

Revitalization of Robotic Work Cell

Problem Statement

A second generation robotic workcell needs to be created such that it incorporates the following:

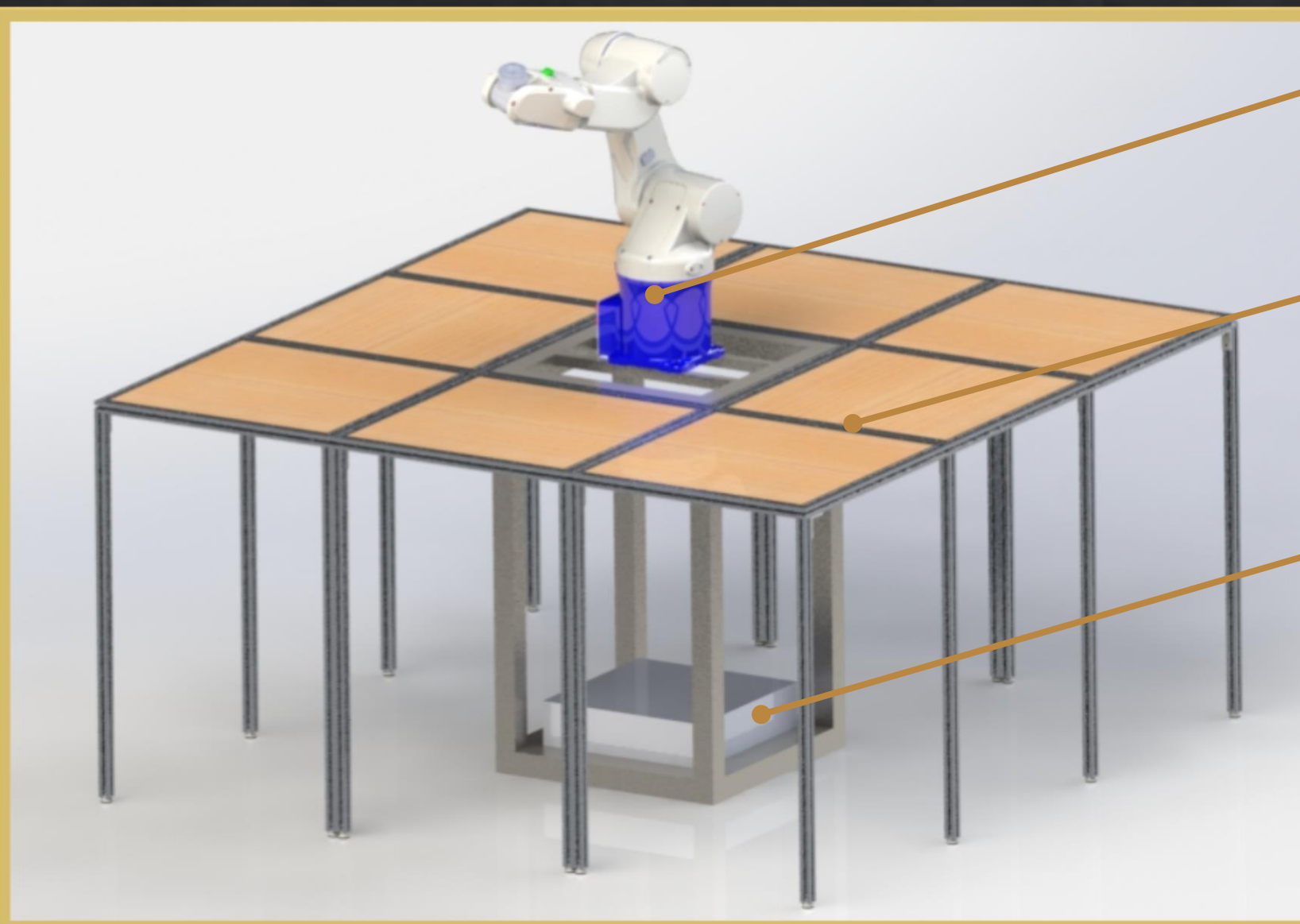
- modular design,
- eliminates movement & vibration under load,
- able to include a second robotic arm,
- includes standalone document of operation.

Permanent walls enclose dedicated 12x12 ft. workspace for robots

2 doors provide easy access to workcell, e-Gard electronic lockout is used

Project Results

Our team designed a new, modular workcell that includes a permanent enclosure with a steel pedestal and a thorough training manual.



