Matthew Brantley, Kyle Gilson, Kevin Jones, Emily Oller, and Whit Shofner
EF 151
Team Project Report

Monster Truck

The project Monster Truck is very successful at doing its job. The team that created this machine was also very successful at the design and building process of the machine. The motor created could lift a one kilogram weight, one meter high, with the simple effort of dropping a twig. The machine had only one flaw in performance- it needed stability. If the Motor was not on a secure and stable platform, it would not perform properly. The successful project was mainly due to the team members, the design, and a lot of hard work.

The team members in "Team Monster Truck" were Matthew Brantley, Kyle Gilson, Kevin Jones, Emily Oller, and Whit Shofner. This team was successful due to its diversity in talent. Matthew Brantley, helped build and supply the project, Kyle Gilson, helped build and design the project, Kevin Jones, helped build and brainstorm the project, Emily Oller added a feminine touch to the project, and Whit Shofner helped build and perfect the project.

The design and effort put into the project also made it successful. The final design was made up of a simple plan. The machine became encouragingly more affective when this occurred. Consequently all previous efforts before this new plan had to be abandoned. This made the effort a considerable amount longer for the team members. However, the final design and machine was worth the work and hardship. The machine worked, with minor errors, and proved to be educational to the team members.

At first, the group had two ideas. Both involved a six-pulley system and some type of elevator. The six-pulley system idea was sparked from a previous example in recitation and seemed to be a great idea. The first elevator was controlled by a vertical cylinder of water which

would slowly be released through a valve. A counter weight would then go down with the water level, lifting the kilogram mass. The second would be powered by a ball rolling down several inclines dropping the elevator which would pull up the mass each time it reaches the end of an incline. After thinking about the work each process would require, it was decided that the water elevator would be the easier of the two.

After purchasing eight pulleys, string, P.V.C. pipe, BB's for a counter weight and a float for the water elevator, construction commenced. The water cylinder and the six-pulley system were built, and testing soon began along with the frustration! The entire project became much more complicated than originally predicted. Because of friction between the pulley system and the plywood support, it was going to take much more weight to lift the kilogram mass. To add to the chaos, the float which was purchased could not support the counter weight and it immediately sank. After a few choice words and many trials, the idea of a six-pulley system and a water elevator was thrown out. A new idea was shortly thought up and the brain storming began. The entire group realized that easier would be better. A ramp would be the answer to the problems. It was half a meter high and a meter long. A string attached to the kilogram was strung to the top of the ramp, through a single pulley, and finally was tied to the back of a toy monster truck which began at the top of the ramp. The truck was weighted down with two five pound weights which were tied down with duct tape.

The device works like so: first, a mouse trap is set off which pulls a barrier out from in front of the truck at the top of the ramp. The truck travels almost the full one meter down the ramp and then it is stopped by another barrier. This sets off a domino trail that curls around and

triggers the final mouse trap which removes the last structure and allows the truck to complete the meter.

The stored energy in the machine includes gravitational potential energy and elastic potential energy. The stored energy can be calculated as follows:

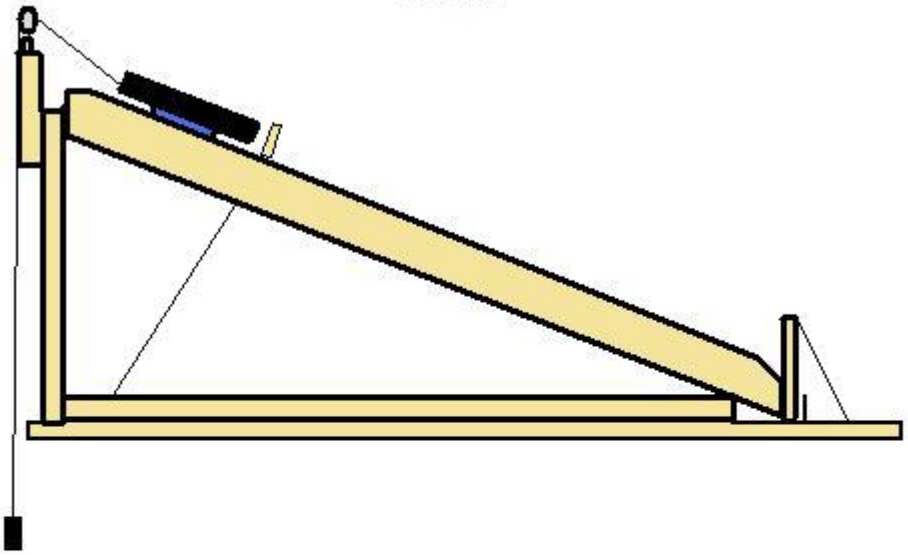
Gravitational Potential Energy = mass*gravity*height = 4.76kg*9.81m/s^2*.457m = 21.3 J

Elastic Potential Energy = 2*.5*k*x^2

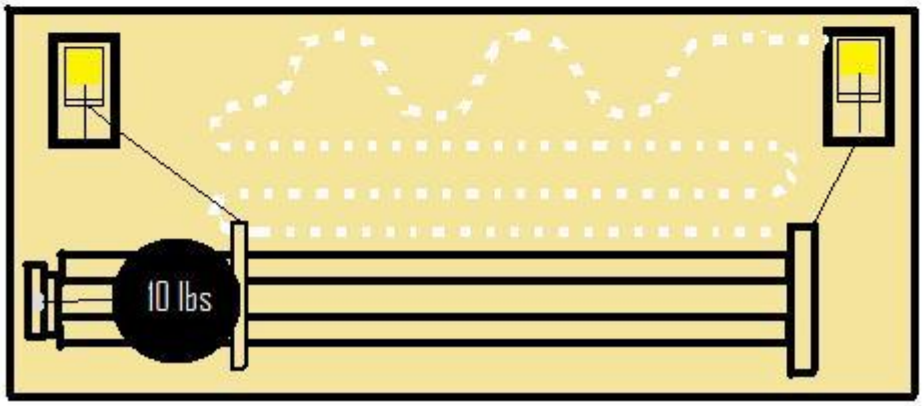
(k is the spring constant in the two mouse traps, x is the distance the spring is stratched from its start, and the formula is multiplied by two because there are two mouse traps)

In conclusion, much was taken from this project. Creating a successful project required many hours of work, the vast majority of which was mental. After spending several hours and dollars and realizing our original plan was not going to work, our resolve was tested. It was very frustrating, but no one gave up. Everyone buckled down and expended much brain power in concocting a new idea. Our project met the qualifications very well in theory, and, when we had a sturdy table, in practice. There were many lessons taken from the project. We learned that when working with a team, there is no such thing as a crazy idea. Any idea, no matter how crazy it seems, can spark other feasible ideas. We learned also that when you put four or five intelligent brains together, there is no limit to what can be accomplished. We all had fun working on this project and made good friends.

SIDE VIEW



TOP VIEW



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Expenses

After all expenses were calculated, the bill looked something like this:

Wood ……$3.00

Monster Truck……...$2.50

String……$0.50

Weights……..…...$5.00

Pulley……$2.00

Dominoes…...……...$6.00

Mouse trap (2)……..... $4.00

Total……...….$23.00