

BUILDING DESIGN FOR HOMELAND SECURITY

Unit I

Building Design for Homeland Security



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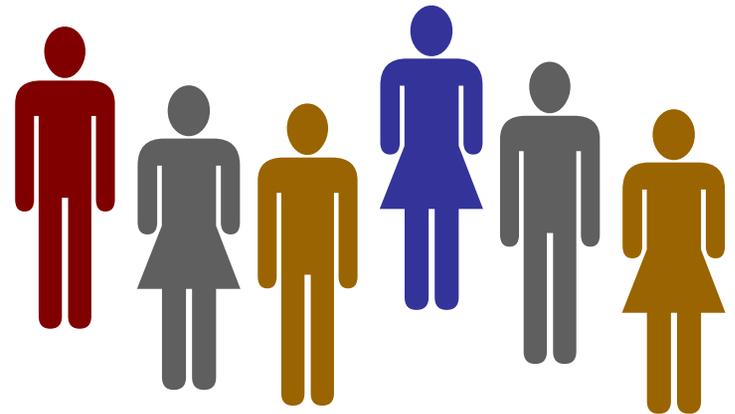
Student Introductions

Name

Affiliation

Area of Concentration

Course Expectations



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Purpose of Course and FEMA 426 Manual

Provide guidance to building sciences community

Decision-makers determine which threats and mitigation measures

Mitigation Information

- Not mandatory
- Not applicable to all buildings
- Not applicable when it interferes with other hazards



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Course Goal

To enhance student understanding of the measures and technology available to reduce risk from terrorist attack.



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U.S. AIR FORCE



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Course Objectives

Students will be able to:

1. **Explain** the basic components of the assessment methodology.
2. **Appreciate** the different assessment methodology approaches that can be used.
3. **Perform** an assessment for a building by identifying and prioritizing assets, threats, and vulnerabilities and calculating relative risk.



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Course Objectives

4. **Identify** available mitigation measures applicable to the site and building envelope.
5. **Understand** the technology limitations and application details of mitigation measures for terrorist tactics and technological accidents.
6. **Perform** an assessment for a given building by identifying vulnerabilities using the Building Vulnerability Assessment Checklist in FEMA 426.



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Course Objectives

- 7. Select** applicable mitigation measures and prioritize them based upon the final assessment risk values.
- 8. Appreciate** that designing a building to mitigate terrorist attacks can create conflicts with other design requirements.



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Course Overview – Day 1

Unit I – Introduction and Course Overview

Unit II – Asset Value Assessment

Unit III – Threat / Hazard Assessment

Unit IV – Vulnerability Assessment

Unit V – Risk Assessment / Risk Management



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Course Overview – Day 2

Unit VI – FEMA 452 Risk Assessment Database

Unit VII – Explosive Blast

Unit VIII – Chemical, Biological, and Radiological
(CBR) Measures

Exam and Exam Review

Unit IX – Site and Layout Design Guidance



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Course Overview – Day 3

Unit X – Building Design Guidance

Unit XI – Electronic Security Systems

Unit XII – Finalization of Case Study Results

Unit XIII – Course Wrap-up



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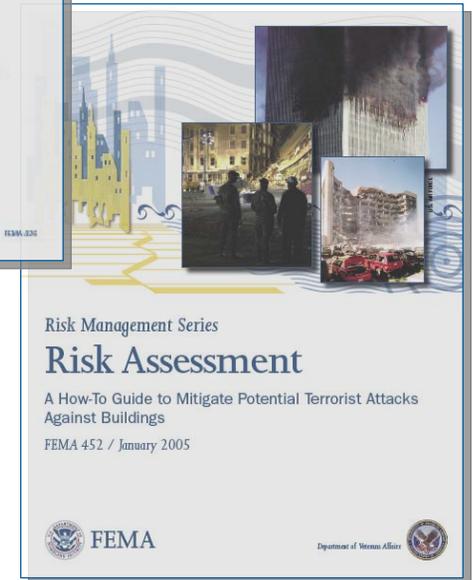
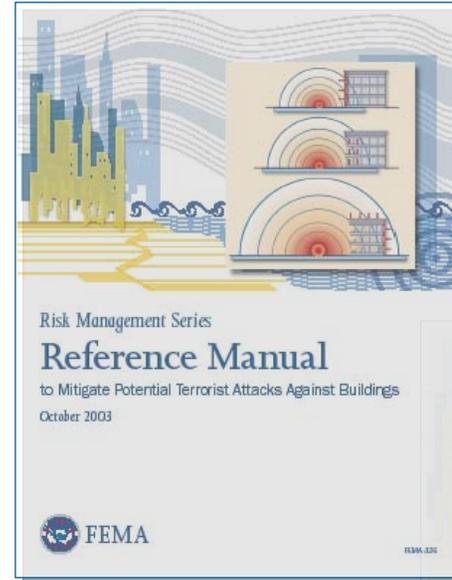
Course Materials

