WHY A BASIC “101” PRESENTATION?

- Anti-Terrorism codes/standards have been implemented since the late 1990’s, however there are still large numbers of both DoD personnel and civilians with little or misunderstood knowledge of “AT/FP” requirements:
  - DoD Personnel
    - PMs
    - Technical Representatives (MEP, Civil, Structural, Architectural)
    - Commanders
    - Even Anti-Terrorism Officers (ATO’s)
  - Civilians
    - A/E’s with little to no Federal Design experience
    - New Employees (Private to Federal sectors; College hires)
    - Contractors
- You must train your clients to understand AT/FP implications. To do this, you must understand.
- DoD is hiring you for your expertise.
AGENDA

- Basic Understanding
- How to Get Started
- TRIGGERS

- Standards 1-21
  - 1 to 5 – Standoff, Unobstructed Space & Site
    - Parking/Roadways and site layout
  - 10 & 12 Glazing (Windows and Exterior Doors)
  - 16 to 21 Electrical and Mechanical

- Enclosures
- Site and Parking
- Design Submittals
BASIC UNDERSTANDING
“MAIN” UFC CRITERIA

UFC 4-010-01: DoD Minimum Antiterrorism Standards for Buildings with change 1 (1 October 2013)

UFC 4-010-02: DoD Minimum Antiterrorism Standoff Distances for Buildings (FOUO)

UFC 4-022-01 Security Engineering: Entry Control Facilities / Access Control Points (ACP) – 25 May 2005

UFC 4-023-03: Design of Buildings to Resist Progressive Collapse with Change 2 (1 June 2013)

Various Technical Reports, ASTM’s, etc.

http://www.wbdg.org/ffc/dod/unified-facilities-criteria-ufc
BASIC UNDERSTANDING

- Design Standards by the Protective Design Center (PDC).
  - Ballistic = Bullet/Projectile
  - Blast = Bomb

- We must understand the logic & intent of Antiterrorism and Force Protection

- The code is not perfect and is not clear on all topics. There are some holes for us to interpret and apply based on sound judgment (recommend collaboration)

- UFC 4-010-01 Setup
  - Chapter 1 – Introduction and General
  - Chapter 2 – Philosophy and Design
  - Appendix A – GLOSSARY
  - Appendix B – STANDARDS for NEW and EXISTING
  - Appendix C – Recommendations
  - Appendix D – Expeditionary
BASIC UNDERSTANDING

- Applies to all DoD Entities (Section 1-8)
- Lack of funding cannot cause these standards to be neglected (Section 1-1.3.2)
- Installation commanders cannot deviate from standards or accept risk based on their own authority (Section 1-1.3.2)
- Deviations must satisfy Geographic Combatant Commanders for a region and not simply an installation (Section 1-1.3.3)
- UFC assumes DoD personnel have been trained in threat recognition and proper protocol (Section 2-4.22)
- Larger Standoff is best way to mitigate costs/design
APPLICATION

- Again, Applies to ALL DoD COMPONENTS/ENTITIES,
  - Does AT/FP apply?
    - YES. UFC 4-010-01 ALWAYS APPLIES!!
  - Do windows have to be “AT/FP”?
    - YES. THE UFC IS APPLICABLE TO ALL WINDOWS!!

- The question is not DOES it apply, but HOW does it apply?

- The building will either trigger compliance with the hardening “AT/FP” standards or will be exempted.
  - Exemptions in section 1-9
  - If exempted, compliance is Recommended but not Required

- If TRIGGER(S) is/are activated, facility required to comply
KEY PHRASES OR WORDING IN THE UFC

- **Triggers** – Criteria reached in order for a facility to be required to comply with these standards (typ. associated with Existing)
  - “For all buildings required to comply with these standards…”
  - “Where buildings are required to meet these standards…”
  - “…buildings designed in accordance with these standards…”
  - Exempted buildings or buildings not TRIGGERED do not have to comply with the text

- **Inhabited** buildings/additions
  - Low Occupancy Buildings (per exemption 1-9.1) will not need to comply with the text

- **Routinely** – Predictable pattern of activity that can be recognized and exploited
  - If 8 people work in a building Monday – Friday but every Saturday from 0800 to 1400, 40 DoD personnel take a class or perform exercises/training, the building is ROUTINELY occupied

- Review Abbreviations, Acronyms, Definitions of Appendix A
HOW TO GET STARTED
HOW TO GET STARTED

- VALIDATE PLANNING REQUIREMENTS
  - Impacts entire SOW, Budget, & Compliance
  - Conduct a meeting among the Designer(s) of Record and Military Installation PMs & ATO
STEP 1: WHAT MATTERS?

