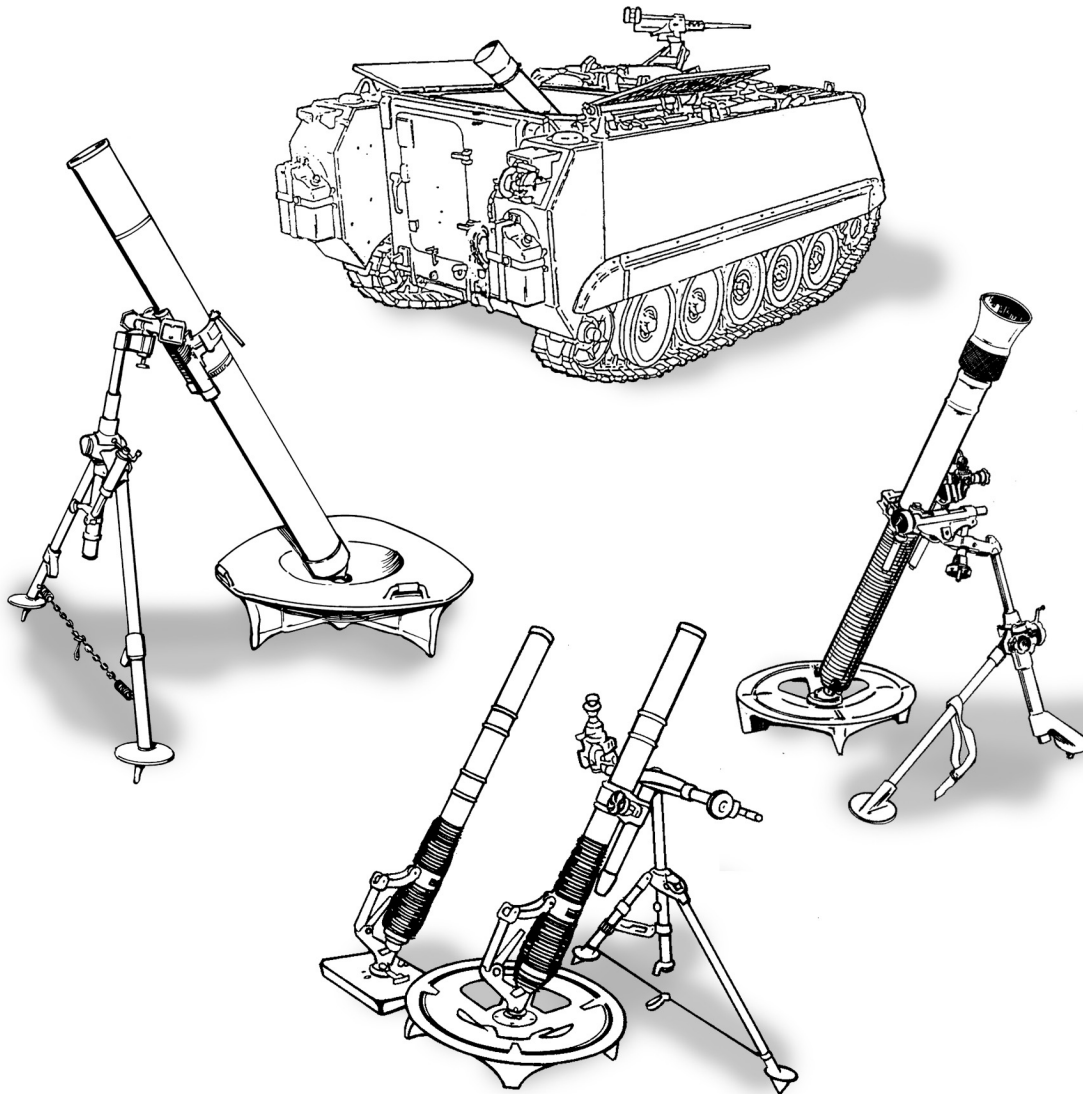


MORTARS



DECEMBER 2007

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

**HEADQUARTERS
DEPARTMENT OF THE ARMY**

This page intentionally left blank.