FEMA Publication 426

Reference Manual
to Mitigate Potential Terrorist
Attacks Against Buildings

FEMA Publication 452

**Risk Assessment: A How-To
Guide to Mitigate Potential
Terrorist Threats Against
Buildings**



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FEMA 426 Reference Manual

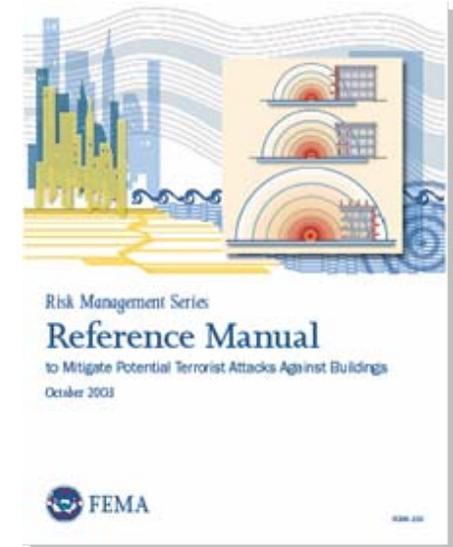
Chapter 1 – Asset Value, Threat/Hazard, Vulnerability, and Risk

Chapter 2 – Site and Layout Design Guidance

Chapter 3 – Building Design Guidance

Chapter 4 – Explosive Blast

Chapter 5 – CBR Measures



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FEMA 426 Reference Manual

Appendix A – Acronyms

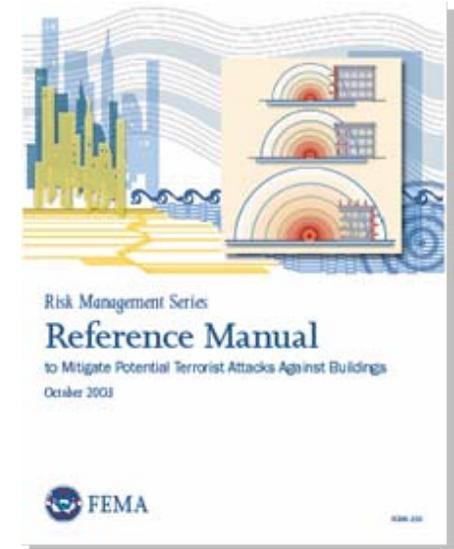
Appendix B – General Glossary

Appendix C – CBR Glossary

Appendix D – Electronic Security Systems

Appendix E – Bibliography

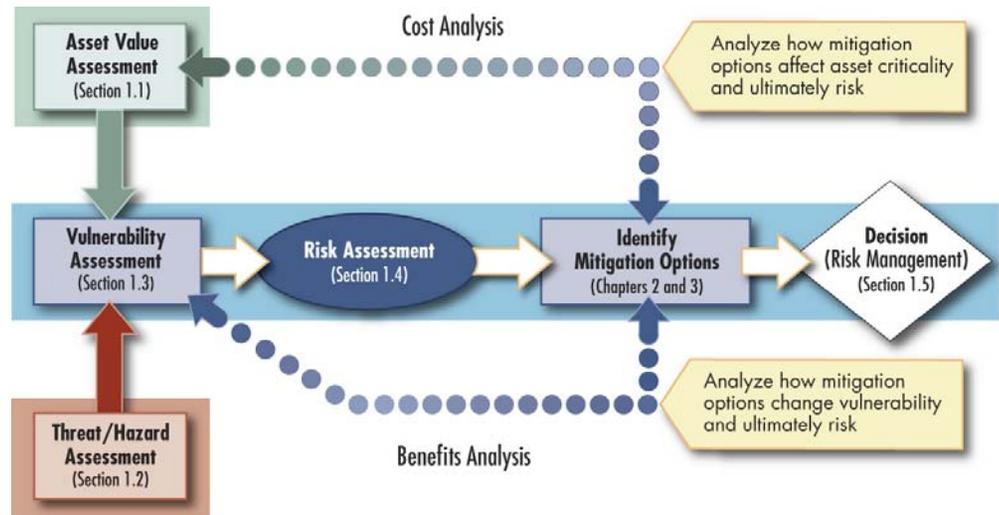
Appendix F – Associations and Organizations



