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"Seismic Analysis of Response factor of Multi Story Building Installed with Dampers using MATLAB Software"

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Abstract – in Recent scenario, The Rapidly growth of population Protect to grow verticality in buildings and protect to lead an new ideas for vertical Growth. Seismic response of multi storey building using state space method, installed with dampers subjected to real earthquake ground motions is investigated. The focus is on understanding the dynamic characteristics of dampers, placement of base isolators in building, identifying viable semi active control strategies, assessing the merits of the control strategies relative to passive and active control alternatives, analyse the response of the system using both displacement and velocity, and demonstrating the structural control concepts by Analytical, Numerical and Experimental methods using MATLAB Software is employed in this research.

Key Words: **Asymmetric Buildings, Earthquake Response, Inelastic Response, Seismic Response, Torsion, Base isolation**

1. INTRODUCTION

Structural control for civil structures was created to provide safe and efficient designs with the help of limited resources. Focus of the structural control is to limit. and has transfer the energy introduced by various dynamic loads including wind, wave, earthquake, and traffic. There are mainly three types of supplemental damping devices, which are divided in to three category.

The first type of damping device is "Passive Device". These are non-controllable and require no power.

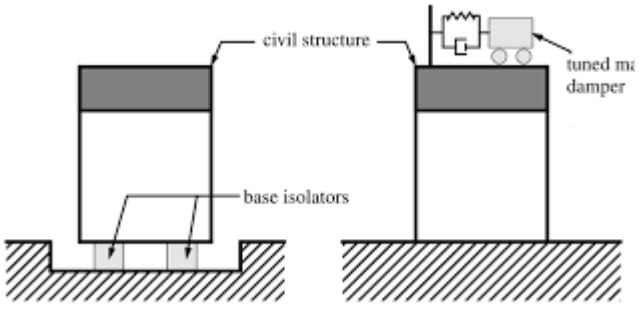

Fig -1: **Passive damping devices** [1]

The second type of damping device is "Active Device". These devices are controllable, but require power to operate.

Fig -2: **Active damping devices** [1]

The third type of damping device is "Semi-Active Device". These devices have the positive aspects of Passive Devices and Active Control Devices which are controllable (like the Active devices) but require less power.

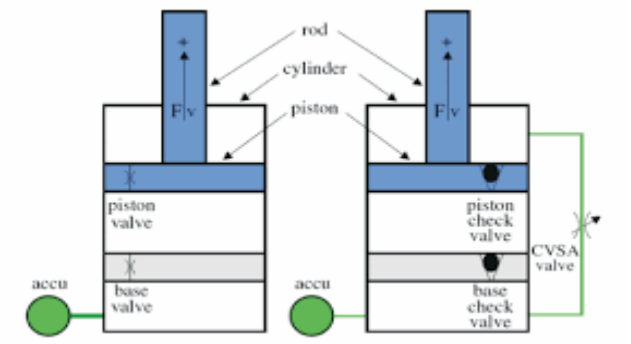

Fig -3: **Semi-Active damping devices** [1]

Asymmetric plan buildings have often been seen as being undesirable because of their weakness to earthquakes due to coupled lateral and torsional motions. Some of the effects of asymmetry include more deformation, force, and ductility demands on lateral load resisting elements. If the deformation is increased it may lead to premature failure of brittle, non-ductile elements. Due to Premature Failure of any structure may result in a sudden loss of the Property of building like strength and stiffness leading to failure. Increment in edge deformations may also cause Cooperation between two very close spaced adjacent buildings and its result in more second-order (P-Δ) effects.

Block Diagram of Normal Structure

1.1OBJECTIVE

- To have a examine seismic response of symmetric structure installed with damper.
- To examine seismic response of asymmetric structure installed with damper.
- To develop artificial neural network for symmetric structure.
- To calculate optimum parameters of damper

2. Literature Review

[1] Snehal V. Mevada and R.S Jangid Study on "Seismic response of Asymmetric systems with linear and non-linear viscous dampers". Proceedings, Received 26 April 2020 Received in revised form 3 June 2020 Accepted 5 June 2020

In this research paper the result is obtained by mathematically solving the governing equations of motion. ascribable to consequence of eccentricity ratio, uncoupled lateral time span, ratio of uncoupled torsional to lateral frequency and supplemental damping eccentricity ratio indicated parameters are scrutinized on crowning results which include lateral, torsional and edge displacements and their hastening pawn parts. And it is also precise forces.

