Overview of Antiterrorism Measures

Presented to
NAVFAC FAR EAST

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Planning, Design and Construction Criteria (PDCC)
Engineering Criteria and Programs

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ANTITERRORISM

UFC 4-010-01
DoD Minimum Antiterrorism Standards for Buildings

Background – Terrorist Attacks

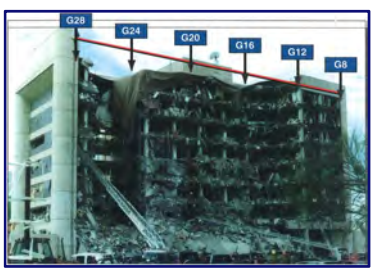
- 1983 – USMC BARRACKS IN BERUIT, LEBANON
- 1993 – WORLD TRADE CENTER GARAGE, NEW YORK
- 1995 – ALFRED P. MURRAH BLDG, OKLAHOMA CITY
- 1996 – KOHBAR TOWERS, SAUDI ARABIA
- 1998 – US EMBASSIES DAR ES SALAAM, TANZANIA AND NAIROBI, KENYA
- 2001 - WORLD TRADE CENTER ATTACKS, NEW YORK
- 2001 – PENTAGON ATTACK, ARLINGTON, VA

The Khobar Towers, and the Embassy bombings in Africa were the impetus behind the development of the DoD Minimum AT Standards.

Background – Murrah Building

1995

- The Murrah Building was a reinforced concrete nine story building housing various Federal Government agencies; SSA, USSS, VA, DEA, ATF, HUD and a day care center.
  - Built to the building code/standards of the 1970s.
  - At time of design, there was no requirement to consider earthquake, blast, or other extreme loadings in Oklahoma City
  - Not designed to prevent progressive collapse
  - Did not include laminated glass
- Explosive weight of approximately 5000 lbs TNT equivalent
- Detonated approximately 16 feet from structural elements (columns)
- 168 fatalities and hundreds more injured

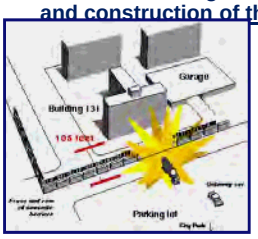


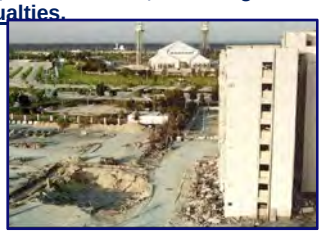
Background - Khobar Towers

1996

- Khobar Towers housed approximately 3,000 Air Force and Army personnel.
  - Built to the British construction standards. Including progressive collapse prevention.
  - Did not include laminated glass
- Explosive weight of approximately 20,000 lbs
- Detonated 105 feet from the face of the building
- 19 casualties

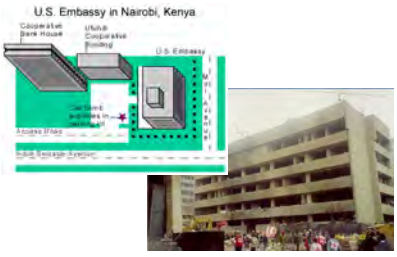
While the Khobar Towers were not designed to withstand the blast effects of a bomb of this magnitude, the building did not collapse; and therefore, the design and construction of the building minimized mass casualties.





Background - US Embassies - Africa
Dar Es Salaam, Tanzania And Nairobi, Kenya

1998



Nairobi, Kenya
- 213 killed (12 Americans)
- 4000 injured
- Adjacent building collapsed
- Built to DOS Foreign Building Operations Criteria

Dar Es Salaam, Tanzania
- 11 killed (No Americans)
- 85 injured
- Built to Israeli Construction Criteria – Former Israeli Embassy

12 Americans, 40 Kenyan and Tanzanian US Embassy employees were killed.

Background of DoD AT Standards
What Drives the Requirements?

TITLE 10 U.S. CODE, SECTIONS 2859. Construction requirements related to ATFP

- Antiterrorism and Force Protection Guidance and Criteria.— The Secretary of Defense shall develop common guidance and criteria to be used by each service Secretary

JOINT PUBLICATION 3-26 JOINT COMBATING TERRORISM

- Secretaries of the Military Departments will ensure military construction programing policies (planning, design, and execution) include AT protective features for facilities and installations to mitigate vulnerabilities and terrorist threats.
  - UFC 4-010-01 DoD Minimum Antiterrorism Standards for Buildings
  - UFC 4-020-01 DOD Security Engineering Facilities Planning Manual

DoDI 2000.12 DoD ANTITERRORISM (AT) PROGRAM

- Include AT protective features for facilities and installations in the planning, design, and execution of minor and military construction projects and leases to mitigate AT vulnerabilities and terrorist threats

DoDI O-2000.16 DoD ANTITERRORISM (AT) PROGRAM IMPLEMENTATION:

- Develop AT protection standards in DoD Unified Facilities Criteria (UFC) for buildings on installations.

DoD D4270.5 MILITARY CONSTRUCTION:

- DoD Components will use DoD Unified Facilities Criteria (UFC) and Unified Facilities Guide Specifications (UFGS) for planning, design and construction of facilities.

Background of DoD AT Standards
What Drives the Requirements?

SECNAVINST 3300.2C: Department Of The Navy (DoN) Antiterrorism (AT) Program

- Implements DoDI 2000.12/2000.16 by providing guidance and information to reduce the vulnerability of DON and USMC military and civilian personnel, family members, select contractors, resources, facilities, and ships to terrorist acts

OPNAVINST 3300.53D: Navy Antiterrorism Program

- CNO N4 shall Ensure that all new construction projects meet or exceed minimum construction standards in UFC to mitigate possibility of a terrorist attack, and to lessen the effects of a terrorist attack should one occur.

MARINE CORPS ORDER (MCO) 3302.1F: Marine Antiterrorism Program

- Commanders shall establish procedures for physical security planning, construction, and acquisition of facilities or buildings as appropriate.
- In accordance with UFC 4-010-01 establish standards that provide minimum levels of protection against terrorist attacks for the occupants of all DoD inhabited buildings.

SECNAVINST 5500.35: Department Of The Navy Physical Security Program

- Establishes the DON Physical Security Program and provides minimum standards for protection of all resources including personnel within the DON, civil servants, contractors, members of the active and reserve units of the USMC and USN, Field Activities and all other organizational entities of the DON – collectively known DON Components.

OPNAVINST 5530.14E: Navy Physical Security and Law Enforcement

- New Construction and Facility Modifications. All new construction' shall comply with the requirements of this manual and approved Unified Facilities Criteria (UFC)

MARINE CORPS ORDER (MCO) 5530.14A: USMC Physical Security Program Manual

- Integrate physical security planning, requirements , procedures , and equipment in all force protection (FP) and antiterrorism (AT) efforts .

UFC 4-010-01, DoD Minimum AT Standards for Buildings - Timeline

1999) **Interim Department of Defense Antiterrorism/Force Protection Construction Standards issued 16 December 1999 by Under Secretary of Defense A&T Memorandum (FOUO).**

2002) **Standards updated and converted to UFC 4-010-01 and issued by Under Secretary of Defense AT&L Memorandum on 20 September 2002.**

2003) **Standards updated 8 October 2003.**

2007) **Standards updated with change 1 dated 22 January 2007.**

2008) **UFC 4-020-01, DoD Security Engineering Facilities Planning Manual Published.**

2012) **Standards Revised 9 February 2012.**

- Change in approach to conventional construction standoff distance
- Reduce minimum standoff distance – blast analysis required
- Major changes to window design – blast analysis required

2013) **Standards updated with change 1 dated 1 October 2013.**

- **Leased Buildings to comply with standards established by the Department of Homeland Security's Interagency Security Committee in *The Risk Management Process for Federal Facilities.***

2013) **SEWG proposed drastic changes to the Standards-eliminating standoff distances.**

2015) **SEWG met with OSD and others to discuss direction of Security Engineering Planning Manual and Standard.**

2017) **SEWG given direction from CP and ESEP in developing major changes to the Standards.**

2018) **CNO releases NAVADMIN 026/18 (NAVFAC ITG 2018-02) relaxing some of the major Standards.**

2018) **Standards Revised UFC 4-010-01, 12 December**

- Implemented the OSD, CP, and ESEP direction in eliminating threat and standoff distances, provided minimum requirements for windows and doors and the effects on the other remaining standards.

2020) **Change 1 dated 19 August 2020 to 12 December 2018**

2022) **Change 2 dated 30 July 2022 to 12 December 2018**

2024) **Change 3 dated 24 May 2024 to 12 December 2018**

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UFC 4-010-01, DoD Minimum AT Standards for Buildings

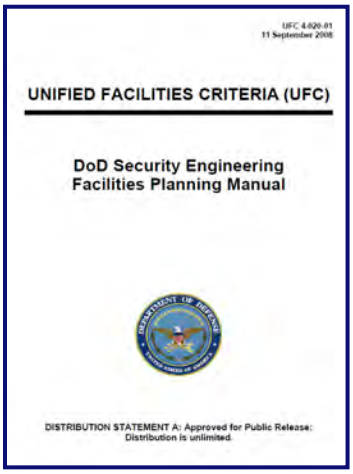
- **Purpose** - Establish minimum engineering standards for DoD projects that incorporate antiterrorism (AT) based mitigating measures not associated with an identified threat or level of protection.
- **Intent** - To reduce collateral damage and the scope and severity of mass casualties in buildings or portions of buildings owned, leased, privatized, or otherwise occupied, managed, or controlled by or for DoD in the event of a terrorist attack.
- **Applicable to all DoD Components and to all DoD inhabited buildings.**
- **DOES NOT establish the Design Basis Threat (DBT) or Level of Protection (LOP) for DoD buildings.**
- **Sets minimum protective measures to be incorporated into DoD buildings to protect DoD personnel.**

BASELINE AT PROTECTIVE MEASURES

- ***UFC 4-020-01 (DoD Security Engineering Facilities Planning Manual)*** is used to establish the Design Basis Threat and Level of Protection for individual projects and to justify protective measures above minimum standards.

UFC 4-020-01, DoD Security Engineering Facilities Planning Manual

- Provides a unified planning approach for security and antiterrorism protective measures.
- Design Criteria Development
- Does not include the protection measures for assets covered by regulatory or policy documents.
  - Arms, Ammunition & Explosives (AA&E)
  - Classified Information
  - Nuclear
  - Chemical



Undergoing a major revision 2024

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UFC 4-010-01, DoD Minimum AT Standards for Buildings Content

Chapter 1: Introduction

- ❑ Background
- ❑ Intent/Implementation
- ❑ Applicability
- ❑ Exemptions
- ❑ Occupancy Calculation
- ❑ Regulatory Authorities
- ❑ Historic Preservation

Chapter 2: Philosophy, Design Strategies, and Assumptions

Chapter 3: Standards

Chapter 4: Standards for Expeditionary Structures

Appendix A: Recommended Antiterrorism Measures for New and Existing Buildings

Appendix B: Best Practices

Appendix C: Representative Standoff Distances for Conventional Construction and Expeditionary Structures

Appendix D: Glossary

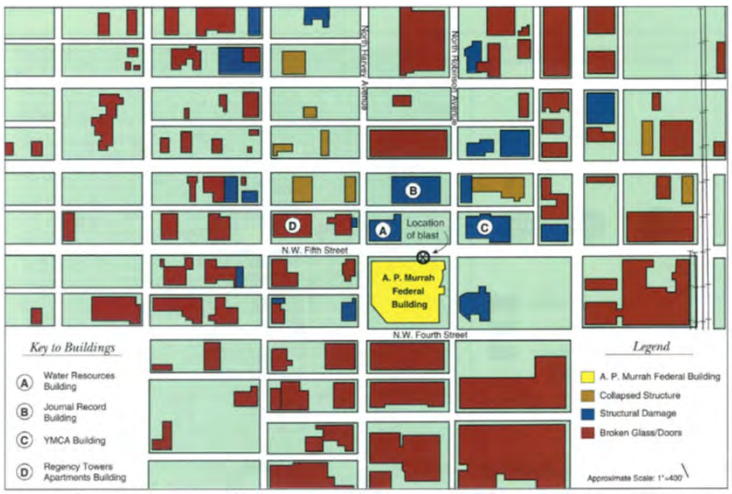
Appendix E: References

Intent of Standards (1-4)

- **PROTECT DOD PERSONNEL, not mission:**
  - **Provides minimum engineering standards to mitigate terrorist threats.**
  - **Minimize collateral damage and the severity of mass casualties in the event of a terrorist attack.**
  - **Provide cost effective, implementable, and enforceable construction standards to protect personnel against terrorist attacks.**
- **Complete protection against all potential threats for every inhabited building is cost prohibitive, the intent can be achieved:**
  - **Prudent Master Planning**
  - **Real Estate Acquisition**
  - **Design and Construction Practices**

Collateral Damage – Oklahoma City Bombing

Immediate Vicinity of Murrah Building



Collateral damage: Injury to personnel or damage to buildings that are not the primary targets of attacks.

UFC 4-010-01, DoD Minimum AT Standards for Buildings – Building Occupancy

- Two Basic Occupancy Categories of Facilities:
  - Low Occupancy
  - Inhabited Structures

Categories of Facilities

Low Occupancy Building:

- Any building or portion of a building routinely occupied by fewer than 11 DoD personnel or with a population density of less than one person per 430 gross square feet (40 gross square meters) are exempt from all provisions of these standards.

Categories of Facilities

Inhabited Structures:

- **Buildings or portions of buildings routinely occupied by 11 or more DoD personnel and with a population density of greater than one person per 40 gross square meters (430 square feet.)**
  - **Generally excludes industrial, maintenance and storage facilities, except more densely populated portions such as administrative areas.**
  - **Does not typically include guard type facilities.**
  - **Does not currently include Family Housing Facilities with less than 13 units.**
  - **In a building that meets the criterion of having 11 or more personnel with low occupancy portions that do not have sufficient population densities to qualify as inhabited buildings, those portions that have sufficient population densities will be considered inhabited buildings while the remainder of the building may be considered low occupancy i.e. Aircraft Hangar.**

ROUTINELY OCCUPIED:

For the purposes of these standards, an established or predictable pattern of activity within a building that terrorists could recognize and exploit.

Applicability (1-6)

These standards apply to all DoD Components, to all DoD inhabited buildings and high occupancy family housing, to all inhabited tenant buildings on DoD installations, and to all DoD expeditionary structures.

- **New construction –** Mandatory for all inhabited buildings regardless of funding sources.
- **Existing Buildings** – Four triggers: Major Investment, Conversion of Use, Glazing Replacement, and Building Additions. ***No trigger = no requirement***.
- **Building Additions -** Inhabited additions to existing buildings must comply with the minimum standards for new buildings. If the addition is 50% or more of the gross area of the existing building, the existing building will comply with the minimum standards for existing buildings.
- **Leased Buildings –** In accordance with Deputy Secretary of Defense Memorandum dated 7 December 2012, the security standards established by the ***Department of Homeland Security's Interagency Security Committee (ISC) in The Risk Management Process for Federal Facilities*** must apply to all off-installation leased space managed by DoD and all DoD occupied spaced in buildings owned or operated by the U.S. General Services Administration (GSA). US and Foreign Countries.

Applicability (1-6)

- **Privatized Buildings –** Privatized (PPV) inhabited buildings and high occupancy family housing.
- **DoD Purchases of Existing Buildings -** occupancy by DoD personnel.
- **Non-DoD Tenant Buildings on DoD Installations -** occupancies for non-DoD tenant-built building will be calculated assuming that building occupants are DoD personnel.
- **National Guard –** using Federal funding for new construction, renovations, repairs, mods, or leasing meeting applicability requirements.
- **Expeditionary Structures –** See Chapter 4 of UFC 4-010-01. Developing UFC 4-027-01, Design of Deployed Operational Bases to Mitigate Terrorist Attacks.
- **Transitional, Temporary, and Relocatable Structures and Spaces in a Non-Expeditionary Environment –** Must comply with standards 1 through 5. Facility use limited to 7 years.

"Triggers" for Existing Structures (1-6.2)

- **Major investments:** Costs for renovation, modification, repair, or restoration exceed 50% of replacement value IAW UFC 3-701-01.
  - Cost is exclusive of costs identified to meet the standards
  - Where 50% threshold is not met, compliance is recommended
- **Change of Occupancy Level:** When any portion of a building is modified from low occupancy to inhabited occupancy.
  - Example: Warehouse (low occupancy) converted to administrative building (inhabited) use
- **Glazing and Door replacement:** Glazing and Door provisions are mandatory for existing inhabited buildings with any planned window, skylight glazing, glazing or door replacement project – including supplemental windows behind (inside face) existing windows and windows in new openings. **(Standards 10 and 12 only)**
- **Heating, Ventilating, and Air Conditioning (HVAC) Systems and Associated Controls:** Whenever HVAC systems featuring outside air intakes or control systems associated with HVAC systems including outside air intakes are being replaced or modified - include but not limited to AHU replacement/damper replacement/ductwork reconfig/control system replacement and/or reprogramming. **(Standards 16 and 18 only)**
- **Building additions:** If addition is 50% or more of the gross area of the existing building the existing building must meet all Standards and be considered as new construction.

Regulatory Authorities (1-9)

- **DoD and Heads of DoD Components:**
  - **May establish additional guidance or standards**
  - **Account for any component related special circumstances**
- **Geographic Combatant Commanders:**
  - **May establish additional guidance or standards in their area of operations**
  - **Antiterrorism Operations Orders OPORDs/Instructions**
- **Installation Specific Requirements:**
  - **Per DoD I O-2000.16 develop Installation Antiterrorism and Security Plan**
    - Reduce Risk and Vulnerability
  - **Plans may define Installation Design Basis Threat (DBT) however UFC 4-020-01 must be used to establish DBT and level of protection for individual projects.**

Geographic Combatant Commands

Geographic Combatant Commands

More Stringent

- Africa Command (USAFRICOM)
- Central Command (USCENTCOM)
- European Command (USEUCOM)
- Pacific Command (USPACOM)

Not More Stringent

- Northern Command (USNORTHCOM)
- Southern Command (USSOUTHCOM)

DoD Philosophy (2-2)

- Comprehensive protection cost prohibitive
- Appropriate level of protection can be provided to lessen risk of mass casualties for all DoD personnel at a reasonable cost.
- Three key elements
  - Time:
    - Must be in place prior to initiation of attack
    - Least expensive time for application is in construction / major renovation / existing building purchase
  - Master planning: Long term "blueprint/roadmap" for installations – present and future needs (1-17)
  - Design Practice: The philosophy of these standards is to build a baseline level of resistance to terrorist attack into all DoD inhabited buildings. Concepts to be incorporated into standard design practice. Construct superstructures to avoid progressive collapse, minimize hazardous flying debris, provide effective building layout, limit airborne contamination, and provide building mass notification.