Mortars

Contents

	Page
	PREFACE..... xiii
Chapter 1	INTRODUCTION..... 1-1
	Section I. General Doctrine 1-1
	Effective Mortar Fire..... 1-1
	Mortar Positions 1-1
	Section II. Indirect Fire Team 1-2
	Applications..... 1-2
	Team Mission..... 1-2
	United States Mortars 1-3
	Section III. Safety Procedures 1-5
	Duties Of The Safety Officer and Supervisory Personnel 1-5
	Safety Diagram and Safety “T” 1-8
	Surface Danger Zones..... 1-12
	Section IV. Ammunition..... 1-13
	Ammunition Care and Handling 1-13
	Ammunition Color Codes 1-15
	Field Storage of Ammunition..... 1-15
Chapter 2	SIGHTING AND FIRE CONTROL EQUIPMENT 2-1
	Section I. Compass, M2..... 2-1
	Characteristics 2-1
	Description 2-2
	Use..... 2-2
	Section II. Aiming Circles, M2 and M2A2..... 2-5
	Characteristics 2-5
	Description 2-5
	Use..... 2-6
	Accessory Equipment 2-9

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

***This publication supersedes FM 3-22.90, 31 December 2004.**

Table of Contents

Setup and Leveling of the Aiming Circle	2-10
Declination Constant	2-11
Orienting of the Instrument on Grid North to Measure Grid Azimuth to Objects	2-14
Measuring of the Horizontal Angle Between Two Points	2-14
Orienting of the 0-3200 Line on a Given Grid Azimuth	2-15
Orienting of the 0-3200 Line on a Given Magnetic Azimuth	2-15
Verification of the Lay of the Platoon	2-16
Orienting by Orienting Angle	2-17
Disassembly of the Aiming Circle	2-17
Care and Maintenance	2-18
Section III. Sightunits	2-18
Sightunit, M67	2-18
Sightunit, M64-Series	2-19
Operation of Sightunits	2-21
Care and Maintenance of Sightunits	2-23
Radioactive Tritium Gas	2-23
Section IV. Boresights	2-24
Boresight, M45-Series	2-24
Boresight, M115	2-25
Sight Calibration	2-26
Boresight Method Of Calibration	2-26
Calibration for Deflection Using the M2 Aiming Circle	2-28
Section V. Other Equipment	2-30
Aiming Posts, M14 and M1A2	2-30
Aiming Post Lights, M58 and M59	2-31
Section VI. Laying of the Section	2-32
Reciprocal Laying	2-33
Placing Out Aiming Posts	2-39
Section VII. Loading and Firing	2-42
Firing of the Ground-Mounted Mortar	2-42
Target Engagement	2-42
Execution of Fire Commands	2-43
Arm-and-Hand Signals	2-45
Subsequent Fire Commands	2-46
Repeating and Correcting of Fire Commands	2-46
Reporting of Errors in Firing	2-47
Night Firing	2-47
Chapter 3	
60-mm MORTAR, M224	3-1
Section I. Squad and Section Organization and Duties	3-1
Organization	3-1
Duties	3-1

	Section II. Components	3-2
	Tabulated Data.....	3-2
	Cannon Assembly, M225.....	3-3
	Bipod Assembly, M170	3-3
	Baseplate, M7	3-5
	Baseplate, M8	3-5
	Section III. Operation	3-6
	Premount Checks	3-6
	Mounting of the Mortar	3-6
	Safety Checks Before Firing	3-7
	Small Deflection and Elevation Changes.....	3-8
	Large Deflection and Elevation Changes	3-8
	Referring of the Sight and Realignment of Aiming Posts	3-9
	Malfunctions	3-10
	Removal of a Misfire	3-11
	Dismounting and Carrying of the Mortar	3-15
	Section IV. Ammunition.....	3-16
	Classification and Types of Ammunition.....	3-16
	Fuzes	3-19
	Cartridge Preparation.....	3-21
	Care And Handling.....	3-22
Chapter 4	81-mm MORTAR, M252.....	4-1
	Section I. Squad and Section Organization and Duties	4-1
	Organization.....	4-1
	Duties	4-1
	Section II. Components	4-3
	Tabulated Data.....	4-4
	Cannon Assembly, M253.....	4-5
	Mount, M177	4-5
	Baseplate, M3A1	4-6
	Section III. Operation	4-7
	Premount Checks	4-7
	Mounting of the Mortar	4-8
	Safety Checks Before Firing	4-10
	Small Deflection and Elevation Changes.....	4-10
	Large Deflection and Elevation Changes	4-11
	Referring of the Sight and Realignment of Aiming Posts Using the M64 Sight.....	4-12
	Malfunctions	4-12
	Removal of a Misfire	4-12
	Dismounting of the Mortar.....	4-16

