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Comparative Study of Unsymmetrical Buildings With And Without Dampers By Etabs

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Abstract – In everyday life, it is expected to consider the conduct of each multi-storyed structure subjected to ground movement which is regular issue for development. The seismic tremor makes the vibrating powers at the base of structure. Quake stack is changing into a magnificent worry in our nation because of not one zone might be chosen as seismic tremor safe zone. A standout amongst the most essential angles is to develop a building structure, which can oppose the seismic power effectively. The essential outlines for vertical and horizontal burdens i.e. wind and seismic are the same for low, medium or elevated structures. The vertical burdens increment in guide extent to the floor region and number of floors. In qualification to the current, the consequence of sidelong loads on a building isn't direct and increment rapidly with increment in stature. Because of these horizontal burdens, minutes on steel parts will be high. By giving thick dampers these minutes can be lessened. In the present examination, an unsymmetrical structures of Z Shape and T Shapes of G+20analyzed with and without dampers by utilizing ETABS V9.7.4. Unsymmetrical structures were investigated with the three diverse soil (high, medium and free) quality conditions. The examination made by considering Story Drift, Shear drive, Bending minute, Building torsion for between Buildings with and without dampers.

1. INTRODUCTION

Earth quakes are common marvels, which cause the ground to shake. The world's inside is hot and in a liquid state. As the magma rises to the top, it cools and new land is shaped. The grounds so framed need to constantly continue floating to enable new material to surface. As indicated by the hypothesis of plate tectonics, the whole surface of the earth can be thought to resemble a few plates, always moving. These plates brush against each other or crash at their limits offering ascend to seismic tremors. In this way locales near the plate limit are profoundly seismic and districts facilitate from the limits display less seismicity. Tremors may likewise be caused by different activities, for example, underground blasts. The investigation of why and where seismic tremors happen goes under geography.

Damping Effect on Structural Response

Damping expanding diminishes basic reaction (speeding up and uprooting) damping impact at low recurrence (near zero) have no impact on range sum and at high recurrence, it has low impact on reaction increasing speed. Figures 1 and 2 demonstrate the most impact of damping expanding in the recurrence of 0.3 to 2.5 seconds.

Friction Dampers

In this kind of damper, seismic vitality is spent in conquering grating in the contact surfaces. Among different highlights of these dampers can be named staying away from weakness in served loads(due to the non-dynamic dampers under load) and their execution autonomous to stacking speed and surrounding temperature. These dampers are introduced in parallel to propping Using rotational friction dampers in retrofitting

2. LITERATURE REVIEW

Shashank R. Bedekar1 Prof. Rakesh Shinde

This examination paper portrays the consequences of a broad investigation on the seismic conduct of structure under two quakes (Bhuj, and Koyna). In this work an endeavor is made to investigate skyscraper structure with the assistance of E-tab programming. This work has chosen Time History Analysis strategy. For investigation reason skyscraper structure with G+25 stories has been chosen. Time History of quakes at two spots (Bhuj, and Koyna) are utilized for examination of chose tall structure. Relative investigation is made between two chose places without and with arrangement of visco-versatile damper. In this work steady stacking parameters are utilized for the two cases, likewise same arrangement is utilized for different models of time history. Load mixes are taken from IS code.

Ravitheja et. al. in the present examination fortified solid minute opposing edge working of G+20 are considered. The building is thought to be situated in the

seismic zone (v) and expected for business reason. Demonstrate I Building without dampers, Model-II – Building with dampers. The working of G+20 has been demonstrated by furnishing with and without damper giving all parameters utilizing S A P 2 0 programming. Results demonstrate that utilizing liquid gooey dampers to building can viably diminish the building reactions by choosing ideal damping coefficient i.e. at the point when the building is associated with the liquid gooey dampers (FVD) can control the two relocations and increasing speeds of the building. Promote damper at suitable areas can essentially lessen the seismic tremor reaction.

3. METHODOLOGY

3.1 Response spectrum method

This examination is completed by the code IS 1893-2002 (part1). Here kind of soil, seismic zone factor ought to be entered from IS 1893-2002 (part1). The standard reaction spectra for sort of soil considered is connected to working for the investigation in ETABS 2013 programming. Following chart demonstrates the standard reaction range for medium soil compose and that can be given as day and age versus ghastly speeding up coefficient (Sa/g).

