



Antiterrorism and
Force Protection
Considerations in
Facility Design

Cost Implications: DoD Antiterrorism Facility Requirements

***Tri-Services Cost
Conference
3-6 June 2003***



**US Army
Corps of Engineers**



**Naval Facilities
Engineering Command**



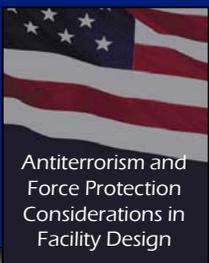
TOPICS

1. Brief Summary - AT/FP Criteria & Standards
2. Cost Guidance & DD1391 Preparation
3. Interim AT Standard Cost Guidance and Tables
4. Example – SNCO Academy
5. Example – Reserve Training Complex
6. Summary & Questions



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Criteria and Guidance

AT/FP CRITERIA-UNIFIED FACILITY CRITERIA (UFC)

DOD Minimum Antiterrorism Standards for Buildings, UFC 4-010-01

DOD Minimum Antiterrorism Standoff Distances for Buildings, UFC 4-010-10 (FOUO)

DOD Design and O&M: Mass Notification Systems, UFC 4-021-01

Numerous MIL-HDBKs, Tech Data Sheets, Users Guides, Interim Guidance, etc.,

New DoD Security Engineering Manuals (SEM):

UFC 4- 011- 01 Security Engineering Planning Manual (FOUO)

UFC 4- 011- 02 Security Engineering Design Manual



22 Supporting UFCs for Planning and Design

(Entry/Access Control, Vehicle Barriers,
Blast Resistant Construction, Progressive Collapse,
Windows and Doors, Mail rooms, PSE,
CBRN Collective Protection, various others.)

UFC 4- 012 – 01 through UFC 4- 012 - 22



Security Engineering Manual Volumes 1 – 4

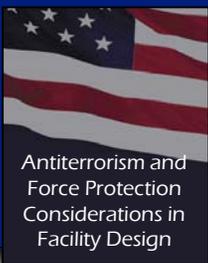
- TM 5-853-1, Volume 1 - Security Engineering Project and Cost Development
- TM 5-852-2, Volume 2 - Security Engineering Project Concept Design
- TM 5-852-3, Volume 3 - Security Engineering Project Final Design
- TM 5-852-4, Volume 4 - Security Engineering Project Electronic Security Design



DoD AT/FP Standard –Philosophy & Associated Cost Implications

GENERAL:

- Comprehensive protection is **cost prohibitive**
- Standard based on *Low* and *Very Low* level of protection that is cost effective/affordable
 - *Low* and *Very Low* level of protection can be provided to lessen risk of mass casualties for all DoD personnel
- Least expensive time for implementing ATFP facility requirements is during initial design and construction and major renovations (existing facilities).
- Typically add 1% to 5% to building cost where standoff distance is met.
- Predicated on maintenance of minimum standoff distances to allow for use of **conventional construction**
- Applies to construction from all appropriations
- Applies to new and existing construction, expeditionary and temporary construction **plus leases**
- Mandatory “Minimum” standard for DoD facility design and construction
 - May be augmented based on CINC standards, Risk and threat analysis, & Commanders’ directives



DoD Minimum AT Standards for Buildings ...For New and Existing Buildings

- Standard 1: Minimum standoff distance 
- Standard 2: Building separation
- Standard 3: Unobstructed space
- Standard 4: Drive-up / drop-off
- Standard 5: Access roads
- Standard 6: Parking beneath buildings or on rooftops
- Standard 7: Progressive collapse avoidance 
- Standard 8: Structural isolation
- Standard 9: Building overhangs
- Standard 10: Exterior masonry walls
- Standard 11: Window and Door Glazing 
- Standard 12: Building entrance layout Standard
- Standard 13: Exterior Doors
- Standard 14: Mailrooms
- Standard 15: Roof access
- Standard 16: Overhead mounted Architectural features 
- Standard 17: Air intakes
- Standard 18: Mailroom Ventilation 
- Standard 19: Emergency air distribution shutoff
- Standard 20: Utility distribution and installation
- Standard 21: Equipment bracing 
- Standard 22: Under building access
- Standard 23: Mass notification 



AT & Security - Potential Additional Cost Implications

- Facility (Building) Key Elements Affected by AT & Security Requirements:
 - Exterior Walls (minimum standoff not met or increased threat)
 - Exterior Window Glazing Requirements
 - Structural Frame (Progressive Collapse Design)
 - Floor and Roof Systems (Progressive Collapse Uplift Design Requirements)
 - HVAC (raised air intakes, redundancy/separate systems, additional bracing, collective protection??)
 - Physical Security Equipment Costs
 - Mass Notification System
- Site Related AT & Security Requirements:
 - Vehicle Barriers
 - Perimeter Barriers
 - Added Site Lighting
 - Additional Fencing
 - Protection for Critical Infrastructure (Power, Water, Steam, etc.)
 - Physical Security Equipment Costs



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DoD AT/FP Standard Available Cost Guidance

COST GUIDANCE:

DOD Minimum Antiterrorism Standards for Buildings, UFC 4-010-01

- Defers to DoD **Security Engineering Manual** for costs
- Defers to Service and DoD guidance for DD Form 1391 preparation

Security Engineering Manual (Volumes 1 – 4)