	Section IV. Ammunition.....	4-16
	Classification and Types of Ammunition	4-16
	Fuzes	4-21
	Cartridge Preparation.....	4-24
	Care and Handling	4-25
Chapter 5	120-mm MORTARS, M120 AND M121	5-1
	Section I. Squad Organization and Duties	5-1
	Organization.....	5-1
	Duties	5-1
	Section II. Components	5-3
	Tabulated Data For the 120-mm Mortar	5-4
	Cannon Assembly, M298.....	5-4
	Bipod Assembly, M191 (Carrier-/Ground-Mounted)	5-6
	Bipod Assembly, M190 (Ground-Mounted)	5-7
	Baseplate, M9	5-8
	Section III. Operations	5-8
	Premount Checks.....	5-8
	Placing a Ground-Mounted 120-mm Mortar Into Action	5-10
	Performing Safety Checks on a Ground-Mounted 120-mm Mortar	5-11
	Performing Small Deflection and Elevation Changes on a Ground-Mounted 120-mm Mortar	5-12
	Performing Large Deflection and Elevation Changes on a Ground-Mounted 120-mm Mortar	5-13
	Malfunctions on a Ground-Mounted 120-mm Mortar During Peacetime	5-14
	Referring of the Sight and Realignment of Aiming Posts During Peacetime	5-14
	Removal of a Misfire on a Ground-Mounted 120-mm Mortar	5-14
	Loading and Firing of the Ground-Mounted 120-mm Mortar	5-21
	Taking the 120-mm Mortar Out of Action.....	5-22
	Section IV. Mortar Carrier, M1064A3	5-23
	Description	5-23
	Tabulated Data for the M1064A3 Carrier.....	5-25
	Mortar and Vehicular Mount.....	5-25
	Maintenance.....	5-26
	Section V. Operation of a Carrier-Mounted 120-mm Mortar	5-26
	Premount Checks.....	5-26
	Placing a Carrier-Mounted 120-mm Mortar Into Action	5-26
	Mounting of the Mortar From a Carrier- to a Ground-Mounted Position	5-27
	Performing Safety Checks on a Carrier-Mounted 120-mm Mortar	5-28
	Performing Small Deflection and Elevation Changes on a Carrier-Mounted 120-mm Mortar	5-29
	Performing Large Deflection and Elevation Changes on a Carrier-Mounted 120-mm Mortar	5-29

	Removal of a Misfire on a Carrier-Mounted 120-mm Mortar	5-30
	Taking the Mortar Out of Action (Ground-Mounted to M1064A3 Carrier-Mounted)	5-37
	Reciprocally Laying the Mortar Carrier Section	5-38
	Section VI. Ammunition.....	5-38
	Classification and Types of Ammunition	5-38
	Fuzes	5-40
	Cartridge Preparation.....	5-43
	Care And Handling of Cartridges	5-44
Chapter 6	MORTAR FIRE CONTROL SYSTEM	6-1
	Description	6-1
	Capabilities.....	6-8
	Soldier Graphic User Interface.....	6-9
	Startup.....	6-12
	Log-In Procedures	6-12
	Data Initialization and System Configuration	6-12
	Additional Functions.....	6-21
Chapter 7	CONDUCT FIRE MISSIONS USING THE MORTAR FIRE CONTROL SYSTEM	7-1
	Pointing Device	7-1
	Navigation and Emplacement.....	7-5
	Fire Commands.....	7-10
	Final Protective Fires	7-14
Chapter 8	FIRE WITHOUT A FIRE DIRECTION CENTER	8-1
	Section I. Fire Procedures.....	8-1
	Advantages and Disadvantages	8-1
	Firing Data.....	8-1
	Observer Corrections.....	8-2
	Initial Fire Commands	8-3
	Fire Commands.....	8-3
	Fire Control	8-5
	Movement to Alternate and Supplementary Positions.....	8-5
	Squad Conduct of Fire	8-5
	Reference Line.....	8-6
	Squad Use of Smoke and Illumination.....	8-6
	Attack of Wide Targets.....	8-6
	Attack of Deep Targets	8-8
	Section II. Direct-Lay Method.....	8-9
	Step 1: Initial Firing Data.....	8-9
	Step 2: Referring the Sight.....	8-9

