Book review

BLAST EFFECTS ON BUILDINGS, 2ND EDITION

D. Cormie, G. Mays and P. Smith (eds) Thomas Telford Publishing, 2009. ISBN-13: 978-0-7277-3521-8, £65, 356 pp.

This is the second edition of a book that has become a standard text on the subject of design for blast effects since it was first published in 1995. The first edition of the book concentrated on the mechanics of design for blast loading, including blast wave propagation and structure interaction effects, structural dynamics and design of concrete structures, steel structures and glazing. The second edition expands on this to take a more holistic view of addressing the threat from explosions, including whole-building response to blast and a discussion of various counter-terrorism measures, which are of course becoming more widespread in today's society.

Generally blast loading on buildings is derived using empirical methods with their origins in tests conducted by the US military in the 1950s and 1960s, and which were presented in the Standard TM5-1300 (now superseded by UFC 3-340-02). While this book still concentrates on empirical techniques for the derivation of blast loading, the authors discuss the limitations of these techniques and briefly introduce phenomenological methods for deflagrative events, and introduce first-principle methods using computational fluid dynamics to quantify complex blast-structure interaction effects.

The design of structures in reinforced concrete and steel has been brought up to date with reference to the appropriate Eurocodes, including guidance on the selection of partial load factors and combination factors. The authors give guidance on the use of static increase factors for material strengths to account for differences between characteristic and actual yield strengths, and dynamic increase factors to account for the high strain rates experienced during a blast excursion. Detailing is an important aspect of designing structures to resist dynamic effects, and advice is provided on the selection of material grades and detailing rules. A new chapter is included on the design of steel-concrete-steel (SCS) composite structures. The

failure modes of SCS construction are analogous to reinforced concrete construction, but with some subtle differences, which are clearly explained in the text.

As the design of structures in steel, reinforced concrete and SCS composite is set out as three individual chapters, there is invariably some repetition in the texts of these chapters. However, the alternative of attempting to address three different materials in one chapter may have led to confusion of the reader, and the repetition does not detract from a useful and informative text with clear examples.

Glazing is becoming an increasingly important element in the design of buildings, with full-height glazed façades now commonplace in modern buildings. The failure of glazing in a blast event can lead to large-scale casualties. The authors discuss the pros and cons of various types of glazing and protection systems, and present a design approach that considers the pre-crack resistance of the glass and the post-crack membrane capacity.

There is a useful chapter dedicated to whole-building response to blast damage, which looks at the prevention of disproportionate and progressive collapse. The authors recognised that there is no universal approach to designing for robustness, and differing approaches are taken depending on the codes and standards being applied. It is also recognised that most of the robustness rules that have been developed around the world relate primarily to accidental actions rather than those of malicious origin, which most blast scenarios reflect. The key issues that an engineer needs to consider in assessing the whole-building response to blast are set out in a clear and concise manner.

The book is well written and easy to digest for those with a basic knowledge of structural dynamics. I would thoroughly recommend this text for those interested in blast effects on buildings, be they students, those seeking an introduction to the subject matter or seasoned practitioners.

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