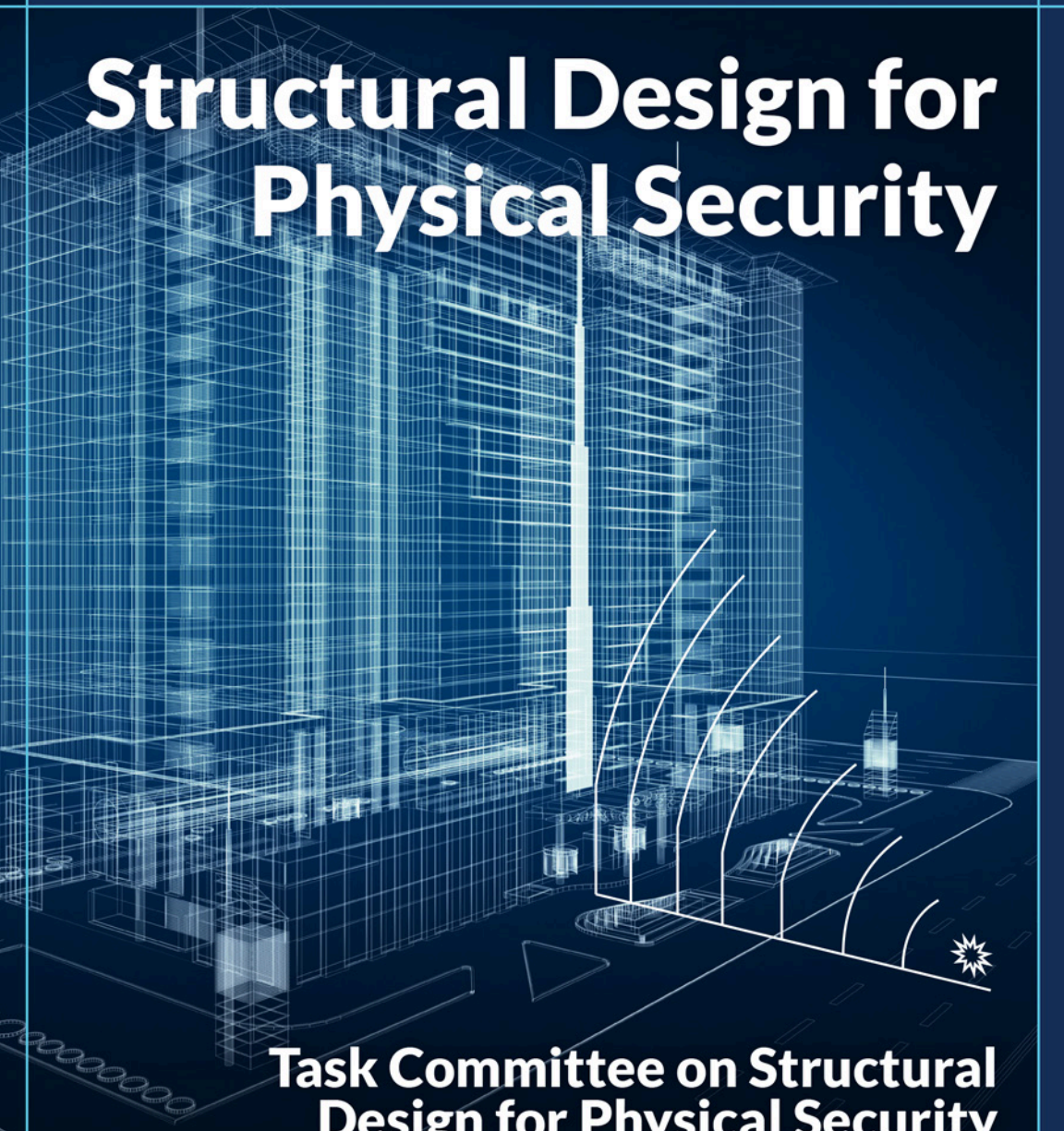
ASCE Manuals and Reports on Engineering Practice No. 142

Structural Design for Physical Security



Task Committee on Structural Design for Physical Security

Edited by Peggy Van Eepoel, P.E., and Sharon M. Gallant, P.E., S.E.

