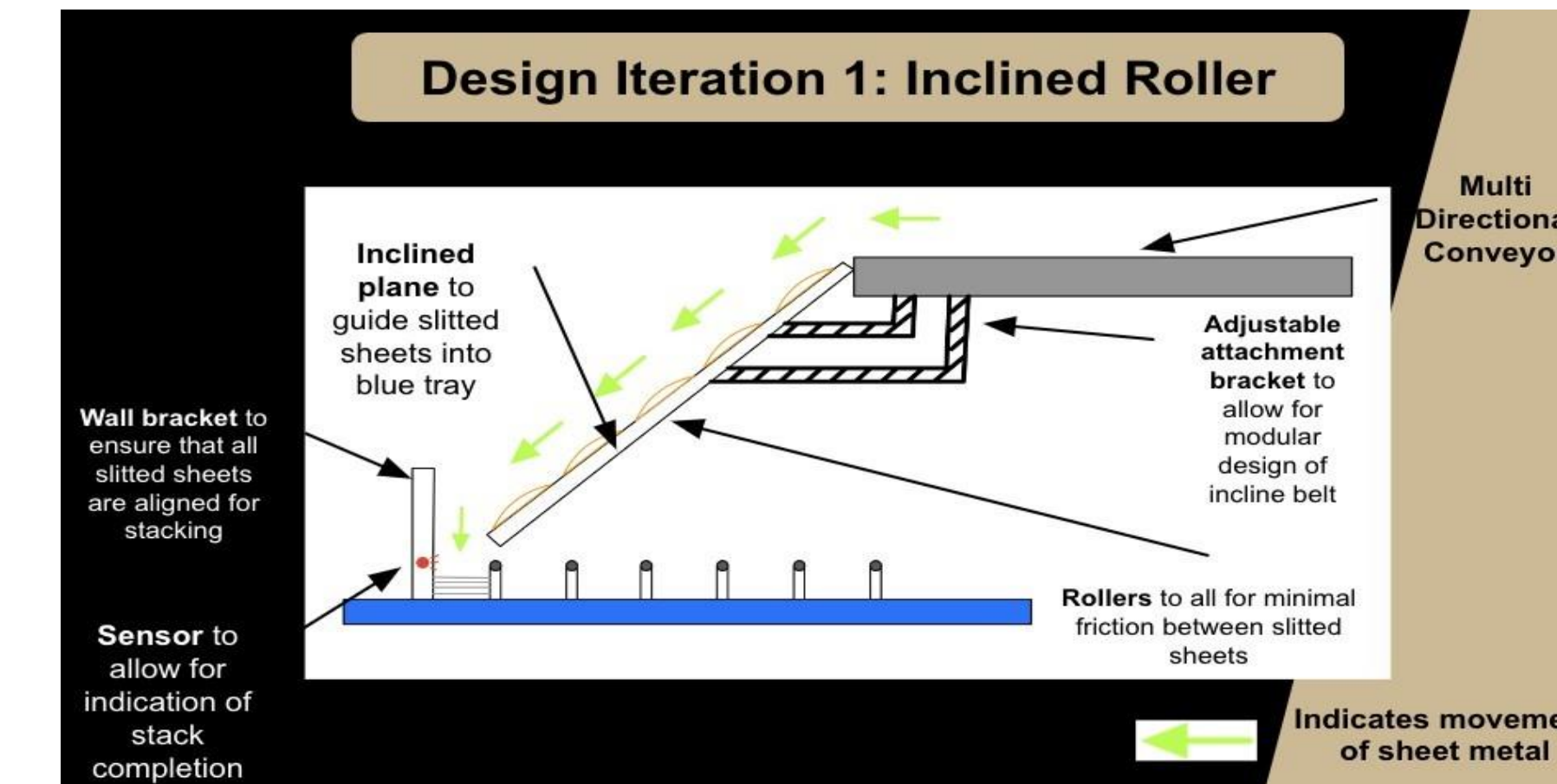


\*Scan QR code to view