Forward Arming and Refueling Point

Tactics, Techniques, and Procedures

August 2006

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY



Tactics, Techniques, and Procedures for Forward Arming and Refueling Point

Contents

		Page
	PREFACE	viii
Chapter 1	INTRODUCTION	1-1
•	Definition	1-1
	Purpose	1-1
	Organization	
	Planning Factors	
	Personnel	
	Tactical Enablers	
	Threat	1-5
Chapter 2	COMMAND, CONTROL, AND COMMUNICATION	2-1
-	Command and Control	
	Aircraft ControL	2-1
	Traffic Layout	2-3
	Radio Communications	
Chapter 3	FORWARD ARMING AND REFUELING POINT UTILIZATION	3-1
	Section I – Employment Factors	3-1
	Types of Forward Arming and Refueling Points	3-1
	Site Selection	3-2
	Engineering Considerations	3-3
	Movement Plan	3-3
	Emplacement	3-4
	Security	3-20
	Relocation	3-20
	Damaged or Destroyed Assets	3-21
	Section II – Forward Arming and Refueling Point Equipment	3-21
	Forward Area Refueling Equipment	
	Advanced Aviation Forward Area Refueling System	
	Heavy Expanded Mobility Tactical Truck Tanker Aviation Refueling System	
	Support Equipment	
	Personnel Refueling Requirements	
	Refueling Nozzles	
	Equipment Setup	

Distribution Restriction: Approved for public release; distribution is unlimited.

3 August 2006 FM 3-04.104 i

	Section III - Ammunition Operations, Equipment, and Storage	3-32
	Ammunition Storage	
	Ammunition Safety Procedures	
	Section IV – Arming Operations	
	Armament Pad Setup	
	Personnel Requirements	
	Section VI – Aircraft Flow and Mix Limitations	
	Aircraft Mix	
	Section V – Training	
	Qualification Training	3-37
	Training Realism	
	Operation Skills	3-38
	Individual and Collective Training	3-38
Chapter 4	SUSTAINMENT	
	Considerations	
	Resupply	
	Class III Requirements	
	Argon Gas	
	Transportation	
	Nonlinear/Noncontiguous Battlefield Operations	4-7
Chapter 5	OPERATIONAL ENVIRONMENTS	5-1
-	Night Operations	
	Desert Operations	
	Winter Operations	
Chapter 6	ENVIRONMENTAL PROTECTION CONSIDERATIONS	
	Army Environmental Management Policy	
	Liability	
	Spill Discovery	
	Assessment	
	Spill Cleanup	6-4
	Spill Kits	
	Reacting to a Small Primary Spill	
	Reacting to a Small/Large Spill	
Appendix A	STANDARD HAND AND ARM SIGNALS	A-1
Appendix B	SAMPLE FORWARD ARMING AND REFUELING POINT STANDING OPERATING PROCEDURE	B-1
Appendix C	LOAD PLANS	C-1
Appendix D	MULTIPLE FORWARD ARMING AND REFUELING POINT OPERATIONS	D-1
Appendix E	FORWARD ARMING AND REFUELING POINT SAFETY REQUIREMENTS .	E-1
Appendix F	ARMAMENT CONFIGURATIONS FOR THE AH-64 AND OH-58D	F-1
Appendix G	TROOP LEADING PROCEDURES	
Appendix H	HAZARDOUS MATERIAL/HAZARDOUS WASTES SUPPLIES	
• •	OLOGO A DV	

