Mortars in Cities

CAPTAIN WILLIAM B. CREWS

In the event of a major conflict in Europe, the major battles will probably be fought in or near urban centers, and NATO forces will most likely find themselves on the defensive. This means that these forces will need the support of large numbers of indirect fire weapons, but that may present some problems.

First, Army Reserve and National Guard units deploying from the continental United States may find themselves without enough artillery pieces when they first enter combat. And even if such a unit has enough supporting artillery, the urban battlefield will probably prevent its effective use, because many parts of a city simply cannot be reached by artillery fire. Obviously, if an indirect fire weapon fires at an elevation of less than 800 mils, and if its projectile must clear a three-story building on its descent, a deadspace 10.5 meters wide is created. At that point, the best that can be hoped for is a hit on the roof or the face of a building, neither of which is likely to damage the enemy much.

Artillery pieces can fire at greater elevations, of course, but the times of flight and the maximum ordinates of their projectiles are dramatically increased, and neither of these factors aids the survivability of the piece that is firing.

For these reasons, then, a maneuver commander's primary indirect fire weapons will probably be his unit's organic mortars. Unfortunately, too many of our mortar units today are not up to taking on this expanded role because of a lack of tactical doctrine, and because they are not properly trained to operate in an urban environment.

Although FMs 23-90, 23-91, and 23-92 were excellent in their day, that day has passed. There are several things a unit needs to know about employing mortars in urban terrain that they may not be able to find in the tactical doctrine.

First, narrow frontages are typical in MOUT; for example, a company usually occupies fronts of from 300 meters in the older city centers to 1,100 meters in industrial areas. Although these narrow frontages tend to give a mortar platoon a centralized location, its guns can best be employed in three squads with the 81mm or four squads with the 107mm. This aids survivability without affecting the performance of an 81mm platoon and with little effect on a 107mm platoon.

Selecting firing positions is critical. For track-mounted guns this is relatively simple and, obviously, the guns and crews have more protection. The tracks can easily create hide positions by driving into most buildings, and with the vehicles buttoned up they should survive counterbattery barrages.

Whether the mortars are vehicle or ground mounted, though, the standard criteria for the selection of a position in any kind of terrain must be observed — particularly in the consideration of mask and overhead clearance. If mask is used properly, the gun will be far less vulnerable: A mortar located in a narrow city street, firing at near-maximum elevation (which just clears the frontal mask) is virtually impervious to counterfire, because incoming rounds will strike only the roof tops on either side of the street. (This is assuming, of course, that the mask will withstand the impact of an incoming round.) Therefore, the more mask, the safer the position. And when considering this, gun crews must also realize that mask to the rear is every bit as important as mask to the front.

PROBLEMS

One of the problems with ground-mounted mortars in urban terrain is the lack of an area suitable for the baseplate. Although the 81mm mortar can be fired from a sandbag-supported baseplate with some success, field trails have shown that the 107mm has too much recoil to be buffered by sandbags. Thus, with ground-mounted mortars the terrain may force the platoon to disperse its mortars whether it wants to or not.

Another problem is that all magnetic instruments such as compasses are affected by the presence of the massive amounts of structural steel and electrical cables usually found in a city. This means that the minimum distance guidelines given in FMs 23-90 and 23-92 for the use of the M-2 aiming circle are impossible

to apply. The M-2 and lensatic compasses will also be less accurate, though the lensatic compass will be less affected.

The best way to lay the gun for direction is to use the orienting angle method. This method, which is outlined in FM 6-50, is basically as follows:

An azimuth is obtained to a distant aiming point. From this azimuth the back azimuth of the direction of fire is subtracted. The difference is indexed on the red scale and the gun is manipulated until the vertical crosshair of the sight is on the aiming point. Such features as the direction of a street may be used instead of a distant aiming point. Either of these methods is much more reliable than using the aiming circle or a compass.

No matter what aiming procedures are used, though, the mortar is by nature an area fire weapon. This is both its strength and its weakness. Usually, precision firing is not required of mortars. For one thing, the fire control equipment has trouble handling small corrections, and for another, the probable error of the mortar makes it useless to compute anything under 25 meters.

In a conventional environment accuracy to 25 meters is more than enough, but in MOUT it is a serious shortcoming because of the amount of deadspace. A 107mm mortar firing at a range of 3,500 meters, for example, and at an elevation of 1065 (its maximum) has a range probable error of 21 meters. This means that 25 percent of the rounds fired will land up to 21 meters beyond the target and 25 percent will land up to 21 meters short of the target. Essentially, the best that can be hoped for is for half the rounds to land in a 42-meter diamond pattern. The other half will, in this case, land somewhere between the muzzle of the gun and 84 meters beyond the target. And this does not account for human error or for the internal and external ballistics that can affect the round.

This fact and the nature of the terrain also greatly affect a forward observer's attempts to adjust fire. To adjust fire effectively the adjusting gun, or the FDC, should send the range probable error to the FO as a message to observer (MTO). This will allow the observer to make an intelligent decision on whether an additional correction is required or whether the probable error of the rounds in the fire for effect (FFE) will achieve target coverage.

