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BUILDING RESPONSE TO BLAST AND EARTHQUAKE LOADING

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ABSTRACT

Nowadays, structural engineers need to consider blast loading in their designs more frequently. To assist them in this task, this paper compares between the response of buildings to blast and earthquake loadings for the purpose of deriving a relationship in a form of formulae and charts between blast and earthquake loads. These relationships can be used for the blast design of structural buildings using seismic design code specifications. The numerical data was obtained using several structural models with different dimensions, shapes, and material and subjected to different blast loadings, and earthquake loads in different zones. An illustrative example is used to demonstrate the use of the method and to show its capabilities in the blast design of structural buildings.

Keywords: Blast, Drift, TNT equivalent, Building, Simulation, Earthquake.

INTRODUCTION

The number and intensity of domestic and international terrorist activities, including September 11, 2001 attack on World Trade Center towers in New York, have heightened concerns towards the safety of our infrastructure systems. Terrorist attack targets where human casualties and economic consequences are likely to be substantial. Structural buildings have been considered attractive targets because of their accessibility and potential impacts on human lives and economic activity.

The effects of a bomb explosion depend on many factors including: 1) the type and size of bomb; 2) the location of the explosion relative to building (i.e., internal or