Table of Contents

	Step 3: Bracketing the Target	8-10
	Step 4: Fire For Effect	8-10
	Section III. Direct-Alignment Method	8-10
	Mortar Dismounted.....	8-10
	Mortar Mounted	8-10
	Natural Object Method	8-11
	Section IV. Adjustment of Range	8-11
	Spottings	8-11
	Bracketing Method	8-12
	Creeping Method of Adjustment	8-13
	Ladder Method of Adjustment.....	8-13
	Establishment of a Reference Line and Shifting From That Line	8-15
Chapter 9	GUNNER'S EXAMINATION	9-1
	Section I. Preparation	9-1
	Methods of Instruction.....	9-1
	Prior Training.....	9-1
	Preparatory Exercises.....	9-1
	Examining Board.....	9-1
	Location and Date.....	9-2
	Eligible Personnel	9-2
	Qualification Scores	9-2
	General Rules	9-3
	Section II. Gunner's Examination with the Ground-Mounted Mortar	9-4
	Subjects and Credits	9-4
	Equipment.....	9-4
	Organization.....	9-4
	Procedure.....	9-4
	Mounting of the Mortar	9-4
	Small Deflection Change	9-9
	Referring of the Sight and Realignment of Aiming Posts.....	9-10
	Large Deflection and Elevation Changes	9-11
	Reciprocal Laying.....	9-13
	Section III. Gunner's Examination with the Track-Mounted Mortar, M121	9-14
	Subjects and Credits.....	9-14
	Equipment.....	9-14
	Organization.....	9-15
	Procedure.....	9-15
	Placement of Mortar into a Firing Position from Traveling Position, 120-mm Mortar	9-15
	Small Deflection Change	9-16
	Referring of the Sight and Realignment of Aiming Posts.....	9-17
	Large Deflection and Elevation Changes	9-19

	Reciprocal Laying	9-20
	Support Squad	9-21
Appendix A	MORTAR TRAINING STRATEGY	A-1
	Training Philosophy	A-1
	Unit Mortar Training	A-1
	Mortar Training at Training Base	A-1
	Training in Units	A-3
	Training Evaluation	A-9
Appendix B	TRAINING DEVICES	B-1
	Section I. Full-Range Training Cartridge, M931	B-1
	Description	B-1
	Procedures	B-1
	Section II. Short-Range Training Round, M880.....	B-2
	Training with the Short-Range Training Round, M880	B-2
	Components	B-3
	Training Considerations	B-9
	Construction of a Scaled Map	B-9
	Safety	B-13
	Malfunctions and Removal of a Misfire	B-13
	Section III. Subcaliber Insert, M303.....	B-14
	Characteristics	B-14
	Maintenance.....	B-15
	Misfire Procedures	B-16
	Section IV. Subcaliber Trainer, M313	B-16
	Characteristics	B-16
	Maintenance.....	B-17
	Misfire Procedures	B-19
	Glossary	Glossary-1
	References.....	References-1
	Index.....	Index-1

Figures

Figure 1-1. Indirect fire team.....	1-2
Figure 1-2. Example completed safety record or card.....	1-9
Figure 1-3. Safety diagram for M821 HE and M853A1 ILLUM.....	1-11
Figure 1-4. Safety “T” for M821 HE.....	1-11
Figure 1-5. Safety “T” for M853A1 ILLUM.	1-11
Figure 1-6. Stacked ammunition.....	1-16
Figure 2-1. Compass, M2 (top view).....	2-1

