

SURVEY OF M16A1 BASIC RIFLE MARKSMANSHIP
CURRENT PROCEDURES AND PRACTICES

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Accordingly, TRADOC directed the U.S. Army Infantry School (USAIS) to conduct a TEA for the M16A1 rifle. In support of the USAIS, the U.S. Army Research Institute (ARI) has initiated TEA-related research for this weapon. A major objective of the ARI research is to identify both short and long range improvements in the training process for M16A1 rifle marksmanship.

One portion of this research is the development of a prototype criterion referenced, threat oriented Basic Rifle Marksmanship (BRM) training program. Based on research accomplished during 1976 and 1977, it appears that the immediate development of the prototype BRM program is premature and that certain intermediate research and development tasks remain to be completed before program development should be initiated. One of these tasks involves updating the existing information base for BRM training procedures and practices. This report presents the findings of a survey of BRM training as it is now implemented at four Army Training Centers (ATCs) and discusses in detail the various procedures, performance measures, diagnostics, remediation activities, training aids, and training materials used for this training. In addition, the report discusses the implications of the survey findings for improving the marksmanship training process.

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FOREWORD

This report is provided by the Mellonics Systems Development Division of Litton Systems, Inc., to the Army Research Institute for the Behavioral and Social Sciences (ARI) under Contract Number DAHC 19-77-C-0011. Under the contract, a part of Mellonics' effort concerns support to the Training Effectiveness Analysis (TEA) research presently being conducted by the ARI for the United States Army Infantry School (USAIS). A major objective of the ARI research is to identify both short and long range improvements in the training process for M16A1 rifle marksmanship. One portion of this research involves updating the existing information base for Basic Rifle Marksmanship (BRM) training procedures and practices. This report presents the findings of a survey of BRM training as it is now implemented at four Army Training Centers (ATCs) and discusses in detail the various procedures, performance measures, diagnostics, remediation activities, training aids, and training materials used for this training. In addition, the report discusses the implications of the survey findings for improving the marksmanship training process.

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SURVEY OF M16A1 BASIC RIFLE MARKSMANSHIP - CURRENT PROCEDURES AND PRACTICES

INTRODUCTION

Recent Training and Doctrine Command (TRADOC) studies indicate for many Army systems that training does not optimize total system effectiveness¹. These same studies show that existing practices tend to under use training resources. Because of these findings, TRADOC initiated the Training Effectiveness Analysis (TEA) effort. The objective of TEA is to produce training improvements through analysis and redesign of the procedures and resources used to implement training. Ideally, this is to lead to more cost-effective training alternatives.

Accordingly, TRADOC directed the U. S. Army Infantry School (USAIS) to conduct a TEA for the M16A1 rifle. In support of the USAIS, the U. S. Army Research Institute (ARI) has initiated TEA-related research for this weapon. A major objective of the ARI research is to identify both short and long range improvements in the training process for M16A1 rifle marksmanship.

The Mellonics Systems Development Division of Litton Systems, Inc., under contract to the ARI, is supporting the TEA research being conducted

¹

Department of the Army. Analyzing training effectiveness (TRADOC PAM 71-8). Washington, D. C.: Author, December 1975.

at the Fort Benning ARI Field Unit. One portion of this research is the development of a prototype criterion referenced, threat oriented Basic Rifle Marksmanship (BRM) training program. Current plans call for this program to teach techniques for both stationary and moving target engagement. This is in contrast to current programs which only teach techniques for engaging stationary targets.

Based on research accomplished during 1976 and 1977², it appears that the immediate development of the prototype BRM program is premature and that certain intermediate research and development tasks remain to be completed before program development should be initiated. One of these tasks involves updating the existing information base for BRM training procedures and practices. This report presents the findings of a survey of BRM training as it is now implemented at four Basic Training (BT) sites and discusses in detail the various procedures, performance measures, diagnostics, remediation activities, training aids, and training materials used for this training. In addition, the report discusses the implications of the survey findings for improving the marksmanship training process.

OBJECTIVES

The objectives of this research were:

- o To update the existing information base for BRM training, and
- o To analyze and discuss the implications of the research findings for the development of improved BRM training.

² Maxey, J. and George, J. Analysis of M16A1 basic rifle marksmanship (Task Report). Fort Benning, GA: Mellonics Systems Development Division, December, 1977.

METHOD

At the onset of this research, it was decided that a series of visits to selected U. S. Army BT sites and on-site observation of their BRM programs would be a satisfactory means of collecting the information required to update the information base for BRM training procedures and practices. Ideally, it would have been desirable to study all of the BRM programs presently being implemented within the Army. Because of time, fiscal, and personnel limitations, this was judged to be impractical. Instead, it was decided to limit the data collection effort to those BT sites that will receive the majority of the male and female trainees coming into the Army in 1978.

Table 1 lists the installations currently conducting BT in the continental United States and their anticipated 1978 trainee input. As shown in Table 1, four installations will receive just over 70 percent of this input: Fort Leonard Wood, MO; Fort Jackson, SC; Fort Dix, NJ; and Fort Knox, KY. Because of this, these installations and their BRM programs were selected for on-site visits and survey.

The dates of each visit to the four BT sites surveyed, the composition of the survey team at each site and, the phases of BRM training observed at these sites are indicated in Table 2. For each visit, a similar procedure was followed in developing a schedule for observing the BRM program. BT schedules of training were inspected. Periods of BRM instruction and practice of interest to the survey team were identified. Visits to training sites (classrooms or firing ranges) were coordinated and scheduled with the

Table 1

U. S. ARMY INSTALLATIONS CONDUCTING BASIC TRAINING AND ANTICIPATED TRAINEE INPUT FOR 1978

Installation	Anticipated 1978 Input	Percent of Total Input	Cumulative Input
Fort Leonard Wood, MO	40,780	18.57	18.57
Fort Jackson, SC	39,764	18.10	36.67
Fort Dix, NJ	38,365	17.47	54.14
Fort Knox, KY	36,016	16.40	70.54
Fort McClellan, AL	20,815	9.48	80.02
Fort Sill, OK	19,862	9.04	89.06
Fort Gordon, GA	17,365	7.91	96.97
Fort Bliss, TX	6,672	3.03	100.00
Total	219,639	100.00	—

Table 2

TRIP DESCRIPTION FOR THE BT INSTALLATIONS VISITED AND BRM TRAINING PROGRAMS OBSERVED

Installation Visited	Trip Dates	Survey Team Composition	BRM Training Observed
Fort Jackson, SC	March 13-17, 1978	4 Civilian Scientists 1 Noncommissioned Officer (E7)	Preparatory Marksmanship 25 Meter Firing Field Firing Practice Record Fire Record Fire Night Defensive Firing Target Detection
Fort Knox, KY	May 15-18, 1978	2 Civilian Scientists 1 Noncommissioned Officer (E7)	Preparatory Marksmanship 25 Meter Firing Field Firing Practice Record Fire Record Fire Automatic and Night Firing Target Detection
Fort Leonard Wood, MO	June 5-7, 1978	1 Civilian Scientist 1 Noncommissioned Officer (E7)	Mechanical Training Preparatory Marksmanship 25 Meter Firing Field Firing Record Fire Target Detection
Fort Dix, NJ	June 12-14, 1978	1 Civilian Scientist 1 Field Grade Officer (O4)	25 Meter Firing Field Firing Automatic and Night Firing Target Detection

local BRM committee group. With the completion of these planning activities, the survey team began its data collection activities.

