Summer Internship Report

Tyler Jones

Engineering Intern

Supervised By: **Kyle Schneider**

Custom Equipment Design

Manufacturing

Presented To: **Executive Team**

Tweet/Garot Mechanical Inc.

Summer 2024

Manufacturing Process Improvement

Goal

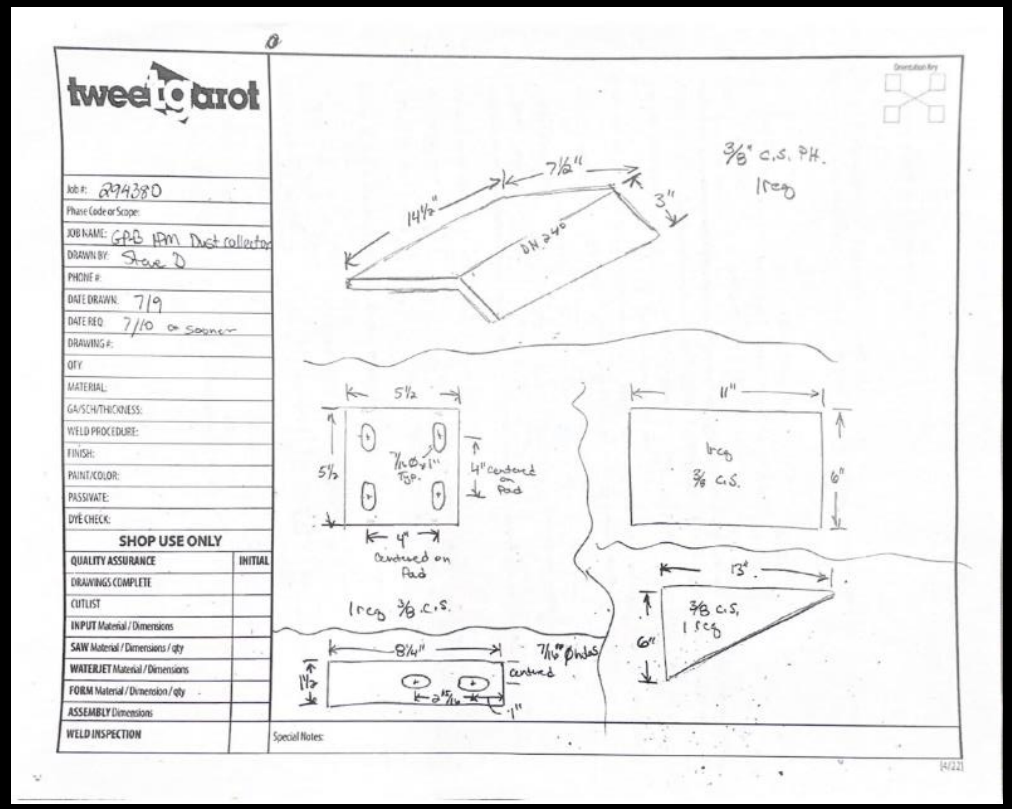
- Bridge the gap between field employees and shop programmers to reduce programming lead time
  - Hand Drawings → Engineering Drawings
  - Improve tracking of inventory, Bills of Materials (BOMs), and Bills of Operations (BOOs), and increase estimating accuracy.

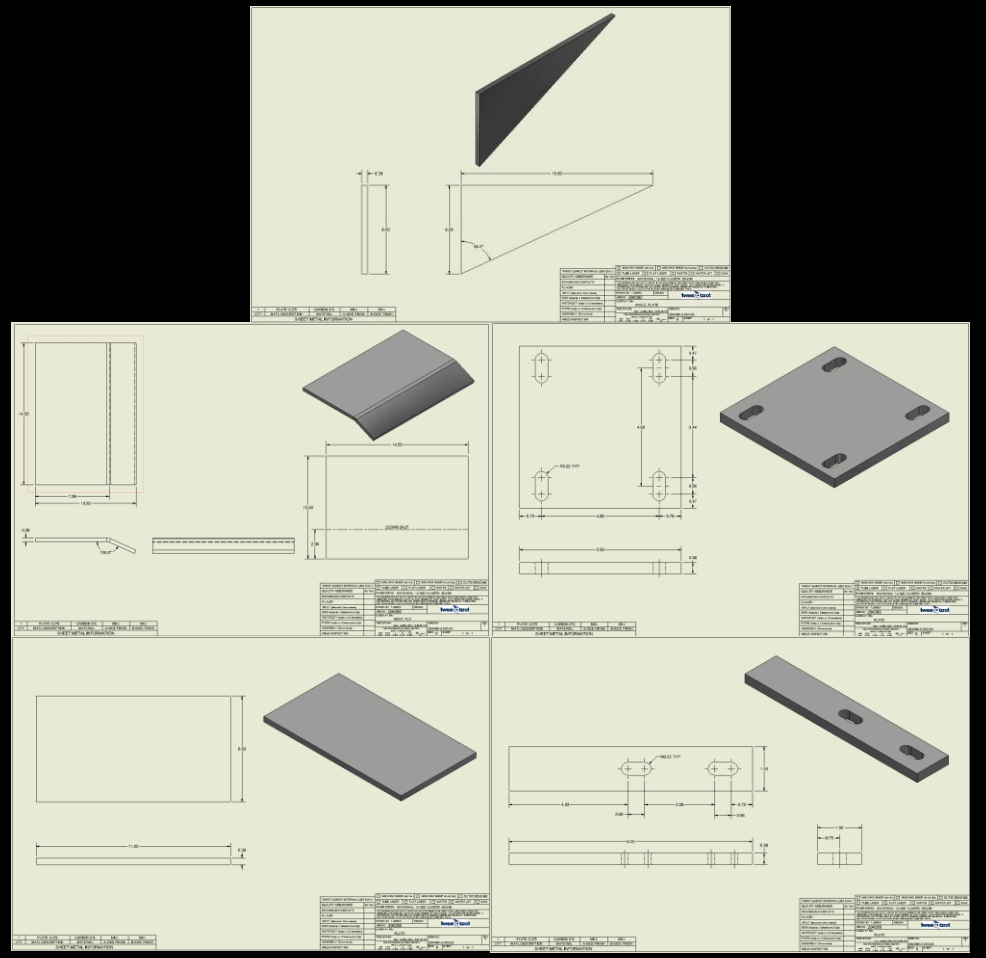
Workflow

- **Receive Hand Drawings:** Design request from shop scheduler
- **Design:** Create part(s) or assembly via CAD (Autodesk Inventor)
- **Engineering Drawings:** Create engineering drawings and import files to Autodesk Vault
- **Data Integration:** Transfer metadata into manufacturing software (SAP)
- **Release Process:** Finalize and release the process for production

Manufacturing Process Improvement: Examples

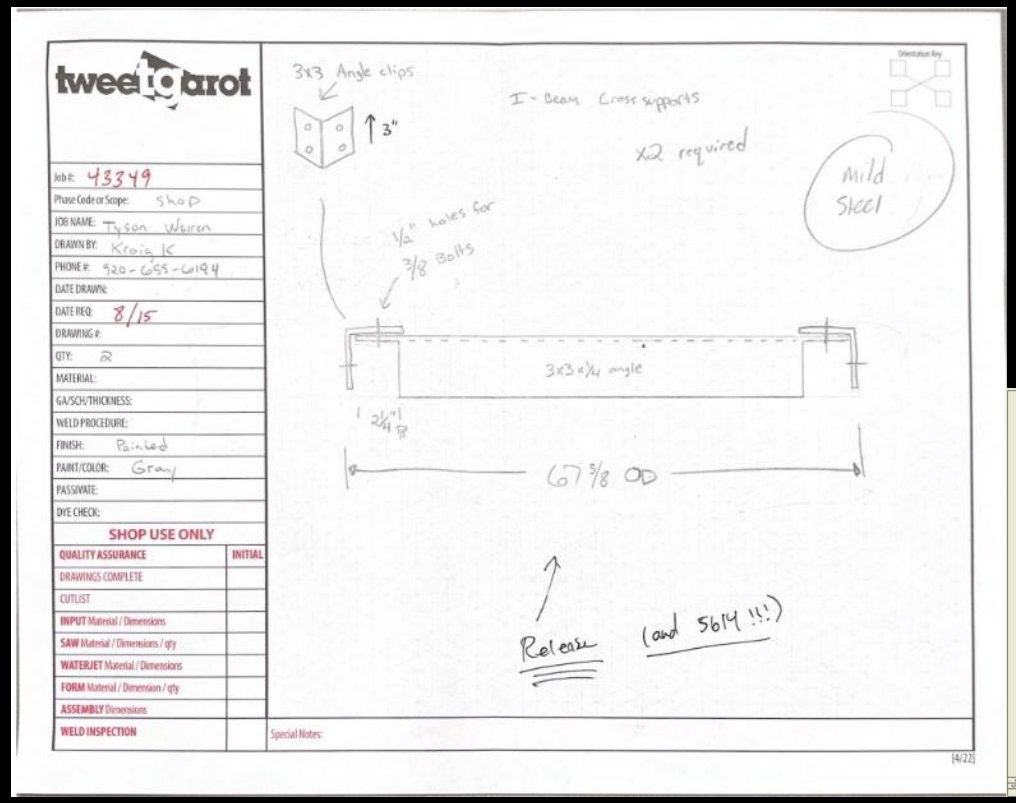
Georgia Pacific – Dust Collector

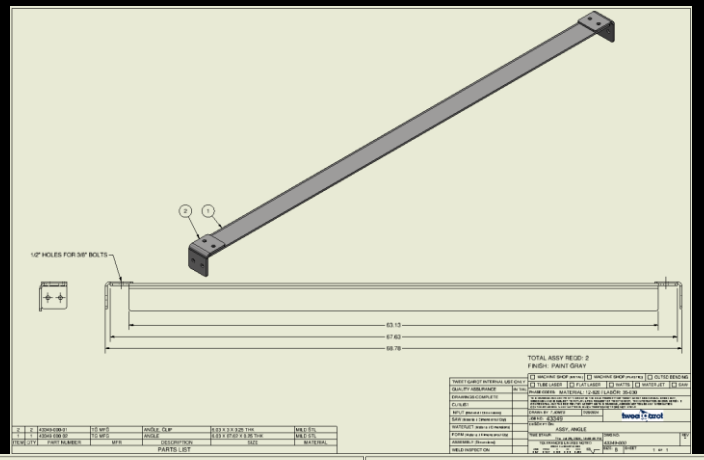


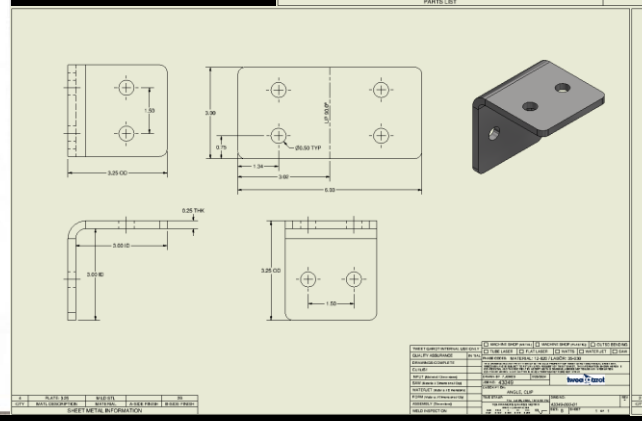


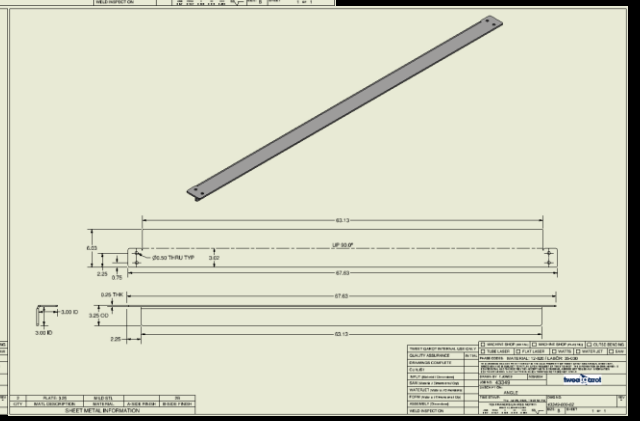
Manufacturing Process Improvement: Examples