Design Strategies (2-3)

- **Prevent Building Collapse**
  - Progressive collapse prevention to minimize mass casualties in buildings three stories or more in height.
- **Minimize Hazardous Flying Debris**
  - Use of laminated glazing systems that eliminates glass shards – dagger like fragments.
  - Special detailing for walls and 'hanging' architectural, mechanical and electrical equipment (non-structural features).
- **Provide Effective Building Layout**
  - Reduce targeting through building entrance layout
  - Provide unobstructed space around facility
  - Control access to roof and under building
  - Locate mailrooms on perimeter of building
- **Limit Airborne Contamination**
  - Provide emergency HVAC shutoff capability
  - Elevate air intakes
  - Provide separate ventilation for mailrooms
- **Provide Mass Notification Capability**
  - Require inhabited buildings to have capability to provide real-time information to building occupants in the immediate vicinity of the building during emergency situations.

DoD Minimum AT Standards for Buildings

CHAPTER 3

"THE STANDARDS"

DoD Minimum AT Standards for Buildings

- **Site Planning**
  - 1: Standoff Distances (N)
  - 2: Unobstructed Space (B)
  - ~~3: Drive-up/Drop-off Areas~~
  - ~~4: Access Roads~~
  - 5: Parking Under Or On (B)
- **Structural Design**
  - ~~6: Progressive Collapse~~
  - 7: Structural Isolation (B)
  - 8: Building Overhangs (N)
  - 9: Exterior Masonry Walls (B)
- **Architectural Design**
  - 10: Glazing (B)
  - 11: Building Entrance Layout (B)
  - 12: Exterior Doors (B)
  - 13: Mail Rooms (N)
  - 14: Roof Access (B)
  - 15: Overhead Mounted Architectural Features (B)
- **Electrical & Mechanical Design**
  - 16: Air Intakes (B)
  - 17: Mail Room Ventilation (N)
  - 18: Emergency Air Distribution Shutoff (B)
  - 19: Equipment Bracing (B)
  - 20: Under Building Access (B)
  - 21: Mass Notification (B)

(N) New Construction Only (B) Both New and Existing Construction

Key Definitions

- Clear Zone: Areas commonly associated with perimeters that are free of all obstacles, topographical features, and vegetation exceeding 8 in. (152 mm) in height that could impede observation or provide cover and concealment of an aggressor.
- Controlled perimeter. For the purposes of these standards, a physical boundary at which vehicle access is controlled with sufficient means to channel vehicles to the access control points. At a minimum, access control at a controlled perimeter requires the demonstrated capability to search for and detect explosives. Where the controlled perimeter includes a shoreline and there is no defined perimeter beyond the shoreline, the boundary for measuring standoff distances will be at the mean high water mark or the elevation associated with top of bank (associated with a flood recurrence interval of 1.2 years). (APPENDIX B ONLY)
- Installation Perimeter: For the purposes of these standards any demarcation identifying limit of DoD property and directly or indirectly indicating that unauthorized access is prohibited.
- Unobstructed Space: Space around inhabited buildings in which there are no opportunities for concealment from observation of explosive devices of no less than a 6 in. (150 mm) cube.

DoD Minimum AT Standards for Buildings

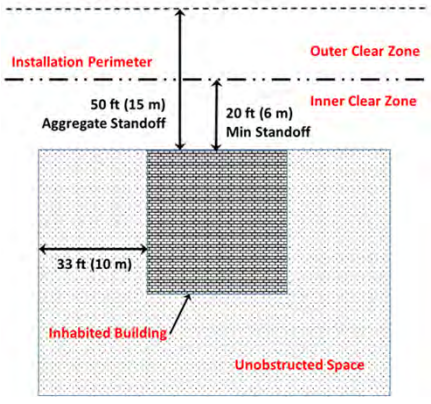
Standard 1. Standoff Distances

- The previous version of Standard 1 established standoff distances to parking, roadways, and controlled perimeters that were based on building construction and occupancy.
- In this revision of Standard 1, standoff distances only apply to distances to installation perimeters for new construction and additions to existing buildings that are required to comply with these standards.
- No required standoff for buildings except for defined clear zone from installation perimeter
- Exception: Existing buildings within an installation perimeter are exempt from this standard.

DoD Minimum AT Standards for Buildings

Standard 1. Standoff Distances

- Standoff distances to installation perimeters are based on clear zone requirements.
- Clear zones are areas established around the perimeters to provide unobstructed views to enhance detection and assessment and do not require access control.
- Some installations and high security areas may have higher clear zone requirements based on the asset requiring protection.
- The minimum standoff distance for new construction and additions to existing buildings to the installation perimeter is 20 ft. (6 m) when there is 30 ft. (9m) of clear zone or greater outside the installation perimeter.

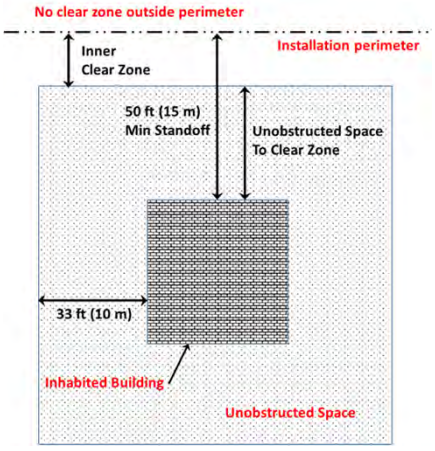


- Provide a minimum aggregate standoff of 50 feet (15 m) inclusive of the clear zones outside and inside the installation perimeter.

DoD Minimum AT Standards for Buildings

Standard 1. Standoff Distances – Clear Zone

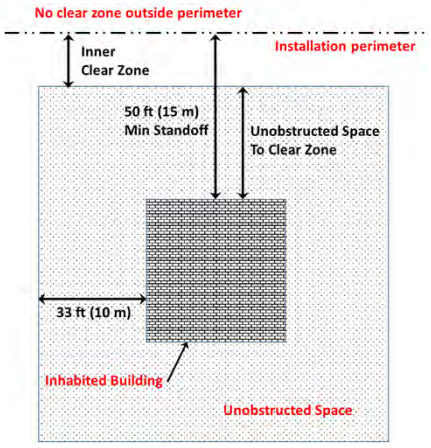
- **For example, if an inner clear zone is 20 ft. (6 m) wide, but the outer clear zone is only 20 ft. (6 m) wide, the standoff distance to the installation perimeter must be 30 ft. (10 m) wide.**
- **Where there is no clear zone outside the perimeter, the minimum standoff distance is 50 ft. (15 m).**
- **For buildings that are outside an installation perimeter, use UFC 4-020-01 to establish the Design Basis Threat, Level Of Protection and resulting standoff – if applicable**



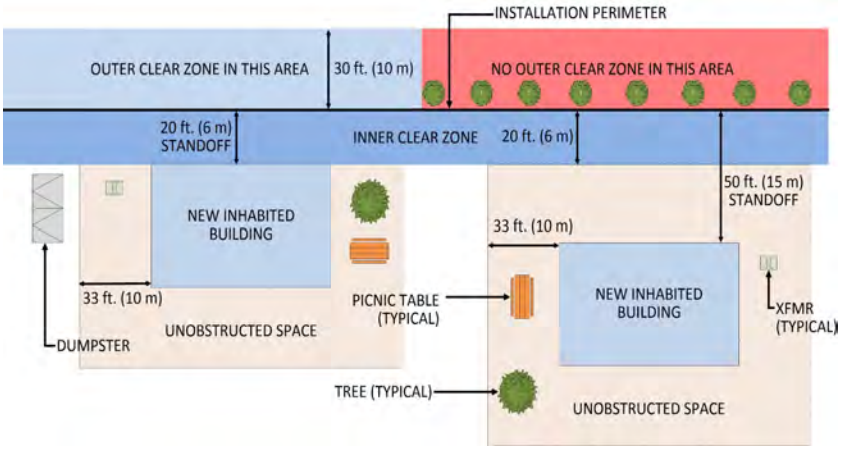
DoD Minimum AT Standards for Buildings

Standard 2. Unobstructed Space

- **The unobstructed space must extend out from the building to the edge of the inner clear zone, or 33 ft. (10 m) whichever is less.**
- **Exception:**
  - Stand-alone franchised fast food operations, commercial, bank, and pharmacy facilities.
  - Stand Alone Shoppettes, Mini Marts, and Commissaries with areas of less than 15,000 square feet (1394 square meters).
- **Parking Within Unobstructed Spaces:**
  - Parking is allowed within the unobstructed space.
  - Parking may be temporarily eliminated within the unobstructed space at a higher Force Protection Condition (FPCON).



DoD Minimum AT Standards for Buildings
Standard 2 – Unobstructed Space



DoD Minimum AT Standards for Buildings

Standard 2. Unobstructed Space

- **Trash Containers.**
  - Trash containers are not allowed within the unobstructed space unless the containers are secured or enclosed to preclude concealment of explosives.
- **Electrical and Mechanical Equipment.**
  - Electrical and mechanical equipment may be located within unobstructed spaces if they do not provide opportunities for concealment of explosives or are within an enclosure.
- **Fuel Tanks.**
  - Fuel tanks may be located within unobstructed spaces if they do not provide opportunities for concealment of explosives or are within an enclosure.

DoD Minimum AT Standards for Buildings

Standard 2. Unobstructed Space

- **Enclosures -** When trash containers, fuel tanks or electrical or mechanical equipment within the unobstructed space provide the opportunity for concealment, they must be enclosed.
  - Enclosures must have four sides and a top.
  - Openings in screening materials and gaps between the ground and screens or walls making up an enclosure less than 6 in. (150 mm).
  - Secure any surfaces of the enclosures that can be opened so that unauthorized personnel cannot gain access.
  - Where opaque top enclosures are provided, they will have a pitch of at least 1 vertical to 2 horizontal to increase visibility of objects thrown onto them and to increase the likelihood that the objects will slide off.
  - Alternatively, if the vertical surfaces of the enclosures are transparent and at least 7 ft. (2.1 m) high, a top enclosure is not required.
- **Walls and Screens.**
  - If walls or other screening devices with more than two sides are placed around trash containers, fuel tanks or electrical or mechanical equipment within the unobstructed space, provide enclosure as required above.

DoD Minimum AT Standards for Buildings

Standard 2. Unobstructed Space

- **Adjacent Existing Buildings**
  - Maintain unobstructed space between new projects and existing buildings located nearby.
  - Modify any features that provide opportunity to conceal explosive devices.

UFC 4-010-01, Standard 2 – Unobstructed Space

LOOKS GOOD

NOPE

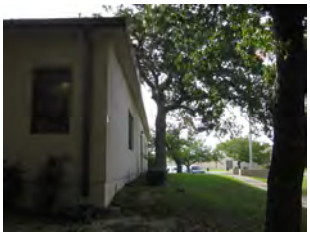
NOPE

MAYBE

MAYBE

MAYBE

UFC 4-010-01, Standard 2 – Unobstructed Space



MAYBE – PROBABLY NOT

NOPE

PROBABLY NOT

LOOKS GOOD

UFC 4-010-01,
Standard 2 – Unobstructed Space





LOOKS GOOD

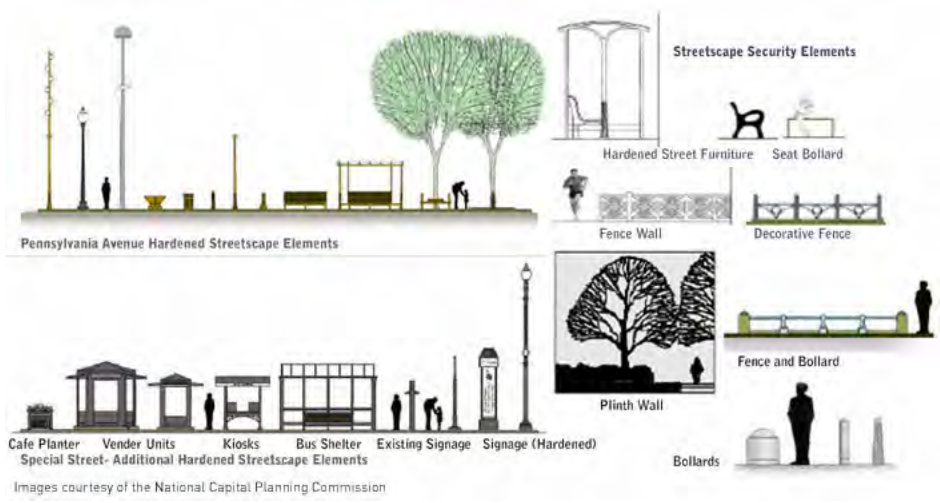
UFC 4-010-01
Standard 2 – Unobstructed Space




NOT REQUIRED BY STANDARD 2

- **LOOKS GOOD**
- **OVER THE TOP (LITERALLY AND PHYSICALLY)**
- **IT MAY BE TOO MUCH**

Site Concepts



DoD Minimum AT Standards for Buildings

Standard 3: Drive-Up/Drop-Off Areas

- Removed and No Longer Applies

Standard 4: Access Roads

- Removed and No Longer Applies

Standard 5: Parking Beneath Buildings or on Rooftops

- **Avoid parking beneath or on rooftops**
- **When required, provide access measures to prohibit unauthorized vehicles from entering**
  - Very Limited Real Estate
  - Existing buildings when triggered/if applicable

Standard 6. Progressive Collapse Avoidance

- **Removed from UFC 4-010-01.**
- **See UFC 4-023-03, Design of Buildings to Resist Progressive Collapse for requirements for progressive collapse resistance.**

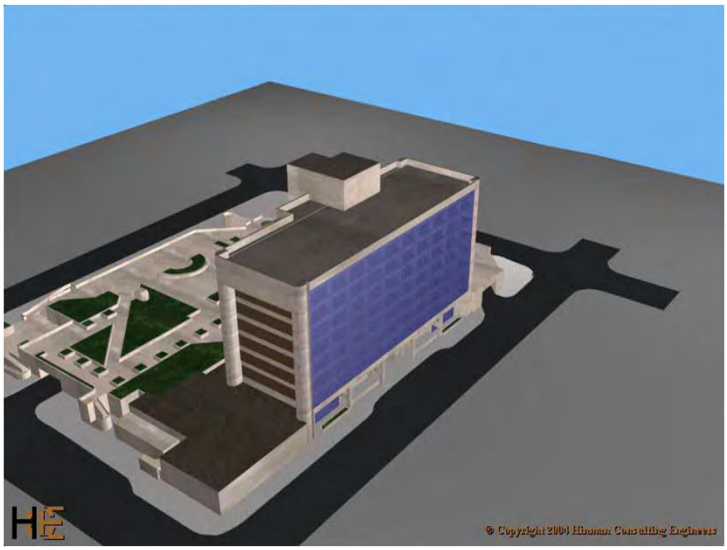
DoD Minimum AT Standards for Buildings

Standard 6. Progressive Collapse Avoidance

ASCE 7- 22, C1.4

- General Structural Integrity
  - Progressive collapse defined as the spread of an initial local failure from element to element, resulting eventually in the collapse of an entire structure or a disproportionately large part of it.

Murrah Federal Building
Oklahoma City



Murrah Federal Building
Oklahoma City

THIS IS PROGRESSIVE COLLAPSE!!

DoD Minimum AT Standards for Buildings

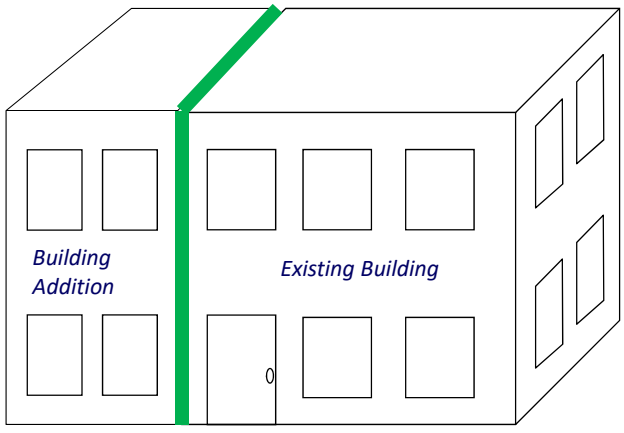
Standard 7: Structural Isolation

- Structural isolation minimizes the possibility that collapse of one part of a building will affect the stability of the remainder of the building.
- Building Addition – Structurally independent or verify through analysis that collapse will not result for addition or existing building.
- Low occupancy portions – ensure superstructure structurally independent from inhabited portions or verify through analysis that collapse will not result for any portion covered by these standards.
- Not required for existing buildings when designed IAW the standards (including previous versions).
- Recommended where possible for existing building not designed IAW the standards (including previous versions).

DoD Minimum AT Standards for Buildings

Standard 7: Structural Isolation

- Building additions to be structurally isolated from the existing building
- Low Occupancy portions to be isolated from inhabited portions
- Alternatively may prove non-collapse with calculations.



Additions are considered new construction.

DoD Minimum AT Standards for Buildings

Standard 8: Building Overhangs and Breezeways

- Avoid building overhangs and breezeways with inhabited spaces above them where people could gain access to the areas underneath the overhangs.
- Where such overhangs or breezeways must be used, ensure the areas underneath overhangs/breezeways comply with the provisions of Standard 2, Unobstructed Space.
- Area underneath overhangs/breezeways are considered an extension of the unobstructed space.

DoD Minimum AT Standards for Buildings

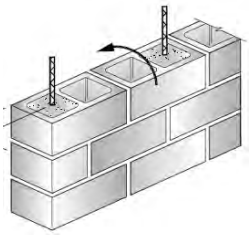
Standard 9: Exterior Masonry Walls

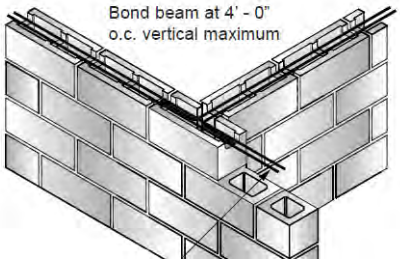
- Unreinforced masonry walls are prohibited for the exterior walls of new construction required to comply with these standards.
- Exterior masonry walls must have vertical and horizontal reinforcement distributed throughout the wall section as required by this standard.
- For conventional cavity wall construction reinforcement only needs to be in the inner wall unless other reinforcement is required by other criteria.
- European masonry walls IAW Table C-5 and PDC Technical Report 10-01 may be considered to meet this standard.