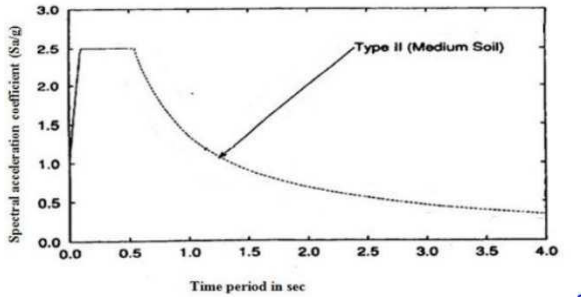


Figure 1. Response spectrum for medium soil type for 5% damping

In this we need to figure the size of powers every which way i.e. X, Y and Z and after that see the consequences for the building. Mix techniques incorporate the accompanying:

- absolute - crest esteems are included
- square base of the total of the squares (SRSS)
- complete quadratic mix (CQC) - a strategy that is a change on SRSS for firmly dispersed modes

3.2 Different types of loads acting on the structure

The types of loads following up on structures for structures and different structures can be comprehensively named vertical loads, flat loads and longitudinal loads. The vertical burdens comprise of dead loads, live load. The even loads contains wind load and quake load.

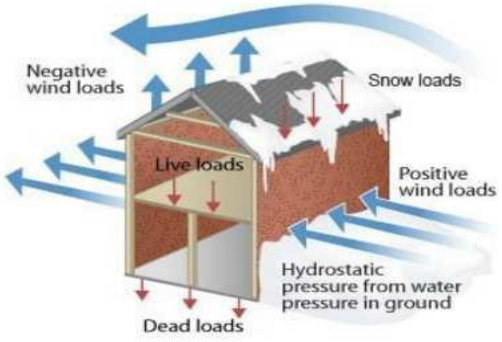


Figure 2. Loads acting on a building

4. MODELING OF BUILDING

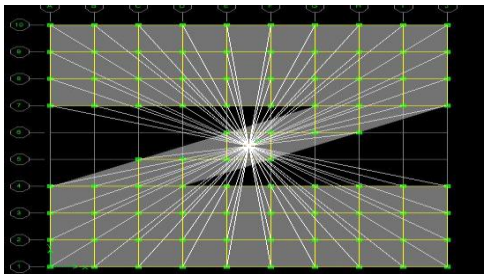
Types of loads acting on the structure are:
a) Dead loads
b) Imposed loads
c) Wind loads
d) Snow loads
e) Earthquake loads
f) Special loads

Problem statement
Basic parameters considered for the analysis are

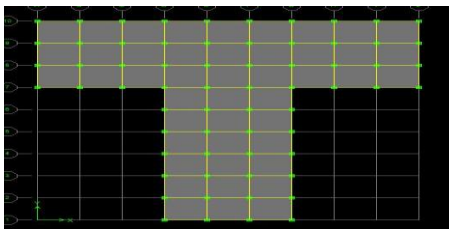
1. Utility of building : Residential building (Z Shape, T Shape)
2. Number of stories : G+5, G+7
3. Shape of building : Rectangular
4. Type of walls : Brick wall
5. Geometric details
   a. Ground floor : 3.3m
   b. floor to floor height : 3m
6. Material details
   a. Concrete Grade : M40 (COLUMNS AND BEAMS)
   b. All Steel Grades : HYSD reinforcement of Grade Fe415
   c. Bearing Capacity of Soil : 200 KN/m^2
7. Type Of Construction :R.C.C FRAMED structure
8. Column : 0.4m X 0.4m
9. Beams : 0.3m X 0.4m
10. Slab : 0.150m