With the exception of the Fort Jackson, SC, visit, the following data collection procedure was employed. Team members observed the instruction and practice activities conducted at the training sites. Notes were taken indicating the specific instruction presented, the procedures followed during training, the measures of performance employed to evaluate training progress, the diagnostics and remediation activities employed during training, and the aids and devices used to support training. Finally, interviews with company and BRM committee group personnel were conducted to discover their views on BRM training and, as required, to clarify points about the program that were unclear or that could not be observed during the visit. Also, training aids and devices used to support training were photographed. Finally, at each installation lesson plans and trainee hand-outs for BRM training were obtained. Together, this information constitutes the data used to update the conduct of current BRM training.

At Fort Jackson, SC, the above activities were completed with one exception; instead of observing the practice and firing activities of the program, the civilian members of the survey team directly participated in these activities. This culminated with their qualification in the use of the M16A1 rifle. The purpose of this was to give the civilian members of the team an opportunity to "get the feel" of the total program and to broaden their knowledge base for rifle marksmanship training. It was believed that this experience would aid in the identification of both problems and difficulties experienced by trainee and cadre during the marksmanship training

process. It was also anticipated that the experience would provide a sound basis for developing ideas for improving BRM training.

RESULTS

In this section the information collected during the observation of BRM training at the four ET sites visited is summarized. The objective of this summary is to provide a cogent picture of current BRM training in terms of the following:

- o Program composition
- o Program organization
- o Training procedures
- o Training aids
- o Program evaluation
- o Diagnostic procedures
- o Remediation activities
- o Training materials

For the most part, notes taken during the observation of training provide the basis for this summary. When observational data were unavailable for particular segments of training, lesson plans were used to provide the required information. As appropriate, the summary is supplemented with information derived from interviews and comments from the personnel (both company and committee cadre) involved in the conduct of the training at the sites visited.

PROGRAM COMPOSITION

Training programs consist of sequences of training (instruction and practice) and evaluation activities. The former are designed to teach

selected subject matter (Instruction) and to provide opportunities to practice the application of the information and skills taught during instruction (practice). The latter are designed to assess proficiency with respect to the training completed prior to the evaluation. The composition of a training program is thus indicated by the nature of the training and evaluation phases comprising it.

Table 3 shows the training and evaluation phases defining each program surveyed. Also, a short description is provided for each phase briefly indicating its objective. Of the 15 phases included in one or more of the programs, 10 are common to all. Considered in the context of their respective objectives, these phases constitute the minimum required to teach and evaluate the individual marksmanship skills for engaging stationary targets under daylight conditions and familiarizing trainees in the firing of the rifle at night and in the automatic mode.

The five phases not common to all of the programs surveyed are special purpose phases designed to accomplish specific functions as follows:

- o To provide trainees an opportunity to practice the development of tight shot groups (Pre-Battlesight Zero Firing),
- o To provide trainees an opportunity to fire the rifle from positions not emphasized in the main body of the program (Position Firing),
- o To give trainees having difficulties in achieving a battlesight zero additional time and rounds to accomplish this task (Battlesight Zero Firing-Remedial)
- o To give trainees an opportunity to adjust to the transition from firing at relatively close (25 meter) stationary targets to firing at more distant (75, 175, and 300 meter) stationary targets (Transition Firing),

Table 3
TRAINING AND EVALUATION PHASES INCLUDED IN EACH BRM PROGRAM SURVEYED

Program Phase	Objective of Phase	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Mechanical Training	Teach the mechanical operation and maintenance of the M16A1 rifle.	X	X	X	*
Preliminary Rifle Instruction (PRI)	Teach sight alignment, aiming point placement, rifle steady hold factors, prone firing position. ^a	X	X	X	*
Familiarization Firing	Give trainees an opportunity to get the "feel" of firing the rifle and to "prove" to the trainee that the rifle will not hurt them.	X	X	X	*
Pre-Battlesight Zero Firing	Apply fundamentals to obtain tight shot groups, analyze shot groups. ^b	X	X	X	*
Battlesight Zero Firing	Achieve a battlesight zero through achievement of tight shot groups and sight adjustments.	X	X	X	X

(continued)

Table 3 (continued)

Program Phase	Objective of Phase	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Position Firing	Practice firing from various positions. The purpose and timing of this firing is dependent on the BRM program. ^c	X	X	-	X
Battlesight Zero Firing (Remedial)	Give trainees who failed to achieve a battlesight zero during the time allotted for this an additional opportunity to achieve a zero before attempting to fire the Field Fire phase of the program.	-	X	-	X
Transition Firing	Practice adjusting the aiming point. Also to provide trainees an opportunity to become adjusted to firing at targets located at longer distances than they have experienced up to this point in training.	-	X	X	X

(continued)

Table 3 (continued)

Program Phase	Objective of Phase	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Field Target Engagement	Instruction and practice firing at targets located at 75, 175, and 300 meter distances under conditions of time pressure. Both single and multiple target configurations are engaged during this firing.	X	X	X	X
Practice Record Fire	Practice firing at targets under conditions similar to the Record Fire evaluation so trainees will "know" what the Record Fire exercise is like.	X	X	X	X
25 Meter Corrective Fire	Confirm the zero achieved during the Battlesight Zero phase of training. Completed by trainees who failed to achieve a minimum score on Practice Record Fire or who hit too "few" targets in field firing. Also completed by trainees who have not yet "zeroed" their rifles by this point in the program.	X	X	X	X

(continued)

Table 3 (concluded)

Program Phase	Objective of Phase	Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Day Record Fire Evaluation	Assess daylight marksmanship proficiency.	X	X	X	*
Automatic Rifle Firing	Familiarize the trainee in the use of the M16A1 rifle in the automatic mode.	X	X	X	*
Night Rifle Firing	Familiarize the trainee in the use of the M16A1 rifle at night.	X	X	X	*
Target Detection Training	Teach topics related to target detection and range estimation.	X	X	X	*

^a Prone supported and unsupported (Fort Leonard Wood and Fort Jackson), prone unsupported (Fort Dix), and prone supported (Fort Knox)

^b In the Fort Jackson program the results of this firing are used to divide the trainees into "best" firers and "worst" firers. In the Battlesight Zero phase of training which follows "best" firers fire the first and "worst" firers fire later.

^c In the Fort Leonard Wood and Fort Jackson programs this occurs "late" in the program, while in the Fort Knox program it occurs "early".

^d In the Fort Leonard Wood program 25 meter corrective fire is completed as required following the first field fire exercise. In the Fort Dix program this is completed as required following the Practice Record Fire exercise. In the Fort Knox program this is completed by trainees who have not yet "zeroed" their weapons by the Practice Record Fire phase of training.

*Common to all programs.

