



**Tri-Service Infrastructure Systems
Conference & Exhibition
August 2 –4, 2005**

Security Engineering and AT Unified Facility Criteria (UFC)

Presented by: Security Engineering Working Group

Bernie Deneke, PE

John Lynch, PE

Richard Cofer, PE

Rudy Perkey, PE

Overview of Topics



“Whirlwind Tour” of Security Engineering and AT Unified Facility Criteria

Bernie Deneke

- UFC Structures to Resist the Effects of Accidental Explosions
- UFC Structural Design to Resist Explosive Effects for Existing Buildings
- UFC Design of Buildings to Resist Progressive Collapse
- UFC Design to Resist Indirect Fire Weapons Effects
- UFC Design to Mitigate Terrorist Attacks in Expeditionary Environments

Richard Cofer

- UFC Design and O&M: Mass Notification Systems
- UFC Security Engineering: Design of Electronic Security Systems
- UFC Security Engineering: Entry Control Facilities / Access Control Points
- UFC Security Engineering: Design of Safe Havens
- UFC Security Engineering: Design for Mitigating Acoustic Emanations
- UFC Security Engineering: Design of Shielding for Reducing Electronic Emanations

John Lynch

- UFC Fences, Gates, and Guard Facilities
- UFC Waterfront Security Design
- UFC Selection and Application of Vehicle Barriers
- UFC Design to Resist Forced Entry
- UFC Design to Resist Direct Fire Weapons Effects

Rudy Perkey

- UFC Security Engineering: Procedures for Designing Airborne CBR Collective Protection for Buildings
- UFC Security Engineering: Design Examples of Airborne CBR Collective Protection Systems for Buildings
- UFC Security Engineering: Design for Protecting Critical Infrastructure

UFC 4-023-01

Structures to Resist the Effects of Accidental Explosions



• Purpose:

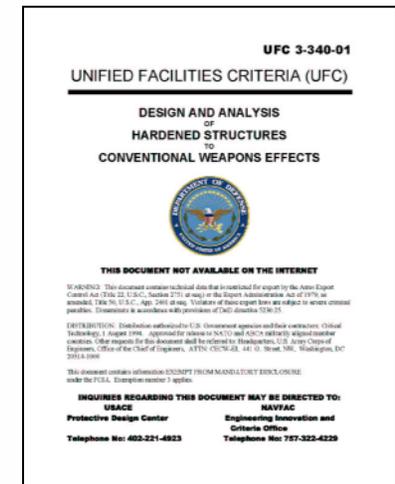
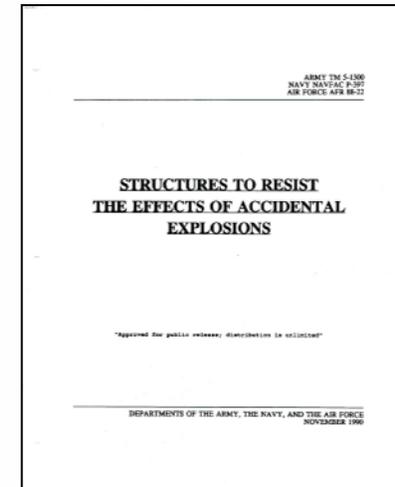
- Update the DoD Design Manual Army TM 5-1300 / NAVFAC P-397 / AFR 88-22, “Structures to Resist the Effects of Accidental Explosions.”
- Identify commonalities between the Explosive Safety, Hardened Structures, and ATPF communities and develop a Joint Common Use manual

• Lead Agency:

- Department of Defense Explosive Safety Board (DDESB)
 - Lea Ann Cotton (Lea.Cotton@DDESB.osd.mil)
- Technical Working Group (Army / Navy / Air Force / DDESB)
 - Chairman: Bill Zehrt, US Army Engineering and Support Center, Huntsville (USAESCH) (William.H.Zehrt@hnd01.usace.army.mil)

• Current Document Status: (Multi-Year staged effort)

- Interim UFC conversion to capture most significant revisions (Underway – Target Completion Dec 2005)
- Update analysis software (Target Completion Aug 2005)
- Creation of Joint Common Use UFC (Long Range Plan)





- **Interim UFC Conversion**

- **Capture most significant changes (As funding / schedule Allows)**

- Update / Relax Lacing requirements
 - Reconsider safety factor and reduce where reasonable
 - Evaluate Pending Non-Propagation Wall Criteria for potential inclusion in updated UFC
 - Correct known typographical errors
 - Eliminate duplicative information
 - Revise deflection/ductility ratios for structural steel
 - Investigate expanded use of tensile membrane action
 - Update to align with current conventional building codes (ACI, AISC, IBC)

- **Develop improved electronic version (If funding available)**

UFC 4-023-01

Structures to Resist the Effects of Accidental Explosions



- **Update Analysis Software**

- **Update SHOCK**

- Validate and document computer code
 - Update and correct code
 - Revise to Windows format
 - Update Users Manual



- **Joint Common Use UFC (Long Range Plan)**

- **Combine common elements of protective design communities**

- Explosive safety
 - Hardened Structures
 - Anti-Terrorism and Force Protection

- **Phased Approach (Tentative Common Topics)**

- Airblast, Fragmentation effects, Debris throw, Projectile penetration, Ground shock and cratering, water shock, loads on structures
 - Mechanical Properties / Mechanics of Structural Elements
 - Design Methods and Examples
 - Instructure Response and Auxiliary Systems

- **Related Effort –**

- DTRA funding the Army Protective Design Center to compare and recommend ways to develop Joint Use UFC.

UFC 4-023-02

Structural Design to Resist Explosive Effects for Existing Buildings



- **Purpose:**

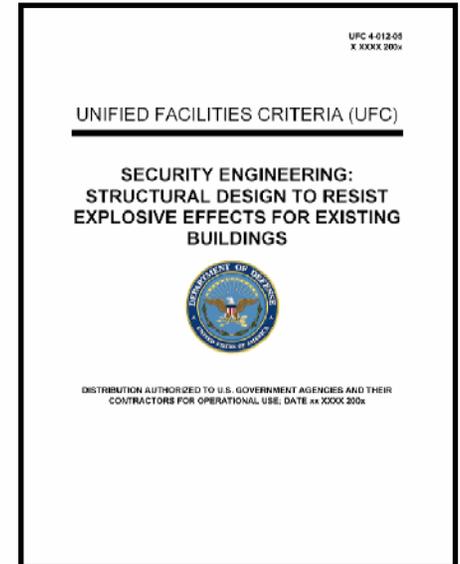
- Evaluating the ability of existing, conventionally-constructed walls, columns, and roofs to resist air blast effects. Provides guidance on various retrofit approaches to improve protection.

- **Lead Agency: Air Force Civil Engineering Support Agency**

- Mr. Jim Caulder / LTC Craig Rutland

- **Current Document Status:**

- 90% complete – Final DRAFT circulated for comment
 - Anticipated completion date: JAN 2006 (??)



Contents Overview

UFC 4-023-02 Structural Design to Resist Explosive Effects for Existing Buildings



• Retrofit Approaches

– Try to capture latest technology

- Are more prescriptive approaches for a given set of conditions.
- Do not provide design requirements for approaches.
 - Exception – Composite Retrofit of Reinforced Columns – CBARD

– Provide information on establishing a Level of Protection for a given threat size.

- TNT equivalent / Standoff / Level of Protection

Table 3-1. Level of Protection for High Capacity Wall Catcher System

TNT Equivalent Yield	Standoff in m (ft) for MEDIUM LOP
25 kg (55 lb)	1 m (3 ft)
100 kg (220 lb)	2 m (6 ft)
225 kg (500 lb)	3 m (10 ft)
450 kg (1000 lb)	4 m (13 ft)
1,800 kg (4000 lb)	10 m (33 ft)
18,000 kg (40,000 lb)	33 m (108 ft)

UFC 4-023-03

Design of Buildings to Resist Progressive Collapse



• Purpose:

–Provides the design requirements necessary to reduce the potential of progressive collapse for new and existing DoD facilities that experience localized structural damage through normally unforeseeable events.

- prudent, effective, and uniform level of resistance to progressive collapse without expensive or radical changes to typical design practice.