Tyson Warren – I-Beam Cross Supports





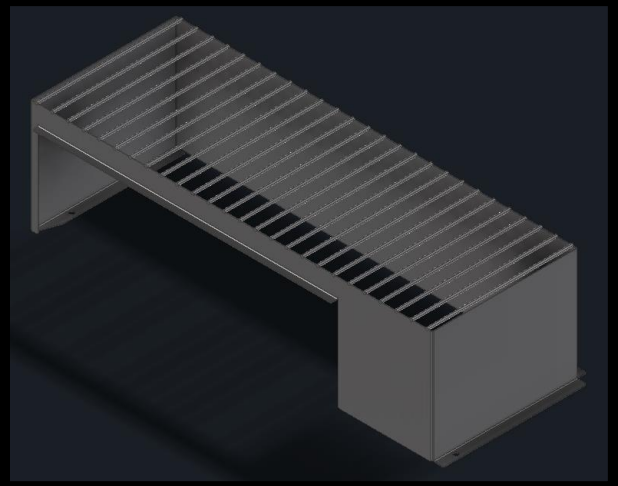


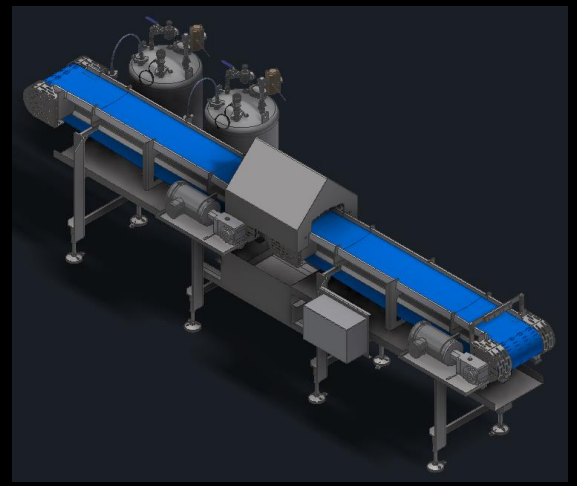


Custom Equipment Design Overview

Main Projects

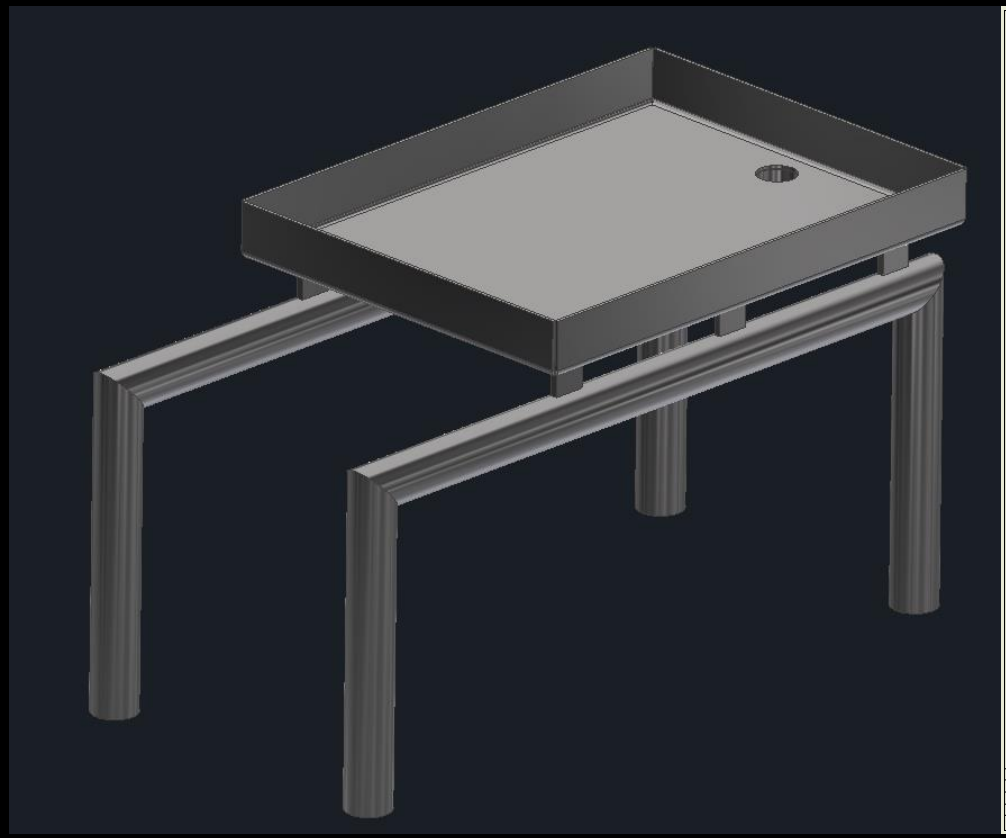
- Feeder Platforms – ConAgra
- Cob Conveyor Platforms – ConAgra
- Screw Conveyor Counterweight - ConAgra
- Peeler Table – Tyson Foods

