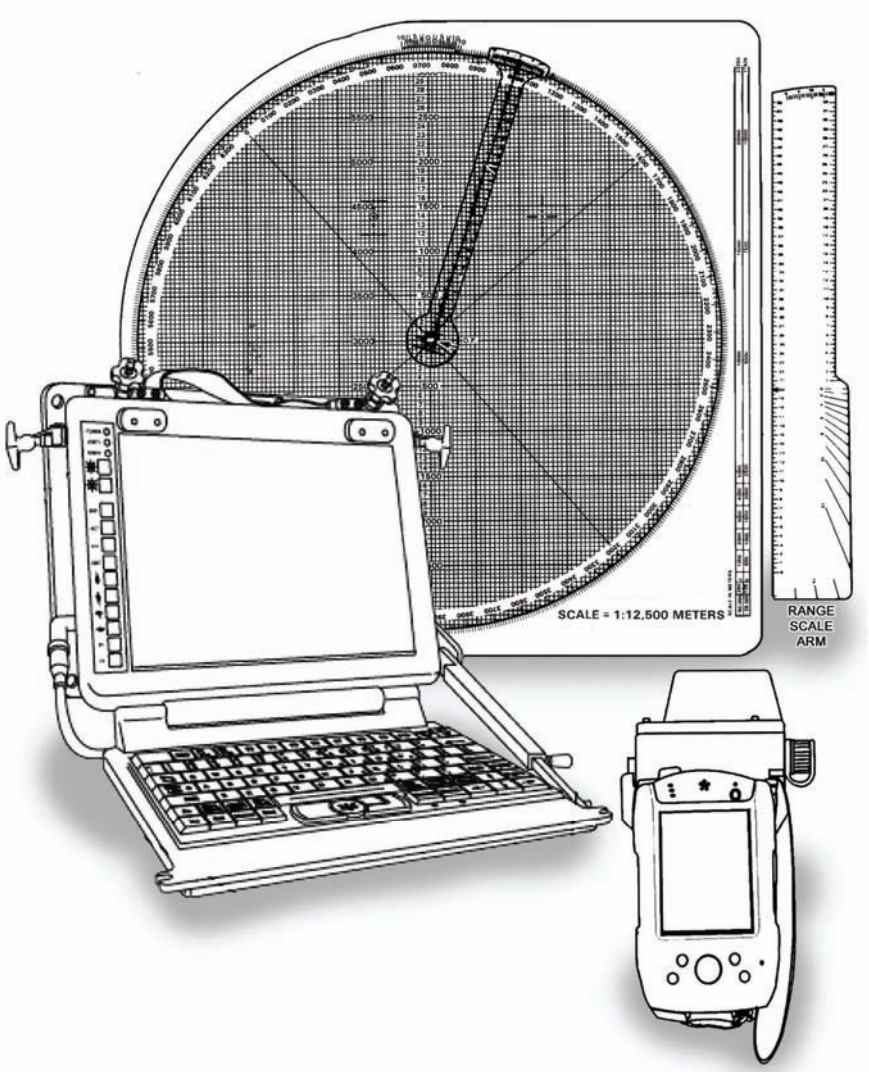
# FM 3-22.91

# MORTAR FIRE DIRECTION PROCEDURES




## July 2008

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Field Manual
No. 3-22.91

Headquarters
Department of the Army
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# Mortar Fire Direction Procedures

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***This publication supersedes FM 3-22.91, 18 January 2005.**

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# Preface

This manual provides guidance for military occupational specialty (MOS) 11C Soldiers and their trainers on the employment of the 60-mm mortars (M224), 81-mm mortar (M252), and 120-mm mortar (M120). It discusses the practical applications of ballistics and a system combining the principles, techniques, and procedures essential to the delivery of timely and accurate mortar fire. (See FM 3-22.90 for information about mechanical training, crew drills, and the characteristics, components, and technical data of each mortar.)

