EARTHQUAKE ENGINEERING

NAME : JUNAID AHMAD

ID : 6872

SECTION : B

SUBMITTED TO : Engr; YASEEN

Ans:01 Part No (a)

Figure:01

- Shows Discontineous shear walls.
- If Seismic occur and there is not a continuous load path through which load Transfer from roof To foundation Safely.
- Thus the result can be Serious over Stressing at point of discontinous.
- Due To above Situation structure can be demage and collapse at critical point of structure.

"Solution":

- The solution to the problem of discontinous shear wall is to eliminate the shear wall.

If the decision is made to use sheear wall then their pressure must be recognized from the begining of schematic design. and their size and location made the subject of careful architectural and engineering coordination early.

Part No (b)

Figure ;02

Shows a Soft Story effect and Stifness of top story is more as compared to first one.

Performance ;

The most prominent of the problems coused by Several stress concentration is that of Soft Story. The Term has commonly been applied To building where ground level story is less ~~Stiff~~ Stiff than above.

- The building code distinguishes between "Soft" and "weak" stories Soft stories are less stiff or more flexible then the above weak stories have less strength.
- A Soft story or weak story at any height creates a problem. But since the comulative load are greater towards the base of building.
A discontinous between first and second floor tends to result in the most serious condition.

Possible Solution:

The solution of this type of problem in structure to add the following structural elements.

"i" Add more column
"ii" Add bracing
"iii" Add external butresses.

Part No 10 (c)

Figure : 03

The "figure 3" have reinterant corners have more stress concentration at these corners and therefore, structure will fail through Twisting.

Problem : There are two problems created by these type of shapes.

- They tend to produce differential motions between different wings of the building that of stiff elements. That tend to be located in this region result in local stress concentration at the re-entrant corners.
- The second problem of this form is torsion which is caused because the center of mass and the center of rigidity in this form cannot be geometrical, conside for possible earthquake directions, result to rotation.

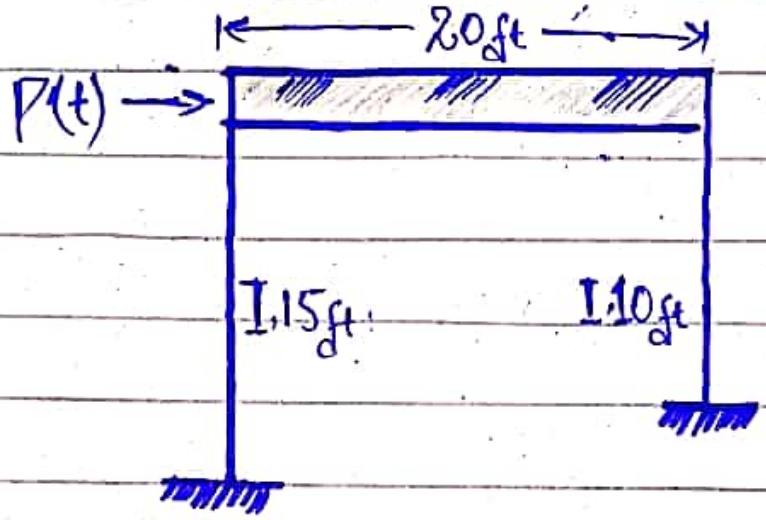
Thus the resulting forces are very difficult to analyze and predict.

Solution; There are ~~three~~ Solution of this problem, given as;

- To provide Tie the building will be Together more strongly, with elements, positioned to provide a more balanced resistance.
  This solution is only apply to Smaller buildings.
- The use of Splayed rather than the right angle, re-entrant corner Lesser the Stress Consentration.

~~Analogus~~ :

Ans:02 Equation of motion for a frame under lateral dynamic force.



As we know; $E = 29000$ ksi

$I = 1200$ in^4

Let; $L = 6872$ lb/ft^2

Solution;

As; $K = K_1 + K_2$ —

$$K = 12EI\left[\frac{1}{(15\times12)^2} + \frac{1}{(10\times12)^2}\right]$$

$K = 313.29$ k/in

OR

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

Mass;

As; $m = \frac{w}{g} = \frac{6.872 \times 20}{32.2 \text{ ft/sec}^2}$

$m = 4.268 \text{ k.sec}^2/\text{ft}$

Slug → $\boxed{m = 4268 \text{ lb.sec}^2/\text{ft}}$

$\boxed{w = 6872 \text{ lb/ft}}$

Using D-Alembert's principle of dynamic equilibrium:

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

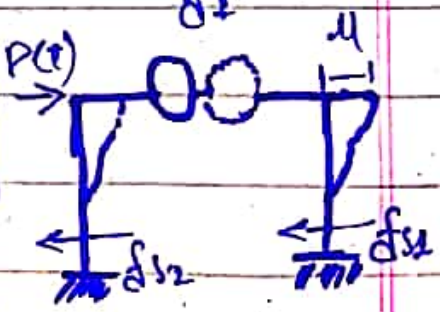
$P(t) - m\ddot{u} - (f_{s1} + f_{s2}) = 0$

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

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

As; By putting values.

$\boxed{P(t) = 4268\ddot{u} + 3759u}$



Where u and p(t) are in "ft" and "lb" respectively.