DoD Minimum AT Standards for Buildings

Standard 9: Exterior Masonry Walls

- **New Buildings**
  - **A minimum of 0.05% vertical steel reinforcement spaced no more than 48 inches**
  - **0.025% horizontal steel**
    - Either joint reinforcing at 16 inches
    - Or bond beam no more than 48 inches

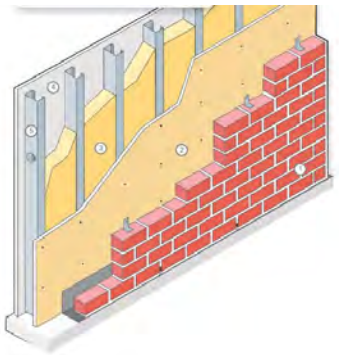


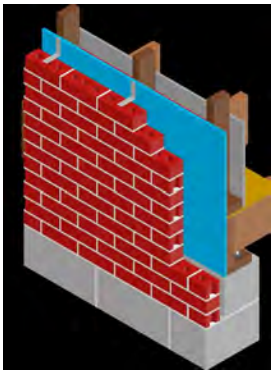


DoD Minimum AT Standards for Buildings

Standard 9: Exterior Masonry Walls

- **Wood or metal studs used with unreinforced clay/concrete/stone masonry *veneers* are allowed.**

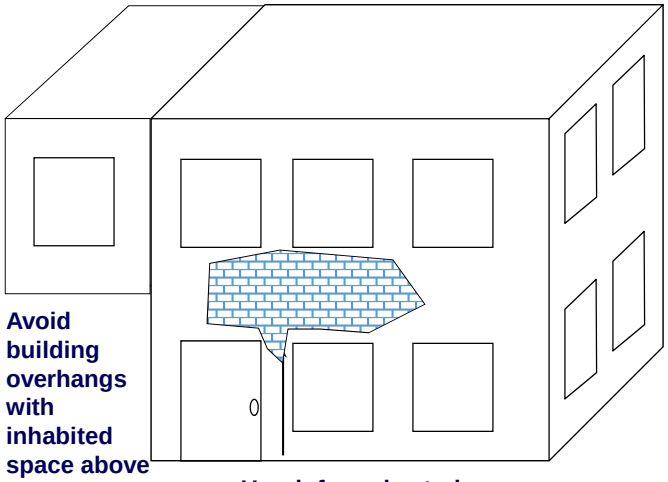




DoD Minimum AT Standards for Buildings

Standards 8 & 9

The areas underneath the overhangs or breezeways can be considered to be extensions of the surrounding unobstructed spaces.



Avoid building overhangs with inhabited space above them (*Standard 8)*

Unreinforced exterior masonry walls prohibited (*Standard 9)*

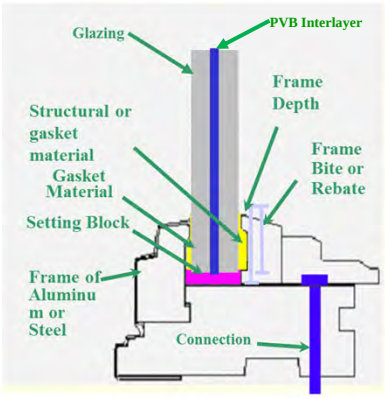
DoD Minimum AT Standards for Buildings

Standard 10. Glazing

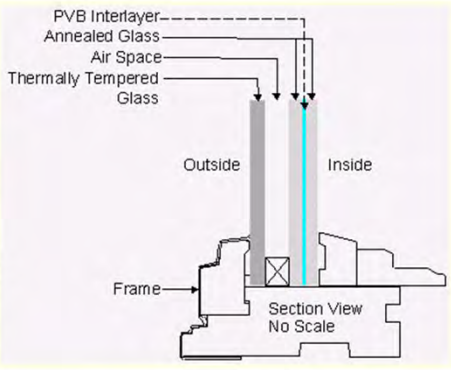
- **Glazing that is in compliance with this standard is not required to be designed or constructed for blast resistance.**
- **It is intended to minimize hazardous glazing fragments.**
- **For glazing in exterior building elements such as storefronts, doors, windows, curtain walls, clerestories, and skylights provide no less than 1/4 in. (6 mm) nominal polycarbonate or laminated glass.**
- **The 1/4 in. (6 mm) laminated glass consists of two nominal 1/8 in. (3 mm) glass panes bonded together with a minimum of a 0.030 in. (0.75 mm) interlayer of a material designed for blast resistance.**
- **For insulated glass units (IGU), use the polycarbonate or laminated glass for the innermost pane as a minimum.**
- **Frames may be constructed of any material – Wood, Steel, Aluminum, Plastic (PVC, PET/HDPE/LDPE/PP/PS) or any combination thereof.**

DoD Minimum AT Standards for Buildings

TYPICAL WINDOW MAKE-UPS



SINGLE PANE



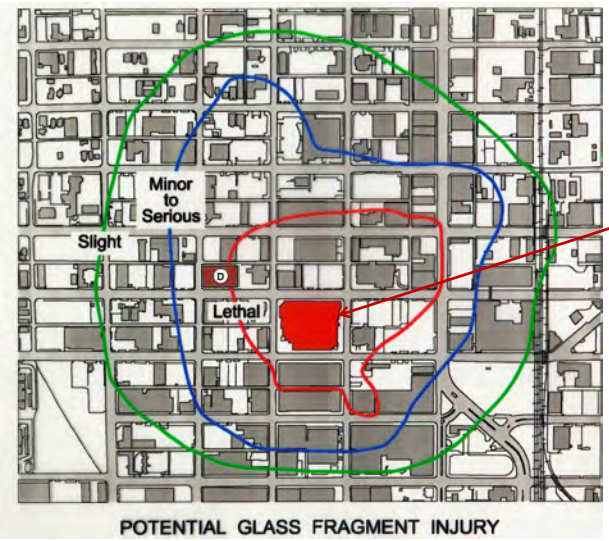
DOUBLE PANE INSULATED GLASS UNIT (IGU)

DoD Minimum AT Standards for Buildings

Glass Fragments

Annealed Glass

DoD Minimum AT Standards for Buildings



Standard 10. Glazing

Extent of Glass Hazard From Oklahoma City Murrah Federal Building Bombing

(D) Regency Towers Apartments Building

Glazing Hazard

(D) Regency Towers Apartments Building

Historically the glazing hazard causes up to 85% of the Injuries in blast events

DoD Minimum AT Standards for Buildings – Glazing Performance

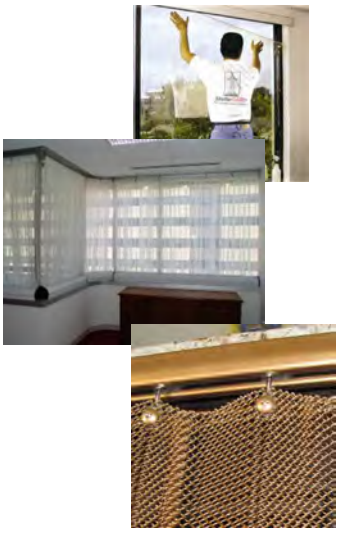
Desired Performance

- Note Glazing Performs Acceptably, Glazing Remains In Frame
- Limited Glass Fragments into Interior

DoD Minimum AT Standards for Buildings

Alternate Window Treatments

- Retrofits incorporating fragment retention film or blast curtains are not allowed for new and existing buildings needing to comply with standards
  - Primary reason – shorter design life
- Fragment retention films has a tendency to deteriorate and then start to 'peel' away from window.
- Laminated glazing, while more expensive initially, is less expensive over its life cycle.
- Blast curtains require operational procedures to ensure they remain closed at all times.
- Fragment retention films and blast curtains are good interim solutions where compliance with these standards is not required.



Structural Design Requirements for Buildings

Do Not Forget Windborne Debris

IBC 2021

- **WINDBORNE DEBRIS REGION.**

Areas within hurricane-prone regions located:

- Within 1 mile (1.61 km) of the mean high-water line where an Exposure D condition exists upwind at the waterline and the basic design wind speed, V, is 130 mph (58 m/s) or greater; or
- In areas where the basic design wind speed is 140 mph (63.6 m/s) or greater.
- For *Risk Category* II buildings and structures and *Risk Category* III buildings and structures, except health care facilities, the windborne debris region shall be based on Figure 1609.3.(1). For *Risk Category* IV buildings and structures and *Risk Category* III health care facilities, the windborne debris region shall be based on Figure 1609.3(2).

- **1609.2 Protection of openings.** In windborne debris regions, glazing in buildings shall be impact resistant or protected with an impact-resistant covering meeting the requirements of an approved impact-resistant standard or ASTM E1996.

DoD Minimum AT Standards for Buildings

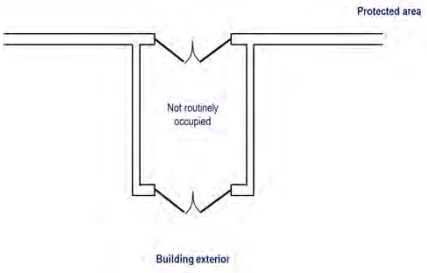
Standard 11: Building Entrance Layout

- **For new construction, ensure that the main entrance to the building does not face uncontrolled vantage points with direct lines of sight or provide means to block the lines of sight using mitigation such as walls, privacy fencing, or vegetation.**
- **For existing building use a different entrance or screen that entrance.**

DoD Minimum AT Standards for Buildings

Standard 12: Exterior Doors

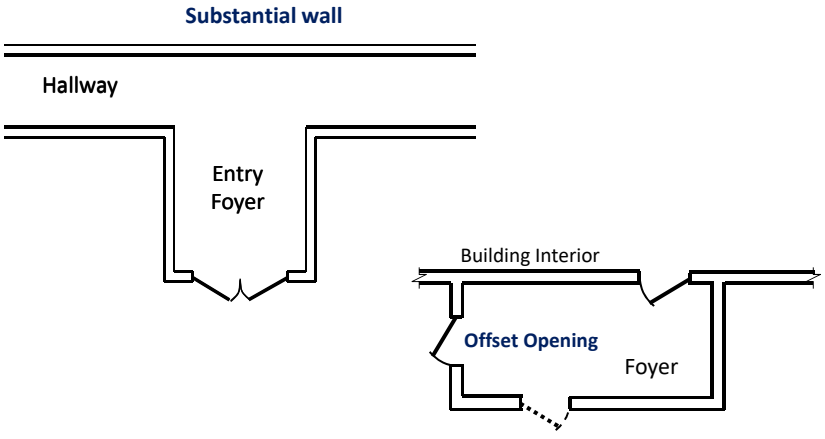
- For all new and existing buildings covered by these standards, ensure that all exterior doors into inhabited areas open outwards.
- Alternatively, position doors such that they will not be propelled into inhabited spaces or provide other means to ensure they do not become hazards to building occupants.
- Glazed Doors – comply with Standard 10 - Glazing



- Sliding glass doors and revolving doors do not have to open outwards.
- Because of the nature of overhead door failures due to blast loads there are no antiterrorism requirements for overhead doors.

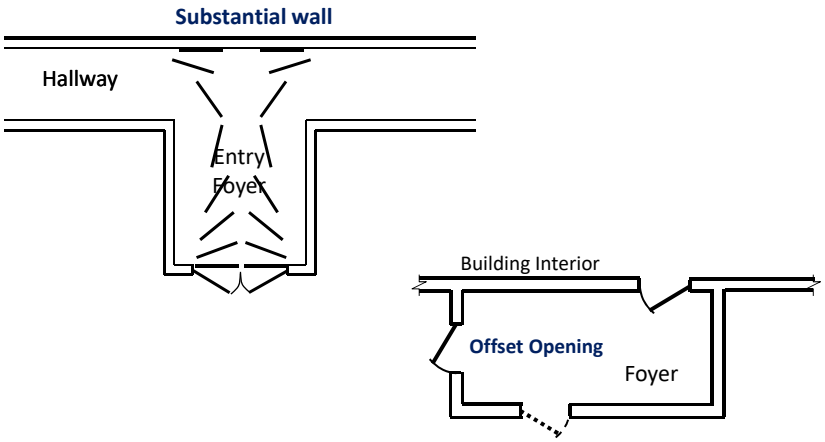
DoD Minimum AT Standards for Buildings

Standard 12. Exterior Doors – Alternate Design



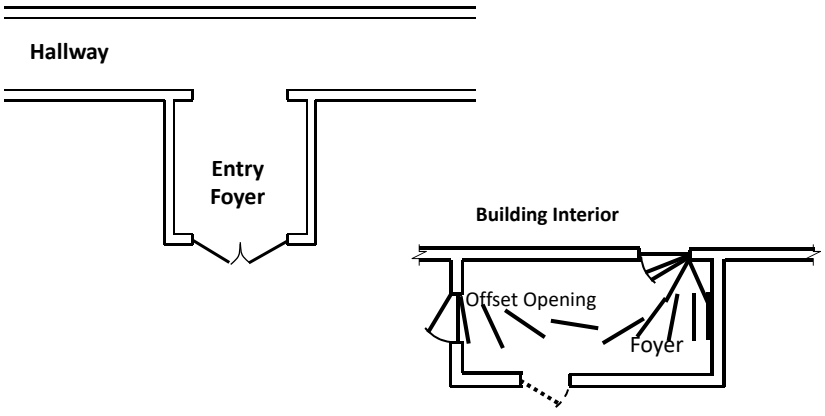
DoD Minimum AT Standards for Buildings

Standard 12. Exterior Doors – Alternate Design



DoD Minimum AT Standards for Buildings

Standard 12. Exterior Doors – Alternate Design



DoD Minimum AT Standards for Buildings

Standard 13: Mail Rooms and Loading Docks

- Addresses location of rooms to which mail or supplies are delivered/handled.
- Not applied to mail rooms/loading docks to which mail/supplies were initially delivered to a central mail/supplies handling facility.
- Locate on the perimeter of building away from heavily populated areas of building.
- Not required for existing building – recommended where possible.

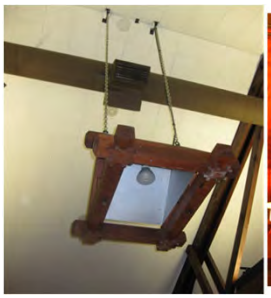
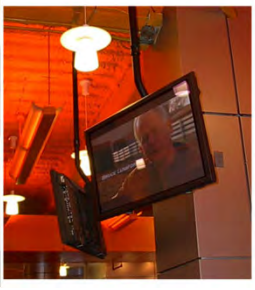
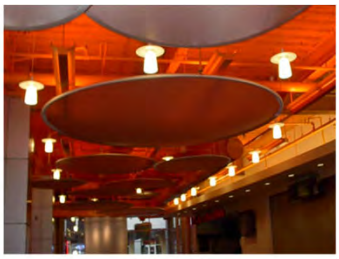
Standard 14: Roof Access

- For buildings required to comply with these standards, control access to roofs.
- For new construction eliminate all external roof access by providing access from internal stairways or ladders, such as in mechanical rooms.
- For existing buildings, eliminate external access where possible or secure external ladders or stairways with locked cages or similar mechanisms.

DoD Minimum AT Standards for Buildings

Standard 15: Overhead Mounted Architectural Features

- New and Existing Buildings
- Overhead mounted features weighing 31 pounds or more
- Secure (rigid/flexible) to resist forces horizontally at 0.5 X weight and vertically/downward at 1.5 X weight
- Need to consider other loading conditions – i.e. Seismic

DoD Minimum AT Standards for Buildings

Standard 16: Air Intakes

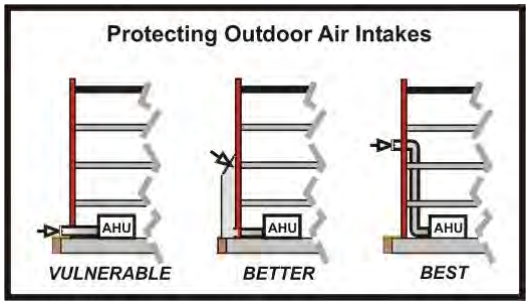
- HVAC systems at ground level that move air throughout the building provide an opportunity for aggressors to easily place contaminants where they could be drawn into buildings.
- New – locate all air intakes at least 10 ft/3 m above ground
- Existing – locate all air intakes at least 10 ft/3 m above ground OR provide exterior chimneys to extend elevation of intake to at least 10 ft/3 m
- Exception – Air intakes within an enclosure that meets the requirements set forth in Standard 2 Unobstructed Space and at a minimum of 10 ft/ 3 m from enclosure perimeter

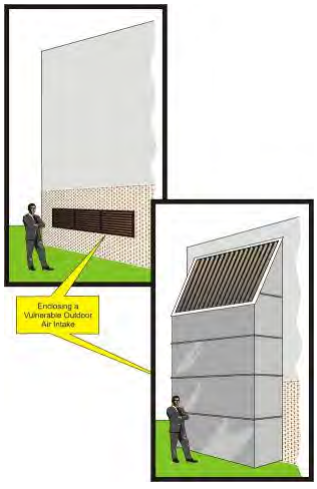
DoD Minimum AT Standards for Buildings

Standard 16: Air Intakes

- LOCATE ALL AIR INTAKES AT LEAST 3 METERS (10 FEET) ABOVE THE GROUND

Mandatory for Both New and Existing Buildings





DoD Minimum AT Standards for Buildings

Standard 17: Mail Room and Loading Dock Ventilation

- New Construction – provide separate/dedicated HVAC for mail rooms/loading docks receiving initial delivery of mail/supplies.
- Dedicated exhaust that maintains slight negative air pressure so flow of air is into and contained in mail rooms/loading docks.
- Provide ventilation system with low leakage isolation dampers that close automatically to isolate mail rooms/loading docks.
- Provide separate control switches or methods to isolate mail rooms.
- Walls must extend from true floor to true ceiling – joints sealed.
- Doors must have gaskets or weather stripping to minimize leakage.