current metal slitting process

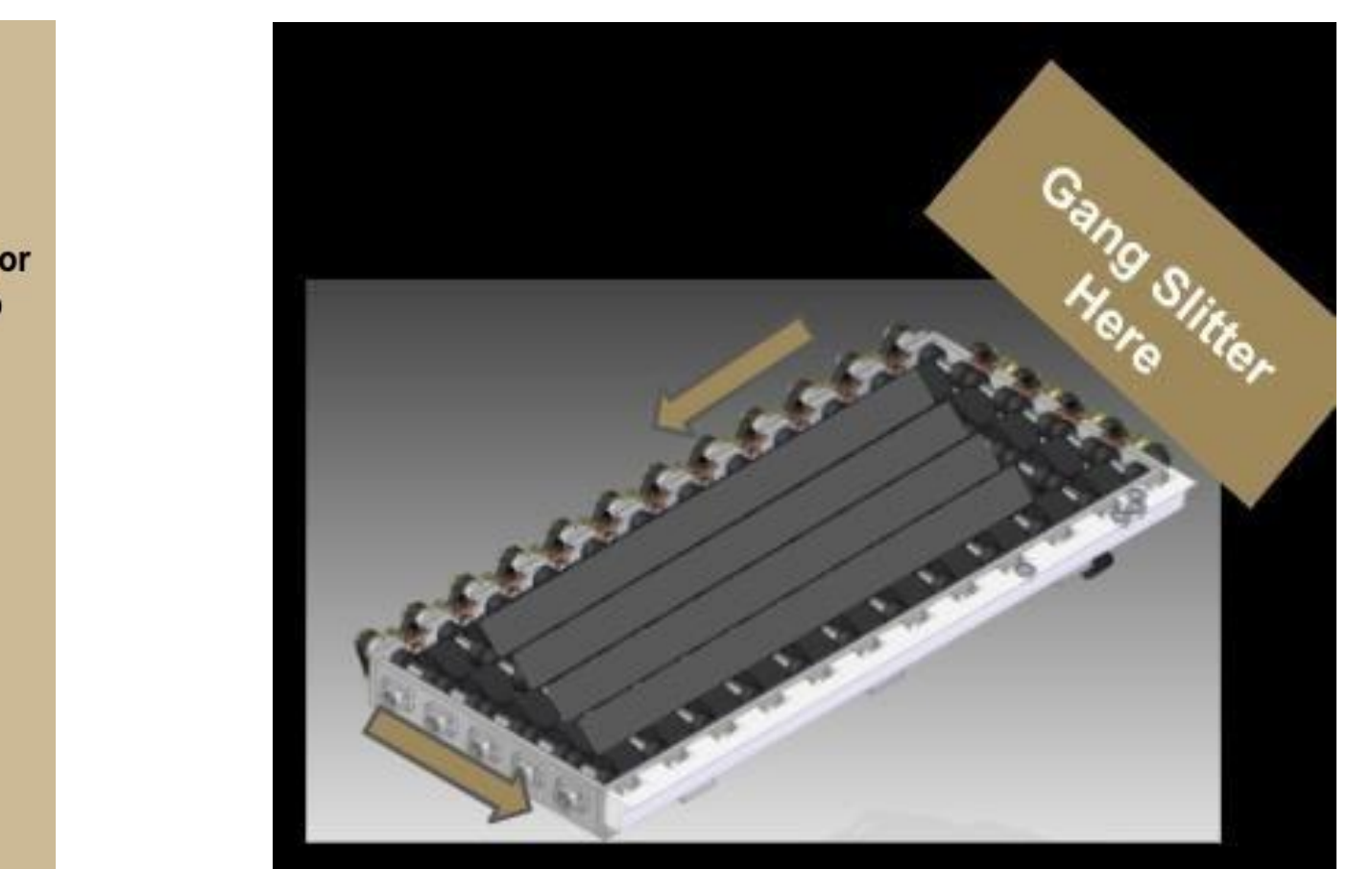