- TM 5-853-1, Volume 1 - Security Engineering Project and Cost Development
- TM 5-852-2, Volume 2 - Security Engineering Project Concept Design
- TM 5-852-3, Volume 3 - Security Engineering Project Final Design
- TM 5-852-4, Volume 4 - Security Engineering Project Electronic Security Design

Currently under
revision/rewrite

Interim Department of Defense Antiterrorism/Force Protection Construction Standards

- Cost tables in appendix 4



DoD AT/FP Standard DD1391 Cost Guidance

DD1391 COST GUIDANCE :

DOD FMR 7000.14R

- COSTS SHALL BE RECORDED IN ACCORDANCE WITH **DOD FMR 7000.14R**
 - **ITEM 9 - COST ESTIMATES:** *“Antiterrorism Force Protection / physical security measures: the entry under primary facility will show physical security improvements (e.g. special structural improvements, ballistic glass, etc.). Where land acquisition serves a specific purpose such as stand-off distance for force protection, the acquisition shall be listed as an antiterrorism force protection subordinate component of the primary facility.”*
 - **ITEM 10 - DESCRIPTION OF PROPOSED CONSTRUCTION:** *“List specific antiterrorism force protection measures and antiterrorism force protection considerations that this project provides.”*

Interim Department of Defense Antiterrorism/Force Protection Construction Standards

- Provides guidance on incorporation of ATFP measures into DD1391
 - See Sections C1.4



DD1391 - Where Information Appears

9. COST ESTIMATES						
Item		U/M	Quantity	Unit Cost	Cost (\$000)	
AIR PASSENGER TERMINAL		m2	3,960	-	6,170	
TERMINAL		m2	3,240	1,914.00	(4,000)	
AIR OPERATIONS BUILDING		m2	720	2,031.00	(1,230)	
AIRCRAFT WASH RACK		LS	-	-	(160)	
BUILT-IN EQUIPMENT		LS	-	-	(400)	
INFORMATION SYSTEMS		LS	-	-	(30)	
TECHNICAL OPERATING MANUALS		LS	-	-	(110)	
ANTI-TERRORISM/FORCE PROTECTION		LS	-	-	(240)	
SUPPORTING FACILITIES		-	-	-	1,160	
SPECIAL CONSTRUCTION FEATURES		LS	-	-	(400)	
ELECTRICAL UTILITIES		LS	-	-	(70)	
MECHANICAL UTILITIES		LS	-	-	(70)	
PAVING AND SITE IMPROVEMENT		LS	-	-	(280)	
FACILITY SUSTAINABLE DEVELOPMENT		LS	-	-	(200)	
ANTI-TERRORISM/FORCE PROTECTION		LS	-	-	(70)	
DEMOLITION		LS	-	-	(70)	
SUBTOTAL		-	-	-	7,330	

"Built-in equipment" should be used vice "Additional Functional Features" or "Special Costs." Describe in Block 10.

e.g. ballistic glass, etc. Detail block 12.

Check-off list para 12 documentation required.

If "demolition" is indicated in Block 9,

e.g. fencing, lighting, etc. Detail block 12.

The DOD abbreviation for square meters is "m2", not "SM".

Round costs to the nearest ten-thousand (It is acceptable to show values less than \$50K).



DD1391 - Where Information Appears

- Block 9
 - Cost For Primary Facility and Supporting Facility Items Directly Related to ATFP
- Block 10/11
 - List Specific ATFP Measures and Considerations Incorporated into the Project
- Block 12
 - Provide Further Detail by Completing Physical Security / ATFP Checklist Items



DD1391 - Where Information Appears

- Additional blocks
 - Some services require additional “backup” blocks in the 1391 generation process
 - Example: Army has a block requiring level of force protection and physical security to be specified then approved by Provost Marshall’s Office and other officials
- NOTE: Be careful not to indicate FOUO/secure information in the DD1391. Indicate “AT/FP Threat Specific Measures” without indicating threat (explosive weight/standoff distance). Reference the applicable standards for the FOUO information (UFC or CINC specific)



Cost Guidance

"Triggers" for Existing Structures

- Major investments: Costs for renovation, modification, or repair at least 50% of building replacement cost
- Conversion of use: When any portion of a building is modified from its current use to that of an inhabited building, billeting, or a primary gathering building for one year or more
- Glazing replacement: For all glazing replacements in inhabited buildings
- Building additions: If addition is 50% or more of the gross area of the existing building – Existing building must meet Standards

Cost Guidance

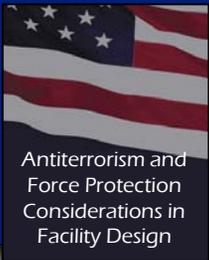


Antiterrorism and
Force Protection
Considerations in
Facility Design

- When minimum AT/FP standoff and separation distances are met and there are **NO** requirements to protect against an elevated threat or increase the Level of Protection, use the following guidance:
 - Add 0.5 percent of facility cost for one and two story buildings, except for administrative buildings,
 - Add 1 percent for administrative buildings and buildings of three or more stories.
 - **Interim Department of Defense Antiterrorism/Force Protection Construction Standards**, Section C1.3.
CONSTRUCTION STANDARDS, paragraph C1.3.1.