DoD Minimum AT Standards for Buildings

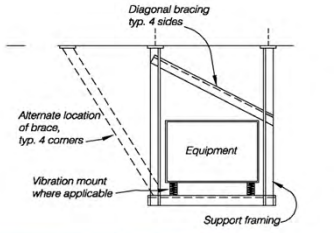
Standard 18: Emergency Air Distribution Shutoff

- For new and existing buildings provide emergency shutoff in the HVAC control system.
- Switch initiates a response in HVAC systems and dampers leading to outside regardless of hand/off/auto (HOA) position within 30 seconds of activation.
- Locate switch for easy access – located similarly to MNS so that travel distance is not in excess of 200 feet
- Minimum of one shutoff switch per floor.
- Ensure switches are well labeled and different color than fire alarm.
- Additional Guidance is provided for:
  - Outside Air Intakes, Relief Air and Exhausts
  - Critical Areas
  - Unoccupied Areas
  - Fan Coil Units

DoD Minimum AT Standards for Buildings

Standard 19: Equipment Bracing

- New and Existing Building
- Overhead utilities and other fixtures weighing 31 pounds or more.
- Secure (rigid/flexible) to resist forces horizontally at 0.5 X weight and vertically/downward at 1.5 X weight.
- Need to consider other loading conditions – i.e. Seismic.



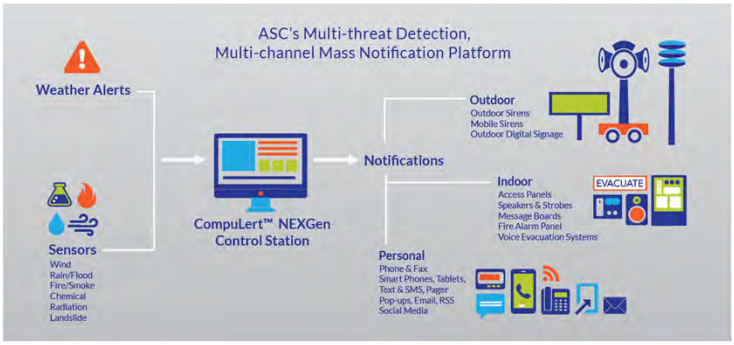
Standard 20: Under Building Access

- For all buildings required to comply w/standards, ensure access to crawl spaces, utility tunnels, and other means of under building access is controlled.

DoD Minimum AT Standards for Buildings

Standard 21: Mass Notification

- All buildings required to comply w/standards must have a timely means to notify occupants of threats and provide instructions on how to respond.
- UFC 4-021-01, Design and O&M: Mass Notification Systems provides additional guidance.



Will eventually remove. Guidance will be provided in UFC 3-600-0, Fire Protection Engineering for Facilities

DoD Minimum AT Standards for Buildings

Standard 21: Mass Notification

Chapter 4 Standards for Expeditionary Structures

Standard 1 – Standoff Distances
Standard 2 – Structure Separation
Standard 3 – Unobstructed Space: Drive-Up/Drop-Off Areas
Additional Standards

- **Container Structures, Modular Structures, and Pre-engineered Buildings**
- **Fabric Covered, Trailers, and Other Expeditionary Structures**
- **Recommendations from Appendix A**

Will eventually remove. Guidance will be provided in soon to be published
UFC 4-027-01, Design of Deployed Operational Bases to Mitigate Terrorist Attacks

Appendix A - Recommendations

Recommendation 1 - Vehicle Access Points
Recommendation 2 - High-Speed Vehicle Approaches
Recommendation 3 - Drive-Up/Drop-Off Areas
Recommendation 4 - Building Location
Recommendation 5 - Railroad Location
Recommendation 6 - Access Control for Family Housing
Recommendation 7 - Standoff for Family Housing
Recommendation 8 - Building Separation
Recommendation 9 - Visitor Control
Recommendation 10 - Asset Location
Recommendation 11 - Room Layout
Recommendation 12 - External Hallways

Appendix B – Best Practices

Use in conjunction with Appendix C when given a DBT and LOP

- **Introduction**
- **Site Planning for Stationary and Hand Delivered Devices**
  - Standoff Distances
  - Drive-Up/Drop-Off Areas
  - Access Roads
  - Parking Beneath Building or on Rooftops
- **Architectural and Structural Design**
  - Windows and Skylights
  - Exterior Doors

The contents in Appendix B are not required to meet the minimum standards. Appendix B presents a best practices strategy for site planning and designing facilities to protect against stationary vehicle bombs and hand delivered devices where a Design Basis Threat and Level of Protection are identified.

The contents in Appendix B are taken from the previous publication of this UFC to retain until publication of UFC 4-020-02 (Security Engineering Design Manual). Use the information contained within Appendix B based on Service, Agency, or Geographic Combatant Command guidance or when UFC 4-020-01 (Security Engineering Planning Manual) establishes a project specific Design Basis Threat (DBT) and Level of Protection (LOP).

USINDOPACCOMINST 0536.2 specifies a Minimum DBT at Installation Perimeters

Appendix B – Best Practices

- Introduction
- Site Planning for Stationary and Hand Delivered Devices
  - Standoff Distances (Standard 1)
  - Unobstructed Space (Standard 2)
  - Drive-Up/Drop-Off Areas (Standard 3)
  - Access Roads (Standard 4)
  - Parking Beneath Building or on Rooftops (Standard 5)
- Architectural and Structural Design
  - Exterior Masonry Walls (Standard 9)
  - Windows and Skylights (Standard 10)
  - Exterior Doors (Standard 12)
- Use in conjunction with Appendix C when given a DBT and LOP

Appendix B – Best Practices

- Site Planning
  - 1: Standoff Distances (N)
  - 2: Unobstructed Space (B)
  - 3: Drive-up/Drop-off Areas
  - 4: Access Roads
  - 5: Parking Under Or On (B)
- Structural Design
  - 6: Progressive Collapse (N)
  - 7: Structural Isolation (B)
  - 8: Building Overhangs (N)
  - 9: Exterior Masonry Walls (B)
- Architectural Design
  - 10: Glazing (Windows and Skylights (B)
  - 11: Building Entrance Layout (B)
  - 12: Exterior Doors (B)
  - 13: Mail Rooms (N)
  - 14: Roof Access (B)
  - 15: Overhead Mounted Architectural Features (B)
- Electrical & Mechanical Design
  - 16: Air Intakes (B)
  - 17: Mail Room Ventilation (N)
  - 18: Emergency Air Distribution Shutoff (B)
  - 19: Equipment Bracing (B)
  - 20: Under Building Access (B)
  - 21: Mass Notification (B)

(N) New Construction Only (B) Both New and Existing Construction

Appendix B affects design criteria of Standards in red

Key Standoff Definitions

- Clear Zone: Areas commonly associated with perimeters that are free of all obstacles, topographical features, and vegetation exceeding 8 in. (152 mm) in height that could impede observation or provide cover and concealment of an aggressor.
- Controlled perimeter: For the purposes of these standards, a physical boundary at which vehicle access is controlled with sufficient means to channel vehicles to the access control points. At a minimum, access control at a controlled perimeter requires the demonstrated capability to search for and detect explosives. Where the controlled perimeter includes a shoreline and there is no defined perimeter beyond the shoreline, the boundary for measuring standoff distances will be at the mean high water mark or the elevation associated with top of bank (associated with a flood recurrence interval of 1.2 years). (APPENDIX B ONLY)
- Installation Perimeter: For the purposes of these standards any demarcation identifying limit of DoD property and directly or indirectly indicating that unauthorized access is prohibited.
- Unobstructed Space: Space around inhabited buildings in which there are no opportunities for concealment from observation of explosive devices of no less than a 6 in. (150 mm) cube.

Appendix B – Best Practices

Standard 1. Standoff Distances

- The previous version of Standard 1 established standoff distances to parking, roadways, and controlled perimeters that were based on an established minimum design basis threat (DBT) and level of protection (LOP) that were based on building location and occupancy.
- UFC 4-010-01: Conventional construction standoff distance (CCSD). The standoff distances at which conventional construction may be used for building components other than doors and windows without a specific analysis of blast effects, except as otherwise required in the UFC.
- Where conventional construction standoff distances are not available, lesser standoff distances may be validated through analysis that verifies the applicable level of protection is met, but none may be closer than the minimum standoff distances in Tables C-1 through C-4.

Appendix B – Best Practices

Standard 1. Standoff Distances

- **Standoff distances for buildings vary based on the specific construction of the walls, on whether they are load bearing or non-load bearing, by level of protection, and by explosive weight.**
- **Conventional construction standoff distances do not apply to doors; refer to B-3.2. Planners and designers will have to analyze tradeoffs between wall standoff and window and door construction.**
- **Minimum standoff distance is the smallest permissible standoff distance allowed for buildings regardless of any analysis results or hardening of buildings that would allow for closer standoff distances.**
  - Note that achieving the minimum standoff distance generally requires a significant degree of building component hardening (especially windows and doors); therefore, where only the minimum standoff distance is provided there should be analysis results that show it can be achieved while still providing the applicable level of protection.

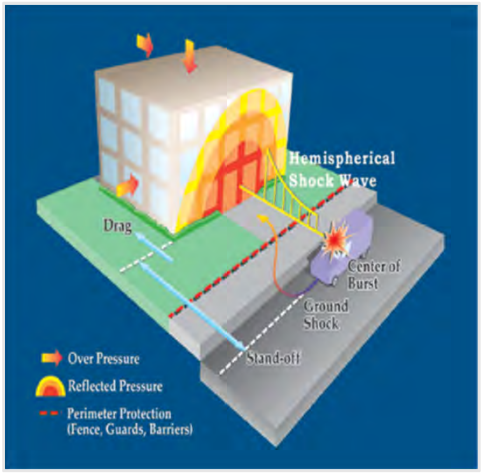
Appendix B – Best Practices

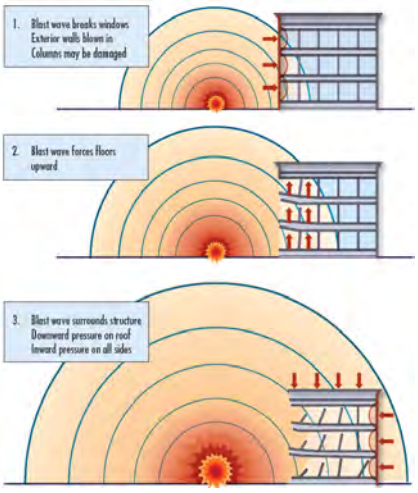
Standard 1. Standoff Distances

- **Where the conventional construction standoff distances are not available, an engineer experienced in blast-resistant design should analyze the building and apply building hardening as necessary to mitigate the effects of the applicable explosives at the achievable standoff distance to the appropriate level of protection.**

DoD Minimum AT Standards for Buildings Standoff Distances – Understanding It

Vehicle Bomb Loads on Buildings





Vehicle Bomb Loads on Buildings

Appendix B – Best Practices

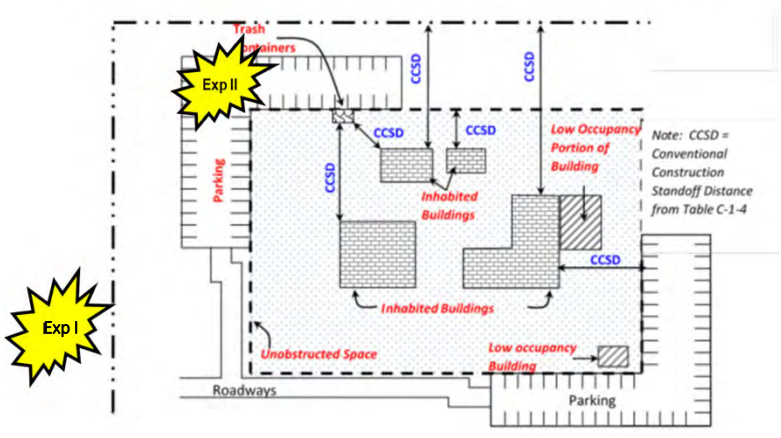
Standard 1. Standoff Distances

- Applicable to all inhabited buildings
  - From Controlled Perimeter
  - From Parking and Roadways (including drive lanes in parking lots)
  - Trash Containers
- Provides flexibility with existing inhabited buildings
  - Access control to parking areas
  - Eliminate parking on roadways within required standoff
- Provides flexibility for:
  - Parking for Family Housing
  - Government Vehicle Parking
  - Parking of Emergency and Operation Support Vehicles
  - Parking of Vehicles Undergoing Maintenance
  - Parking and Roadway Projects
  - Parking of Mobile Ground Tactical Platforms
- Adjacent Underground Parking
- Parking for Handicapped Personnel
- Standoff to Entry Control Facilities/Access Control Points
- Adjacent Existing Buildings
- Parking Structures

Appendix B – Best Practices

Standard 1. Standoff Distances

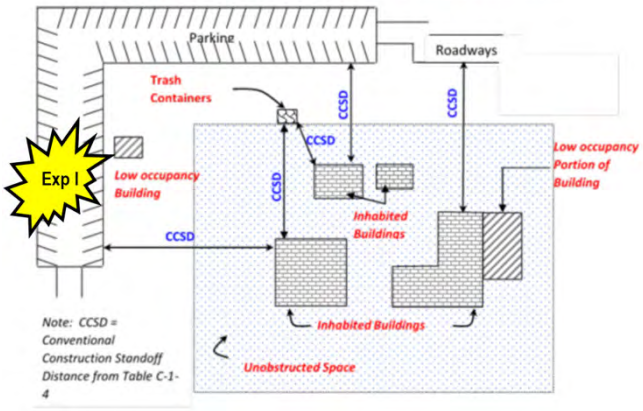
Figure B-1 Standoff Distances – With Controlled Perimeter



Appendix B – Best Practices

Standard 1. Standoff Distances

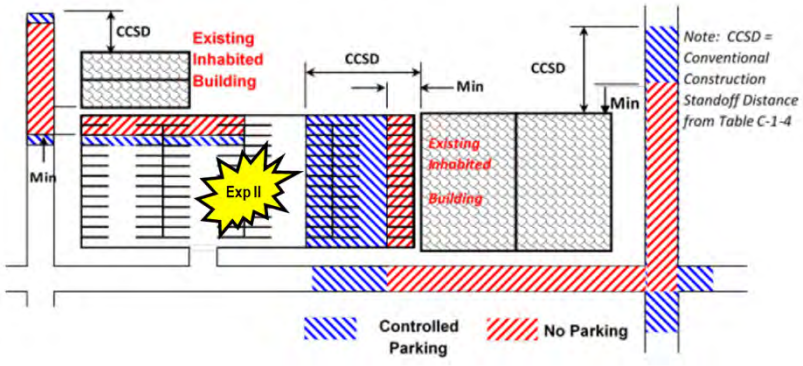
Figure B-2 Standoff Distances – No Controlled Perimeter



Appendix B – Best Practices

Standard 1. Standoff Distances – Existing Bldgs.

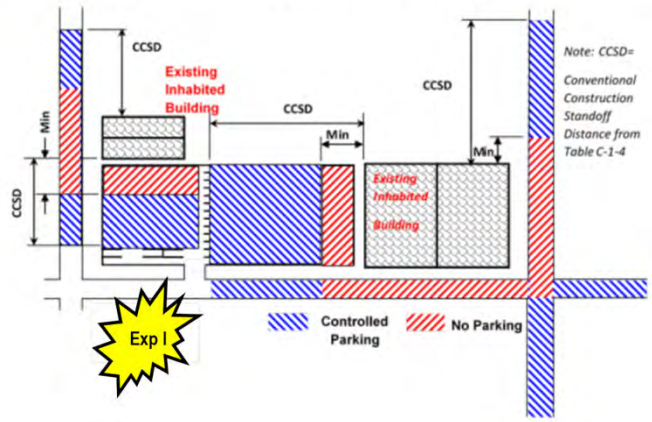
Figure B-3 Parking and Roadway Control for Existing Buildings – Controlled Perimeter



Appendix B – Best Practices

Standard 1. Standoff Distances – Existing Bldgs.

Figure B-4 Parking and Roadway Control for Existing Buildings – No Controlled Perimeter



Appendix B – Best Practices

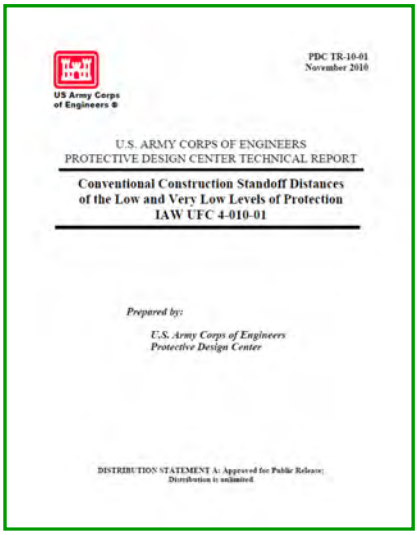
Table B-1 Levels of Protection – New and Existing Buildings

Level of Protection	Potential Building Damage/Performance [2]	Potential Door and Glazing Hazards[3,4]	Potential Injury
Below AT standards[1]	Severe damage. Progressive collapse likely. Space in and around damaged area will be unusable.	* Windows will fail catastrophically and result in lethal hazards. *(High hazard rating)* * Doors will be thrown into rooms. *(Category V)*	Majority of personnel in collapse region suffer fatalities. Potential fatalities in areas outside of collapsed area likely.
Very Low	Heavy damage - Onset of structural collapse, but progressive collapse is unlikely. Space in and around damaged area will be unusable.	* Glazing will fracture, come out of the frame, and is likely to be propelled into the building, with potential to cause serious injuries. *(Low hazard rating)* * Doors will become dislodged from the structure but will not create a flying debris hazard. *(Category IV)*	Majority of personnel in damaged area suffer serious injuries with a potential for fatalities. Personnel in areas outside damaged area will experience minor to moderate injuries.
Low	Moderate damage – Building damage will not be economically repairable. Progressive collapse will not occur. Space in and around damaged area will be unusable.	* Glazing will fracture, potentially come out of the frame, but at reduced velocity, does not present a significant injury hazard. *(Very low hazard rating)* * Doors will experience non-catastrophic failure, but will have permanent deformation and may be inoperable. *(Category III)*	Majority of personnel in damaged area suffer minor to moderate injuries with the potential for a few serious injuries, but fatalities are unlikely. Personnel in areas outside damaged areas will potentially experience minor to moderate injuries.
Medium	Minor damage – Building damage will be economically repairable. Space in and around damaged area can be used and will be fully functional after cleanup and repairs.	* Glazing will fracture, remain in the frame and results in a minimal hazard consisting of glass dust and slivers. *(Minimal hazard and No Hazard ratings)* * Doors will be openable but will have permanent deformation. *(Category II)*	Personnel in damaged area potentially suffer minor to moderate injuries, but fatalities are unlikely. Personnel in areas outside damaged areas will potentially experience superficial injuries.
High	Minimal damage. No permanent deformations. The facility will be immediately operable.	* Innermost surface of glazing will not break. (No Break hazard rating) * Doors will be substantially unchanged and fully operable. *(Category I)*	Only superficial injuries are likely.