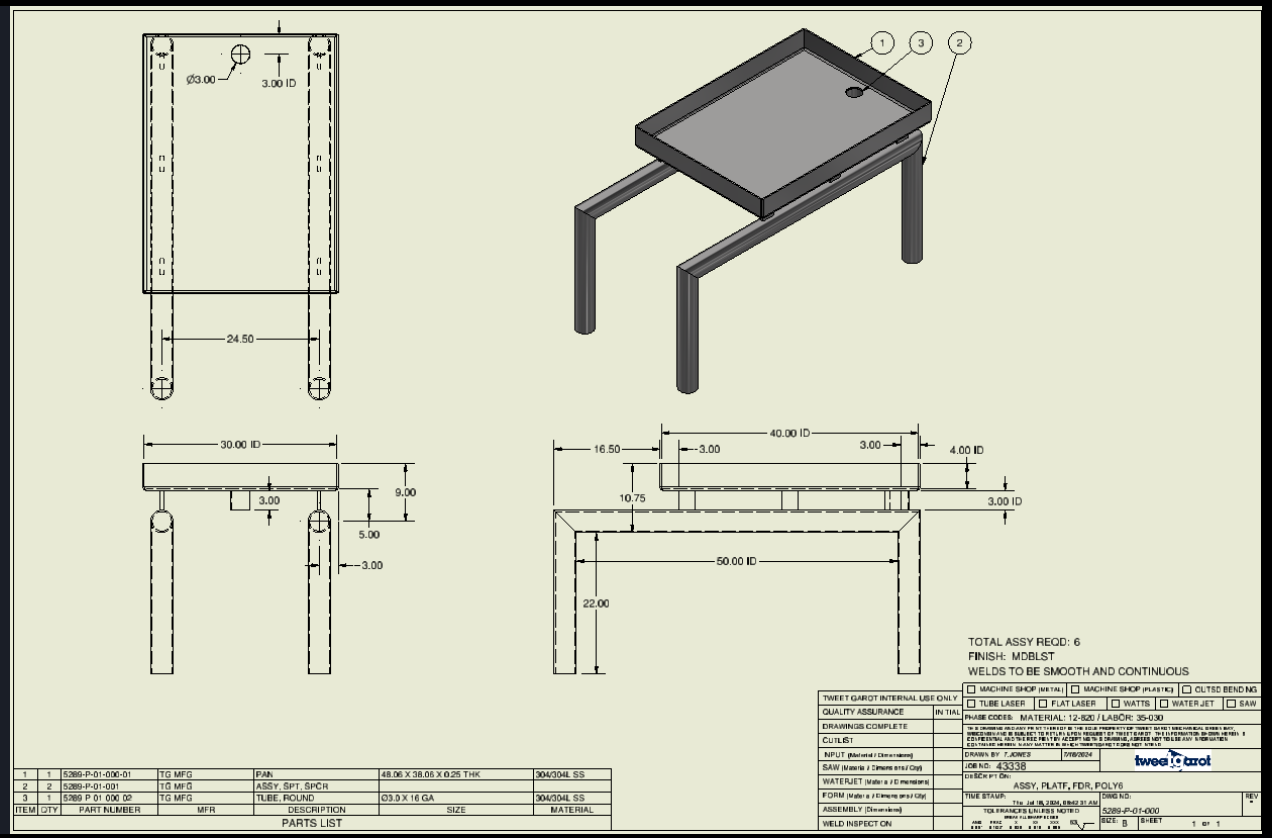




Project: Feeder Platforms

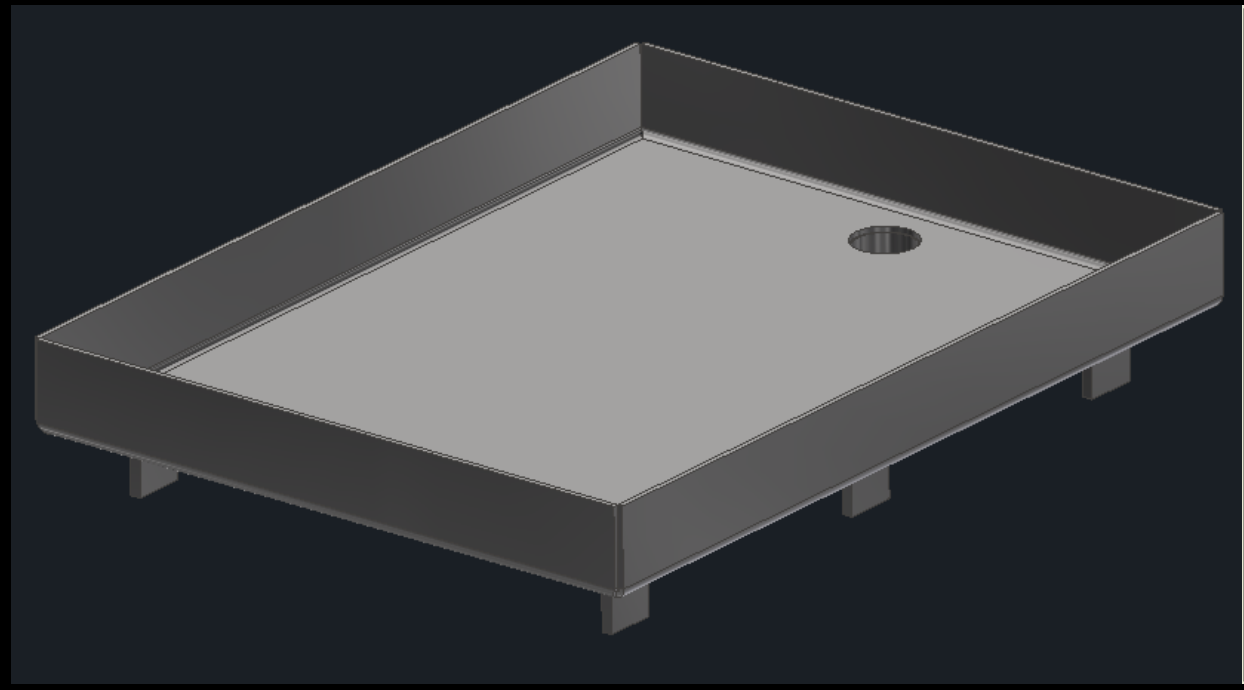
Poly 6 Platform

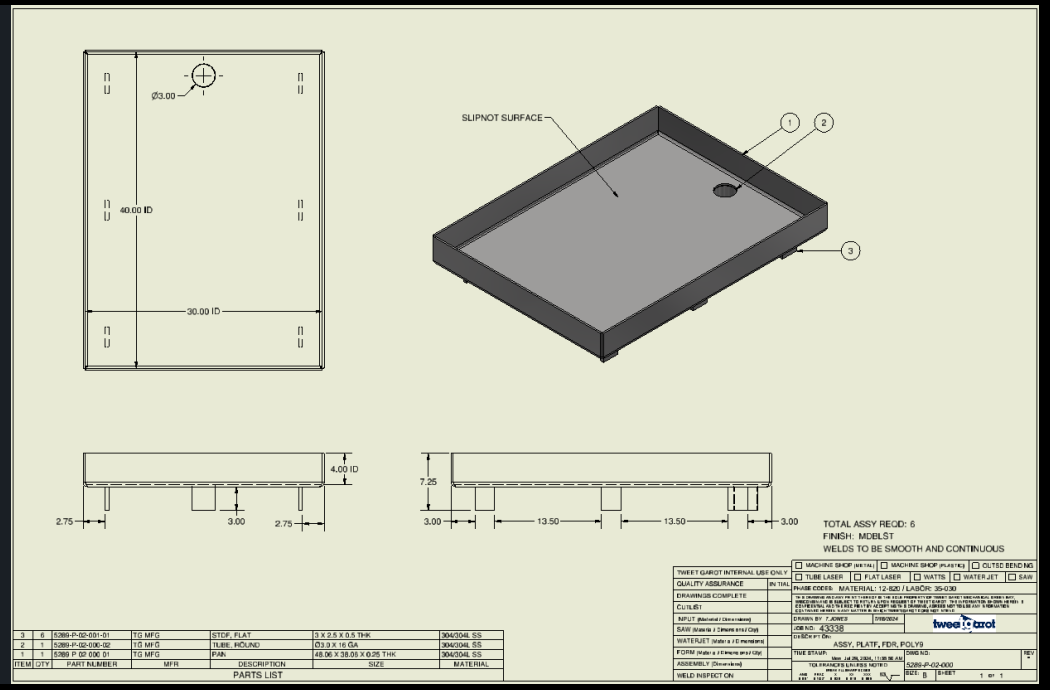




Project: Feeder Platforms

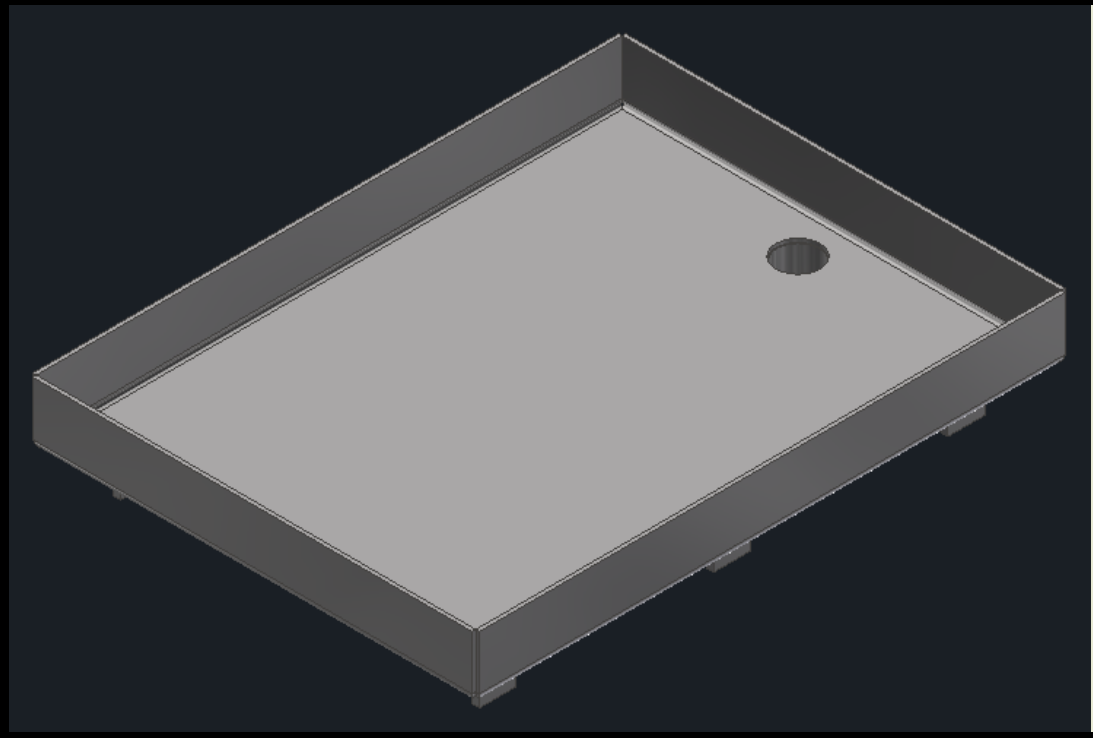
Poly 9 Platform

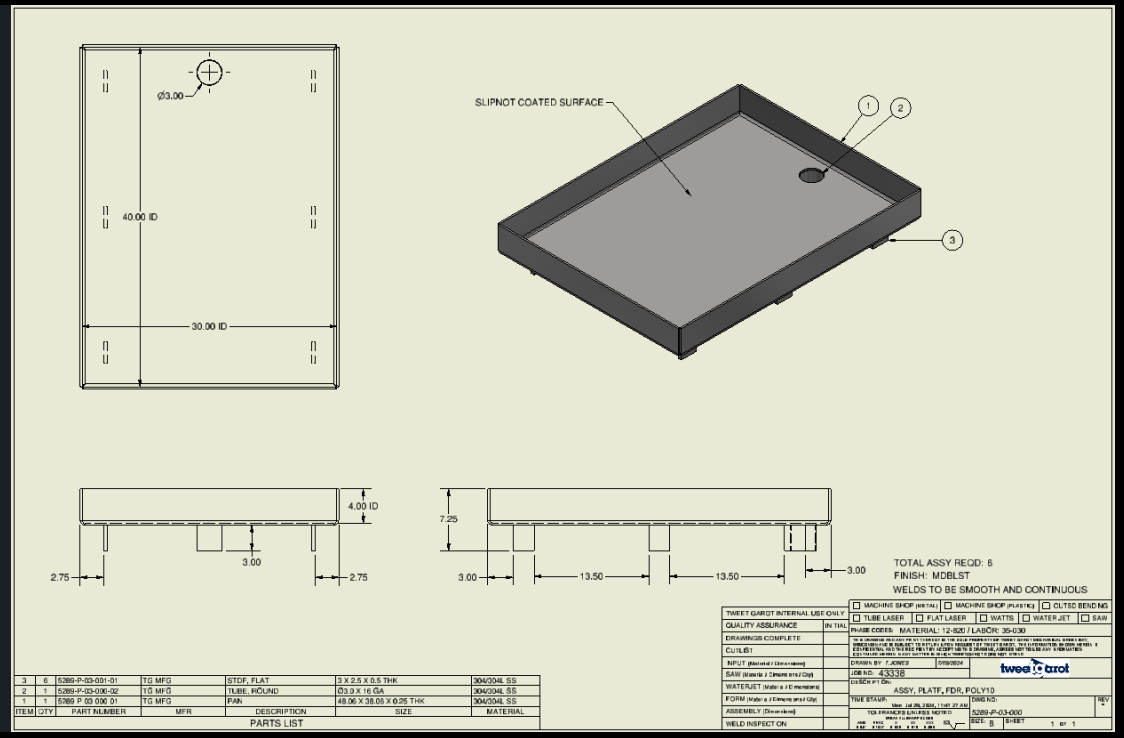




Project: Feeder Platforms

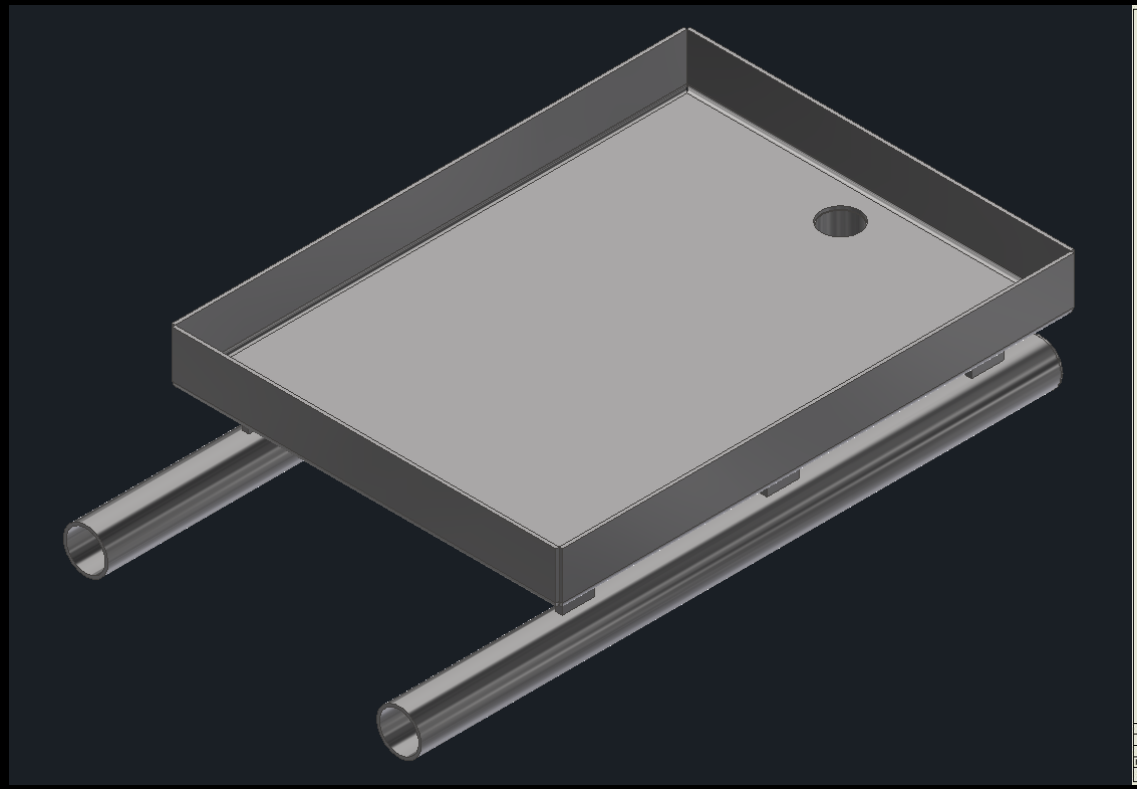
Poly 10 Platform

