

STRUCTURAL PERFORMANCE OF BUILDINGS AGAINST BLAST LOADING

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The history of the use of explosives goes back some hundreds of years and it originated in ancient China. However, major leap of explosive technology began in the latter part of 19th century when Alfred Nobel invented “Dynamite”. In recent years, the explosive devices have become major weapons of choice for most of the terrorist attacks. Such factors as the easy accessibility of information on the construction of bomb devices, relative ease of manufacturing, mobility and portability, coupled with significant property damages and injuries, are responsible for significant increase in bomb attacks all over the world. In most of these cases, structural damage and the glass hazard have been major contributors to death and injury for the targeted buildings. Following the events of September 11, 2001, the so-called “icon buildings” are perceived to be attractive targets for possible terrorist attacks. Hence, detailed research studies on methods for protecting buildings and occupants against such bomb attacks are essential under present situations in most countries of the world.

Under this study, a structural performance of the newly constructed building located at Postgraduate Graduate Institute of Agriculture (PGIA) of University of Peradeniya was analyzed under a hypothetical blast loading. Finite element model of the concerned building has been prepared and expected blast loadings have been applied at pre selected loading points of the building. How the building would perform under this intended blast loading was studied. Based on that, the areas where damage was critical have been identified and necessary strengthening has been proposed.

In addition to that, it was found that the effect of having glazes as windows will increase the potential damage caused by blast loadings. The relation between standoff distance and the amount of explosive have been found. These results have significant bearing on the design of the building against blast loading and more research should be done to identify the real behaviour of the building against blast loading.

