

Robotic Arm Pedestal

Mechanical Engineering

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PROJECT BACKGROUND

The Robotic Arm Pedestal project stems from the Klippenstein Corporation. Klippenstein specializes in robotic palletizing, tray formers and case sealers as well as conveying solutions. Klippenstein is a Fresno based company who's project was acquired through a student intern.

CURRENT ISSUE

The Robotic Arm Pedestal project is based on an issue involving a tall pedestal. The robotic arm, a FANUC Robot M-410iB, was causing the structure to slightly bend during normal operations. The potential unwanted results of such behavior is incorrect robotic arm timing and a potential for dynamic failure.

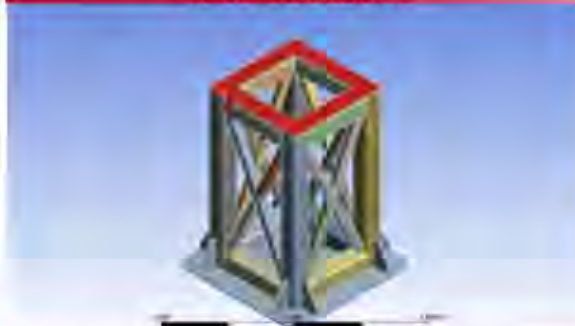
MODEL WITH ISSUE



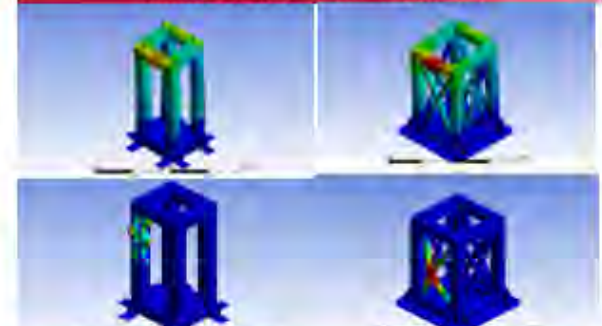
REDESIGNED CONCEPT

The original design's structural members included a top plate, and four square tubes. To decrease the deformation, the redesigned concept includes trusses which distribute the load evenly and decrease the likelihood of buckling.

REDESIGN MODEL



SIMULATIONS COMPARISONS



SIMULATION CONCLUSIONS

The ANSYS simulations reveal that while under identical loading conditions the total deformation decreased by a third (top simulations). Additionally, the new members decreased the likelihood of buckling by a factor of 10 (bottom simulation).

NEW DESIGN TASK



Klippenstein has tasked the group to design a smaller pedestal for a new job to be delivered to a customer soon.

FINAL DESIGNS AND CONCLUSIONS

The new design incorporates the knowledge gained by adding c-channel members to stiffen the structure. The result is that the total expected deformation under similar loading conditions is half of the original design without fear of buckling.

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