Unit III
Threat / Hazard Assessment

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Unit Objectives

Identify the threats and hazards that may impact a building or site.

Define each threat and hazard using the FEMA 426 methodology.

Provide a numerical rating for the threat or hazard and justify the basis for the rating.

Define the Design Basis Threat, Levels of Protection, and Layers of Defense.

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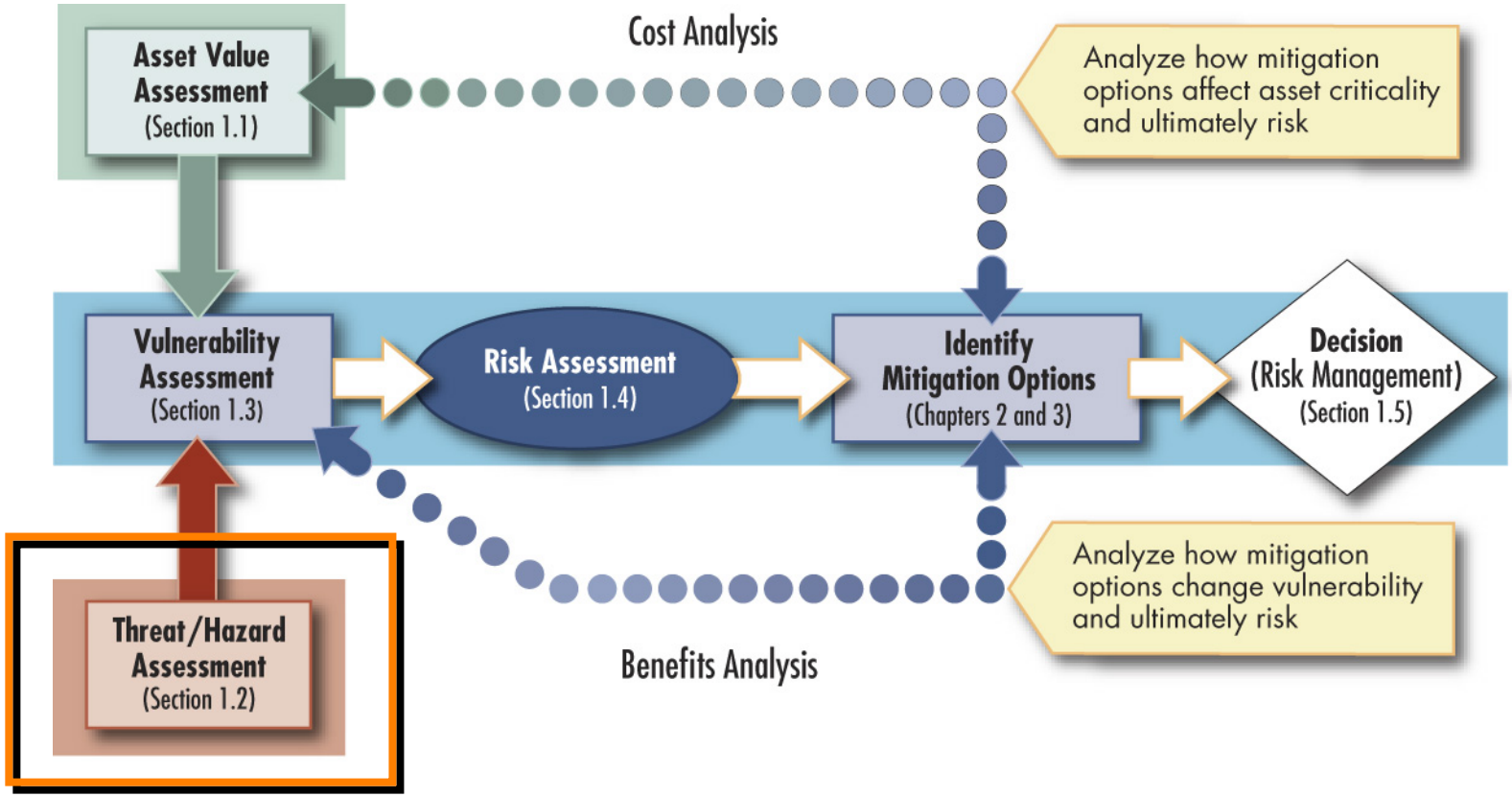
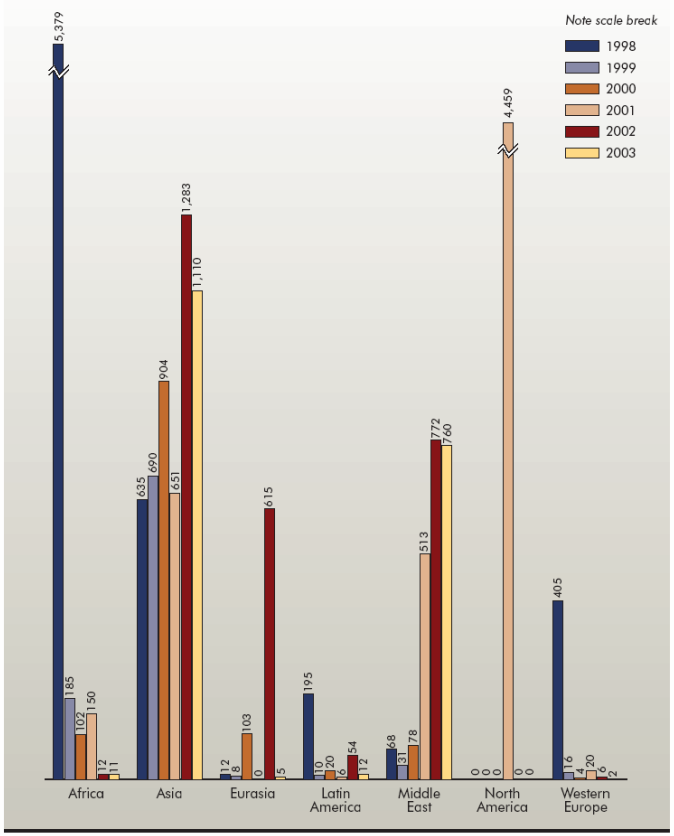
Assessment Flow Chart