- **Construction and Scope**
  - What is the Building and is it New/Existing/Addition?
  - If existing, what is the scale of the desired Renovation?
  - If an Addition, how large compared to Existing?
  - What are the goals of the project and potential effects on UFC compliance?
  - Replacing Windows?
  - Materials (CMU, Steel, veneer, etc.)?
  - Size, Complexity, Costs?

- **Occupancy**
  - Low Occupancy, Inhabited, Primary Gathering

- **Standoff**
  - Inside a controlled perimeter or not
  - If Within a controlled perimeter is it within 200' of it (Explosive Weights I & II)
  - How is the site configured with Parking, Roadways, markings, etc.?

- **Triggers**
  - What existing conditions are changing and are they Better or Worse
  - Use the above considerations to assess TRIGGERS and if/how they are activated
STEP 1: WHAT MATTERS?

- These questions need to be considered as early as possible and preferably in the proposal phase.

- If the UFC requirements are not considered;
  - Budget and efforts are effected
  - Schedule is effected (last minute design help at 95% when submittal goes out the door the next day or so)
  - Domino effect of other disciplines (openings, framing, standoff, parking, etc.)
  - Over designing where items can be exempted or reduced (effects construction costs)
  - The above complications most likely negatively effect client relations
STEP 2: EVALUATE POTENTIAL TRIGGERS

- NEW - Implementation of standards is MANDATORY
- EXISTING Triggers Checklist
  - Major Investment
    - Renovation exceeds 50% PRV
    - Exclude Additions and Glazing Replacement Costs
  - Addition (Considered NEW Building)
    - If *inhabited* addition ≥ 50% gross SF, harden Existing
  - Change of Occupancy
    - Increase of Occupancy (LO ➔ INH ➔ PG)
  - Encroachment
    - Cannot encroach on existing Standoff Distances
  - Trash Containers
    - Locate at or greater than CCSD (Conventional Construction Standoff Distance)
  - Glazing
    - Replacement in *inhabited* buildings
## ADDITIONS AND OCCUPANCY

<table>
<thead>
<tr>
<th>CODE</th>
<th>OCCUPANCY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low Occupancy</td>
<td>Building or Portion of building ROUTINELY occupied by 10 or less DoD personnel OR density less than 1 person per 430 gross SF</td>
</tr>
<tr>
<td>2</td>
<td>Inhabited</td>
<td>Building or Portion of building ROUTINELY occupied by 11 or more DoD personnel AND population density greater than 1 person per 430 gross SF</td>
</tr>
<tr>
<td>3</td>
<td>Primary Gathering</td>
<td>Building or Portion of building ROUTINELY occupied by 50 or more DoD personnel AND population density greater than 1 person per 430 gross SF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>EXISTING</th>
<th>NEW</th>
<th>EXISTING</th>
<th>NEW</th>
<th>EXISTING</th>
<th>NEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>DoD Personnel ROUTINELY in Facility</td>
<td>40</td>
<td>40</td>
<td>15</td>
<td>30</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>Building Square Footage (SF)</td>
<td>15,000</td>
<td></td>
<td>8,000</td>
<td></td>
<td>8,000</td>
<td></td>
</tr>
<tr>
<td>[Addition SF to Existing Building]</td>
<td>[4,000]</td>
<td>19,000</td>
<td>[3,000]</td>
<td>11,000</td>
<td>[5,000]</td>
<td>13,000</td>
</tr>
<tr>
<td>Population Density (Persons/430 SF)</td>
<td>1.15</td>
<td>0.91</td>
<td>0.81</td>
<td>1.17</td>
<td>0.81</td>
<td>0.99</td>
</tr>
<tr>
<td>Occupancy Code from Table above</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
1-9 - EXEMPTIONS

- 1-9.1 – Low Occupancy
- 1-9.7 – Temporary
  - Buildings intended for use for less than 5 years
- 1-9.14 – Parking Structures
- Review others

1-10 – HISTORIC

- Implementation of these standards will not supersede DoD’s obligation to comply with the National Historic Preservation Act, which conversely does not negate the requirements of these standards
WHEN A BUILDING IS NEW OR AN EXISTING BUILDING IS TRIGGERED, WHAT NEXT?