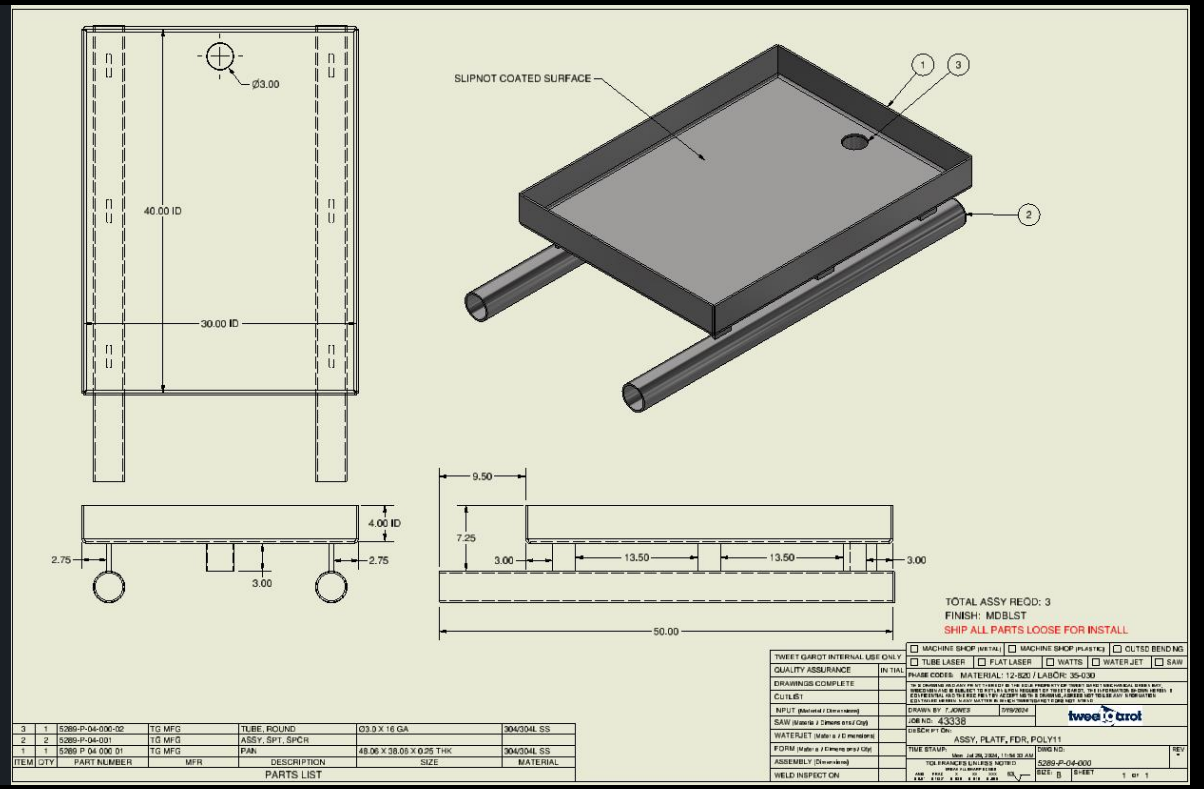




Project: Feeder Platforms

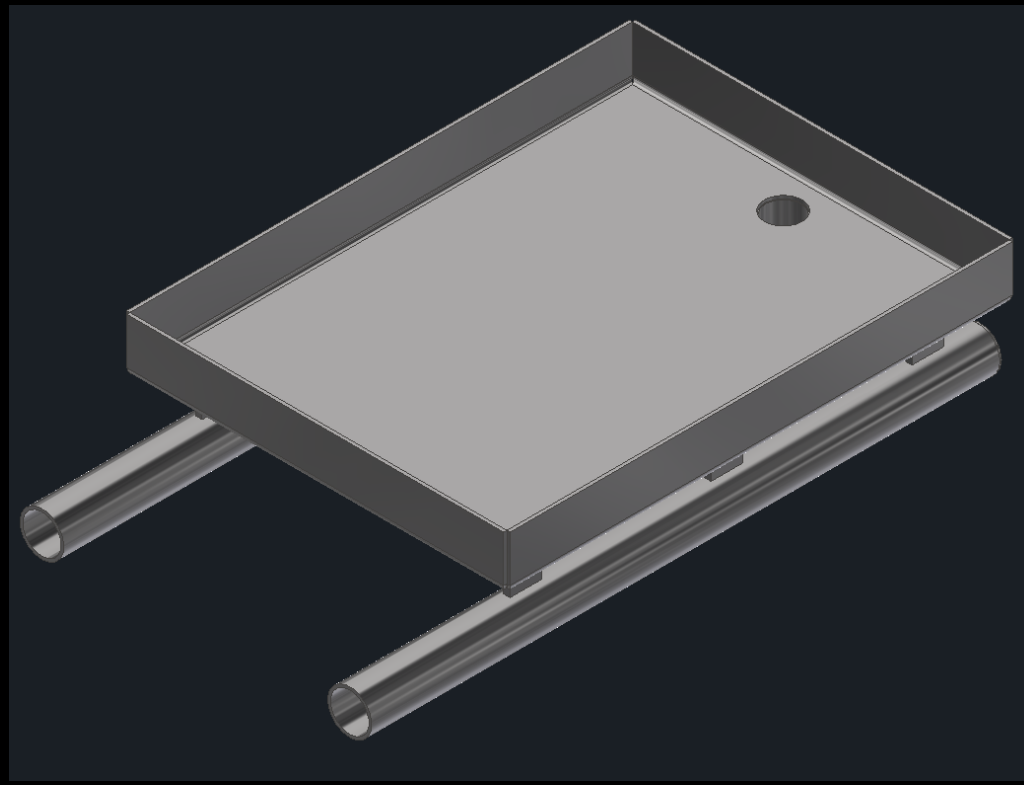
Poly 11 Platform

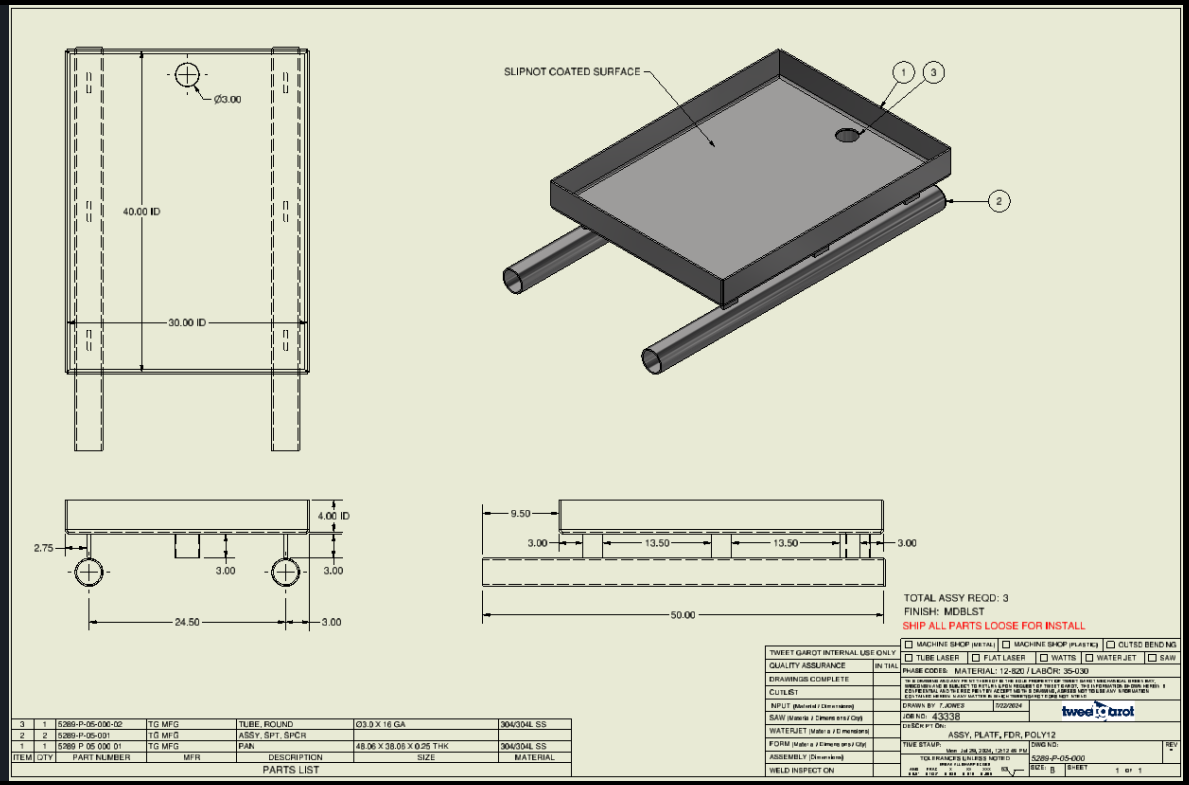




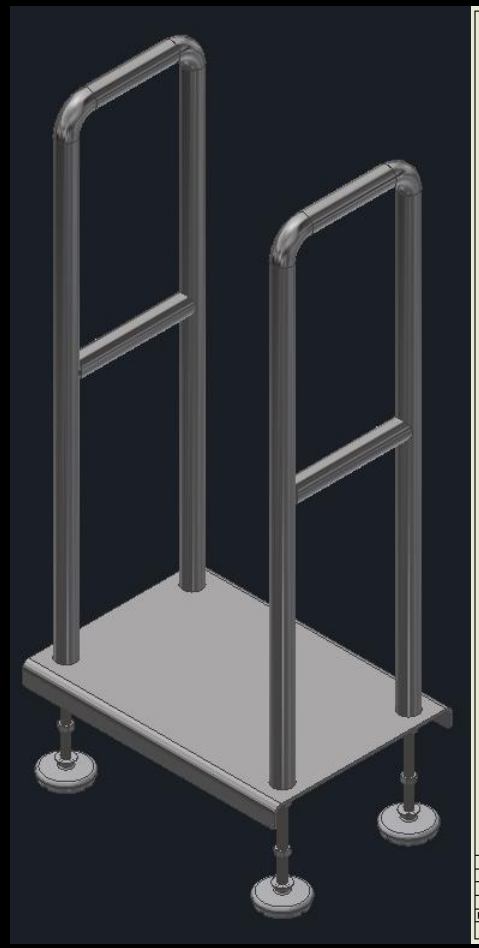
Project: Feeder Platforms

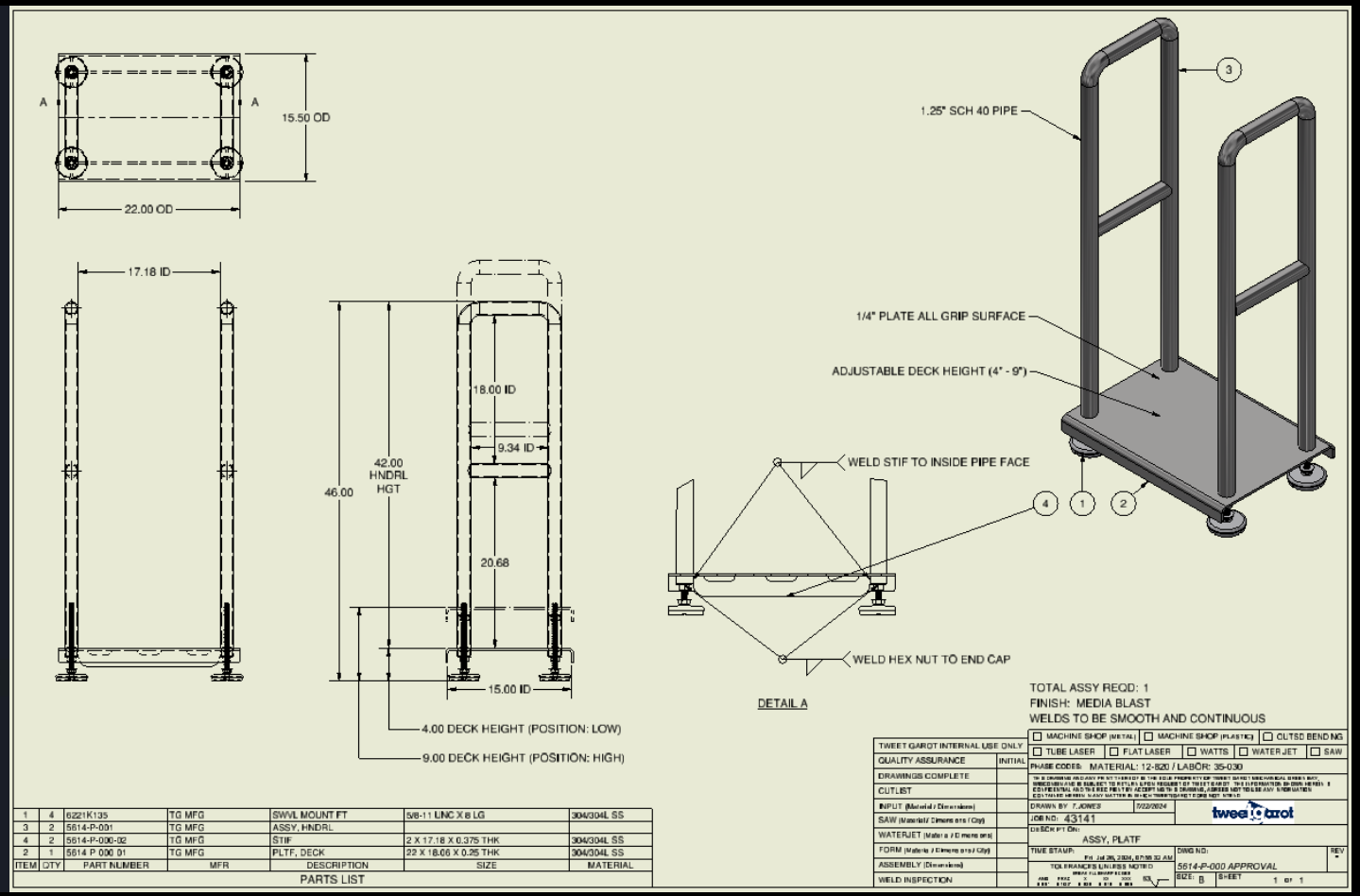
Poly 12 Platform



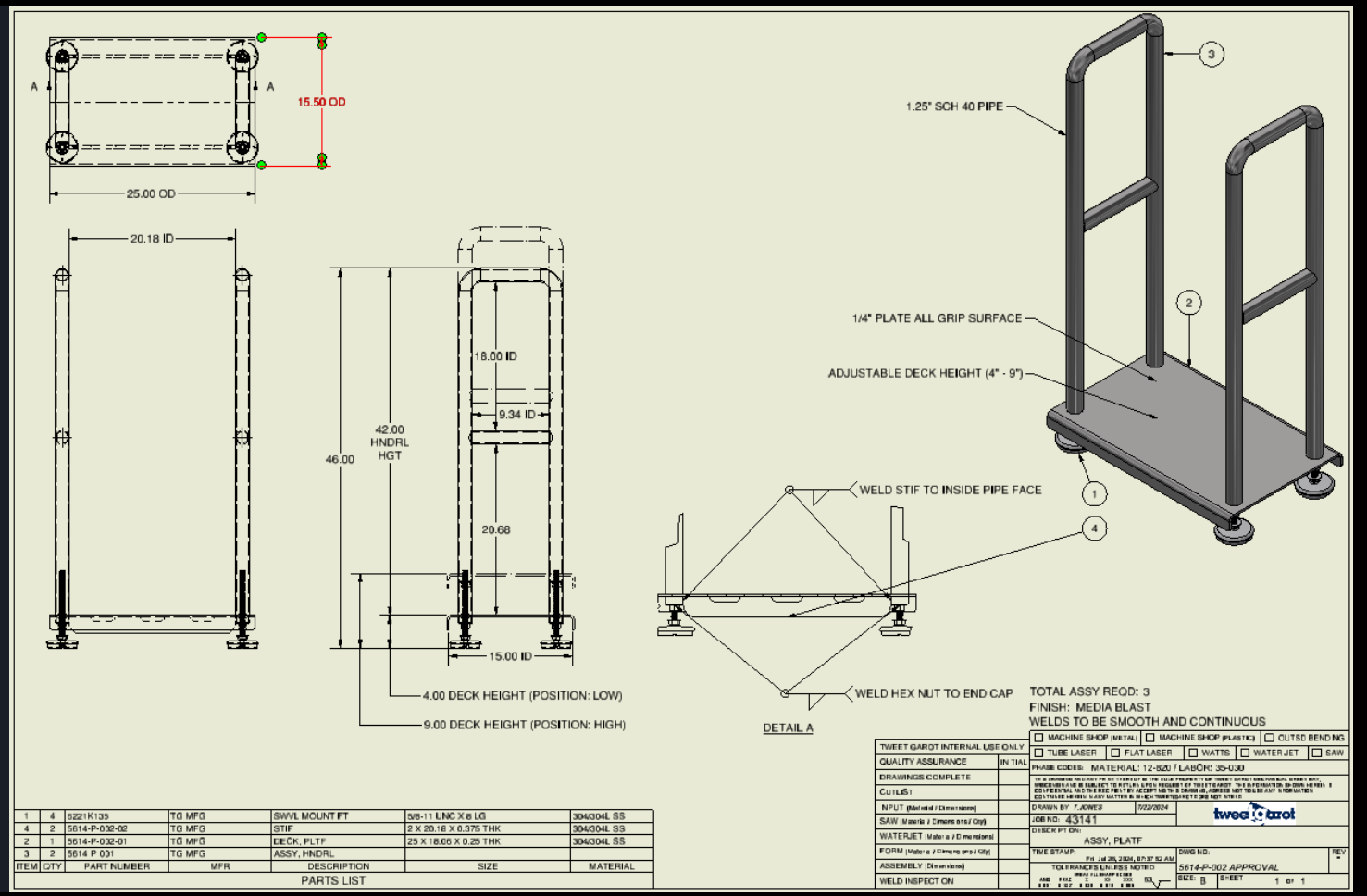


Project: Cob Conveyor Platforms



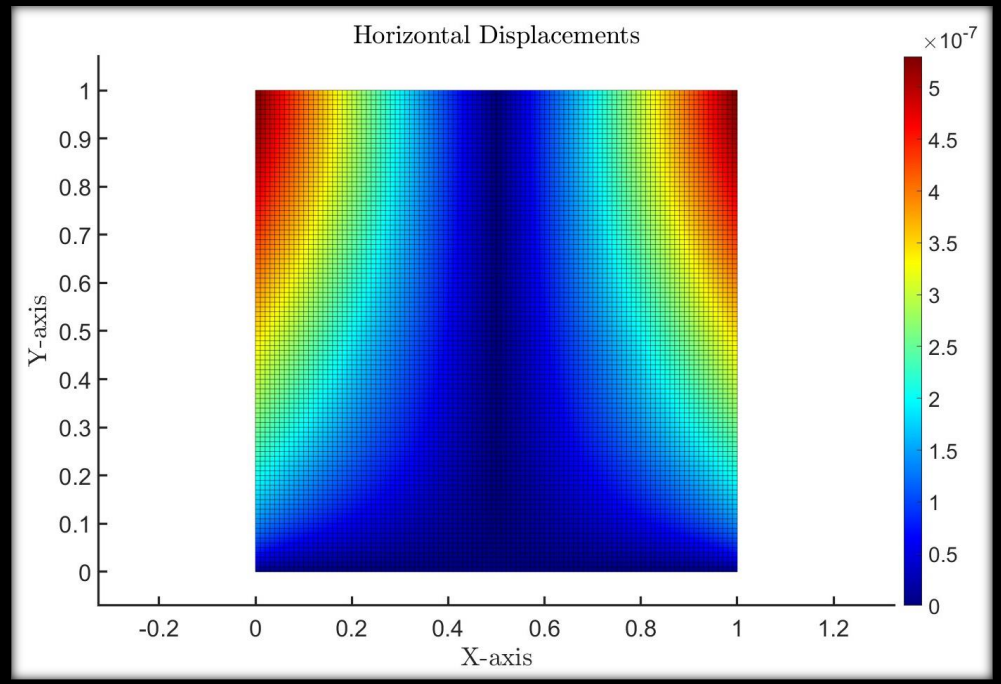


