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SUBJECT :

INTR TO STRUCTURAL DYNAMIC & Earth Quake

TEACHER :

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SECTION :

B

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QUESTION # 01

FIGURE # 01

→ In figure 1 the type of Configuration is DISCONTINUOUS SHEAR WALL.

→ If there is not a Continuous load path through the walls from roof to foundation, the results can be Serious Overstressing at the point of discontinuity. This discontinuous shear wall condition represent a special, but common Case of the "soft" first-story problem. The purpose of the shear wall is to collect diaphragm loads at each floor and transmit them as directly and efficiently as possible to the foundation.

SOLUTION :

→ The Solution to

the problem is to provide a shear wall where it is required.

→ if the decision is made to use shear wall, then their presence must be recognized from the beging of schematic design, and their size and location made the subject of careful architectural and engineering coordination early.

FIGURE # 02

→ In figure 02 the type of configuration is SOFT STOREY EFFECT

→ The most prominent of the problems caused by severe stress concentration is that of soft story. The term has commonly been applied to building whose ground-level story is very less stiff than those above.

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SOLUTION :

→ The Solution of Soft Story building are.

1. TO Provide more Columns.
2. Addition of bracing
3. Addition of External Buttreses.

FIGURE # 03

→ In figure 03 the type of Configuration is Re-entrant Corners.

→ There are two problems Created by These shapes :

→ Firstly they tend to produce differential motion between different wings of the building, because stiff elements that tend to be located in this region results in local stress concent-ration at the re-entrant

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Corner.

→ The Second problem of this form is torsion which caused because of the center of mass and the corner of rigidity in This form can-not geometrically Coincide for all Coincide for all possible earthquake directions. The Result is rotation.

SOLUTION:

→ There are two basic alternative approches to the problem of re entrant corner forms: Structurally to Separate the building into Simpler shapes, or to tie the building together more Strongly with element positioned to provide a more balanced resistance.

→ The latter Solution applies Only to Smaller buildings.

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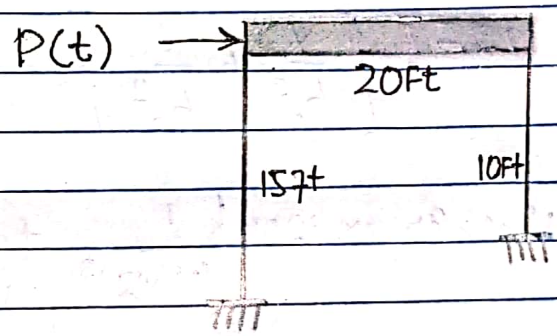
QUESTION # 02



GIVEN DATA :

$E = 29{,}000$ ksi

Load, $W = 7700$ lb/ft

Length, $L = 20$ ft

gravitational force, $g = 32.2$ ft/sec^2

$I = 1200$ in^4

REQUIRED :

Develop Equation of Motion.

SOLUTION :

As we know from D-Alembert's principal of dynamic Equilibrium

$$P(t) = ku + m\ddot{u} \rightarrow (1)$$

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first we will find K.

As

$$K_{eq} = k_1 + k_2$$

$$K = 12EI\left[\frac{1}{h_1^3} + \frac{1}{h_2^3}\right]$$

$$K = 12 \times 29000 \times 1200 \left| \frac{1}{(15 \times 12)^3} + \frac{1}{(10 \times 12)^3} \right|$$

$$K = 313.29 \text{ k/in}$$

$$\boxed{K = 3759 \text{ k/ft.}}$$

Now

$$M = \frac{W}{g} = \frac{7.70 \times 20}{32.2}$$

$$m = 4.782 \text{ k sec}^2/\text{ft.}$$

$$\boxed{m = 4782 \text{ lb sec}^2/\text{ft}}$$

Using D-Alemberts principal.

Babar Paper Product

Checked By:.................Parents:.................Excellent ☐ Good ☐ Need Improvement

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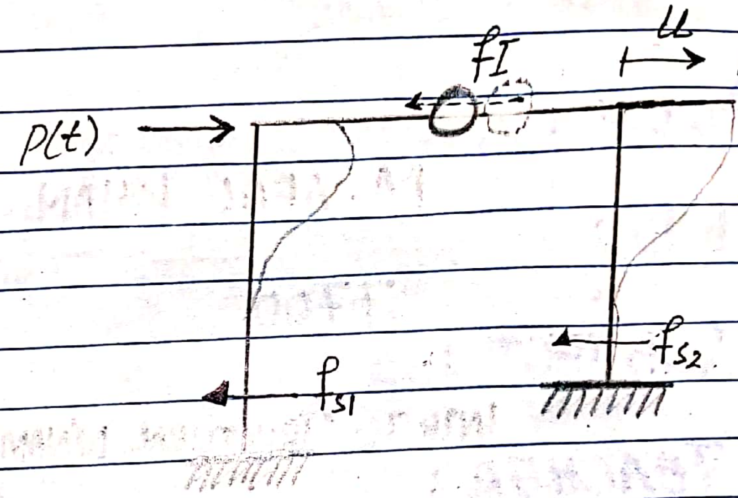

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$p(t) - f_{s1} - f_{s2} - f_I = 0$

$p(t) - m\ddot{u} - (f_{s1} + f_{s2}) = 0$

$p(t) = (k_1 u + k_2 u) + m\ddot{u}$

$p(t) = (ku) + m\ddot{u}$

Now puting the values.

$p(t) = 3759 \times 10^6 u + 4782\ddot{u}$