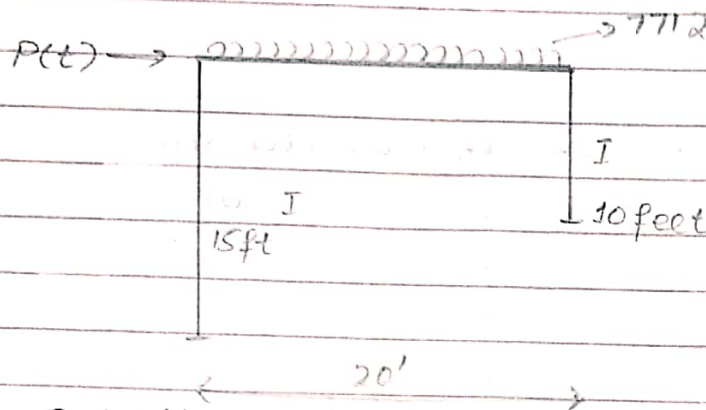


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Q # 2

Ans:



Equation of Motion (EOM)

General Form of EOM

$$m\ddot{u} + c\dot{u} + ku = P(t)$$

$$\text{As } \sum f_x = m\ddot{u}$$

$$P(t) - f_{s1} - f_{s2} = m\ddot{u}$$

$$m\ddot{u} + f_{s1} + f_{s2} = P(t) \quad \text{--- (A)}$$

$$f_{s1} = \frac{12EI}{L^3} = \frac{12EI}{15^3} \quad \text{--- (1)}$$

$$f_{s2} = \frac{12EI}{L^3} = \frac{12EI}{10^3} \quad \text{--- (2)}$$

$$m = \frac{7712 \times 20}{32.2} = \frac{7712 \times 20}{32.2} = 4790 \text{ kg} \quad \text{--- (3)}$$

Put eq. (1), (2) & (3) in A

$$4790\ddot{u} + 12EI \left[ \frac{1}{15^3} + \frac{1}{10^3} \right] u = P(t)$$

$$\boxed{4790\ddot{u} + (0.0156EI)u = P(t)} \quad \text{Required Equation}$$

Q#1

Ans: In figure no1 the building is collapsed due to soft story effect. And it is due to change in stiffness of lower story than the rest of stories. The more the stiff the more it takes load.

→ In figure no2 the configuration is not good because that there are alot of corners or alot of structure members attached so there should be building separator joint

→ In figure no3 it has the same case of figure no2 it also have reentrain corners which is critical during earth quake and also the columns are shortened due to the presence of wall which has made it more stiffer thus it take more load and hence collapse

Solutions for these problems: Reentrant corner should not be present in a building, a building should be modelled as rectangular and square arrangements all columns should be continued from bottom to top or vice versa and stiffness of all stories should be equal to minimize soft story effect.

The end.