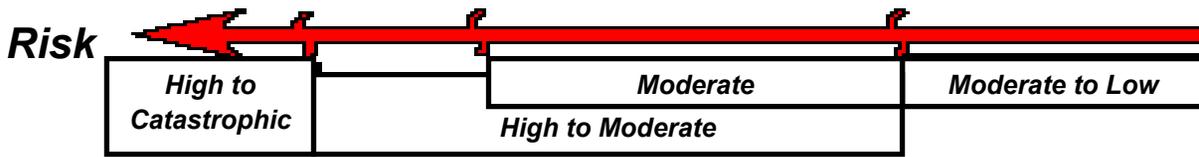
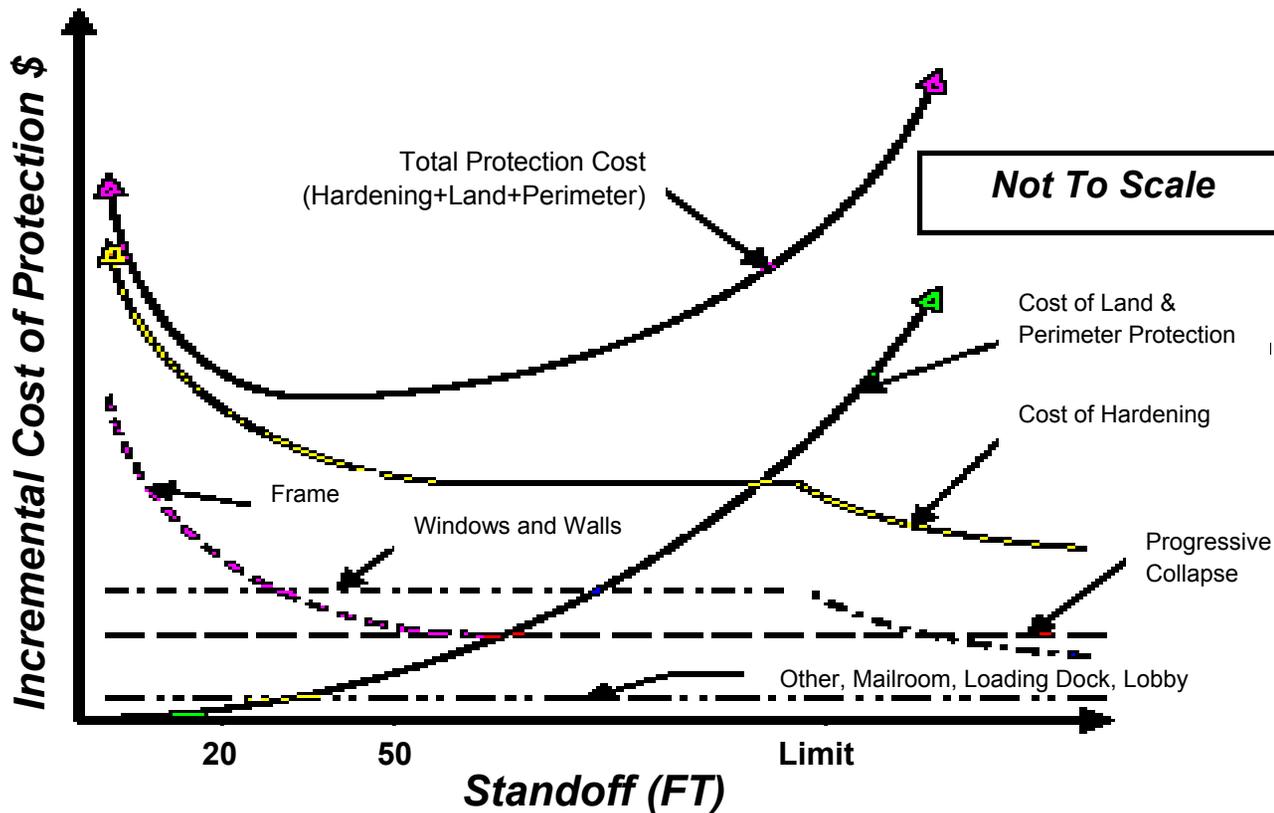
Cost Guidance

- When Minimum Measures Are **NOT** Met, Threat Specific Standards and Cost Guidance from Interim DOD AT/FP Construction Standards and Experience of Cost Engineers Are Utilized to Develop Estimates
 - **Interim Department of Defense Antiterrorism/Force Protection Construction Standards**
 - Cost tables in appendix 4
- Updated Cost Guidance Will Appear in **new DOD Security Engineering Manual** in the Future
- Ongoing Tri-service effort to determine cost associated with AT and progressive collapse requirements:
 - Enhancement of PACES cost estimating program to accurately reflect the cost of AT requirements and progressive collapse
 - Study/Report to determine the costs associated with progressive collapse
 - 3 Story Barracks/Billeting Facility (masonry shear wall, concrete moment frame)
 - 3 Story Admin. Facility (concrete moment frame, steel moment and braced frame)
 - Study/Report findings will be incorporated in the PACES enhancements



Impact of Standoff Distance on Component Cost

GSA Study
conducted by
Applied Research
Associates, Inc.





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Table AP4.T3.

