STRUCTURAL RESPONSE OF BUILDING FACADES AND ARCHITECTURAL FEATURES TO EXPLOSION LOADS

Abstract:

Building collapse is a threat for large vehicle borne improvised explosive devices (VBIED), however facades and architectural features are also vulnerable to lower explosion loads, such as those from person borne improvised explosive devices (PBIED). Upon failure these elements produce hazardous projectiles which can inflict significant injuries on personnel outside the lethal blast radius of the explosion or cause obstructions preventing access to emergency services.

The response of typical elements including cladding panels, glazing systems, signage, doors etc will be considered. These components demonstrate a wide range of characteristics and failure mechanisms and hence require a detailed knowledge of explosion loading, material behaviour and engineering dynamics in order to justify acceptable performance and understand how they will interact with the structural support system.

In addition to the response of individual components, the study will also consider the design process for large scale construction projects, from concept through to completion, and highlight how blast engineers help the project meet security requirements efficiently and with minimal impact on the design intent. This requires close collaboration with a number of organisations including the client, security advisers, architects, manufacturers and contractors.

Key words:

VBIED, PBIED, Explosion Loads, Structural Response, Facades, Cladding, Glazing, Blast Engineering

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