SITE PLANNING
• Standard 1 – Standoff Distances
• Standard 2 - Unobstructed Space
• Standard 3 – Drive-Up/Drop-Off Areas
• Standard 4 – Access Roads
• Standard 5 – Parking Beneath Buildings or on Rooftops

STRUCTURAL
• Standard 6 – Progressive Collapse Resistance
• Standard 7 – Structural Isolation
• Standard 8 – Building Overhangs and Breezeways
• Standard 9 – Exterior Masonry Walls

ARCHITECTURAL
• Standard 10 – Windows and Skylights
• Standard 11 – Building Entrance Layout
• Standard 12 – Exterior Doors
• Standard 13 – Mail Rooms
• Standard 14 – Roof Access
• Standard 15 – Overhead Mounted Architectural Features

ELECTRICAL AND MECHANICAL
• Standard 16 – Air Intakes
• Standard 17 – Mail Room Ventilation
• Standard 18 – Emergency Air Distribution Shutoff
• Standard 19 – Equipment Bracing
• Standard 20 – Under Building Access
• Standard 21 – Mass Notification
STANDARD 1: STANDOFF DISTANCES

- Explosive Weights (UFC 4-010-02 [FOUO])
  - I (Largest): Without, On, or Within 200’ of a Controlled Perimeter
    - Vehicle Bomb
  - II: Within, and greater than 200’ from, a Controlled Perimeter
    - Typical
  - III (Smallest): Small Hand-Held explosive devise
  - CAN ONLY REFER TO EXPLOSIVE WEIGHTS AS I, II, OR III

- Occupancy
- Conventional Construction Standoff Distance (CCSD_I, CCSD_{II})

- Review Tables B-1 and B-2
- From Tables, acquire Both Minimum and CCSD
- Compare wall and roof construction with Table 2-3
### Table B-1 Standoff Distances for New and Existing Buildings

<table>
<thead>
<tr>
<th>Building Category</th>
<th>Distance to Wall Type</th>
<th>Applicable Level of Protection</th>
<th>Load Bearing Walls</th>
<th>Non-Load Bearing Walls</th>
<th>Minimum Standoff Distance</th>
<th>Applicable Explosive Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controlled Perimeter or Parking and Roadways without a Controlled Perimeter</td>
<td>Billing and High Occupancy Family Housing</td>
<td>Low</td>
<td>A</td>
<td>C</td>
<td>20 ft (6 m)</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>Primary Gathering Building</td>
<td>Low</td>
<td>A</td>
<td>C</td>
<td>20 ft (6 m)</td>
<td>I</td>
</tr>
<tr>
<td></td>
<td>Inhabited Building</td>
<td>Very Low</td>
<td>B</td>
<td>D</td>
<td>20 ft (6 m)</td>
<td>I</td>
</tr>
<tr>
<td>Parking and Roadways within a Controlled Perimeter</td>
<td>Billing and High Occupancy Family Housing</td>
<td>Low</td>
<td>E</td>
<td>G</td>
<td>13 ft (4 m)</td>
<td>III</td>
</tr>
<tr>
<td></td>
<td>Primary Gathering Building</td>
<td>Low</td>
<td>E</td>
<td>G</td>
<td>13 ft (4 m)</td>
<td>III</td>
</tr>
<tr>
<td></td>
<td>Inhabited Building</td>
<td>Very Low</td>
<td>F</td>
<td>H</td>
<td>13 ft (4 m)</td>
<td>III</td>
</tr>
<tr>
<td>Trash Containers</td>
<td>Billing and High Occupancy Family Housing</td>
<td>Low</td>
<td>E</td>
<td>G</td>
<td>13 ft (4 m)</td>
<td>III</td>
</tr>
<tr>
<td></td>
<td>Primary Gathering Building</td>
<td>Low</td>
<td>E</td>
<td>G</td>
<td>13 ft (4 m)</td>
<td>III</td>
</tr>
<tr>
<td></td>
<td>Inhabited Building</td>
<td>Very Low</td>
<td>F</td>
<td>H</td>
<td>13 ft (4 m)</td>
<td>III</td>
</tr>
</tbody>
</table>

### Table B-2 Conventional Construction Standoff Distances

<table>
<thead>
<tr>
<th>Wall Type</th>
<th>Column Letter</th>
<th>Without Controlled Perimeter Applicable Explosive Weight</th>
<th>Within Controlled Perimeter Applicable Explosive Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Bearing Walls</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Non-Load Bearing Walls</td>
<td>I</td>
<td>J</td>
<td>K</td>
</tr>
</tbody>
</table>

#### Notes:
- (1) Conventional Construction
- (2) Load Bearing Walls
- (3) Non-Load Bearing Walls
- (4) Minimum Standoff Distance
- (5) Applicable Explosive Weight

---

### Additional Information

- Wood Studs – Brick Veneer
  - A: 105 ft (32 m)
  - B: 105 ft (32 m)
  - C: 75 ft (24 m)
  - D: 65 ft (20 m)
  - E: 36 ft (11 m)
  - F: 36 ft (11 m)
  - G: 23 ft (7 m)
  - H: 16 ft (5 m)

