Name(s)	Project Number
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Project Title

Impact Forces

Abstract

Objectives/Goals
I wanted to determine if two objects of equal mass and each traveling the same speed would each experience an impact force equal to a third object of equal mass traveling at twice the speed hitting an immovable object.

Methods/Materials
A duel arm pendulum swing was built to collide soda cans into each other and then into a solid object giving me results with repeatable outcomes and consistent measurable speeds. A camera using slow motion along with a grid was used to formulate and verify mph. The length of the soda cans were measured before and after each impact to determine the stopping distance which allowed me to calculate the amount of force applied to each can. The above process was repeated four times for each speed used.

Results
2 soda cans colliding into each other at 4 mph measured a stopping distance of 10/32 in. while 1 colliding into a cinder block at 8 mph measured a stopping distance of 26/32 in. Therefore, they do not have the same impact forces. In this case, 2 x 4 mph collision does not equal an 8 mph collision, thus proving my hypothesis correct that the impact force will be greater on the one object going twice the speed. A single car collision into a solid wall at 80 mph will have more damage than two 40 mph cars hitting head on.

Conclusions/Discussion
The results showed that the impact forces were the same for the two objects traveling 4 mph when added together and the 8 mph collision into the solid object, however the energy was split between the two-object collision and therefore the stopping distances were not equal. This supported my hypothesis that a single car collision will have more damage. This project helped me understand how damage and injuries occur between moving objects and how crumble zones built into newer cars can absorb energy and save lives.

Summary Statement

To disprove that a two car collision will have the same impact force as one car hitting a solid wall at twice the speed

Help Received