This manual is divided into six parts. Part 1 discusses the fundamentals of mortar fire direction; Part 2 summarizes the operational procedures of a fire direction center (FDC); Part 3 describes the capabilities and use of the mortar ballistic computer (MBC); Part 4 describes the capabilities and use of the M16/M19 plotting boards; Part 5 discusses the Mortar Fire Control System (MFCS); and Part 6 discusses the lightweight handheld mortar ballistic computer (LHMBC).

This manual was revised to delete references to obsolete material and systems and add references to new 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.
- Adds references to the LHMBC.
- Replaces references to common terms with their accepted modifications.

This publication prescribes DA Form 2188-R (Data Sheet), DA Form 2188-1-R (LHMBC/MFCS Data Sheet), DA Form 2399-R (Computer's Record), DA Form 5472-R (Computer's Record [MPI]), DA Form 2601-2-R (MET Data Correction Sheet 6400 Mils [Mortars]), and DA Form 2601-1-R (MET Data Correction Sheet for Mortars).

This publication applies to the Active Army, the Army National Guard (ARNG)/Army National Guard of the United States (ARNGUS), and the US Army Reserve (USAR) unless otherwise stated.

Terms that have joint or Army definitions are identified in both the glossary and the text. Terms for which FM 3-22.91 is the proponent FM are indicated with an asterisk in the glossary.

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.

The proponent for this publication is the US Army Training and Doctrine Command. The preparing agency is the US Army Infantry School. You may send comments and recommendations by any means (US mail, e-mail, fax, or telephone) as long as you use DA Form 2028 (Recommended Changes to Publications and Blank Forms) or follow its format. Point of contact information is as follows:

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PART ONE

# Introduction and Fundamentals of Mortar Fire Direction

## Chapter 1

## Introduction

The mission of the mortar platoon is to provide close and immediate indirect fire support for maneuver battalions and companies.

## ORGANIZATION

1-1. Mortars are organized as part of a company, battalion, and cavalry squadron. They are organized either as sections or platoons in infantry brigade combat team (IBCT) companies and as platoons in tank and heavy brigade combat team (HBCT) battalions. Regardless of the organization to which they belong, mortars have the battlefield role of providing the maneuver commander with immediate indirect fires. Mortars fulfill this mission when all of the elements responsible for placing effective mortar fire on the enemy are properly trained.

## GENERAL DOCTRINE

1-2. Doctrine demands the timely and accurate delivery of indirect fire to meet the needs of supported units. All members of the indirect fire team must strive to reduce, by all possible measures, the time required to execute an effective fire mission; they must be thoroughly indoctrinated with a sense of urgency. A key principle of effective training is the use of appropriate doctrine. (See Appendix A for more information.)

1-3. Good observation is required for effective mortar fire. Limited observation results in a great expenditure of ammunition and less effective fire. Every target needs some type of observation to ensure that fire is placed on the target. Observation of close battle areas is usually visual. Radar or sound observation is best used when terrain features hide targets or when great distance or limited visibility is involved. When observation is possible, corrections can be made to place mortar fire on the target using adjustment procedures. Lack of observation, however, must not preclude firing on targets that can be located by other means.

1-4. Mortar fire must be delivered using the most accurate means that time and the tactical situation permit. When possible, survey data will be used to accurately locate the mortar position and target. Under some conditions, only a rapid estimate of the relative location of weapons and targets may be possible.

1-5. To achieve effective massed fires, units should survey the area using accurate maps of mortar positions, registration points (RPs), and targets. The immediate objective is to deliver a large volume of accurate, timely fire to cause as many enemy casualties as possible. Surprise fire often increases the number of casualties inflicted in a target area. If surprise massed fires cannot be achieved, the time required to bring effective fires on the target should be as brief as possible.

1-6. Mortars can inflict the greatest demoralizing effect on the enemy by delivering as many rounds as possible (from all mortars in a section or platoon) in the shortest period of time possible.

1-7. Mortar units must be prepared to handle multiple fire missions. Mortars are area fire weapons, but units can employ them to neutralize or destroy area or point targets, to screen large areas with smoke for sustained periods, to provide illumination, or to provide an immediate, heavy volume of accurate fire for sustained periods.