- Wood Studs – EIFS
  - A: 207 ft (63 m)
  - B: 207 ft (63 m)
  - C: 165 ft (50 m)
  - D: 141 ft (43 m)
  - E: 65 ft (20 m)
  - F: 86 ft (26 m)
  - G: 66 ft (20 m)
  - H: 55 ft (17 m)

- Metal Studs – Brick Veneer
  - A: 187 ft (57 m)
  - B: 187 ft (57 m)
  - C: 207 ft (63 m)
  - D: 155 ft (47 m)
  - E: 75 ft (23 m)
  - F: 75 ft (23 m)
  - G: 82 ft (25 m)
  - H: 75 ft (23 m)

- Metal Studs – EIFS
  - A: 381 ft (110 m)
  - B: 381 ft (110 m)
  - C: 420 ft (128 m)
  - D: 361 ft (110 m)
  - E: 151 ft (46 m)
  - F: 151 ft (46 m)
  - G: 151 ft (46 m)
  - H: 151 ft (46 m)

- Metal Panels
  - A: n/a
  - B: 151 ft (46 m)
  - C: 108 ft (33 m)
  - D: n/a
  - E: n/a
  - F: 58 ft (17 m)
  - G: 39 ft (12 m)

- Girls
  - A: n/a
  - B: 115 ft (35 m)
  - C: 59 ft (18 m)
  - D: n/a
  - E: n/a
  - F: 58 ft (17 m)
  - G: 23 ft (7 m)
  - H: 16 ft (5 m)

- Reinforced Concrete
  - A: 98 ft (30 m)
  - B: 98 ft (30 m)
  - C: 23 ft (7 m)
  - D: 23 ft (7 m)
  - E: 18 ft (5 m)
  - F: 18 ft (5 m)
  - G: 18 ft (5 m)
  - H: 18 ft (5 m)

- Reinforced Masonry
  - A: 282 ft (86 m)
  - B: 282 ft (86 m)
  - C: 125 ft (38 m)
  - D: 33 ft (10 m)
  - E: 90 ft (27 m)
  - F: 80 ft (24 m)
  - G: 26 ft (8 m)
  - H: 18 ft (5 m)

- European Block
  - A: 164 ft (50 m)
  - B: 164 ft (50 m)
  - C: 50 ft (15 m)
  - D: 30 ft (9 m)
  - E: 30 ft (9 m)
  - F: 30 ft (9 m)
  - G: 23 ft (7 m)
  - H: 16 ft (5 m)
<table>
<thead>
<tr>
<th>Wall or Roof Type</th>
<th>Sections</th>
<th>Span</th>
<th>Spacing</th>
<th>Support Condition</th>
<th>Supported Weight</th>
<th>Reinforcement Ratio</th>
<th>Min. Static Material Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood Studs - Brick Veneer</td>
<td>2x4 &amp; 2x6 in (50x100 &amp; 50x150 mm)</td>
<td>8 - 10 ft (2.4 - 3 m)</td>
<td>10 - 24 in (400 - 600 mm)</td>
<td>S-S</td>
<td>44 psf (215 kg/m²)</td>
<td>N/A</td>
<td>875 psi (6 MPa)</td>
</tr>
<tr>
<td>Wood Studs - EIFS</td>
<td>2x4 &amp; 2x6 in (50x100 &amp; 50x150 mm)</td>
<td>8 - 10 ft (2.4 - 3 m)</td>
<td>10 - 24 in (400 - 600 mm)</td>
<td>S-S</td>
<td>10 psf (49 kg/m²)</td>
<td>N/A</td>
<td>875 psi (6 MPa)</td>
</tr>
<tr>
<td>Steel Studs - Brick Veneer</td>
<td>600S1602-43</td>
<td>8 - 12 ft (2.4 - 3.7 m)</td>
<td>10 - 24 in (400 - 600 mm)</td>
<td>S-S</td>
<td>44 psf (215 kg/m²)</td>
<td>N/A</td>
<td>50,000 psi (345 MPa)</td>
</tr>
<tr>
<td>Steel Studs - EIFS</td>
<td>600S1602-43</td>
<td>8 - 12 ft (2.4 - 3.7 m)</td>
<td>10 - 24 in (400 - 600 mm)</td>
<td>S-S</td>
<td>10 psf (49 kg/m²)</td>
<td>N/A</td>
<td>50,000 psi (345 MPa)</td>
</tr>
<tr>
<td>Metal Panels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(In wall or roof construction)</td>
<td>1/8 - 3 in (38 - 76 mm)</td>
<td>4 - 8 ft (1.2 - 2.4 m)</td>
<td>S-S</td>
<td>10 psf (49 kg/m²)</td>
<td>N/A</td>
<td>33,000 psi (230 MPa)</td>
<td></td>
</tr>
<tr>
<td>Girder</td>
<td>(In wall or roof construction)</td>
<td>2x3 &amp; 2x4 in</td>
<td>20 - 25 ft (6 - 7.6 m)</td>
<td>S-S</td>
<td>5 psf (24 kg/m²)</td>
<td>N/A</td>
<td>50,000 psi (345 MPa)</td>
</tr>
<tr>
<td>Reinforced Concrete</td>
<td>&gt; 6 in (150 mm)</td>
<td>12 - 20 ft (3.7 - 6 m)</td>
<td>S-S</td>
<td>10 psf (49 kg/m²)</td>
<td>&gt; 0.0015</td>
<td>3,000 psi (21 MPa)</td>
<td></td>
</tr>
<tr>
<td>Unreinforced Masonry</td>
<td>&gt; 6 in (150 mm)</td>
<td>12 - 20 ft (3.7 - 6 m)</td>
<td>S-S</td>
<td>10 psf (49 kg/m²)</td>
<td>0</td>
<td>1,500 psi (10 MPa)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2-3 Conventional Construction Parameters