Minimum Criteria and Multiple Threat Costs Integration

<i>Criteria</i>	<i>Standard Cost 0.5 - 1.0 %</i>	<i>Blast Tables Cost AP4.T4</i>	<i>Ballistics Table Cost AP4.T20</i>	<i>Vehicle Barrier AP4.T21&22 and/or AP4.F1</i>
Minimum Standards	X			
Minimum, Standoff not met		X		
Blast Threat		X		
Ballistics Threat	X		X	
Blast and Ballistics		X	X	
Blast with vehicle		X		X
Blast with vehicle and ballistics		X	X	X



Cost Tools and Guidance

Current Cost Guidance (Interim AT Standard) is Based on Parametric Cost Estimates for Six Facility Categories:

- 288 Person Barracks w/ interior corridor
- 288 Person Barracks w/ exterior entrances
- Dining Facility
- Administrative Facility
- Medical Clinic
- Special Structures





Cost Tools and Guidance

- Primary Gathering and Troop Billeting
- Add AT/FP percent cost increase from Tables AP4.T5 and AP4.T8 to DD 1391 primary facility at available standoff distance to provide minimum Level of Protection required by minimum AT/FP standards
 - Explosive Weight Specified in the Criteria



Cost Tools and Guidance

Table AP4.T5 XX lbs TNT Low Level of Protection

STANDOFF DISTANCE IN FEET	Percentage Building Cost Increase					
	BARRACKS EXTERNAL ENTRANCES	BARRACKS INTERIOR CORRIDOR	DINING FACILITY	ADMIN FACILITY	MEDICAL CLINIC	SPECIAL STRUCTURE
30-34	4.7	4.6	10.3	20.5	8.0	6.7
35-39	3.4	3.3	9.0	12.7	6.8	4.8
40-49	3.3	3.2	8.9	12.1	6.7	4.6
50-69	2.8	2.7	8.5	10.3	6.3	4.2
70-89	2.8	2.7	8.4	10.0	6.2	4.1
90-149	2.7	2.5	8.3	9.5	6.1	4.0
150-	2.1	2.0	7.3	7.4	4.7	4.0



Cost Tools and Guidance

Table AP4.T8 XXX lbs TNT Low Level of Protection

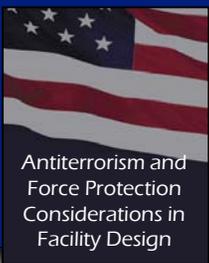
STANDOFF DISTANCE IN FEET	Percentage Building Cost Increase					
	BARRACKS EXTERNAL ENTRANCES	BARRACKS INTERIOR CORRIDOR	DINING FACILITY	ADMIN FACILITY	MEDICAL CLINIC	SPECIAL STRUCTURE
40-43	7.6	7.5	11.1	27.1	13.1	15.1
44-45	7.3	7.1	10.8	26.5	12.8	13.8
46-47	6.8	6.6	10.3	25.7	12.4	12.1
48-49	6.5	6.3	9.8	25.3	11.8	11.6
50-51	4.6	4.5	8.1	14.5	9.9	8.9
52-53	4.0	3.9	7.5	13.6	9.5	6.9
54-64	3.6	3.5	7.1	12.4	9.2	5.8
65-70	3.6	3.5	7.0	12.0	9.1	5.7
71-74	3.2	3.1	6.7	11.5	8.8	4.5
75-89	3.2	3.1	6.6	11.3	8.8	4.5
90-109	3.1	3.0	6.5	11.0	8.7	4.4
110-124	3.1	3.0	6.5	10.6	8.6	4.4
125-129	2.8	2.7	6.3	10.3	8.5	4.2
130-339	2.8	2.7	6.2	10.0	8.4	4.1
180-339	2.6	2.5	6.1	9.2	8.3	3.9
340-	2.1	2.0	4.7	7.0	7.3	3.9



Cost Tools and Guidance

Inhabited Buildings General Case

- **Add AT/FP percent cost increase from Tables AP4.T5 to DD 1391 primary facility category at available standoff distance to provide minimum Level of Protection required by DOD minimum AT/FP standards**
 - **Explosive Weights Specified in the Criteria**



Cost Tools and Guidance

- Additional Cost Information on Passive and Active Vehicle Barriers**

Rating	Cost Per Foot	Vehicle Weight (in lbs)	Vehicle Speed MPH
High	\$100	60,000	Up to 25
High	\$100	15,000	30-50
Low to Medium	\$30	15,000	Up to 30
Low to Medium	\$30	4,000	Up to 55
Non-rated fence	\$23	Not Applicable	Not Applicable

**Table AP4.T21
Passive Vehicle
Barrier Costs
and Ratings**

Rating	Cost Per Vehicle Lane	Vehicle Weight (in lbs)	Vehicle Speed MPH
High	\$42,000	60,000	Up to 25
High	\$42,000	15,000	30-50
Low to Medium	\$25,000	15,000	Up to 30
Low to Medium	\$25,000	4,000	Up to 55
Non-rated access control gate	\$2,000	Not Applicable	Not Applicable

