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Sec A

Subject Introduction to Structural Dynamics and Earthquack Engineering.

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Q1=

Ans= Figure 1

In figure one the problem occurs due to non continuous load path through the walls from roof to foundation. it is very dangerous case and very main issue by overstressing at the point of discontinuity.

The discontinuity shear wall condition represents a special but common case of the soft first story problem.

The purpose of shear wall is to collect all loads of each floor and transmit it to foundation very efficiently. due to presence of shear wall

the structure will be stable at a time of earth quack and other dynamic forces.

Sollution

If we want to use shear wall then their presence must be recognized from the begining of schematic design and their size and location made the subject of careful architectural and engineering coordination early.

Q = 1.

Ans 1 Figure 2

In figure 2 the problem is due to less stiff of ground story. the ground level story is less stiff than above. The building codes differentiate between soft and weak stories. Soft stories are less stiff the the story above. A weak story at any height creates a problem but since the comulative loads are greatest towards the base of the building.

The problem will be due to discontinuty between the first

and second floor. it will result to very dangerous result.

Sollution:-

soft story effect can be usually reduced by adding new columns, braces and external buttresses in a structure. due to these addition the structure will be more stable. due to these addition soft story will be neglected. soft story usually causes drift in a structure which is dangerous and will be controlled by addition of these column, bracing and external buttresses.

Q1 Figure 3

Ans

A building seismic behavior is strongly influenced by the nature of the perimeter design. There are two main problem created by these shapes.

The first is that they tend to produce differential created motions between different wings of building that because of stiff elements that tend to be located in this region result in local stress concentration at the reentrant corner.

The second problem is torsion. it is due to centre of mass and centre of rigidity. in this

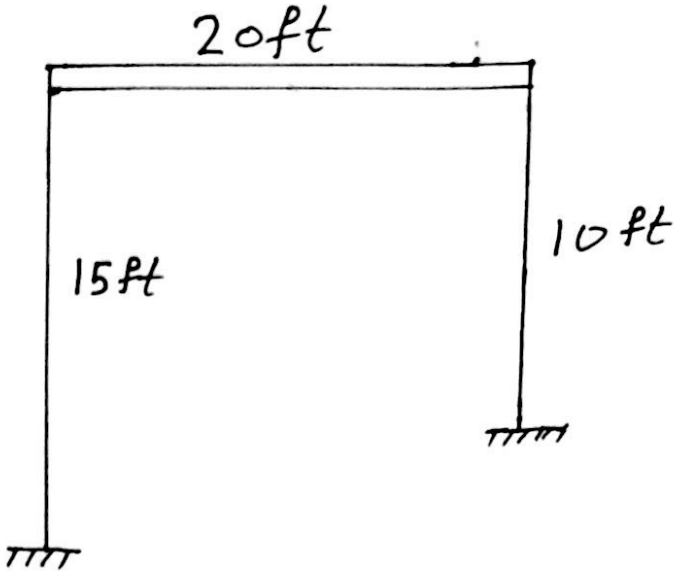
Form cannot geometrically concide for all possible earthquack directions. The result will be rotation.

Sollution:-

There are two different sollution of this problem. the problem can be solved if structurally to seperate the buildings into simpler shape.

The second sollution is if we tie the building together more strongly with elements to provide a more balanced resistance.

Q2:



$E = 29000$ ksi

$I = 1200$ in^4

Load $= 7756$ lb/ft^2

Sollution:

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

we know that

$$k = 12EI \left| \frac{1}{(15 \times 12)^2} + \frac{1}{(10 \times 12)^2} \right|$$

$k = 313.29$ k/in

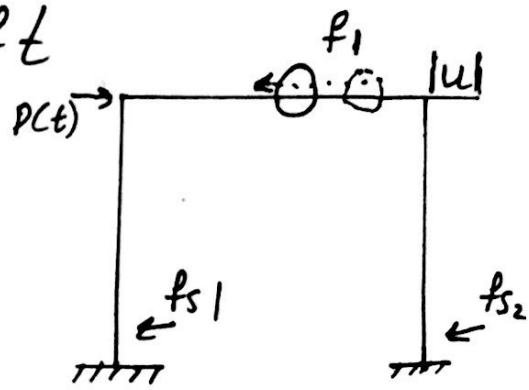
$k = 3759$ k/ft

$$m = w/g$$

$$m = \frac{7.756 \times 20}{32.2 \text{ ft/sec}^2}$$

$$m = 4.817 \text{ k sec}^2/\text{ft}$$

$$m = 4817 \text{ lb sec}^2/\text{ft}$$



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

Now putting values.

$$\boxed{P(t) = 4817\,\ddot{u} + 3.759 \times 10^6}$$

So it is equation of motion.