

### ANSWERS

Level 1:

$$k = 400,000 \text{ N/m}$$

$$x = 0.3 \text{ m}$$

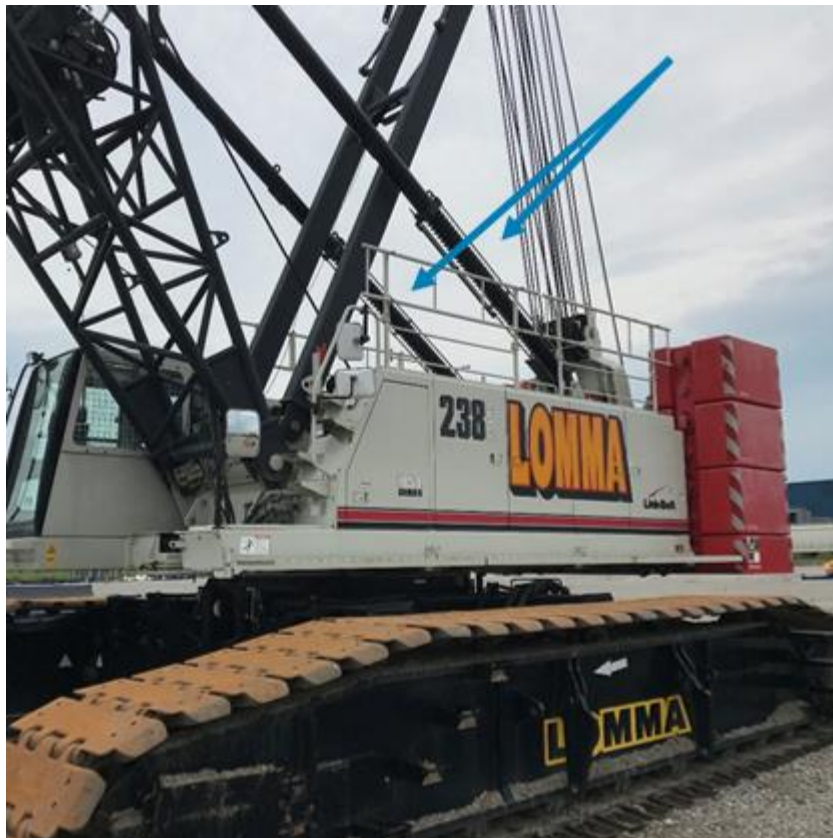
$$\text{Hooke's Law: } F = -k * x$$

$$F = -\left(400,000 \frac{\text{N}}{\text{m}}\right) * 0.3 \text{ m}$$

$$F = -120,000 \text{ N}$$

The force of the spring is 120,000 Newtons in the negative direction.

If you increase the spring constant, the force will increase, and it will stay in the negative direction.



Two springs can be seen coming off this crane found in OE's laydown yard!

Level 2:

$$k = 100,000 \frac{N}{m}$$

$$x = 0.005 m$$

$$m = 20 kg$$

$$\text{Hooke's Law: } F = -k * x$$

$$F = -100,000 \frac{N}{m} * 0.005 m$$

$$F = -500 N$$

The spring has a force of 500 Newtons on the block.

$$F = m * a$$

$$-500 N = 20 kg * a$$

$$-500 \frac{kg * m}{s^2} = 20 kg * a$$

$$a = \frac{-500 \frac{kg * m}{s^2}}{20 kg}$$

$$a = -25 \frac{m}{s^2}$$

The block will accelerate at  $25 \frac{m}{s^2}$  away from the wall.