Project: Cob Conveyor Platforms



Project: Cob Conveyor Platforms

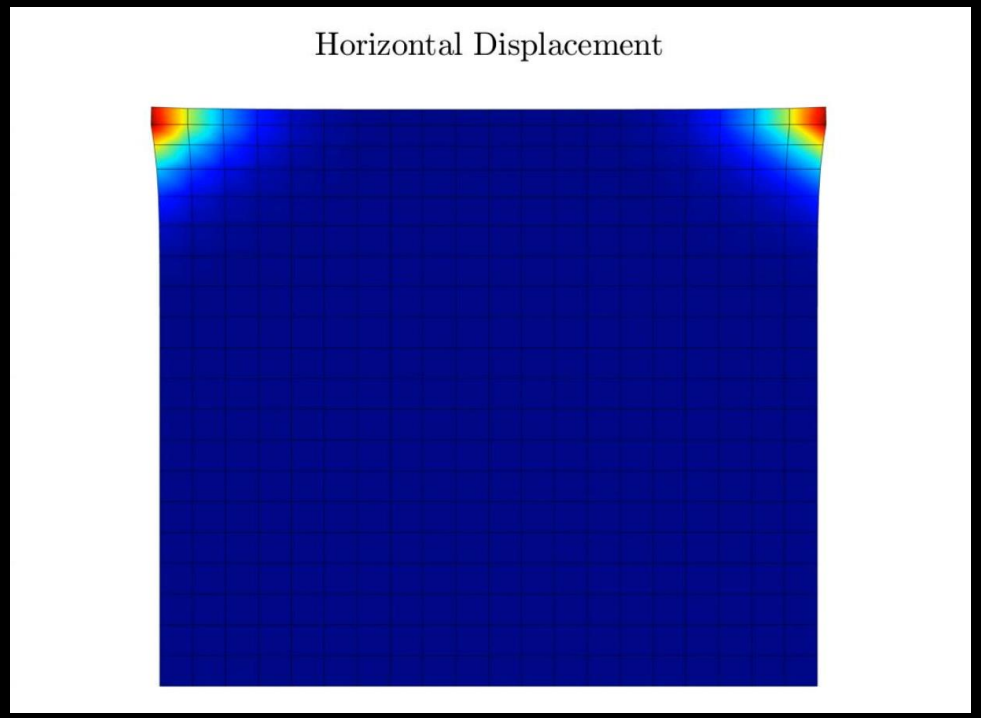
- Is this design safe?
  - Add stiffeners between legs
  - Finite Element Analysis
    - Validify NASTRAN results for a benchmark case
    - Conduct FEA
    - Analyze results



Project: Cob Conveyor Platforms

- Benchmark Test Case on 2D Plate
  - Uniformly distributed compressive load on top edge