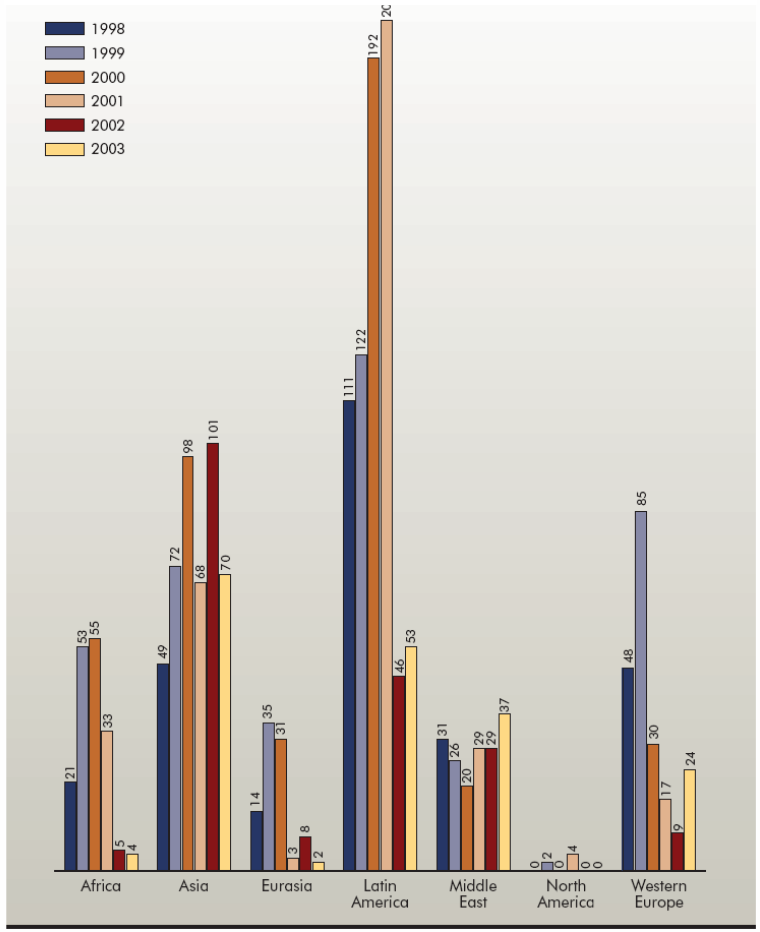
FEMA 426, Figure 1-3: The Assessment Process Model, p. 1-5

