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AN REVIEW STUDY ON FVD AND TMD

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Abstract

An analytical work is done for the comparative study of various types of dampers used for multi-story reinforcement cement concrete Building. We have used response spectrum method to analyze seismic behavior of G+15 story building with and without dampers. For analysis earthquake load is applied in both x and y Direction. For the analysis purpose ETABS 2015 version 14.2.2 software is used by considering seismic zone iv as per is 1893:2002(part 1) code. Results of these analyses are discussed in terms of various parameters such as maximum absolute displacement, absolute acceleration, absolute velocity, story shear, story drift. The comparison of these various parameters is done. The structure is analyzed with and without various types of dampers.

Keywords: Tune Mass Dampers, Fluid Viscous Dampers.

Introduction

Hybrid control frameworks deals with the consolidated utilization of detached and dynamic control framework. For instance, a base disconnected structure which is furnished with actuator which effectively controls the improvement of its execution.

1. Dampers

1.2 Tuned mass damper

A TMD is a mass appended to the structure area where most extreme movement liable to happen (by and large close to the highest point of the structure), with the assistance of legitimately tuned spring and damping component. Most normally utilized dampers are gooey and viscoelastic dampers. TMD (tune mass dampers) gives a recurrence subordinate marvel which increments damping in the casing structure joined to it, this aides in decrease in its movement. The vigor is controlled by their dynamic attributes, stroke and the measure of included mass they utilize. The extra damping presented by the TMD is additionally reliant on the proportion of the damper mass to the compelling mass of the structure in a specific mode

vibration.TMDs weight is changed between 0.25%-1.0% of the structure's weight in the essential mode (regularly around 33%).

The recurrence of a TMD is kept in such a way, that when basic recurrence is energized the TMD will resound out of stage with edge movement and diminishes its reaction and vibration. Numerous damper designs (MDCs) which comprise of a few dampers put in parallel with disseminated characteristic frequencies around the control tuning recurrence is utilized for better reaction control. For a similar all out mass, a different mass damper can essentially build the proportionate damping acquainted with the framework.

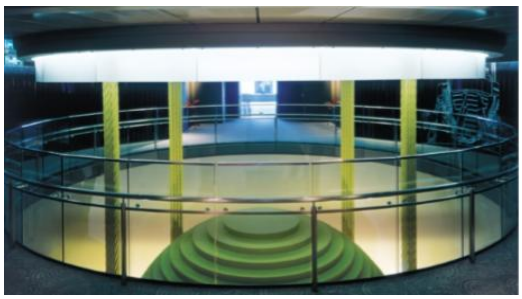

Figure 1.1:tuned mass damper in taipei 101

1.3 Fluid Viscous Damper

In structural designing perspective vibration control of a different structure is finished by utilizing liquid gooey dampers, they simply like the safeguards present in vehicles. At first they are utilized in the military building work and aeronautic trade for a long time. Liquid thick dampers have been equipped for diminishing at the same time diversion and worries with in a structure, normal portrayal of liquid gooey damper as appeared in Fig 1.2 Fluid thick damper is commonly inbuilt with an of a cylinder head with holes contained in a barrel loaded up with a thick liquid, generally loaded up with a material are to be silicone or a comparable kind of oil are to be utilized. In this technique vitality is dispersed by liquid opening when the cylinder head moves in that unique position through the liquid. The liquid material present in the barrel is about incompressible structure. The able volume inside the barrel is diminished when the damper is exposed to compressive power therefore in the development of cylinder bar region. Because of diminishing in volume results in a reestablishing power in the FVD. This power for keep the gatherer in the gadget

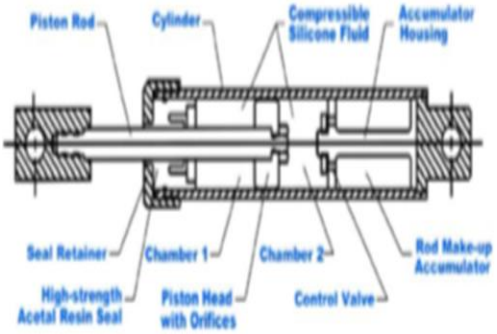

Fig: 1.2 Typical Representation of Fluid Viscous Damper

Literature Review

Wang and Lin (2005) examined the impact of soil– structure collaboration (SSI) impact on the power of different tuned mass dampers (MTMD) for vibration control of unpredictable structures demonstrated as torsionally coupled structures (single story working) because of ground movements by a proficient modular investigation approach. The execution file of MTMD was built up dependent on the establishment actuated structure floor movements with and without the establishment of MTMDs. It was finished up from numerical confirmations that the increasein height– base proportion of an unpredictable structure and the reduction in relative firmness of soil to structure by and large enhance both SSI and MTMD detuning impact, basically for a structure with exceedingly torsionally coupled impact. Additionally detuning impact can be diminished with appropriate increment of the recurrence separating of the ideal MTMDs. Result additionally demonstrated that if the SSI impact is noteworthy, the MTMD is more viable than single TMD. **Hoang and Warnitchai (2005)** built up another technique to plan numerous tuned mass dampers (various TMDs) to diminish intemperate vibration of structures utilizing a numerical streamlining agent that pursues the Davidon– Fletcher– Powell calculation which can deal with huge number of structure factors with no limitation before the examination. The strategy was utilized to plan different TMDs for SDOF lumped-mass structures exposed to wide-band excitation. It demonstrated that the ideally structured different TMDs have appropriated characteristic frequencies and unmistakable damping proportions at low damping dimension. It was presumed that, if there should arise an occurrence of vulnerabilities in the auxiliary properties; expanding the TMD damping proportions alongside augmenting the TMD recurrence

go make the framework progressively vigorous. It is likewise compulsory to structure TMDs for higher damping proportions and a smaller recurrence extend if TMD parameters themselves are dubious.

Li and Qu (2006) contemplated the adequacy of various tuned mass dampers (MTMD) with indistinguishable solidness and damping coefficient however extraordinary mass to decrease translational and torsional reactions for two-level of-opportunity (2DOF) structure (which speaks to the dynamic normal for a general topsy-turvy structure) utilizing numerical reenactment. The 2DOF structure was a displayed as a 2DOF arrangement of an uneven structure with pervasive translational and torsional reactions under seismic tremor excitations utilizing the mode reduced order technique. From the examination it was reasoned that MTMD is equipped for diminishing the torsional reaction of the torsionally adaptable structures and the translational and torsional reactions of the torsionally hardened structures.

Han and Li (2006) explored the vibration control limit of dynamic different tuned mass damper (AMTMD) with indistinguishable firmness and damping coefficient yet shifting mass and control drive. A three story steel structure demonstrate with three ATMDs which was exposed to a few chronicled quakes actualized in SIMULINK.

Amid numerical reproduction, a firmness vulnerability of 15% of its underlying solidness of the structure was considered. The enhancement ATMD parameters were done in recurrence area by minimization of the base estimation of the most extreme powerful amplification factor for general structure. From numerical outcome it was presumed that AMTMD has preferred adequacy over a solitary ATMD for structure exposed to verifiable seismic tremor and furthermore in structure where there is a solidness vulnerability of 15%.

Conclusion

We also check that of frequencies in static and dynamic manner then we have found that in static there is no change in three parameter. But in dynamic acceleration there are somewhat changes occur. One thing found that the acceleration is gradually increased in fluid viscous damper and tuned mass damper. The acceleration is more in tuned mass damper as compare to fluid viscous damper.

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