THE DEVELOPMENT OF STRUCTURAL RETROFITS

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ABSTRACT

The majority of buildings were designed with no thought of explosive attack, they are therefore, in most cases, very vulnerable to such attack. The aim of structural retrofitting is to correct this situation. The objective of retrofitting a building against the effects of an explosive or other attack may be to enable the building to resist the attack, or to stop or reduce the dangerous consequencies of the attack or both of these. There are a number approaches which include structural strengthening, modifying structural response, modifying the loading, increasing the ability of the structure to absorb energy, reducing or intercepting secondary fragmentation. Although these approaches are not mutually exclusive they are not always compatible. Under explosive loading it can easily happen that an apparently beneficial retrofit has unintended and damaging consequences. For example strengthening one part of a structure may lead to the overloading of another part. The paper starts by discussing and explaining the various approaches and then uses the development one method, the use of expanded metal sheeting (XPM), to show both the principles and the practical problems of retrofitting. This is illustrated by the results of full scale trials carried out in the UK and in Israel.