Nature of the Threat

International Casualties by Region 1998-2003



International Attacks by Region 1998-2003



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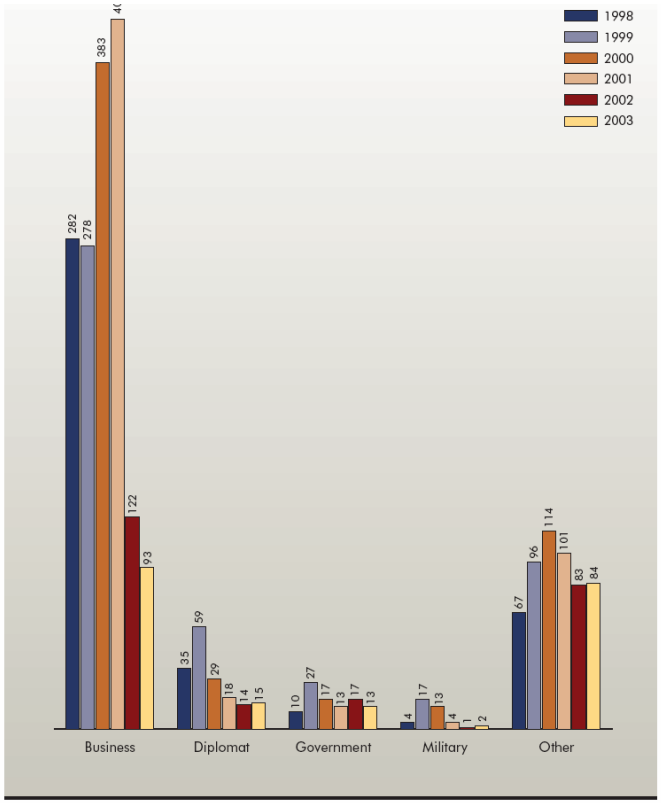
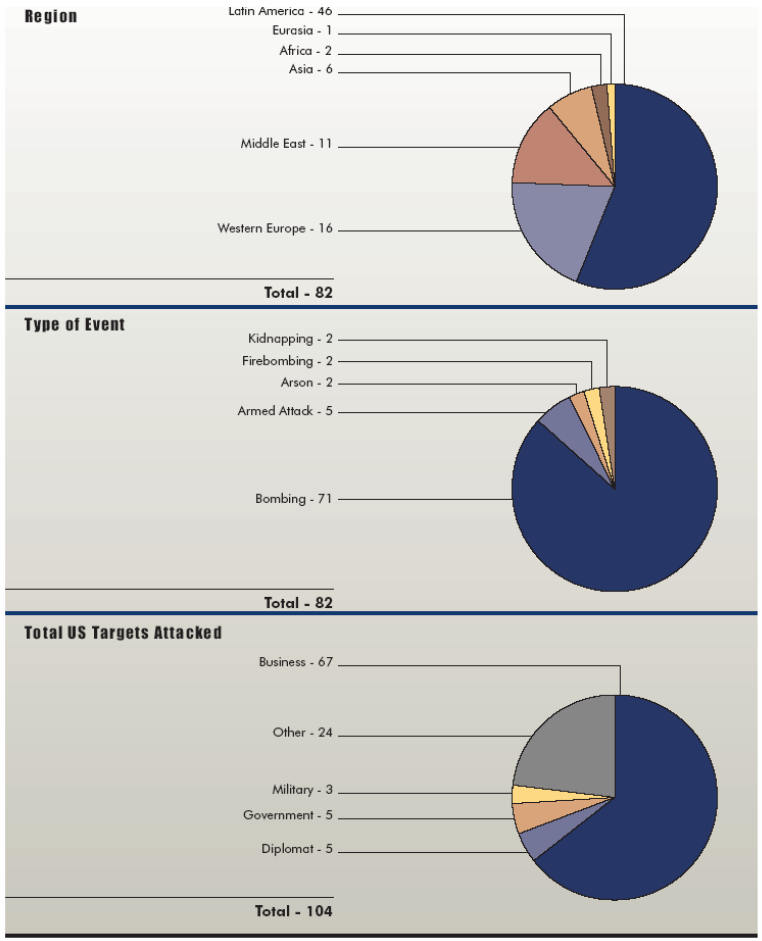
From *Patterns of Global Terrorism 2003 Department of State April* 2004

