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SECTION B

SUBJECT INTRODUCTION TO STRUCTURAL DYNAMICS AND EARTH ENGINERING

SUBMITED TO. ENGR. YASEEN

DEPT B.S CIVIL.

SEMESTER 8TH.

Q1

Ans

Figure-1.

Configuration Codition

→ Soft and weak Stories

Effect on Siesmic Performance of a Structure

→ A Soft or Weak Story at any height Creates a Problem, but Since the comulative loads are greatest towards the base of the building a discontinuity between the first and Second floor tends to result in the most Serious Condition.

Solution.

Add columns.

Add bracing.

Add external buttresses

→ figure 2

Configuration Condition

→ Discontinous Shear walls.

Effect of Seisemic Performance of a Structure

• when Shear wall from the main lateral resistant elecment of a structure and There is not a continouse load Path Throngh the wall from roof to foundation The result can be Serious overstressing at the Point of discontinuity.

The discontinous Shear wall Condition represent a Speeial, but Common case of the Soft First-Story Problem.

→ Solution - Avoid discontinous Shear walls.

→ The Solution to the Problem of the discontinous Shear wall is to eleminate The Shear walls.

→ If the dicision is made to use shear walls then thier presence must be recognized from the beginig of schematic design, and thier size and location made the subject of careful architectural and engineering coordination early.

Figure 3.

Configuration Condition

Re-entrant Corners.

Effect on Siesmic Performance of a to Structures.

→ There are two Problem Created by these two shapes

The first is that that tend to Produce differential motion Between wings of the building that's because of Stiff element that tend to be located in this region result is local Stresses Concentration of the re-entrant corner

→ The Second Problem of this form is torsion which is Caused because the Center of mass & the Center of rigidity is this form cannot Geometrically Coincide for all Possible earthquake direction. The result is rotation. The resulting forces are very difficult to analyze and Predict.

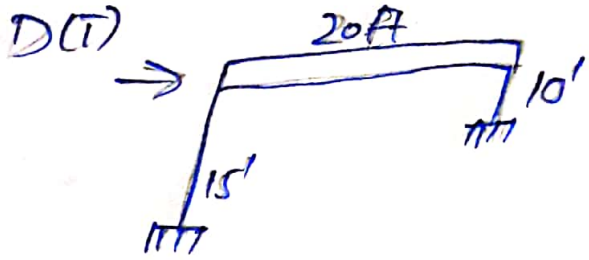
⇒ Solution

There are two basic alternative approaches to the Problem of re-entrant corner form Structurally to Separate the building into Simplex Shapes or to tie the building together More Strongly with elements Positioned to Provide a more balanced resistance. The letter Solution applies only to Smaller building.

The Use of Splayed rather Than right angle re-entrant Corner lessens the Stress Concentration.

The is analogous to the way a tapered beam is Structurally more desirable Than a abruptly notched one.

Q2 Equation of Motion for a Frame under lateral Dynamic force.




$E = 29000 \text{ k/s}^2$

$I = 1200 \text{ in}$

load $7852 \text{ lb/ft}^2$

Sol = $k = k_1 + k_2$

$$k = 12EI \left| \frac{1}{(15\times12)^2} + \frac{1}{(10\times12)^2} \right|$$

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

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

$$m = w/g = \frac{7.752 \times 20}{32.2 \text{ ft/sec}^2}$$

$m = 4.814 \text{ k sec}^2/\text{ft}$

$m = 4814 \text{ lb} \sec^2/\text{ft}$

$P(t) = kv + mv$

Put values.

$$P(t) = 4814 + 3759 \times 10^6$$