POINT TARGETS

Most MOUT targets have to be treated as point targets unless the attitude of the target is plotted, or unless the target is parallel to the section's attitude. If a target on a street is engaged by a mortar section firing a parallel sheaf, it is obvious that if the street is not parallel to the section, only one round, that of the adjusting piece, will hit the target. The others will be wasted.

If the section is fired, the sheaf must be converged. The preferred method is as outlined in FM 23-91. Firing a large number of rounds with one gun increases the probability that at least one round will hit the target. The effectiveness of the FFE probably can be improved by firing a 50-meter zone mission with the 107mm or a search mission with the 81mm. This would increase the distribution of rounds in the target area and allow the range probable error to work to the gun's advantage.

Other factors also work against the firing of precision missions by mortars. As an infantry or armor battalion has no organic survey capability, the best grid location that can be hoped for is one obtained by use of a map and a coordinate scale. Registration is of doubtful value, once again, because of the lack of survey data and because the range probable error will make it easy to lose rounds in streets and behind buildings. In addition, registration needlessly expends ammunition and exposes the platoon to counterbattery fires. If a registration is desired, the first target engaged should serve as the registration point, because a fairly good 8-digit grid can be obtained.

When a platoon is firing its mortars from three or four one-gun positions, it can increase its survivability by allowing a single gun to move after each fire mission instead of forcing the entire platoon to displace. Such shoot-and-scoot tactics can diminish the effectiveness of counterbattery fires. Too, the FDC should be used as an operations center and a clearing house for information. Round counts should be maintained for each gun, and fire missions should be parceled out to the gun best able to fire that mission. The plotting function of the FDC should be limited to massing the fires of the platoon. Using organic wire, control can be maintained over a span of three-fourths to one mile. With company or battalion assistance, this distance can be increased.

The 107mm FDC is particularly suited for this function. A 1:25,000-scale map can be placed under the plotting sheet, if the acetate type is used, or it can be used instead of the plotting sheet. This will allow a situation map to be mated to the fire control system. The FDC can mass the fires of the four guns by simply placing the vertex pin at each gun location and using the 1:25,000 ballistic plate instead of the 1:12,500.

When it comes to weapon effects, little information is available on the effect of mortar fires on MOUT targets. A study of the urban warfare techniques used in Beirut did conclude that a mortar round of a size less than 120mm had a negligible effect on buildings and roads. Although there were no 107mm mortars involved in that study — only 120mm, 82mm, and 81mm mortars — the 107mm probably has effects similar to those of the Soviet 120mm.

One fact is certain, mortars should not be assigned a preparatory fire mission. Because of their throw weight, the projectiles simply will not do enough damage to justify the expenditure of ammunition. The best solution is to mass the fires of the platoon and fire a short, intensive barrage of 20 to 30 seconds. This drumfire barrage, pioneered by the

Germans in World War I, will suppress defenders long enough for attacking forces to close with them. It will also limit ammunition expenditure.

The choice of fuze is also critical. Proximity fuzes may not be particularly effective, and they may pose more of a threat to friendly troops along the gun-to-target line than to the enemy; buildings, possibly occupied by friendly troops, will probably activate their fuzes.

The mechanical time super quick (MTSQ) fuze is probably the best all around fuze, but it is not available for the 81mm mortar. The decision on whether to fire point detonating (PD) or delay fuze options is also important. The only way an 81mm mortar can obtain an air burst is to fire delay-fuzed ammunition and have the round ricochet off surfaces that it cannot penetrate. Obviously, this will not always give the desired result.

The use of illumination in MOUT also needs to be seriously examined. When the illuminating element deploys, it will create shadows, shadows that could just as easily conceal enemy positions as friendly ones, and there is no apparent way to combat this. Perhaps the best use for illumination is harassment. If illumination bursts in the vicinity of a position, the soldiers there must assume they are under observation and that a coordinated firing mission is coming. Even if high explosive rounds do not follow, movement is still frozen for the burn time. Accordingly, illumination rounds fired over chokepoints and major lines of communication can slow traffic appreciably.

These various aspects of employing mortars in urban terrain are presented here as material for further study and development. If mortars are to play the prominent role that is being projected for them on any future battlefield, we need to do something now to bring our mortar doctrine up to date in its applications to military operations in urban terrain.

CAPTAIN WILLIAM B. CREWS, an Infantry officer, is Assistant G 3 Training Officer of the Berlin Brigade. A graduate of Old Dominion University, he also holds a master's degree from Webster College in Missouri. He previously served as leader of a rifle platoon and a 4.2-inch mortar platoon.

Handing Off the Battle

CAPTAIN TERRENCE THOMAS

If a war breaks out in Europe in the foreseeable future, the first battle the United States Army will fight there undoubtedly will be a defensive one. Unfortunately, one key aspect of fighting defensive battles has been largely neglected in our existing doctrinal manuals — that of handing off a covering force's battle to units in the main battle area. Unless this handoff is conducted properly, the success of the entire defensive battle can be seriously jeopardized.

A defensive battlefield is divided into four general areas — the deep battle area (DBA), the covering force area (CFA), the main battle area (MBA), and the rear area. (See the accompanying illustration.) A line just forward of the forward edge of the battle area (FEBA) between the MBA and the CFA is where the handoff of the battle actually takes place.

Detailed planning and coordination are required if a handoff is to proceed smoothly. Much of this should be done before the battle