Nature of the Threat

Facilities Struck by International Attacks 1998-2003



Total Anti-US Attacks 2003



From *Patterns of Global Terrorism 2003 Department of State April* 2004

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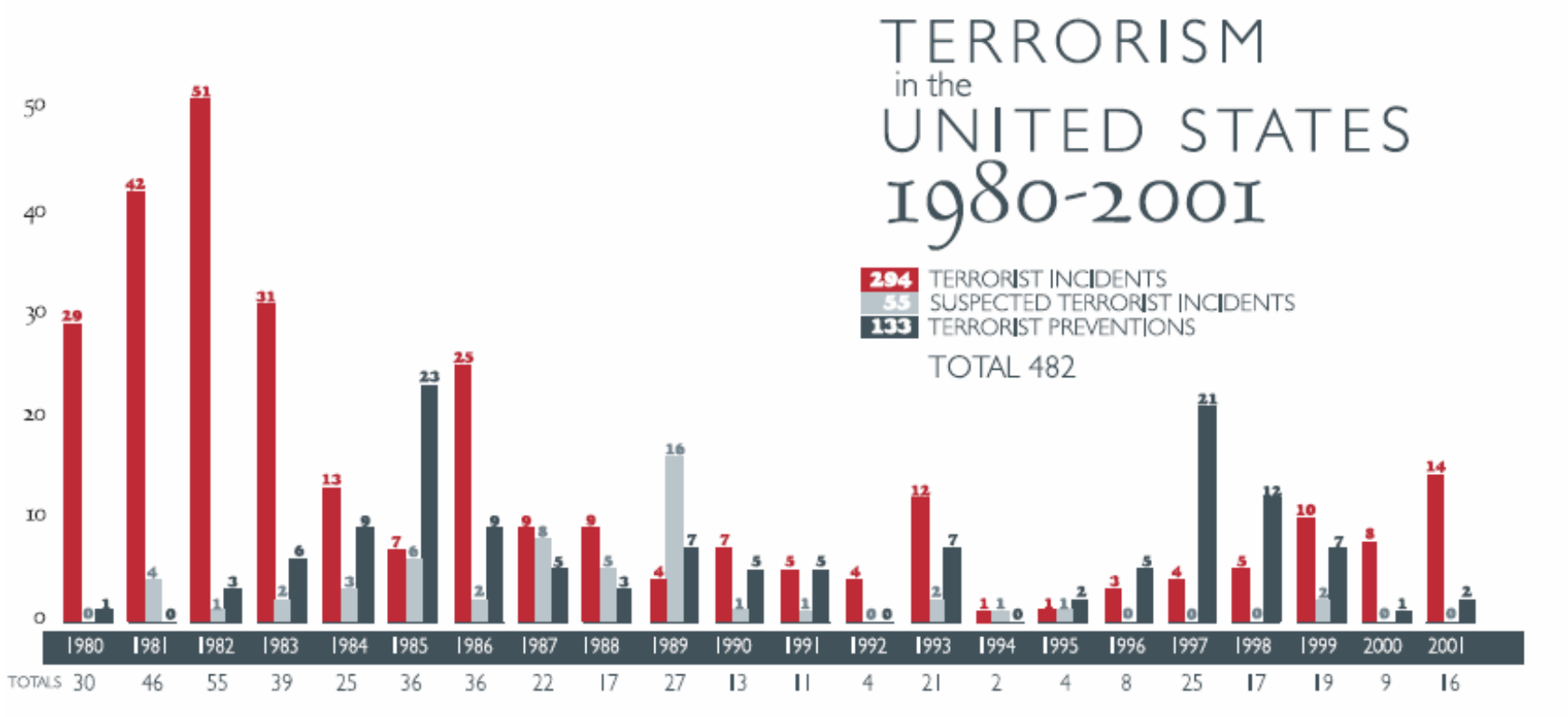
Nature of the Threat



From *Terrorism 2000/2001 FBI Publication #0308*

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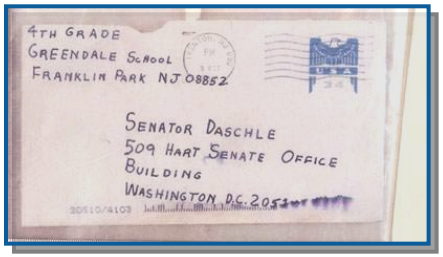
CBR Terrorist Incidents Since 1970



