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Customer Background

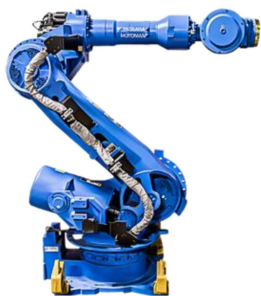
The Honda plant that we are working for directly is in Greensburg, IN opened in 2008. The main use of this plant is the manufacturing and production of the Honda Civic. This facility also produces the Honda CR-V and the Honda Insight Hybrid vehicles.

Problem Statement / Scope of Work

- The maintenance team at the Honda plant needs a solution to more efficiently and safely perform pivot joint maintenance on their robots.
- The finished product of a mounting fixture that can be attached to a crane to lift the arm of an ES200N and ES165N Motoman robotic arms for repairs.

Requirements

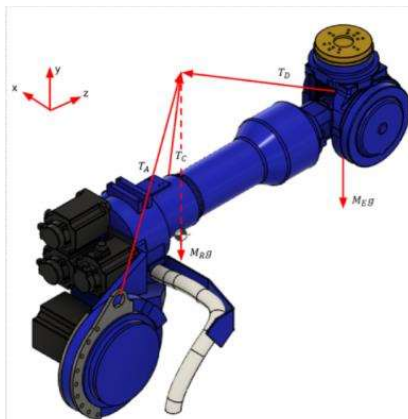
- The requirements that Honda wanted fulfilled for this project are listed below.
- A mounting fixture that can be attached to a crane
 - Must be stable enough to prevent the arm from moving during maintenance
 - Must be compatible with Honda's preexisting overhead crane



Experimentation and Concepts



Final Design



- The team's final design uses seven clearance-fitted holes to mount.
- The manner of mounting allow the technicians onsite to have control of the robot's arm while it is held by a crane.
- By slimming down the design, we have allowed for a better fit.
- Due to the static loading conditions, our part has been designed for a 2X safety factor and has satisfactorily met that standard.
- The team has manufactured three for Honda's use.

FMEA

The FMEA was completed to the risk analysis, which we were not able to finish due to the incomplete testing of our system.

However, the modes of failure was analyzed and listed below in order of severity and likelihood, calculated through FEA analysis

- Hook Attachment
- Main Body
- Bolt Holes
- Bolts

Failure would cause our system to not restrict movement within the various axes of the robot arm

Testing

- Testing is to be outsourced to a materials testing lab
- A tensile tester with an angled mounting rig and a clevis fixture will be used for proof loading
- A load of 4000 newtons will be applied
- We are looking for no deformation beyond the elastic limit