DENSO VS-577G 6 axis robotic arm

Modular tables allow the work surface to be tailored to different processes

RC7M Controller operates robot, I/O for end effectors and lockout interface

Render of Final Workcell



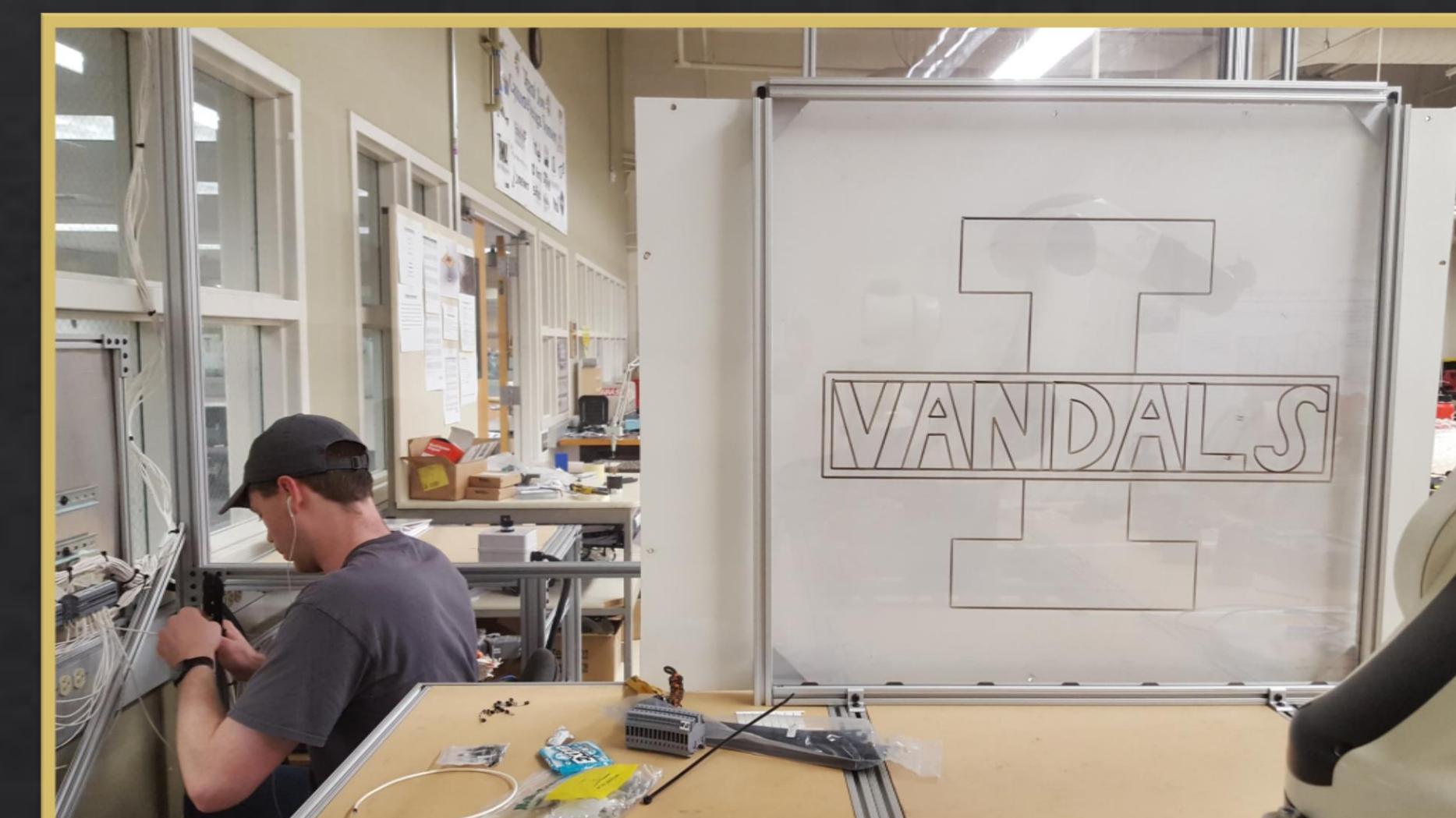
E-Gard Electronic Lockout

The e-Gard lockout is attached to the main entrance and disables robot movement when an operator is inside the workcell. This system meets all OSHA safety standards for a robotic manufacturing workcell.