1972 Typhoid

1984 Salmonella
200 Injured

1984 Botulinum

1985 Cyanide

June 1994 Sarin
7 Dead, 200 Injured

1992 Cyanide

March 1995 Ricin

April 1995 Sarin

March 1995 Sarin
12 Dead, 5,500 Affected

May 1995 Plague

April-June 1995 Cyanide, Phosgene, Pepper Spray

April 1997 U235

February 1997 Chlorine
14 Injured, 500 Evacuated

March 1998 Cesium-137

November 1995 Radioactive Cesium

December 1995 Ricin

June 1996 Uranium

2001 Anthrax

70 75 80 85 90 95 00

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Hazard

Hazard - A source of potential danger or adverse condition.

- Natural Hazards are naturally-occurring events such as floods, earthquakes, tornadoes, tsunami, coastal storms, landslides, hurricanes, and wildfires.

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Manmade Threats

Threats – Any indication, circumstance, or event with the potential to cause loss of, or damage to an asset. They can be technological accidents and terrorist attacks.

Technological accident

Terrorism act

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Threat Overview

Any indication, circumstance, or event with the potential to cause loss of, or damage to an asset

Involves two steps:

- **Selection of primary threats:** tools and tactics as well as people with intent to cause harm
- **Determine the threat rating:** a parameter used to quantify your losses

Weapons, tools, and tactics can change faster than a building can be modified.

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Threat Overview

- Improvised Explosive Device (Bomb)
- Armed Attack
- Chemical Agent
- Biological Agent
- Radiological Agent
- Cyberterrorism

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Step 1: Selection of Primary Threats

Criteria

Selected Threats

- Cyber Attack
- Armed Attack
- Vehicle Bomb
- CBR Attack

Criteria							
Scenario	**Access to Agent**	**Knowledge/ Expertise**	**History of Threats (Building Functions/ Tenants)**	**Asset Visibility/ Symbolic**	**Asset Accessibility**	**Site Population/ Capacity**	**Level of Defense**
9-10	Readily available	Basic knowledge/ open source	Local incident, occurred recently, caused great damage; building functions and tenants were primary targets	Existence widely known/ iconic	Open access, unrestricted parking	> 5,000	Little to no defense against threats. No security design was taken into consideration and no mitigation measures adopted.
6-8	Easy to produce	Bachelor's degree or technical school/open scientific or technical literature	Regional/State incident, occurred a few years ago, caused substantial damage; building functions and tenants were one of the primary targets	Existence locally known/ landmark	Open access, restricted parking	1,001-5,000	Minimal defense against threats. Minimal security design was taken into consideration and minimal mitigation measures adopted.
3-5	Difficult to produce or acquire	Advanced training/rare scientific or declassified literature	National incident, occurred some time in the past, caused important damage; building functions and tenants were one of the primary targets	Existence published/ well-known	Controlled access, protected entry	251-1,000	Significant defense against threats. Significant security design was taken into consideration and substantial mitigation measures adopted.
1-2	Very difficult to produce or acquire	Advanced degree or training/ classified information	International incident, occurred many years ago, caused localized damage; building functions and tenants were not the primary targets	Existence not well-known/ no symbolic importance	Remote location, secure perimeter, armed guards, tightly controlled access	1-250	Extensive defense against threats. Extensive security design was taken into consideration and extensive mitigation measures adopted.

FEMA 452, Table 1-4: Criteria to Select Primary Threats, p. 1-20

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Step 1: Selection of Primary Threats

Scenario	Criteria: Access to Agent	Knowledge/ Expertise	History of Threats (Building Functions/ Tenants)	Asset Visibility/ Symbolic	Asset Accessibility	Site Population/ Capacity	Level of Defense	Score
Improvised Explosive Device (Bomb)								
1-lb. Mail Bomb	9	9	3	8	3	10	3	45
5-lb. Pipe Bomb	9	9	3	8	3	10	3	45
50-lb. Satchel Bomb/Suicide Bomber	8	8	6	8	3	10	5	48
500-lb. Car Bomb	6	8	7	8	3	10		
5,000-lb. Truck Bomb	4	8	5	8	3	10		
20,000-lb. Truck Bomb	2	6	1	8	3	10		
Natural Gas	2	8	1	8	3	10		