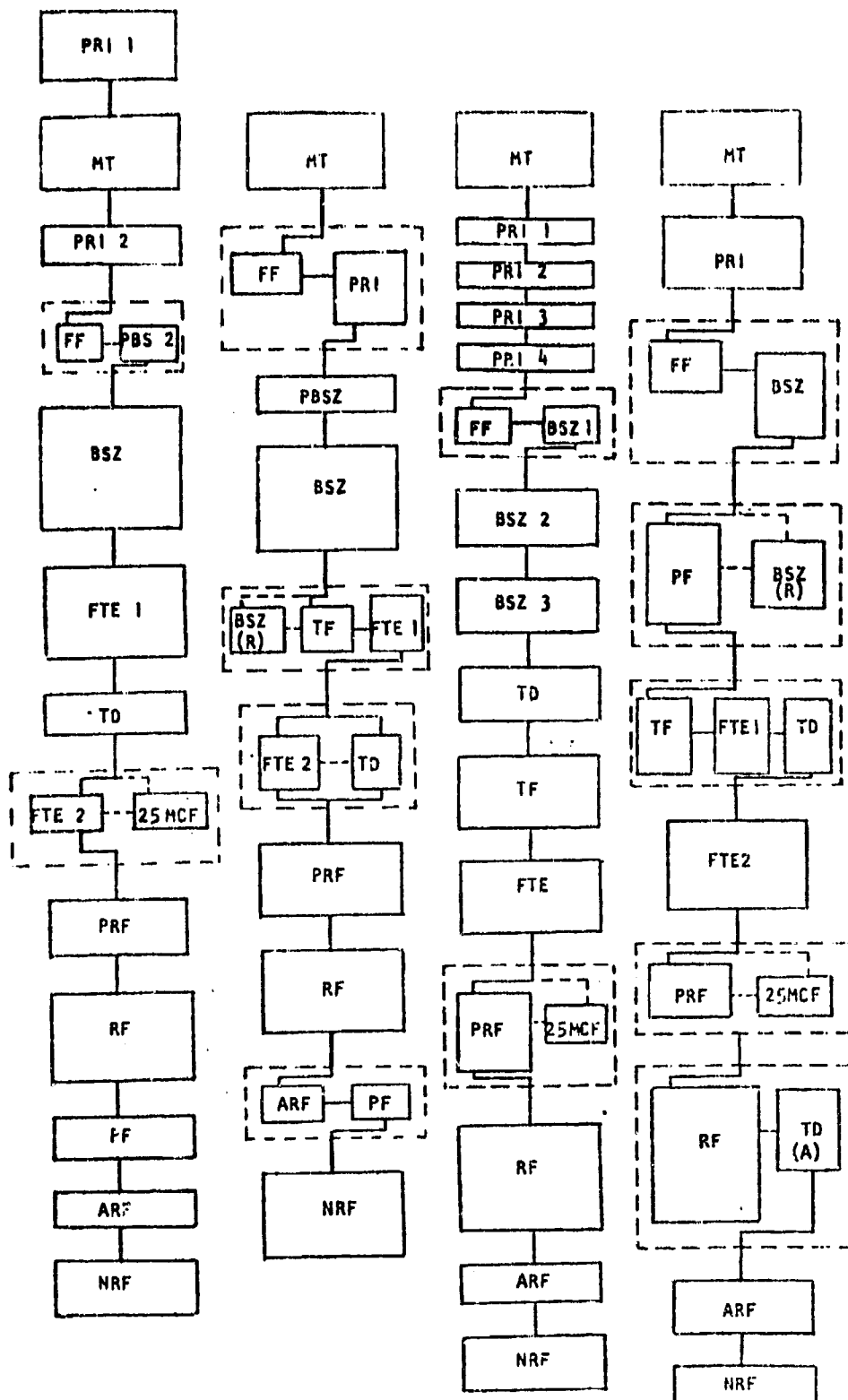
- o To determine if a failure to maintain a battlesight zero is responsible for inadequate firing performance during field and/or practice record firing (25 Meter Corrective Fire).

Thus, in terms of the basic classes of instruction, practice and evaluation activities comprising the programs surveyed, there is a significant amount of overlap. Where differences emerge, these appear to involve the inclusion of specific training phases designed to augment or supplement the training process.

PROGRAM ORGANIZATION

A BRM training program, while built around a set of phases each with its own objectives, is in practice implemented via segments of instruction and practice called "periods". In some instances, a given phase will be synonymous with a period. In other instances, several periods will be required to implement a given training or evaluation phase. The manner in which a program's training and evaluation phases are partitioned and organized into periods defines the organizational structure of a program. Figure 1 displays the structure of the programs surveyed for this report. Each block in this figure corresponds to a period of instruction. Block labels broadly indicate the nature of the training completed during the periods. Block size in the vertical dimension roughly indicates the amount of time allocated for the period. Table 4 lists the complete title for each block and the title abbreviations used in Figure 1.

An inspection of Figure 1 suggests across programs that organizational structure is highly variable. However, when Figure 1 is considered in relation to the discussion of program composition, it is readily seen that the



Fort Leonard Wood

Fort Jackson

Fort Dix

Fort Knox

Figure 1. Organizational structure of the Fort Leonard Wood, Fort Jackson, Fort Dix, and Fort Knox BRM training programs.

Table 4
BLOCK TITLES AND ABBREVIATION

Block Title	Block Abbreviation
Mechanical Training	MT
Preliminary Rifle Instruction	PRI
Familiarization Firing	FF
Pre-Battlesight Zero Firing	PBSZ
Battlesight Zero Firing	BSZ
Position Firing	PF
Field Target Engagement	FTE
Battlesight Zero Firing (Remedial)	BSZ(R)
Transition Firing	TF
Target Detection Training	TD
Target Detection Training (Aerial)	TD(A)
25 Meter Corrective Fire	25MCF
Practice Record Fire	PRF
Record Fire	RF
Automatic Rifle Firing	ARF
Night Rifle Firing	NRF

programs may be considered to be transformations of a single, basic organizational strategy for training. This strategy is presented in Figure 2.

In moving from the basic strategy shown in Figure 2 to each of the program organizations displayed in Figure 1, five mechanisms appear to have been employed:

- o Incorporation of "new" phases in the basic framework to augment one or more of the basic phases (and its associated periods).
- o Consolidation of phases (and their associated periods) into single periods of instruction.
- o Segmentation of a unitary phase into two or more periods of instruction.
- o Movement of a single period of instruction from its original position in the basic framework to another position (either earlier or later in time) in the hierarchy.
- o Retention of obsolete training from a previous training program structure.

Thus, in terms of basic structure, the four programs surveyed are very similar. Where differences in structure exist, these are a matter of the presence of "new" training, training consolidation, training segmentation, timing, and retention of training from a prior framework. In determining the reasons for the existence of these differences, it is likely that they derive from at least three sources:

- o Local preferences and opinions concerning what and how BRM training should be conducted.
- o Local training considerations, e. g., availability of