4.1 Models In Etabs

Z Shape building



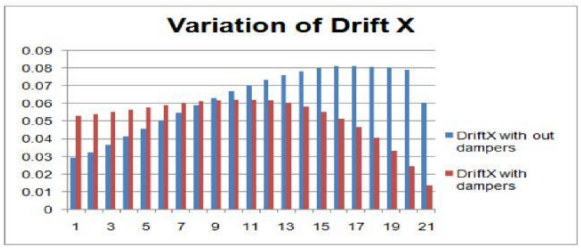
T Shape Building



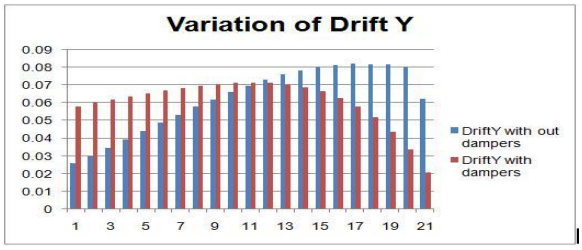
5. Results and

analysis T Shape –

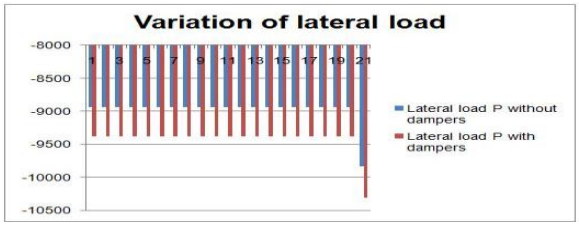
Loose soil Drift x



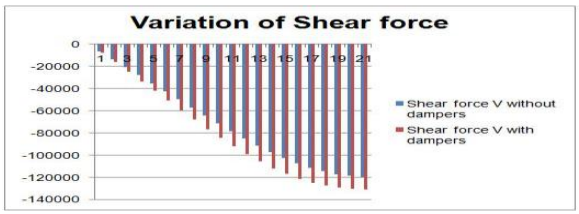
Drift Y



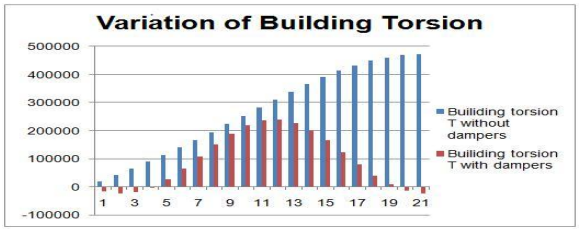
Lateral load (P)