Scenario		Criteria: Access to Agent	Knowledge/ Expertise	History of Threats (Building Functions/ Tenants)	Asset Visibility/ Symbolic	Asset Accessibility	Site Population/ Capacity	Level of Defense	Score
Chemical Agent									
Choking	Chlorine	5	7	2	8	3	10	5	40
Choking	Phosgene	3	10	2	8	3	10	5	41
Blood	Hydrogen Cyanide	3	8	2	8	3	10	5	39
Blister	Lewisite	3	6	2	8	3	10	5	37
Nerve	Sarin	3	4	9	8	3	10	5	42

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FEMA 452, Adaptation of Table 1-5: Nominal Example to Select Primary Threats for a Specific Urban Multi-story Building, p. 1-21

Step 2: Determine the Threat Rating

Threat Rating		
Very High	10	Very High – The likelihood of a threat, weapon, and tactic being used against the site or building is imminent. Internal decision-makers and/or external law enforcement and intelligence agencies determine the threat is credible.
High	8-9	High – The likelihood of a threat, weapon, and tactic being used against the site or building is expected. Internal decision-makers and/or external law enforcement and intelligence agencies determine the threat is credible.
Medium High	7	Medium High – The likelihood of a threat, weapon, and tactic being used against the site or building is probable. Internal decision-makers and/or external law enforcement and intelligence agencies determine the threat is credible.

Key elements

- Likelihood of a threat (credible, verified, exists, unlikely, unknown)
- If the use of the weapon is considered imminent, expected, or probable

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FEMA 452 Table 1-6: Threat Rating, p. 1-24

Step 2: Determine the Threat Rating (continued)

Threat Rating		
Medium	5-6	Medium – The likelihood of a threat, weapon, and tactic being used against the site or building is possible. Internal decision-makers and/or external law enforcement and intelligence agencies determine the threat is known, but is not verified.
Medium Low	4	Medium Low – The likelihood of a threat, weapon, and tactic being used in the region is probable. Internal decision-makers and/or external law enforcement and intelligence agencies determine the threat is known, but is not likely.
Low	2-3	Low – The likelihood of a threat, weapon, and tactic being used in the region is possible. Internal decision-makers and/or external law enforcement and intelligence agencies determine the threat exists, but is not likely.
Very Low	1	Very Low – The likelihood of a threat, weapon, and tactic being used in the region or against the site or building is very negligible. Internal decision-makers and/or external law enforcement and intelligence agencies determine the threat is non-existent or extremely unlikely.

Key elements

- Likelihood of a threat (credible, verified, exists, unlikely, unknown)
- If the use of the weapon is considered imminent, expected, or probable

FEMA 452 Table 1-6: Threat Rating, p. 1-24

Critical Functions

Function	Cyber attack	Armed attack (single gunman)	Vehicle bomb	CBR attack
Administration				
Asset Value	5	5	5	5
Threat Rating	**8**	**4**	**3**	**2**
Vulnerability Rating				
Engineering				
Asset Value	8	8	8	8
Threat Rating	**8**	**5**	**6**	**2**
Vulnerability Rating				

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FEMA 426, Adaptation of Table 1-20: Site Functional Pre-Assessment Screening Matrix, p. 1-38

Critical Infrastructure

Infrastructure	Cyber attack	Armed attack (single gunman)	Vehicle bomb	CBR attack
Site				
Asset Value	4	4	4	4
Threat Rating	**4**	**4**	**3**	**2**
Vulnerability Rating				
Structural Systems				
Asset Value	8	8	8	8
Threat Rating	**3**	**4**	**3**	**2**
Vulnerability Rating				

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FEMA 426, Adaptation of Table 1-21: Site Infrastructure Systems Pre-Assessment Screening Matrix, p. 1-39

Threat Sources

Identify Threat Statements

Identify Area Threats

Identify Facility-Specific Threats

Identify Potential Threat Element Attributes

Seek information from local law enforcement, FBI, U.S. Department of Homeland Security, and Homeland Security Offices at the state level.