1-8. In HBCT battalions, units can normally fire mortars from mortar carriers (mortars maintain their ground-mounted capability). This permits rapid displacement and quick reaction to the tactical situation.

# INDIRECT FIRE TEAM

1-9. The team mission is to provide accurate, timely response to the unit it supports. Effective communication is vital to the successful coordination of the indirect fire team's efforts. Indirect fire procedures are a team effort (Figure 1-1). They include locating the target, designating the correct asset to fire the mission, determining firing data, clearing indirect surface-to-surface fires, applying data to the mortar, and preparing the ammunition. Since the mortar is normally fired from the defilade position (where the crew cannot see the target), the indirect fire team gathers and applies the required data, and coordinates and synchronizes the fires with the concept of the operation. This team consists of a fire support officer (FSO) in the fires cell (FC), forward observer (FO), a fire direction center (FDC), and mortar squads.

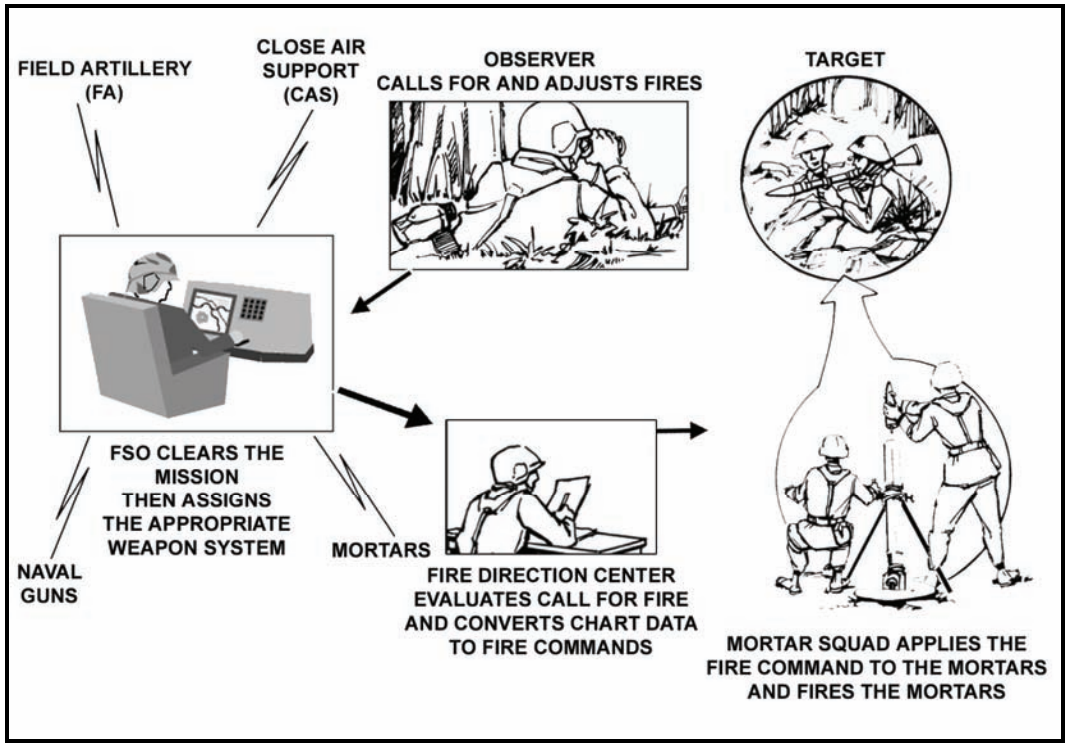


**Figure 1-1. Indirect fire team.**

1-10. The battalion FSO coordinates and synchronizes fire support for the maneuver battalion. He is in charge of the FC and is the principal fire support advisor to the maneuver battalion commander. The FC is located with the operations element of the maneuver force. The commander is responsible for integrating fire support, but typically delegates planning and supervisory authority for clearing indirect fires for the unit to the FSO. Table 1-1 shows the organization of an FC in support of IBCT and HBCT battalions.