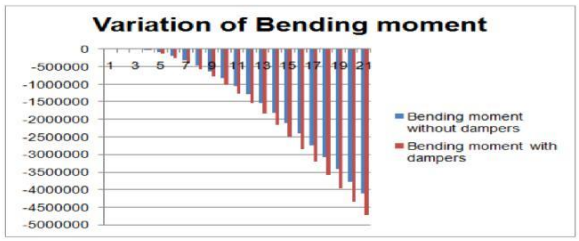
Shear force



Building Torsion

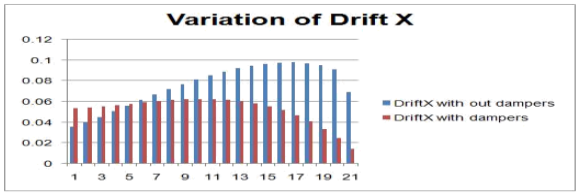


Bending moment

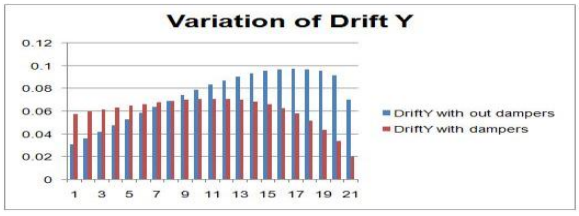


Medium soil

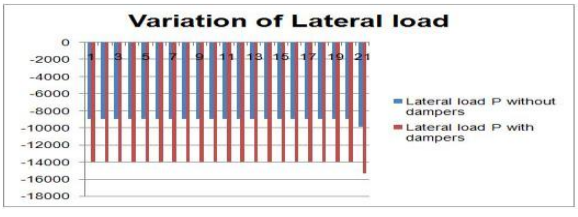
Drift x



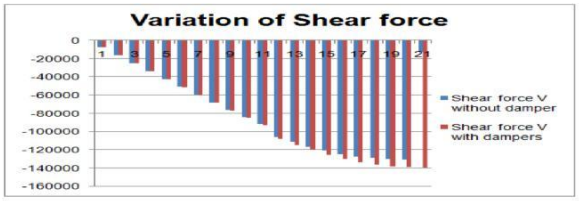
Drift Y



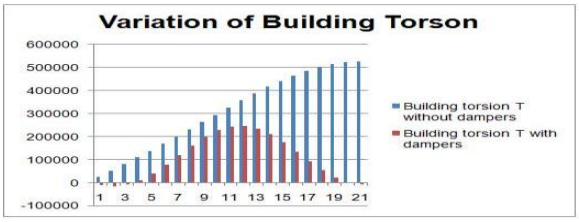
Lateral load



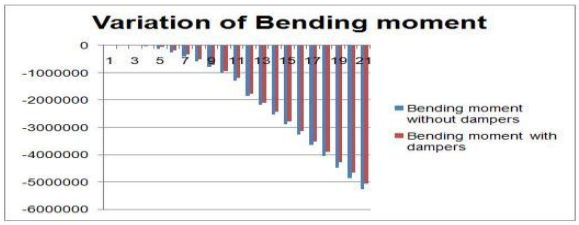
Shear force



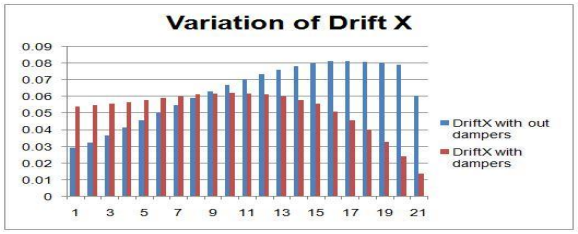
Building Torsion



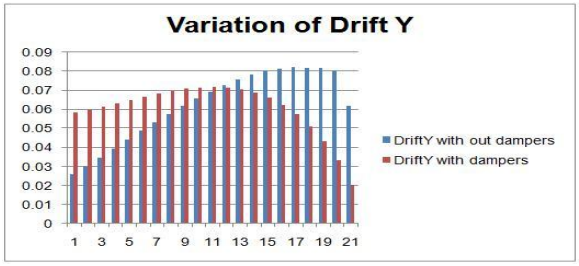
Bending moment



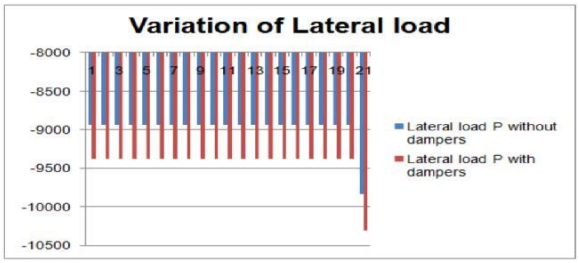
Hard soil - Drift X



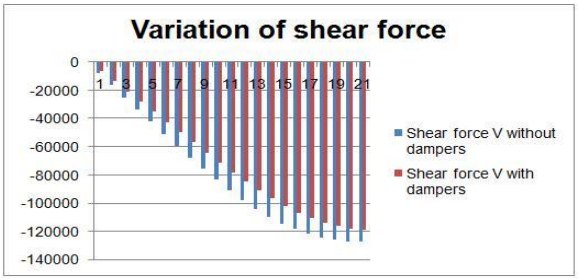
Drift Y



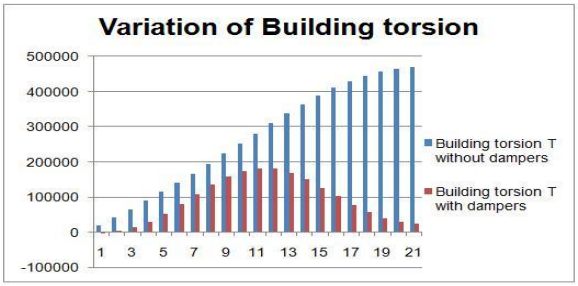
Lateral Load



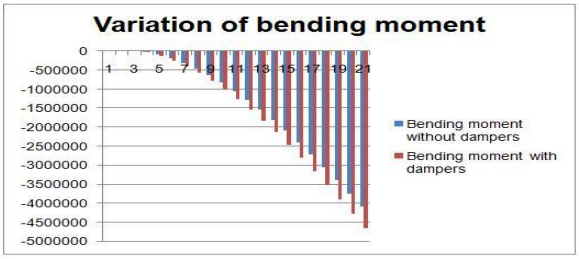
Shear force



Building Torsion

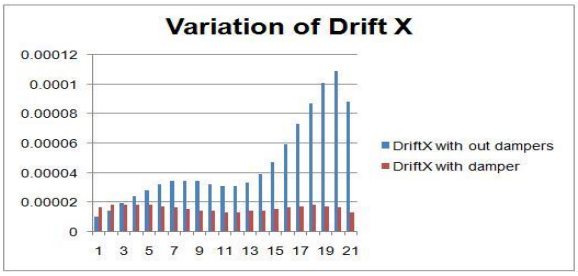


Bending moment

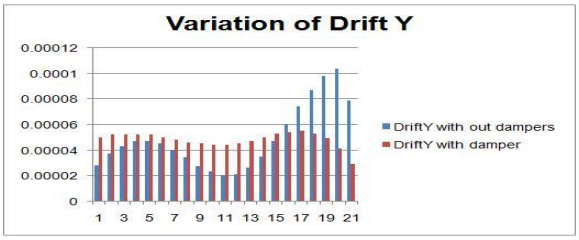


Z Shape Building – Loose soil

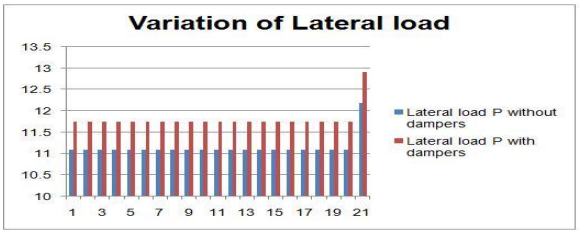
Drift X



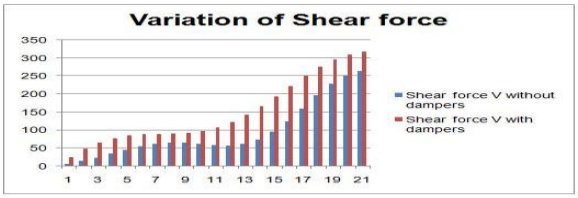
Drift Y



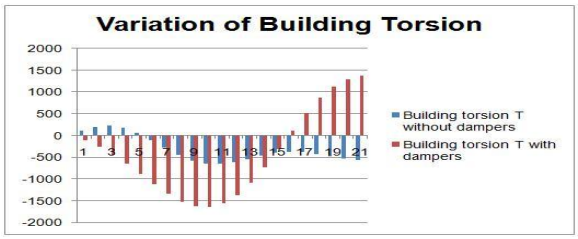
Lateral load