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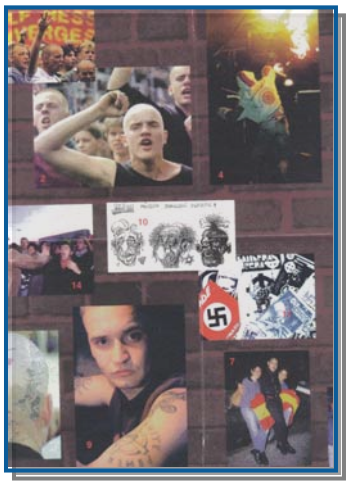
FEMA 426, p. 1-14 to 1-15

Design Basis Threat

The threat against which assets within a building must be protected and upon which the security engineering design of the building is based.



Levels of Protection

Layers of Defense Elements

- Deter
- Detect
- Deny
- Devalue

The strategy of Layers of Defense uses the elements and Levels of Protection to develop mitigation options to counter or defeat the tactics, weapons, and effects of an attack defined by the Design Basis Threat.

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FEMA 426, p. 1-9

Levels of Protection

Deter: The process of making the target inaccessible or difficult to defeat with the weapon or tactic selected. It is usually accomplished at the site perimeter using highly visible electronic security systems, fencing, barriers, lighting and security personnel; and in the building by security access with locks and electronic monitoring devices.

Detect: The process of using intelligence sharing and security services response to monitor and identify the threat before it penetrates the site perimeter or building access points.

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FEMA 426, p. 1-9

Levels of Protection

Deny: The process of minimizing or delaying the degree of site or building infrastructure damage or loss of life or protecting assets by designing or using infrastructure and equipment designed to withstand blast and chemical, biological, or radiological effects.

Devalue: The process of making the site or building of little to no value or consequence, from the terrorists' perspective, such that an attack on the facility would not yield their desired result.

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FEMA 426, p. 1-9

Levels of Protection

Level**	Typical Location	Examples of Tenant Agencies***	Security Measures (based on evaluation)
I	10 Employees (Federal) 2,500 Square Feet Low Volume Public Contact Small "Store Front" Type Operation	Local Office District Office Visitor Center USDA Office Ranger Station Commercial Facilities Industrial/Manufacturing Health Care	High Security Locks Intercom Peep Hole (Wide View) Lighting w/Emergency Backup Power Controlled Utility Access Annual Employee Security Training
II	11 - 150 Employees (Federal) 2,500 - 80,000 Square Feet Moderate Volume Public Contact Routine Operations Similar to Private Sector and/or Facility Shared with Private Sector	Public Officials Park Headquarters Regional/State Offices Commercial Facilities Industrial Manufacturing Health Care	Entry Control Package w/Closed Circuit Television (CCTV) Visitor Control/Screening Shipping/Receiving Procedures Guard/Patrol Assessment Intrusion Detection w/Central Monitoring CCTV Surveillance (Pan-Tilt, Zoom System) Duress Alarm w/Central Monitoring

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FEMA 426, Table 1-6: Classification Table Extracts, p. 1-26

Levels of Protection (continued)

Level**	Typical Location	Examples of Tenant Agencies***	Security Measures (based on evaluation)
III	151 - 450 Employees (Federal) Multi-Story Facility 80,000 - 150,000 Square Feet Moderate/High Volume Public Contact Agency Mix: Law Enforcement Operations Court Functions Government Records	Inspectors General Criminal Investigations Regional/State Offices GSA Field Office Local Schools Commercial Facilities Industrial Manufacturing Health Care	Guard Patrol on Site Visitor Control/Screening Shipping/Receiving Procedures Intrusion Detection w/Central Monitoring CCTV Surveillance (Pan-Tilt/Zoom System) Duress Alarm w/Central Monitoring
IV	>450 Employees (Federal) Multi-Story Facility >150,000 Square Feet High Volume Public Contact High-Risk Law Enforcement/Intelligence Agencies District Court	Significant Buildings and Some Headquarters Federal Law Enforcement Agencies Local Schools, Universities Commercial Facilities Health Care	Extend Perimeter (Concrete/Steel Barriers) 24-Hour Guard Patrol Adjacent Parking Control Backup Power System Hardened Parking Barriers
V	Level IV Profile and Agency/Mission Critical to National Security	Principal Department Headquarters	Agency-Specific

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FEMA 426, Table 1-6: Classification Table Extracts, p. 1-26