**Table AP4.T22
Active Vehicle
Barrier Costs
per Vehicle
Entrance/Exit**

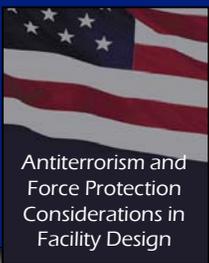
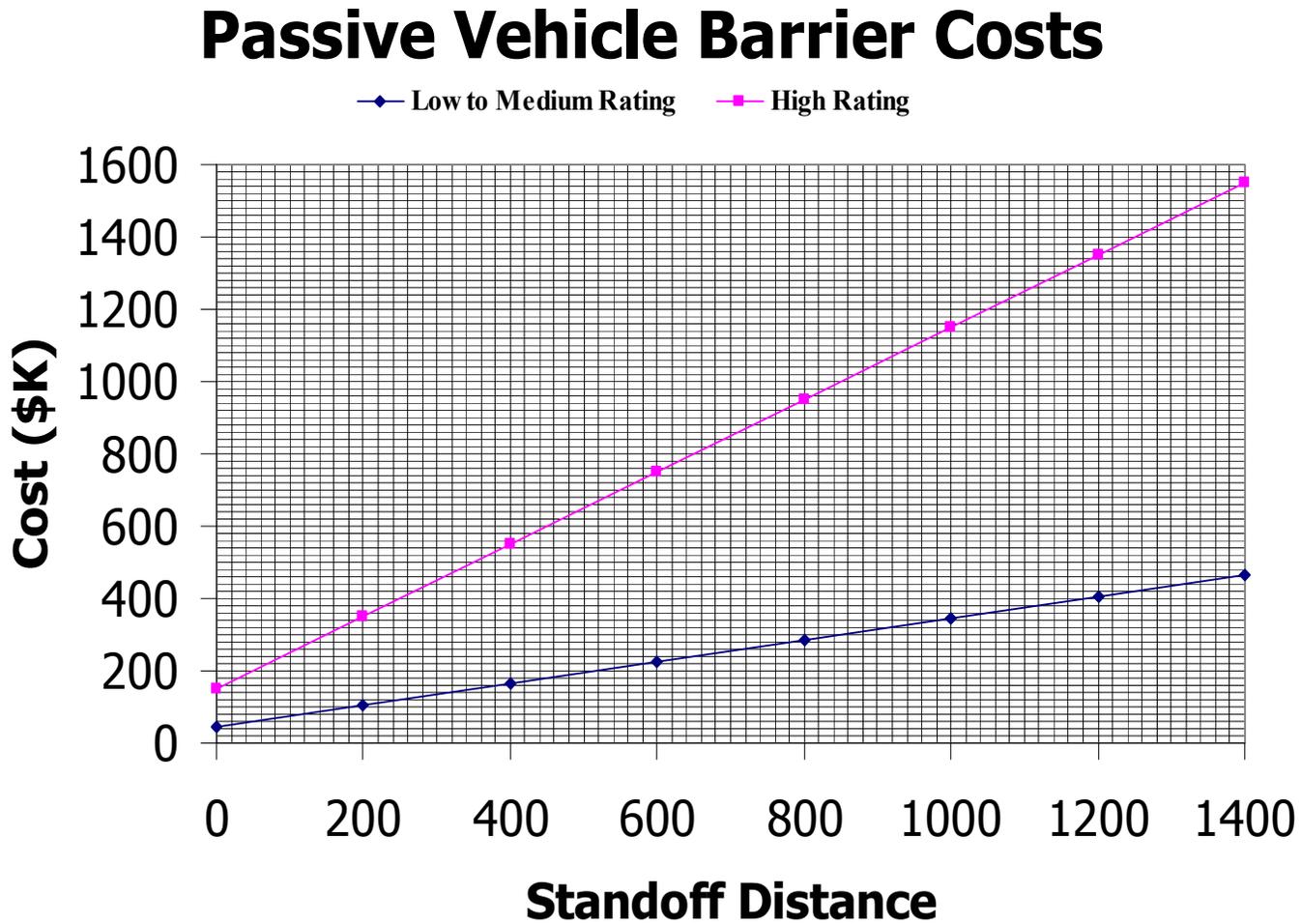


Figure AP4.F1.
Total Cost for Passive Vehicle Barrier Systems Versus
Standoff Distance





Cost Tools and Guidance

- Tables Provided for Specific Threats or Levels of Protection Above the Minimum Standards

STANDOFF DISTANCE IN FEET	Percentage Building Cost Increase					
	BARRACKS EXTERNAL ENTRANCES	BARRACKS INTERIOR CORRIDOR	DINING FACILITY	ADMIN FACILITY	MEDICAL CLINIC	SPECIAL STRUCTURE
178-185	85.7	17.9	29.1	39.8	35.3	55.9
186-199	84.4	16.5	27.8	37.7	34.3	50.5
200-204	69.6	15.4	25.4	35.2	31.1	46.3
205-215	69.4	15.1	25.2	33.9	30.9	46.0
216-239	67.9	14.8	22.9	31.7	27.9	42.4
240-259	67.7	13.5	22.7	31.1	27.7	41.8
260-273	60.3	12.9	21.5	29.8	26.1	39.7
274-279	59.4	12.9	20.2	28.6	24.2	38.1
280-281	59.3	12.8	20.0	27.8	24.1	37.9
282-291	58.6	11.3	19.3	26.7	23.6	35.1
292-319	58.3	11.3	18.8	26.2	22.8	34.5
320-335	58.2	11.2	18.7	25.9	22.7	34.4
344-349	56.5	9.2	17.0	23.3	21.5	27.4
350-372	41.7	8.1	14.6	20.8	18.3	23.3
373-379	41.1	7.5	14.0	19.9	17.9	20.8
380-444	41.1	7.4	14.0	19.7	17.8	20.8
445-494	40.7	7.1	13.6	19.2	17.5	19.6
495-569	40.1	6.5	13.0	18.3	17.1	17.1
570-574	40.0	6.4	12.9	17.7	17.0	17.0
575-674	39.8	6.2	12.7	17.3	16.8	16.0
675-766	25.0	5.0	10.3	14.8	13.6	11.8
767-799	24.7	4.7	10.0	14.8	13.4	10.4
800-1059	24.6	4.6	9.9	14.0	13.3	10.3
1060-1099	24.5	4.5	9.8	13.1	13.2	10.1
1100-1237	17.1	3.9	8.6	11.9	11.5	8.0
1238-2659	16.8	3.7	8.4	11.6	11.4	7.9
2660-	2.1	2.0	4.7	7.0	7.3	3.9

