This project’s goal is to provide our sponsor with a system that can quantify the protectiveness of their packaging at their convenience. Our team has built a testing rig for reliable drop testing and an Impact Data Recorder (IDR) measuring the impact that the package received. In addition to building the testing rig, our team has also implemented testing on four representative products and has made some recommendations for improvements in packaging.

Design Requirements
- The rig has to accommodate for 95% of SEI packages.
- The rig must be able to drop a package in multiple orientations without impeding its fall.
- The rig needs to have a lift system that can lift the drop platform evenly in all corners to different heights.
- The rig needs to be mobile.

Design specifications and features
- The size of the frame: 4 x 6 x 7 ft
- The rig has a drop mechanism consisting of 2 spring-loaded drop arms, a winch mounted on a central post, and a cable connecting the winch and the drop arms.
- The lift system consists of an electrical winch mounted on one side of the platform and a pulley system.
- Four caster wheels are attached at the bottom of the rig for easy movement.

Results
- In addition to regular drop test, we also performed a series of corner drops using a hazard box dropping on 8 packages containing mirror panels to find the relative protectiveness of the following:
  - 12-kg foam or 17-kg foam
  - With or without wooden panel (MDF)
  - Single-walled or Double-walled
- To establish a baseline expectation of real-world impacts, we also shipped a package with the IDR mounted inside using UPS for three days.

Conclusion
- We provided our sponsor with a functional testing rig and a method to measure the protectiveness of their packaging before sending out packages to their customers.
- We learned that flat drops usually record a higher impact compared to edge and corner drops due to the larger surface area.
- From the hazard box testing, we learned that denser packaging foam (17-kg density) and wooden panel (MDF) did a significant job in protecting the products. Moreover, the denser packaging foam is more effective than wooden panel.

Any question or suggestion please email mtn110020@utdallas.edu
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