TRAINING NOTES

The Weaponeer and Marksmanship

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The Weaponeer, a training device that simulates the live-fire conditions of the M16A1 rifle, can be a valuable resource, or it can be a detriment to effective marksmanship training. It all depends on how the device is used. And there are some problems with the way it is now being used.

The Fort Benning Field Unit of the Army Research Institute (ARI) has been doing research on marksmanship for several years. A major product of this research is the current basic rifle marksmanship (BRM) program of instruction. BRM training now includes more feedback, better instructor training, and better supporting materials. This research has also led to the development of an advanced rifle marksmanship program as well as to guidelines for conducting unit marksmanship training. (Articles summarizing major portions of this research appeared in the July-August and September-October 1981 issues of INFANTRY.)

Although the original Weaponeer, rather than the current one, was used in this research, I believe my observations here are still valid and that my recommendations will help trainers make the most of the time their soldiers spend on the device. (The views expressed are my own.)

The Weaponeer is a stand-alone rifle marksmanship simulator that uses a non-restorable M16A1 rifle. The rifle's recoil is simulated by the operation of a recoil rod that attaches to the barrel of the rifle, and the sound of the rifle is transmitted through earphones.

Contrary to appearances, the Weaponeer does not use a laser to register hits or misses. It uses infrared light from a light-emitting diode on the target to activate a sensor that is mounted on the rifle barrel. When the rifle is aimed and fired, this sensing system provides precise information about target acquisition and shot location. (This information is then processed by a computer in the console.) The Weaponeer has a memory for recording up to 32 accurately simulated shot impacts and a printer for providing a printout of all shots on the selected targets.

A video display shows the shooter's aiming point, which appears as a dot or ball of light. The screen also displays the selected target and the location of hits and misses. Two unique features of the video display are the "replay" and the "each shot" controls. When activated, the "replay" feature shows the movement of the rifle during the three seconds before firing, while the "each shot" feature displays not only the location of each shot but also the order in which the shots were fired. The video display also includes such information as the number of hits on the target, the number of misses, the late shots (fired after the target has dropped), and the total number of shots fired.

The Weaponeer contains four targets: a scaled, 25-meter zeroing target; a scaled, 100-meter E-silhouette target (kneeling man target); and two scaled, 250-meter E-silhouette targets. The scaled, 25-meter zeroing target shows a scaled, 250-meter E-silhouette target with superimposed grid lines, like those on the Army's current 25-meter live-fire zeroing target.

The targets are presented one at a time, but they can be activated singly or in automated sequence by buttons on the Weaponeer's control panel or remote control box. The silhouette targets can be programmed to fall when hit by means of the "kill" button. Exposure time can be varied from 1 to 30 seconds for the scaled, 100-meter target and from 2 to 30 seconds for the scaled, 250-meter targets. The targets can also be set for continuous presentation. Firing pads used with the Weaponeer enable the firer to shoot from any position.