**Table AP4.T18
XX,XXX lbs
TNT Medium
Level of
Protection**



Cost Tools and Guidance

Caution:

- **Cost Guidance Prepared based on Assumed Types of Construction for Baseline Facilities**
- **Carefully Review Descriptions of Construction to Insure Proper Use of Guidance**
- **Example: Admin. Facilities Assume Steel Stud with Brick Veneer Wall Construction as the Starting Point**



Dangers of Interim Cost Data

Example:

- Assume you have estimated the cost of a office building constructed of concrete masonry exterior walls
- Interim cost guidance would have you estimate cost of ATFP based on “Admin Facilities”, which assumes steel stud exterior walls as the baseline construction
- However, this would overestimate increased relative cost for wall hardening since original estimate started with CMU



Dangers of Interim Cost Data

Example continued:

- If you used “Special Structures” category that assumed CMU construction....
- The facility types in this category typically have fewer windows than an Admin facility
- So, “Special Structures” category may underestimate the cost of window hardening for this office building
- Answer may actually be between the cost increases found in the two categories



Cost Increases for Existing Buildings

- Interim Standard does not include cost increases for upgrading existing buildings
- Accurately estimating the cost of modifications to existing buildings will require detailed engineering assessment
- Costs can vary greatly depending on the type of construction and the required protective measures



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SNCO Academy

Scenario 1 - Facts:

SNCO Academy is a primary gathering structure since 50 or more people routinely gather there.

SNCO Academy is a school and falls under administration facilities as shown in Table AP4.T2.

At the proposed site the existing installation perimeter will provide 55m standoff distance which is 10m more than required for primary gathering structures.

At the proposed site, parking will be 25m from the SNCO Academy, which meets the minimum AT/FP requirement.

Active and passive barriers are in place and secure the installation perimeter.



SNCO Academy

Solution:

Add 1 percent of Academic Instruction Building cost itemized under primary facility, as minimum AT/FP cost on Form DD1391

- **.01 X 3,560,000=\$35,600**
- **rounded up to \$36,000 on DD1391**



SNCO Academy

Scenario 2 - Facts:

- **SNCO Academy is a primary gathering structure since 50 or more people routinely gather there.**
- **SNCO Academy is a school and falls under administration facilities as shown in Table AP4.T2.**
- **At the proposed site the installation perimeter will provide 32m of standoff which is less than the required 45m.**
- **At the proposed site, parking will be 20m from the SNCO Academy, which is less than the minimum 25m required for primary gathering structures.**
- **Active and passive barriers are in place and secure the installation perimeter.**

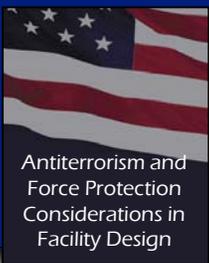


Cost Tools and Guidance

Table AP4.T8 XXX lbs TNT Low Level of Protection

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46-47	6.8	6.6	10.3	25.7	12.4	12.1
48-49	6.5	6.3	9.8	25.3	11.8	11.6
50-51	4.6	4.5	8.1	14.5	9.9	8.9
52-53	4.0	3.9	7.5	13.6	9.5	6.9
54-64	3.6	3.5	7.1	12.4	9.2	5.8
65-70	3.6	3.5	7.0	12.0	9.1	5.7
71-74	3.2	3.1	6.7	11.5	8.8	4.5
75-89	3.2	3.1	6.6	11.3	8.8	4.5
90-109	3.1	3.0	6.5	11.0	8.7	4.4
110-124	3.1	3.0	6.5	10.6	8.6	4.4
125-129	2.8	2.7	6.3	10.3	8.5	4.2
130-339	2.8	2.7	6.2	10.0	8.4	4.1
180-339	2.6	2.5	6.1	9.2	8.3	3.9
340-	2.1	2.0	4.7	7.0	7.3	3.9

Evaluate Perimeter Standoff Mitigation



Cost Tools and Guidance

Table AP4.T5 XX lbs TNT Low Level of Protection

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35-39	3.4	3.3	9.0	12.7	6.8	4.8
40-49	3.3	3.2	8.9	12.1	6.7	4.6
50-69	2.8	2.7	8.5	10.3	6.3	4.2
70-89	2.8	2.7	8.4	10.0	6.2	4.1
90-149	2.7	2.5	8.3	9.5	6.1	4.0
150-	2.1	2.0	7.3	7.4	4.7	4.0

Evaluate Parking Standoff Mitigation



SNCO Academy

Solution:

- **Installation perimeter standoff mitigation**
 - Read 11 percent cost increase for perimeter standoff mitigation from Table for Administration facility (at 32m)
- **Parking standoff mitigation**
 - Read 10.3 percent cost increase for parking standoff mitigation from Table for Administration facility (at 20m)



SNCO Academy

Solution Continued:

- Standoff mitigation cost increase
 - Use 11 percent cost increase for perimeter standoff mitigation since it is greater than 10.3 percent increase for hardening required for parking.
 - Add 11 percent of Academic Instruction Building cost, itemized under primary facility, as minimum AT/FP cost on Form DD1391
 - $(.11)(3,560,000) \approx \$390,000$
- Do not add 1% for minimum.