Table of Contents

Figure 2-2. Compass, M2 (side view).....	2-3
Figure 2-3. Compass, M2 (user's view).....	2-4
Figure 2-4. Aiming circles, M2 and M2A2, and accessory equipment.....	2-6
Figure 2-5. Aiming circle, M2.....	2-7
Figure 2-6. Leveling screws.....	2-10
Figure 2-7. Marginal data from a map.....	2-13
Figure 2-8. Aiming circle oriented in desired direction of fire.....	2-15
Figure 2-9. Method used to orient an aiming circle, M2.....	2-16
Figure 2-10. Orienting by orienting angle.....	2-17
Figure 2-11. Sightunit, M67.....	2-18
Figure 2-12. Sightunit, M64-series.....	2-20
Figure 2-13. Warning label for tritium gas (H ³).....	2-23
Figure 2-14. Boresight, M45.....	2-25
Figure 2-15. Boresight, M115.....	2-26
Figure 2-16. Verifying proper alignment of the boresight device.....	2-28
Figure 2-17. Calibration for deflection using the angle method.....	2-29
Figure 2-18. Calibration for deflection using the distant aiming point method.....	2-30
Figure 2-19. Aiming posts, M14 and M1A2.....	2-30
Figure 2-20. Aiming post lights, M58 and M59.....	2-31
Figure 2-21. Parallel sheaf.....	2-32
Figure 2-22. Principle of reciprocal laying.....	2-33
Figure 2-23. Mortar laid parallel with the aiming circle.....	2-35
Figure 2-24. Mortars laid parallel in the desired azimuth.....	2-36
Figure 2-25. Mortar laid parallel with sights.....	2-37
Figure 2-26. Sighting on the mortar sight.....	2-38
Figure 2-27. Arm-and-hand signals used in placing out aiming posts.....	2-40
Figure 2-27. Arm-and-hand signals used in placing out aiming posts (continued).....	2-41
Figure 2-28. Arm-and-hand-signals for ready, fire, and cease firing.....	2-46
Figure 3-1. 60-mm mortar, M224, handheld and conventional mode.....	3-2
Figure 3-2. Cannon assembly, M225.....	3-3
Figure 3-3. Bipod assembly, M170.....	3-4
Figure 3-4. Baseplate, M7.....	3-5
Figure 3-5. Baseplate, M8.....	3-5
Figure 3-6. Large deflection and elevation changes.....	3-9
Figure 3-7. Compensated sight picture.....	3-10
Figure 3-8. Kicking the mortar to clear a misfire.....	3-12
Figure 3-9. Multioption fuze, M734.....	3-19
Figure 4-1. Position of squad members.....	4-2
Figure 4-2. 81-mm mortar, M252.....	4-3
Figure 4-3. Cannon assembly, M253.....	4-5
Figure 4-4. Mount, M177, in folded position.....	4-5
Figure 4-5. Baseplate, M3A1.....	4-6