REFERENCES	 References-1
INDEX	Index-1

Figures

Figure 1-1. Sample structure for a forward support company	1-2
Figure 1-2. Aviation support battalion	1-2
Figure 1-3. Aviation support battalion (support of combat aviation brigade)	1-3
Figure 2-1. Air traffic services company in general support aviation battalion	2-2
Figure 2-2. AN/TSQ-198 tactical terminal control system	2-2
Figure 2-3. Traffic layout at a forward arming and refueling point	2-3
Figure 2-4. Forward arming and refueling point layout for simultaneous operations	2-4
Figure 3-1. Rolling forward arming and refueling point	3-2
Figure 3-2. Typical disposition of theater and division class III/V products	3-5
Figure 3-3. Heavy expanded mobility tactical truck forward arming and refueling point layout	3-8
Figure 3-4. Configuration of the extended range fuel system (fat cow)	3-10
Figure 3-5. Gear board	3-10
Figure 3-6. Refueling point setups	3-11
Figure 3-7. Extended range fuel system layout configuration	3-11
Figure 3-8. Extended range fuel system II functional components	3-12
Figure 3-9. Forward area refueling equipment kit assembly	3-12
Figure 3-10. Configuring the forward area refueling equipment components	3-13
Figure 3-11. Heavy expanded mobility tactical truck tanker aviation refueling system configuration and additional components for CH-53 forward arming and refueling point	3-14
Figure 3-12. Heavy expanded mobility tactical truck tanker aviation refueling system configuration and additional components for KC-130 forward arming and refueling point	
Figure 3-13. Heavy expanded mobility tactical truck tanker aviation refueling system configuration and additional components for C-17 forward arming and refueling point	
Figure 3-14. Example of a site layout for a volcano arming point	
Figure 3-15. Advanced aviation forward area refueling system	
Figure 3-16. Advanced aviation forward area refueling system layout	
Figure 3-17. Forward area refueling equipment setup under various wind conditions	
Figure 3-18. Unisex connections	
Figure 3-19. Heavy expanded mobility tactical truck tanker aviation refueling system components and layout	
Figure 3-20. Closed circuit refueling open-port (gravity-fill) nozzle adapter	3-29
Figure 3-21. Model 125-1000 closed-circuit refueling nozzle	3-30
Figure 3-22. Recirculation nozzle	
Figure 3-23. D-1 center-point refueling nozzle	3-30
Figure 3-24. Two typical layouts for helicopter rearm points	3-34
Figure 3-25. Three-dimensional view of a helicopter rearm point plan	3-35

Figure 3-26. Simultaneous rearming and refueling forward arming and refueling point layout	3-36
Figure 4-1. Flow of class III/V supplies	
Figure 4-2. Formulas for calculating class III (JP8)	
Figure 4-3. Air-to-air stinger launcher	
Figure 4-4. Basic charging unit	
Figure 5-1. T-Formation forward area refueling equipment/advanced aviation	4-3
forward area refueling system setup	5-3
Figure 6-1. Spill kit.	
Figure 6-2. Digging a dike/berm	
Figure A-1. Position of ground guide for a rotary-wing aircraft	A-1
Figure A-2. Proceed to next ground guide	A-1
Figure A-3. This way	A-1
Figure A-4. Move ahead	A-2
Figure A-5. Turn to left (port)	A-2
Figure A-6. Turn to right (starboard)	A-2
Figure A-7. Landing directions	A-2
Figure A-8. Move upward	A-3
Figure A-9. Hover	A-3
Figure A-10. Move downward	A-3
Figure A-11. Move to right	A-3
Figure A-12. Move to left	A-3
Figure A-13. Slow down	A-3
Figure A-14. Stop	A-4
Figure A-15. Brakes	A-4
Figure A-16. Fire	A-4
Figure A-17. Engage rotor(s)	A-4
Figure A-18. Start engine(s)	A-5
Figure A-19. Wave-off	A-5
Figure A-20. Affirmative (all clear)	A-5
Figure A-21. Negative (not clear)	A-5
Figure A-22. Move back	A-6
Figure A-23. Land	A-6
Figure A-24. Tail to right (starboard)	A-6
Figure A-25. Tail to left (port)	A-6
Figure A-26. Clearance for personnel to approach aircraft	A-7
Figure A-27. Personnel approach the aircraft (given by ground crewmember)	A-7
Figure A-28. Up hook	A-7
Figure A-29. Down hook	A-7
Figure A-30. Slow down engine(s) on indicated side	A-8
Figure A-31. Cut engine(s) or stop rotor(s)	A-8
Figure A-32. Connect auxiliary power unit	A-8

Figure A-33. Disconnect auxiliary power unit	A-8
Figure A-34. Insert chocks/chocks inserted	A-9
Figure A-35. Remove chocks	A-9
Figure A-36. Hook up load	A-9
Figure A-37. Release load	A-9
Figure A-38. Load has not been released	A-10
Figure A-39. Cut cable	A-10
Figure A-40. Winch up	A-10
Figure A-41. Winch down	A-10
Figure A-42. Lock wings/helicopter blades	A-11
Figure A-43. Install	A-11
Figure A-44. Remove	A-11
Figure A-45. Remove blade tie-downs	A-11
Figure A-46. Droop stops out	
Figure A-47. Droop stops in	A-12
Figure A-48. Ground hand signals	A-13
Figure B-1. Example of a forward arming and refueling operations annex to a tactical A-standing operation procedure	B-1
Figure C-1. M978 heavy expanded mobility tactical truck tanker	C-1
Figure C-2. M977 heavy expanded mobility tactical truck cargo vehicle	C-2
Figure C-3. M989A1 heavy expanded mobility tactical truck	C-2
Figure C-4. Suggested ammunition load plan 1	C-3
Figure C-5. Suggested ammunition load plan 2	C-3
Figure C-6. Suggested ammunition load plan 3	
Figure C-7. Load plan key	C-4
Figure D-1. Multiple forward arming and refueling point operations	D-1
Figure D-2. Suggested forward arming and refueling point schedule	D-2
Figure E-1. Forward arming and refueling point requirements	E-1
Figure F-1. AH-64 armament configurations	F-1
Figure F-2. OH-58D authorized armament configurations	F-2
Figure G-1. Critical elements of the forward arming and refueling point planning sequence	