SNCO Academy

Antiterrorism and
Force Protection
Considerations in
Facility Design

1. Component NAVY		2. Date 16-Mar-03		
3. Installation and Location/UIC: USMC BASE USA		4. Project Title SNCO ACADEMY		
5. Program Element	6. Category Code 171-10	7. Project Number P- XXX	8. Project Cost (\$000) 4,940	
9. COST ESTIMATES				
Item	U/M	Quantity	Unit Cost	Cost (\$000)
SNCO ACADEMY				
ACADEMIC INSTRUCTION BUILDING	SQM	2,811	1,266	(5,210)
WAREHOUSE	SQM	411	1,345	(3,560)
ARMORY	SQM	167	2,216	(540)
BUILT-IN EQUIPMENT	LS	1	250,000	(370)
TECHNICAL OPERATING MANUALS - OMSI	LS	1	100,000	(250)
AT/FP THREAT SPECIFIC MEASURES, INST. BLDG.	LS	2,811	139	(100)
SUPPORTING FACILITIES				
SPECIAL CONSTRUCTION FEATURES	LS	1	60,000	(390)
ELECTRICAL UTILITIES	M	367	300	(60)
MECHANICAL UTILITIES	M	521	250	(110)
PAVING AND SITE IMPROVEMENT	SQM	6,024	78	(130)
DEMOLITION	SQM	146	68	(470)
SUBTOTAL				
CONTINGENCY - (5.00%)				780
TOTAL CONTRACT COST				(60)
SIOH - (6.00%)				(110)
TOTAL REQUEST				(130)
TOTAL REQUEST ROUNDED				(470)
				(4,430)
TOTAL CONTRACT COST				222
SIOH - (6.00%)				(4,652)
TOTAL REQUEST				279
TOTAL REQUEST ROUNDED				(4,931)
				(4,940)



TOPICS

1. Brief Summary - AT/FP Criteria & Standards
2. Cost Guidance & DD1391 Preparation
3. Interim AT Standard Cost Guidance and Tables
4. Example – SNCO Academy
5. Example – Reserve Training Complex
6. Summary & Questions



Reserve Training Complex

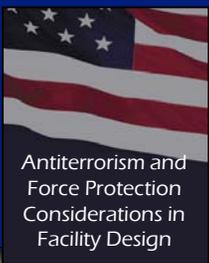
- Scenario 1 - Facts:
 - Reserve training complex is a primary gathering structure since 50 or more people routinely gather there.
 - Existing installation perimeter provides 90m of standoff which is twice the required minimum 45m.
 - Active and passive barriers are not in place to secure the installation perimeter and are not required to meet minimum AT/FP requirements.
 - Required 25m parking standoff can be met.



Reserve Training Complex

Solution:

- **Since installation perimeter and parking standoff distances for the Reserve Training Complex can be met**
 - **Add 1 percent of Reserve Training Building cost itemized under primary facility, as minimum AT/FP on Form DD1391**
 - **$(.01)(\$6,470,000)=\$64,700$**
 - **Rounded to \$65,000 on Form DD1391**



Reserve Training Complex

1. Component NAVY		FY 2000 MILITARY CONSTRUCTION PROGRAM			2. Date 16-Feb-01
3. Installation and Location/UIC: USMC BASE EUROPE			4. Project Title RESERVE TRAINING COMPLEX		
5. Program Element	6. Category Code 171-15	7. Project Number P- XXX	8. Project Cost (\$000) 10,840		
9. COST ESTIMATES					
Item		U/M	Quantity	Unit Cost	Cost (\$000)
RESERVE TRAINING COMPLEX					(7,555)
RESERVE TRAINING BUILDING		SQM	4,738	1,331	(6,470)
VEHICLE MAINTENANCE FACILITY		SQM	669	1,290	(890)
TECHNICAL OPERATING MANUALS - OMSI		LS	1	130,000	(130)
AT/FP MINIMUM MEASURES		SQM	4,876	13	(65)
SUPPORTING FACILITIES					(2,180)
ADDED CONSTRUCTION FEATURES		LS	1	1,180,000	(1,180)
ELECTRICAL UTILITIES		LS	1	220,000	(220)
MECHANICAL UTILITIES		M	1	200,000	(200)
PAVING AND SITE IMPROVEMENT		LS	1	520,000	(520)
DEMOLITION		LS	1	60,000	(60)
SUBTOTAL					(9735)
CONTINGENCY - (5.00%)					487
TOTAL CONTRACT COST					(10222)
SIOH - (6.00%)					(613)
TOTAL REQUEST					(10835)
TOTAL REQUEST ROUNDED					(10,840)



Reserve Training Complex

Scenario 2 - Facts:

- Existing installation perimeter provides 90m of standoff which is twice the required minimum 45m.
- Design Specific Threat Protection is required
 - High level of protection against 500lb TNT NEW at installation perimeter.
 - Two entrance/exit gates and a passive perimeter barrier system are required at the installation perimeter to stop a 15,000 vehicle at up to 30MPH. The section of the perimeter requiring a barrier system is 4665 feet long.



