Protective Design

Force Protection Standards and Historic Preservation Policy

Daniel G. Kurmel, RA
Protective Design Center
Omaha, NE

U.S Army Corps of Engineers®
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Integrating
Natural and Cultural Resources
with Readiness
Integrating
Historic Structures with Readiness
Integrating

Historic Structures

with Security
Agenda

• Security as a Priority
• Historical Precedence
• Threat Basis
• Introduction to Criteria: UFC
• Examples of Integration
Agenda

• Security as a Priority
• Historical Precedence
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• Introduction to Criteria: UFC
• Examples of Integration
Beirut Marine Barracks 1983
Khobar Towers 1996
New York WTC 9-11
WHY WE ARE HERE

OCT 1983  MARINE BARRACKS BEIRUT, LEBANON  243
DEC 1988  PAN AM FLT 103, LOCKERBIE, SCOTLAND  244
FEB 1993  WORLD TRADE CENTER, NYC, NY  6
JUN 1996  KHOBAR TOWERS, DHAHRAH, SA  19
AUG 1998  US EMBASSIES, KENYA/TANZANIA  224
OCT 2000  USS COLE, ADEN, YEMEN  17
SEP 11 TH 2001  WORLD TRADE CENTER, NYC, NY  3000+

PENTAGON, WASHINGTON DC
UNITED AIRLINES FLT 93
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Agenda

• Security as a Priority
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• Security as a Priority
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Stationary vs. Moving Vehicle Bombs

The vast majority of vehicle bombs have been of the stationary variety.
Glass Fragments in a Blast

Minimize fragments as first step in protection
Glass Fragment Hazards

Historically speaking, glazing has caused about 85% of injuries in blast events.
Placed Bombs
Mail and Supplies Bomb
Indirect Fire Weapons
Direct Fire Weapons
Structural Fire Damage
Chem/Bio Attacks
Agenda

- Security as a Priority
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- Examples of Integration
DoD Minimum Antiterrorism Standards for Buildings

U.S. Army Corps of Engineers Protective Design Center
Co-chair, DoD Security Engineering Working Group
Intent

• Provide appropriate, implementable, and enforceable protection for all inhabited DoD buildings where there is no known terrorist threat

• Where minimum standoff distances can be met conventional construction is adequate

• Where standoff distance cannot be met, comparable protection must be provided through design adjustment

• Minimum standards will provide:
  – Reduced risk of mass casualties due to explosive event
  – Minimized collateral damage from explosives effects and fragmentation
  – Facilitation of future upgrades and increases in Force Protection Condition
Contents of Standards

- Chapter 1: Introduction
- Chapter 2: Philosophy, Design Strategies, and Assumptions
- Appendix A: Definitions
- Appendix B: DoD Antiterrorism Standards for New and Existing Buildings
- Appendix C: Recommended Additional Antiterrorism Measures for New and Existing Buildings
- Appendix D: DoD Antiterrorism Standards for Expeditionary and Temporary Structures
Applicability

- *All* new inhabited DoD buildings - regardless of appropriation
- *All* existing inhabited DoD buildings when triggered
  - Renovations, modifications, repairs, and restorations where costs exceed 50% of replacement cost
  - Conversions of use
  - Planned glazing replacement projects
  - New portions of building additions and existing building if addition is 50% of gross area
- Leased buildings where DoD personnel occupy at least 25% of net interior useable space
- Expeditionary and temporary buildings
Historic Preservation Impacts

1-9. HISTORIC PRESERVATION COMPLIANCE FOR IMPLEMENTATION OF ANTI-TERRORISM STANDARDS.

1-9.1 Security and Stewardship. The Department of Defense remains the lead federal agency in balancing security threats with the protection of historic properties. The Department of Defense abides by federal legislation on protecting cultural resources, and issues its own complementary policies for stewardship. Historic properties and archaeological sites on military land are protected with other facilities from terrorism where there is a perceived threat to people and critical resources.

1-9.2 Compliance with Laws. In the wake of terrorist attacks against the armed forces and civilian personnel, the need to include the National Historic Preservation Act and the Archaeological Resources Protection Act. Installation personnel need to determine possible adverse effects upon an historic structure and/or archaeological resource prior to anti-terrorism standard undertakings and consult accordingly. Personnel at installations abroad should coordinate with the host nation regarding possible adverse effects to cultural resources.

