up. (A well policed and straight line-up of vehicles reflects the discipline of a unit, and a mobile unit can remain mobile only if it has a successful maintenance program.)

Crime prevention and physical security are also high priority programs, because fraud, waste, and outright negligence have led too often in the past to lost and stolen equipment. The XO must therefore initiate effective programs that are aimed at safeguarding all U.S. Army hardware. This includes strict compliance with AR 190-31, Department of the Army Crime Prevention Program; AR 190-13, The Army Physical Security Program; and FM 19-30, *The Physical Security Manual*.

The XO's goal should be absolute security. He should see that all of the necessary forms are filled out properly so that weapons and ammunition are not lost or misplaced. At the same time, an emphasis on locking and securing wall lockers and rooms can save the Army and its individual soldiers money, manpower, and plain grief.

As part of his crime prevention effort, the XO must inspect the company areas at least once a month. A casual walk through the troops' rooms during a weekday, for example, can yield unexpected results. Troops lounging in their rooms often take shortcuts by leaving their rooms and valuables unsecured. By making on-the-spot corrections and by informing platoon leaders and platoon sergeants of any fraudulent violations, the XO can prevent potential problems.

And the XO must see that crime prevention and physical security are emphasized all the time—not just when a general inspection is coming up. Informative classes and posters can help maintain this emphasis.

In addition to these regular duties and responsibilities, a headquarters XO usually must also juggle such extra duties as tax assistance officer, unit fund officer, awards officer, indebtedness officer, unit supply officer, tool control officer, and field sanitation officer. His job is a difficult one indeed, for a failure in any one of these areas can result in low morale and an ineffective organization. An XO must therefore display maturity and experience if he is to anticipate possible problems and prepare the unit to solve them.

In summary, the headquarters XO is the commander's inspector and his personal representative in all areas of tactical operations and daily garrison activities. He is also an advisor to the commander on many areas that in the headquarters section are normally divided among the staff officers. If he neglects one of these areas, his unit's combat readiness, to some extent, will be impaired.

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Mortaring

Can We Now Move Forward?

WARRANT OFFICER-1 KEITH F. HOYLE, British Army

Before we go too far down the rocky road of no return, our current mortaring systems need further review. While already in the throes of a major change, we need to adopt new procedures and new technology, and at the same time allow old and impractical procedures to fall by the wayside.

For example, the laser range finder and the thermal imager will greatly improve the fire support team's ability, and our gun line procedures must be ready and able to accept this change. But first, the sentiment that surrounds the 4.2-inch mortar must be put to one side to allow room for newer and better systems that will have a more positive effect on the modern battlefield. Frankly, the 4.2-inch mortar provides complications that we can do without.

The weight of the whole system is impractical and unmaneuverable, and it does not lend itself to the fast moving and rapidly changing battlefield of the 1990s. It is essential that a weapon system be movable, either dismantled into easily carried parts or placed on a carriage. Each 4.2-inch round weighs 29 pounds, which is three times as much as an 81mm round, but it does not produce three times the lethality. For each 4.2-inch round we bring forward, we can bring up three 81mm rounds.

Another problem is that the rifled barrel on the 4.2-inch mortar wears faster than a smooth barrel, and an extra fire direction center procedure must be employed to "aim off" a round for drift.

When comparing systems, of course,

we need to beware of putting too much emphasis on maximum range. A deployed mortar platoon needs a large area in which to operate, camouflage its vehicles, and disperse its ammunition. If the mortar has a very long range, it is likely to be deployed farther to the rear than current doctrine calls for. More than likely, it will then be deployed in an area that is out of the battalion commander's control. If it begins to sound like an artillery piece, that may be its future—out of the battalion commander's control!

SIGHTS

By far the biggest problem to be overcome at the moment is the sighting system. Should all of our mortars — 60mm, 81mm, 120mm — have the same sight? Quite clearly the M64 sight, currently on the M224 (60mm) and planned for the M252 (81mm), will be too delicate for the 120mm. It may also be unsuitable for the M252, which also produces quite a traumatic shock to the sight. Whichever is chosen, all the sights currently in use need three modifications to speed up mortar deployment and to simplify plotting procedures.