1. This is not a level of protection and should never be a design goal. It only defines a realm of more severe structural response, and may provide useful information in some cases.
2. For damage / performance descriptions for primary, secondary, and non-structural members, refer to PDC Technical Report 06-08.
3. Glazing hazard ratings are from ASTM F 2912.
4. Door damage level categories are from ASTM F 2247 and F 2927.

Levels of Protection (LOP)

DoD Minimum AT Standards for Buildings Conventional Construction Standoff Distances


PDC TR-10-01
November 2010

US Army Corps of Engineers

U.S. ARMY CORPS OF ENGINEERS
PROTECTIVE DESIGN CENTER TECHNICAL REPORT

Conventional Construction Standoff Distances of the Low and Very Low Levels of Protection IAW UFC 4-010-01

Prepared by:

U.S. Army Corps of Engineers
Protective Design Center

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USACE Protective Design Center
Technical Report (PDC TR-10-01)
Conventional Construction Standoff Distances Of The Low And Very Low Level Of Protection IAW UFC 4-010-01

- Prepared/Published during the development of new conventional construction standoff distances (CCSD) based on the structural analysis of standard building components used for DoD inhabited and primary gathering facilities – this over the last 5 YEARS
- Installations that knowingly did not have the CCSD recognized the extra cost applied to each project.
- Often times the design team would relocate the facility and reduce the CCSD during the planning or design phase, not recognizing the ATFP cost impacts of this decision
- Those costs then become an unfunded project requirement having significant cost impacts to building projects
- Installations unable to meet the CCSD's required an analysis to review the standoff distance requirements for their building components

AVAILABLE AT THE ARMY CORPS OF ENGINEERS PROTECTIVE DESIGN CENTER WEBSITE
https://www.nwo.usace.army.mil/About/Centers-of-Expertise/Protective-Design-Center/PDC-Library/

Appendix C – Representative Standoff Distances for Conventional Construction and Expeditionary Structures

- Introduction
- How to Use this Appendix
- Walls
- Roofs
- Windows
- Expeditionary Structures
- Tables: C-1 through C-6
  - C-1: Representative Standoff Distances for Very Low Level of Protection
  - C-2: Representative Standoff Distances for Low Level of Protection
  - C-3: Representative Standoff Distances for Medium Level of Protection
  - C-4: Representative Standoff Distances for High Level of Protection
  - C-5: Conventional Construction Parameters
  - C-6: Standoff Distances for Expeditionary Structures

Note that these standoff distances are for planning purposes only.

All building components should be designed for blast loading and conventional loading.

Appendix C – Representative Standoff Distances for Conventional Construction and Expeditionary Structures

Table C-2 Representative Standoff Distances for Low Level of Protection [7]

Construction [1]	Explosive Weight (TNT)											
	55 lbs (25 kg)		220 lbs (100 kg)		550 lbs (250 kg)		1,100 lbs (500 kg)		4,400 lbs (2,000 kg)		19,800 lbs (9,000 kg)	
	LB [2]	NLB [3]	LB [2]	NLB [3]	LB [2]	NLB [3]	LB [2]	NLB [3]	LB [2]	NLB [3]	LB [2]	NLB [3]
Metal Stud with Lightweight Sheathing [4]	150 ft (46 m)	84 ft (26 m)	376 ft (115 m)	206 ft (63 m)	661 ft (201 m)	372 ft (113 m)	971 ft (296 m)	566 ft (173 m)	1642 ft (500 m)	1279 ft (390 m)	2656 ft (809 m)	2910 ft (887 m)
Metal Stud with Brick Veneer [4]	74 ft (22 m)	42 ft (13 m)	186 ft (57 m)	107 ft (33 m)	341 ft (104 m)	191 ft (58 m)	538 ft (164 m)	300 ft (91 m)	1303 ft (397 m)	730 ft (223 m)	2545 ft (776 m)	1779 ft (542 m)
Wood Stud with Lightweight Sheathing [4]	85 ft (26 m)	65 ft (20 m)	211 ft (64 m)	163 ft (50 m)	386 ft (118 m)	299 ft (91 m)	601 ft (183 m)	465 ft (142 m)	1441 ft (439 m)	1134 ft (346 m)	2645 ft (806 m)	2625 ft (800 m)
Wood Stud with Brick Veneer [4]	36 ft (11 m)	22 ft (7 m)	103 ft (31 m)	78 ft (24 m)	193 ft (59 m)	150 ft (46 m)	303 ft (92 m)	238 ft (73 m)	761 ft (232 m)	589 ft (179 m)	2010 ft (613 m)	1546 ft (471 m)
Pre-engineered Building (Girt and Metal Panel [4])	104 ft (32 m)	54 ft (17 m)	336 ft (102 m)	151 ft (46 m)	684 ft (209 m)	287 ft (88 m)	1132 ft (345 m)	458 ft (140 m)	1668 ft (508 m)	1294 ft (394 m)	2780 ft (847 m)	2985 ft (910 m)
Unreinforced Concrete Masonry [4]	80 ft (24 m)	26 ft (8 m)	262 ft (80 m)	124 ft (38 m)	535 ft (163 m)	276 ft (84 m)	906 ft (276 m)	484 ft (148 m)	1893 ft (577 m)	1393 ft (425 m)	2780 ft (847 m)	2940 ft (896 m)
Unreinforced European Clay Masonry [4]	38 ft (11 m)	22 ft (7 m)	163 ft (50 m)	59 ft (18 m)	398 ft (121 m)	148 ft (45 m)	748 ft (228 m)	314 ft (96 m)	1614 ft (492 m)	1146 ft (349 m)	N/A	2688 ft (819 m)
Reinforced Masonry [4]	28 ft (9 m)	13 ft (4 m)	85 ft (26 m)	30 ft (9 m)	166 ft (51 m)	72 ft (22 m)	273 ft (83 m)	120 ft (37 m)	736 ft (224 m)	326 ft (99 m)	2212 ft (674 m)	945 ft (288 m)
Reinforced Concrete [4]	22 ft (7 m)	14 ft (4 m)	104 ft (32 m)	35 ft (11 m)	234 ft (71 m)	105 ft (32 m)	424 ft (129 m)	200 ft (61 m)	1255 ft (383 m)	663 ft (202 m)	2504 ft (763 m)	2122 ft (647 m)
Concrete roofs and Metal Roofs w/ concrete topping[5]	13 ft (4 m)		23 ft (7 m)		50 ft (15 m)		92 ft (28 m)		270 ft (82 m)		737 ft (225 m)	
Windows [6]	51 ft (15 m)		123 ft (37 m)		197 ft (60 m)		269 ft (82 m)		545 ft (166 m)		1092 ft (333 m)	
Minimum Standoff Distance [8]	13 ft (4 m)		20 ft (6 m)		26 ft (8 m)		33 ft (10 m)		50 ft (15 m)		82 ft (25 m)	

1. Refer to Table C-5 for details on the analysis assumptions and material properties for these wall and roof types.
2. Load bearing construction.
3. Non-load bearing construction.
4. Where wall types include multiple cladding systems such as brick half way up the wall and EIFS above that, use the greater of the two applicable standoff distances. For additional information on Steel Studs see PDC TR 15-01, Minimum Standoff Distances for Non-Load Bearing Steel Stud In-Fill Walls.
5. Roof construction seldom controls standoff distances. Standoffs of at least those in this row will commonly be adequate for those roof types. Other roof types will have to be analyzed separately
6. At distances closer than these standoff distances windows will commonly be much heavier and more expensive than conventional windows.
7. Note that these standoff distances are for planning purposes only. All building components should be designed for blast loading and conventional loading.
8. See Paragraph B-2.1.3.

Appendix C – Representative Standoff Distances for Conventional Construction and Expeditionary Structures

Table C-5 Conventional Construction Parameters

Wall or Roof Type [9]	Analysis Assumptions [2, 10]						
	Sections	Span	Spacing	Support Condition	Supported Weight [8]	Reinforcement Ratio	Min. Static Material Strength
Wood Studs – Brick Veneer	2x4 & 2x6 in (50x100 & 50x150 mm)	8 – 10 ft (2.4 - 3 m)	16 - 24 in (400 – 600 mm)	S-S	44 psf (215 kg/m²)	N/A	875 psi (6 MPa)
Wood Studs – EIFS	2x4 & 2x6 in (50x100 & 50x150 mm)	8 – 10 ft (2.4 – 3 m)	16 -24 in (400 -600 mm)	S-S	10 psf (49 kg/m²)	N/A	875 psi (6 MPa)
Steel Studs – Brick Veneer [2]	600S162-43 600S162-54 600S162-68	8 – 12 ft (2.4 – 3.7 m)	16 - 24 in (400 – 600 mm)	S-S	44 psf (215 kg/m²)	N/A	50,000 psi (345 MPa)
Steel Studs – EIFS [2]	600S162-43 600S162-54 600S162-68	8 – 12 ft (2.4 – 3.7 m)	16 - 24 in (400 – 600 mm)	S-S	10 psf (49 kg/m²)	N/A	50,000 psi (345 MPa)
Metal Panels [2] (in wall or roof construction)	1.5 – 3 in (38 - 76 mm) 22, 20, & 18 ga	4 – 8 ft (1.2 - 2.4 m)	N/A	S-S	10 psf (49 kg/m²)	N/A	33,000 psi (228 MPa)
Girts [2] (in wall or roof construction)	8Z3 &10Z3 16, 14, & 12 ga	20 – 25 ft (6 – 7.6 m)	6 – 8 ft (1.8 – 2.4 m)	S-S	5 psf (24 kg/m²)	N/A	50,000 psi (345 MPa)
Reinforced Concrete [7]	≥ 6 in (≥ 150 mm)	12 – 20 ft (3.7- 6 m)	N/A	S-S, One way flexure	10 psf (49 kg/m²)	≥ 0.0015	3,000 psi (21 MPa)
Unreinforced Concrete Masonry [4, 5]	6 – 12 in (150 – 300 mm)	8 – 12 ft (2.4 – 3.7 m)	N/A	S-S, One way flexure	10 psf (49 kg/m²)	0	1,500 psi (10 MPa)
Reinforced Concrete Masonry [7, 5]	8 – 12 in (200 - 300 mm)	10 – 14 ft (3 – 4.3 m)	N/A	S-S, One way flexure	10 psf (49 kg/m²)	0.0005 - 0.0030	1,500 psi (10 MPa)

Wall or Roof Type [9]	Analysis Assumptions [2, 10]						
	Sections	Span	Spacing	Support Condition	Supported Weight [8]	Reinforcement Ratio	Min. Static Material Strength
European Clay Block Masonry [4, 5]	6 – 8 in (150 – 200 mm)	10 – 12 ft (3 – 3.7 m)	N/A	S-S, Brittle Flexure	10 psf (49 kg/m²)	0	1,800 psi (12 MPa)
Concrete Roofs [7]	4 – 12 in (100 - 300 mm)	6 ft (1.8 m)	N/A	F-S	15 psf (73 kg/m²)	0.0015 - 0.005	3,000 psi (21 Mpa)
Metal Roofs	K and LH joists with Metal Deck and/or 3.5 - 5.5 in (90 - 140 mm) Concrete Topping	30 ft (9.1m)	4 – 8 ft (1.2 – 2.4 m)	S-S	15 – 90 psf (73 – 439 kg/m²)	N/A	50,000 psi (345 MPa)

1. Other types of construction other than that shown in this table may be permissible subject to validation by the designer of record.
2. See PDC Technical Report 10-01 for details on the analysis assumptions and material properties.
3. Steel studs are assumed to be connected top and bottom for load bearing walls. For non-load bearing walls steel studs are assumed to have a slip-track connection at the top. For additional information on Steel Studs see PDC TR 15-01, Minimum Standoff Distances for Non-Load Bearing Steel Stud In-Fill Walls.
4. Unreinforced masonry must have adequate lateral support at the top and bottom.
5. Weight supported by the wall that moves through the same deflection as the wall, not including self-weight of the component.
6. For walls or roofs built using metal panels and girts; use the greater of the standoffs for the metal panel and the girt.
7. Reinforcing steel is 60,000 psi (414 MPa) tensile strength.
8. Concrete Masonry Units (excluding European block) are medium weight (120 pcf / 1922 kg/m³)
9. European clay block masonry complies with DIN: 105 Teil 1 + 2/HLz B
10. Shear will need to be checked when using higher than minimum material strengths.

S-S = Simple - Simple Supports F-S = Fixed - Simple Supports

Appendix C – Representative Standoff Distances for Conventional Construction and Expeditionary Structures

Example Standoff Table from Appendix C of UFC 4-010-01

Table C-2 Representative Standoff Distances for Low Level of Protection [7]

Construction [1]	Explosive Weight (TNT)									
	55 lbs (25 kg)		220 lbs (100 kg)		550 lbs (250 kg)		1,100 lbs (500 kg)		4,400 lbs (2,000 kg)	
	LB [2]	NLB [3]	LB [2]	NLB [3]	LB [2]	NLB [3]	LB [2]	NLB [3]	LB [2]	NLB [3]
Unreinforced European Clay Masonry [4]	38 ft (11 m)	22 ft (7 m)	163 ft (50 m)	59 ft (18 m)	398 ft (121 m)	148 ft (45 m)	748 ft (228 m)	314 ft (96 m)	1614 ft (492 m)	1146 ft (349 m)
Reinforced Masonry [4]	28 ft (9 m)	13 ft (4 m)	85 ft (26 m)	30 ft (9 m)	166 ft (51 m)	72 ft (22 m)	273 ft (83 m)	120 ft (37 m)	736 ft (224 m)	326 ft (99 m)
Reinforced Concrete [4]	22 ft (7 m)	14 ft (4 m)	104 ft (32 m)	35 ft (11 m)	234 ft (71 m)	105 ft (32 m)	424 ft (129 m)	200 ft (61 m)	1255 ft (383 m)	663 ft (202 m)
Concrete roofs and Metal Roofs w/ concrete topping[5]	13 ft (4 m)		23 ft (7 m)		50 ft (15 m)		92 ft (28 m)		270 ft (82 m)	
Windows [6]	51 ft (15 m)		123 ft (37 m)		197 ft (60 m)		269 ft (82 m)		545 ft (166 m)	
Minimum Standoff Distance [8]	13 ft (4 m)		20 ft (6 m)		26 ft (8 m)		33 ft (10 m)		50 ft (15 m)	

- ***Note that these standoff distances are for planning purposes only.***
- ***All building components should be designed for blast loading and conventional loading.***
- ***Standoff distance for windows and doors must be individually analyzed, and typically control (typically no less than 15 m)***

Conventional (Type 5) Construction

BEFORE

Conventional (Type 5) Construction

BEFORE

Very Low Level of Protection – Conventional (Type 5) Construction

Conventional Construction Standoff

Very Low Level of Protection – Conventional (Type 5) Construction

Low Level of Protection – Conventional (Type 5) Construction

Conventional Construction Standoff

How Much You Want to Protect the Asset

Levels of Protection

Low

High

Very Low

Appendix B – Best Practices

Standard 2. Unobstructed Space

- The requirements for the unobstructed space are based on eliminating opportunities to conceal objects indicated below. **(CONCEALMENT)**
- It is assumed that aggressors will not attempt to place explosive devices in areas near buildings where those explosive devices could be visually detected by building occupants.
- Ensure there are unobstructed spaces in which there are no obstructions or building features that might allow for concealment from observation of explosive devices with dimensions of no less than a 6 in. (150 mm) cube around buildings and underneath building overhangs or breezeways.
- This does not preclude the placement of site furnishings or plantings around buildings.
- It only requires conditions such that any explosive devices placed in the unobstructed spaces would be observable by building occupants or passers by either from within the buildings or as they walk into or around it.
- For trees or shrubs ensure that no foliage extends lower than 3 ft. (1 m) above the grounds to improve observation of objects underneath them.

CONCEALMENT

Appendix B – Best Practices

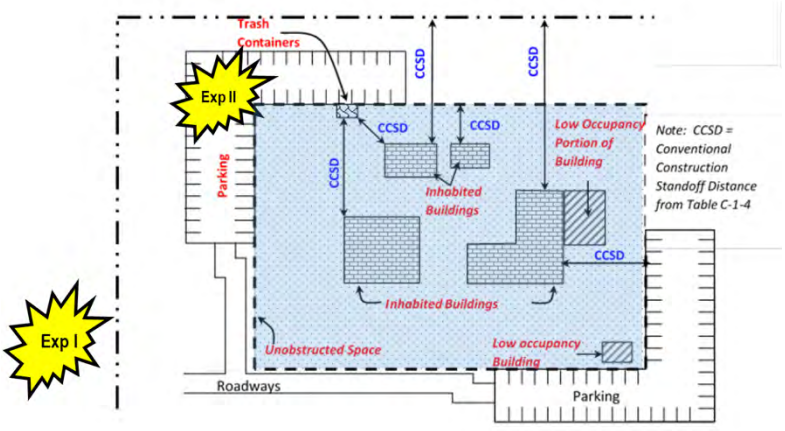
Standard 2. Unobstructed Space

- Standard 2 covers unobstructed space requirements to meet the minimum standards, however, fully mitigating the effects of a **hand placed explosive** (EW II type) requires determining a standoff distance based on the building construction, DBT, and applicable LOP.
- The unobstructed space should extend out to the applicable conventional construction standoff distance to walls for parking and roadways in accordance with Table C-1 through Table C-4, but not less than the minimum standoff distance.
- Where controlled parking associated with existing buildings is allowed, the unobstructed space should be considered to extend to the limits of those parking areas where access is controlled.
- When an explosive threat has been identified, parking should not be allowed within unobstructed spaces except for parking of emergency, command, and operations support vehicles and mobile ground tactical platforms.

