

# Design Specification Drop Weight Tester

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## **Narrative:**

You are part of a 5-person team who will be studying the effects of impact on a carbon fiber wrapped column. The device that delivers the impact to the column is to deliver the same energy per area as a car moving at 60 miles per hour and impacting into a bridge support column.

## **Design Statement:**

Design a device to impact a 6-in diameter concrete column, which is 12-in in length, over an area of approximately 1-square inch.

## **Constraints:**

- Must be able to be designed and built in a 1-week time
- Must be able to be built using electric hand tools and a standing drill press
- Must cost less than or equal to \$200
- Must be able to deliver 50% to 150% of the energy per area (approximate range) as a car moving at 60 miles per hour impacting into a bridge support column over one square inch
- Impact area is to be approximately 1-square inch (plus or minus 25%)
- You have access to a two-story overlook in a civil engineering lab. A 3-ft high pipe fence borders the overlook.

## **Suggested Output:**

- The minimum amount of energy the impact tester can deliver
- The maximum amount of energy the impact tester can deliver
- Three concept tester descriptions
- Analysis indicating why you selected the design from the three concepts
- Detailed sketches of the selected tester with parts list
- Estimated cost from the parts list
- Assembly drawing of major assemblies and final assemblies
- Exploded view with bill of material
- Instructions on how to use the tester