<table>
<thead>
<tr>
<th>Analysis Assumptions</th>
<th>Sections</th>
<th>Span</th>
<th>Spacing</th>
<th>Support Condition</th>
<th>Supported Weight</th>
<th>Reinforcement Ratio</th>
<th>Min. Static Material Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinforced Masonry</td>
<td>8 - 12 in (200 - 300 mm)</td>
<td>10 - 14 ft (3 - 4.3 m)</td>
<td>12 ft (3.7m)</td>
<td>S-S, One way flexure</td>
<td>10 psf (49 kg/m²)</td>
<td>0.0005 - 0.0030</td>
<td>1,500 psi (10 MPa)</td>
</tr>
<tr>
<td>European Block</td>
<td>6 - 8 in (150 - 200 mm)</td>
<td>10 - 12 ft (3 - 3.7 m)</td>
<td>N/A</td>
<td>S-S, Brittle Flexure</td>
<td>10 psf (49 kg/m²)</td>
<td>0</td>
<td>1,800 psi (12 MPa)</td>
</tr>
<tr>
<td>Concrete Blocks</td>
<td>4 - 12 in (100 - 300 mm)</td>
<td>6 ft</td>
<td>1.8 m</td>
<td>N/A</td>
<td>F-S</td>
<td>15 psf (73 kg/m²)</td>
<td>0.0015 - 0.005</td>
</tr>
<tr>
<td>Metal Roofing</td>
<td>K and LH, Gulp with Metal Deck and/or 3.5 - 5.5 in (90 - 140 mm) Concrete Topping</td>
<td>30 ft (9.1m)</td>
<td>4 - 8 ft (1.2 - 2.4 m)</td>
<td>S-S</td>
<td>15 - 90 psf (73 - 439 kg/m²)</td>
<td>N/A</td>
<td>50,000 psi (345 MPa)</td>
</tr>
</tbody>
</table>

1. Other types of construction other than that shown in this table may be permissible subject to validation by the designer of record.
3. 1/1: 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-back connection at the top and bottom.
4. Unreinforced masonry must have adequate lateral support at the top and bottom.
5. Weight supported by the wall that moves through the same direction as the wall, not including self-weight of the component.
6. 1/1: For walls or roofs built using metal panels and girts, use the greater of the standards for the metal panel and the girt.
7. 1/1: Reinforcing steel is 60,000 psi (414 MPa) tensile strength.
8. 1/1: Concrete Masonry Units (including European Block) are medium weight (120 psf / 1,622 kg/m²).
9. 1/1: Shear will need to be checked when using higher than minimum material strengths.
STANDARD 2: UNOBSERVED SPACE

- Extends to (CCSD), not minimum standoff
  - Building to Non-Controlled Parking

- Only applies to facilities within a controlled perimeter (Explosive weight II is basis for establishment)

- No obstructions that allow for concealment of explosive devices with a least dimension of 6”
STANDARD 2: UNOBSERVED SPACE

- No parking within unobstructed space/CCSD unless
  - controlled parking
  - emergency vehicles,
  - GOVs that never leave the restricted areas, etc.

- Large objects such as trees are permissible as devices can be seen. However, no foliage can extend lower than 3 feet above ground.