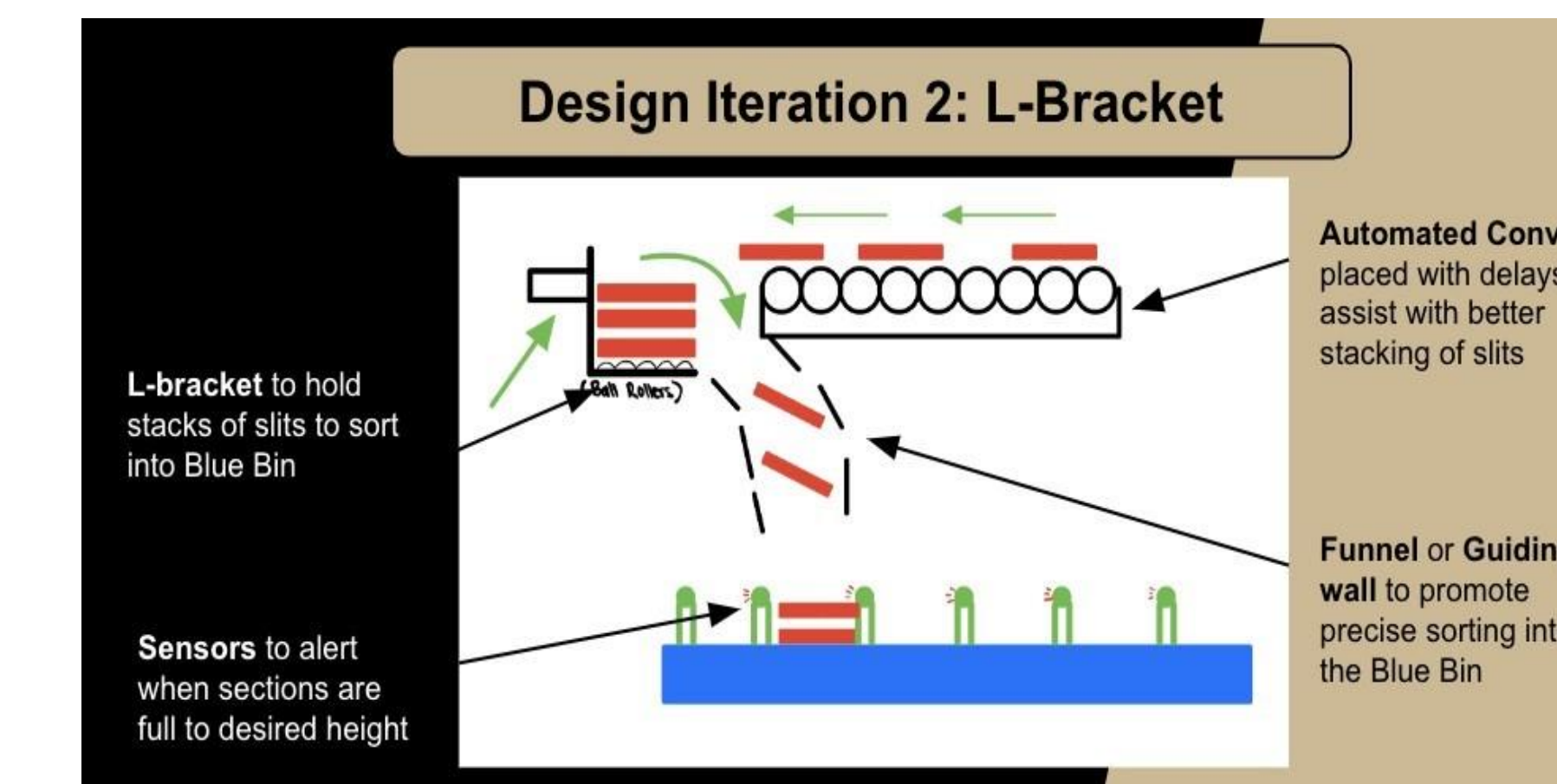
## System Model



