World Academy of Science, Engineering and Technology
International Journal of Civil and Architectural Engineering
Vol:15, No:05, 2021

Effects of Blast Load on Historic Stone Masonry Buildings in Canada: A Review and Analytical Study

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Abstract : The global ascendancy of terrorist attacks on building infrastructure with economic and heritage significance has increased awareness of the possibility of terrorism in Canada. Many structures in Canada that are at risk of terrorist attacks include government buildings, built many years ago of historic stone masonry construction. Although many researchers are investigating ways to retrofit masonry stone buildings to mitigate the effect of blast loadings, lack of knowledge on the dynamic behavior of historic stone masonry structures under blast loads makes it difficult to ascertain the effectiveness of the retrofitting techniques. This paper presents a review of open-source literature for the experimental and numerical stone masonry structures under blast loads. This review yielded very little information of the response of the historic stone masonry structures under blast loads. Thus, a comprehensive study is needed to understand the blast load effects on historic stone masonry buildings. The out-of-plane response of historic masonry structures to blast loads is investigated by using single-degree-of-freedom analysis. This approach presents equations that can be used effectively in the analysis of historic masonry walls to out-of-plane blast loading.

Keywords : blast loads, historical buildings, masonry structure, single-degree-of-freedom analysis
Conference Title : ICMSBCM 2021 : International Conference on Masonry Structures, Brick and Concrete Masonry
Conference Location : Amsterdam, Netherlands
Conference Dates : May 13-14, 2021