Table of contents

- Foreward (p. xv)
- Acknowledgments (p. xvii)
- Part I Overview (p. 1)
- 1 Codes and Regulations and the Construction Team (p. 3)
- Traditional Roles (p. 7)
- Traditional Role of Building Owners, Architects, Engineers, and Contractors (p. 8)
- **Design-Bid-Build Process** (p. 10)
- **Design-Build Process** (p. 11)
- Traditional Role of Building Product Manufacturers and Suppliers (p. 12)
- Traditional Role of Building Codes and Standards (p. 13)
- Traditional Role of Building Officials (p. 17)
- Traditional Role of Owners and Building Managers (p. 18)
- How the Construction Team Functioned in the Pre-9/11 World (p. 19)
- 2 Challenges Facing the Construction Team: Revising Codes and Standards, Redefining Roles and Responsibilities (p. 23)
- A World Transformed: The Impact of 9/11 and Large-Scale Natural Disasters on the Construction Team and Construction Codes and Standards (p. 23)
- The Construction Team's National Response to 9/11 and Actions to Meet the Challenges of Future Large-Scale Disasters (p. 26)
- Private Sector Response and Actions (p. 29)
- Building and Fire Codes and Standards (p. 34)
- **Public Sector Actions to 9/11** (p. 39)
- Work of the Federal Government: White House, Congress, and Federal Agencies (p. 39)
- Expansion of Existing Projects (p. 41)
- New Federal Initiatives (p. 44)
- State and Local Government Actions (p. 47)
- Collaborative Public-Private Sector Initiatives: The All Hazards approach and Call for Regional Preparedness, Response, and Recovery (p. 48)
- 3 Findings from the World Trade Center Towers Collapse and Other Post-9/11 Disasters: What Is It That We Want Buildings to Do? (p. 51)
- What Is It That 9/11 Taught Us? A Look at the NIST World Trade Center Report (p. 53)
- Findings and Recommendations as a Reflection on What Is Currently Available (p. 53)
- The Codes and Standards Provisions in Place in the World Trade Center Towers on 9/11 and Unique Construction Elements (p. 54)
- Unique Construction Elements (p. 55)
- Impact of Aircraft, Resultant Fires, Evacuations, and Collapse (p. 60)
- NIST Findings Concerning Structural and Fire Safety (p. 65)
- Egress Issues (p. 66)
- NIST Findings on Operational Codes, Standards, and Practices (p. 67)
- NIST 30 Recommendations (p. 68)

- Relevance of the NIST Findings and Recommendations to an All Hazards Approach toward Construction (p. 76)
- Lessons from the Attack on the Pentagon (p. 81)
- Original Construction of Pentagon (p. 81)
- **Pentagon Retrofit** (p. 82)
- Areas for Future Research (p. 82)
- Lessons from the Anthrax Attacks (p. 82)
- Lessons from Natural Disasters: 2004 and 2005 Hurricane Seasons (p. 83)
- Application of Lessons Learned (p. 85)
- What Provisions Are Currently Available in Our Codes, Standards, and Other Documents to Protect the Public? (p. 85)
- Part II Existing Guidelines, Codes and Standards and How They Protect Buildings and the Public from Disasters (p. 89)
- **Overview** (p. 89)
- 4 Beginning with the End in Mind: Assessing Risk, Threats, and Mitigation Strategies (p. 91)
- Seeking a Balanced Approach (p. 91)
- Risk Assessment Tools (p. 94)
- Beginning with the End in Mind: To Know What To Do We Must Assess Risk (p. 94)
- Background on Risk Assessment (p. 96)
- Federal Risk Assessment Tools: General Services Administration, Federal Emergency Management Agency, National Institute of Justice, and National Institute of Standards and Technology (p. 97)
- The General Services Administration's Approach toward Risk Assessment (p. 97)
- Department of Justice and General Services Administration Risk Assessment and Building Classifications (p. 98)
- Federal Emergency Management Agency Risk Assessment Tools and a Common Approach (p. 106)