Lead Agency: NAVFAC / USACE PDC

–Bernie Deneke / Ed Conrath

• Current Document Status:

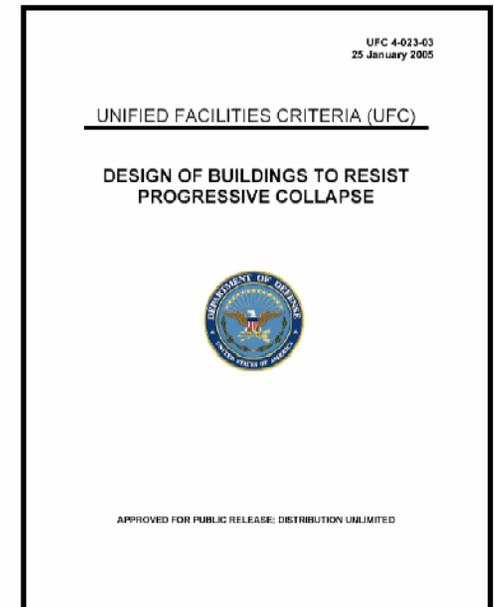
–Document Completed - 25 January 2005

–http://www.ccb.org/docs/UFC/4_023_03.pdf

–Ongoing study to determine costs associated with progressive collapse

- Tie Forces – 0.15% to 0.20% of ECC (across various seismic force levels)

–Directly supports requirements of AT Minimum Construction Standards (UFC 4-010-01)



Contents Overview

UFC 4-023-03 Design of Buildings to Resist Progressive Collapse



• Contents:

– Design requirements for New and Existing Construction

- Levels of protection
- Common Design Requirements

– Design Strategies

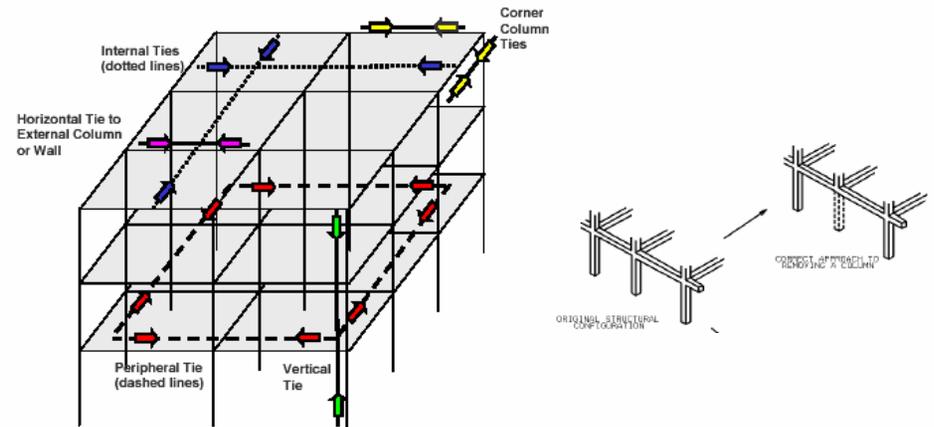
- Tie Force
 - Load and Resistance Factor Design
 - Material overstrength considerations
 - Inadequate tie force capacity – APM
- Alternate Path Method
 - Load and Resistance Factor Design
 - Material overstrength considerations

– Materials

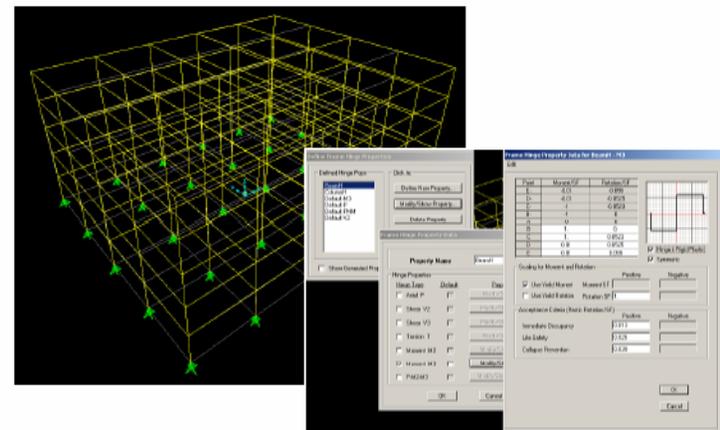
- Reinforced Concrete
- Structural Steel
- Masonry
- Wood
- Cold-Formed Steel

– Appendices

- References
- Commentary
- Reinforced Concrete Frame Design Example
- Structural Steel Frame Design Example
- Masonry Connecting Details
- Wood Frame Construction Design Example
- Special inspection requirements



Note: The required External Column, External Wall, and Corner Column tie forces may be provided partly or wholly by the same elements that are used to meet the Peripheral or Internal tie requirement.

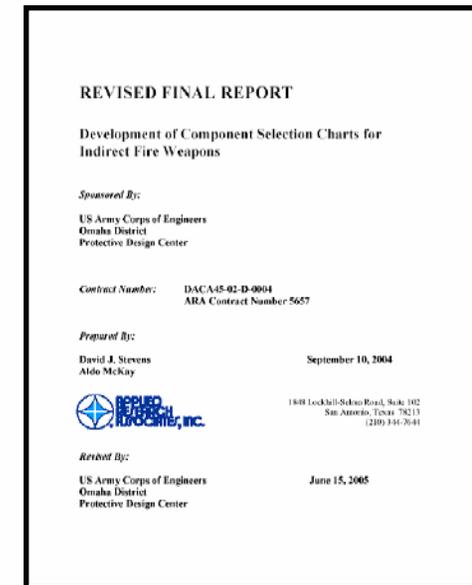


UFC 4-023-08

Design to Resist Indirect Fire Weapons Effects



- **Purpose:**
 - Presents guidance for designing common building components to resist indirect fire weapons.
- **Lead Agency: USACE PDC**
 - Ed Conrath
- **Current Document Status:**
 - 50% Complete**
 - Preliminary reports to support Security Engineering Facility Planning and Design Manuals.
 - Anticipated completion date: Unknown**
 - Additional funding required to complete document.**
 - UFC format / information



Contents Overview

UFC 4-023-08 Design to Resist Indirect Fire Weapons Effects



• Contents:

–Conventional Construction Components

- One way reinforce concrete walls
- Reinforced Masonry Walls
- Unreinforced Masonry Walls
- Unreinforced European Clay Tile Walls
- Single, Double and Triple Brick Walls
- Brick Veneer and Steel Stud Walls
- On-Way Reinforced Concrete Roof Slabs

Wall and Roof Components			
Elements	Thicknesses (in)	Spans (in)	Reinforcing Ratios
One-Way RC Walls	4, 6, 8, 12, and 18	156	0.15, 0.25, and 0.50
Reinforced US Masonry Walls	8, 10, and 12	156	0.05, 0.15, and 0.30
Unreinforced US Masonry Walls	8, 10, and 12	156	----
Unreinforced European Tile Walls	10, 14, and 18	156	----
Single, Double and Triple Brick Walls	3.25 (1 unit)	156	----
Brick Veneer and Steel Studs Walls	6 and 8	156	----
One-Way RC Roof Slabs	4, 6, 9, and 12	59, 150, and 240	0.15, 0.25, and 0.50

–Weapons Considered

- Standard Mortar
- Rocket
- Improvised Mortar
- Other?

Weapon Specifications			
Properties	Weapon		
	Standard Mortar	Rocket	Improvised Mortar
Weight of explosive (lb)	2.1	12.8	44.0
Charge length (in)	9.84	17.7	39.4
Charge diameter (in)	2.76	4.80	5.91
Weight of casing (lb)	5.50	28.7	97.0

–Threat Severity Levels/Levels of Protection

- VLLOP, LLOP, MLOP, HLOP
 - Fragment Perforation
 - Spall and Breach

UFC 4-027-01

Design to Mitigate Terrorist Attacks in Expeditionary Environments



- **Purpose:**
 - Design to Mitigate Terrorist Attacks in Expeditionary Environments

- **Lead Agency: Air Force Civil Engineering Support Agency**
 - Jim Caulder / LTCOL Craig Rutland

- **Current Document Status:**
 - No significant work started to compile UFC
 - Other similar efforts
 - Joint Forward Operations Base Force Protection: Handbook of TTPs to Mitigate Rockets, Artillery, Mortars and IEDs
 - Convert or Adopt Joint Pub as UFC
 - Various efforts to provide secure facilities in Iraq
 - Anticipated completion date – Unknown
 - Funding needed to produce UFC
 - All encompassing document for expeditionary environment use.