Tables

Table 3-1. Portable fire extinguisher types	3-27
Table 3-2. Common items used during helicopter rearm operations	3-33
Table 3-3. Minimum safe distances (in feet) between rearm points and ready ammunition storage area	3-33
Table 4-1. Cargo capacity comparison in rounds	4-1
Table 4-2. Fuel Consumption Rates	4-3
Table 4-3. Round-trip travel times	4-7

Preface

This FM describes forward arming and refueling point (FARP) operations. It provides aviation commanders, staff elements, and Class III and V personnel with a comprehensive view of the purpose, organization, and operation of the FARP. It also describes planning considerations for setup of the FARP as well as transportation planning for Class III and V products.

This FM primarily applies to aviation unit commanders, their staffs, and Class III and V personnel operating a FARP. It applies to aviation units operating on the battlefield. The principles contained herein apply to all aviation units that may be involved in forward arming and refueling missions.

The Combined Arms Support Command is the proponent for operations and military occupational specialties (MOSs) related to fueling and ammunition operations. This FM provides tactics, techniques, and procedures for arming and refueling of Army aircraft.

Units must refer to FM 10-67-1 for greater detail and applicable checklists. FM 10-67-1 consolidates and supersedes FMs 10-18, 10-20, 10-68, 10-69, 10-70-1, and 10-71. Units ensure that FARP personnel have the most current version of FM 10-67-1 available during FARP operations.

For ammunition operations, the user should refer to FM 4-30.1.

This publication applies to the Active Army, the Army National Guard/Army National Guard of the United States, and the United States Army Reserve unless otherwise stated.

The proponent of this publication is Headquarters, United States Army Training and Doctrine Command. Send comments and recommendations on Department of the Army (DA) Form 2028 (Recommended Changes to publications and Blank Forms) or automated link (http://www.usapa.army.mil/da2028/daform2028.asp) to Commander, United States Army Aviation Warfighting Center (USAAWC), ATTN: ATZQ-TD-D, Fort Rucker, Alabama 36362-5263. Comments may be e-mailed to the Directorate of Training and Doctrine (DOTD) at av.doctrine@us.army.mil.

Unless this <u>publication states otherwi</u>se, masculine nouns and pronouns do not refer exclusively to men.

This publication has been reviewed for operations security considerations.

Chapter 1

Introduction

The forward arming and refueling point (FARP) is vital to the success of the aviation combat mission. Attack, air assault, and support aviation units all depend on the FARP to provide fuel and ammunition where and when they are needed. This chapter defines the FARP and discusses its purpose. It also discusses organization, planning factors, personnel, tactical enablers, and the threat.

DEFINITION

1-1. A FARP is a temporary facility—organized, equipped, and deployed by an aviation commander, and normally located in the main battle area closer to the area where operations are being conducted than the aviation unit's combat service area—to provide fuel and ammunition necessary for the employment of aviation maneuver units in combat. The forward arming and refueling point permits combat aircraft to rapidly refuel and rearm simultaneously.

PURPOSE

1-2. The FARP increases the time on station and extends the range of aircraft for the commander by reducing the turnaround time associated with refueling and rearming. FARPs thereby give the commander more time to apply continuous pressure on the enemy. They are usually employed when the turnaround time at the unit trains is too long or when time on station must be optimized. FARPs also are employed in support of

Contents		
Definition	1-1	
Purpose	1-1	
Organization	1-1	
Planning factors	1-3	
Personnel	1-4	
Tactical enablers	1-5	
Threat	1-5	

deep attacks or special operations when the distance covered exceeds the normal range of the aircraft. Additionally, FARPs are employed during rapid advances when field trains are unable to keep pace. The most efficient use of a FARP is simultaneous arming and refueling.

ORGANIZATION

1-3. Under the combat aviation brigade (CAB), aviation battalions have forward support companies (FSCs)/distribution (DISTRO) companies and maintenance personnel. The attack reconnaissance battalion (ARB) is assigned Class III/V (89B-ammunition specialists) assets under the FSC structure and armament personnel are assigned under the component repair platoon. The assault helicopter battalion (AHB) and the general support aviation battalion (GSAB) are assigned Class III and Class V (89B-ammunition specialists) assets under the FSC, armament personnel are not required. The aviation support battalion (ASB) is assigned Class III assets under the DISTRO and armament personnel are assigned under the component repair platoon. These structures allow commanders and platoon leaders the ability to task organize FARP operations. Task organizing Class III/V assets at the unit level may present some challenges, if proper coordination is not taken and necessary resources are not available.