First, the sight scale rings, now numbered progressively in a counter-clockwise direction, should be numbered in a clockwise direction in the same way as the aiming circle. This very simple modification would allow the complicated and unnecessary use of deflections to fade into obscurity and would provide the following benefits:

- Plotting procedures would be much simpler with only one set of scales to be read.
- Once the aiming posts had been established, each sight could be slipped to read the mounting azimuth. This means that the sight would read the grid azimuth along which the barrel was pointing.
- Azimuths from the plotter would be applied directly to the sight.
- On a mortar firing toward the east, the sight would read 1600 mils. This would make orientation and safety supervision much simpler.

The second modification needed on the sight is to the telescope. Currently, the elbow can be set in only two positions. This means that the gunner has to either stand or crouch down when laying the mortar; no position in between will do. If the cross-hair were engraved on the telescope and not on the elbow, the eyepiece could be rotated without moving the cross-hair. This would save valuable seconds, as the gunner would not need to "set" the eyepiece but could position it for himself.

Finally, the sight needs a simple periscope attachment, which would provide several advantages:

- It would prevent sight blockage.
- The aiming circle would not have to be put to the left front of the platoon but could be positioned anywhere.
- The gunner would have no problem seeing the posts when firing from a mortar pit.
- The posts would not need to be offset 400 mils to the left as they are in the current procedure.

Our plotting procedures also need to be reviewed, especially as the mortar ballistic computer (MBC) is about to be issued. Any simplification to plotting procedures must be a time and money saving bonus. (Currently, students at the Infantry Mortar Platoon Course spend almost 40 percent of the course learning plotting procedures. When the MBC is issued, two more weeks will be added to the course.)

Procedures can be simplified as follows:

- There should not be any differences between the charts — the surveyed chart should not be used. It is unrealistic to expect to have surveyed points on a constantly changing and fast moving battlefield.
- The scale should be fixed at 1:25,000. A larger scale, 1:12,500, is unnecessary, because mortar accuracy should not be desired down to ten meters. (Although we would expect to hit a trench or point target with mortar fire, we cannot do it aiming at the point and firing one round. Because of the mortar's characteristics—the effects of wind, variations in round weight—this is not realistic. We hit a point target by putting an adjusting round as close as we can and firing for effect. This uses the large beaten zone of the mortar to spread the rounds out and hopefully hit the point target.)
- The board should be gridded on deployment so that the pivot point is the mortar location. (The first two simplifications above would effectively do away with the need to "drop below the pivot point" when the range exceeds 2,900 meters.)

FUTURE

When mortars fire, they are subject to radar detection. This can "fix" a mortar position quickly and accurately and allow it to be counter-bombarded almost immediately before any adjustments can be made, or at a more crucial stage of the battle when adjustment has been completed.

There are only three ways to defend mortars against radar:

- Fire on the lowest charge employing a low trajectory to stay under the radar scanner and reduce the time of flight.
- Delay registration or adjustment until the last possible moment.
- Position the mortar line where there is high cover—behind hill features, behind woodlines, in small wooded clearings, or in city streets.

If mortars are to produce the necessary fire support for a battalion commander, they must be able to produce accurate supporting fire when they are subjected to counter-bombardment. Even though they may be firing from an entrenched position, that position will not protect the crew from the fragments of an airburst.

We should think now about firing mortars from under armor. In fact, the next generation of mortars must be completely contained within an armored tracked vehicle that can keep up with the M1 tank and M2 fighting vehicle. It must not have a hatch — such as the ones on the M106 or M125 — that opens to enable the mortar to fire, because this will allow airburst shrapnel to enter the hatch.