- Common Steps in Risk Assessment: A Basic Approach for Building Owners and Owners of Companies (p. 106)
- The Federal Emergency Management Agency Hazard Risk Assessment Software Tool-HAZUS: Assessing Natural Disaster Risks (p. 109)
- National Institute of Justice: Assessment Tools (p. 110)
- National Institute of Standards and Technology: "Cost-Effective Responses to Terrorist Risks in Constructed Facilities" (p. 111)
- Private Sector Assessment Guides (p. 114)
- Risk Management Methodology from the Report of the American Society of Heating Refrigerating and Air Conditioning Engineers (p. 114)
- American Society of Heating, Refrigerating and Air Conditioning Engineers' "One Approach to Risk Management" (p. 115)
- Other Current Private Sector Risk Management Processes (p. 118)
- Combining Tools from Public and Private Sector Tools (p. 119)
- Summary of Benefits of Conducting a Risk-Threat Analysis (p. 119)
- Constraints on Undertaking Risk-Threat Analysis (p. 120)

- 5 Existing Construction Standards, Codes, Practices, and Guidelines that Promote Security and Disaster Resilience in New Construction (p. 123)
- Overview of Guidelines, Codes, and Standards for Building Security in New Construction: Crime and Terrorism (p. 124)
- **Basic Security Principles** (p. 125)
- Selecting the Best Approach or a Blend of Guidelines, Standards, and Codes (p. 128)
- Building Security Design Guides (p. 129)
- Guidelines for External Protection of the New Building: The Outer Ring of Defense (p. 130)
- Perimeter Security to Prevent or Delay Attack (p. 130)
- Building Group 1: Buildings with Varying Levels of Risk from Crime but Low Level of Risk from Terrorism (p. 130)
- Perimeter Security Building Group 2: Buildings with Moderate to High Risk from Terrorism and Varying Levels of Risk from Crime (p. 135)
- FEMA 430: "Primer for Incorporating Building Security Components in Architectural Design" (p. 141)
- Building Type 2-Guidelines for Protection: The Outer Ring (p. 142)
- Characteristics of the Surrounding Area: Beyond the Outer Ring and Their Impact on Determining the Level of Outer Ring Security for the Building (p. 142)
- Checklist for Surrounding Area Characteristics (p. 143)
- Other Resources for Defending the Outer Ring for High-Risk Structures (p. 150)
- Codes and Standards and the Outer Ring (p. 150)
- The Inner Ring-Building Type 2 (p. 151)
- Security Inside the Outer Ring: Protection from Blast and Progressive Collapse (p. 151)
- Understanding Blast and Its Impact on Building Exteriors and Interiors (p. 153)
- Guidelines for Protecting the Structure from Progressive Collapse (p. 156)
- Guidelines for Protecting the Interior of the Building from Other Blast Damage (p. 158)
- Guidelines to Reduce Blast Effects (p. 160)
- Guidelines for Protecting Windows (p. 161)
- Protection of Other Areas Against Blast: Doors, Roof, and Other Parts of the Building (p. 162)
- Internal Building Security: Protecting the Building from Internal and External Biochemical Attack (p. 165)
- The Indoor Air Environment (p. 165)
- Other Approaches (p. 172)
- Guidelines, Codes, and Standards to Enhance Protection from Natural Disasters: Seismic, Wind, and Flood (p. 173)
- What Level Do You Build to? What Features to Include? (p. 173)
- High Levels of Risk from One or More Natural Disasters (p. 174)
- Resources for Seismic Events: FEMA, NEHRP, Model Codes and "Whole Building Design Guide (p. 175)
- Resources for Winds and Floods: Other Jurisdiction, Model Codes, and FEMA (p. 175)

- Recent Changes by States and Major Cities to Their Codes, Statutes, and Ordinances (p. 178)
- **New York City** (p. 178)
- **Chicago** (p. 180)
- **Los Angeles** (p. 181)
- **Pittsburgh** (p. 181)
