NAME : HAMAD

Reg No : 7747

SECTION : "B"

SUBJECT : Earthquake Engr

DEPT : Civil ENGR

SEMESTER : 8th

EXAM : Mid TERM

INSTRUCTOR : Engr Yaseen

QUESTION NO : 1
ANSWER

Figure : 1

When shear walls form the main lateral resistance elements of a structure, and there is not a continuous load path through the walls from roof to foundation, the result can be serious ~~overstan~~ overstresing at the point of discontinuity. This dislontinuity shear wall condition represents a special, but common, case of the "soft" first story problem.

The purpose of shear wall is to called digram loads at each floor and transmit the

load directly and efficiently as possible to the foundation to interrupt this load path is unde-sirable.

Possible Solution :-

The solution of the discontinuious shear wall is to eliminate the shear walls.

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

Figure : 2

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

The building code distinguishes between "soft" and "weak" stories. Soft stories are less stiff, or more flexible, than the story above; weak stories have less strength.

Possible Solution :

Add Column :

We will add column to prevent the softening of the ground level.

Add Buttresses :

A buttress is a structure built to support a reinforce the height of a wall.

Buttresses counteract lateral force to prevent a wall pushing against it. transfer the force to ground. It can be built close to an exterior wall or built away from a wall.

Add Bracing :

Bracing is a system utilized reinforce building structure in which diagonal support interest

Bracing is important in earthquick resistance building, because it helps keep a structure standing.

Figure : 3

There are two problem created by these shapes. first is they tend to produce differential motion between different wings of the building. because of stiff elements that tends to be locate in this region. Result in stress concentration at the re-entrant corner.

The second problem is torsion which is caused because the centre of mass &

the centre of rigidity in this form cannot geometrically coincide for an possible earth -quake directions the result is rotation. The resulting force are very difficult to analyze & predict.

Possible Solution :.

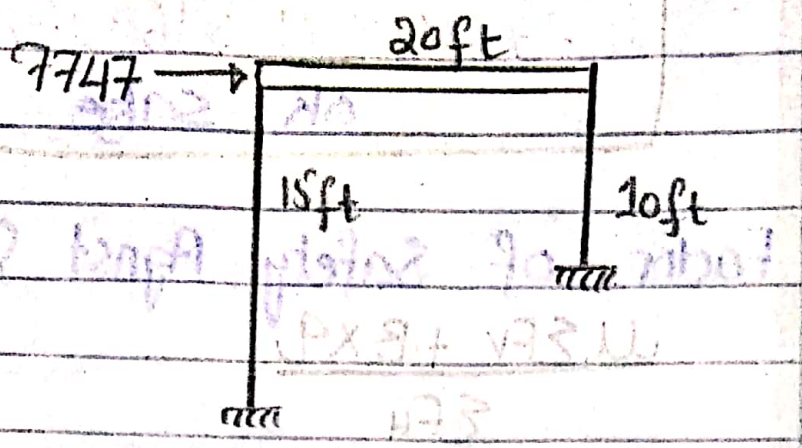
There are two basic solution or alternative approaches to the problem of reentrant - corner form: Structurally to separate the building into simpler shapes, or to tie the building together more strongly with elements positioned to provide a more balanced resistance. (see The latter solution applies only to smaller buildings.

In Case of separation building must be sufficient-ly away to ensure they do not pound together and damages each other in an earthquake.

The use of splayed rather than right angle re-entract corner lessen the stress concentration.

Question No : 2

ANSWER



Given data :

$$E = 29000 \text{ ksi}$$

$$I = 1200 \text{ in}^4$$

$$L = 7747 \text{ lb/ft}^2$$

Solution :

We known that

$$K_{eq} = K_1 + K_2$$

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

$$K = 12(29000)(1200)\left[\frac{1}{(15\times12)^2} + \frac{1}{(10\times12)^2}\right]$$

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

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

We know that

$$m = w/g$$

$$m = \frac{7.747 \times 20}{32.2 \text{ ft/sec}^2}$$

$$m = 4.80 \text{ k sec}^2/\text{ft}$$

$$m = 4800 \text{ lb sec}^2/\text{ft}$$

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

Put value

$$\boxed{P_t = 4800\ddot{u} + 3.759 \times 10^6}$$