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FEMA 426 – Chapter 1

- Asset Value Assessment
- Threat/Hazard Assessment
- Vulnerability Assessment
- Risk Assessment
- Risk Management
- Building Vulnerability Assessment Checklist



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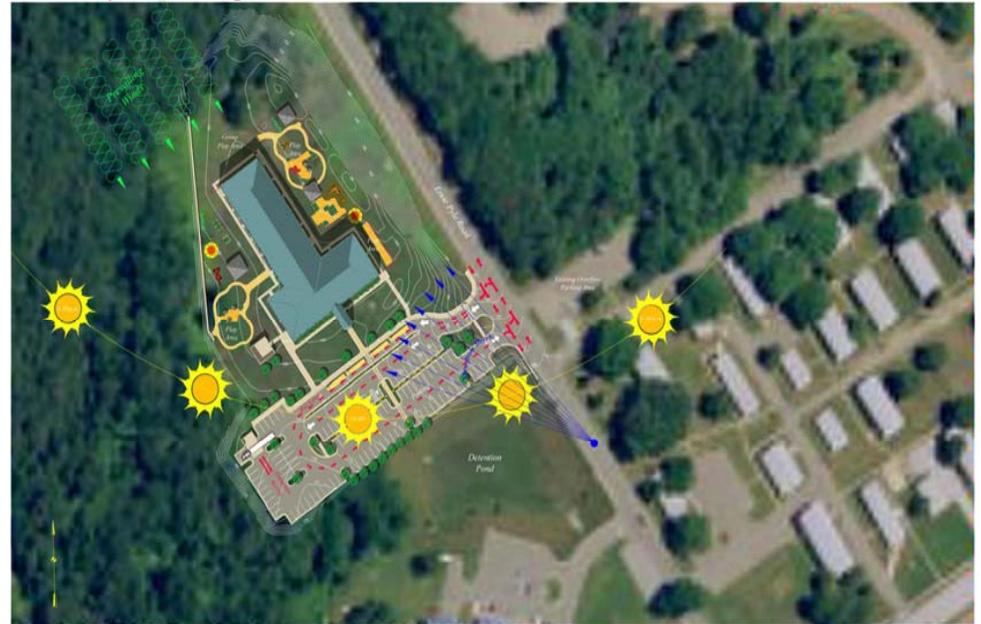
FEMA 426, Figure 1-3: The Assessment Process Model, p. 1-5

FEMA 426 – Chapter 2

Site and Layout Design

- Layout Design
- Siting
- Entry Control/Vehicle Access
- Signage
- Parking
- Loading Docks
- Physical Security Lighting
- Site Utilities

Site Analysis Drawing



Samaha
Associates

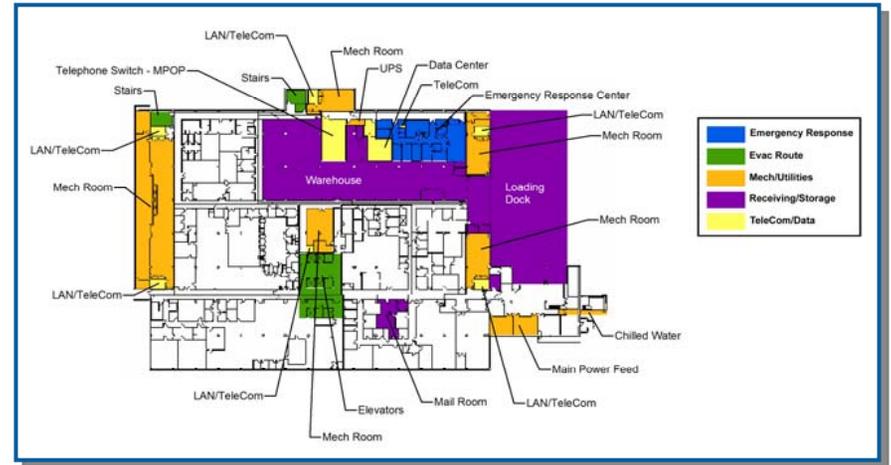


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FEMA 426 – Chapter 3

Building Design Guidance

- Architectural
- Building Structural and Nonstructural Considerations
- Building Envelope considerations
- Other Building Design Issues
- Building Mitigation Measures



FEMA 426, Figure 1-10: Non-Redundant Critical Functions Collocated Near Loading Dock, p. 1-41