Figure 4-6. Layout of equipment. 4-8

Figure 4-7. Baseplate placed against baseplate stake. 4-9

Figure 4-8. Kicking the mortar to dislodge the round. 4-13

Figure 4-9. Removing the firing pin. 4-14

Figure 4-10. Raising the cannon to a horizontal position. 4-15

Figure 4-11. Removing the round from the cannon. 4-15

Figure 4-12. Correct way to open an ammunition box. 4-26

Figure 4-13. Floating firing pin. 4-26

Figure 5-1. Position of squad members. 5-2

Figure 5-2. 120-mm mortar. 5-3

Figure 5-3. Cannon, M298, with old and new styles of breech cap. 5-5

Figure 5-4. Bipod assembly, M191 (carrier-/ground-mounted). 5-6

Figure 5-5. Bipod assembly, M190 (ground-mounted). 5-7

Figure 5-6. Baseplate, M9. 5-8

Figure 5-7. Rotating the artillery cleaning staff. 5-16

Figure 5-8. Holes in the cartridge body. 5-17

Figure 5-9. Withdrawing the cartridge from the barrel, M120. 5-17

Figure 5-10. Pressing the extractor catches. 5-18

Figure 5-11. Removing the breech cap assembly from the barrel. 5-20

Figure 5-12. Mortar carrier, M1064A3, front and side view. 5-23

Figure 5-13. Mortar carrier, M1064A3, rear view. 5-24

Figure 5-14. Withdrawing the cartridge from the barrel, M121. 5-33

Figure 5-15. Mechanical time superquick fuze, M776. 5-41

Figure 5-16. Point-detonating fuze, M935. 5-41

Figure 5-17. Multioption fuze, M734. 5-42

Figure 5-18. Point-detonating fuze, M745. 5-43

Figure 6-1. Mortar Fire Control System. 6-2

Figure 6-2. Commander's interface. 6-3

Figure 6-3. Power distribution assembly. 6-5

Figure 6-4. Pointing device. 6-6

Figure 6-5. Gunner's display. 6-7

Figure 6-6. Driver's display. 6-7

Figure 6-7. Vehicle motion sensor. 6-8

Figure 6-8. Graphic user interface. 6-11

Figure 6-9. Log-in screen. 6-12

Figure 6-10. "Unit List" screen. 6-14

Figure 6-11. "Configuration" screen. 6-15

Figure 6-12. "Data" screen. 6-16

Figure 6-13. "Geographic Reference" screen. 6-17

Figure 6-14. "Position" screen. 6-18

Figure 6-15. "Mounting Azimuth and Reference" screen. 6-19

Figure 6-16. "Channel A" screen. 6-20

Table of Contents

Figure 6-17. “Ammo Fire Unit” screen.	6-22
Figure 6-18. “Ammo Roll-up” screen.....	6-23
Figure 6-19. “Status Fire Unit” screen.....	6-24
Figure 6-20. “Check Fire” screen.	6-25
Figure 6-21. “Read” screen.	6-26
Figure 6-22. “Send” screen.	6-27
Figure 6-23. “Alerts” screen.	6-28
Figure 6-24. “Plot” screen.	6-29
Figure 6-25. “Plot” screen legend.	6-30
Figure 7-1. Pointing device “Status” screen.....	7-2
Figure 7-2. “Boresight” screen.	7-4
Figure 7-3. “Navigation/Emplacement” screen.	7-5
Figure 7-4. “Navigation/Emplacement” screen: Send status.	7-6
Figure 7-5. Driver’s display showing steering directions, distance, and position.....	7-6
Figure 7-6. “Navigation/Emplacement” screen: destination azimuth, destination range, and heading.....	7-7
Figure 7-7. Driver’s display showing arrival at the waypoint.....	7-7
Figure 7-8. “Navigation/Emplacement” screen: message transmitted and received by the FDC.....	7-8
Figure 7-9. “Navigation/Emplacement” screen: fire area.....	7-9
Figure 7-10. Driver’s display activated.....	7-10
Figure 7-11. “Fire Command” screen.....	7-11
Figure 7-12. Subsequent “Fire Command” screen.	7-12
Figure 7-13. “End of Mission” screen.....	7-13
Figure 7-14. “Not in Mission” screen.....	7-13
Figure 7-15. Fire command for an assigned FPF.	7-14
Figure 7-16. End of mission.	7-15
Figure 7-17. Fire the stored FPF.....	7-16
Figure 8-1. Observer more than 100 meters from mortar but within 100 meters of GT line.	8-3
Figure 8-2. Traversing fire.....	8-7
Figure 8-3. Searching fire.....	8-9
Figure 8-4. Bracketing method.....	8-13
Figure 8-5. Ladder method of fire adjustment.....	8-14
Figure 8-6. Adjusting fire onto a new target with the observer within 100 meters of the GT line.	8-16
Figure 9-1. Example of completed DA Form 5964-R.....	9-2
Figure 9-2. Diagram of equipment layout and position of personnel for the gunner’s examination (60-mm mortar).	9-5
Figure 9-3. Diagram of equipment layout and position of personnel for the gunner’s examination (81-mm mortar, M252).	9-6
Figure 9-4. Diagram of equipment layout and position of personnel for the gunner’s examination (120-mm mortar).	9-7

Figure A-1. Integrated training strategy.A-4
 Figure A-2. Example training program for IBCT battalion.....A-7
 Figure A-3. Example training program for HBCT battalion.A-8
 Figure B-1. Scaled range for short-range training round, M880.B-3
 Figure B-2. Short-range training round, M880—practice round.B-4
 Figure B-3. Converting 1:50,000 grid to 1:5,000 grid..... B-10
 Figure B-4. Plotting targets on the 1:5,000-scale map. B-11
 Figure B-5. Determining direction from mortar position to the registration point. B-12
 Figure B-6. Example completed DA Form 2188-R. B-12
 Figure B-7. Example completed DA Form 2399 showing SHELL AND FUZE
 entries in the FDC ORDER and INITIAL FIRE COMMAND columns. B-13
 Figure B-8. Subcaliber insert, M303. B-14
 Figure B-9. Subcaliber trainer, M313. B-16