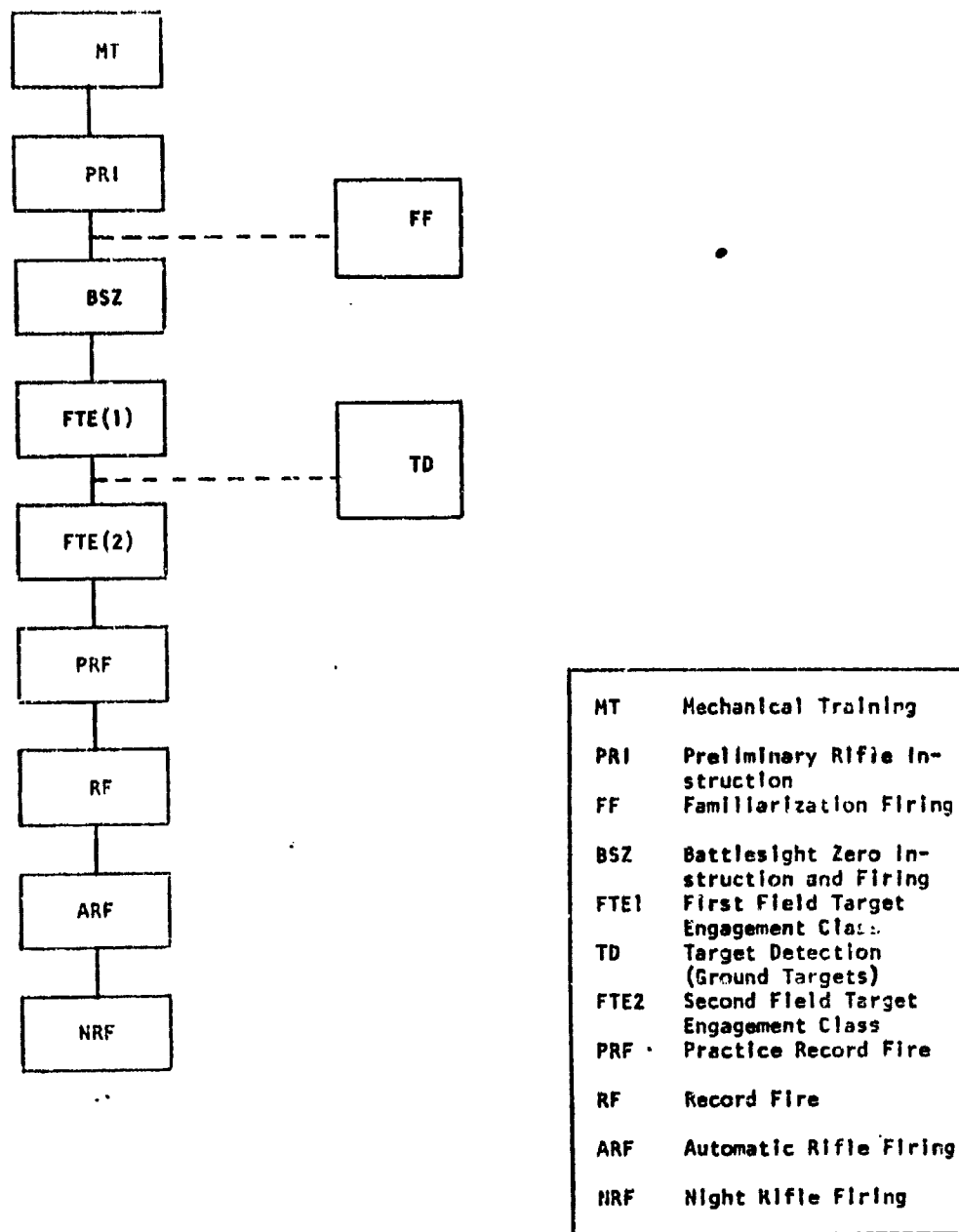


Figure 2. Organizational structure underlying the BRM programs surveyed at Fort Leonard Wood, Fort Jackson, Fort Dix, and Fort Knox.

training cadre, operative firing ranges, and training aids and the typical company fill for the installation.

- o Guidance from the BRM committee commander or higher local authorities.

Table 5 displays the organizational structure of the four programs surveyed in terms of the periods of instruction and practice comprising the programs and the responsible BT elements for these periods. With one exception (25 Meter Corrective Fire in the Fort Dix program), all of the instruction and practice following Preliminary Rifle Instruction was conducted by the BRM committee group. However, for the periods dedicated to Mechanical Training and Preliminary Rifle Instruction, the responsibility for the conduct of these periods varied across the programs. For Mechanical Training, company cadre conducted this training in three of the programs (Fort Leonard Wood, Fort Jackson, and Fort Knox), while in the fourth (Fort Dix) BRM committee group personnel conducted the training. For Preliminary Rifle Instruction, both company and committee elements conducted their instruction in the Fort Leonard Wood and Fort Knox programs, while in the Fort Jackson program it was taught by the committee and in the Fort Dix program it was taught by the company. Thus, it is clear for the most part that the conduct of BRM in the programs surveyed was the responsibility of the BRM committee. Where the company took responsibility, this appeared to be for at least two reasons:

- o Convenience
- o A desire on the part of local authorities to have the company cadre become more involved in the training process.

Table 5

PROGRAM ORGANIZATION BY PERIODS OF INSTRUCTION AND THE RESPONSIBLE BT ORGANIZATIONAL ELEMENT FOR EACH PERIOD

Program Phase	Fort Leonard Wood		Fort Jackson		Fort Dix		Fort Knox	
	Period No.	Taught By	Period No.	Taught By	Period No.	Taught By	Period No.	Taught By
Mechanical Training	1	Company	1	Company	1	BRM Committee	1	Company
Preliminary Rifle Instruction	0	Company	2	BRM Committee	2	Company	2	BRM Committee
	2	BRM Committee			3	Company		if OSUT; Company
Familiarization Firing	3	BRM Committee	2	BRM Committee	6	BRM Committee	3	BRM Committee
	3	BRM Committee	3	BRM Committee	—	—	—	—
Pre-Battlesight Zero Firing	4	BRM Committee	4	BRM Committee	6	BRM Committee	3	BRM Committee
Battlesight Zero Firing	10	BRM Committee	3	BRM Committee	—	—	4	BRM Committee
Position Firing	—	—	5	BRM Committee	—	—	4	BRM Committee
Battlesight Zero Firing (Remedial)	—	—	5	BRM Committee	10	BRM Committee	5	BRM Committee
Transition Firing	5	BRM Committee	5	BRM Committee	11	BRM Committee	5 ^a	BRM Committee
Field Target Engagement	7	BRM Committee	6	BRM Committee			5	BRM Committee

(continued)

Table 5 (Continued)

Program Phase	Fort Leonard Wood		Fort Jackson		Fort Dix		Fort Knox	
	Period No.	Taught By	Period No.	Taught By	Period No.	Taught By	Period No.	Taught By
Practice Record Fire	8	BRM Committee	7	BRM Committee	12	BRM Committee	7	BRM Committee
25 Meter Corrective Fire	7	BRM Committee	—	—	12	Company	7	BRM Committee
Day Record Fire Evaluation	9	BRM Committee	8	BRM Committee	13	BRM Committee	8 ^b 9	BRM Committee BRM Committee
Automatic Rifle Firing	11	BRM Committee	9	BRM Committee	14	BRM Committee	10	BRM Committee
Night Rifle Firing	12	BRM Committee	10	BRM Committee	15	BRM Committee	11	BRM Committee
Target Detection Training	6	BRM Committee	6 ^c	BRM Committee	9	BRM Committee	5 ^d 8 ^e	BRM Committee BRM Committee
Total Periods	13		10		15		9/10 ^f	
Total Hours	45		43		45		50/55 ^f	

^a For OSUT companies Periods 5 and 6 are combined into a single period.

^b These periods are combined in practice. For this reason, they are treated as a single unit in counting the numbers of periods in this program.

^c Target detection is concurrent training in this program.

(continued)

- d,e Target detection is concurrent training in these periods. For Period 5, ground target detection is taught. For Period 5, aerial target detection and engagement is taught.
- f Because Periods 5 and 6 are combined for OSUT companies, their program consists of 9 periods. For the BT companies, however, the program consists of 10 periods. As a result, OSUT companies complete a 50 hour program, while BT companies complete a 55 hour program.

TRAINING PROCEDURES

The procedures employed to implement a training program consist of the collection and sequencing of instructional and practice activities that are used to teach specific sets of knowledge and skills. In this section, the procedures employed in implementing the programs surveyed are compared and contrasted for the various phases of training and evaluation comprising these programs.

Mechanical Training. In all but the Fort Leonard Wood BRM program, mechanical training is the first step in the BRM training process. In the Fort Leonard Wood program, this training follows a company presented period dedicated to introducing the concepts of aiming, sight alignment, and the sight picture (see Figure 1). In all but the Fort Dix program the mechanical training phase of instruction is taught by company cadre either in an open area adjacent to the company or in a company area classroom. The Fort Dix instruction in this area, in contrast, is presented by BRM committee group cadre in a Brigade area classroom. This is a relatively recent change to the Fort Dix BRM program.

