

The Effects of Damping Devices on Displacements, Velocities and Accelerations of Structures

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Abstract : The most recent earthquakes that occurred in the world and particularly in Algeria, have killed thousands of people and severe damage. The example that is etched in our memory is the last earthquake in the regions of Boumerdes and Algiers (Boumerdes earthquake of May 21, 2003). For all the actors involved in the building process, the earthquake is the litmus test for construction. The goal we set ourselves is to contribute to the implementation of a thoughtful approach to the seismic protection of structures. For many engineers, the most conventional approach protection works (buildings and bridges) the effects of earthquakes is to increase rigidity. This approach is not always effective, especially when there is a context that favors the phenomenon of resonance and amplification of seismic forces. Therefore, the field of earthquake engineering has made significant inroads among others catalyzed by the development of computational techniques in computer form and the use of powerful test facilities. This has led to the emergence of several innovative technologies, such as the introduction of special devices insulation between infrastructure and superstructure. This approach, commonly known as "seismic isolation" to absorb the significant efforts without the structure is damaged and thus ensuring the protection of lives and property. In addition, the restraints to the construction by the ground shaking are located mainly at the supports. With these moves, the natural period of construction is increasing, and seismic loads are reduced. Thus, there is an attenuation of the seismic movement. Likewise, the insulation of the base mechanism may be used in combination with earthquake dampers in order to control the deformation of the insulation system and the absolute displacement of the superstructure located above the isolation interface. On the other hand, only can use these earthquake dampers to reduce the oscillation amplitudes and thus reduce seismic loads. The use of damping devices represents an effective solution for the rehabilitation of existing structures. Given all these acceleration reducing means considered passive, much research has been conducted for several years to develop an active control system of the response of buildings to earthquakes.

Keywords : earthquake, building, seismic forces, displacement, resonance, response

Conference Title : ICEED 2020 : International Conference on Earthquake Engineering and Dynamics

Conference Location : London, United Kingdom

Conference Dates : May 21-22, 2020