To know the effectiveness of various types of dampers, the optimized controlled result of asymmetric structure is compared with their corresponding uncontrolled results. Hence It is shows that the non-linear viscous dampers are more effective as compared to linear Viscous dampers. The main function of non- linear viscous dampers is noted that it reduces the responses and the damper force relies on asymmetric structure and supplemental damping. Correspondingly, the effectiveness of dampers pointedly bank on structural and damping eccentricity ratio. Also torsional to lateral frequency ratio of System.

[2] Goel and Booker, 2001 "Effects of supplemental viscous damping on inelastic seismic response of Asymmetric systems".

The foremost Resolution of Supplemental viscous damping is fewer distortion, ductility and hysteretic energy dissipation dictate in lateral load resisting elements of Asymmetric Structure. And subsequent in inelastic range.

The level of lessening of above Characteristic are muscularly be contingent on the plan wise dispersal of the supplemental damping Device. Its also distinguished that the precise dispersal of supplemental damping device the distortion and difficulties of ductility in the elastic side portion can be diminish to near about the equivalent symmetric plan structural system.

[3] (Lin and Chopra, 2003) has studied on "Asymmetric one-storey elastic systems with non-linear viscous and visco-elastic dampers:

Simplified research and supplemental damping system design". In this paper it is perceived that the outcomes of asymmetric one-story systems with nonlinear visco-elastic (VE) dampers by scrutinizing the equivalent linear viscous system in this all non-linear VE dampers are swapped with their energy correspondent linear viscous dampers.

The consequence of equivalent linear viscous system is obtained by two procedures including response history analysis (RHA) and by response spectrum analysis (RSA) approaches prolonged for non-classically damped systems. The stretchy edge and stiff edge distortions and plan rotation of their analogous linear viscous system resolute by the extended RSA process is shown to be nearly perfect for design applications. and also, blunders are between 10 and 20%. The ultimate analysis and considerate of how the analysis of an asymmetric one-story structure is depend on the plan wise dispersal of supplemental damping established in Reference gives a basis for selecting the optimal plan wise dispersal of supplemental dampers.

[4] (Matsagar and Jangid, 2005) has studied on "Base isolated Building with Asymmetries due to the Isolator Parameters".

The secluded building is modelled as a single-story structure which is isolated by two different devices namely elastomeric and sliding systems which involves non-linear restoring forces. The displacement analysis of the secluded system with different combinations of structural arrangements, isolation systems and the ratio of uncoupled torsional to lateral frequency of the system is scrutinized.

In the pliable superstructure of the asymmetric base-isolated building, the lateral displacements diminish and the torsional displacement hastens. The displacement consequence is more than that in case of the torsionally inflexible system. In case of torsionally tweaked systems, the rejoinder of displacement is bottommost.

[5] (De Stefano, Faella and Ramasco, 1998) has studied on "Inelastic Seismic Response of One-Way Plan-Asymmetric Systems under bi-directional Ground Motions".

In this review paper, the seismic response of two constituent ground motions of one-way asymmetric systems premeditated as said by Uniform Building Code (UBC) has been appraised. It has been made known that UBC static torsional provisions triumph to stop effects of torsional response for rudiments located along the system asymmetric

direction. In certain, along such course, UBC design consequences in almost uniform plan dispersal of rigid actions, with larger ductility demands among resisting rudiments very adjacent or even fewer than the value illustrating the rejoinder of correspondent symmetric systems.

It is terminated that one-way asymmetry should be scrutinized by seismic codes as an intrinsic system property, thus portentous that superior rations should be further for designing elements shown along the symmetric system direction, in accumulation to those currently pledged to design the asymmetric direction elements. However, along the symmetric system direction, this code guises ineffective to shield the conforming resisting elements, since no allowance is made for effects induced by rotation. In both cases, it has been perceived that such upsurge in strength is bank on on the plan aspect ratio, with that alleged the mutable system parameters. This consequence is due to the fact that over sturdy is not spent properly. Nevertheless, in a slighter number of cases, when the inner symmetric direction element split ends up with experiencing the most inelasticity, this latter criterion flops to diminish ductility demands up to the value of the symmetric reference system.

3. CONCLUSION

From the above research paper it is conclude that the asymmetric building having Dampers is effective and also possible but requires special arrangement of structural member and it gives Batter Behavior in semi Active type of dampers but it also fulfill the purpose like Earthquake Response, Inelastic Responses, Protective Systems, Seismic Response and Neural Network.

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