- Preferred location of MEP equipment
  - outside of the unobstructed space
  - on the roof

- Units may be provided within unobstructed space as long as they are mounted flush to the ground and with no crevice/opening 6” or greater in any direction
  - If the unit opens, it shall be locked
STANDARD 3: DRIVE-UP/DROP OFF AREAS

- Medical, exchanges/commissaries, schools
- Standoff measured to nearest parking
- Areas/Lanes must be clearly defined/marked
- No Parking or unattended vehicles and never closer than minimum Standoff distance

- Strategically place
  - Not under any inhabited areas (Standard 8)
  - Not adjacent to inhabited portions of buildings
  - For Example – School Drop off next to a hallway entrance or exterior breezeway the length of the CCSD
  - Corner of building
STANDARD 4: ACCESS ROADS

- Ensure access control measures are implemented to prohibit unauthorized vehicles

- Site specific and these measures are left to local physical security personnel
STANDARD 5: PARKING BENEATH BUILDINGS OR ON ROOFS

- Avoid where possible

- Where cannot be avoided, implement control measures
STANDARD 6: PROGRESSIVE COLLAPSE

- 3 stories of human occupancy and up (egress, light, ventilation)
  - i.e. Basements with no windows or occupancy do not apply

- UFC 4-023-03: Design of Buildings to Resist Progressive Collapse with Change 2 (1 June 2013)

- If the project contains a facility with 3 or more stories, consult Structural Engineer on implications
STANDARD 7: STRUCTURAL ISOLATION

- Additions must be independent unless it can be verified the collapse of either the addition or existing building will not result in collapse of other.

- PORTIONS: Inhabited and Primary Gathering Buildings can have portions with Low Occupancy areas:
  - Office area with 11 or more DoD personnel AND greater than 1/430 SF with a Warehouse
  - Buildings CANNOT be divided into Primary and Inhabited. All areas would be considered PG.
    - If an addition to an inhabited building increases DoD personnel >50 and >1/430, entire building is PG.

- Judgement and discretion must be used in separating building into portions.
STANDARD 8: OVERHANGS AND BREEZEWAYS

- Parking under inhabited areas is not allowed in new buildings
- If cannot be avoid in existing buildings, implement restrictions
STANDARD 9: EXTERIOR MASONRY WALLS

- Unreinforced masonry (URM) is prohibited in new construction unless it is the veneer of a wall that meets the standards of the UFC

- Where CCSD of existing URM cannot be provided, mitigation measures must be implemented
Applies to all standoff distances, even when CCSD is exceeded
UFC 4-010-01 applies to LLOP and VLLOP. For higher levels, refer to PDC Technical Report 10-02

## Table 2-1 Levels of Protection – New and Existing Buildings

<table>
<thead>
<tr>
<th>Level of Protection</th>
<th>Potential Building Damage/Performance</th>
<th>Potential Door and Glazing Hazards</th>
<th>Potential Injury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below AT standards¹</td>
<td>Severe damage - Progressive collapse likely. Space in and around damaged area will be unusable.</td>
<td>Windows will fail catastrophically and result in lethal hazards. <em>(High hazard rating)</em> Doors will be thrown into rooms. <em>(Category VI)</em></td>
<td>Majority of personnel in collapse region suffer fatalities. Potential fatalities in areas outside of collapsed area likely.</td>
</tr>
<tr>
<td>Very Low</td>
<td>Heavy damage - Onset of structural collapse, but progressive collapse is unlikely. Space in and around damaged area will be unusable.</td>
<td>* Glazing will fracture, come out of the frame, and is likely to be propelled into the building, with potential to cause serious injuries. <em>(Low hazard rating)</em></td>
<td>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.</td>
</tr>
<tr>
<td>Low</td>
<td>Moderate damage – Building damage will not be economically repairable. Progressive collapse will not occur. Space in and around damaged area will be unusable.</td>
<td>* Glazing will fracture, potentially come out of the frame, but at reduced velocity, does not present a significant injury hazard. <em>(Very low hazard rating)</em> * Doors will experience non-catastrophic failure, but will have permanent deformation and may be inoperable. <em>(Category III)</em></td>
<td>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.</td>
</tr>
</tbody>
</table>
STANDARD 10: WINDOWS AND SKYLIGHTS

- Explosive Weights (UFC 4-010-02 [FOUO])
  - I (Largest): Without, On, or Within 200’ of a Controlled Perimeter
  - II: Within, and greater than 200’ from, a Controlled Perimeter

- Glazing Replacements in inhabited buildings must comply with UFC standards regardless of any other trigger
STANDARD 10: WINDOWS AND SKYLIGHTS

- Window within 75’ of parking and 150’ of controlled perimeter.

Which Controls?