- **Florida** (p. 181)
- Setting the Stage: An Introduction to Existing Buildings and the Unique Problems and Hazards They Face (p. 187)
- Proposals and Provisions in Future Editions of Building and Fire Codes for New Construction (p. 182)
- The Critical Role of the Construction Team (p. 184)
- 6 Existing Buildings: Inspections and Retrofitting (p. 187)
- After 9/11: What Has Really Changed? (p. 191)
- The Sheer Size of Our Existing Infrastructure (p. 191)
- The Complexity of Mitigating Vulnerabilities and Risks to Natural and Man-Made Hazards and Threats (p. 194)
- **Hippocratic Oath: First Do No Harm** (p. 195)
- What Do You Want the Building to Do? (p. 196)
- Life-Cycle Cost Perspective (p. 197)
- The Critical Role of Inspections Commissioned by the Owner: Understanding the Existing Building Top to Bottom (p. 198)
- Understanding the Base Construction Code Provisions that Underlie Renovation or Rehabilitation of Existing Structures (p. 199)
- Overview of the Basic Security Principles for Existing Structures (p. 202)
- Rings Of Defense: The Challenges for Existing Buildings (p. 202)
- Applying Risk-Threat Analysis and Mitigation Plan to Existing Buildings (p. 204)
- Selecting the Best Approach or a Blend of Guidelines, Standards, and Codes for Existing Buildings (p. 205)
- Guidelines for External Protection of Existing Buildings: The Outer Ring of Defense (p. 208)
- Perimeter Security to Prevent or Delay Attack (p. 208)
- Building Group 1 Buildings with Varying Levels of Risk from Crime but Low Levels of Risk from Terrorism (p. 208)
- The Inner Ring for the Low-Risk Building (p. 210)
- Building Group 2 Existing Buildings with Varying Levels of Risk from Crime and Moderate to High Risk from Terrorism (p. 210)
- Guidelines for Considering Reorientation of Building Functions on the Existing Site (p. 212)
- Guidelines for Protection: The Outer Ring of an Existing Building (p. 213)
- **The Inner Ring** (p. 218)
- Guidelines for Protecting the Interior of the Building from Other Blast Damage (p. 222)
- Internal Building Security: Protecting an Existing Building from Internal and External Biochemical Attack (p. 223)
- The Indoor Air Environment (p. 223)

- Redesign and Program Considerations for Protecting Buildings and Their Occupants from External and Internal Release of Biochemical Agents (p. 225)
- Relocation of Outdoor Air Intakes (p. 226)
- Emergency Egress: Currently Available Codes and Future Trends (p. 228)
- Guidelines, Codes, and Standards to Enhance Protection from Natural Disasters: Seismic, Wind, and Flood (p. 229)
- High Levels of Risk from One or More Natural Disasters (p. 231)
- Recent Changes by States and Major Cities to Their Codes, Statutes, and Ordinances for Existing Buildings (p. 234)
- New York City (p. 234)
- **Chicago** (p. 235)
- The Critical Role of the Construction Team Revisited (p. 236)
- Part III Addressing New Issues: Viewing the Building as a Complete Life-Cycle System (p. 239)
- **Overview** (p. 239)
- 7 Homeland Security and the Issues of Energy, Sustainability, Environment, Accessibility and New Products, Materials and Techniques (p. 241)
- The Department of Homeland Security: Its Structure, Programs, and Relationship to the Built Environment (p. 243)
- Department of Homeland Security Structure (p. 243)
- Policies That Impact the Construction Industry and Built Environment (p. 244)
- National Infrastructure Protection Plan and 17 Different Infrastructures (p. 246)
- Shift in Focus within DHS and Critical Infrastructure Community (p. 248)
- Blue Cascades III and the Need for Disaster Resiliency (p. 250)
- Resources and Best Practices: TISP and the Guide to Regional Disaster Resilience (p. 252)