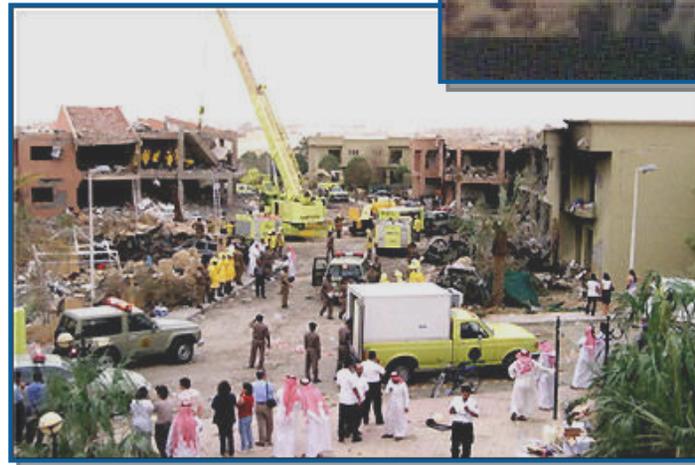


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FEMA 426 – Chapter 4

Explosive Blast

- Building Damage
- Blast Effects and Predictions
- Stand-off Distance
- Progressive Collapse



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FEMA 426 – Chapter 5

CBR Measures

- Evacuation
- Sheltering in Place
- Personal Protective Equipment
- Filtering and Pressurization
- Exhausting and Purging



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FEMA 452 Risk Assessment How-To

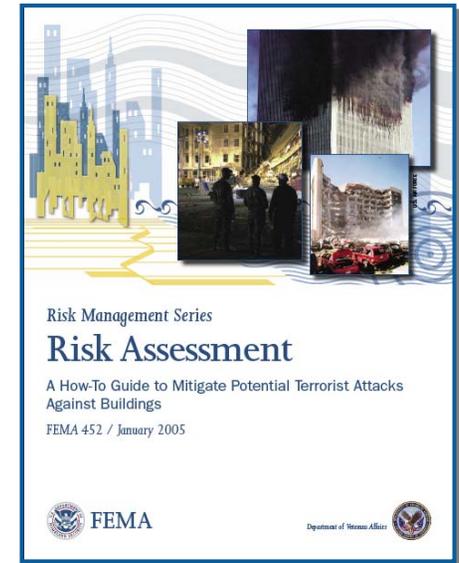
Step 1 – Threat Identification and Rating

Step 2 – Asset Value Assessment

Step 3 – Vulnerability Assessment

Step 4 – Risk Assessment

Step 5 – Consider Mitigation Options



FEMA 452 Risk Assessment How-To

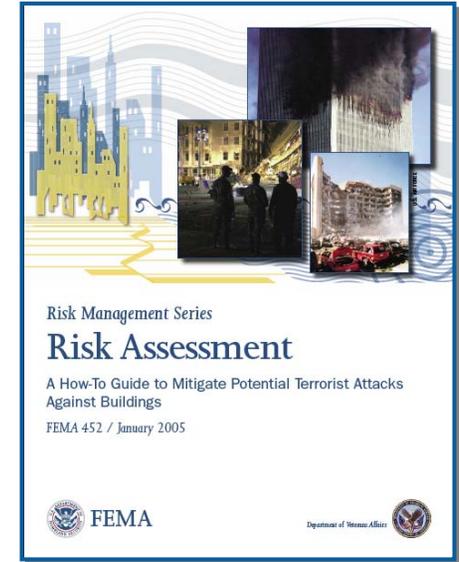
Appendix A – Building Vulnerability Assessment Checklist

Appendix B1 – Risk Management Database v1.0: Assessor's User Guide

Appendix B2 – Risk Management Database v1.0: Database Administrator's User Guide

Appendix B3 – Risk Management Database v1.0: Manager's User Guide

Appendix C – Acronyms and Abbreviations



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Summary

FEMA 426 and 452 are intended for building sciences professionals.

Manmade hazards risk assessments use a “Design Basis Threat.”

Site and building systems and infrastructure protection are provided by layers of defense.

Multiple mitigation options and techniques.

Use cost-effective multihazard analysis and design.

