

Instructions for Mortar Fire Control Android Application

Sniper Flash Cards

www.sniperflashcards.com/mortars.php

There are two Android applications: Fire Control and Forward Observer. The Fire Control application includes both direct-fire and indirect-fire applications. The direct-fire application is necessary for using a street intersection as a reference point as described in the example below. It can also be used for shooting snipers off the roofs of buildings.

The Forward Observer application asks him to input his observations and a short text message, which it then encrypts (using AES) in preparation for texting the gunner. The gunner pastes this message into the Fire Control application and inputs his own observations. Hitting “calculate” decrypts the FO’s message, assigns that data to its variables and displays the FO’s text message along with the corrections to elevation and azimuth angle, as well as flight time.

Explanation of Message

All messages from the forward observer (FO) must begin with one of these nine explanations.

A/F	Adjust Fire	A large correction is needed. Fire one shot and wait for further instructions from the forward observer.
EOM	End Of Mission	Stop firing. The text message explains if the target has moved, been destroyed, proven itself invulnerable or whatever.
FIRE	Commence Firing	This order must be preceded by an A/F, FFE or ILL order ending with AMC (at my command). Correction data should be ignored as the mortar is already adjusted for its first shot.
FFE	Fire For Effect	A small correction is needed and, once this adjustment is made, the gunner should fire rapidly until the target is destroyed. If no correction is needed, be sure to zero out the correction data.
IS	Immediate Smoke	A machine gun has taken friendly troops under fire. There is no time to walk in accurate fire and/or the weapon is invulnerable to mortar fire, but immediately obscuring their vision will help.
ILL	Illuminate	Fire flares at intervals until you receive an EOM order. If there is more than one type of flare, it is described in the text.
MET	Meteorological	Do not fire; the correction data is meaningless. Just read the text for meteorological data and other background information.
MOVE	Pack Up and Move	The text message explains why and where to move to. Ignore the correction data.
RUN	Leave Immediately	Do not pack up. Abandon unsecured supplies and (if it is not vehicle mounted) the mortar tube itself. Just scam.

Reference Points

All messages calling for fire (A/F, FFE, IS or ILL) must specify the reference point from which the corrections are measured. If the reference point is omitted, it is assumed to be PREV.

RP1	Reference Points	A building, tree, rock formation, etc. which the gunner has already test fired his mortar on. RP2, RP3,... are additional ones.
PREV	Previous Shot	The last shot fired. This is used when the gunner is walking his shots towards the target.
INT	Intersection	An intersection that the gunner can locate on a street map. He has not previously fired on it so he must use the direct-fire software to determine how to hit it and then adjust off that.
GRID	Grid Coordinates	Like an intersection but less accurate because the gunner is referencing off of a whole square on his map. Used in rural areas where there are no nearby street intersections.

Timing

All messages calling for fire or movement (A/F, FFE, IS, ILL or MOVE) must specify when the orders are to be carried out. If timing is omitted, it is assumed to be W/R.

AMC	At My Command	Adjust the mortar but do not fire until the command is given. AMC orders must be followed by a FIRE or an EOM order.
IAW	In Accordance With	Refers to written orders for the operation. The attack will probably start at a specific time or when the commander fires.
SOP	Standard Operating Procedure	Refers to standing orders for operations of this type.
SQ	Super Quick	Fire or move as fast as possible, without regard to fine details. The enemy is preparing to move.
W/R	When Ready	Take your time to measure the environment and adjust mortar. The enemy is not going anywhere.

Ammunition Types

Calls for immediate smoke (IS) or illumination (ILL) do not need further explanation of the ammunition type. However, calls to adjust fire (A/F) or fire for effect (FFE) need further explanation. Note that it is important to know what color of smoke is being used because there may be other gunners firing on the same target. If ammunition type is omitted, then it is assumed to be the last type fired.

AP	Anti-Personnel	An air burst with little explosive and much shrapnel. Also known as case shot, CASE.
CAN	Canister Shot	Like a big shotgun cartridge. If a helicopter is flying low looking for the mortar, canister shot can be used if it flies directly in line with the mortar tube.
BALL	Solid Steel Ball	Mostly used for testing purposes. It can sink some small slow-moving boats.
BLU	Blue Smoke	Used for walking shots to the target or for test firing on a reference point.
CS	Tear Gas	A surface burst of a chemical agent, usually tear gas. It is a war crime to use mustard gas against either soldiers or civilians.
GRN	Green Smoke	Used for walking shots to the target or for test firing on a reference point.
HE	High Explosive	A surface burst with much explosive and little shrapnel. Used against bunkers; requires fine accuracy.
ONG	Orange Smoke	Used for walking shots to the target or for test firing on a reference point.
RED	Red Smoke	Used for walking shots to the target or for test firing on a reference point.
VLT	Violet Smoke	Used for walking shots to the target or for test firing on a reference point.
WP	White Phosphorous	The same ammunition used for immediate smoke (IS); it is also an incendiary and will start grass fires or ignite spilled fuel. It is a war crime to use white phosphorous over civilian populations.
YLW	Yellow Smoke	Used for walking shots to the target or for test firing on a reference point.

Example

- 1) The gunner is using shells with an initial speed of 360 m/s that are ballistically equivalent to 100 mm solid steel balls. He is in a trench with his muzzle 5 m below ground and on a 5% hill climbing northward. The altitude is 350 m, the temperature is 15° C and the air pressure is 30.2" of Hg. He records this information on the direct-fire application and waits for further instructions.

- 2) Knowing that another mortar team is operating in the area and using green smoke, the forward observer (FO) chooses red smoke. He spots an enemy anti-aircraft gun in a residential neighborhood at -160° off magnetic north. It is too far away to read the street signs but he knows that the large intersection nearby is Main and Broadway. From his perspective, the intersection is 280 m past the target and 150 m left of it. He sends this data and the following text message: A/F INT Main & BW W/R RED

- 3) The gunner uses a ruler on a street map to determine that this intersection is 2750 m away. Because the map is oriented towards true north he must consider declination to determine that his compass reading off magnetic north is 37° when facing the intersection. Because he is facing 37° off the 5% slope, the grade is $5\% \times \cos(37^\circ) = 4\%$ towards the intersection. When facing in this direction, there is a 7 m/s wind from the 2 o'clock direction. The gunner inputs this data into the direct-fire software and, after several trials, finds that a 65.4° angle of elevation and 46.9 mils right windage would hit the intersection.
- 4) The gunner does not fire at the intersection. Hitting "calculate" on the direct-fire application automatically transfers the data to the indirect-fire application. He just adds 37° to the windage correction of 2.6° that was transferred from the direct-fire application. The input data is then what it would be if the gunner had fired and hit the intersection. He pastes in the FO's encrypted message, hits "calculate" and the application tells him to adjust his angle of elevation 50.9 mils down and his azimuth angle 81.0 mils left. His angle of elevation and compass heading are automatically updated so the gunner will not have to re-enter the corrected data. He makes these adjustments and fires a red smoke grenade.
- 5) The FO observes red smoke 22 m past the target and 13 m to its right. The anti-aircraft gun crew has also seen the smoke and is frantically packing up their gun to move out. The FO inputs this correction data (-160° , 22 m long and 13 m right) and the following text message: FFE PREV SQ AP
- 6) The gunner pastes in the FO's message, hits "calculate" and is advised to adjust his angle of elevation 5.4 mils down and his azimuth angle 2.3 mils right. He makes these adjustments and fires anti-personnel shells set to detonate in 38.2 s as fast as he can.
- 7) The FO sends the following text message: EOM target destroyed