Contents Overview

UFC 4-027-01 Design to Mitigate Terrorist Attacks in Expeditionary Environments



- **Contents:**

- Force Protection Planning
- Threat Analysis
- Risk Assessment
- Site Selection and Layout
- Perimeter Security
- Internal Security
- Protective Construction
- Incident Response and Consequence Management
- Communications
- Critical Infrastructure
- Resourcing
- Training and Exercises
- Force Protection Plan Templates
- Force Protection Assessment Benchmarks.

UFC 4-024-01

Security Engineering: Procedures for Designing Airborne CBR Collective Protection for Buildings



- Purpose:

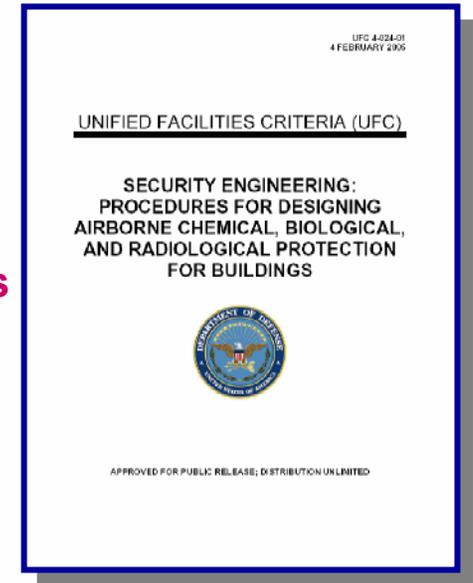
- Presents design guidance for establishing collective protection for buildings or spaces within buildings to mitigate the effects of airborne chemical, biological, and radiological agents.
- Will standardize the COLPRO design for all DoD Facilities

- Lead Agency: Army Corps of Engineers

- Protective Design Center - Ken Christenson

- Current Document Status:

- 95% Complete
- Anticipated completion date – Fall 2005
- Approval from DoD Joint Program Manager for Collective Protection being obtained.



What is Collective Protection (ColPro)?

- Protection to Mission Essential Resources Afforded to Enclosed Areas/ Zones Allowing a Force Structure to Operate Safely, at Near-normal Levels While in a Chemical, Biological, Radiological and Nuclear Environment.

Contents Overview

UFC 4-024-01 Security Engineering: Procedures for Designing Airborne CBR Collective Protection for Buildings



• Contents:

–Requirements & Guidance

- Design Process
 - Assessment, P&D Phase
- Construction Types
 - New, Retrofit, Expeditionary
- Threat Types
 - Agents, Delivery, Design Basis Threats
- Design Requirements
 - Levels of Protection
 - Overpressure Classifications
 - System Design info
 - Control Schemes (internal / external release)
 - Envelope, HVAC, Ductwork, Doors info



Multi Cell Radial Flow Filter Housing



Navy Standard Filter Housing Assembly

Contents Overview (continued)

UFC 4-024-01 Security Engineering: Procedures for Designing Airborne CBR Collective Protection for Buildings



• Contents:

– Startup and O&M

- Airflow Balancing
- Filtration System Testing
- Training
- O&M Manuals
- Filter replacements

– Appendices

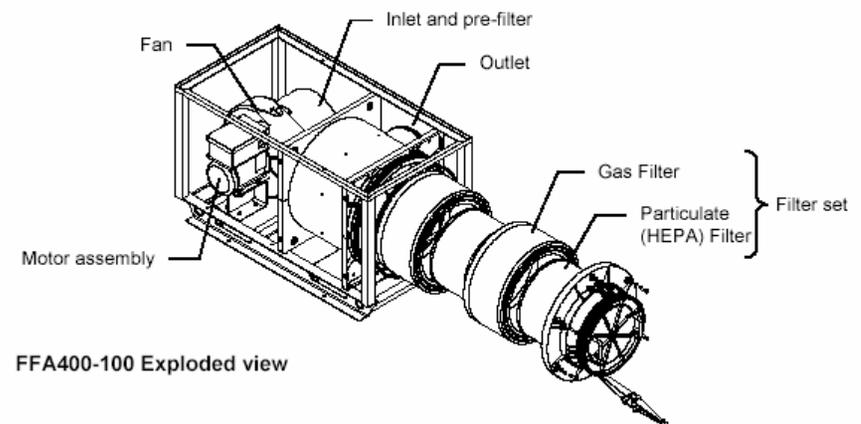
- Airlock Design
- Shelter-in-place
- Operational procedures
- Filtration Equipment
- System Testing requirements



M98 Radial Flow Filter Set



Fan-Filter Assemblies (FFAs)



FFA400-100 Exploded view

Contents Overview (continued)

UFC 4-024-01 Security Engineering: Procedures for Designing Airborne CBR Collective Protection for Buildings



Overpressure Classifications

Overpressure Class	Event Duration	Protection Components
I Filtration with Pressurization	Hours to Days	<ul style="list-style-type: none">• Filtration System• 0.3 iwg Overpressure• 25 – 30 mph wind• Airlocks for ingress and egress
II Filtration with Little Pressurization	Hours	<ul style="list-style-type: none">• Filtration System• Slight Overpressure (0.02 to 0.05 iwg)• 5 - 7 mph wind
III Passive Protection	Hours	<ul style="list-style-type: none">• Toxic free area with diminishing protection

UFC 4-024-02

Security Engineering: Design Examples of Airborne CBR Collective Protection Systems for Buildings



- **Purpose:**

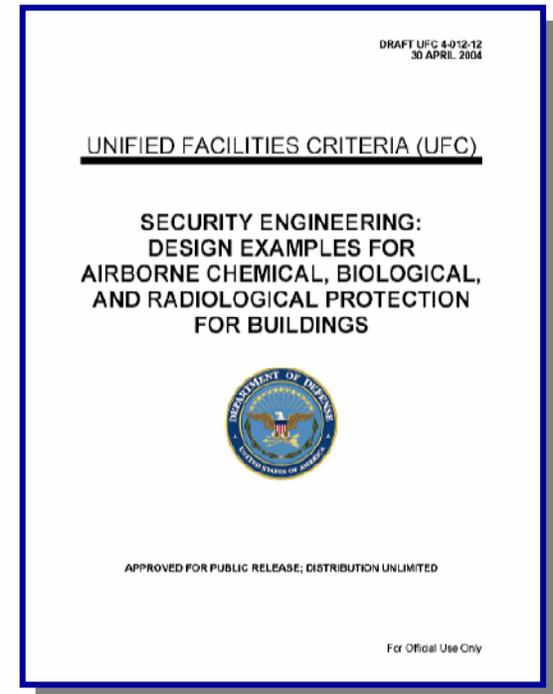
- Presents examples of collective protection against systems for protection of dormitories and office buildings against airborne chemical, biological, and radiological agents.