In each program, instructors cover essentially the same content areas (see Table 6) using a combination of lecture and demonstration. That is, a topic is presented and discussed by the instructor. Concurrently, as appropriate, a demonstration (using the rifle) is conducted by the instructor. Next, the trainees repeat the demonstration with their rifles. Following this, another topic is presented and the above procedure is repeated.

Table 6

CONTENT AREAS COVERED DURING THE MECHANICAL TRAINING PHASE

Content Area	Fort Leonard Wood	BRM Program		Fort Dix	Fort Knox
		Fort Jackson			
M16A1 Characteristics	X	X			X
M16A1 Nomenclature	X	X	X		X
M16A1 Functioning		X	X	X	X
Clearing	X	X		X	X
Disassembly	X	X		X	X
Assembly	X	X		X	X
Function Check		X		X	X
Maintenance	X	X		X	X
Immediate Action		X			X
Loading	X	X			X
Unloading	X	X			X

Preliminary Rifle Instruction. For all but the Fort Leonard Wood program, preliminary rifle instruction is taught following the Mechanical Training phase. For the Fort Leonard Wood program, part of this training comes prior to and part after the Mechanical Training phase. The organizational element responsible for implementing this training and its structure is program dependent. For the Fort Jackson program the training is conducted entirely by BRM committee personnel within a single period. In contrast, in the Fort Dix program this instruction is entirely the responsibility of the company cadre and is taught in four periods. In the Fort Knox program, OSUT companies are taught in a single period by BRM committee personnel, while BT companies are taught in a single period by company cadre. Finally, in the Fort Leonard Wood program, company cadre teach the portion of this instruction that comes prior to mechanical training, while BRM committee personnel teach that portion of this instruction scheduled following mechanical training. Apparently these variations reflect local considerations and opinions about how instruction for preliminary rifle marksmanship training should be implemented.

The purpose of this training in all of the programs is twofold. First, it is to teach the trainee how to use the sighting mechanism of the rifle to aim so that a round fired from the rifle will hit a designated target. Second, it is to teach the trainee how to hold his rifle, squeeze the trigger, and control breathing while firing so that his aim will be minimally affected. The topics addressed in this training for the programs surveyed are presented in Table 7. As shown in the table, there is a significant overlap in the areas relevant to the above objective for this training.

Table 7

CONTENT AREAS COVERED DURING THE PRELIMINARY RIFLE INSTRUCTION PHASE

Content Area	BRM Program			
	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Sight Picture	X	X		X
Sight Alignment	X	X	X ^a	X
Aiming Point Placement	X	X	X ^a	X
Eye Focus	X	X		X
Steady Hold Factors	X	X	X ^a	X
Shot Group Analysis		X	a	
Prone Unsupported Position		X	X	
Prone Supported Position		X		X
Long and Short Range Sights		X		X
Magazine Changing			X	

^a Previously addressed as part of Mechanical Training in this program.

This process is continued until all topics slated to be covered have been addressed. As a final step in the training the trainees complete the tasks covered during instruction several times under the guidance of assistant instructor personnel. As problems or difficulties arise these personnel assist the trainees in correcting the problem or difficulty.

In addition to the above activities, the Fort Dix program follows up the mechanical training with a lecture on sight alignment, aiming point placement, sight picture, rifle steady hold factors, shot group analysis, sight adjustments, and the target box exercise. Following this lecture, the trainees use the M15 Sighting device to practice aiming point placement and sight alignment and complete the aiming bar exercise to practice achievement of a correct sight picture. While instruction and practice for the above topics is completed in the next four periods of this program, (which are administered by the company), the BRM committee judged it appropriate to cover these topics during the mechanical training phase to ensure that the trainees will have some preliminary understanding prior to company instruction in these areas.

Finally, in none of the programs surveyed was it found that relevant TEC lessons were being used to instruct the trainees in the mechanical training and maintenance aspects of the M16 rifle. This is viewed as a limitation since TEC lessons properly integrated into a training program can be a valuable means of increasing the knowledge and skill base of an individual.

For all of the programs it was observed that instructors depend heavily on the lecture to present their instruction in this phase of training. Charts and training aids are also employed extensively to assist in getting teaching points across to the trainees. While trainees are allowed to take notes during these lectures, they are not encouraged by the instructors to do this. For all of the programs observed, note taking behavior was seldom observed.

For all except the Fort Jackson program, the training for this phase of BRM is implemented as follows: The trainee company receives a lecture as a group. Immediately following this lecture, the company as a group completes a practical exercise relevant to the lecture. In contrast, the trainee company in the Fort Jackson program is broken down into four groups prior to the training. Next, each group proceeds to one of four stations. These stations each have their own instructor personnel and are designed to address a specific set of topics. At each station the trainees receive a lecture. Next, trainees complete a station specific practical exercise. When the trainees at each station have finished the required exercise, they rotate to a new station for a new lecture and a different practical exercise. This process continues until all trainee groups have moved through all of the stations.

The variety of and frequency with which practical exercises are completed during this phase of training was found to vary considerably across the programs surveyed. This is shown in Table 8. Clearly the Fort Jackson program places the greatest emphasis on practical exercises in this phase.

Table 8

PRACTICAL EXERCISES COMPLETED DURING THE PRELIMINARY RIFLE INSTRUCTION PHASE

Practical Exercise	BRM Programs		
	Fort Leonard Wood	Fort Jackson	Fort Knox
M15 Sighting Device Sight Alignment Sight Picture	— —	4 ^a 4	— —
Washer/Dime Exercise	1	15-25	1
Modified Paige Exercise	1	AR ^b	—
Transposition/Target Box Exercise	1	AR	1
Aiming Bar Exercise	—	—	—
Assumption of Prone Unsupported Position	AR	AR	—
Assumption of Prone Supported Position	AR	AR	AR

^a Numbers in the table indicate the number of times each trainee completes the exercise

^b AR = As required in judgement of the instructor

This is shown by the fact that this program requires the trainees to complete many more practical exercises related to the instruction for this training phase than are required in the other programs observed.

Familiarization Firing. In all of the programs this phase is integrated with another phase of training. The particular phase with which it is integrated is program dependent. In the Fort Dix and Fort Knox programs, it is conducted as the first part of Battlesight Zero firing. In the Fort Jackson program it is integrated into the Preliminary Rifle Instruction phase, while in the Fort Leonard Wood phase it is integrated into the Pre-Battlesight Zero Firing phase. In all cases it constitutes the first firing that any of the trainees complete and is conducted against 25 meter zero targets.

This phase involves only a firing exercise. The number of rounds fired and the positions from which these rounds are fired vary across the program as shown in Table 9. In the Fort Jackson and Fort Knox programs, no assessment is made of the results of these findings. In the Fort Dix and Fort Leonard Wood programs, however, assistant instructor personnel inspect the results of the familiarization firings and make "bold" sight adjustments if the shot groups appear (in their judgement) to be "sufficiently" compact. The idea behind this phase is that the trainee may come into the BRM program with some inherent fear of firing a weapon. By letting him fire the weapon early in training, he is allowed to see that the weapon will not "hurt" him. It is assumed that if the trainee finds this to be the case, his inherent fears will be reduced. As a consequence, he will be more receptive to the training he receives after the firing.

