

# Blast Loading and Blast Effects on Structures – An Overview

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## ABSTRACT

*The use of vehicle bombs to attack city centers has been a feature of campaigns by terrorist organizations around the world. A bomb explosion within or immediately nearby a building can cause catastrophic damage on the building's external and internal structural frames, collapsing of walls, blowing out of large expanses of windows, and shutting down of critical life-safety systems. Loss of life and injuries to occupants can result from many causes, including direct blast-effects, structural collapse, debris impact, fire, and smoke. The indirect effects can combine to inhibit or prevent timely evacuation, thereby contributing to additional casualties. In addition, major catastrophes resulting from gas-chemical explosions result in large dynamic loads, greater than the original design loads, of many structures. Due to the threat from such extreme loading conditions, efforts have been made during the past three decades to develop methods of structural analysis and design to resist blast loads. The analysis and design of structures subjected to blast loads require a detailed understanding of blast phenomena and the dynamic response of various structural elements. This paper presents a comprehensive overview of the effects of explosion on structures. An explanation of the nature of explosions and the mechanism of blast waves in free air is given. This paper also introduces different methods to estimate blast loads and structural response.*

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