- **Lead Agency: Army Corps of Engineers**

- Protective Design Center - Ken Christenson

- **Current Document Status:**

- 30% Complete
- Anticipated completion date – Winter 2005



Contents Overview

UFC 4-024-02 Security Engineering: Design Examples of Airborne CBR Collective Protection Systems for Buildings



• Contents:

– Two Examples of a COLPRO Design

- 40,000 SF 3-Story Command Center
 - Medium Level of Protection
- 900 SF Crisis Management Center on 1st Floor of Multi-story Building
 - High Level of Protection

– Examples Include:

- Blower Door Testing
- Bldg Air Leakage per ASHRAE Method
- Airflow Calculations
- Equipment Selections
- Equipment Placement & Configuration
- Supplemental Heating & Cooling



UFC 4-027-05

Security Engineering: Design for Protecting Critical Infrastructure



- **Purpose:**

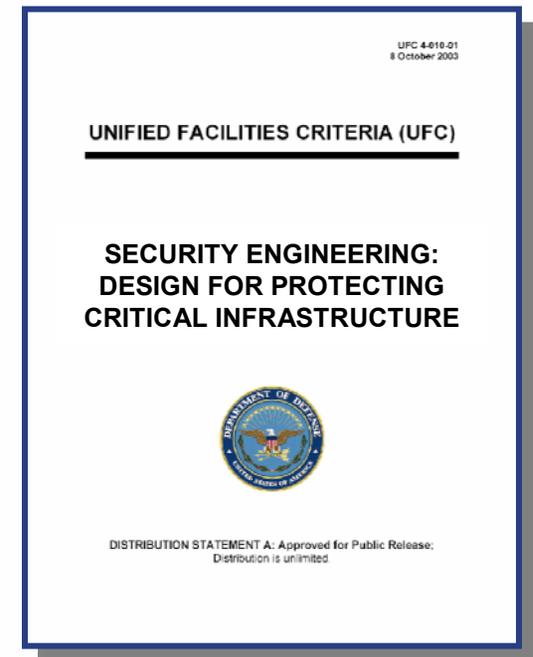
- Provides design guidance for protecting critical transportation elements, utilities, and related infrastructure against terrorist attack.

- **Lead Agency:**

- Army Corps of Engineers

- **Current Document Status:**

- Planned
- Anticipated completion date – Summer 2006

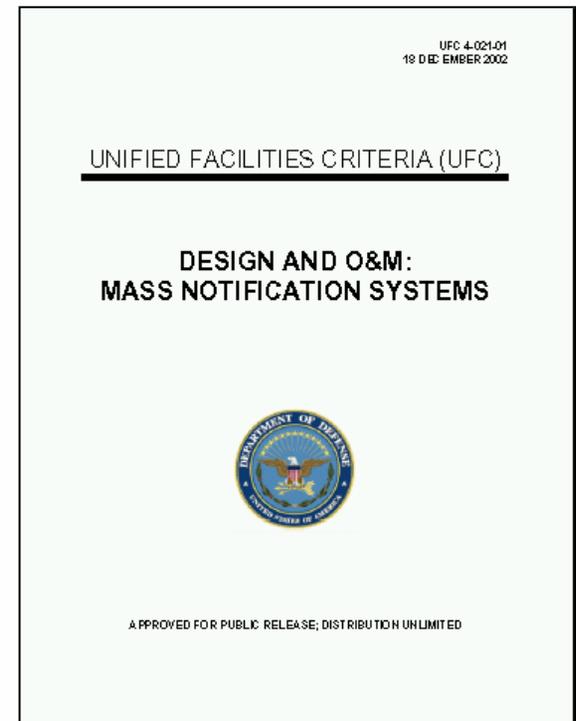


UFC 4-021-01

Design and O&M: Mass Notification Systems



- **Purpose:**
 - Design a system that provides a timely means to notify building occupants of threats and what should be done in response to those threats to reduce the risk of mass casualties.
- **Lead Agency: Air Force.**
 - Point of contact: Raymond Hansen
- **Current Document Status:**
 - Base document Completed, posted on www.WBDG.org
 - Revision currently out for review
 - Agencies working to integrate Mass Notification into Fire Alarm system.



UFC 4-021-01

Design and O&M: Mass Notification Systems



•Contents:

- CHAPTER 1 INTRODUCTION
- CHAPTER 2 OVERVIEW OF MASS NOTIFICATION SYSTEMS
- CHAPTER 3 IMPLEMENTATION APPROACHES BASED ON BUILDING TYPE
- CHAPTER 4 SELECTION AND CRITERIA FOR MASS NOTIFICATION SYSTEMS
- CHAPTER 5 MAINTENANCE CRITERIA



UFC 4-021-02

Security Engineering: Design of Electronic Security Systems



- **Purpose:**

- Presents guidance for designing electronic security systems, including intrusion detection systems, access control systems, closed circuit television systems, and all the supporting infrastructures based on the requirements and concepts established using UFC 4-020-01 Security Engineering Facility Planning Manual and UFC 4-020-02, Security Engineering Facility Design Manual currently in draft.

- **Lead Agency: Army**

- Point of contact: Robert Fite

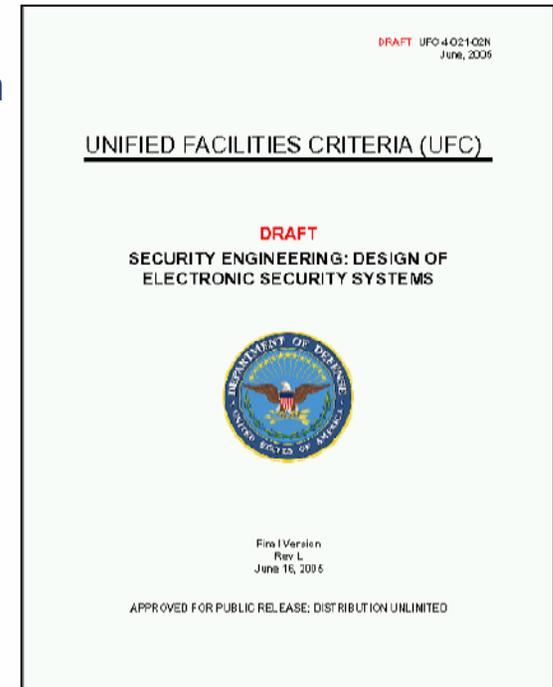
- **Current Document Status:**

- 70% Complete

- Completion in approximately 8 months

- Will replace UFC 4-023-04A, formally TM 5-853-4 being Navy working on update of Design Manual 13.02, Final Review complete.

- When Army and Navy documents are complete they will be combined into Tri-Service UFC



Contents Overview

UFC 4-021-02A Security Engineering: Design of Electronic Security Systems



- **Contents:**

- Chapter 1 Introduction
- Chapter 2 ESS overview
- Chapter 3 Site Survey Procedures
- Chapter 4 Interior Intrusion Detection Sensors
- Chapter 5 Exterior Intrusion Detection Sensors
- Chapter 6 Electronic Entry Control Systems
- Chapter 7 Closed Circuit Television
- Chapter 8 Security Control Center
- Chapter 9 Supporting Systems and Interfaces



UFC 4-021-02N

Security Engineering: Design of Electronic Security Systems



- **Purpose:**

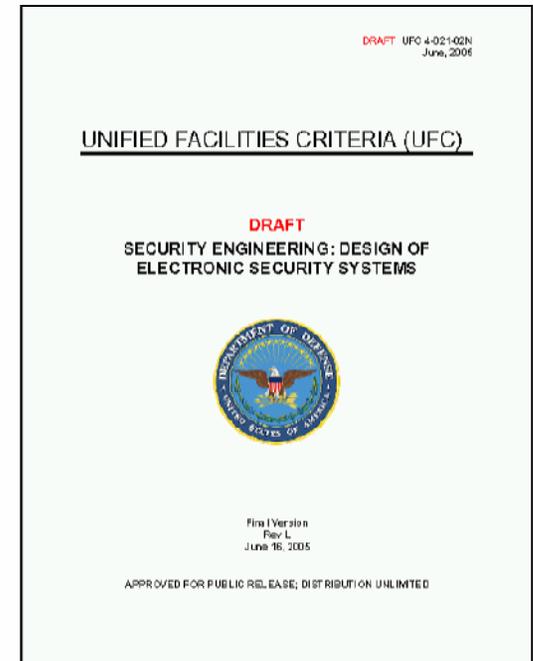
- Presents guidance for designing electronic security systems, including intrusion detection systems, access control systems, closed circuit television systems, and all the supporting infrastructures based on the requirements and concepts established using UFC 4-020-01 Security Engineering Facility Planning Manual and UFC 4-020-02, Security Engineering Facility Design Manual currently in draft.

- **Lead Agency: Navy**

- Point of contact: Richard Cofer

- **Current Document Status:**

- Final Review Complete
- Ready for signature in September
- Document being developed concurrently by the Army (update of TM 3-583-04) Approximately 70% complete.
- When Army and Navy documents are complete they will be combined into Tri-Service UFC.



