Syed Jawad

7386

Introduction To Structure & Dynamics

Q#1 Figure 1 (1)

AVOID DISCONTINUOUS SHEAR WALLS:-

If the shear walls are made the main lateral resistant elements of a structure, the load is not uniformly distributed from roof to the foundation over loading to ~~stream~~ streaming at the points of ~~discontinuity~~ dis-continuation makes the "soft" first story problem.

~~The Problem~~ Purpose of shear walls is to collect the load at each floor and transmit it directly to the foundation.

SOLUTIONS:-

(1) Discontinous shear walls is a problem and can be solved by eliminating the shear walls.

(2) Proper architechtural and engineering co-ordination and recognizing the schematic design should be initially done before take a decision to put shear walls.

Fig. 2

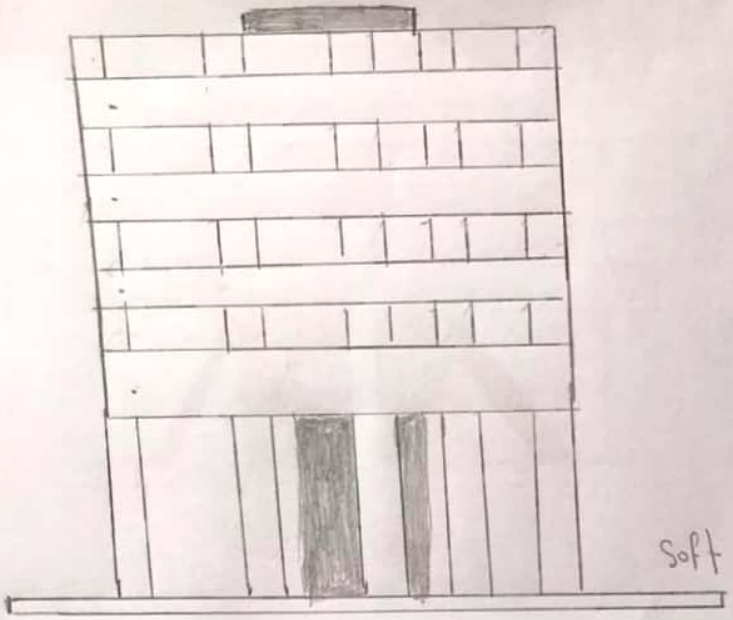
Soft And Weak Stories:-

(1) They are the most Prominant Problem as the ground level story is less stiff than those above.

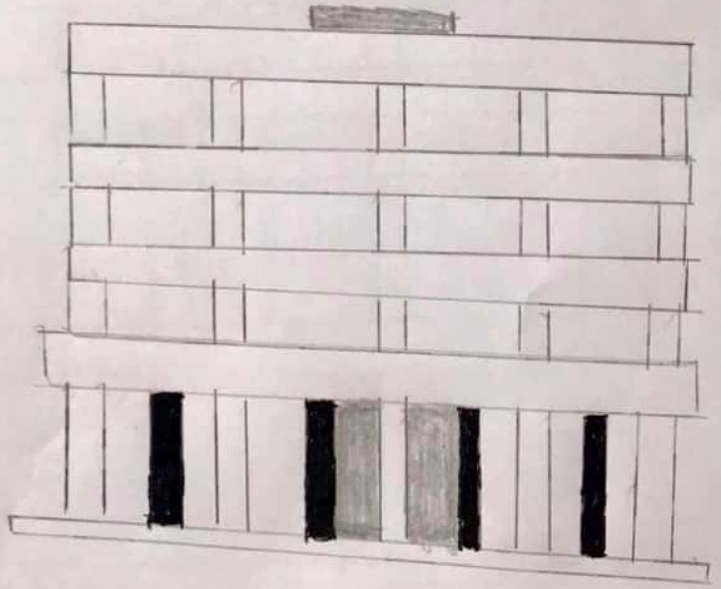
(2) The difference between soft and weak stories is that soft stories are less stiff and more flexible whereas, weak stories have less strength.

(3) Both Stories, create Problems but as the load is tend to be great towards the base of building. first and second floor causes a more Serious Condition.