## Methodology



- Pros: Consistent Output, reduce manual labor and risks, improved workflow efficiency
- Cons: High investment cost, potential downtime during installation
- Adjustable slide: precision metal slit loading onto desired slot, lightweight, durable
- U-Shape Dropper: reduce used workspace, encourage metal slit flipping



## NIOSH Lifting Analysis

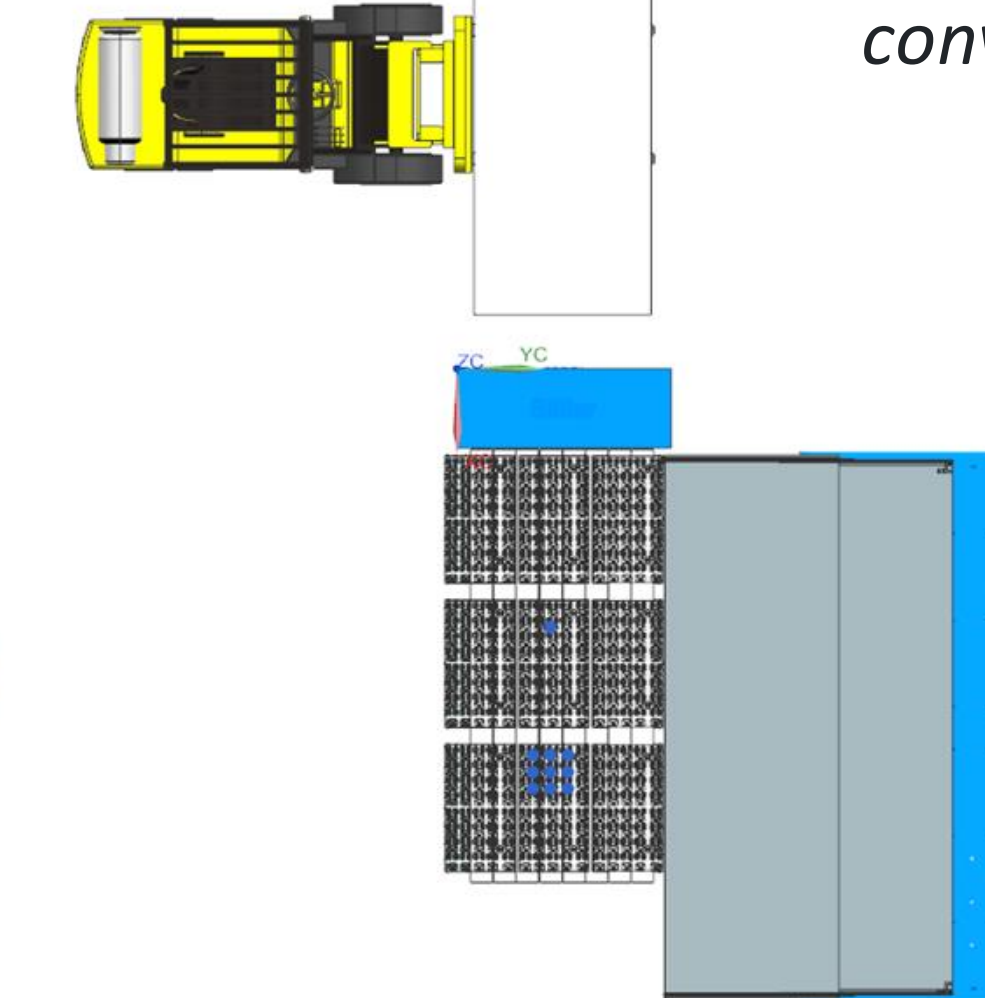
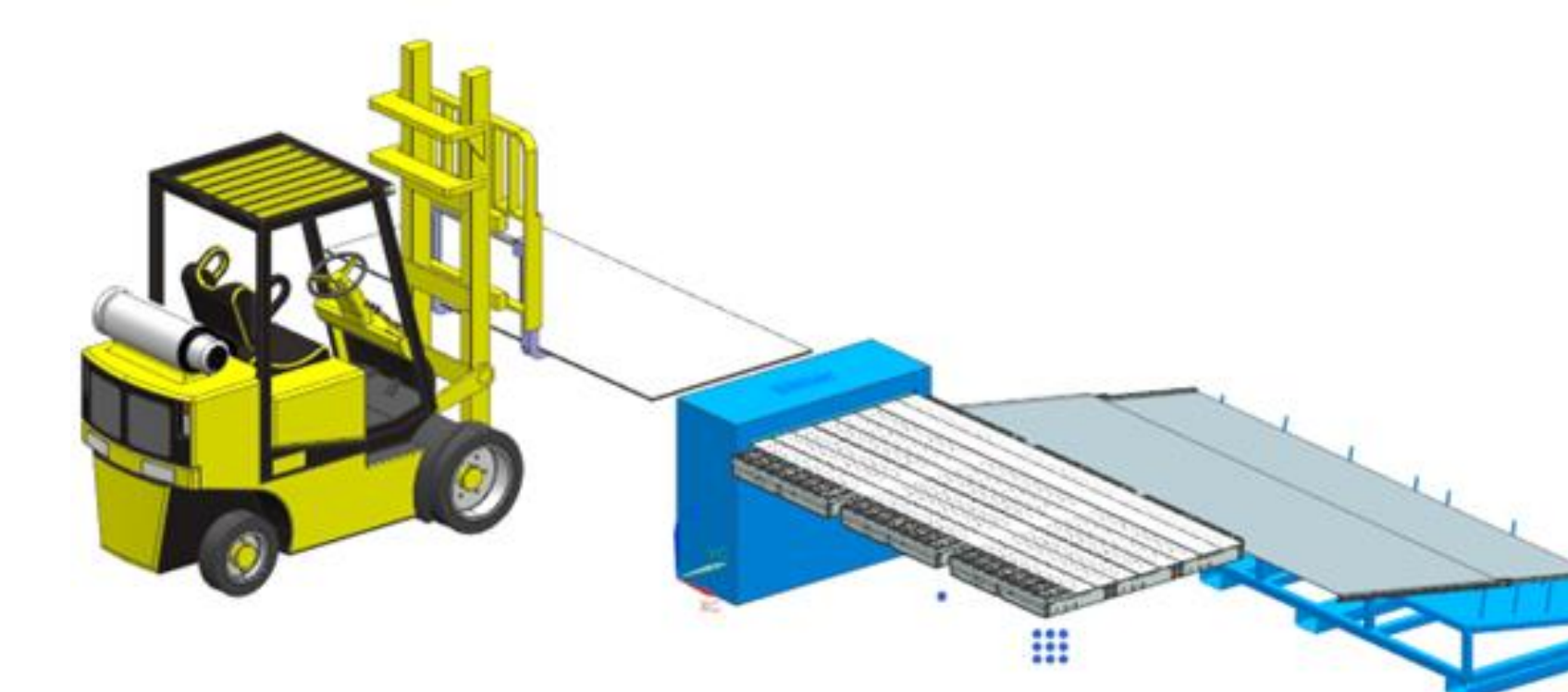
LIFTING ANALYSIS WORKSHEET																
DEPARTMENT				AFAB Team 3				JOB DESCRIPTION								
JOB TITLE				AFAB Current Production NIOSH Analysis												
ANALYST'S NAME				Kevin Pinkley												
DATE																
STEP 1. Measure and record task variables																
Object Weight (lbs)	Hand Location		Vertical Distance		Asymmetric Angle (deg.)		Frequency Rate lifts/min	Duration Hrs	Object Coupling							
	Origin	Dest	H	V	H	V				D	A	A	F	C		
L(AVG)	L(MAX)	H	V	H	V	D	A	A	F	Hrs	C					
21	23.5	12	37.5	18	3	34.5	0	0	3	1.5	poor					
STEP 2. Determine the multipliers and compute the RWLs																
RWL = LC x HM x VM x DM x AM x FM x CM																
ORIGIN	RWL =	51	x	.83	x	.94	x	.87	x	1	x	.79	x	.9	=	24.61 lb(s)
DEST.	RWL =	51	x	.56	x	.8	x	.87	x	1	x	.9	x	.79	=	14.13 lb(s)
STEP 3. Compute the LIFTING INDEX																
ORIGIN	LIFT INDEX	OBJECT WEIGHT	=	21/24.61	=	.85										
DESTINATION	LIFT INDEX	OBJECT WEIGHT	=	21/14.13	=	1.49										