Appendix B – Best Practices

Standard 2. Unobstructed Space

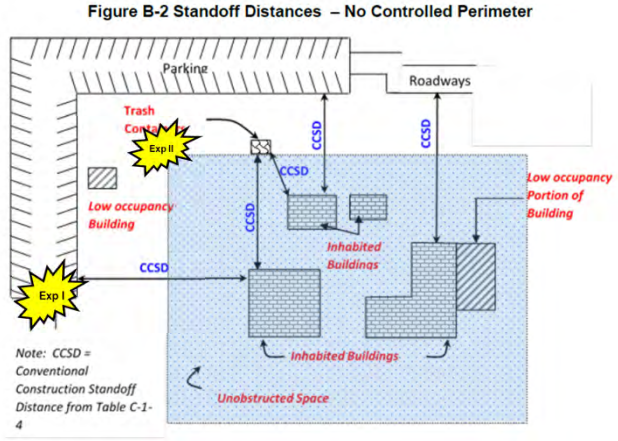
Figure B-1 Standoff Distances – With Controlled Perimeter



Appendix B – Best Practices

Standard 2. Unobstructed Space

Figure B-2 Standoff Distances – No Controlled Perimeter



Appendix B – Best Practices

Standard 2. Unobstructed Space

- **Trash Containers.**
  - Trash containers are not allowed within the unobstructed space unless the containers are secured or enclosed to preclude concealment of explosives.
- **Electrical and Mechanical Equipment.**
  - Electrical and mechanical equipment may be located within unobstructed spaces if they do not provide opportunities for concealment of explosives or are within an enclosure.
- **Fuel Tanks.**
  - Fuel tanks may be located within unobstructed spaces if they do not provide opportunities for concealment of explosives or are within an enclosure.

Appendix B – Best Practices

Standard 2. Unobstructed Space

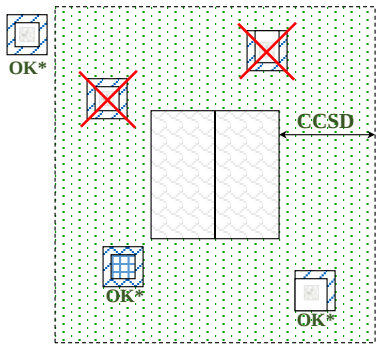
- **Enclosures -** When trash containers, fuel tanks or electrical or mechanical equipment within the unobstructed space provide the opportunity for concealment, they must be enclosed.
  - Enclosures must have four sides and a top.
  - Openings in screening materials and gaps between the ground and screens or walls making up an enclosure will not be 6 in. (150 mm) or greater.
  - Secure any surfaces of the enclosures that can be opened so that unauthorized personnel cannot gain access.
  - Where opaque top enclosures are provided, they will have a pitch of at least 1 vertical to 2 horizontal to increase visibility of objects thrown onto them and to increase the likelihood that the objects will slide off.
  - Alternatively, if the vertical surfaces of the enclosures are transparent and at least 7 ft. (2.1 m) high, a top enclosure is not required.
- **Walls and Screens.**
  - If walls or other screening devices with more than two sides are placed around trash containers, fuel tanks or electrical or mechanical equipment within the unobstructed space, provide enclosure as required above.

Appendix B – Best Practices

Landscaping within Unobstructed Space

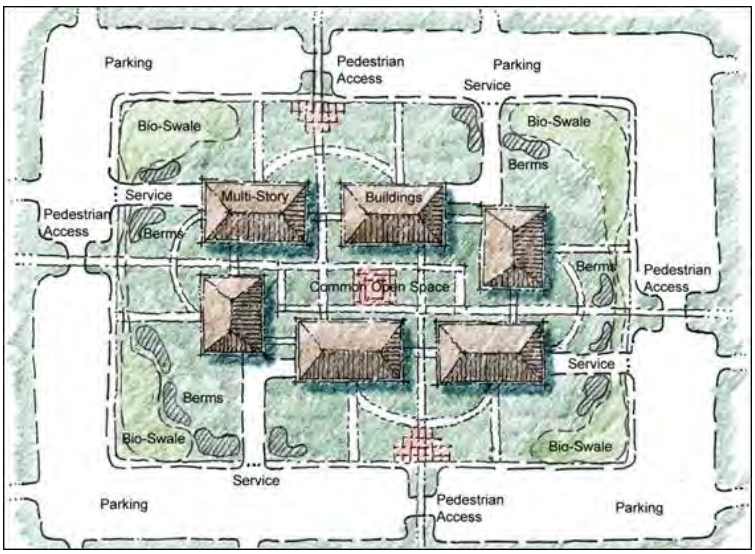
Appendix B – Best Practices

Equipment Enclosures



- **Avoid opportunities for concealment**
- **Screening material ≤ 6 inches (150 mm)**
- **Secure surfaces that can be opened**
- *** Trash container standoff distances also apply**

Site Concepts



Site Concepts – PPV - Norfolk

Site Concepts

What We Do Want!

AT and Physical Security features should be attractive and unapparent.

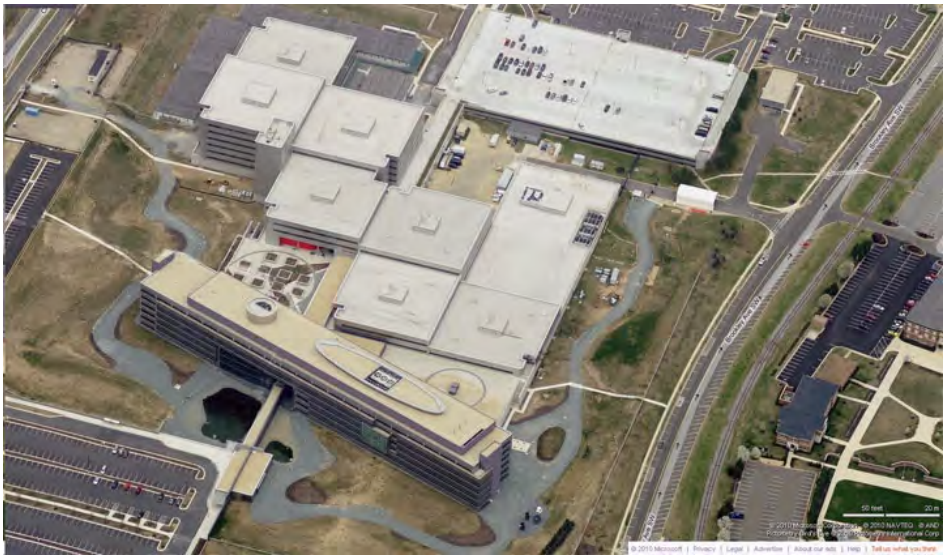
450,000 SF Admin Facility.

Water element was required for bio-retention pond. Used for vehicle barrier.

Wall (vehicle barrier) was built using loose stack local stone

Vehicle barriers not required for DoD Minimum Standards

What We Do Want!



What We Do Want!- Enhanced Use Lease

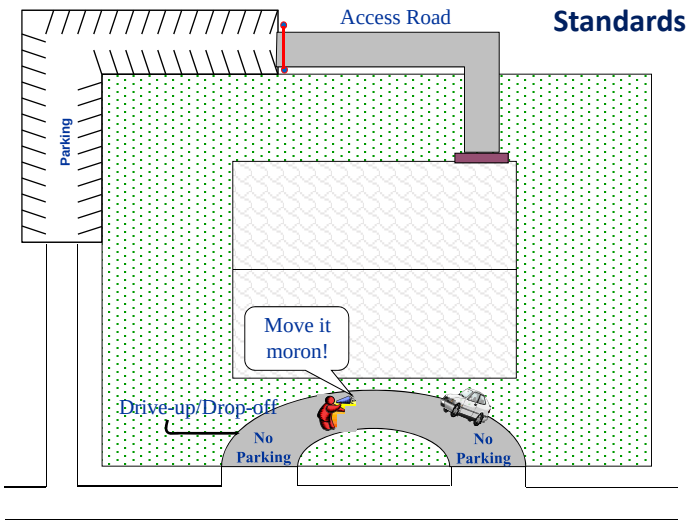
What We Don't Want!

What We Do Want!

Appendix B – Best Practices

- **Standard 3: Drive-Up/Drop-Off Areas**
  - Medical facilities, exchanges, commissaries, child care centers, and schools
  - Provide markings for restricted areas and lanes IAW MUTCD
  - Do not allow unattended vehicles
  - Do not locate drive through/drive-up/drop-off lanes under any inhabited portion of a building
- **Standard 4: Access Roads**
  - Where necessary for operation and fire department access, ensure access control measures are implemented.

Appendix B – Best Practices



Appendix B – Best Practices

Standard 5. Parking Beneath Buildings or on Rooftops
(of Inhabited Buildings)

- **Eliminate parking beneath inhabited building or on rooftops of inhabited building**
- **Where parking must be underneath, such as areas with limited real estate:**
  - **Provide access control**
  - **To mitigate the effects of an explosive event underneath or on top of a building, ensure that there is no general collapse of more than one single bay of floor beneath or floors/roof above inhabited areas and that all other adjacent supporting structural elements will not fail from the detonation in the parking area of the threat explosive.**
  - **Design structure to prevent progressive collapse (3 or more stories) when required**

Appendix B – Best Practices

Appendix B – Best Practices

Appendix B – Best Practices

Standard 10. Glazing

- New Glazing. Windows and skylights shall meet the AT performance requirements of UFC 4-010-01, Appendix B – Best Practices.
- For glazing in exterior building elements such as storefronts, doors, windows, curtain walls, clerestories, and skylights provide no less than 1/4 in. (6 mm) nominal polycarbonate or laminated glass.
- The 1/4 in. (6 mm) laminated glass consists of two nominal 1/8 in. (3 mm) glass panes bonded together with a minimum of a 0.030 in. (0.75 mm) interlayer of a material designed for blast resistance.
- For insulated glass units (IGU), use the polycarbonate or laminated glass for the innermost pane as a minimum.

Appendix B – Best Practices

Standard 10. Glazing

- **Glazing and frames must work as an integrated system to provide effective hazard mitigation – glass/frame/bite/anchorage/structural support.**
- **Provisions apply all standoff distances even if conventional wall construction standoff distances are met or exceeded.**
- **Minimum requirements**
  - **Use laminated glass or polycarbonate**
    - **Minimum of two 3mm (1/8 inch) annealed panes bonded together with 0.75mm (0.030 inch) polyvinyl-butyral (PVB) interlayer.**
    - **Monolithic glass or monolithic acrylic used as a single pane or as the inner lite of a multi-lite system is not allowed for the purposes of complying with this standard**
  - **Window frames shall be aluminum or steel. Other materials must be verified through testing**
  - **Connection design of frame to building structural support system**
  - **Supporting Structural Elements**

- **While the APPENDIX C tables address windows, the standoff distances shown should only be used for planning purposes as indicators of standoff distances at which conventionally constructed windows can be used.**

ALL glazing systems must be designed for specific design basis threat at the achievable standoff and provide required level of protection.

DoD Minimum AT Standards for Buildings

Flying Hazardous Debris – Glazing System

Appendix B – Best Practices

STANDARD 10 - GLAZING

- **ALL windows must be designed for blast loads at achievable standoff distance and provide required level of protection.**
- **Allows for design by**
  - ❑ **ASTM F2248/E1300 design approach – "static equivalent", frame bite requirements, connection design**
  - ❑ **Dynamic Analysis – Single-Degree-of Freedom Blast Effects Design Spreadsheets for Windows (SBEDS-W) and PDC TR-10-02**
  - ❑ **Testing – ASTM F1642**
- **Performance Requirements as defined in Table B-1**

Appendix B – Best Practices

STANDARD 10 - GLAZING

- **ASTM F2248,** *Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass*
- **ASTM E1300,** *Standard Practice for Determining Load Resistance of Glass in Buildings*
- **ASTM F1642,** *Standard Test Method for Glazing and Glazing Systems Subject to Air Blast Loadings*
- **ASTM F2912**, *Standard Specification for Glazing and Glazing Systems Subject to Airblast Loading*

Appendix B – Best Practices

Table B-1 Levels of Protection – New and Existing Buildings

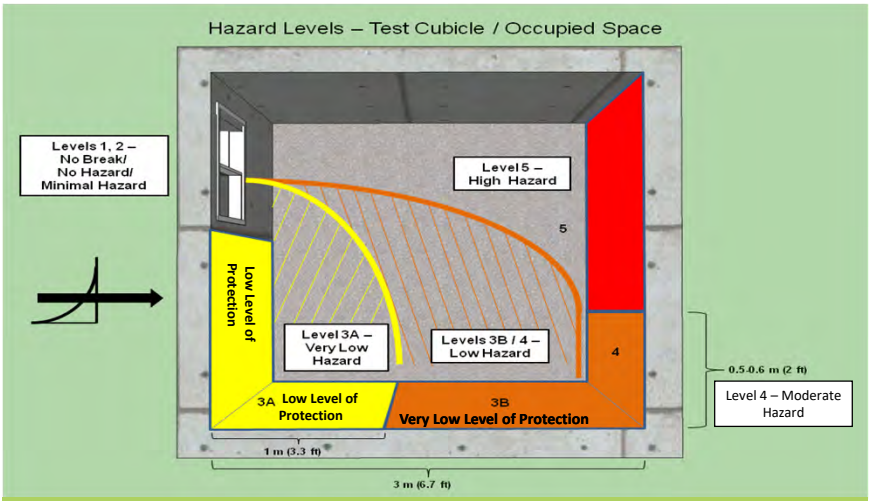
Level of Protection	Potential Building Damage/Performance [2]	Potential Door and Glazing Hazards[3,4]	Potential Injury
Below AT standards[1]	Severe damage. Progressive collapse likely. Space in and around damaged area will be unusable.	* Windows will fail catastrophically and result in lethal hazards. *(High hazard rating)* * Doors will be thrown into rooms. *(Category V)*	Majority of personnel in collapse region suffer fatalities. Potential fatalities in areas outside of collapsed area likely.
Very Low	Heavy damage - Onset of structural collapse, but progressive collapse is unlikely. Space in and around damaged area will be unusable.	* Glazing will fracture, come out of the frame, and is likely to be propelled into the building, with potential to cause serious injuries. *(Low hazard rating)* * Doors will become dislodged from the structure but will not create a flying debris hazard. *(Category IV)*	Majority of personnel in damaged area suffer serious injuries with a potential for fatalities. Personnel in areas outside damaged area will experience minor to moderate injuries.
Low	Moderate damage – Building damage will not be economically repairable. Progressive collapse will not occur. Space in and around damaged area will be unusable.	* Glazing will fracture, potentially come out of the frame, but at reduced velocity, does not present a significant injury hazard. *(Very low hazard rating)* * Doors will experience non-catastrophic failure, but will have permanent deformation and may be inoperable. *(Category III)*	Majority of personnel in damaged area suffer minor to moderate injuries with the potential for a few serious injuries, but fatalities are unlikely. Personnel in areas outside damaged areas will potentially experience minor to moderate injuries.
Medium	Minor damage – Building damage will be economically repairable. Space in and around damaged area can be used and will be fully functional after cleanup and repairs.	* Glazing will fracture, remain in the frame and results in a minimal hazard consisting of glass dust and slivers. *(Minimal hazard and No Hazard ratings)* * Doors will be openable but will have permanent deformation. *(Category II)*	Personnel in damaged area potentially suffer minor to moderate injuries, but fatalities are unlikely. Personnel in areas outside damaged areas will potentially experience superficial injuries.
High	Minimal damage. No permanent deformations. The facility will be immediately operable.	* Innermost surface of glazing will not break. (No Break hazard rating) * Doors will be substantially unchanged and fully operable. *(Category I)*	Only superficial injuries are likely.

1. This is not a level of protection and should never be a design goal. It only defines a realm of more severe structural response, and may provide useful information in some cases.
2. For damage / performance descriptions for primary, secondary, and non-structural members, refer to PDC Technical Report 06-08.
3. Glazing hazard ratings are from ASTM F 2912.
4. Door damage level categories are from ASTM F 2247 and F 2927.

STANDARD 10 - GLAZING

Levels of Protection (LOP)

Appendix B – Best Practices



ASTM F1642 – STANDARD TEST METHOD FOR GLAZING AND GLAZING SYSTEMS SUBJECT TO AIRBLAST LOADINGS

Appendix B – Best Practices

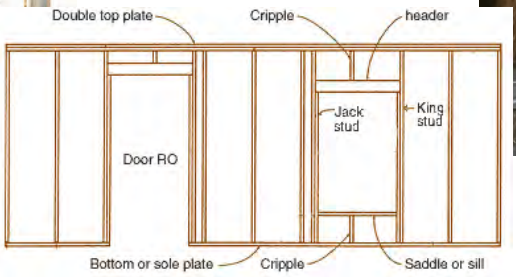
STANDARD 10 - GLAZING
Supporting Structural Element Issues

- **Surrounding wall must be able to take the load from the anchors that fasten the window frame to the wall.**

Appendix B – Best Practices

STANDARD 10 – GLAZING

Timber Window Framing



Appendix B – Best Practices

STANDARD 10 – GLAZING

NOT ANCHORED PROPERLY

Appendix B – Best Practices

STANDARD 10 – GLAZING

- **Does not apply to:**
  - ❑ Translucent fiberglass panels (Ex. – Kalwall Wall Systems)
  - ❑ Lightweight plastic panels
  - ❑ Spandrel glass (backed by wall or beam)
  - ❑ Glass unit masonry
  - ❑ These are governed by Standard 1(wall type systems) and the performance requirements of Table B-1 and proven through testing or analysis
- **Does apply to:**
  - ❑ Engineered glass block window systems
  - ❑ Spandrel glass open to occupied space

DoD Minimum AT Standards for Buildings

Standard 10. Glazing

Stairwells, Vestibules, Covered or Enclosed Walkways:

- Because the glazing in stairwells and covered or enclosed walkways must comply with Standard 10 in Chapter 3 (see previous slides on glazing wrt to Chapter 3) building components behind the exterior stairwell glazing should be capable of mitigating any hazards resulting from the stairwell or enclosed walkway glazing failure in response to a blast event in accordance with the applicable levels of protection described in Table B-1.
- In addition, any windows, inner doors, sidelights, and transoms that are interior to the exterior stairwells, vestibules, or covered or enclosed walkways must meet the requirements of this standard.