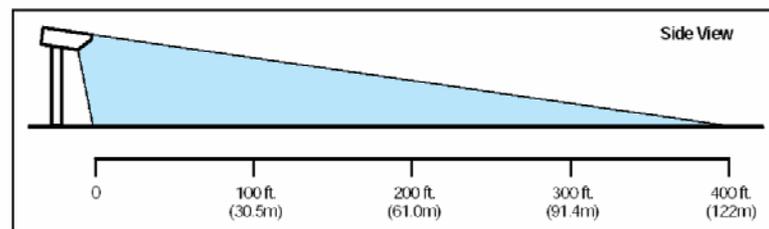
Contents Overview

UFC 4-021-02N Security Engineering: Design of Electronic Security Systems



• Contents:

- Chapter 1 Introduction
- Chapter 2 ESS overview
- Chapter 3 Access Control Systems
- Chapter 4 Closed Circuit Television
- Chapter 5 Intrusion Detection System
- Chapter 6 Data Transfer Media (DTM)
- Chapter 7 Dispatch Center
- Chapter 8 ESS Subsystem Integration
- Chapter 9 General Requirements and Cross-Discipline Coordination
- Chapter 10 Model Design Approach



UFC 4-022-01

Security Engineering: Entry Control Facilities / Access Control Points



- **Purpose:**

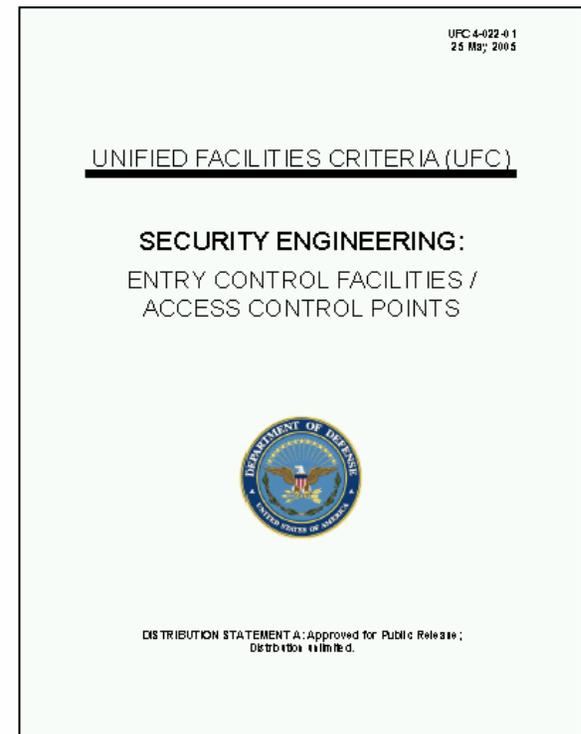
- Design criteria for Entry Control Facilities that permit access points for pedestrian and vehicular traffic into an installation or restricted area. The criteria focuses focus on entry control points to installations.

- **Lead Agency: Navy**

- Point of contact: John Lynch

- **Current Document Status:**

- Completed, posted on www.WBDG.org
 - The first Entry control points designed to the current criteria are no operating. Collecting lessons learned.



Contents Overview

UFC 4-022-01 Security Engineering: Entry Control Facilities / Access Control Points



• Contents:

- Chapter 1 Introduction
- Chapter 2 Existing Requirements and Guidance
- Chapter 3 ECF Classifications and Function
- Chapter 4 Planning and Site Selection Criteria
- Chapter 5 Organization and Operation of an ECF
- Chapter 6 Design Guidelines
- Chapter 7 Large Commercial Vehicle and Truck Inspection Facilities
- Chapter 8 Notional Layout



UFC 4-023-01

Security Engineering: Design of Safe Havens



- **Purpose:**

- Provides guidance for designing safe havens to resist weapons and explosive effects and forced entry attempts. (Possible partnering with FEMA and potential incorporation of Israeli manual.

- **Lead Agency: Navy**

- Point of contact: Richard Cofer

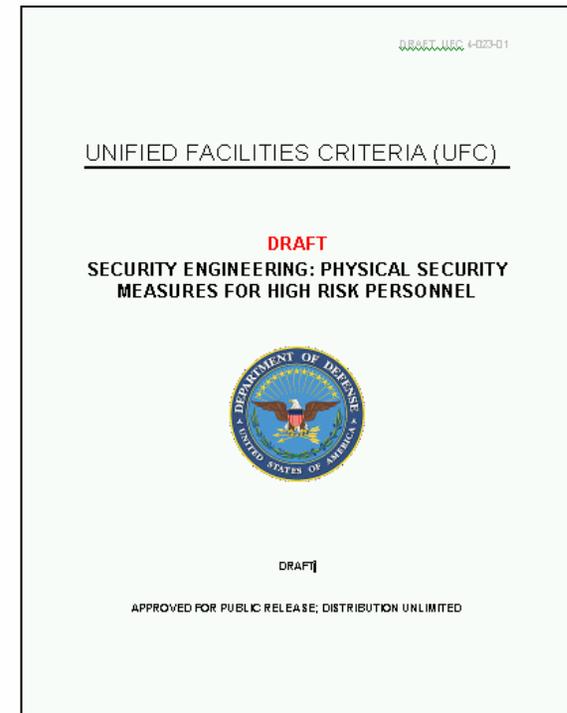
- **Current Document Status:**

- No significant work started.

- Anticipated completion date – 18 months from start

- Joint Staff has assembled a working group to develop requirements for the protection of High Risk Personnel and the training of the personnel that protect them.

- Title may change to Security Engineering: Physical Security Measures for High Risk Personnel.



Contents Overview

UFC 4-023-01 Security Engineering: Design of Safe Havens



- **Contents:**

- **HRP Offices and Residences**
- **Physical Security Overview,**
- **Physical Security Assessment**
- **Physical Security Measures.**
 - **Safe Havens, Landscaping, Lighting, IDS, CCTV, Access Control Systems, Delay Systems, and Communications System**
- **OCONUS/CONUS Considerations**
 - **Host Nation Agreements**
 - **Leased Space Challenges**





- **Purpose:**

- Presents guidance for designing rooms that will minimize the transmission of sound from within them.

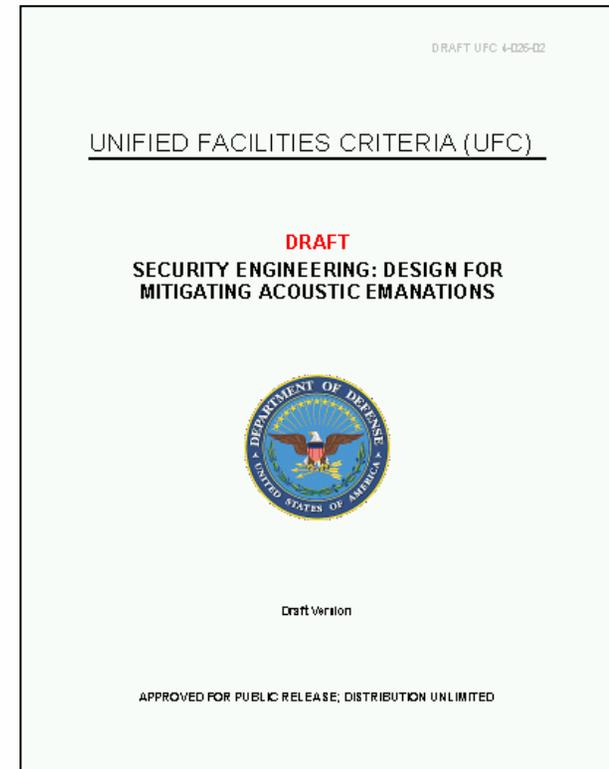
- **Lead Agency: Army**

- Point of contact: Not assigned

- **Current Document Status:**

- Not started

- Anticipated completion date – Unknown



UFC 4-026-03

Security Engineering: Design of Shielding for Reducing Electronic Emanations



- **Purpose:**

- Presents guidance for designing buildings or rooms that are shielded to reduce compromising electronic emanations from within them.