- Homeland Security and Our Nation's Resilience Written Large: What Is It That Keeps Us Safe and Secure? (p. 253)
- Issues Impacting the Construction Team and Built Environment (p. 254)
- Energy and Environmental Quality as Part of Homeland Security (p. 254)
- Green as a Part of Homeland Security (p. 257)
- Building Green from Market Niche to Mainstream (p. 258)
- Sustainable Building Industry Council's Programs (p. 262)
- Sick and Healthy Buildings (p. 262)
- Changing Demographics and Accessibility (Emergency Egress) (p. 263)
- Information Technology and Its Impact on Industry (p. 265)
- Building Information Modeling and Three- and Four-Dimensional Virtual Design (p. 267)
- Information Technology Applied to Regulatory Processes (p. 269)
- Critical Role of New Products, Materials and Methods and Techniques (p. 272)
- New Technologies in Existence or Under Development (p. 273)
- New Products Existing or Under Development (p. 274)
- Impact on the Construction Team (p. 276)
- The Need to Write the Construction Team Larger: Insurance Industry, Banking Community, and Elected Officials (p. 277)
- The Insurance Industry (p. 277)

- The Banking Community (p. 278)
- The Elected Officials (p. 278)
- Partners in Disaster Resilience: Prevention, Response, Recovery (p. 279)
- Where Does All of This Take Us between Now and 2025? (p. 279)
- 8 A World Transformed: A Vision of One Possible Future for the Construction Industry and Construction Team (p. 281)
- At a Crossroads (p. 281)
- The Scenario: One Possible Vision of the Future (p. 286)
- The Construction Industry in 2025 (p. 286)
- How Do We Get There? A Convergence (p. 287)
- Growing Recognition of the Critical Role of Our Construction and Building Industry in a Time of National Need (p. 287)
- 9/11: Public Safety and Competitiveness as Catalysts for Convergence (p. 292)
- Toward a Common Vision for Enhanced Public Safety and Economic Competitiveness: Four Building Blocks That Already Are in Place (p. 292)
- We Aren't Alone: Great Britain's "Rethinking Construction" and Disaster Resilience Efforts (p. 297)
- Additional Building Blocks That Need to be Put in Place (p. 298)
- Federal Government Becomes a Catalyst (p. 299)
- Steps That Can Be Taken by the Construction Team to Fulfill This Vision (p. 300)
- Time and Opportunity to Act (p. 301)
- Appendix Resources, Web sites, and Chapter Notes (p. 303)
- **Objective** (p. 303)
- Part I Resources: List of Agencies and Organizations (p. 303)
- **Federal Government** (p. 304)
- State Government (p. 304)
- Local Government (County/Municipal/Townships) (p. 304)
- Associations Representing Public Sector (p. 305)
- Part II Chapter Notes (p. 306)
- Chapter 1 Codes and Regulations and the Construction Team (p. 306)
- The ICC International Codes (p. 308)
- The NFPA Codes and Standards Development Process (p. 312)
- Guide to More Effective and Efficient Codes Administration Charts (p. 316)
- Chapter 2 Challenges Facing the Construction Team: Revising Codes and Standards, Redefining Roles and Responsibilities (p. 317)
- Chapter 3 Findings from the World Trade Center Towers Collapse and Other Post-9/11 Disasters (p. 322)
- Chapter 4 Beginning with the End in Mind: Assessing Risk, Threats, and Mitigation Strategies (p. 323)
- Chapter 5 Existing Construction Standards, Codes, Practices, and Guidelines That Promote Security and Disaster Resilience in New Construction (p. 324)
- Chapter 6 Existing Buildings: Inspections And Retrofitting (p. 325)
- Chapter 7 Homeland Security and the Issues of Energy, Sustainability, Environment, Accessibility, and New Products, Materials, and Techniques (p. 326)
- Chapter 8 A World Transformed: A Vision of One Possible Future for the Construction Industry and Construction Team (p. 330)