1-9.3 Compliance with DoD Standards. Federal agencies are always the decision-maker in the Section 106 process of the National Historic Preservation Act. Preservation issues need to be quickly and effectively resolved, so as not to obstruct force protection efforts.
Baseline Threats

• Vehicle bombs
  – Cars and light trucks
  – Small waterborne vessels
• Placed bombs
• Mail bombs
• Indirect fire weapons
• Direct fire weapons
  – Small arms
  – Shoulder fired rockets
• Fire
• Chemical, biological, and radiological agents
Design Strategies

• Maximize standoff distance
• Prevent building collapse
• Minimize hazardous flying debris
• Provide effective building layout
• Limit airborne contamination
• Provide mass notification
• Facilitate future upgrades
Sitework Standards
(when a controlled perimeter is used)
Sitework Standards
(when a controlled perimeter is not available)
Other Site Planning Issues

- Parking
- Drive-up/Drop-off
- Access Road
Structural Design

Superstructure designed to limit progressive collapse (3 stories and above)

Avoid parking underneath or on roof

Unreinforced exterior masonry walls prohibited

Floors designed to resist uplift

Avoid building overhangs with inhabited space above them

Isolate building additions from existing portions of buildings

Avoid parking underneath or on roof
Structural Design

Superstructure designed to limit progressive collapse (3 stories and above)

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Isolate building additions from existing portions of buildings

Avoid parking underneath or on roof
Architectural Design

- Control roof access
- 6mm laminated glass windows
- Doors positioned to minimize targeting
- Exterior doors open outwards
- Brace overhead architectural features
- Mailroom on building perimeter
- Avoid parking underneath or on roof
- Avoid parking underneath or on roof
Architectural Design

- Control roof access
- Brace overhead architectural features
- 6mm laminated glass windows
- Doors positioned to minimize targeting
- Exterior doors open outwards
- Installation perimeter
- Mailroom on building perimeter
- Avoid parking underneath or on roof
Electrical and Mechanical Design

- Avoid exterior walls for critical utilities
- Do not collocate redundant utilities
- Locate emergency backups away from backed up systems

Air intakes above 3 meters

Brace overhead utilities

Provide mass notification capability

Provide separate Mailroom air ventilation system

Emergency shutoff of air distribution

Ensure access beneath building is controlled
Electrical and Mechanical Design

- Provide mass notification capability
- Provide separate Mailroom air ventilation system
- Ensure access beneath building is controlled
- Air intakes above 3 meters

- Avoid exterior walls for critical utilities
- Do not collocate redundant utilities
- Locate emergency backups away from backed up systems
Building Standards Summary

- **Control roof access**
  - 6mm laminated glass windows

- **Doors positioned to minimize targeting**

- **Floors designed to resist uplift**

- **Control roof access**

- **Provide mass notification capability**

- **Doors positioned to minimize targeting**

- **Exterior doors open outwards**

- **Superstructure designed to limit progressive collapse (3 stories and above)**

- **Air intakes above 3 meters**

- **Brace overhead utilities and architectural features**

- **Emergency shutoff of HVAC**

- **Installation perimeter**

- **Mailroom on building perimeter and with separate ventilation system**

- **Avoid parking underneath or on roof**

- **Unreinforced exterior masonry walls prohibited**

- **Ensure access beneath building is controlled**
Recommended Additional AT Measures for New and Existing Buildings

Site Planning

- Recommendation 1: Vehicle access points
- Recommendation 2: High-speed vehicle approaches
- Recommendation 3: Vantage points
- Recommendation 4: Drive-up/drop-off points
- Recommendation 5: Building locations
- Recommendation 6: Railroad location
- Recommendation 7: Access control for family housing
- Recommendation 8: Standoff for family housing
- Recommendation 9: Minimize secondary debris
Recommended Additional AT Measures for New and Existing Buildings

Structural and Architectural Design

- Recommendation 10: Structural redundancy
- Recommendation 11: Internal circulation
- Recommendation 12: Visitor control
- Recommendation 13: Asset location
- Recommendation 14: Room layout
- Recommendation 15: External hallways
- Recommendation 16: Windows
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Examples
Building Frame Retrofit
Murrah Bldg, OK City (95)
Option: Move out of Historic Areas
Blast Glazing Retrofit
Ballistic Glazing Retrofit
Change Room Arrangement
STOP IN THE NAME OF HUMANITY
A Final Thought

If we always do what we have always done,
we will always get what we have always gotten.

- anonymous
Key Definitions in the UFC:

- **DoD building:** Any building or portion of a building (permanent, temporary, or expeditionary) owned, leased, privatized, or otherwise occupied, managed, or controlled by or for DoD.

- **Inhabited building:** Buildings or portions of buildings routinely occupied by 11 or more DoD personnel with a personnel density of greater than one person per 40 gross square meters. This density generally excludes industrial, maintenance, and storage facilities, except for more densely populated portions of those buildings, such as administrative areas.

- **Primary gathering buildings:** Inhabited buildings routinely occupied by 50 or more DoD personnel and family housing with 13 or more family units per building.

- **Billeting:** Any building or portion of a building in which 11 or more unaccompanied DoD personnel are routinely housed, including Temporary Lodging Facilities and military family housing permanently converted to unaccompanied housing.
Mailroom Design
Progressive Collapse