Table 9
 ROUNDS FIRED AND POSITIONS FROM WHICH FIRINGS ARE CONDUCTED

BRM Program	Rounds Fired	Positions
Fort Leonard Wood	9	Prone Supported
Fort Jackson	3	Standing
Fort Dix	10	Prone Supported
Fort Knox	6	Prone Supported

Pre-Battlesight Zero Firing. This phase of training is conducted in two of the four programs observed: the Fort Jackson and the Fort Leonard Wood programs. In both programs the purpose of the phase is to provide trainees with an opportunity to achieve compact shot groups prior to attempts to achieve a battlesight zero. In the Fort Jackson program this phase is conducted as a single unit, while in the Fort Leonard Wood program it and the Familiarization Firing phase are integrated.

In the Fort Jackson program the trainees as a company receive a lecture addressing the topics of sight alignment, shot group analysis, sight changes, and rifle steady hold factor prior to a firing exercise. During the lecture the instructor uses a metal board made up to look like a 25 meter zero target and a set of three magnetic dots to illustrate the concept of shot groups and to present a discussion of shot group analysis. He also uses a chart showing the effect of incorrect sight alignment on the trajectory of a round after it has been fired from the rifle. Following the lecture, a demonstration is given to the trainees showing them the proper way to assume the foxhole firing position. Following this lecture, the trainees go to the firing line in pairs and fire 9 rounds in three, three round groups from the foxhole position. At the firing line, one member of each trainee pair fires while the other watches the firer. The man watching the firer is supposed to tell the firer when he is not employing the proper technique of fire. Based on the results of the firing, the "best" and "worst" firers are identified and assigned to groups for the battlesight zero firing that occurs in the next phase of their instruction. In addition, the assistant instructors who monitor the firing are supposed to

Identify trainees who are not properly assuming the firing position and correct such errors. They are also supposed to evaluate the shot groups fired by the trainees and for dispersed shot groups determine what aspect of the trainee's firing technique is being incorrectly performed.

In the Fort Leonard Wood program this phase is integrated with familiarization firing. Prior to the familiarization firing/pre-battle-sight zero firing exercise, the trainees receive as a company group a lecture covering the rifle steady hold factors, shot group analysis and the importance of correct sight alignment for achieving tight shot groups and hitting distant targets. During this lecture, the trainees are talked through the rifle steady hold factors. In addition, they are encouraged to refer to a booklet issued to them earlier that summarizes rifle marksmanship fundamentals. It should be noted that the Fort Leonard Wood program is unique in this respect. It is the only program that provides the trainee with written guidance summarizing the fundamentals of rifle marksmanship.

Following the lecture, the trainees move to the firing line with only one man on the line at a time. The trainee fires his nine familiarization rounds. Next, he fires a six round and then a three round shot group. While firing, assistant instructors observe his firing techniques and firing positions, making corrections as they judge appropriate. Based on the results of these firings the assistant instructors are supposed to identify errors in firing technique being committed by those trainees who fail to achieve tight shot groups. In those cases where trainees have very tight shot groups, sight changes are made. These trainees are then allowed to demonstrate that they have achieved a "zero" by firing an additional three round shot group.

Battlesight Zero Firing. All of the programs include this phase of training. In the Fort Leonard Wood, Fort Jackson, and Fort Knox programs this training is conducted within a single period. In the Fort Knox program, however, it is integrated with familiarization firing. Finally, in the Fort Dix program this training is spread over three periods with the first of these being integrated with familiarization firing.

Table 10 presents the instructional content of these programs for this phase of training. As shown by this table there is a degree of variability in the content addressed during the conduct of this phase across the programs. In all of the programs the trainees as a company receive a lecture as the first item of training. The instructors cover the topics shown in Table 10 during their lectures and employ a variety of training aids to help illustrate the subject matter covered, e.g., charts are showing a correct sight picture, charts showing the effect of incorrect sight alignment, a metal board with a 25 meter zero target and magnetic dots to illustrate shot group analysis.

Following the lecture, the trainees are organized into firing orders and move to the firing line to initiate the achievement of a battlesight zero. The nature of this firing varies with each BRM program. In the Fort Leonard Wood program the trainee fires from the prone supported position. He is issued up to 30 rounds and fires these in three round groups. He continues firing to achieve a "zero" (a) until he "zeroes", (b) until ammunition is no longer available, or (c) until the range is closed. With each three round firing, his shot group is analyzed and the likely error

Table 10

CONTENT AREAS COVERED DURING THE BATTLESIGHT ZERO FIRING PHASE

Content Areas	BRM Program			
	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Sight Alignment			X	X
Aiming Point Placement			X	X
Rifle Steady Hold Factors	X	X	X	X
Battlesight Zero		X	X	
Shot Group Analysis			X	X
Sight Adjustments		X	X	X
Prone Supported Position	X			X
Foxhole Position		X		

he is committing in firing technique is identified. In this program, a "zero" is achieved when the three round shot group is within the four squares around the "x" located below the 25 meter zero target aiming point. One round out of the four squares is acceptable as long as it is not judged to be too far out. As time is available in later periods, trainees not "zeroed" continue to try to achieve a "zero".

In the Fort Dix program, the trainee also fires from the prone supported position over three separate periods. He is issued up to 36 rounds and fires these in three round groups. He continues firing (a) until he "zeroes", or (b) until his 36 rounds are used up. With each firing the shot groups are analyzed and errors in firing technique are identified by instructor personnel. To "zero" in this program the three round shot group must fall within a 5.2 cm which is centered on an "x" located below the 25 Meter Zero Target Aiming point. If the trainee in this program fails to zero during the time allocated, he is sent to the Weaponeer for diagnosis of his firing problem and remedial firing. He works on the Weaponeer until the Weaponeer personnel are satisfied that the trainee's problems have been corrected. Following the Weaponeer training, the trainee returns to the range and attempts to "zero" his weapon.

In the Fort Knox program, the trainee fires from the prone supported position. Familiarization firing is integrated with the Battlesight Zero firing. The six familiarization rounds are fired first. Next, he fires 12 rounds in three round groups (a) until he "zeroes" or (b) until his rounds are all expended. Each shot group is analyzed and likely errors

in firing technique identified by an instructor. If he fails to zero he is pulled from the firing line for remedial training. The nature and conduct of this training is left up to the company cadre. Following this training, the trainee returns to the firing line and may expend up to 30 more rounds to achieve a "zero". If the trainee is unable to zero after firing the additional 30 rounds, he is provided an opportunity to continue zeroing in the next period of instruction in this program. The same zero criteria are applied in this program as are applied in the Fort Dix program.

Finally, in the Fort Jackson program, the trainee fires his rounds for zeroing from the foxhole position. This is in contrast to the other programs where the "zero" is achieved from the prone supported position. Initially, the trainees in this program are issued 18 rounds. These are fired in three round groups. With each firing, shot groups are analyzed and likely errors in firing technique are noted by instructor personnel. If a "zero" is not achieved after firing the 18 rounds, the trainee is pulled from the firing line and sent to a remedial training class put on by the BRM committee cadre. Following the remedial activities, the trainee is returned to the firing line and issued an additional 18 rounds. These are fired until he zeroes or until his ammunition is used up. If after this firing, the trainee still has not zeroed, he is given personal attention by an instructor and firing continues (a) until he zeroes, (b) the range is closed, or (c) until the company returns to its area. In this program, the criteria for zeroing are the same as for the Fort Dix and Fort Knox programs.