We should start to look at a turret-mounted mortar, a weapon system for the next century. It is conceivable that in 10 years we will be able to put an 81mm round out to 7,500 meters. First-round hit accuracy will be provided by laser range finders, more accurate sighting

equipment, position locating computers, and ammunition that consistently has exactly the same weight and propellant for each round. This vehicle should be based either on the M2 or its replacement, with a redesigned turret containing a breech-loaded 81mm mortar and a different layout inside to accommodate at least 100 rounds of ammunition. With a crew of four, this should not be a problem.

The mortar is a very simple weapon system. Anything that detracts from this simplicity or requires complicated procedures will cause problems that we must make every effort to eradicate. The mortar must remain highly mobile, protected, and within the control of the battalion commander. New ideas and concepts must be fully thought out and, if acceptable, integrated quickly into our training. It is essential that new concepts and procedures be disseminated quickly to all TOE units and that a procedure for this be organized at the Infantry School level.

Although mortaring in its current form has been with us since 1916, only now is it being affected by new technology and materials. Mortaring is ready for a quantum jump forward and must not be held back by repressive ideas and negative thinking.

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A Magazine for the Machinegun

CAPTAIN BRUCE P. MAMONT

Some soldiers seem to consider it the height of fashion to sling belts of M60 machinegun ammunition diagonally across their shoulders. Slinging the ammunition does permit a soldier to use both his hands for his rifle and also distributes the ammunition evenly and close to the body. Unfortunately, the first time the bearer takes cover in the prone position, the ammunition becomes fouled with mud, snow, or sand that is certain to cause it to malfunction in the machinegun.

Although I don't endorse that way of doing things, I do sympathize with the problem. Ammunition cans are unwieldy and can't be comfortably suspended on a strap to leave a rifleman's hands free. The 100-round bandoliers in the cans are no better. They are almost as bulky as the cans themselves and lack the cans' weatherproofing and security. (The full belts of ammunition that litter a squad live fire course after an exercise testify to how easily ammunition carried in a bandolier can be lost while the bearer is running.)

The original -12 operators manual for the M60 showed a magazine to hold the 100-round-belt box. This magazine encased the box in rubberized canvas to protect the belt from the elements. A sheet metal clip was mated with a clamp and lever mounted on the left side of the machinegun receiver for attaching the magazine. The belt fed into the receiver through a slot in the side of the magazine.

That magazine was not rigid enough, though, because of its canvas construction and could not support the weight of the ammunition. The solution was to replace the magazine with the present system of a hanger group and bandolier. But the bandolier is no more rigid than the magazine was, and it provides even less waterproofing for the belt. Besides, it is not unusual to encounter ammunition not in bandoliers that lacks the web collar necessary to suspend the ammunition on the hanger group.

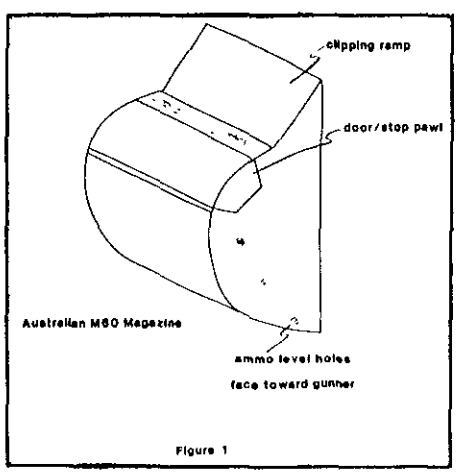

Figure 1

In reviewing small arms literature in search of alternatives, I was struck with the many types of magazines foreign machinegun designers use. One in particular looked promising—a semi-cylindrical magazine the Australian Army uses on the M60.

Constructed of sheet metal coated with nylon as a dry lubricant, this ingenious device enables a gunner to carry a short 40-round belt (see Figure 1). The small magazine keeps weight and profile low and still holds enough ammunition for several good bursts. Before a belt is expended, the assistant gunner can attach another one. The belt from an external can feeds smoothly over the magazine's round top. At the end of an engagement the belt can be broken to a length of 40