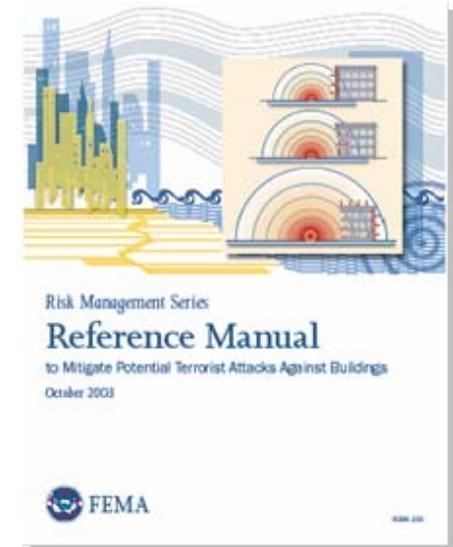


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Case Study Activities

In small group settings, apply concepts introduced in the course.

Become conversant with contents and organization of FEMA 426.



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HAZARDVILLE INFORMATION COMPANY (HIC)

Case Study

Small IT / Communications / Data Center Company

- Occupies portion of building rented in Suburban Office Park
- Data center and communications for off-site clients



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Hazardville Information Company



Hazardville Information Company (HIC)



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Mission

Regional Computer Center

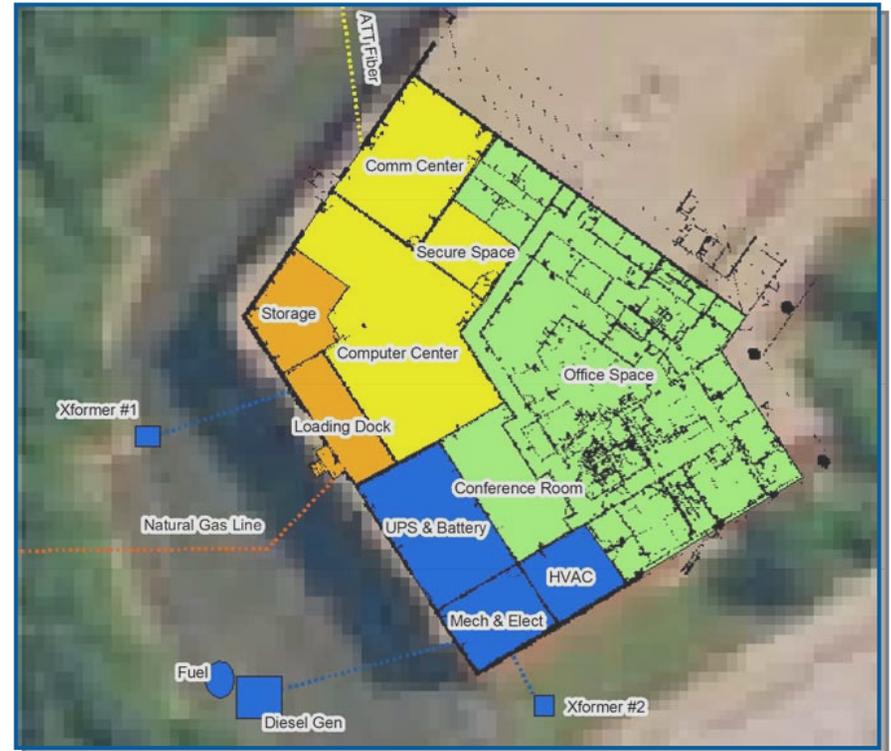
- Real-time IT support
- Backup services
- 24 x 7 operations

Customers

- Government and commercial
- Some classified work

Layout

- Downstairs: Computers, Communications, Staff
- Upstairs: Executive offices
- Loading dock, Storage



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Threat Analysis

Terrorist Threat

Intelligence Threat

Criminal Threat



FEMA 426, Figure 2-1: An Example of Using GIS to Identify Adjacent Hazards, p. 2-5