- **Lead Agency: Army**

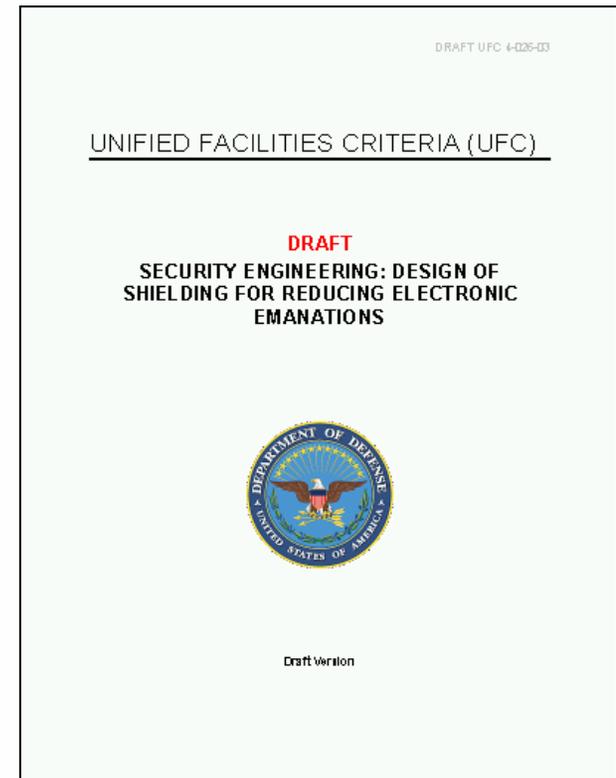
- Point of contact: Les Goldstein

- **Current Document Status:**

- Not started

- Anticipated completion date – Unknown

- Electrical Working Group working on 3-500-05 RF Shielded Enclosures. Final Review Complete, being sent forward for signatures.

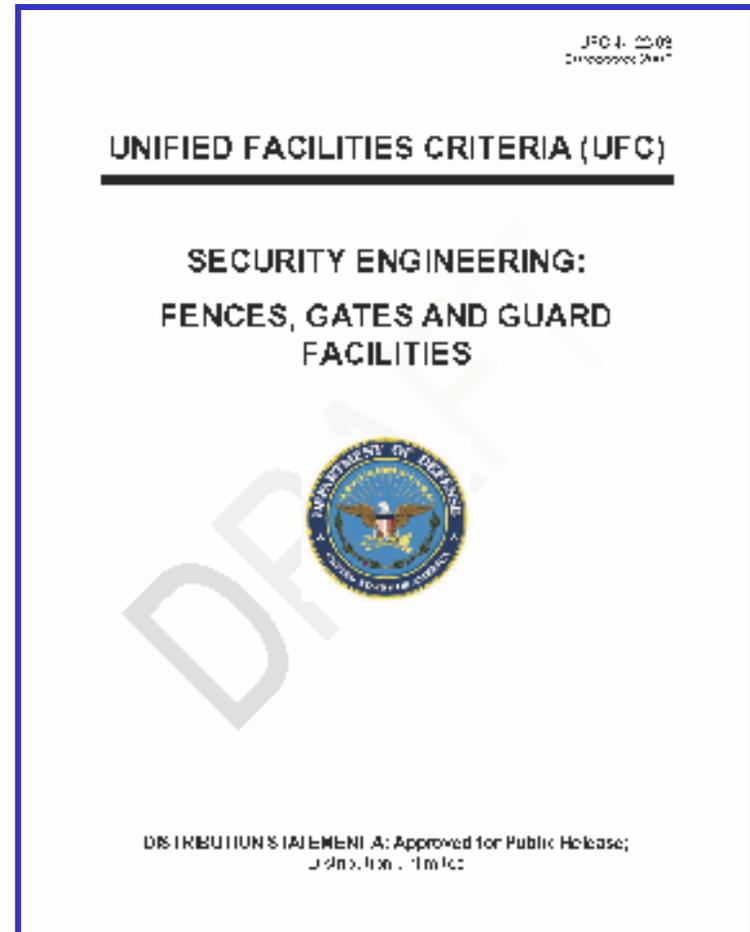


UFC 4-022-03

Fences, Gates, and Guard Facilities



- **Purpose:**
 - This document is to provide a unified approach for the design, selection, and installation of security fences, gates, and guard facilities associated with Department of Defense (DoD) facilities.
 - Replaces Military Handbook 1013/10
- **Lead Agency: Naval Facilities Engineering Command – NAVFAC Atlantic**
 - Mr. John Lynch
- **Current Document Status:**
 - 95% Complete
 - Anticipated completion date – September 2005
 - Final – final document will be submitted this month for review and comment.



Contents Overview

UFC 4-022-03 Fences, Gates, and Guard Facilities



- **Contents:**

- **Fencing**

- Overview
 - Levels of Protection
 - Chain Link
 - Ornamental
 - Welded Wire Mesh Fabric
 - Expanded Metal
 - Farm-Style
 - Expeditionary Perimeter Fencing
 - Taut Wire



- **Gates**

- Personnel
 - Vehicular
 - Overhead
 - Vertical Lift



- **Guard Facilities**

- Sentry Booths and Gatehouses
 - Prefabricated Structures
 - Lighting
 - Grounding



Contents Overview (continued)

UFC 4-022-03 Fences, Gates, and Guard Facilities



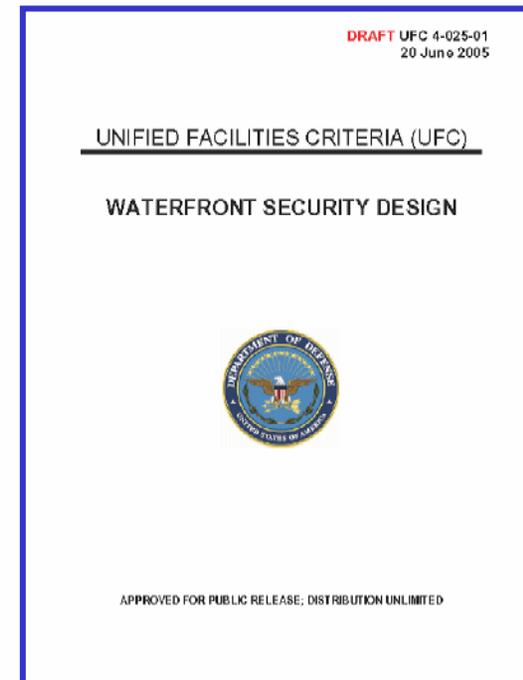
- Appendix A – References
- Appendix B – Standard Fence Drawings
- Appendix C – Standard Gate Drawings
- Appendix D – Standards Guard Facility Drawings



UFC 4-025-01 Waterfront Security Design



- **Purpose:**
 - DoD facilities and installations located adjacent to bodies of water such as ports, airfields, R&D facilities, and training areas face the same terrorist and criminal threats as land-locked facilities or installations, and they must be defended against waterside assault.
 - This document will assist in providing an integrated security system and defensive measures to protect our personnel, information, and critical resources on the waterfront against a wide range of threat attacks, including terrorists, criminals, and saboteurs.
- **Lead Agency: Naval Facilities Engineering Command – NAVFAC Atlantic**
 - Mr. John Lynch
- **Current Document Status:**
 - 75% Complete
 - Anticipated completion date – September 2005
 - Final Draft currently out for comment.