Tables

Table 1-1. Selected characteristics of U.S. mortars and ammunition..... 1-4
 Table 1-2. Mortar ammunition color codes. 1-15
 Table 2-1. Selected characteristics of the aiming circles, M2 and M2A2. 2-5
 Table 2-2. Set-up distance from objects. 2-11
 Table 2-3. Sightunit, M67, equipment data. 2-19
 Table 2-4. Sightunit, M64-series, tabulated data. 2-21
 Table 2-5. Boresight, M45-series, tabulated data. 2-24
 Table 2-6. M115 boresight tabulated data. 2-26
 Table 2-7. Sequence for transmission of fire commands. 2-43
 Table 3-1. Tabulated data for the 60-mm mortar, M224..... 3-2
 Table 3-2. High-explosive ammunition for the 60-mm mortar, M224. 3-17
 Table 3-3. Illumination ammunition for the 60-mm mortar, M224. 3-17
 Table 3-4. Smoke, white phosphorus ammunition for the 60-mm mortar, M224. 3-18
 Table 3-5. Training practice ammunition for the 60-mm mortar, M224. 3-18
 Table 4-1. Tabulated data for the 81-mm mortar, M252..... 4-4
 Table 4-2. High-explosive ammunition for the 81-mm mortar, M252. 4-18
 Table 4-3. Illumination ammunition for the 81-mm mortar, M252. 4-19
 Table 4-4. Smoke, white phosphorus ammunition for the 81-mm mortar, M252. 4-20
 Table 4-5. Training practice ammunition for the 81-mm mortar, M252. 4-20
 Table 5-1. Tabulated data for the 120-mm mortar..... 5-4
 Table 5-2. Tabulated data for the mortar carrier, M1064A3. 5-25
 Table 5-3. High-explosive ammunition for 120-mm mortars, M120 and M121. 5-39
 Table 5-4. Illumination ammunition for 120-mm mortars, M120 and M121..... 5-39
 Table 5-5. Smoke, white phosphorus ammunition for 120-mm mortars, M120 and
 M121..... 5-40

Table of Contents

Table 5-6. Training practice ammunition for 120-mm mortars, M120 and M121.....	5-40
Table 6-1. Function keys.....	6-3
Table 8-1. Initial range change.	8-12
Table 9-1. Organization for conducting gunner's examination (ground-mounted).	9-4
Table 9-2. Organization for conducting gunner's examination (carrier-mounted).	9-15
Table A-1. Institution courses.	A-3
Table B-1. Supply data for short-range training round, M880.....	B-9

Preface

This publication prescribes guidance for leaders and crewmen of mortar squads. It concerns mortar crew training, and it is used with the applicable technical manuals (TMs) and Army Training and Evaluation Programs (ARTEPs). It presents practical solutions to assist in the timely delivery of accurate mortar fires, but does not discuss all possible situations. Local requirements may dictate minor variations from the methods and techniques described herein. However, principles should not be violated by modification of techniques and methods.

The scope of this publication includes mortar crew training at the squad level. The 60-mm mortar, M224; 81-mm mortar, M252; and 120-mm mortars, M120/M121 are discussed, to include nomenclature, sighting, equipment, characteristics, capabilities, and ammunition. (For information on the tactics, techniques, and procedures that mortar sections and platoons use to execute the combat mission, refer to FM 7.90.)

This manual was revised to delete references to obsolete material and systems. In addition to various editorial corrections, this revision—

- Removes all references to M2 and M19 mortar systems, as they are now obsolete.
- Removes all references to M29 and M29A1 mortar systems, as they are now obsolete (except for M29A1 use with the M303 subcaliber insert).
- Removes all references to the sabot, as this round is now obsolete.
- Replaces all references to the five-man mortar squad with the term “four-man mortar squad” to reflect the new structure.
- Removes all references to the first and second ammunition bearers to reflect the new four-man mortar squad. All references now read “ammunition bearer.”
- Replaces references to common terms with their accepted modifications. These modifications include—
 - Replacing the term “nuclear, biological, chemical (NBC)” with “chemical, biological, radiological, nuclear (CBRN).”
 - Replacing the term “battle dress uniforms (BDUs)” with “Army combat uniforms (ACUs).”
 - Replacing the term “light infantry” with “infantry brigade combat team (IBCT).”
 - Replacing the terms “mechanized infantry” and “armored infantry” with “heavy brigade combat team (HBCT).”