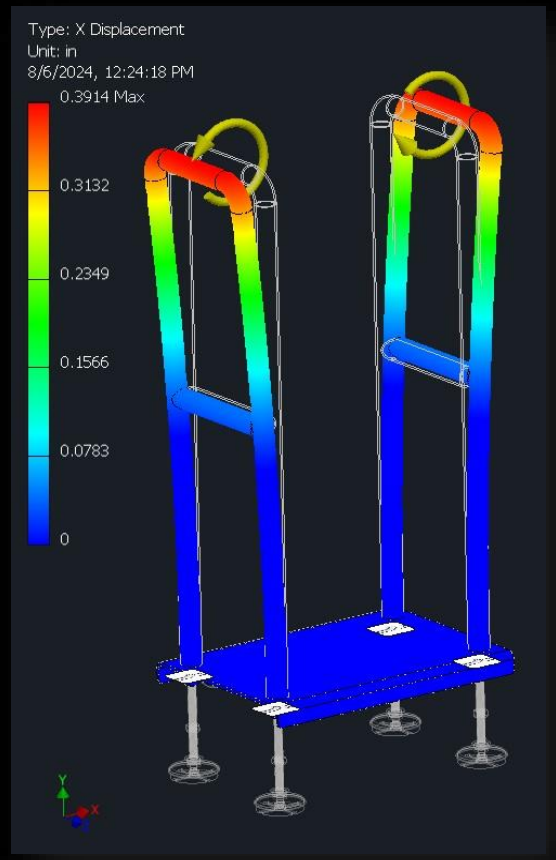
My Programmed Analysis via MATLAB

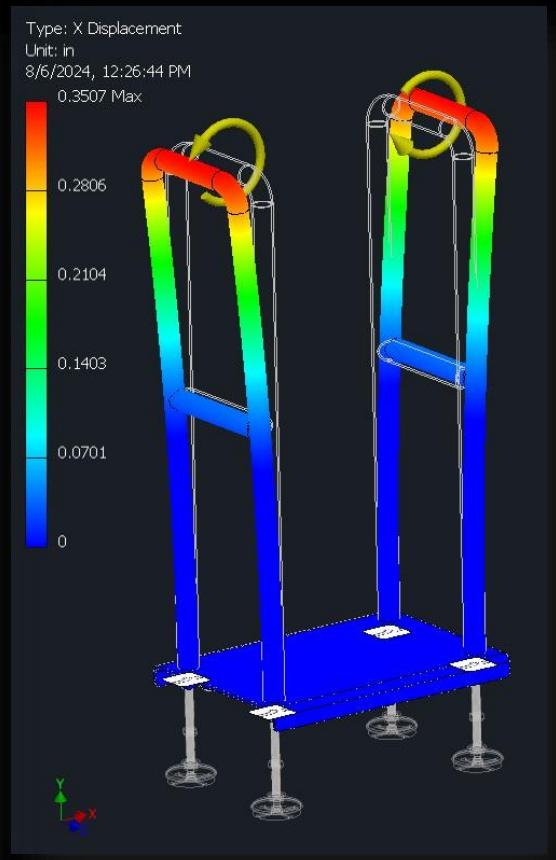


Inventor: Stress Analysis

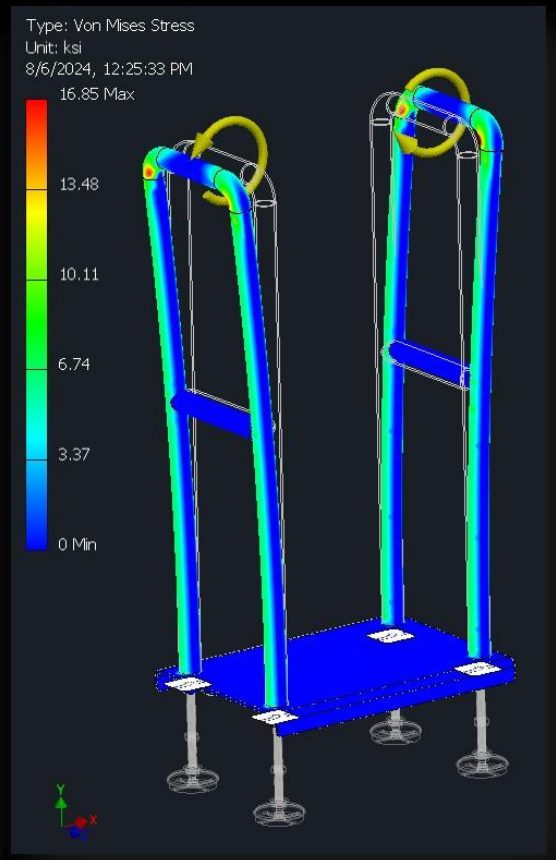
Project: Cob Conveyor Platforms

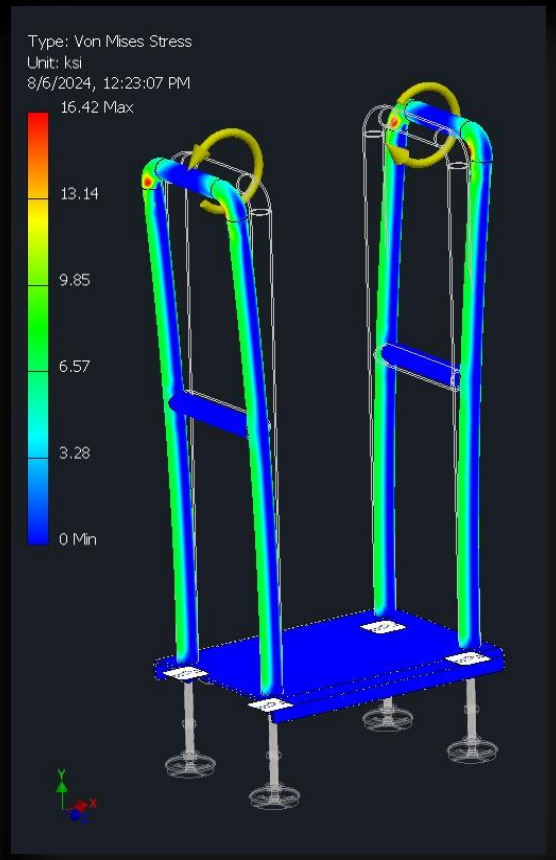
Displacement Results



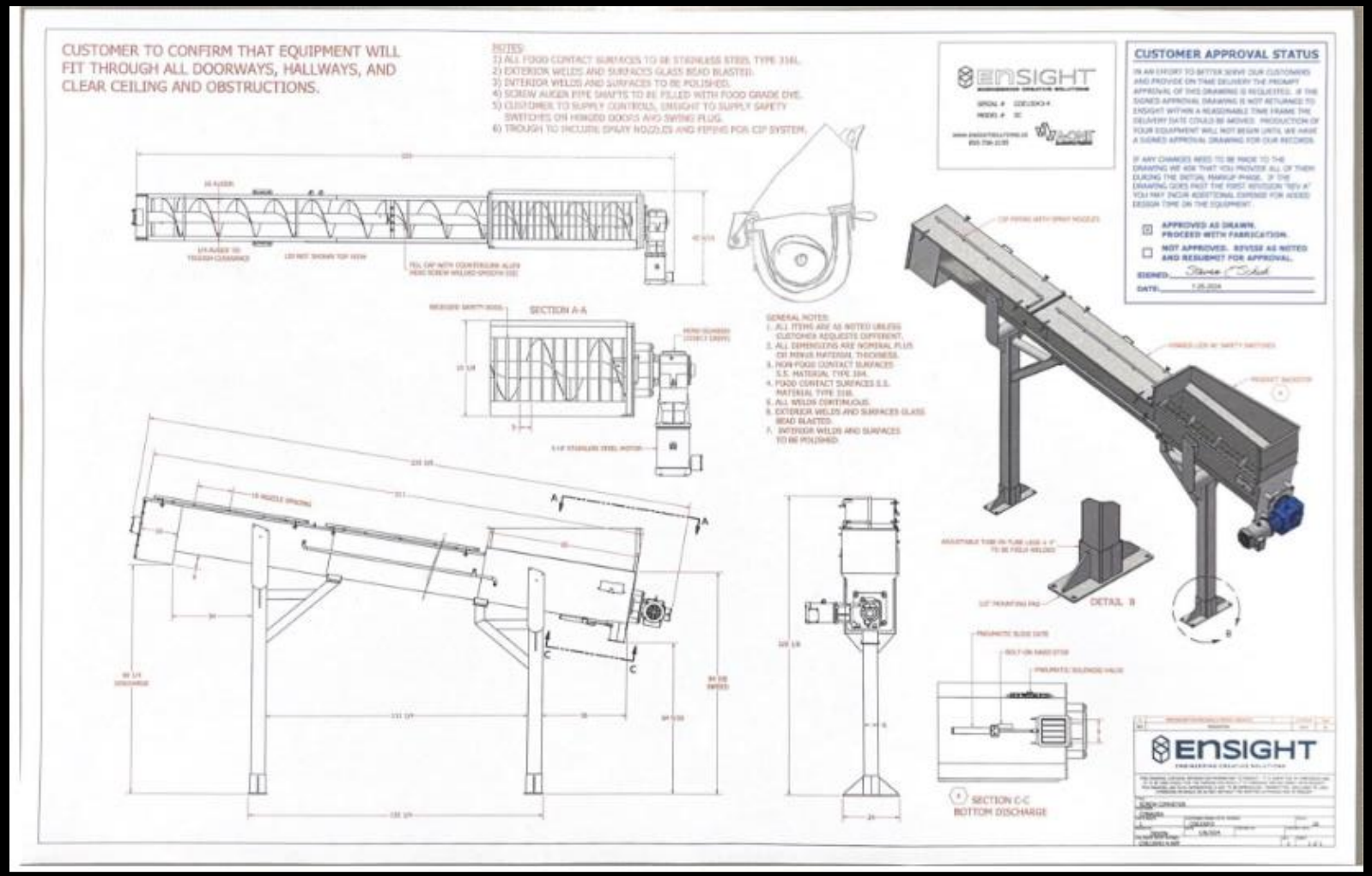


Stress Results

