A Review of Blast and Impact of Metallic and Sandwich Structures

F. Zhu and G. Lu
Swinburne University of Technology, Australia

ABSTRACT

In blast and impact, structures usually undergo large plastic deformations or failure, and they absorb considerable energy. In this paper, the characteristics of blast loads and corresponding structural response, as well as the current advances in this area, were briefly reviewed. The concept and effects of blast wave, the main means of blast impact, are introduced. Several critical structural responses are classified and briefly illustrated. The major experimental methods were introduced with a brief description of corresponding experimental devices such as ballistic pendulums and a wide range of sensors to measure impulse, pressure and acceleration and displacement of structures. Several commonly used analytical models were presented and compared to estimate the dynamic behaviour of structure under blast loading. The numerical approaches to analyze the structure responses to blast impact were also summarised with a number of available constitutive relations of explosive charge and material properties of structures.