Hazard Analysis

HazMat

- Facilities
- Highway
- Rail

Liquid Fuels



Air Traffic

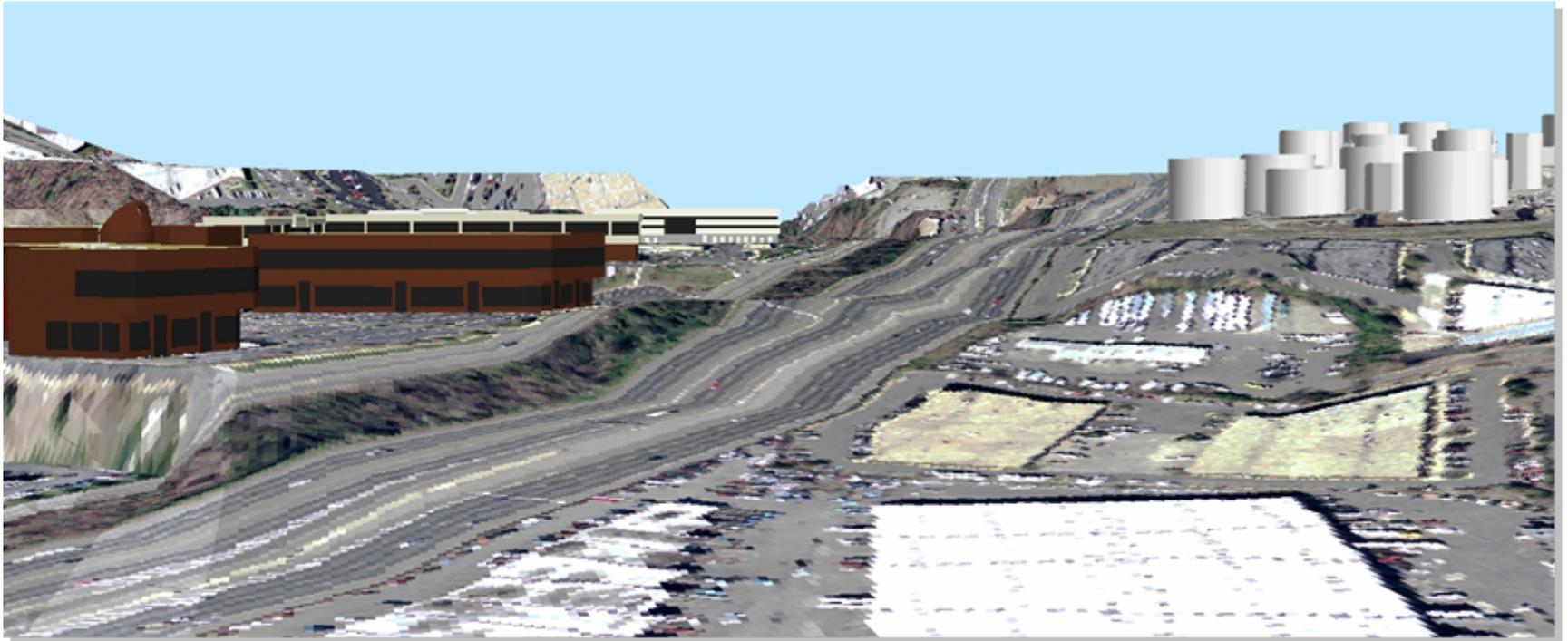


Natural Hazards



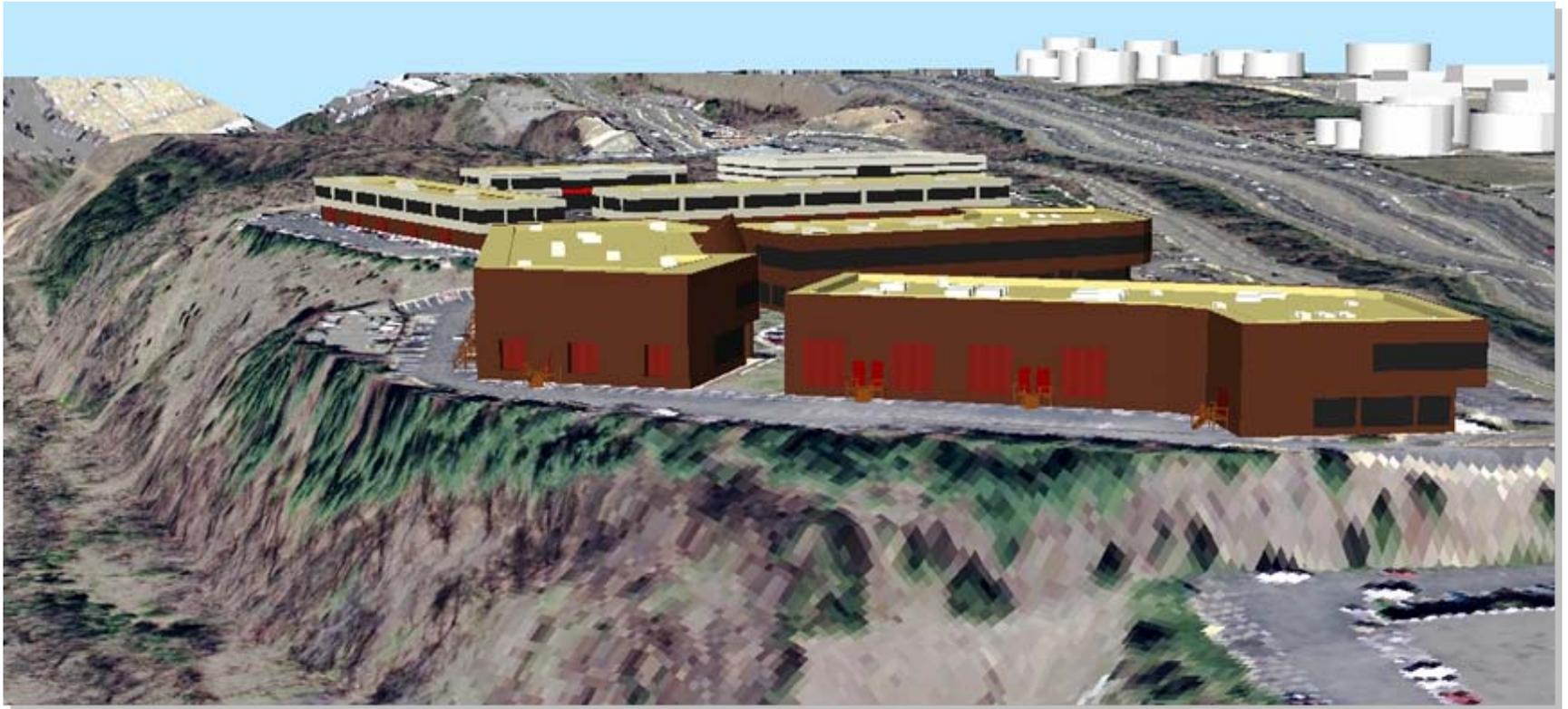
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Computerized Elevation Looking Northwest