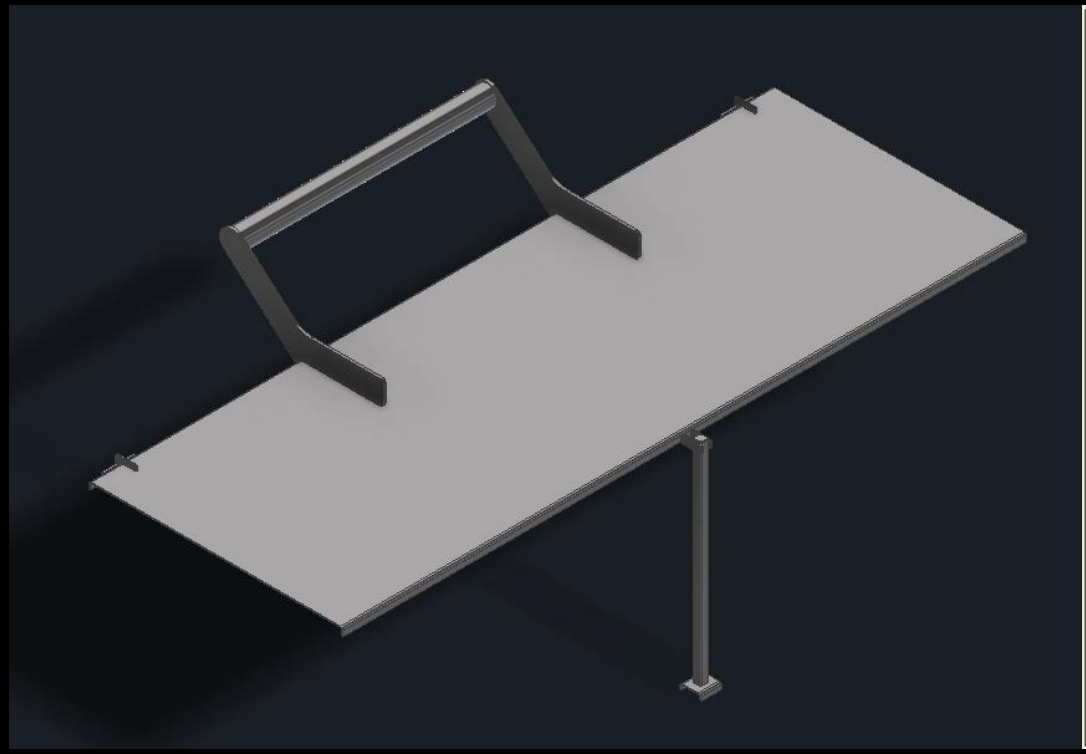


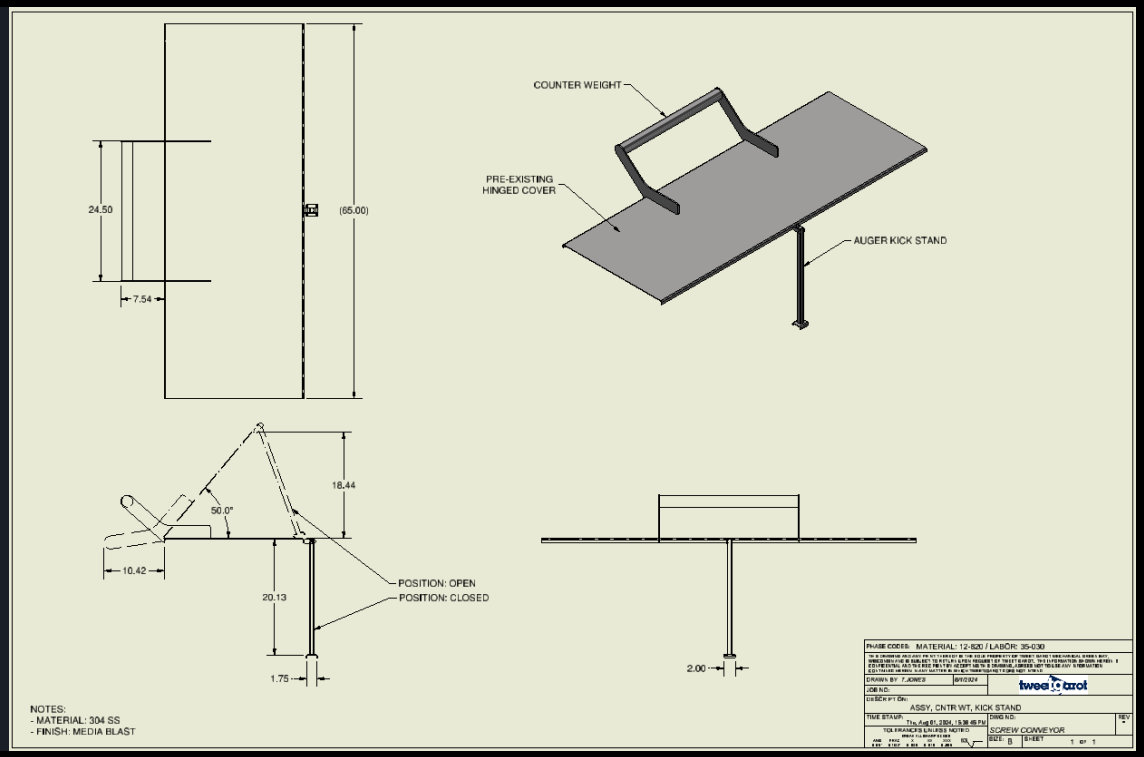


Project: Conveyor Cover Counterweight



Project: Conveyor Cover Counterweight



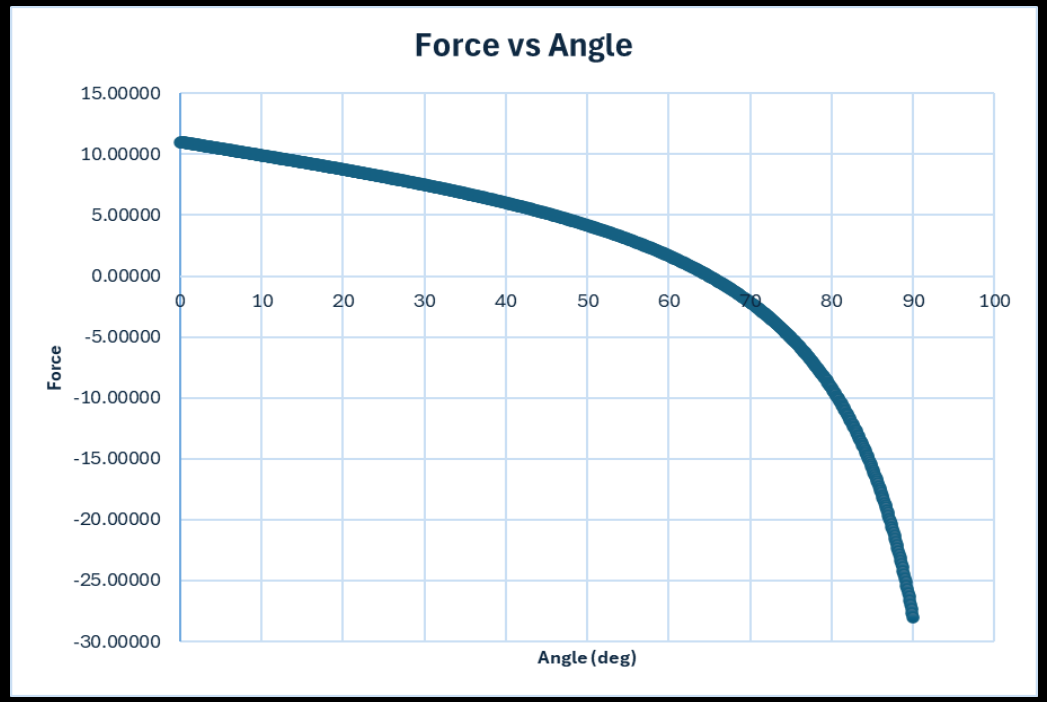


Project: Conveyor Cover Counterweight

Analysis

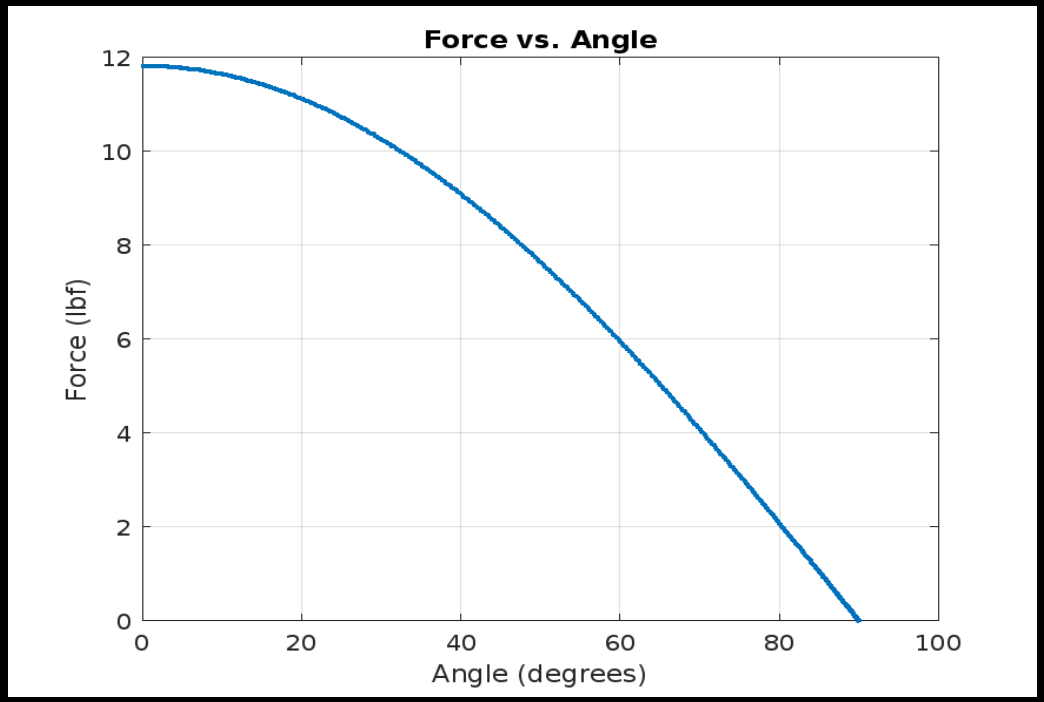
- Force required by operator to lift cover – Two different approaches

