

The Pulley System Investigation

Aim

My aim is to create a pulley system which must consist of one, two or three pulley systems so that the results are recorded.

I will also investigate and find the difference in the value of the force obtained for the three different pulley systems.

Hypothesis

I should be able to pick up 500g with one pulley but to make this easier I will use a pulley system, if I use one pulley that the force needed to lift this amount of weight should decrease by 25%. Of course this is my hypothesis

Apparatus

- Nylon Rope (3 Metres long Rope)
- Three pulley systems.
- 500g mass load force meter. (Newton Meter)
- Clamp, Boss, Retort Stand.
- Loop and Weights.

Safety Points

The first thing that you must always be concerned about should be the safety of yourself and people around you. Safety should always be looked at seriously as this could alter the results and the test could turn unequal and unfair.

You must always be concerned about Safety as this could always make the test more equal and Fair.

Make sure that you put a pad underneath the pulleys in case they drop.

A tension should always be readily available on the strings so that the whole pulley system does not collapse.

Counter Balancing Masses could be an effective way to improve rather than a Newton Meter (optional).

Method

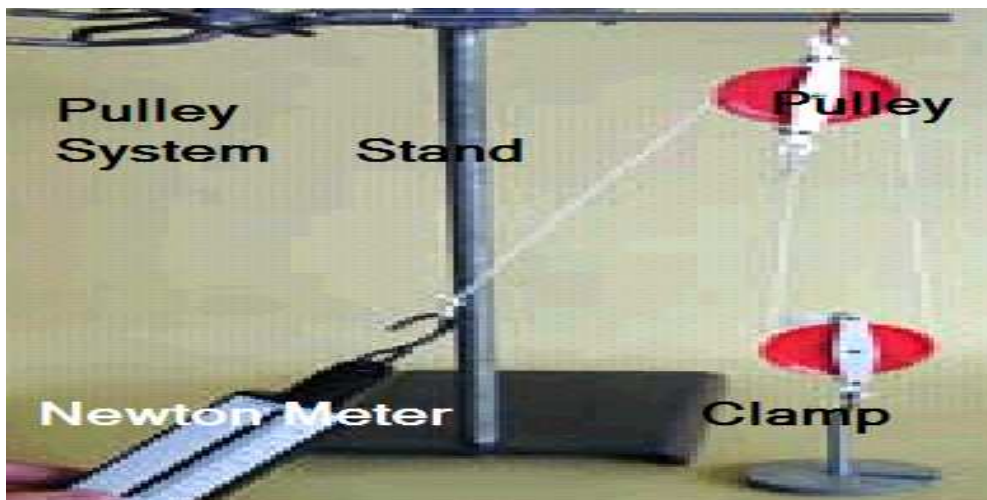
- 1) The pulley must be firstly fixed together with a loop to a retort stand.
- 2) A string which has looped ends is then placed on top of the pulley
- 3) Weights can then be attached to one end of the string using its loop. A Newton Meter is then attached to the other side of the string.
- 4) By pulling down the Newton Meter you are able to raise the weight which sets the height and the effort is recorded on the Newton Meter.
- 5) You can now attach more pulleys and compare the force required to raise the weights. I have observed that you will not get the required result if you skip weight increasing from one number to another. You must go up step by step to see the trend. This is so that you can take real measurements and make observations correctly.
- 6) Adaptations - To help make the experiment more efficient, the stand was were unstable; I got a friend to hold down the experiment whilst i was pulling the Newton meter.

May I also mention that standard procedure may be different to the procedures which conclude in a Science Based Service.

Science Based Services have much more detailed and quality instructions as well as equipment which give much more accurate readings. These accurate data include materials such as a digital Newton Meter which gives you an accurate reading to three decimal places.

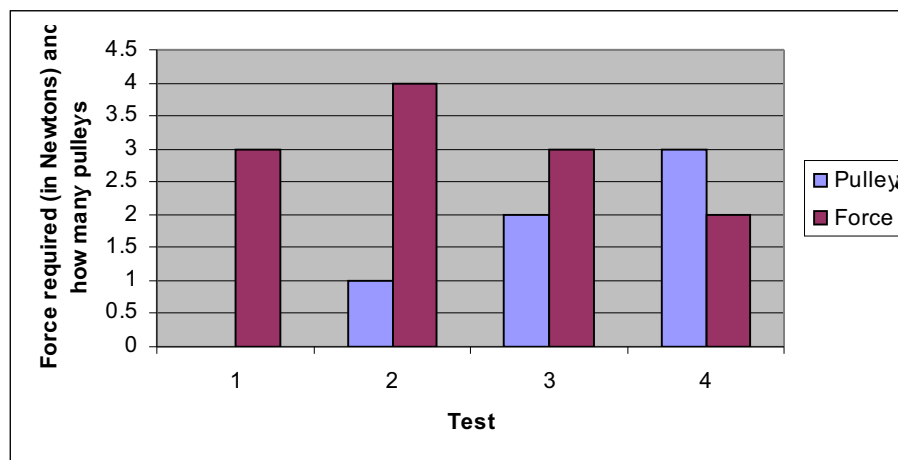
A Service which uses this equipment includes a building company which has to pick up a lot of weight.

Diagram



Result

Test	Number of Pulley Systems	Force Needed to lift 500g load off the floor
1	0	3N
2	1	4N
3	2	3N
4	3	2N



A surprising result has been achieved. The trend is very unusual. I have seen that the more the pulley is added the less force is required. But through observation i can see that without a pulley at all is better that has 1 pulley or 3 pulleys.

The device is not very good as it was very unstable and people had to be aware of it. It was probably able to fall but did not due to the care that was taken.

The performance of the system as a whole has not really attracted me. This is because the machine we used was insecure and unsafe to use. The first three tests were also very bad as they were better of not to be done. We contained results which were very unexpected. If you were to add more pulleys the machine would get too complicated and may also not be able to handle it. As you know i had wished to add more pulleys but there were not any more to go around in the class.

Conclusion

I found out as the number of pulleys increased from 1 to 3 the amount of force needed to lift goes down.

Evaluation

I could improve my experiment if I repeat the test a few times to cancel any human errors such as wrong measurements which may occur during the measurement of the rope. Other measurements such as the weights may have been misunderstood due to their sizes which will vary accordingly. We also required adding more pulleys to get a more accurate result as more pulleys would have given us a more appropriate result.

In the Industry

In a laboratory you would use a pulley system simply to get the over all picture. It would be very small machine and the results taken would not be accurate.

In a real world industry people have to move very large heavy items and materials. In an industry there are special separate companies which have the business of just moving items with huge pulley like machines. They take accurate reading of all there uses and determine through past experience of how much weight will be picked up and take on a job with the appropriate amount of pulleys. They have also got more stable and secure equipment which is checked regularly. The difference is our equipment is low graded and has not been specified for any specific weight criteria like there. We are also taking experiments before any real work can be taken up. But they have already got all the information required and choose there machine depending on the weight intended.

Pulleys are found usually on cranes which help pick loads vertically but they use ropes, wires and chains!