FORWARD SUPPORT COMPANY

1-4. The ARB, AHB, and GSAB FSC have a headquarters platoon, field feeding, DISTRO platoon, and ground maintenance platoon. The DISTRO section provides aircraft refuel capability, ammunition

specialists (89B), water, and transportation. Also, with proper coordination the ARB, AHB, and GSAB can be augmented by the ASB. (See figure 1-1 for general structure of a FSC.)

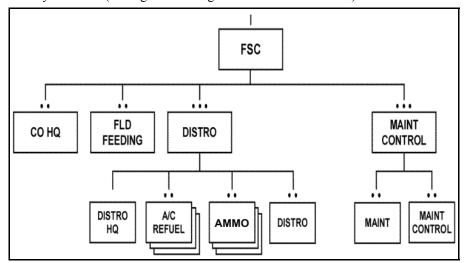


Figure 1-1. Sample structure of a forward support company

AVIATION SUPPORT BATTALION ORGANIZATION

1-5. The ASB (figure 1-2) consists of four companies—the headquarters and support company (HSC), the DISTRO company, the network signal company and the aviation support company (ASC). The ASB provides aviation and ground field maintenance, network communications, resupply, and medical support. The HSC provides medical support and conducts field-ground maintenance and recovery. The DISTRO company functions as a supply support activity and distributes supplies to subordinate units of the CAB. The network signal company provides network and signal support to the CAB headquarters. The ASC provides intermediate maintenance and support for on-aircraft and critical off-aircraft field level maintenance and the maintenance of unmanned aerial systems. The ASC also conducts battle damage assessment (BDA) and repair and provides backup support to the aviation maintenance company (AMC).

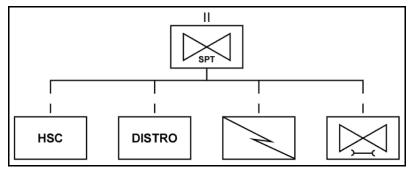


Figure 1-2. Aviation support battalion

- 1-6. The DISTRO company provides logistics support for the aviation brigade. The DISTRO company receives, temporarily stores, and issues bulk Class III. It also establishes and operates Class III (aviation fuel) transload sites in the brigade support area (BSA) to resupply brigade operations. Using the brigade/battalion rear FARP, the DISTRO company provides fuel to all brigade aircraft. Figure 1-3, page 1-3, shows the unit organization of the ASB in support of the aviation brigade.
- 1-7. The ASC provides armament personnel to FSCs upon request. The additional armament personnel will assist the FSCs with arming and dearming operations to fulfill mission requirements and provides the FSC advanced field maintenance support.

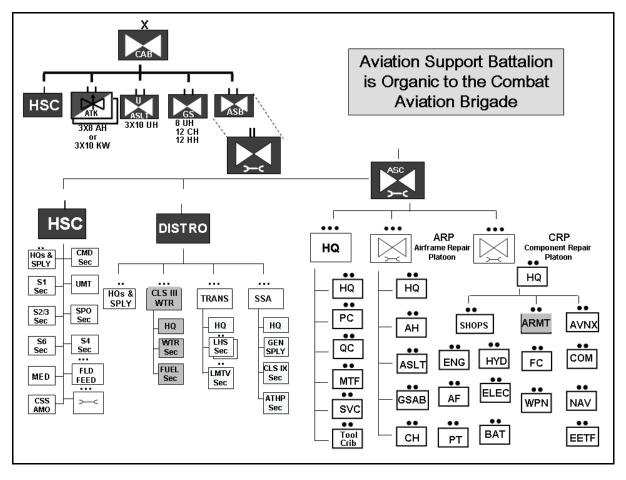


Figure 1-3. Aviation support battalion (support of combat aviation brigade)

PLANNING FACTORS

- 1-8. The following basic principles should be satisfied when planning a FARP to support aviation units:
 - The FARP should meet unit mission requirements.
 - The FARP should provide support throughout the battlefield under all conditions.
 - The FARP should avoid threat observation and engagement.

PLANNING CONSIDERATIONS

- 1-9. The intensity of the battle will affect FARP activities. The commander should be aware of the following planning considerations:
 - Command, control, and communication (C3).
 - Terrain analysis (maps, overlays, databases, software).
 - Weather analysis.
 - Analysis of other characteristics of the battlefield.
 - Wet or dry cross-country mobility
 - Transportation systems (road and bridge information).
 - Vegetation type and distribution.
 - Surface drainage and configuration.
 - Surface materials (soils).
 - Ground water.