Contents Overview

UFC 4-025-01 Waterfront Security Design



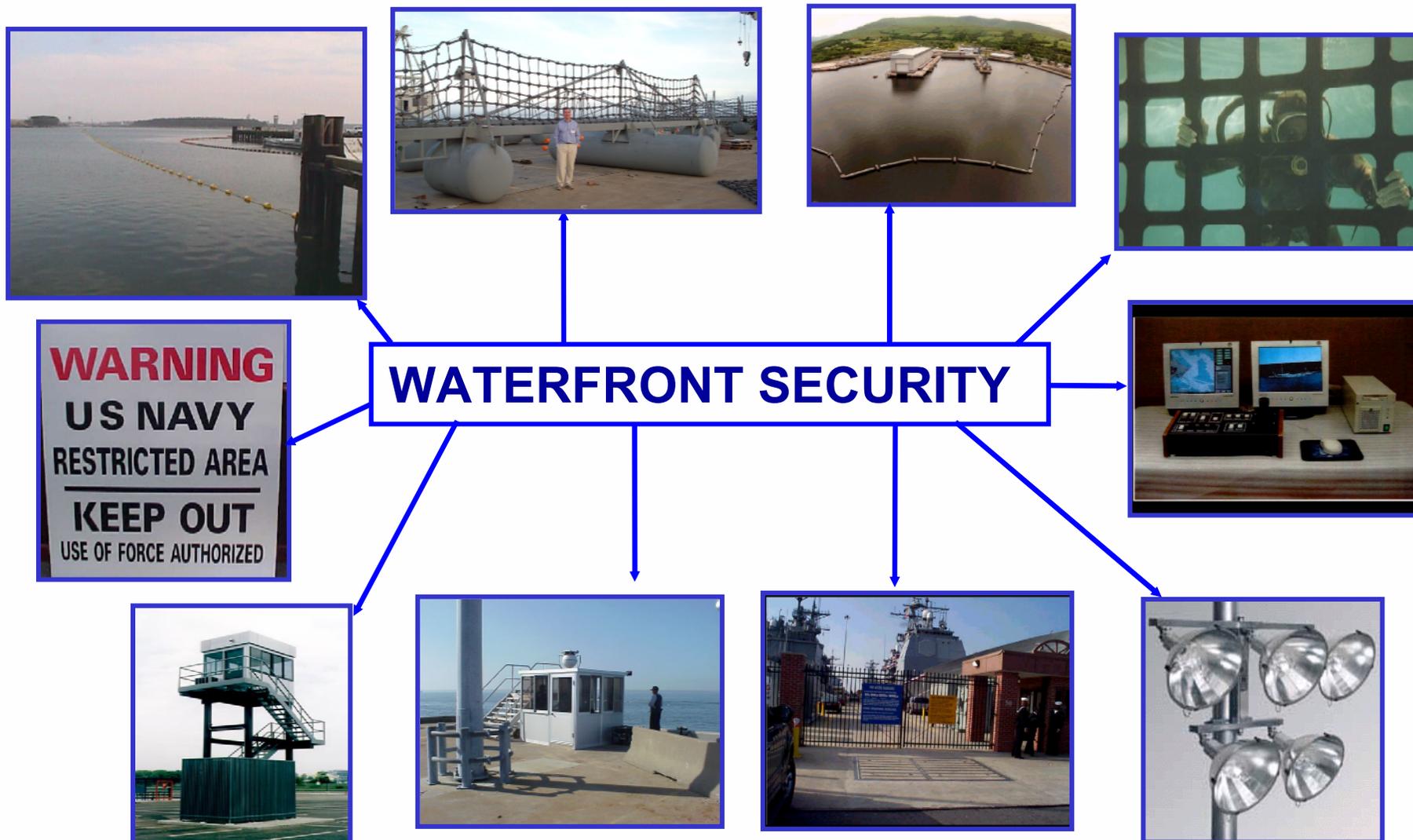
- **Contents:**

- Pier access control, which includes guard house, vehicle barrier/gate, and fencing
- Waterside Barriers
- Waterside Watch Tower and Guard Houses
- Waterside Security Lighting
- Communications Systems for waterside surveillance
- Swimmer Detection
- Harbor Patrols



Contents Overview (continued)

UFC 4-025-01 Waterfront Security Design

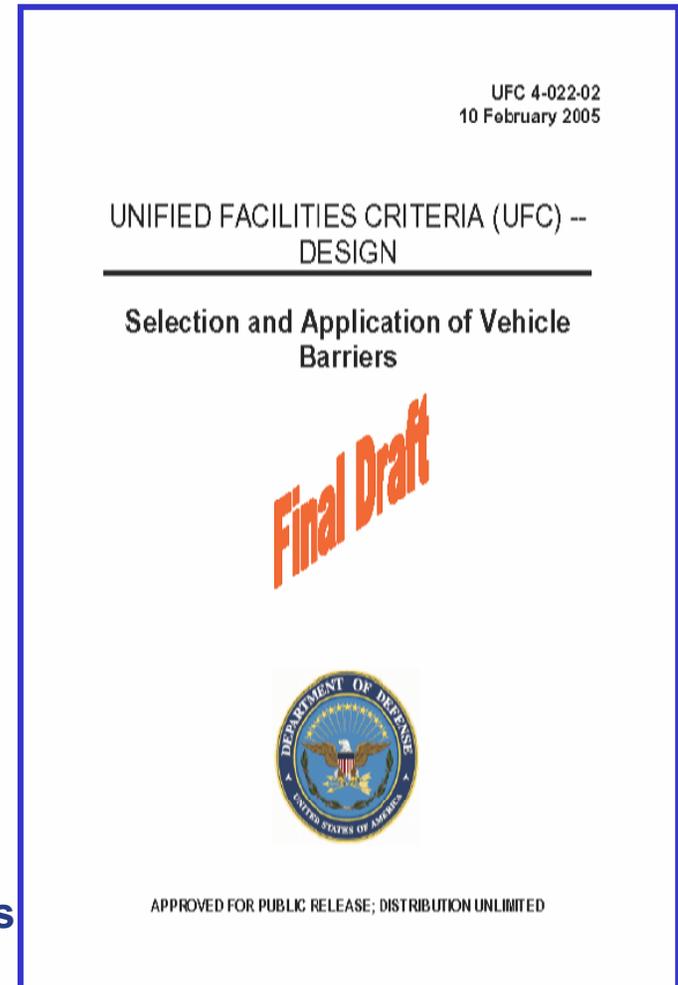


UFC 4-022-02

Selection and Application of Vehicle Barriers



- **Purpose:**
 - Provides the design requirements necessary to plan, design, construct, and maintain vehicle counter-mobility barriers used within Entry Control Facilities (ECFs) or as perimeter protection.
 - Replaces Military Handbook 1013/14
- **Lead Agency: Naval Facilities Engineering Command – NAVFAC Atlantic**
 - Mr. John Lynch
- **Current Document Status:**
 - 90% Complete
 - Anticipated completion date – September 2005
 - Final Draft received quite a number of comments and NAVFAC, A/E, and reviewers currently resolving.



Contents Overview

UFC 4-022-02 Selection and Application of Vehicle Barriers



- **Contents:**

- **Existing Requirements and Technical Guidance**

- **Vehicle Barrier Design Parameters**

- **Vehicle Barrier Selection, Design and Installation**

- Vehicle Barrier Types
 - Barrier Capability
 - Vehicle Barrier Certification

- **Active and Passive Barriers**

- Surface Mounted
 - Wedge Type
 - Bollard System
 - Crash Beam
 - Crash Gate
 - Ground Retractable Automobile Barrier (GRAB)
 - Concrete Bollard
 - Concrete Median
 - Concrete Planter
 - Guardrail

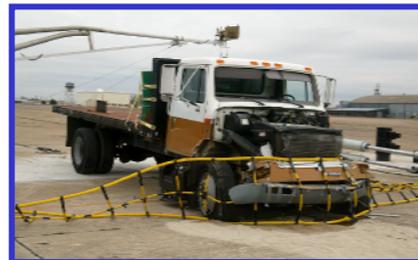


Contents Overview (continued)

UFC 4-022-02 Selection and Application of Vehicle Barriers



- Appendix A – List of Manufacturers
- Appendix B – Cost Data
- Appendix C – Performance Data for Active and Passive Vehicle Barriers
- Appendix D – Examples For Protection Against Terrorist Vehicle Bombs
- Appendix E – Vehicle Debris Minimization Effects on Counter-Mobility




DOS CERTIFIED ANTI-RAM VEHICLE BARRIERS
 May 25, 2005
(THE FOLLOWING BARRIERS MEET THE CERTIFICATION CRITERIA OF DD-STD-001, REVISED A, DATED MARCH 2000)