The provisions of this publication are the subject of STANAG 2321, NATO Code of Colors for the Identification of Ammunition (Except Ammunition of a Caliber Below 22 Millimeters).

This publication prescribes DA Form 5964-R (Gunner’s Examination Scorecard–Mortars).

Uniforms depicted in this manual were drawn without camouflage for clarity of the illustration. Unless this publication states otherwise, masculine nouns and pronouns refer to both men and women.

Terms that have joint or Army definitions are identified in both the glossary and the text. Terms for which FM 3-22.90 is the proponent FM are indicated with an asterisk in the glossary. 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 for this publication is the U.S. Army Training and Doctrine Command. The preparing agency is the U.S. Army Infantry School. Send comments and recommendations to benn.229-S3-doc-lit@conus.army.mil or, using DA Form 2028 (Recommended Changes to Publications and Blank Forms) or its format, write directly to:

Commandant, U.S. Army Infantry School
ATTN: ATSH-INB
6650 Wilkin Drive, Building 74, Room 102
Fort Benning, Georgia 31905-5593
Telephone: 706-545-8623 or DSN 835-8623
Fax: 706-545-8600 or DSN 835-8600

This page intentionally left blank.

Chapter 1

Introduction

Mortars are suppressive indirect fire weapons. They can be employed to neutralize or destroy area or point targets, screen large areas with smoke, and provide illumination or coordinated high-explosive/illumination. The mortar platoon's mission is to provide close and immediate indirect fire support for maneuver battalions and companies.

SECTION I. GENERAL DOCTRINE

Doctrine demands the timely and accurate delivery of indirect, high-angle fire to meet the needs of supported units. All members of the indirect fire team must be trained to quickly execute an effective fire mission.

EFFECTIVE MORTAR FIRE

1-1. For mortar fire to be effective, it must be dense and must hit the target at the *right* time with the *right* projectile and fuze. Good observation is necessary for effective mortar fire. Limited observation results in a greater expenditure of ammunition and less effective fire. Some type of observation is desirable for every target to ensure that fire is placed on the target. Observation of close battle areas is usually visual. When targets are hidden by terrain features or when great distance or limited visibility is involved, observation can be achieved by radar or sound. When observation is possible, corrections can be made to place mortar fire on the target by adjustment procedures; however, lack of observation must not preclude firing on targets that can be located by other means.

1-2. Mortar fire must be delivered by the most accurate means that time and the tactical situation permit. When possible, survey data or systems, such as the Mortar Fire Control System (MFCS), are used to accurately locate the mortar position and target. Under some conditions, only a rapid estimate of the location of weapons and targets may be possible. To achieve the most effective massed fires, the MFCS should be used or a survey using accurate maps should be made of each mortar position, registration point, and target.

1-3. The immediate objective is to deliver a large volume of accurate and timely fire to inflict as many enemy casualties as possible. The number of casualties inflicted in a target area can usually be increased by surprise fire. If surprise massed fires cannot be achieved, the time required to bring effective fires on the target should be kept to a minimum. The greatest demoralizing effect on the enemy can be achieved by delivering the maximum number of effective rounds from all the mortars in the shortest possible time.

1-4. Mortar units must be prepared to accomplish multiple fire missions. They can provide an immediate, heavy volume of accurate fire for sustained periods.

1-5. In heavy brigade combat team (HBCT) companies, mortars are normally fired from mortar carriers; however, they maintain their capability to be ground-mounted. Firing from carriers permits rapid displacement and quick reaction. Infantry brigade combat team (IBCT) companies must fire their mortars from the ground.

MORTAR POSITIONS

1-6. Mortars should be employed in defilade to protect them from enemy direct fire and observation, and to take the greatest advantage of their indirect fire role. Although the use of defilade precludes sighting the weapons directly at the target (direct lay), it is necessary for survivability. Because mortars