Inventor: Dynamic Simulation



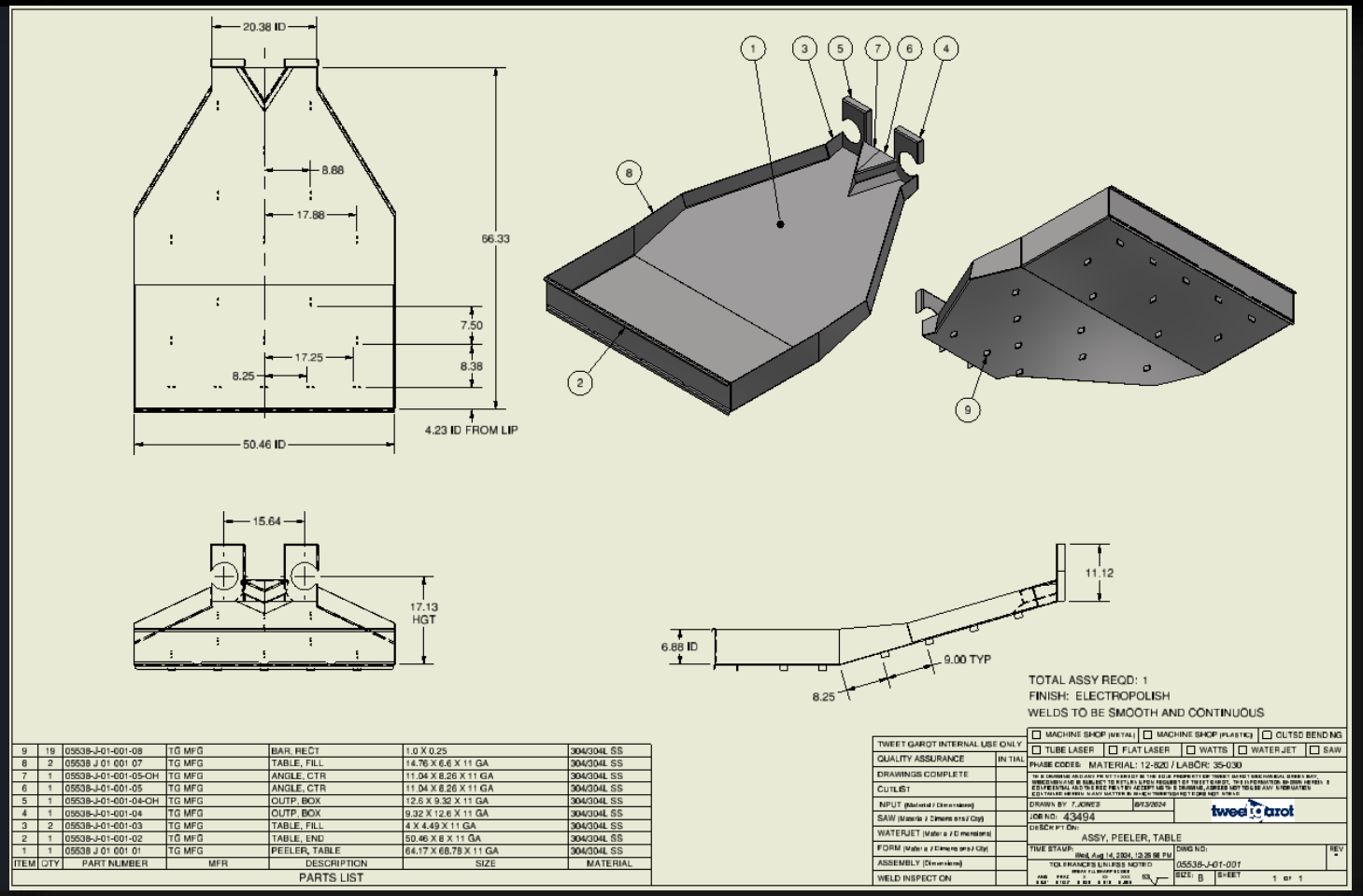
Autodesk Inventor using Lagrangian and Hamiltonian mechanics

My Programmed Solution via Fortran



Iteratively solving static equilibrium equations [Source Code]

Project: Peeler Table



ITEM	QTY	PART NUMBER	MFR	DESCRIPTION	SIZE	MATERIAL
9	19	05538-J-01-001-08	TG MFG	BAR, RECT	1.0 X 0.25	304/304L SS
8	2	05538 J 01 001 07	TG MFG	TABLE, FILL	14.76 X 6.6 X 11 GA	304/304L SS
7	1	05538-J-01-001-05-OH	TG MFG	ANGLE, CTR	11.04 X 8.26 X 11 GA	304/304L SS
6	1	05538-J-01-001-05	TG MFG	ANGLE, CTR	11.04 X 8.26 X 11 GA	304/304L SS
5	1	05538-J-01-001-04-OH	TG MFG	OUTP, BOX	12.6 X 9.32 X 11 GA	304/304L SS
4	1	05538-J-01-001-04	TG MFG	OUTP, BOX	9.32 X 12.6 X 11 GA	304/304L SS
3	2	05538-J-01-001-03	TG MFG	TABLE, FILL	4 X 4.49 X 11 GA	304/304L SS
2	1	05538-J-01-001-02	TG MFG	TABLE, END	50.46 X 8 X 11 GA	304/304L SS
1	1	05538 J 01 001 01	TG MFG	PEELER, TABLE	64.17 X 68.78 X 11 GA	304/304L SS

PARTS LIST

TWEET GAROT INTERNAL USE ONLY	
QUALITY ASSURANCE	IN TIAL
DRAWINGS COMPLETE	
CUTLIST	
INPUT (Material / Dimensions)	
SAW (Material / Dimensions/ Qty)	
WATERJET (Material / Dimensions)	
FORM (Material / Dimensions/ Qty)	
ASSEMBLY (Dimensions)	
WELD INSPECT ON	

☐ MACHINE SHOP (METAL) ☐ MACHINE SHOP (PLASTIC) ☐ CUTSD BEND NG
☐ TUBE LASER ☐ FLAT LASER ☐ WATTS ☐ WATER JET ☐ SAW

PHASE CODES: MATERIAL: 12-820 / LABOR: 35-030

DRAWN BY T.JONES 8/13/2024

JOB NO: 43494

DESCRIPTION:
ASSY, PEELER, TABLE

TIME STAMP: Wed, Aug 14, 2024, 12:26:56 PM

DWG NO: 05538-J-01-001

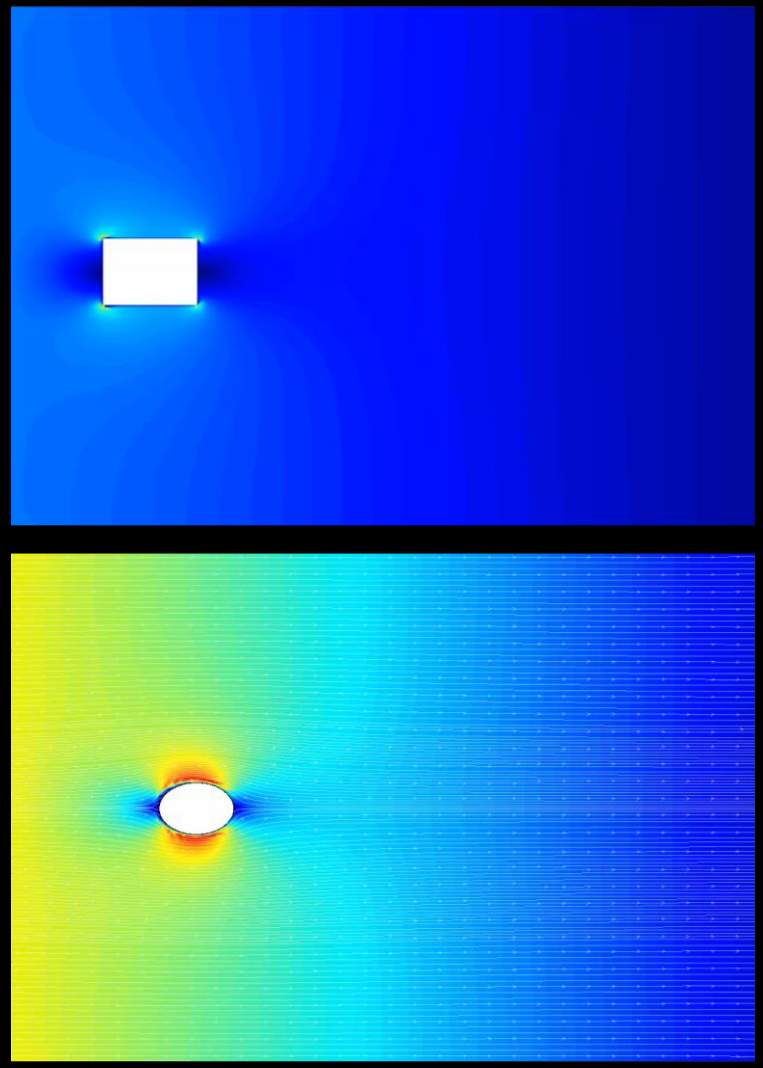
REV -

TOLERANCES UNLESS NOTED

SIZE: B SHEET 1 OF 1

Applications from Education

- Computational Engineering
  - CFD for HVAC
  - FEA for Custom Equipment Design team
  - Programming: Fortran and MATLAB
- Engineering Mechanics
  - Mechanics of Materials
  - Material Science
  - Static/Dynamic Analysis
  - Stress Analysis
- Computer Aided Design
  - Autodesk Inventor
  - Design for Manufacturing



Close Support

- Manufacturing
  - Kyle Schneider – Production Manager
  - Bethany VanSickle – Manufacturing Engineer
  - Jason Waligursky – Shop Scheduler
  - Shop and field employees
- Custom Equipment Design
  - Rod Jones – CED Manager
  - Brandon Blochowiak – CED Engineer
  - Tony Vertz – Virtual Designer
  - Amber Hady – Virtual Designer
  - Leon Xiong – Virtual Designer

THANK YOU!