Pulley And String Balance

28. Mtandi Day

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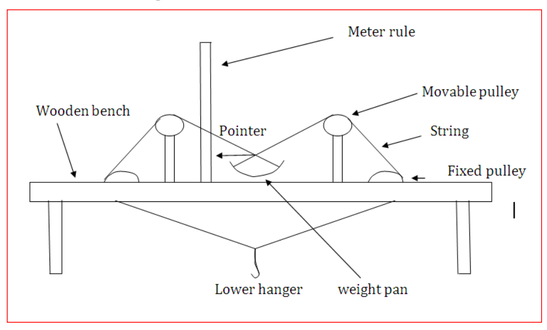
Introduction:
The project is concerned with design of a STRING AND PULLEY BALANCE. The aim of this instrument is measure mass of objects with the help of the string.

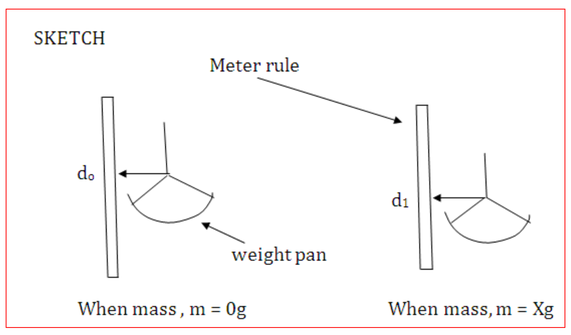
This instrument can be able to measure the mass by balancing it with already known standard mass, and also measures mass depending on the established scale. STRING AND PULLEY BALANCE consists of the following parts
Wooden bench that supports the whole system.
Four pulleys of which the lower two are fixed, and the upper two are movable.
A non – stretchable string which rolls over the pulleys
A weight pan, pointer, meter rule and lower hanger

Materials:
The wide part of material used in this project of designing “String and pulley balance” consists of local materials. The whole coverage of materials are used as follows;
Woods
String (non – stretchable)
Plastic materials
Axles, bearings
Standard masses
Nails
Meter rule

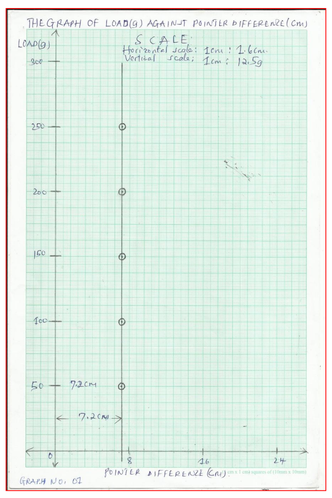


Methods:
In order for a “string and pulley balance” to work as it is desired, two different methods have been used when finding ideas on how a device can measure the masses of objects The methods involve a conduct of experiments by using the same device in order to come out with knowledge on how;
•To measure the mass by balancing with known one
•To measure mass depending on established scale.

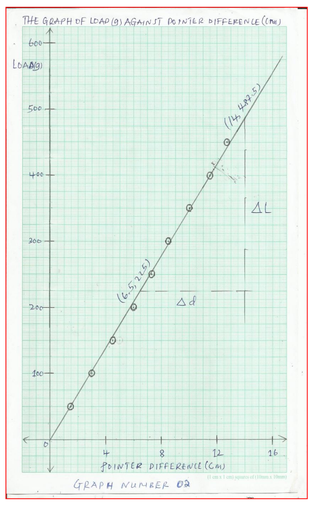
EXPERIMENT NO 1.
AIM: To investigate the effect of balanced masses on the pointer Difference using string and pulley balance.



Results:



Exp 1



Exp 2

MASS (g)	POINTER DIFFERENCE (d) IN cm					
	d_1	d_2	d_3	d_4	d_5	Average d
50	6.60	7.30	7.20	7.10	7.80	7.20
100	6.90	7.50	7.40	7.30	6.90	7.21
150	7.00	7.10	7.80	7.20	6.60	7.14
200	7.30	7.10	7.20	7.30	7.40	7.26
250	7.40	7.30	7.10	7.20	7.10	7.200

From the graph:

Slope (m) = $\frac{\triangle L}{\triangle d} = \frac{L_2 - L_1}{d_2 - d_1} = \frac{(487.5 - 225)g}{(14 - 6.5)cm}$
= 35g/1cm.

Hence,

Slope = 35g/1cm

Conclusions:
To sum up the observation it has been verified that;
Measurement of mass by balancing with already known mass bring about un changed pointer difference.
Experimentally shown that, d = 7.2cm.
Measurement of mass by using an established scale depends on the fact that mass on the weight pan varies directly with pointer difference with a constant slope of 35g 1cm
These results are significant in the following senses;
That it provide a clear knowledge on how a “string and pulley balance” can be used in measurement of mass.
That the string is cheap and easily available hence results in device being easily affordable.
Our research can be related to that of verification of **Hooke’s law**. However, the big **Difference** is that a non – stretchable string and pulley have been used instead of spiral spring.
Therefore , we relates mass versus pointer difference resulted by opposing masses instead of extension

References:
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Holt physics by; Raymond A. Ser way (North Carolina state university)
Jerry S. Faughn (Eastern Kentucky university)
A – level physics by; Roger Muncaster
Basic Mathematics Form 3 (OXFORD USAID)

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