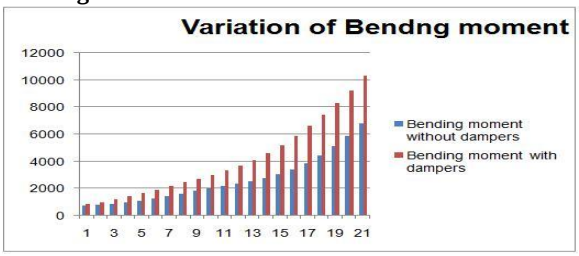
Shear force



Building Torsion

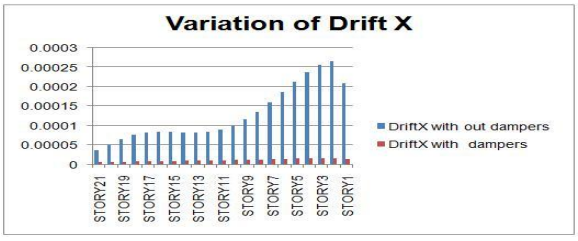


Bending moment

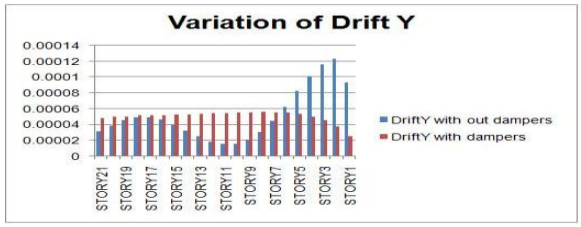


Medium soil

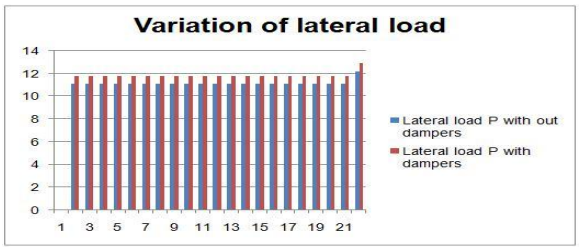
Drift X



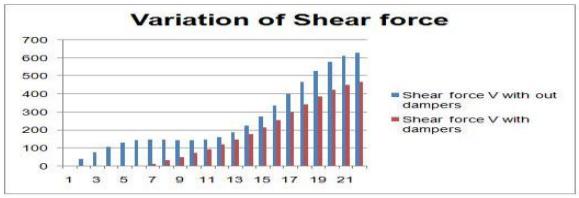
Drift Y



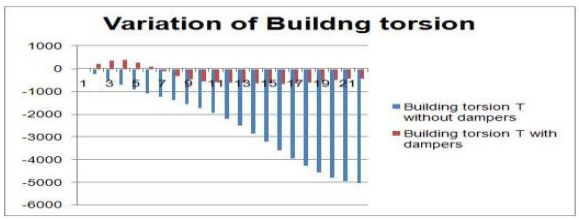
Lateral load



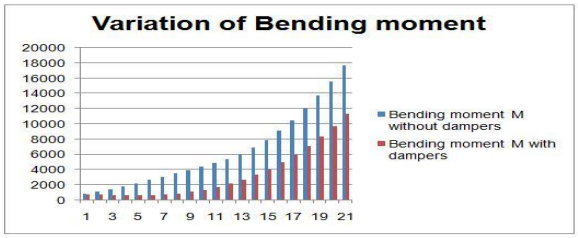
Shear force



Building Torsion

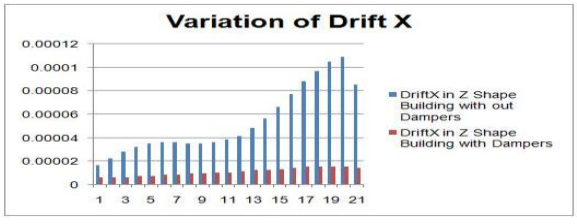


Bending moment

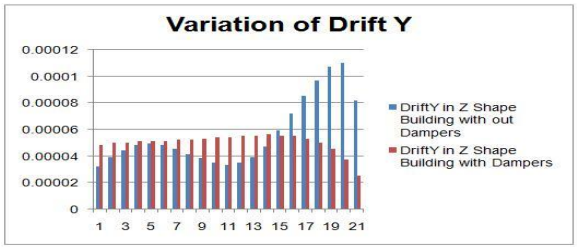


Hard soil

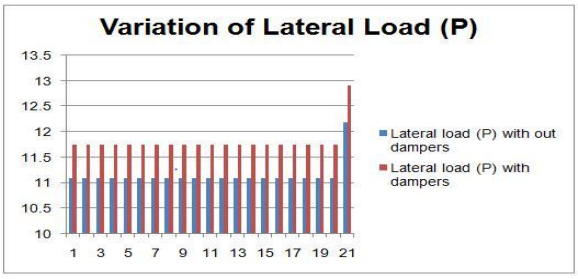
Drift X



Drift Y

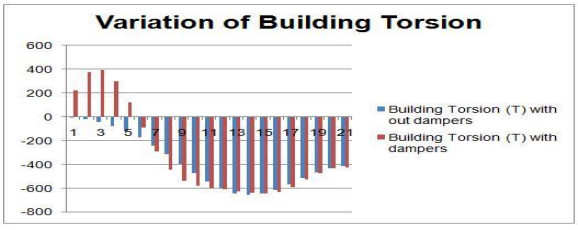


Lateral load

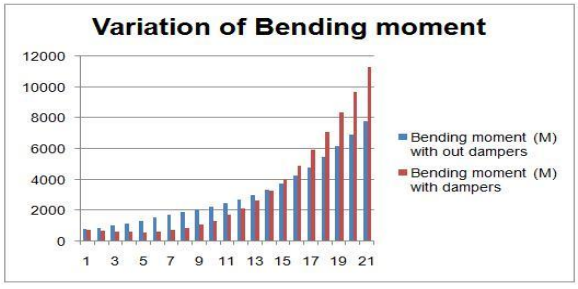


Shear force

Building Torsion



Bending moment



6. CONCLUSIONS

From the above study the comparison is made between the Z Shape building and T Shape building

1. The computational modeling of the damper and structural analysis has indicated a rather efficient damping system and has also indicated its limitations.
2. The device is easy to manufactures and implements its structure and above economical due to easy availability of material and easy replaced.
3. By Response spectrum analysis for the G+20 Building by using dampers the value of Drift is more for the T Shape building than Z Shape building in both X and Y Directions.
4. The value of story shear (Shear force, Bending moment, Building torsion) by Response spectrum analysis for G+5 building by using dampers has higher value for the Z Shape building than the T Shape Building.
5. Seismic performance of building can be improved by providing energy dissipating device (damper), which absorb input energy during earthquake.
6. After application of damper is much better when we provide same number of damper to bottom 5 stories.
7. Frame is safer when damper is provided up to floor from base as compare with other arrangement. Due to drift reduction one can make the structure cost effective.
8. The result shows that, the buildings with friction dampers are more vulnerable compared to other buildings.

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