Replacement with Wall or Roof Systems:

- When windows or skylights are being replaced by filling in the openings with wall or roof material fill in the openings with the same or similar construction as the adjacent wall or roof construction.
- Alternatively install lightweight translucent fiberglass or plastic panels in the openings.
- Regardless of the infill construction used, it must be designed and constructed for blast resistance to provide the applicable level of protection.

Appendix B – Best Practices

STANDARD 10 – GLAZING

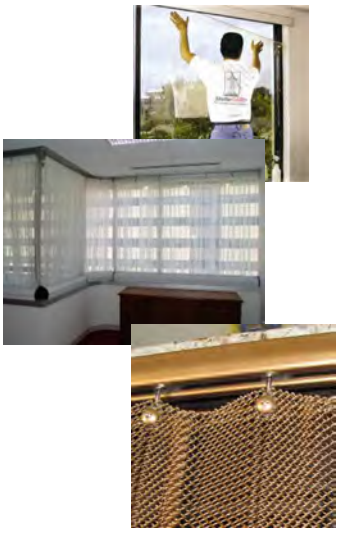
Desired Performance

- **Note Glazing Performs Acceptably, Glazing Remains In Frame**
- **Limited Glass Fragments into Interior**

Appendix B – Best Practices

Alternate Window Treatments

- **Retrofits incorporating fragment retention film or blast curtains are not allowed for new and existing buildings needing to comply with standards**
  - **Primary reason – shorter design life**
- **Laminated glazing, while more expensive initially, is less expensive over its life cycle.**
- **Blast curtains require operational procedures to ensure they remain closed at all times**
- **Fragment retention films and blast curtains are good interim solutions where compliance with these standards is not required.**



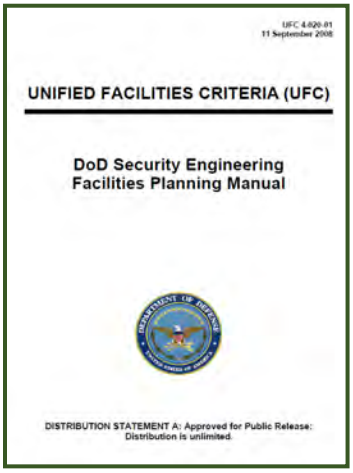
Appendix B – Best Practices

Alternate Window Treatments

How to determine the Facility Design Basis Threat and Level of Protection…

UFC 4-020-01, DoD Security Engineering Facilities Planning Manual

- **Provides a unified planning approach for security and antiterrorism protective measures.**
- **Chapter 3 describes steps to perform facility design basis threat (DBT)**
- **Risk-asset management to establish protection thresholds**
- **Chapter 4 describes design strategies**
- **Appendixes list cost impacts**
- **Does not include the protection measures for assets covered by regulatory or policy documents.**
  - **Arms, Ammunition & Explosives (AA&E)**
  - **Classified Information**
  - **Nuclear**
  - **Chemical**



Undergoing a major revision 2024

Facility DBT and LOP

- UFC 4-020-01 Chapter 3, Design Criteria Development
  - **Risk** is function of **asset criticality, threat/likelihood/tactic/severity, and vulnerability/LOP**
    - Step 1: Convene the planning team
    - Step 2: Identify assets
    - Step 3: Determine **asset value**
    - Step 4: Identify **aggressor likelihoods**
    - Step 5: Identify **tactics** and threat **severity** levels
    - Step 6: Consolidate into initial **design basis threat (DBT)**
    - Step 7: Determine initial **level of protection (LOP)**
    - Step 8: Determine planning **risk** levels
    - Step 9: Assess acceptability of **risk** levels
    - Step 10: Identify user constraints

Facility DBT and LOP

- **UFC 4-020-01 Chapter 3, Design Criteria Development**
  - **Step 1: Convene the planning team**
    - **Engineer(s)**
    - **Facility User(s)**
    - **Military Intelligence**
    - **Project Manager**
    - **Installation Planner**
    - **Etc.**

Facility DBT and LOP

- **UFC 4-020-01 Chapter 3, Design Criteria Development**
  - **Step 2: Identify assets**
    - The design criteria developed in this chapter relate primarily to assets associated with facilities as opposed to the facilities themselves.
    - Protecting individual assets is generally more cost effective than protecting an entire facility.
    - Buildings should only be considered assets if they are the likely direct target of aggression, as in vandalism or where the buildings have some special significance such as a highly symbolic or historic structure.
    - Determining the assets to be protected is the first step in establishing any protective system.

Facility DBT and LOP
Asset Value

- **UFC 4-020-01 Chapter 3, Design Criteria Development**
  - **Step 3: Determine asset value**
    - Asset value refers to the value of an asset to its user. It is a reflection of the consequence of having the asset compromised by an aggressor.
    - The asset value helps the Planning Team to determine the level of protection that is warranted for the asset.
  - **Work through a series of tables to compute**
    - Table 3-4. Criticality to User / **Mission Impact** / Population Type
    - Table 3-5. Impact on National Defense
    - Table 3-6. **Asset Replacement**
    - Table 3-7. Perceived Political Sensitivity
    - Table 3-8. **Relative Value to User**

Facility DBT and LOP
Example Worksheet

Asset Value

ASSET VALUE/AGGRESSOR LIKELIHOOD WORKSHEET

Project or Building: *A Motor Pool* | Asset: *Tactical vehicles* | Asset Category: *D* | Analyst: *Jane Q. Planner* | Date: *4 August 2008*

Value Rating Factors					Sum of Value Factors	Value Rating[2]	Potential Aggressor	Aggressor Group[3]	Aggressor	Likelihood Rating Factors														Sum of Likelihood Factors	Likelihood Rating[7]
Criticality to User / Population Type[1] / Impact on National Defense	Replaceability	Political Sensitivity	Relative Value to User							Intelligence Level[4]	Proximity Profile[4]	Accessibility[4]	Availability[4]	Operations[4]	Vulnerability	Relative Value to Aggressor	Law Enforcement[5]	Aggressor Perception of Success	Threat Level[6]	History[5] / Intent[6]	Operational Capability	Operational Experience	Arming[4]		
General Population							✓	M	Unsophisticated Criminals	2	4	2	2	3	12	15	18	24	6	6				94	.52
Critical Infrastructure and Operations and Activities							✓	M	Sophisticated Criminals	2	4	2	2	3	12	12	18	24	6	6				91	.51
							✓	M	Organized Crime Groups	2	4	2	2	3	15	9	18	30	6	6				97	.54
Sensitive Information							✓	G	Vandals	2	4	2	2	3	12	6	18	24	6	6				85	.47
All Other Assets							✓	G	Extremist Protesters	2	4	2	2	3	15	6	18	24	6	6				88	.49
4	4	4	3	4	19	.76	✓	G	Domestic Terrorists	2	4	2	2	3	15	9	18	24	5	4	4	6	4	102	.57
Notes:							✓	G	International Terrorists	2	4	2	2	3	15	9	18	30	5	4	6	10	2	116	.64
							✓	G	State Sponsored Terrorists	2	4	2	2	3	15	9	18	30	5	10	10	10	10	130	.72
							✓	G	Saboteurs	2	4	2	2	3	15	3	18	30	6	6				91	.51
									Foreign Intelligence Services																

1. Population Type applies to General Population only
2. Sum of Value Ratings = 10 for Sensitive Information; 15 for General Population; 20 for Critical Infrastructure and Operations and Activities; 25 for all other assets
3. G for mission related goal, P for monetary related goal, M for monetary related goal
4. Factors that should be same for all aggressors for given asset
5. Applies to all aggressors other than terrorists
6. Applies to Terrorists only
7. Sum of Likelihood Ratings = 180

Value Rating Factors					Sum of Value Factors	Value Rating[2]
Criticality to User / Population Type[1] / Impact on National Defense	Replaceability	Political Sensitivity	Relative Value to User			
4	4	4	3	4	19	.76

Facility DBT and LOP Aggressor Likelihood

- UFC 4-020-01 Chapter 3, Design Criteria Development
  - **Step 4: Identify aggressor likelihoods**
    - This step includes identifying potential aggressors and determining the likelihoods that they will attempt to compromise the assets.
  - **Work through another series of tables to compute**
    - Table 3-10. Asset Location
    - Table 3-11. Installation or Facility Publicity Profile
    - Table 3.12 **Asset Accessibility**
    - Table 3-13. Asset Availability
    - Table 3-14. Asset Dynamics
    - Table 3-15. Recognizability
    - Table 3-16. Relative Value to Aggressors
    - Table 3-17. **Law Enforcement Personnel Visibility**
    - Table 3-18. Aggressors' Perception of Success
    - Table 3-19. **Threat Level**
    - Table 3-20. History of Acts Against Like Assets / Terrorist Intention
    - Table 3-21. Terrorist **Operational Capability**
    - Table 3-22. Terrorist Operating Environment
    - Table 3-23. Terrorist Activity

Facility DBT and LOP Aggressor Likelihood

- UFC 4-020-01 Chapter 3, Design Criteria Development
  - **Step 5 : Identify Tactics and Threat Severity Levels**
    - The tactics aggressors are likely to use in attempting to compromise assets can be selected on a default basis considering the likely objectives of the aggressors toward the assets and the asset categories
    - The threat severity levels will indicate the initial tools, weapons, explosives, or agents that will be associated with those tactics for the purposes of the planning level risk analysis.
    - These form the basis for a preliminary protective system for an asset that can be used to develop a planning level cost estimate.
  - **Step 6 : Consolidate into Initial Design Basis Threat**
    - The initial design basis threat is the threat upon which the preliminary protective system will be based. It represents the worst-cases of the applicable threat severity levels for each applicable tactic for a given asset.
    - The initial design basis threat may be changed during the design process based on detailed risk analysis as described in UFC 4-020-02.
    - It will also be used to assess vulnerabilities in the case of existing facilities.
  - **Step 7 : Determine Initial Level of Protection**
    - Levels of protection reflect the degree to which an asset is protected against the threat based on its value to its user.

Facility DBT and LOP Aggressor Likelihood

- UFC 4-020-01 Chapter 3, Design Criteria Development
  - **Step 8 : Determining Planning Risk Levels**
    - Risk levels are used as a basis for comparing alternatives among levels of protection or countermeasures.
    - Risk levels are based on asset values, aggressor likelihoods, and protection factors that reflect levels of protection provided to the assets.
    - The risk analysis process in this UFC is for developing design criteria.
    - A more detailed treatment of risk that considers the contribution of specific countermeasures is in UFC 4-020-02.
  - **Step 9 : Assess Acceptability of Risk Levels**
    - There are no specific criteria for determining whether or not a given risk level is acceptable.
    - In some cases the Planning Team may have a goal for a risk level, although that is not recommended. In other cases the costs for achieving a level of protection associated with a risk may be the basis for a risk being acceptable.
    - Because the risk levels in this UFC are relative, their best use is as an aid in decision making.
    - The risk level means relatively little in itself, but when the reduction in risk can be evaluated with respect to the cost of a protective system, that provides a rough means of evaluating benefit versus cost.
    - The benefit is the reduction in risk.
  - **Step 10 : Identify User Constraints**
    - User constraints include physical characteristics and qualities or operational considerations that restrict or dictate the design of a protective system.
    - During design criteria development the Planning Team considers non-technical constraints relating to user requirements.

Facility DBT and LOP Example Worksheet

Aggressor Likelihood

ASSET VALUE/AGGRESSOR LIKELIHOOD WORKSHEET

Project or Building: *A Motor Pool*
Asset: *Tactical vehicles*
Asset Category: *D*
Analyst: *Jane Q. Planner*
Date: *4 August 2008*

Criticality to User / Population Type[1]	Impact on Natural Defense	Replaceability	Political Sensitivity	Relative Value to User	Sum of Value Factors	Value Rating[2]	Potential Aggressor	Aggressor Goal[3]	Aggressor	Installation Location[4]	Publicity Profile[4]	Accessibility[4]	Availability[4]	Dynamics[4]	Recognizability	Relative Value to Aggressor	Law Enforcement[4]	Aggressor Perception of Success	Threat Level	History[5] / Intentions[6]	Operational Capability[5]	Operating Environment[5]	Activity[5]	Sum of Likelihood Factors	Likelihood Rating[7]
General Population																									
							✓	M	Unsophisticated Criminals	2	4	2	2	3	12	15	18	24	6	6				94	.52
Critical Infrastructure and Operations and Activities							✓	M	Sophisticated Criminals	2	4	2	2	3	12	12	18	24	6	6				91	.51
							✓	M	Organized Criminal Groups	2	4	2	2	3	15	9	18	30	6	6				97	.54
Sensitive Information							✓	G	Vandals	2	4	2	2	3	12	6	18	24	6	6				85	.47
All Other Assets							✓	G	Extremist Protesters	2	4	2	2	3	15	6	18	24	6	6				88	.49
4	4	4	3	4	19	.76	✓	G	Domestic Terrorists	2	4	2	2	3	15	9	18	24	5	4	4	6	4	102	.57
Notes:							✓	G	International Terrorists	2	4	2	2	3	15	9	18	30	5	8	6	10	2	116	.64
							✓	G	State Sponsored Terrorists	2	4	2	2	3	15	9	18	30	5	10	10	10	10	130	.72
							✓	G	Saboteurs	2	4	2	2	3	15	3	18	30	6	6				91	.51
									Foreign Intelligence Services																

0.64

1. Population Type applies to General Population only
2. Sum of Value Ratings = 10 for Sensitive Information; 15 for General Population; 20 for Critical Infrastructure and Operations and Activities, 25 for all other assets
3. G for mission related goal, P for publicity related goal, M for monetary related goal.
4. Factors that should be same for all aggressors for given asset
5. Applies to all aggressors other than terrorists
6. Applies to Terrorists only
7. Sum of Likelihood Ratings = 180

Facility DBT and LOP Example Worksheet

TACTIC, THREAT SEVERITY, AND LEVEL OF PROTECTION WORKSHEET

Project or Building	Asset		Analyst
A Motor Pool	*Tactical Vehicles*		*Jane Q. Planner*
	Asset Category *D*	Asset Value *0.76*	Date *4 August 2008*

Tactics / Aggressors	Aggressor Likelihood	Explosives and Incendiary Devices			Standoff Weapons		Entry		Surveillance and Eavesdropping			Contamination		
		Moving Vehicle Devices	Stationary Vehicle Devices	Hand Delivered Devices	Indirect Fire Weapons	Direct fire weapons	Forced Entry	Covert Entry	Visual Surveillance	Acoustic Eavesdropping	Electronic Emanations Eavesdropping	Airborne Contamination	Waterborne Contamination	Waterfront Attack
Applicable Tactics			✓	✓	✓	✓	✓	✓						
Unsophisticated Criminals	.52						L	L						
Sophisticated Criminals	.51						L	L						
Organized Criminal Groups	.54			L		L	L	L						
Vandals	< .5													
Extremist Protesters	< .5													
Domestic Terrorists	.57		L	M	L	L	L	L						
International Terrorists	.64		L	M	L	L	L	L						
State Sponsored Terrorists	.72		L	M	L	L	M	L						
Saboteurs	.51			M	L	L	M	L						
Foreign Intelligence Services														
Initial Design Basis Threat (highest Threat Severity Level for each tactic)			L	M	L	L	M	L						
Initial Level of Protection for Applicable Tactic (Table 3-28)			M	M	M	L	M	M						

DBT
LOP

Facility DBT and LOP Threat Parameters

Table 3-27 Threat Parameters

Aggressor Tactic	Design Basis Threat	Weapons	Tools Or Delivery Method
Moving and Stationary Vehicle Devices	Special Case [1]	9000 kg (19,800 lbs) TNT	18,000 kg / ~ 40,000 lbs truck
	Very High	2000 kg (4400 lbs) TNT, Fuel	7000 kg / ~ 15,000 lbs truck
	High	500 kg (100 lbs) TNT, Fuel	2500 kg / ~ 5500 lbs truck
	Medium	250 kg (550 lbs) TNT, Fuel	1800 kg / ~ 4000 lbs car
	Low	100 kg (220 lbs) TNT	1800 kg /~ 4000 lbs car
	Very Low	25 kg (55 lbs) TNT	1800 kg / ~ 4000 lbs car
Hand Delivered Devices	High	IID, IED (up to 25 kg/55 lbs TNT) &hand grenades (Mail bomb limited to 1 kg/2.2 lbs TNT)	None
	Medium	IID, IED (up to 1 kg/2.2 lbs TNT) & hand grenades	
	Low	IID	
Indirect Fire Weapons Attack	Very High	Improvised mortar (up to 20 kg/44 lbs TNT)	None
	High	122 mm rocket	
	Medium	82 mm mortar	
	Low	Incendiary devices	
Direct Fire Weapons Attack	Very High	Light antitank weapons, and UL 752 Level 10 (12.7 mm (0.50 caliber), 1 shot)	None
	High	UL 752 Level 9 (7.62mm NATO AP, 1 shot)	
	Medium	UL 752 Level 5 (7.62mm NATO ball)	
	Low	UL 752 Level 3 (.44 magnum)	

THREAT/ THREAT SEVERITY

Facility DBT and LOP Threat Parameters

RISK LEVEL CALCULATION WORKSHEET

Project or Building:	Asset:	Analyst:
A Motor Pool	*Tactical vehicles*	*Jane Q. Planner*
	Asset Value (*Av*): *0.76*	Date: *4 August 2008*

	Aggressor	T_L[1]	T_E (Table 3-29)	Highest[2] T_L (T_{HL})	T_{HE}[2]	Tactic		LOP[3]	P_I[4] (Table 3-30)	Avg.[5] P_I ($P_{I(avg)}$)	P_R[6] Aggressor Category C	T	S	F	Risk Level[7] Aggressor Category C	T	S	F
Criminals (C)	Unsophisticated Criminals	.52	1.0	.54	.95	Explosives and Incendiaries	Moving Vehicle Bomb											
	Sophisticated Criminals	.51	.98				Stationary Vehicle Bomb	M	.7	.7	.67	.63	.63		.14	.20	.14	
	Organized Criminal Groups	.54	.95				Hand Delivered Devices	M	.7									
	Vandals	< .5				Standoff Weapons	Indirect Fire Weapons	M	.7	.5	.48	.45	.45		.22	.30	.21	
Terrorists (T)	Extremist Protesters	< .5		.72	.90		Direct Fire Weapons	L	.3									
	Domestic Terrorists	.57	.95			Entry Tactics	Forced Entry	M	.7	.7	.67	.63	.63		.14	.20	.14	
	International Terrorists	.64	.93				Covert Entry	M	.7									
	State Sponsored Terrorists	.72	.90			Surveillance and Eavesdropping	Visual Surveillance											
	Saboteurs (S)	.51	.90	.51	.90		Acoustic Eavesdropping											
	Foreign Intelligence Services (F)						Electronic Emanations Eavesdropping											
						Contamination	Airborne Contamination											
							Waterborne Contamination											
						Waterfront Attack												

1. From Tactic, Threat Severity, and LOP Worksheet.
2. Highest likelihood rating for each aggressor group.
3. Effectiveness rating for aggressor with highest likelihood.
4. From Table 3-30.
5. Average for P_I for all tactics within tactic group.
6. $P_R = T_{HE} \times P_{I(avg)}$ for each aggressor & tactic group combination.
7. $R = A_V \times T_{HE} \times (1-P_R)$ for each aggressor & tactic group.

