MOUT PROBABILITY TABLE	
Street Width in Relation to Range Probable Error Distance	Percentage of Rounds to Reach Target
2.0 X	50.00%
2.5	60.05
3.0	68.84
3.5	76.19
4.0	82.26
4.5	87.03
5.0	90.80
5.5	93.62
6.0	95.74
6.5	97.18
7.0	98.16
7.5	98.84
8.0	99.30
8.5	99.60
9.0	99.76
9.5	99.87
10.0	99.92
10.5	99.96
11.0	99.98
11.5	100.00

Figure 5

rounds will reach the street even though all have been fired correctly. But if the street width is twice the range probable error distance, 50 percent of the rounds fired will reach their target (Figure 5).

Or, going back to the example used earlier with the MOUT firing table (Figure 4), the FDC knows that if Charge 4 is used with an elevation of 1,393 mils, the range probable error distance (R) is 11 meters. This means that the rounds will clear the buildings and 25 percent will fall within 11 meters of the intended range — that is, in the street. If all else is equal but the street width is 22 meters, then half of the rounds fired will reach the street. (For this fire mission, any charge of 4 or above will work, but with counter-battery radar, the lowest workable charge should be used.)

If they had this kind of information in hand, commanders and FDCs would know not only how to fire their mortar rounds but how many they would have to fire to produce a given effect, even in the narrowest of streets. In some situations, such information would tell them that they could not bring effective fire on a certain street without a great and inefficient expenditure of rounds — or that they could not bring effective fire on it at all. Guesswork would be eliminated.

The Army needs to incorporate these two procedures into its doctrine and teach them for all kinds of mortars. No new research or technology would be needed. By simply restructuring what is already available, we could vastly improve the effectiveness of our indirect fire assets in urban terrain operations.

We can't afford not to do it.

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Captain Robert A. Lambert has also served as a mortar platoon leader and, while assigned to the Infantry School, helped write a field manual on the tactical employment of mortars. He is a graduate of the University of Alabama and is now a company commander in the 1st Infantry Training Brigade at Fort Benning.

81mm Mortar Training — with 60mm Ammunition

CAPTAIN RODNEY W. JOYE

Sustaining combat readiness in any unit is a continuous process that includes equipment, personnel, maintenance, and training. All of these unit readiness criteria are important, but if unit personnel are not trained to perform their assigned missions, all the other categories of readiness become meaningless.

Gunnery training, in particular, has become increasingly difficult because of the rising costs of training ammunition, and this includes mortar training. Today, the Army simply cannot afford to conduct all of its mortar gunnery training with service ammunition. The cost of a current production 81mm high explosive (HE) round, for example, is $122, and the cost of the improved 81mm HE round is estimated at $225. In addition to the cost, the transition to the improved 81mm round has created a critical shortage in the ammunition available for training. Presently, almost all remaining stocks of the old ammunition are being held in war reserve, and the shortage for training purposes is expected to continue through Fiscal Year 1992.

If this situation is left unresolved, the Army is faced with two unacceptable choices: Either use war reserve stocks of 81mm ammunition for training or allow the combat effectiveness of its 81mm mortar sections to decline.

The logical solution to this dilemma, therefore, is to use training devices, scaled range ammunition, and subcaliber ammunition, along with service ammunition. The new POCAL scaled range ammunition, for example, can be used on local scaled ranges (up to 500 meters), sub-

caliber ammunition for practice gunnery or for ARTEPs, and full-caliber 81mm ammunition (when it is available) for ARTEPs. If necessary, 81mm mortar sections can conduct *all* their live fire missions effectively with subcaliber ammunition using the 60mm Insert Subcaliber Device (ISD).

This device was developed by personnel of the 50th Armored Division, New Jersey Army National Guard, for use in its mortar training. The ISD is identical to the M-31 subcaliber device used to fire 60mm ammunition in the 107mm mortar except that the adapter rings and the spacer sizes are smaller to fit snugly inside the M-29A1 mortar. During training, all crew actions are the same with this device as they are with 81mm ammunition.

The maximum range of 60mm ammunition is about 1,800 meters, which makes the ISD ideal for use in small impact areas. The 60mm ISD is the only way to provide training in the use of high explosive, white phosphorus, and illumination rounds, aside from using 81mm service ammunition.

Unlike 81mm ammunition, there is plenty of 60mm ammunition available. In fact, after deducting war reserve stocks from the total Army stocks, there is approximately a 10-year supply in the Army inventory available for training. And as improved 60mm ammunition is procured for war reserve stocks, additional quantities of the old 60mm ammunition can be released from war reserve for use in training. This means that, with proper management, there may be a 30-year stock for training.

Aside from the availability of 60mm ammunition, its use for 81mm mortar training would greatly reduce the cost of the ammunition used in 81mm mortar training programs. The existing stocks of 60mm ammunition were procured many years ago for $12.57 per round, and the use of existing stocks would not require the expenditure of new funds for training ammunition as the other options would.

In short, the use of 60mm ammunition for 81mm gunnery would save the Army at least $95 million over the next ten years. (With this saving, the Army could buy another 50 M-2 Bradley Fighting Vehicles.) Total Army requirements for the 60mm ISD could be procured for less than $1 million (based on a recommended basis of issue of four devices per infantry or mechanized infantry battalion).

Although the device, in concept, is not new, the need for it has recently become more critical, and it can be locally produced at minimal cost.

If the 60mm ISD were adopted, it would quickly provide a highly realistic solution to a long-term training problem.

Anyone who would like to have further information on this device and its use may write or call the Ammunition and Support Branch of the National Guard Bureau in Washington, D.C. — Major Schlimgen, AUTOVON 289-1720 — or the Office of Policy and Planning, New Jersey Army National Guard, Eggert Crossing Road, CN340, Trenton, NJ 08625-0340 — telephone (609) 984-3621.

Captain Rodney W. Joye is a National Guard officer serving with the National Guard Bureau where he recently completed an assignment as a training devices staff officer. He previously served on active duty with the 3d Infantry Division, including a tour as a mortar platoon leader, and with the 24th Infantry Division.

Platoon Early Warning System

STAFF SERGEANT DONALD L. MOORE

"Protect the force" is one of the seven imperatives of modern combat, but sometimes there are not enough people to provide the necessary security. Although technology cannot replace a skilled rifleman in this role, it can help. One product of technology that can be of tremendous help to a commander is the Platoon Early Warning System (PEWS).

PEWS is a lightweight, battery-powered, portable intrusion detection system designed for use by small units. PEWS detectors, when activated by personnel or vehicular intrusion (ground vibration or magnetic field), transmit a coded message by radio or wire to a remotely located receiver. The operator receives both audible and visible alarms.

The major components of the system include:

- A receiver, which receives signals from the detectors and transmits an