- SD\text{II} = 75’
- Load = 55 PSF
- SD\text{I} = 150’
- Load = 70 PSF

- Design: Dynamic Analysis, Testing, or the ASTM F2248 approach
- \(\frac{1}{4}\)” Minimum laminated glass consisting of two nominal 1/8-in annealed glass panes bonded together with a minimum of a 0.030-in interlayer of a material designed/tested for blast resistance
- Supporting Structural Elements (SSE) are building elements (not of the glazing system) that resist the blast load (Structural)
STANDARD 10: WINDOWS AND SKYLIGHTS

- No selected Manufacturer on Project
  - Delegate the glazing design, the glazing rating, or fastening.
  - Typically, designers do not know which window/storefront manufacturer will get the job so dictating construction specifics can have unintended consequences
    - Proper vetting considerations must be implemented
  - Provide design parameters and criteria on submittal documents

- Manufacturer Selected on Project
  - Coordinate the glazing design, the glazing rating, or fastening.
  - Construction specifics can be designed
    - Sections and details
    - Specifications can be tailored
  - Provide specific pressures, etc.
STANDARD 11: BUILDING ENTRANCE LAYOUT

- Ballistic Related in lieu of Blast
  - If main entrances to buildings face controlled perimeters, people entering and exiting the buildings are vulnerable to being fired upon from vantage points outside those perimeters.

- New Building - Main entrance should not face perimeter.

- Existing Building that entrances faces perimeter, mitigate by:
  - Utilizing another entrance or screen than entrance.

- Line of Sight
  - Where there are vantage points (Line of Sight) that compromise people entering/exiting the building, screen that entrance to limit the ability of targeting personnel.
STANDARD 12: EXTERIOR DOORS

- Previous versions from the 2012 update only had requirement for door to open outwards (SEATED) so pressures would press door into frame

- New provisions allow UNSEATED doors (doors swing inward)
  - Special Hardware and Hinges so door remains in frame $$$$

- Unglazed Doors – Tested per ASTM F2247 or ASTM F2927
  - Category I – High LOP - Specimen Unchanged
  - Category II – Medium LOP - Operable but damaged
  - Category III – Low LOP - Non-catastrophic failure but inoperable. Remains in place to provide barrier
  - Category IV – Very Low LOP - Severely Deformed but does not become flying debris. For unseated test, door may swing inward as long as hinges are intact
  - Category V – Below AT Standards and will fail catastrophically (thrown into room)

- Glazed Doors – Tested per ASTM F2927
  - If alternate design is utilized, glazing and bite designed per Standard 10, however framing, connection and SSE do not have to be applied
STANDARD 12: EXTERIOR DOORS

- Alternate Designs
  - Exterior Doors open into Low Occupancy Portions
  - Provide compliant means in which propelled door will be intercepted (i.e. Reinforced CMU Wall)

- Overhead Doors shall not open into inhabited spaces
  - If unavoidable, the doors must be intercepted to alleviate being projected into inhabited areas

- Vestibule/Foyers where there are inner and outer doors, the INNER DOORS must comply along with any other associated glazing (i.e. sidelights)
  - Inner Door Assemblies must meet windborne debris resistance requirements
STANDARD 13: MAIL ROOMS AND LOADING DOCKS

- Not intended for facilities served by a central mail handling system (already vetted)
- Locate on the perimeter of Building and as far from populated areas as possible where no central system is present

STANDARD 14: ROOF ACCESS

- Eliminate external roof access and provide from interior. If unavoidable on existing buildings, secure external ladders/stairwells

STANDARD 15: OVERHEAD MOUNTED ARCH FEATURES

- If features ≥ 31 pounds, mount systems to resist 0.5*weight in any horizontal direction and 1.5*weight in downward direction
STANDARD 16: AIR INTAKES

- Requirements of this standard does not have to be met applied when air intakes are within and enclosed mechanical yard with access control.

- 10’ above ground (add extensions as required).

- Equipment and Interior Walls must be designed to the same standard for blast resistance as exterior blast walls and doors based on the standoff distance where air intakes may allow blast pressures to infiltrate equipment room.
STANDARD 17: MAIL ROOM VENTILATION

- Provide separate, dedicated AIR ventilation systems
- Heating/Cooling systems (steam, hot water, chilled water, and refrigerant) are allowed as long as airflow systems are separate
- Provide Dedicated Exhaust to maintain slight negative air pressure (min. 0.05” of water [12.5 Pa])
- Provide Outside Air intakes, Relief air, and exhausts with low leakage isolation dampers that can be automatically closed
  - Dampers = max. leakage rates of 3 cfm/sf with differential pressure of 1” of water gage (250 Pa) across damper
- Provide separate switches/control to isolate mail rooms
- Provide walls/doors to inhabited areas with seals/gaskets
STANDARD 18: EMERGENCY AIR DISTRIBUTION SHUTOFF