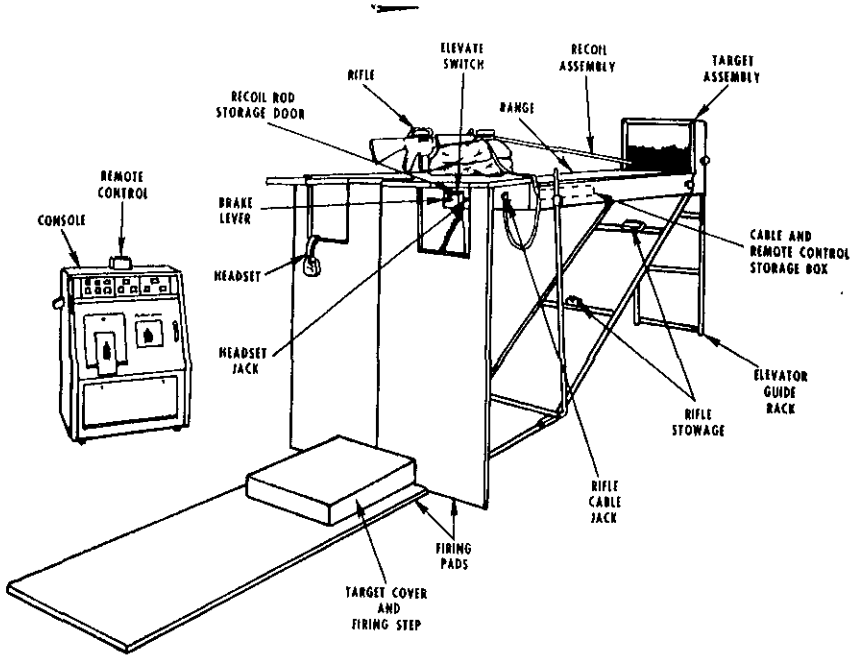
The first problem in the use of the Weaponeer is that there is a limited supply of the devices and a high demand for them. The Army now has about 45 Weaponeers distributed among 21 installations throughout the world. At Fort Benning, for example, during BRM training alone, the demand for the Weaponeer is so great that only the worst shooters can be allowed to use it. Even then, these shooters are rarely permitted to spend more than a few minutes on it.

Although the Army plans to buy a total of 220 Weaponeers (including those already in the system and some designated for use by its Reserve Components), these additional devices probably will not alleviate the supply problem. In fact, as more soldiers are exposed to the Weaponeer, the demand is likely to increase accordingly. Thus, the only way to alleviate the problem — apart from continuing to buy more and more Weaponeers — is to develop more efficient approaches to using the ones that are available.

One of the reasons for the excessive demand on the device is that trainers and commanders alike have greeted the Weaponeer with favorable attitudes and high expectations. Although these attitudes and expectations are welcome signs of the Weaponeer's acceptance, they have also contributed to a considerable amount of over-reliance on the device as a cure-all for shooting problems.

This over-reliance has had at least three negative side effects. First, it has led to the neglect of other, more traditional forms of marksmanship training that could be helpful to the problem shooter. Second, those who would otherwise be providing this training have begun to use the Weaponeer as a crutch — if a soldier cannot shoot, they send him to the Weaponeer. (Obviously, solving a soldier's shooting problems is not as simple as that.) Finally, over-reliance inflates the demand for the Weaponeer, and soldiers sometimes stand in line for long periods waiting to use it. This waiting time is usually unproductive.

The third problem with the Weaponeer is the lack of a standardized set of procedures for its use. With no guidelines to follow, instructors are put in a learn-as-you-go situation. Most try to make the best of it, but with no tested and established guidelines for using the device and with a high rate of turnover among instructors, inefficient and counterproductive procedures are frequently used.



Weaponeer set up for use in foxhole supported position.

There are several ways of alleviating these problems:

The Weaponeer should be used continuously. The Weaponeer is a limited resource, and that limited resource is being wasted any time it is allowed to sit idle when troops are around.

The Weaponeer should be used for diagnosis. The task of diagnosis is to identify the sources of the various problems soldiers have with shooting. Diagnosis is therefore a necessary first step toward remedying these problems.

One of the reasons the Weaponeer is so valuable as a diagnostic device is that it eliminates most of the errors caused by the rifle, the ammunition, and the environmental conditions (wind, for example). This makes it easy to trace shooting problems back to the shooter himself. A second reason is that the features on the Weaponeer, most notably the replay feature, can provide more information about a soldier's shooting problems than is now available through any other means. Through these features, most violations of the fundamentals of marksmanship can be detected.

While problems can be diagnosed quickly and effectively with the Weaponeer, ARI's research indicates that these problems cannot be remedied with it — at least not quickly and effectively enough to warrant using the device in this manner. In one experiment, for example, the live-fire performance (rounds to zero) of initial entry soldiers who had received various types and amounts of instruction on the Weaponeer was compared with the performance of a group of initial entry soldiers who had received no instruction on the device. Overall, each soldier in the former groups received an average of about seven minutes of individual instruction and fired an average of about nine shots on the device. The results showed that these soldiers performed no better than those who did not receive the instruction.

