

WAIT A MOMENT – I DON'T GET THIS!

An Experiment Demonstrating the Moment of a Force

Here is an experiment you should try so you really get a good understanding of moments acting on structures, and how they are different from the forces themselves:

a) Hold a meter stick with both hands, at one end; hold it out slightly in front of your stomach, parallel to the floor. Get a partner to take a spring scale connected to a loop of string, and apply a force of 5N at the 40 cm mark. Your job is to hold the meter stick level at all times. Now have your partner increase the load by 5N at a time, until you cannot hold the meter stick up straight anymore. What did you notice about the amount of turning force that your arms and wrist muscles had to apply to the stick to keep it up? Why did this happen?

Now have your partner apply a 5N force at the 10 cm mark. Then have them move the 5N load further away from the persons hands – move it to 20 cm, and keep moving it out , 10 cm at a time, until you get to 100 cm, all the while keeping the applied force at 5N. What did you notice about the amount of turning force that your arms and wrist muscles had to apply to the stick to keep it up? How could this happen when the force applied to the ruler never changed?

Repeat both these experiments with your arms extended, holding the meter stick straight out in front of your body. Was it easier or more difficult to hold the meter stick level in this position? Why?