Position Firing. Three of the programs surveyed (Fort Leonard Wood, Fort Jackson, and Fort Knox) include a position firing phase. The timing and purpose of this phase are program dependent. In the Fort Knox program position firing and remedial battlesight zero firing are integrated into a single period which is conducted after the battlesight zero phase is completed. During this period position firing is conducted against 25 meter targets. Prior to the firing exercise the trainees as a group receive a lecture and a demonstration designed to teach them the firing positions for the exercise. Stoppages and immediate action are also reviewed during the lecture. The purpose of the firing is to provide the trainees with an opportunity to engage 25 meter zero targets from a variety of positions, i.e., kneeling supported, kneeling unsupported, prone supported, foxhole, and standing. Nine rounds are fired from each position. The results of the firings are not scored and no diagnosis or remediation activities are employed based on the firing results (shot group patterns).

In contrast to the Fort Knox program, position firing in the Fort Leonard Wood and Fort Jackson programs takes place following Record Firing. Position firing in the Fort Leonard Wood program takes place in a single period, while in the Fort Jackson program this firing is integrated into the Automatic Rifle Firing period. The Fort Leonard Wood program requires trainees to fire a total of 26 rounds at E-type silhouette targets while wearing protective masks. Both the kneeling unsupported and prone bipod supported position are employed during the firing. A lecture and demonstration of these positions precedes the firing exercise. The purpose of the firing is to familiarize the trainee with

firing the rifle while wearing the protective mask. The exercise is not scored. For these reasons, no diagnostics or remedial activities are employed to identify and correct trainee firing difficulties.

Finally, in the Fort Jackson program, position firing is conducted following automatic rifle fire instruction. This firing is conducted from the kneeling supported and kneeling unsupported positions (nine rounds for each position) against 75 and 175 meter targets. Prior to the firing exercise, the trainees as a group receive a lecture and demonstration of these positions. The purpose of the exercise is to familiarize the trainee with firing the rifle from the two kneeling positions. Further, as was true for the other programs, the exercise is not scored and further remediation activities are not employed.

In all cases, this phase appears to serve as a means of familiarizing the trainee with firing the rifle from positions not employed for the most part during the rest of training. No emphasis is placed on firing excellence (number of hits or size of the shot group achieved) or on the identification and correction of firing difficulties that occur when the firing is conducted.

Battlesight Zero Firing - Remedial. Only two of the programs (Fort Jackson and Fort Knox) surveyed explicitly provide for this training phase. In both programs this phase is integrated with at least one other phase. All trainees who do not achieve a battlesight zero during the time allocated for this task receive this training.

The trainees designated for this activity first receive a lecture reviewing the previous instruction for rifle marksmanship fundamentals (sight alignment, aiming point placement, rifle steady hold factors). The lecturer employs the training aids (charts and devices) used previously to support instruction in the fundamentals. Following the lecture, the trainees move to the firing line and begin firing three round shot groups at 25 meter zero targets. As a trainee zeroes he is removed from the firing line and sent to the main body of trainees. Here he is integrated into the training that the main body of trainees is receiving. Once all of the trainees completing the remedial zero phase have zeroed, the instructors police up the range, clear it, and return to the main training area.

Transition Firing. Three of the four programs surveyed provide for transition firing. In the Fort Jackson and Fort Knox programs transition firing is integrated with other training, while in the Fort Dix program transition firing is conducted as a separate period of instruction. In all of the programs, the purpose of this phase is to provide a "bridge" between the firing conducted in the 25 meter range and the firing to be conducted on the field firing ranges. The rounds fired, the positions employed and the target-to-firer distances for this phase are program dependent (see Table 11).

In the Fort Jackson program, transition firing is integrated into the first field target engagement exercise. It is not presented to the trainees as transition firing, but rather a part of the overall firing exercise. Prior to the firing exercise, the trainees receive a lecture

Table 11

POSITIONS EMPLOYED, TARGET-TO-FIRER DISTANCES, AND ROUNDS FIRED FOR TRANSITION FIRING

Position	Target-to-Firer Distance	BRM Program		
		Fort Leonard Wood	Fort Jackson	Fort Dix Fort Knox ^a
Foxhole	75	—	2	—
	175	—	2	—
	300	—	3	—
Prone Supported	75	—	1	—
	175	—	1	—
	300	—	1	—
Prone Unsupported	75	—	2	—
	175	—	2	18 ^b
	300	—	3	—
Total		—	17	18
		—	17	15

^a Some instructors employ only the 175 meter target distance. In this case, all 15 rounds are fired at the 175 meter target.

^b If conducted on a Field Fire range, 175 meter targets are used. If conducted on a known distance range, 200 yard targets are used.

on aiming point placement and the adjustment of the aiming point. Charts and other aids are not employed to assist in getting across the teaching point of the exercise. Following this lecture, the trainees move to the firing line for a firing exercise. Transition Firing is conducted from three positions (foxhole, prone supported, and prone unsupported) in the following manner: The trainee assumes his firing position and single field fire targets are raised: Two 25 meter targets, two 175 meter targets and three 300 meter targets. The trainees are given an unlimited amount of time to engage these. The first target at a given range is fired on. Based on whether a hit or a miss is achieved, and whether the trainee is able to "sense" where his round went, the trainee is supposed to adjust his aiming point and fire at the next target at that range. Once this exercise is completed, a series of field fire targets (with time limits) are engaged.

In the Fort Knox program, transition firing is also conducted during the same time frame as the first field target engagement exercise. However, it is conducted as a separate exercise. Prior to firing, the trainees receive a lecture on aiming point placement and aiming point adjustment. The lecturer uses E- and F-type silhouette targets to assist in getting the teaching point of the lecture across to the trainees. Following the lecture, the trainees move to the firing line on a Field Fire range. Each man firing has a man sitting to his rear to spot rounds as they are fired. Because of the Field Fire range design, spotters are only able to spot rounds that fall too short. Rounds that are fired too high or to the left or right of the target are not readily observable by the spotter. For these reasons,

there is some question about the value of the spotters.

Depending on the instructor personnel at the range, trainees either fire at just 175 meter targets or at 75, 175, and 300 meter targets. Once this exercise is completed, the trainees then fire their first Field Target Engagement exercise. During the firing, the trainees are supposed to adjust their aiming point so that the likelihood of target hits is maximized. Trainees who have problems hitting targets are not necessarily identified. No special activities to help the trainee are employed in this phase.

Finally, in the Fort Dix program, transition firing is conducted as a single unitary phase. Trainees receive a lecture covering aiming point placement and adjustment. Also rifle marksmanship fundamentals are reviewed. Charts and aids are not employed during this lecture. Then from the prone unsupported position they fire 18 rounds at 175 meter targets (if conducted on a Field Fire range) or at 200 yard targets (if conducted on a Known Distance Range). The first six rounds are considered practice rounds. The next 12 are for scoring. The trainees are encouraged to hit 7 out of these 12 rounds. If, however, this criterion is not achieved, no diagnostics or remediation activities are employed to improve the trainee's hit capability.

Field Target Engagement. All of the programs surveyed provide for some type of field target engagement training. As shown by Tables 12, 13, and 14, the exact nature of the training is program dependent. In general, the purpose of this phase is to teach the rules for engaging both single and multiple target configurations at near (75 meter), medium (175 meter)

Table 12

SUMMARY OF FIELD TARGET ENGAGEMENT TRAINING BY BRH PROGRAM SURVEYED

Characteristics	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox ^a
Number of Periods for Conduct	2	2	1	2(1)
Hours Scheduled (Total)	9	8	4	11(6)
Targets	E-type silhouettes	E-type silhouettes F-type silhouettes	E-type silhouettes F-type silhouettes	E-type silhouettes F-type silhouettes
Rounds Fired- Single Targets	60	42	21	106(48)
Multiple Targets	40	36	33	32(18)
Total	100	78	54	138(66)
Positions Fired- Foxhole	45	34	18	54(18)
Prone Supported	—	10	—	—
Prone Unsupported	55	34	18	54(18)
Kneeling Supported	—	—	9	(10)(10)
Kneeling Unsupported	—	—	9	(10)(10)
Standing	—	—	—	(10)(10)
Total	100	78	54	138(66)

^a The numbers in () are for OSUT companies. In this program, BT companies fire two periods in the Field Target Engagement phase, while OSUT companies fire one period.