Reserve Training Complex

Solution:

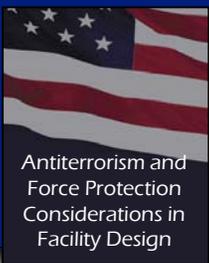
- **Read cost increase for high level of protection with 500lb TNT NEW at 90m and enter (increase x unit cost) on Form DD 1391.**
 - See table in Interim Standard
 - Assume Increase @ 13.2%
 - Add 13.2 percent of Reserve Training Building cost, itemized under primary facility, as minimum AT/FP on Form DD1391
 - $(.132)(6,470,000) = \$854,040$
 - rounded up to \$855,000
 - Do not add 1% for minimum AT/FP



Reserve Training Complex

Solution Continued:

- Active vehicle barriers: Table AP4T22 indicates that to stop a 15,000lb vehicle at up to 30 MPH (i.e., Low to Medium Level of Protection), each active barrier will cost \$25,000. Four barriers are required.
 - Add $(\$25,000)(4) = \$100,000$ itemized under supporting facilities as an elevated AT/FP cost on Form DD1391



Reserve Training Complex

Cost for Active Vehicle Barriers



Table AP4.T22. Active Vehicle Barrier Costs per Vehicle Entrance/Exit

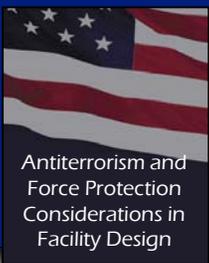
Rating	Cost Per Vehicle Lane	Vehicle Weight (in lbs)	Vehicle Speed MPH
High	\$42,000	60,000	Up to 25
High	\$42,000	15,000	30-50
Low to Medium	\$25,000	15,000	Up to 30
Low to Medium	\$25,000	4,000	Up to 55
Non-rated access control gate	\$2,000	Not Applicable	Not Applicable



Reserve Training Complex

Solution Continued:

- Passive vehicle barrier: You can calculate the cost of a passive barrier system using Table AP4.T21, Passive Vehicle Barrier Costs and Ratings. It indicates that the cost of a barrier designed to stop a 15,000 lb vehicle traveling at up to 30 MPH would be \$30 per foot at the Low to Medium Level of Protection.
 - $\$30 \times 4665\text{ft.} = \139950 . Round up to \$140,000.
 - Add \$140,000 itemized under supporting facilities as an elevated AT/FP cost on Form DD1391 for the passive barrier.



Reserve Training Complex

Cost for Passive Vehicle Barriers

Table AP4.T21. Passive Vehicle Barrier Costs and Ratings

Rating	Cost Per Foot	Vehicle Weight (in lbs)	Vehicle Speed MPH
High	\$100	60,000	Up to 25
High	\$100	15,000	30-50
Low to Medium	\$30	15,000	Up to 30
Low to Medium	\$30	4,000	Up to 55
Non-rated fence	\$23	Not Applicable	Not Applicable



Reserve Training Complex

1. Component NAVY		FY 2000 MILITARY CONSTRUCTION PROGRAM			2. Date 16-Feb-01
3. Installation and Location/UIC: USMC BASE EUROPE			4. Project Title RESERVE TRAINING COMPLEX		
5. Program Element	6. Category Code 171-15	7. Project Number P- XXX	8. Project Cost (\$000) 11,940		
9. COST ESTIMATES					
Item					
	U/M	Quantity	Unit Cost	Cost (\$000)	
RESERVE TRAINING COMPLEX					
RESERVE TRAINING BUILDING	SQM	4,876	1,331	(8355)	
VEHICLE MAINTENANCE FACILITY	SQM	746	1,290	(890)	
TECHNICAL OPERATING MANUALS - OMSI	LS	1	140	(140)	
AT/FP THREAT SPECIFIC MEASURES	SQM	4 876	175	(855)	
SUPPORTING FACILITIES					
ADDED CONSTRUCTION FEATURES	LS	1	1,178	(2370)	
ELECTRICAL UTILITIES	LS	1	217	(1180)	
MECHANICAL UTILITIES	M	1	196	(220)	
PAVING AND SITE IMPROVEMENT	LS	1	518	(200)	
DEMOLITION	LS	1	63	(520)	
ANTITERRORISM/FORCE PROTECTION					
ATFP Active Vehicle Barriers	EA	4	25	(240)	
ATFP Passive Vehicle Barriers	LF	4665	30	(100)	
SUBTOTAL					
				(10725)	
CONTINGENCY - (5.00%)				536	
TOTAL CONTRACT COST				(11261)	
SIOH - (6.00%)				676	
TOTAL REQUEST				(11937)	
TOTAL REQUEST MROUNDED				(11940)	



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Experience with Costs for AT

- Some DoD Engineering Activities have developed additional “rules of thumb” on AT costs
 - For Example:
 - Atlantic Division NAVFAC typically applies 1% markup for the minimum standards, with a 5% markup if progressive collapse mitigation will be required.
 - Southwest Division NAVFAC has directed that when there is no specific threat identified and you meet the standoff distances, add 1% of facility cost for one-and two story buildings, except for administrative buildings. Add 2%-3% percent for administrative buildings and buildings of three to five stories. Use 4%-5% for anything more than five stories, such as BEQs, etc." This cost factor includes requirement for the prevention of progressive collapse.



Experience with Costs for AT

- For active or passive vehicle barrier systems, it is recommended that you obtain vendor quotes for more accurate cost estimates
- Consider the costs of additional control features, environmental protection, and other options when pricing active vehicle barriers
 - See MILHDBK 1013/14



Costs for AT – Progressive Collapse Mitigation

- It is generally thought that the guidance provided in the Interim Standard does not implicitly consider progressive collapse mitigation
- New cost data being developed for DoD Security Engineering Manual still may not address adequately
- Tri-services are managing a task order to evaluate progressive collapse mitigation costs – PACES upgrade initiative



Questions