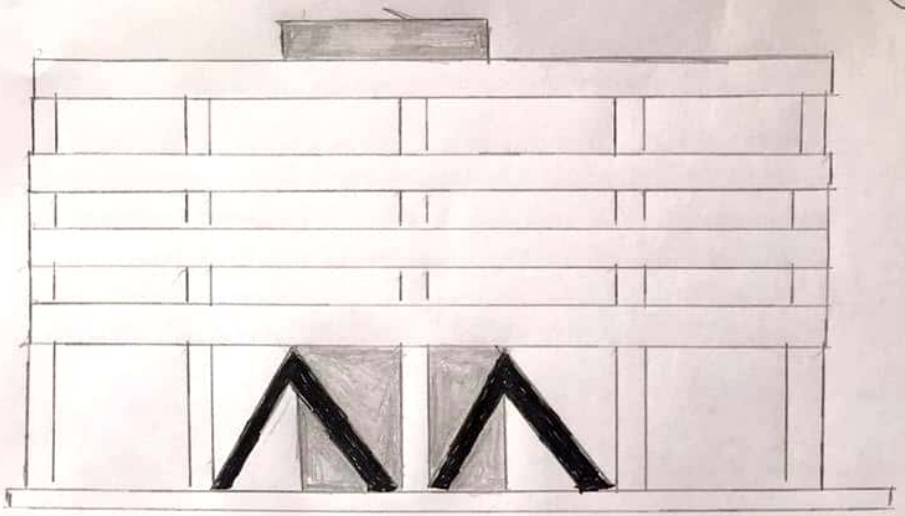
Solutions:-



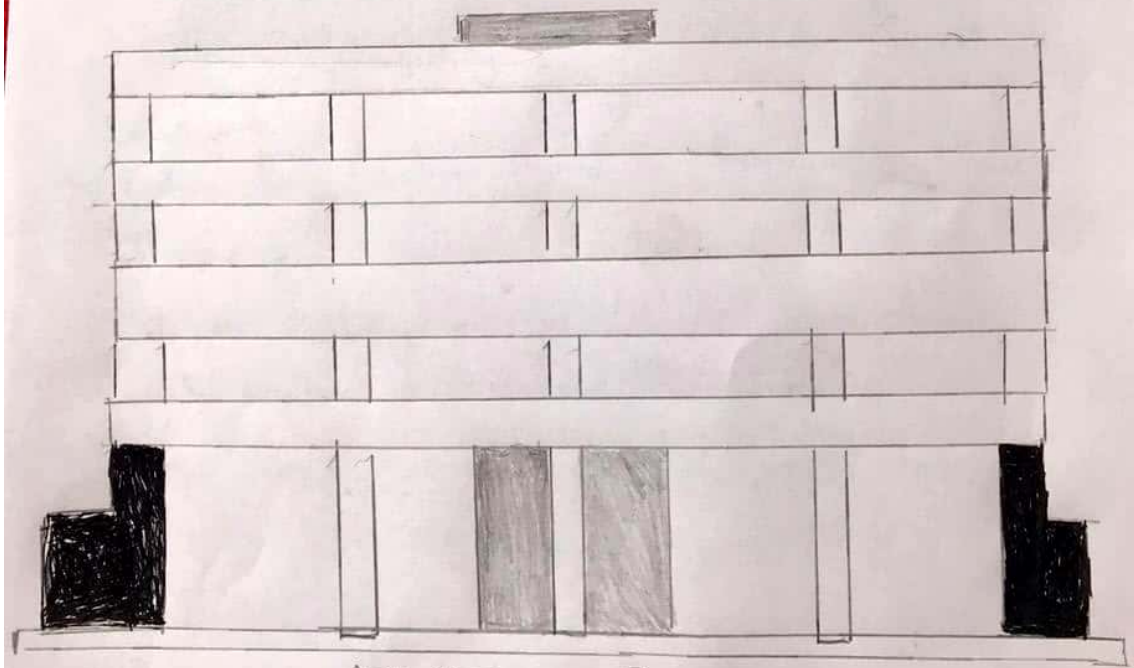
Soft Story.



ADD COLUMNS



ADD BRACING



ADD EXTERNAL BUTTRESSES

Fig. 3

. RE-ENTRANT CORNERS:-

when the buildings are formed in Shape L, T, H etc or a Combination, this is known re-entract Corners.

→ The first Problem with re-entract Corners is that they Cause different motion on different wings of a building leading to local stress Concentration at the re-entrant Corner.

→ The other Problem is torsion. The rotation or torsion is Caused by Earthquakes as the Centre of mass and Centre of rigidity or not Coincide Geometrically

Solutions:-

(1) Either the Structure should be Seperated in Similer Shapes.

(2) OR the building should be tied more strongly to Provide a balanced Resistance.

(3) Using splayed rather than Complete right angle Structure is also Preferable.

Solution:-

$$m = \frac{w}{g} = \frac{7386 \text{ lb/ft} \times 20 \text{ ft}}{32.2 \text{ ft/sec}^2}$$

$$m = 4587.57 \text{ lb sec}^2/\text{ft}.$$

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 $k = 3759$

$$4587.57\ddot{u} + 3.76 \times 10^6 u = P(t)$$