

**QUESTION:**

A machine operates with a power of 1500 Watts. the machine lifts one steel beam, of 500 N, vertically upward 15 meters. How long does it take for the machine to lift 20 beams

**SOLUTION:**

The power of the machine is

$$P = \frac{A}{t}$$

According to the work-energy theorem:

$$A = mgh \text{ (for one beam)}$$

$$mg = 500 \text{ N}$$

Hence,

$$P = \frac{A}{t} = \frac{mg \cdot h}{t}$$

$$t = \frac{mg \cdot h}{A}$$

$$t = \frac{500 \cdot 15}{1500} = 5 \text{ s}$$

So, it takes

$$t_1 = 20t$$

$$t_1 = 20 \cdot 5 = 100 \text{ s}$$

to lift 20 beams

**ANSWER:**

$$t_1 = 100 \text{ s}$$