Even if it were possible to solve a soldier's shooting problems in, say, 30 to 60 minutes, it probably would not make sense — in most cases, at least —

to use the device as a remedial trainer. If each soldier were given only 10 minutes on the device, it would take 5 Weaponeers and 8 hours to "remediate" a company of 240 soldiers. Even with 10 Weaponeers, each soldier's remedial training time would be only 20 minutes.

Given the limited supply of Weaponeers, this same point could be made in regard to the use of the device as a substitute for live-fire training. One soldier's training will almost always come at the expense of another's. Then, too, the Weaponeer was not designed to serve as a substitute for live fire. Anyone who has fired the Weaponeer knows it does not produce the same sensations as live fire does. In short, the Weaponeer is an excellent supplement to live fire but can never totally replace it.

Instead, after their problems have been diagnosed, soldiers should be assigned to dry fire remedial training exercises that are designed to correct their individual shooting problems. Dry fire can be quite effective when it is done with the help of a good instructor, and it is cost effective. This way, resources are not wasted in efforts to conduct training on the Weaponeer that can and should be conducted elsewhere. In addition, instructors can concentrate their efforts in the areas where soldiers need help the most.

The Weaponeer should be used early in BRM training. If the Weaponeer is used in the early stages of BRM training, shooting problems can be detected and eliminated before they develop into bad habits, which are not easy to change. Shooting problems can be corrected quickly at that time because the soldiers have repeated opportunities for practice and feedback. If these problems are identified later in BRM training, the soldiers may not be able to correct them before they attempt to qualify.

As an illustration, ARI recently examined the effect of varying amounts and types of Weaponeer training on the record fire performance of permanent party soldiers. These soldiers fired up to 128 rounds on the Weaponeer, with feedback, 24 to 48 hours before firing record fire. While the Weaponeer training had a clearly beneficial effect on the soldiers' performance on the Weaponeer, it had no apparent effect on their performance at record fire. Given this result, it would seem far wiser to use the Weaponeer to diagnose the shooting problems of many soldiers early in their training than to attempt to upgrade the existing skills of only a few soldiers immediately before record fire.

The Weaponeer should be used in the prone, unsupported position as well as in the foxhole supported position. BRM training emphasizes both firing positions, but virtually all diagnosis with the Weaponeer is now being conducted in the foxhole supported position. (This position is seen as having first priority because it is easier to learn and is the position from which soldiers zero their rifles.) Data from two separate experiments, however, strongly suggest that firing from the prone position involves skills only weakly related to those involved in firing from the foxhole. In other words, a soldier who shoots well from the foxhole supported position may or may not shoot well from the prone unsupported position and vice versa. Since half the rounds in record fire are fired from the prone unsupported position, it would be beneficial to use the Weaponeer to diagnose firers in that position, too, preferably after they begin showing signs of mastering the foxhole supported position.

Trainers should keep track of soldiers who have shooting problems. Once a soldier has been diagnosed as having shooting problems, an effort should be made to keep track of his progress from one period to the next. Some feel that when the poor BRM performer eventually zeros, his shooting problems are solved. But they are mistaken. Unless weak shooters are identified early and helped throughout the program, chances are they will still have problems when they attempt to qualify.

The Weaponeer also may provide needed support to unit marksmanship training, particularly since live fire ranges are often either inadequate or unavailable. This is especially true in Europe where there is a scarcity of certified outdoor range facilities that can be used to satisfy both marksmanship training and record fire requirements. Typically, Army Reserve and Army National Guard units also must bear time and cost burdens because of the need to transport troops to remote training locations and billet them there.

One potential use of the Weaponeer at the unit level is for sustainment training. The problem is that there is no compelling evidence to support the Weaponeer's training value for sustainment. Again, our research indicates that training on the Weaponeer improves performance on the device itself but not on the live fire range. Other research in which individual soldiers improved after receiving Weaponeer training leaves it unclear whether these gains resulted from the training itself or from other factors, such as more or better individualized instruction.