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Computerized Elevation Looking Northeast



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Building Data

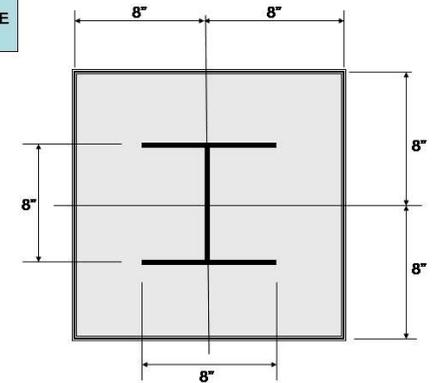


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Building Structure



COLUMN ENCLOSURE DETAIL



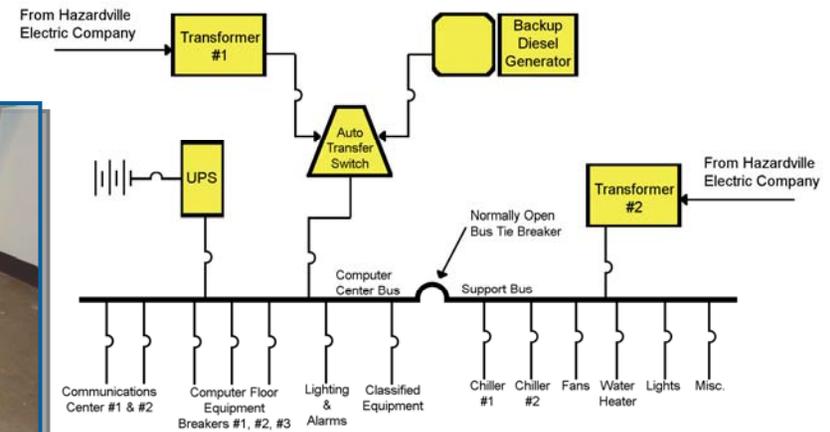
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Mechanical Systems



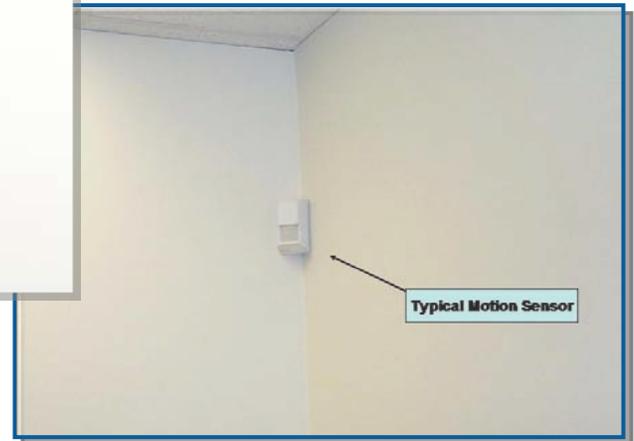
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Electrical Systems