In the existing process, workers are **exceeding the acceptable threshold of 1** for the lifting index at the delivery point.

Additionally, there have been **multiple incidents** where workers sustained cuts from freshly cut metal.

Transitioning to a **fully automated outbound process** will mitigate the risks associated with lower back injuries and lacerations, effectively eliminating these hazards.

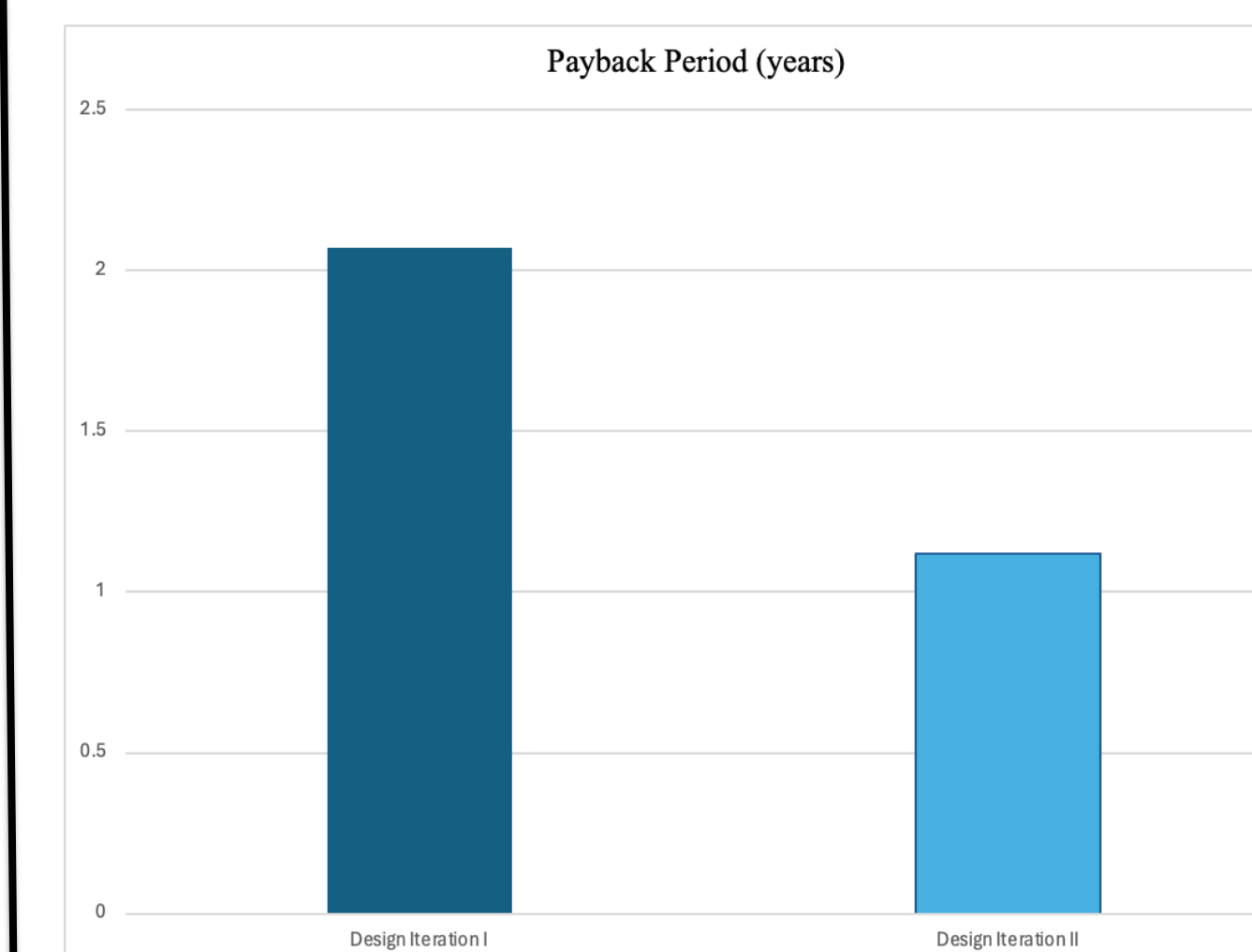
## Final Design CAD Render



\*Scan QR code to view multidirectional conveyor on display



## ROI/Payback Period



Prototype 1		Prototype 2	
USD 136,800	USD 66,000	USD 74,133	USD 66,000
= 2.07 years (2 years and 26 days)		= 1.12 years (1 year, 1 month and 15 days)	

Prototype 1: USD 136,800 / USD 66,000 = **2.07 years (2 years and 26 days)**  
 Prototype 2: USD 74,133 / USD 66,000 = **1.12 years (1 year, 1 month and 15 days)**