Manufacturer Product/Model	Barrier Model	Pass Rating
American Fence Products 1555 N. Kings Road Tulsa, OK 74116 (918) 467-2772 Fax (918) 926-7363 Fax	Impervio Perimeter Security Fence (uses 4" x 4" solid vertical endposts) Impervio Perimeter Security Fence Type A (uses 2" solid vertical endposts with cast-in-place bases)	K6
American Barrier America, Inc. 4335 Boulevard Marie, Louisiana Broussard, Louisiana, 70044-0440 (409) 639-6727 Fax (409) 659-6966 Fax	RIB 79 (uses concrete endposts with cast-in-place bases)	K12
Bull ARMOX Corp 9053 Tully's Circle Macon, GA 30110 (706) 335-4804 Fax (706) 335-6822 Fax	Metal M (galvanized pipe) Metal M-A (galvanized pipe with cast-in-place bases) Metal M-B (galvanized pipe with cast-in-place bases) Metal M-C (galvanized pipe with cast-in-place bases) Metal M-D (galvanized pipe with cast-in-place bases)	K6 K4 K12 K12 K12
Chattahoochee Industries, Inc. 4900 South Hynes Ave Chicago, IL 60609 (312) 254-1611 Fax (312) 254-1104 Fax	Metal M Perimeter Security Wall (uses solid endposts)	K12 ¹
Chemical Building Products 6409 Highway 200 Fort Worth, TX 76116-1295 (817) 432-7168 Fax (817) 432-6929 Fax	CEP 4500 (uses cast-in-place bases) CEP 4501 Perimeter Security Wall (uses solid endposts)	K12 ¹ K12 ¹

Page 1 of 4



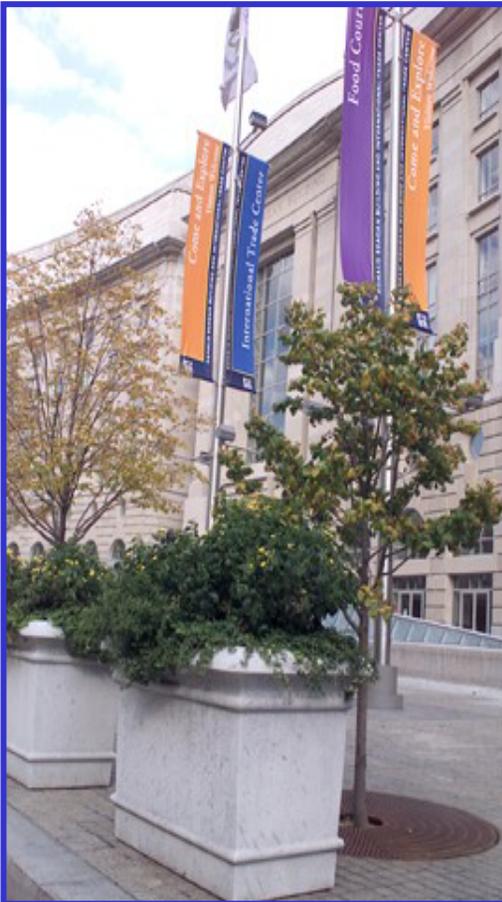
Barrier Test Photos

UFC 4-022-02 Selection and Application of Vehicle Barriers



Passive Barriers - Planters

UFC 4-022-02 Selection and Application of Vehicle Barriers



UFC 4-026-01

Design to Resist Forced Entry



- **Purpose:**
 - The purpose of this UFC is to support planning and design of projects that include forced entry requirements for security and antiterrorism.
- **Lead Agency: Naval Facilities Engineering Command – NAVFAC Atlantic**
 - Mr. John Lynch
- **Current Document Status:**
 - 75% Complete
 - Anticipated completion date – September 2005
 - Draft currently out for review and comment.

DRAFT UFC 4-026-01
30 June 2005

UNIFIED FACILITIES CRITERIA (UFC)

SECURITY ENGINEERING: DESIGN TO RESIST FORCED ENTRY



APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

Contents Overview

UFC 4-026-01 Design to Resist Forced Entry



• Contents:

–Forced Entry Threat

- Tools
- Tool Effects

–Design Basis Threat

–Concept Design

–Detection

–Final Design

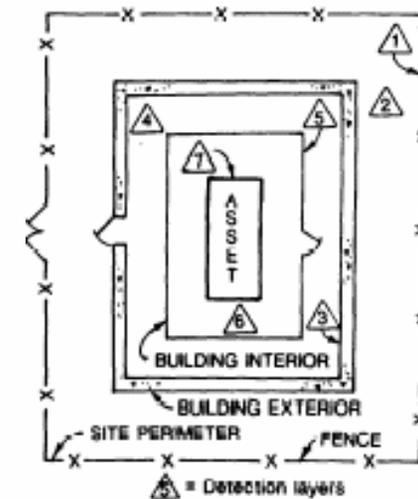
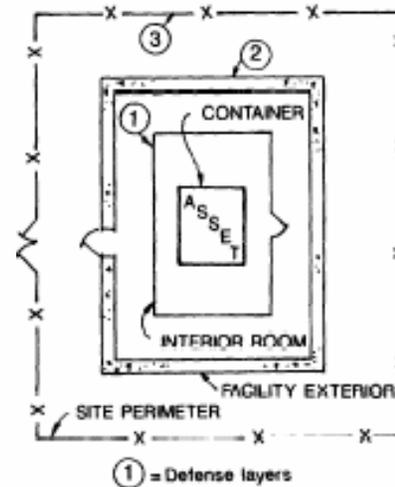
- Resist Tool Effects
- New Construction
- Retrofit Construction
- Walls/Roofs/Floors/Doors/Windows
- Utility Openings
- Vaults
- Design for Critical Assets

–Project Cost Development

–Appendix A – Forced Entry Resistant Building Components

–Appendix B – References

–Appendix C – Forced Entry Tools and Test Methods



UFC 4-023-07

Design to Resist Direct Fire Weapons Effects



- **Purpose:**

- The purpose of this UFC is to present engineering guidelines and cost effective solutions to protect fixed facilities and their assets against direct fire (anti-tank weapons and ballistics) attacks. This includes ballistic weapons (small arms weapons such as pistols, rifles, shotguns, and submachine guns) and anti-tank weapons (shoulder fired rockets).
- Emphasis will be on countermeasures for the various levels of protection.

- **Lead Agency: Naval Facilities Engineering Command – NAVFAC Atlantic**

- Mr. John Lynch

- **Current Document Status:**

- **95% Complete**
- **Anticipated completion date – September 2005**
- **Final Draft currently out for review and comment.**

DRAFT UFC 4-023-07
4 July 2005

UNIFIED FACILITIES CRITERIA (UFC)

FINAL DRAFT

Security Engineering Design to
Resist Direct Fire Weapons Effects



July 2005

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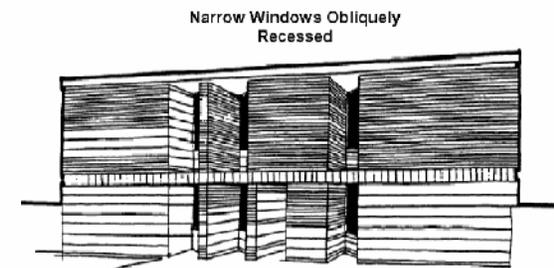
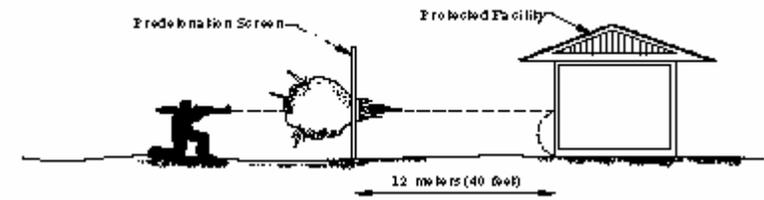
Contents Overview

UFC 4-023-07 Design to Resist Direct Fire Weapons Effects

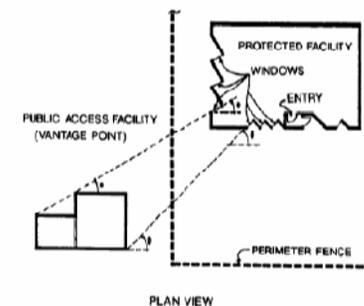


• Contents:

- Direct Fire Threats, Munitions, and Capabilities
- Design Approach
- Site Work Elements
- Building Elements
- Additional Considerations
- Ballistic Resistant Glazing
- Environmental Analysis
- Cost Analysis
- Appendix A – Glossary
- Appendix B – Ballistic Glazing Planning and Analysis
- Appendix C – Cross Sections



ELEVATION



PLAN VIEW

Questions?



•Questions?

Thanks!

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