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Physical Security



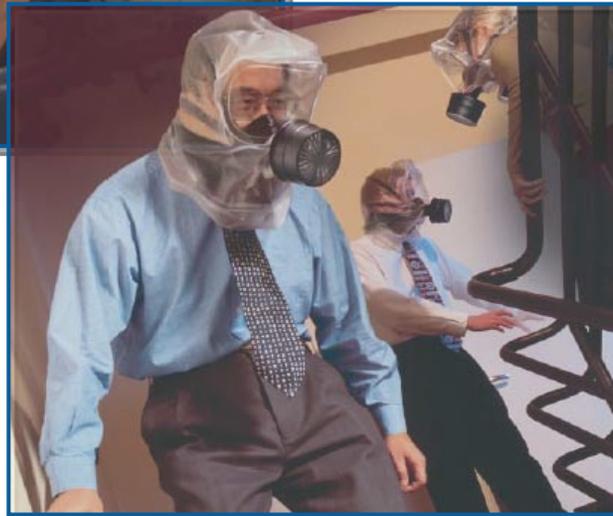
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IT Systems



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Emergency Response



Source: Mine Safety Appliances Company



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Design Basis Threat

Explosive Blast: Car Bomb 250 lb TNT equivalent. Truck Bomb 5,000 lb TNT equivalent (Murrah Federal Building class weapon)

Chemical: Large quantity gasoline spill and toxic plume from the adjacent tank farm, small quantity (tanker truck and rail car size) spills of HazMat materials (chlorine)

Biological: Anthrax delivered by mail or in packages, smallpox distributed by spray mechanism mounted on truck or aircraft in metropolitan area

Radiological: Small “dirty” bomb detonation within the 10-mile radius of the HIC building



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Design Basis Threat

Criminal Activity/Armed Attack: High powered rifle or handgun exterior shooting (sniper attack or direct assault on key staff, damage to infrastructure [e.g., transformers, chillers, etc.]

Cyber Attack: Focus on IT and building systems infrastructure (SCADA, alarms, etc.) accessible via Internet access



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Levels of Protection and Layers of Defense

Levels of Protection for Buildings

- GSA Interagency Security Criteria Level II Building
- DoD Low Inhabited Building

Elements of the Layers of Defense Strategy

- Deter
- Detect
- Deny
- Devalue

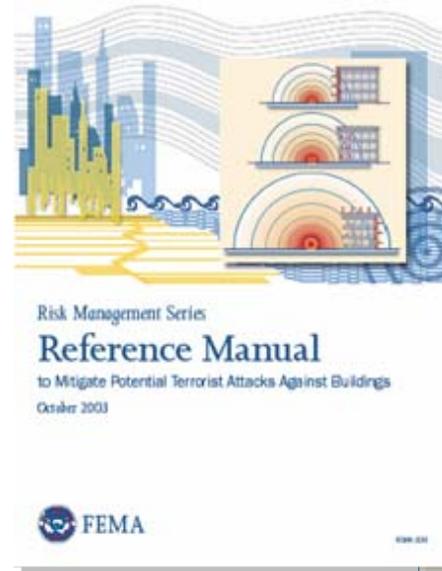


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Summary

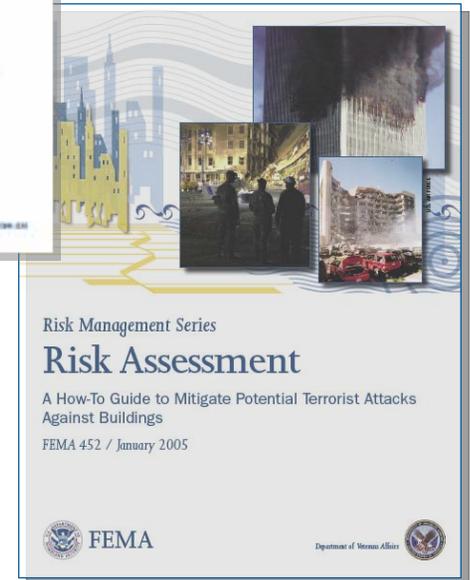
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Unit I Case Study Activity

Introduction and Overview

Background

Emphasis:

- Refamiliarize yourself with Appendix S, Case Study
- Get acquainted with FEMA 426

Requirements

Refer to Case Study and, as a team, answer worksheet questions

Use Case Study data to answer worksheet questions

- Ask instructors any clarifying questions based upon your experience



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