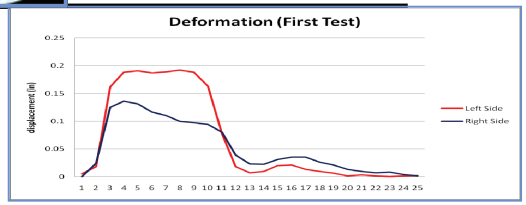
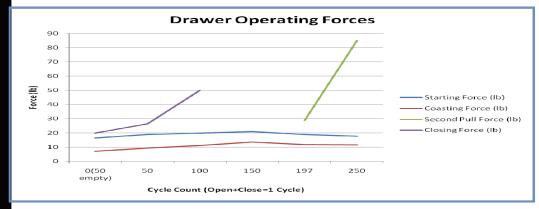
Accommodations: Testing





Conclusion

The testing resulted in premature deformation. The drawers failed after 421 cycles the first time and 250 cycles the second time. Increasing the number of bearings will distribute the load, and with more contact points, it will take longer to fail. Furthermore, the inner slides deformed, as well as a slight part of the slide assembly. Thicker parts are recommended so as to increase the stiffness. The FEA done shows that creating a channel along the route of the bearings, will also increase stiffness. Strong and stiffer materials can be chosen to also address both problems.

Designing the next generation toolbox resulted in a jobsite tool cabinet, and a combination toolbox. The combination toolbox seemed the most versatile, but manufacturing a working circular pivot drawer system is not feasible. RFID is useful but also not feasible.

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IPRO 341

New Product Evaluation & Improvements

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ILLINOIS INSTITUTE OF TECHNOLOGY
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IPRO 341

New Product Evaluation & Improvements

Introduction:

Versatility Tool Works and Manufacturing (VTW) is a small metal works company based in Alsip, Illinois. Recently, the company has started producing tooling cabinets to accompany press brakes manufactured by Amada America Inc. However, the company has run into a few problems and decided to contact Illinois Institute of Technology for help.

Objective:

The IPRO 341 team was charged with two tasks:

- Test new cabinet to ensure cabinet functionality.
- Develop innovative ideas for a next generation tool storage cabinet.

SUB-GROUP TEAMS:

In order to accomplish all of the objectives in time, the IPRO team was split up into design and testing sub-teams.

Design:

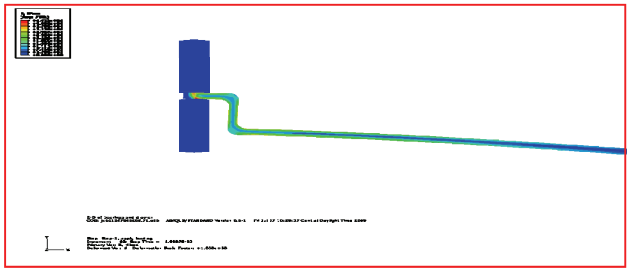
- Developed two different designs: Jobsite box & Combo
- Incorporated technology: Radio Frequency Identification (RFID)

Testing:

- Tested new drawer system in weight distribution, load capacity and longevity in relation to capacity.
- Provided Finite Element Analysis (FEA) which is a numerical technique

Throughout the semester, the IPRO team as a whole met with the sponsor and kept them up to date on the progress.

TESTING: Finite Element Analysis

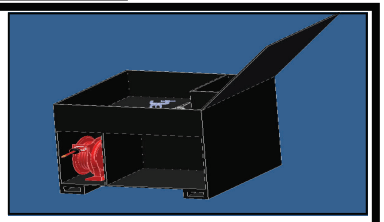


Visual of a drawer deformed using FEA software

FEA allows detailed visualization of where structures bend or twist, and indicates the distribution of stresses and displacements. The benefits are: FEA include increased accuracy, enhanced design and better insight into critical design parameters and Increase productivity and revenue

DESIGN

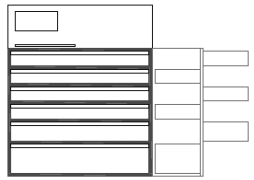
Jobsite Box



The benefits of the jobsite box are:

- Stores different sizes and shapes of tools
- Built in compressor and generator
- Decreases theft by linking movable tools to the box
- Allow access to air and electricity

Combo Drawer



- Easy access
- It can be utilized as an end piece
- Wastes no space
- Storage for different geometric shapes and long pipes or pieces
- Utilized data acquisition/RFID screen on top of drawer

Radio Frequency Identification (RFID)

Why RFID in general?

- Locks up expensive equipment, allows only specific personnel to access tools
- tracks expensive equipment
- provide insight into process/product design as well as more accurate managerial accounting
- being able to locate which drawer contains the appropriate part can decrease wear by eliminating the extra use of opening the wrong drawer