Robot Programming

A few programs were made to demonstrate the robot's capabilities such as drawing the U of I logo and cup stacking.

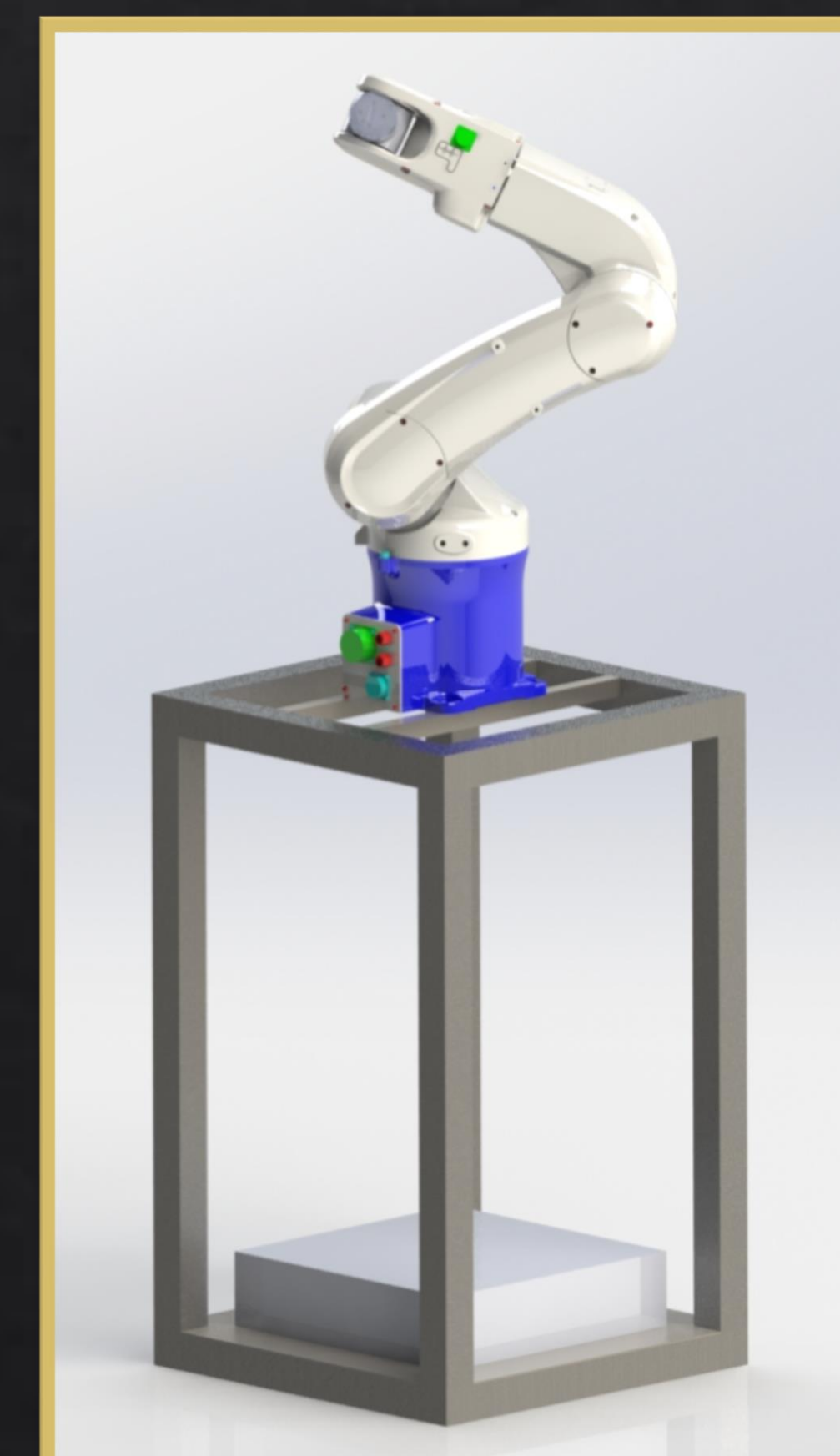
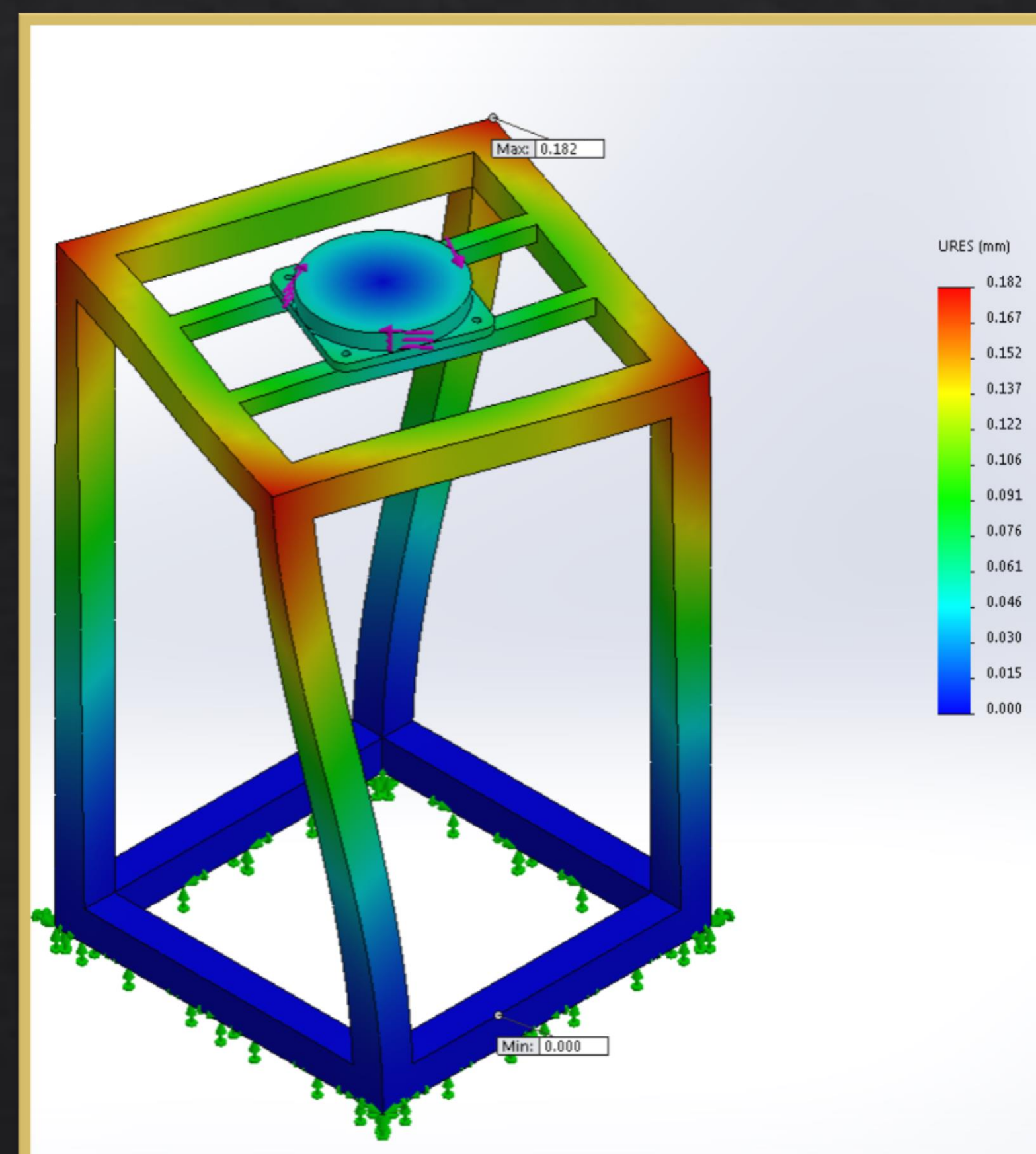


Workcell Use Manual

A user manual was developed to help teach future students about using the workcell and basic robotic programming.

Pedestal Design

FEA demonstrates pedestal (steel tubing) has minimal deflection and no movement under robot weight or maximum rotational force of the robot.



A custom end effector was developed for each procedure. To the right is a pneumatic gripper that utilizes the robot's air solenoid system to grab cups to be stacked.



UI ROBOTIC WORKCELL

SETUP, OPERATION, AND PROGRAMMING OF THE ENGINEERING DEPT. ROBOTIC WORKCELL

This instructional manual includes information on the DENSO Robotic arm and the modular work-cell designed for it. Information discussed in this manual includes general information on safety, manual operation, basic programming, and advanced programming using WINCAPS III software.



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