ASCE

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Structural Design for Physical Security

Prepared by the
Task Committee on Structural Design for Physical Security of the
Blast, Shock, and Impact Committee of the Dynamic Effects
Technical Administration Committee of the Structural Engineering
Institute of the American Society of Civil Engineers

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MANUALS AND REPORTS ON ENGINEERING PRACTICE

(As developed by the ASCE Technical Procedures Committee, July 1930, and revised March 1935, February 1962, and April 1982)

A manual or report in this series consists of an orderly presentation of facts on a particular subject, supplemented by an analysis of limitations and applications of these facts. It contains information useful to engineers in their everyday work, rather than findings that may be useful only occasionally or rarely. It is not in any sense a "standard," however; nor is it so elementary or so conclusive as to provide a "rule of thumb" for nonengineers.

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A list of available Manuals of Practice can be found at http://www.asce.org/bookstore.

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PREFACE

BACKGROUND

The first edition of this book was published in 1999 during the aftermath of the bombing attacks on the World Trade Center in New York City in 1993 and on the Alfred P. Murrah Building in Oklahoma City, Oklahoma, in 1995. These terrorist events and others worldwide created a need for structural engineers to protect a much broader portfolio of facility types against hostile acts, including threats posed by criminals, terrorists, and subversives. Although many US military and other government entities have had methodology and criteria documents, they were primarily restricted to official use only. The goal was to provide a widely available document to structural engineers so they may better understand the design of structures with enhanced physical security.

Since 1999, the United States has been subject to significant terrorist events, the most impactful being the 2001 airplane attacks on the World Trade Center in New York City and at the Pentagon in Arlington, Virginia. In the two decades that followed, there have been ongoing wars related to international and domestic terrorism and evolving threats involving bombings, hostile vehicle rammings, active shooters, civil disturbance, and chemical–biological attacks. The constant change in aggressor profile, threat tactics, and types have led to the need for flexible and adaptable physical security designs that account for these new considerations and anticipate future environments, with flexibility and adaptability being priorities. Physical security considerations are now applied to select municipal facilities, cultural venues, hospitals, stadiums, schools, places of worship, and other "soft" targets that previously had no precedence to necessitate protection against attack.

PURPOSE

Despite the ongoing evolution of the threat environment, this book continues to be a relevant reference for the design and assessment of a broad range of facilities. The original text was the state of the practice at its time of publication, and many of the core principles relating to physical security remain the same and have served as the foundation of this book. However, there has been significant development in the field in the last 20 years including research, testing, software, criteria documents, specifications, certifications, testing standards, and products. Projects of all types have been assessed, designed, and built, thus providing a wealth of information on the effectiveness of mitigation strategies. Many of the lessons learned from these projects have emphasized the importance of close coordination with other design considerations, which at times are at odds with physical security design strategies. These considerations include aesthetics, daylighting, energy performance, accessibility and life safety, and the constructability of building systems such as façades. Nevertheless, when addressed early enough in the project, the protective measures can be integrated seamlessly in the design, and the protected facilities will serve their intended functions.

The envisioned readership for this Manual of Practice is design professionals involved in projects with physical security concerns, most specifically related to explosive, ballistic, forced-entry, and hostile vehicle threats. This book provides an overview of the typical design considerations encountered in new construction and the renovation of facilities for physical security. Because a structure will likely be damaged in response to these malevolent events, the book helps the engineer appreciate the extent of damage and incorporate upgrades to maintain structural integrity and manage debris. The authors assume that most readers will have training and experience in structural engineering and design for dynamic loadings. This book is not intended to be a textbook or primer on these subjects but rather a manual to guide designers involved in physical security. As such, each chapter references other resources including books, standards, and research, where more in-depth information may be found.

Furthermore, the revised edition changed from a Technical Report to a Manual of Practice. As such, this Manual of Practice was peer-reviewed by a Blue Ribbon Panel of experts before seeking final approval from the ASCE Executive Committee. Several of the original edition's authors served as part of the Blue Ribbon Panel. This second edition is therefore an even more valued resource to the physical security design community.