Levels of Protection

DoD Minimum Antiterrorism (AT) Standards for New Buildings

Level of Protection	Potential Structural Damage	Potential Door and Glazing Hazards	Potential Injury
Below AT standards	Severely damaged. Frame collapse/ massive destruction. Little left standing.	Doors and windows fail and result in lethal hazards	Majority of personnel suffer fatalities.
Very Low	Heavily damaged - onset of structural collapse. Major deformation of primary and secondary structural members, but progressive collapse is unlikely. Collapse of non-structural elements.	Glazing will break and is likely to be propelled into the building, resulting in serious glazing fragment injuries, but fragments will be reduced. Doors may be propelled into rooms, presenting serious hazards.	Majority of personnel suffer serious injuries. There are likely to be a limited number (10 percent to 25 percent) of fatalities.

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FEMA 426, Table 4-1, p. 4-9

Levels of Protection (continued)

Level of Protection	Potential Structural Damage	Potential Door and Glazing Hazards	Potential Injury
Low	Damaged – unrepairable. Major deformation of non-structural elements and secondary structural members, and minor deformation of primary structural members, but progressive collapse is unlikely.	Glazing will break, but fall within 1 meter of the wall or otherwise not present a significant fragment hazard. Doors may fail, but they will rebound out of their frames, presenting minimal hazards.	Majority of personnel suffer significant injuries. There may be a few (<10 percent) fatalities.
Medium	Damaged – repairable. Minor deformations of non-structural elements and secondary structural members and no permanent deformation in primary structural members.	Glazing will break, but will remain in the window frame. Doors will stay in frames, but will not be reusable.	Some minor injuries, but fatalities are unlikely.
High	Superficially damaged. No permanent deformation of primary and secondary structural members or non-structural elements.	Glazing will not break. Doors will be reusable.	Only superficial injuries are likely.

DoD Minimum Standards

FEMA 426, Table 4-1, p. 4-9

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Levels of Protection

UFC 4-010-01 APPENDIX B DoD MINIMUM ANTITERRORISM STANDARDS FOR NEW AND EXISTING BUILDINGS	
Standard 1	Standoff Distances
Standard 2	Unobstructed Space
Standard 3	Drive-Up/Drop-Off Areas
Standard 4	Access Roads
Standard 5	Parking Beneath Buildings or on Rooftops
Standard 6	Progressive Collapse Avoidance
Standard 7	Structural Isolation
Standard 8	Building Overhangs
Standard 9	Exterior Masonry Walls
Standard 10	Windows and Skylights
Standard 11	Building Entrance Layout
Standard 12	Exterior Doors

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Levels of Protection

UFC 4-010-01 APPENDIX B DoD MINIMUM ANTITERRORISM STANDARDS FOR NEW AND EXISTING BUILDINGS	
Standard 13	Mail Rooms
Standard 14	Roof Access
Standard 15	Overhead Mounted Architectural Features
Standard 16	Air Intakes
Standard 17	Mail Room Ventilation
Standard 18	Emergency Air Distribution Shutoff
Standard 19	Utility Distribution and Installation
Standard 20	Equipment Bracing
Standard 21	Under Building Access
Standard 22	Mass Notification

Summary

Process

- Identify each threat/hazard
- Define each threat/hazard
- Determine threat rating for each threat/hazard

Threat Assessment Specialists

Critical Infrastructure and Critical Function Matrix

Determine the “Design Basis Threat”

Select the “Level of Protection”

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Threat/Hazard Rating Considerations

Go to Page SM III-C-2 in your Student Manual

1. Asset visibility, proximity, or locality
2. Asset usefulness ($, goals, publicity)
3. Asset availability
4. Local incidents in past
5. Geographic area incidents in past
6. Potential for future incidents (# terrorist groups, # HAZMAT sites, natural hazard history)
7. Accessibility to asset
8. Effectiveness of law enforcement
9. Cyber

Unit III Case Study Activity

Threat Ratings

Background

Hazards categories: natural and manmade

Case Study Threats: Cyber Attack, Armed Attack, Vehicle Bomb, and CBR Attack (latter two are main focus of course)

Result of assessment: "Threat Rating," a subjective judgment of threat

Requirements

Refer to Case Study data

Complete worksheet tables:

- Critical Function Threat Rating
- Critical Infrastructure Threat Rating

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