- Emergency shutoff switch in HVAC control system that can immediately shut down air handling system throughout building

- Locate switches where they are easily accessible by the building occupants. Travel distance to the nearest shutoff switch < 200’

- Shutoff switches labeled and different color than fire alarm

- Provided outside air intakes, relief air, and exhaust openings with low leakage dampers to be automatically closed when switch is activated
STANDARD 18: EMERGENCY AIR DISTRIBUTION SHUTOFF

- Dampers = max. leakage rates of 3 cfm/sf with differential pressure of 1” of water gage (250 Pa) across damper

- If shutting down exhaust system violates fire/building codes, exhaust system may continue to operate

- Critical area air handling units close with low leakage dampers

- Fan Coil Unit Heaters and AC
  - New Buildings – Provided system that allows to have emergency shutoff
  - Recommended but not mandatory
STANDARD 19: EQUIPMENT BRACING

- If equipment $\geq 31$ pounds, mount systems to resist $0.5 \times \text{weight}$ in any horizontal direction and $1.5 \times \text{weight}$ in downward direction

STANDARD 20: UNDER BUILDING ACCESS

- Control access to crawl spaces, tunnels, etc. under building

STANDARD 21: MASS NOTIFICATION

- New Building – Provide capability of real-time information to building occupants during emergency situations
- Existing Building – Provide capability of real-time information to building occupants during emergency situations for Primary Gathering. Recommended for inhabited
ENCLOSURES
ENCLOSURES

- Screen walls are permitted where devices cannot be fully concealed and can be seen by personnel walking by.

- When concealment is created (i.e. 3-sided “enclosure”), a fourth wall and roof must be added as well to alleviate.

- When concealment is created and/or top enclosures are Opaque, top enclosures will have a pitch at least 1 vertical to 2 horizontal to increase visibility of objects thrown on top and to increase likelihood that the objects will slide off.
ENCLOSURES

- If vertical surfaces of enclosures are transparent and at least 7’ high, top enclosure is not required
  - Chain Link Fence
  - Ornamental (i.e. Ameristar) fence: pickets < 6” O.C. and < 6” above ground

- Openings in screens walls shall be less than 6”
SITE AND PARKING
SITE

- UFC does not require physical barriers that are capable of stopping moving vehicles to prevent vehicles from accessing areas within the standoff distances.

- Measures using landscaping features, curbing, or pavement striping/marking will meet the requirements of these standards for establishing standoff.
  - UFC assumes that all DoD personnel have been trained in basic AT/FP awareness, are able to recognize applicable threat, and take proper action.

- Adjacent Existing Buildings
  - Of any new parking, roads, trash associated with project, provide standoffs to adjacent building in accordance with Tables B-1 and B-2.
  - Where those distances are unavailable, parking/roadways cannot encroach on existing SD.
  - Trash containers must still comply with Tables B-1 & B-2.
PARKING

- Controlled Parking allows parking to be as close as the minimum standoff distance per Table B-1 without hardening or analysis if access control is provided at the CCSD
  - Automated Card Readers for Operated Gates
  - Physical Personnel
  - Means to control pedestrian access such as fencing
- Emergency and GOV’s that are continuously controlled or that never leave the restricted areas
- Marking/Striping, etc. is economical way to restrict areas
- Exterior stairwells and covered/enclosed walkways may be excluded from consideration of inhabited buildings
  - Not considered to be routinely occupied.
  - Standoff distance, therefore, may be to the walls of the buildings instead of the walls of the exterior stairwells or covered walkways
DESIGN SUBMITTALS PER 1-11

1. Narratives of how each applicable standard is met.
2. Applicable explosive weights and levels of protection
   - Note that weights can only be referred to as Explosive Weights I, II, or III
3. Standoff distances provided
4. Blast resistant window system and supporting structure calculations or test results
   - Window System calcs by manufacturer; SSE calcs by Structural
5. Building element structural analysis or design calculations as specified
   - By Structural
6. Progressive collapse calculations (where applicable)
   - By Structural
VALIDATE PLANNING REQUIREMENTS

- Impacts entire SOW, Budget, & Compliance
- Conduct a meeting among the Designer(s) of Record and Military Installation PMs & ATO
MOVING FORWARD

- Today only scratched the surface of the basis of Anti-Terrorism/Force Protection codes. Numerous subjects and items not discussed.
- 

  Person 1: Know what you don’t know because if you don’t know what you don’t know you won’t know that you don’t know it and need to know it.

- Person 2: If I don’t know what I don’t know, then how do I know to know what I don’t know?

QUESTIONS?