Most feel that the device does have training value, but our data suggest that if the Weaponeer is going to have an appreciable effect on unit marksmanship performance, the amount of training must be quite extensive. Since most installations do not have enough Weaponeers to provide this extensive training to every soldier who needs it, we recommend that when a device becomes available for use in unit training it should be used for diagnosis. Once a soldier's shooting problems have been diagnosed, he can then be given remedial training exercises *off* the Weaponeer that are tailored to his specific needs. (If time allows, the Weaponeer can also be used following dry fire to help determine whether a soldier's shooting problems have, in fact, have been solved.)

Another way the Weaponeer can be used in units is to help commanders predict which of their soldiers will qualify and which will fail when they go for record fire. In one experiment, for example, soldiers fired a "surrogate" record fire scenario on the Weaponeer (not the Weaponeer's pre-

programmed "random raise scenario") 24 to 48 hours before their actual record fire. Of the 48 soldiers tested, 73 percent passed it when it was predicted they would pass or failed when it was predicted they would fail. Nineteen percent passed when it was predicted they would fail, and, most significantly, only 8 percent failed when it was predicted they would pass. The use of the device for prediction is not foolproof, of course, and it may be difficult for unit commanders to schedule the use of the device over extended periods for testing purposes. But it is an option for the commander who may feel he has no options.

Used in this way, the Weaponeer may at least be able to identify weak shooters before they go to record fire so that they can be given remedial training. As an alternative, their performance on the Weaponeer might be used as a substitute for some record fire, which should result in significant savings in time and money. (ARI is now in the process of preparing a report that will provide specific information on how to conduct "surrogate" record fire testing on the Weaponeer. And a more complete discussion on the use of Weaponeer is presented in ARI Research Product 82-08, *Guidelines for Use of Weaponeer During Basic Rifle Marksmanship Training,* by J.D. Schendel and G.P. Williams.)

Thus, research indicates that if the Weaponeer is used as suggested here, and not misused, it can be a valuable resource both during BRM training and later in unit marksmanship training programs.

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The Light Leaders Course now being conducted at Fort Benning was developed in conjunction with the conversion last year of the 7th Infantry Division to the new light division organization. Once that division's training has been completed, the other divisions that are being activated or converted to that organization will also be trained.

The course was designed as a way to increase the infantry skills of company leaders in the areas of leadership, training instruction, and tactical battle drill. In addition, it emphasizes the development of unit cohesiveness, teamwork, and professionalism. The "spirit of light infantry," which flavors the course, helps produce a tough, aggressive, and smart infantry leader — one who has confidence in his abilities, his training, and his men, as well as in the ability of light infantry units to fight and win on the battlefield.

The course is 28 days long and includes an average of 16 hours of training per day. Although the course is taught by members of the York Branch, Benning Ranger Division of the U.S. Army Ranger Department, it is not a Ranger school — it is a leadership course, and one that is unique in the Army's formal education system.

Each class is made up of the company chain of command, from commander through team leader, of three rifle companies from one battalion. (Under its TOE, each light infantry battalion has three rifle companies and a headquarters company.) The three company cadres are formed into student platoons for training, with the leadership positions rotated daily. (The students wear their regular insignia of rank, however, and the formal chain of command of each company is still responsible for all non-training administration and control for that company.)

During the course, the three company commanders work as part of the course staff to plan and present instruction and training. And because the Light Leaders Course uses a train-the-trainer approach, more than half of the formal instruction and training is prepared and presented by members of the class. All members of the student company, in fact, participate in the training and are evaluated by Ranger instructors on their leadership, motivation, supervision, and communication, as well as on their tactical application of the subject matter.

The subject matter is divided into three groups: core subjects, METT-T training, and tactical battle drills (which culminate in a situational training exercise). The core subjects are the individual soldier skills and leadership skills soldiers must have to perform squad collective tasks and battle drills — marksmanship, physical training, hand-to-hand combat, and troop-leading procedures, for example.

The METT-T training includes tasks that each leader must overcome his fears to perform — such as small-