RISK LEVEL

Facility DBT and LOP Threat Parameters

BUILDING COST AND RISK EVALUATION WORKSHEET

Project or Building:	Asset:	Analyst:
A Motor Pool	*Tactical Vehicles*	*Jane Q. Planner*
	Facility Building Category (*Table 3-1*): *Special Structure*	Date: *4 August 2008*

Tactic		Initial: Design Basis Threat[1]	LOP[2] or P_E	Rank[3] Level	Standoff, Stn. Size, Shores, %	Cost[4] Increase (%)	Cost Incr. Sum	Revised: Threat Severity Level	LOP[2,5] or P_E	Rank[3] Level	Standoff, Stn. Size, Shores,%	Cost[4] Increase (%)	Cost Incr. Sum	Analysis: Change[6] in Cost (%)	Change[7] in Risk (%)	Ratio[8]
Explosives and Incendiaries	Moving Vehicle Bomb[9]			(T)			17.1			(T)			6.5	-62	+40	-.64
	Stationary Vehicle Bomb[9]	L	M	.20	25 m	17.1		M	L	.28	25 m	6.5				
	Hand Delivered Devices															
	• Entrance[9]	M	M		10 m	1.7		H	L		10 m	1.7				
	• Mail Room[9]															
	• Loading Dock[9]															
	• Entry Area[9]															
Standoff Weapons	Indirect Fire Weapons	L	M	(T)		1.8	2.17	M	L	(T)		1.8	2.17	0	+40	
	Direct Fire Weapons	L	L	.30		0.37		M	L	.28		0.37				
Entry Tactics	Forced Entry			(T)			1.8			(T)			1.1	-39	+40	-1.02
	• Entrance															
	• Interior[9]	M	M	.20	large	0.35		H	L	.28	large	0.12				
	Covert Entry	L	M			0.5		M	L			0.1				
Surveillance and Eavesdropping	Visual Surveillance															
	Acoustic Eavesdropping															
	• Entrance															
	• Interior[9]															
	Electronic Emanations Eavesdropping															
	• Entrance															
	• Interior[9]															
Contamination	Airborne Contamination															
	Waterborne Contamination															
Waterfront Attack																
					Sum[10] (%)		21.07					Sum[10] (%)	9.77			

1. Use highest cost among these tactics
2. From Tactic, Threat Severity and LOP Worksheet
3. Level of Protection or Initial Protection Level
4. From Risk Level Calculation Worksheet
5. One risk level for each tactic group
6. Risk level for aggressor whose threat severity level controls DBT (from Tactic, Threat Severity, and LOP Worksh
7. Indicate which aggressor controls
8. From Appendix A or B or from other cost estimate
9. Enter small, medium, or large or n
10. Enter percentage of building perimeter protected
11. (Revised cost sum – initial cost sum) ÷ initial cost sum
12. (Revised risk level – initial risk level) ÷ initial risk level
13. Change in risk – change in cost
14. Total building cost increase (with progressive collapse)

RISK LEVEL

BUILDING COST

Facility DBT and LOP Protection Parameters

- UFC 4-020-01 **Chapter 4, Design Strategies**
  - **Vehicle bomb tactics (stationary & moving)**
  - Hand delivered devices
  - Indirect fire weapons
  - **Direct fire weapons**
    - **Low LOP: block sightlines**
    - **High LOP: harden building elements (e.g. 4" RC for 7.62mm)**
  - Airborne contamination tactic
  - Waterborne contamination tactic
  - Waterfront attack tactic
  - **Forced entry tactic**
    - **Low LOP: 1 min. delay**
    - **High LOP: 15 min. delay**
  - Covert entry tactic
  - Visual surveillance tactic

Project Development

Project Development

The planning team must:

- Understand related DoD/Service Policy/Regulations
- Understand related GCC OPORD AT requirements
- Determine if more than the minimum standards are required
- Incorporate protective measures and related costs in project scope and budget as required

❖ See paragraphs in UFC 4-010-01 Titled 'DoD and Heads of DoD Components'; 'Geographic Combatant Commanders' 'Installation Specific Requirements' for guidance in determining/validating threat and level of protection requirements.

Project Development

- **Incorporate AT requirements and the associated costs into the DD 1391. Work with our supported Commanders to determine:**
  - ➢ Requirement for AT.
    - ❑ Is the Facility an Inhabited facility?
    - ❑ Is the Facility 3 stories or more?
    - ❑ Is the Facility located within a Installation perimeter?
    - ❑ Are there any identified threats (GCC OPORD)?
    - ❑ Is the Facility a Critical Asset?
    - ❑ Is there a required/desired level of protection?

MUST BE DONE DURING PROJECT PLANNING

Use UFC 4-020-01 (Planning Manual) to establish/validate the Design Basis Threat and Level of Protection for individual projects.

Project Development

INTEGRATE OTHER REQUIREMENTS:

- **Security Regulations: DoD and Service policy and regulations establish baseline requirements for protective measures.**
- **Explosive Safety: Explosive safety regulations may require high level of protection than required by the antiterrorism standards**
- **GCC AT Construction Standards (OPORD)**
- **Historic Preservation: Implementation of security and antiterrorism protective measures cannot supersede the obligation to protect cultural resources.**
  - **Installation personnel need to determine possible adverse effects upon an historic structure and/or archaeological resource during project development.**
- **Sustainable Design: Security and antiterrorism protective measures may pose challenges for sustainable design, but the two are not mutually exclusive.**

Project Development

Document the AT requirements

- **Block 10 (scope) of DD 1391 and backup documentation should be utilized to describe AT requirements.**
  - This facility is considered low occupancy per UFC 4-010-01.
  - This facility is considered Inhabited per UFC 4-010-01.
  - Progressive Collapse Avoidance must be included in the Structural design of this facility per UFC 4-010-01.
- **Utilize 1391 Team Checklist to document requirements**

1391 Team Checklist - AT

5.050 Designer Coordinate Electronic Security Systems (ESS) / Physical Security Equipment (PSE) including Intrusion Detection Systems
(IDS) with NAVFACHQ CI ATFP (soon to be transferred to CNIC), User/Operator, and Installation's BCO.

6.081	Designer	Identify Antiterrorism (AT) and Physical Security (PHYSEC) factors such as expected occupancy of the facility (i.e., low occupancy, inhabited, primary gathering, billeting)	Low				Defined	Defined			Basis of Design (BOD)	No	CV
6.082	Designer	Identify the Antiterrorism (AT) and Physical Security (PHYSEC) elements that could impact scope and cost, such as does the facility meet UFC 4-101-01 definition of an inhabited building?	Medium				Defined	Defined			Basis of Design (BOD)	No	SD
6.083	Designer	Identify the Antiterrorism (AT) and Physical Security (PHYSEC) elements that could impact scope and cost, such as is the facility located within the installation's defined perimeter clear zone?	Low				Defined	Defined			Basis of Design (BOD)	No	CV
6.084	Designer	Identify the Antiterrorism (AT) and Physical Security (PHYSEC) elements that could impact scope and cost, such as is the level of protection needed based on facility type, location, and other factors.	Medium				Defined	Defined			Basis of Design (BOD)	No	SD
6.085	Designer	Identify the Antiterrorism (AT) and Physical Security (PHYSEC) elements that could impact scope and cost, such as the level of protection above minimum DoD standards for COCOMs and others.	Medium				Defined	Defined			Basis of Design (BOD)	No	SD
6.086	Designer	Are there mission assurance considerations or COCOM requirements that dictate protection above the minimum standards?	Medium				Defined	Defined			Basis of Design (BOD)	No	SD
6.090	Designer	Indicate feasibility of meeting sustainable design guiding principles. Include NAVFAC Sustainable Energy Data Record Card/High Performance Sustainable Building (NSERDC/HPSB) checklist. Develop a Third Party Certification (TPC) checklist.	Low				Defined	Preliminary			Basis of Design (BOD)	No	EC

1391 Team Checklist - AT

6.400 Designer Determine if there are any special operations requirements; for example: need to limit access to the building; special security measures around the facility perimeter; need for special loading docks or ramps for delivery; need to oversized doors to permit removal of large items for regular maintenance or replacement.

6.432 Cost Engineer Have Cybersecurity Features and Commissioning been considered and included into this project.

8.040	Designer	Determine whether this project will need to include a Sensitive Compartmented Information Facility (SCIF) or a Special Access Program Facility (SAPF). SCIFs and SAPFs have special security requirements such as opening restrictions, special walls, and sound attenuation. For each SCIF or SAPF the following information should be provided: - SCIF ID# assigned by Accrediting Official (AO) or SAPF ID# - Space requirement (square feet) - Site Security Manager (SSM) contact information (name, phone#, email) - SCIF/SAPF Preliminary Construction Security Plan (CSP)	High			
8.050	Designer	Determine if this project requires a Controlled Access Area (CAA) other than a SCIF or SAPF within the facility. If so, indicate the number and square footage of each CAA.	High			
8.060	Designer	Identify any special finishes required for flooring and/or walls.	Low			
8.070	Designer	Identify any sound attenuation requirements.	Low			

Project Development

Document the Cost Associated with AT Standards

- **Block 9 (Project Cost) of DD 1391 and backup documentation should be utilized to document costs of the AT and PSE requirements.**
  - Cost for AT Minimum Standards must be included in Block 9 of the DD 1391 under primary facilities (Anti-Terrorism/Force Protection).
- **Renovation jobs:**
  - Requirements need to be considered early in project development to ensure the mitigation measures are considered in the project scope/budget and included in the economical analysis.

Project Development

- **Cost Associated with DoD Minimum AT Standards:**
  - **New construction: Consult with Cost Engineering**
  - **Major renovation work (50% Replacement Cost)**
    - ✓ The 50% cost is exclusive of the costs identified to meet the standards
  - **Note that a Seismic Risk Evaluation must be performed at 30% replacement value.**
- **Refer to MCON/MCNR Consistency Review Board (CRB) Guidelines & DD 1391 Development**
  - **Available on the portal: CI Programs > MILCON Program Office > Program Guidance**

RFP/Design Development

Validate and finalize the AT scope during preliminary design.

- **Has the occupancy changed?**
- **Is there a desired Level of Protection requirement?**
- **Is there validated design basis threat?**
- **Include AT Minimum Standards, GCC AT Standards (where allowed per information security/sensitivity requirements) in RFPs/construction contracts.**

Construction

Build Facility in accordance with the contract documents!

- **Consider AT and GCC OPORD when evaluating any contract modifications**
- **Do not delete any AT Standard**

Compliance

As the Design & Construction Agent for the Navy and USMC, NAVFAC ensures projects incorporate applicable DoD/Navy/USMC Policies, Building Codes, and Best Practices

Project Planning: Incorporate AT requirements and the associated costs into the DD 1391.

RFP and Design: Validate planning requirements and incorporate protective measures into documents.

Construction: Ensure protective measures are provided in accordance with the contract documents (Plans and Specs).

Enforcement

- **DoD/Joint Staff** – DoD/Joint Mission Assurance Assessment (DODMA/JMAA)
  - Per DoD policy (various), DoD Components must have an assessment conducted every three to seven years.
  - Higher Headquarter Mission Assurance Assessments (HHQ MAA)
  - DoD Mission Assurance Benchmarks
- **Chief Naval Operations** also conduct mission assurance assessments (CNO MAA/HHQ MAA) which may be conducted in lieu of or in addition to DOD/JMAA. (OPNAVINST 3502.8 NAVY MA PROGRAM)
- **HQMC** – The Marine Corps Mission Assurance Assessment Program (MCO 3058.1 USMC MA)
- **Joint Mission Assurance Assessment (MAA) teams conduct Joint Staff assessments to assist in identifying vulnerabilities and recommending options to reduce risk and improve mission assurance**
  - **Per DoD policy, DoD installations must have an assessment conducted approximately every three years per DoD D 3020.40 *Mission Assurance* DoD I 3020.45 *Mission Assurance Construct***
- **Higher Headquarters Assessments to include:**
  - **Geographic Combatant Commander (GCC) Assessment**
  - **Chief Naval Operations Mission Assurance Assessment (CNO-MAA)**
  - **Fleet**
  - **Navy Regional Assessments**

  All teams utilize the DoD and GCC construction standards
- **Installation and associated tenant commands are to coordinate on the completion of the Corrective Action Plan, on identified vulnerabilities within 90 days of receipt of the final report.**

OPNAVINST F3300.53D NAVY ANTITERRORISM PROGRAM

See Chapter 2 – Deviations From Navy Prescribed AT STDS and FPCON Measures

Exceptions, Exemptions, Variance, or Deviations

- Ensure that all new construction projects meet or exceed minimum construction standards in UFC 4-010-01 to mitigate possibility of a terrorist attack, and to lessen the effects of a terrorist attack should one occur.
- Navy activities must direct all requests for exception to UFC 4-010-01 or the GCC AT Construction Standards to OPNAV N46 via their TACON chain of command. Request should be submitted during the project planning phase. Requests must contain an operational and physical risk mitigation assessment with detailed rational for the request to include a technical review by NAVFACENGSYSCOM, a current local TA memorandum and the ability to employ mitigation measures other than UFC requirements.
- UFC 4-010-01 and the AT construction measures directed by the GCC define the minimum AT standards for buildings in a given AOR. Construction that exceeds the standards defined by UFC 4-010-01 or the GCC AT Construction Standards adds cost to capital improvement projects that must be approved by OPNAV N46 via their TACON chain of command. Requests must include justification, based on mission assurance or critical infrastructure and the increase in construction costs associated with building to higher than the defined minimum. Request should be submitted during the project planning phase.
- **MILITARY STANDARD (MIL-STD) – 3007G, DOD STANDARD PRACTICE, UNIFIED FACILITIES CRITERIA, FACILITIES CRITERIA AND UNIFIED FACILITIES GUIDE SPECIFICATIONS provides additional guidance in Appendix A UFC AND FC WAIVER AND EXEMPTION PROCESS.**

Roles and Responsibilities

- **Project Design and Construction Agent Project Technical Staff (PTS)**
  - **Coordinates request with facility user**
  - **Originates request, coordinates with Discipline Lead**
  - **Coordinates with NAVFAC ECH IV (OICC Florence – Ech III)**
  - **Submits request via the Marine Corps Chain of Command**
- **NAVFAC Technical Warrant Holder (TWH)**
  - **Interprets criteria**
  - **Coordinates with Criteria Office**
  - **Recommends approval/disapproval to CHENG**
- **MCI HQ - Submits request to NAVFAC HQ, Deputy CHENG**
- **NAVFAC HQ, CHENG – Approves/Disapproves request**

Exemption/Waiver Process-Navy

NAVFAC CHENG **Deputy CHENG** **TWH** **Criteria Manager**	ECH II	1. Deputy CHENG receives package from ECH III and tasks TWH to review, and develop exemption/recommendation for CHENG 2. TWH prepares ECH II CHENG endorsement letter and sends to Deputy CHENG 3. Deputy CHENG finalize, format, serialize and ensure consistency and sends to ECH II CHENG for final signature
ECH III CHENG **Discipline Lead** **TWH** **Criteria Manager**	ECH III	1. ECH III CHENG tasks the Discipline Lead to review the ECH IV exemption package 2. Discipline Lead develop endorsement letter for ECH III CHENG in coordination with TWH and Criteria Manager 3. ECH III CHENG sends endorsement to ECH II Deputy CHENG for final approval/review (MIL-STD-3007, A3.6.2a)
ECH IV CHENG **Discipline Lead** **TWH** **PTS**	ECH IV	1. PTS consult with Discipline Lead 2. Discipline Lead consult with TWH on viability of exemption/waiver, and TWH consult with the Criteria Office 3. PTS, working with Discipline Lead, TWH and customer, will confirm position with ECH IV CHENG and develop ECH IV CHENG endorsement (per MIL-STD-3007, A.3.5.1, A.3.6.2) 4. ECH IV CHENG approves endorsement letter/sends to ECH III CHENG

Note - Red font indicates lead

Waiver Exemption Package

- **Request and Endorsement Letters - through Chain of Command**
- **Attachment: Waiver Exemption Template**
  - **https://www.wbdg.org/ffc/dod/federal-military-specifications-standards/mil-std-3007**
  - **Ten (10) items**

Waiver Exemption Template

10 Items required in the 'Waiver/Exemption Package':

1. Waiver or Exemption number
2. Statement of Requirement and UFC/FC reference that cannot be met
3. Justification
4. Description of Physical Location
5. Mitigation plan and measures
6. Impact on Mission, Safety, Operation
7. Costs associated with complying
8. Actions to comply with criteria requirement and eliminate need for waiver
9. Points of Contact
10. Supporting Documentation - Enclosures

Who Needs To Know About the Standards and Policies?

- Commander – Regional/Installation
- Facilities managers
  - Family Housing, Bachelor Housing (Billeting), Quality of Life support – MWR, Medical, Family Support Services, Training Facilities, Admin Facilities ….
- Master Planners
  - Site constraints, encroachment, environmental requirements…
- Designers
  - PM, Architect, Civil, Structural, Electrical, Mechanical, Fire Protection
- Physical Security and Antiterrorism Personnel
  - Base/Installation, Regional, ATOs

Take Away

1. The DoD has Unified Criteria for Antiterrorism and Physical Security.
2. The Criteria is risk based.
3. The Criteria is reasonable and implemental.
4. The Criteria requires input during project development and planning phases.
5. Planners, Engineers, Architects, must work with Regional/Installation Security Professionals and Antiterrorism Officers to ensure project meets the supported Commander's AT and Physical Security requirements.

Thanks!

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