Table 13

**SUMMARY OF FIELD TARGET ENGAGEMENT FIRING EXERCISES: ROUNDS
FIRED BY FIRING POSITIONS EMPLOYED AND TARGET TYPE**

Firing Position	Target Type	BRM Program			
		Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox ^a
Foxhole	Single Targets	25	16	6	38(9)
	Two Targets	8	18	6	10(6)
	Three Targets	12	—	6	6(3)
Prone Supported	Single Targets	—	10	—	—
	Two Targets	—	—	—	—
	Three Targets	—	—	—	—
Prone Unsupported	Single Targets	35	16	7	38(9)
	Two Targets	8	18	8	10(6)
	Three Targets	12	—	3	6(3)
Kneeling Supported	Single Targets	—	—	3	10(10)
	Two Targets	—	—	6	—
	Three Targets	—	—	0	—
Kneeling Unsupported	Single Targets	—	—	5	10(10)
	Two Targets	—	—	4	—
	Three Targets	—	—	0	—
Standing	Single Targets	—	—	—	10(10)
Total		100	78	54	138(66)

^a Numbers in parenthesis for OSUT companies.

Table 14

SUMMARY OF FIELD TARGET ENGAGEMENT FIRING EXERCISES:
 ROUNDS FIRED BY TARGET-TO-OBSERVER DISTANCES EMPLOYED

Target-to-Observer Distance	BRM Program			Fort Knox ^a
	Fort Leonard Wood	Fort Jackson	Fort Dix	
75 meters	34	18	19	60(24)
175 meters	39	28	21	50(24)
300 meters	27	32	14	28(18)
Total	100	78	54	138(66)

^a Numbers in parentheses for OSUT companies.

and long (300 meter) target distances. Lectures precede firing exercises. During the lectures, the trainees are given guidance about aiming point placement and aiming point adjustment. The nature of the exercise to be fired is explained along with the range and safety considerations for the exercise. For the most part few or no training aids (charts, mock-ups) are employed to support these lectures. Following the lecture, the trainees move to the firing line and complete a firing exercise.

For the firing exercises, the total number of hits out of the total rounds fired is the measure used to index trainee firing proficiency. In no instance was it observed that instructor personnel inspected trainee firing records to discover what types of target situations were associated with low trainee hit rates. Further, as shown in Tables 13 and 14, the specific target exercises fired in each program vary considerably from program to program. Also, it was found that there is considerable variability in the way the results of the firing exercises are employed by the instructor personnel to diagnose individual trainee firing problems for correction. This is summarized in Table 15.

Practice Record Fire. This phase is included in all of the programs surveyed. The details of the training vary from program to program. In general though, a similar procedure is employed across programs: The trainees arrive at the firing range designated for this phase. In the Fort Jackson program this is a computer controlled range, while in the other programs it is a Record Fire Range. Next, as a group they receive a lecture which addresses the conduct of the practice record fire exercise and range procedures.

Table 15

USE OF FIELD TARGET ENGAGEMENT FIRING RESULTS FOR TRAINEE DIAGNOSIS AND REMEDIATION

Use of Results	BRM Program		
	Fort Leonard Wood	Fort Jackson	Fort Dix
Scoring	No formal scoring conducted.	For both firing exercises, the total number of hits achieved.	For both firing exercises, the total number of hits achieved.
Diagnostic Procedure	After completion of the first firing exercise in this program, those trainees who failed to hit 4 out of the first 10 rounds fired in the exercise may be sent to reconfirm their zero.	If a 50% hit rate or better is achieved in and exercise, the trainee "qualifies" in the exercise. No-thing is done with "un-qualified" trainees.	If the hit rate exceeds between 37 and 44 percent, the trainee "qualifies" in the exercise. At the company commander's discretion, trainees who score too few hits may be sent to the "Weapon" for diagnosis of firing problems and correction.
Remediation Activity	Reconfirm Zero	No special activities.	Fire on Weaponner
			Firing additional rounds on the Field Fire range at either single or multiple target configurations.

In addition, a review is provided that covers single and multiple target engagement, and aiming point placement. Few or no training aids are employed to support this lecture. Next, the trainees report to the firing line and fire the practice exercise. The exercise is designed to be similar to the qualification Record Fire exercise that is fired in the next phase of all programs. Thus, the purpose of this phase is to prepare the trainee for Record Firing.

Tables 16 and 17 summarize the Practice Record Fire exercise for the four programs surveyed. For all but the Fort Knox program, the exercises are very similar in terms of the positions from which firing is conducted, the types of targets fired at, and the distribution of rounds across target-to-observer distances. The Fort Knox program, in contrast, employs both a prone move out phase and a standing hasty aimed fire phase. This results in a distribution of rounds by distance that is somewhat different from the other programs. In all cases the measure of trainee firing effectiveness is the total number of hits achieved during the exercise. The use of the firing results for diagnostic and remediation, however, varies across the programs. This is shown in Table 18.

25 Meter Corrective Fire. All but the Fort Jackson program provide for 25 meter corrective firing. In the Fort Dix and Fort Leonard Wood programs, this is conducted using the Weaponeer facility. The Fort Knox program, which does not have an available Weaponeer, conducts this training in the field. The purpose of this phase is to identify and correct the firing technique of trainees that have not scored at minimum acceptable levels up to the point in the program where this phase occurs (see Figure 1).

Table 16

SUMMARY OF PRACTICE RECORD FIRE EXERCISE: ROUNDS
FIRED BY FIRING POSITIONS EMPLOYED AND TARGET TYPE

Firing Position	Target Type	BRM Program			
		Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Foxhole	Single Targets	12	11	11	10
	Two Targets	8	6	6	—
	Three Targets	—	3	3	—
Prone Unsupported	Single Targets	5	12	12	10
	Two Targets	12	8	8	—
	Three Targets	3	—	—	—
Move Out (Prone)	Single Targets	—	—	—	1
	Two Targets	—	—	—	6
	Three Targets	—	—	—	3
Hasty Aimed Fire (Standing)	Two Targets	—	—	—	10
Total		40	40	40	40

Table 17

**SUMMARY OF PRACTICE RECORD FIRE EXERCISE:
ROUNDS BY TARGET-TO-OBSERVER DISTANCES EMPLOYED**

Target-to-Observer Distance	BRM Program		
	Fort Leonard Wood	Fort Jackson	Fort Knox
25 m	—	—	10
50 m	5	7	5
100 m	7	7	5
150 m	6	7	6
200 m	7	7	5
250 m	7	7	6
300 m	8	5	3
Total	40	40	40

Table 18

USE OF PRACTICE RECORD FIRE RESULTS FOR TRAINEE DIAGNOSIS AND REMEDIATION

Use of Results	BRM Program		
	Fort Leonard Wood	Fort Jackson	Fort Dix
Scoring	Fort Knox		
Diagnostic Procedure	Total number of hits achieved.	Total number of hits achieved.	Total number of hits achieved.
	If a trainee does not score at least 17 hits out of the 40 rounds fired he is told he needs to do better.	Results not used for diagnostic purposes.	If a trainee does not score at least 17 hits out of the 40 rounds fired, he is allowed to fire 20 additional rounds. At the commander's discretion the trainee may be sent to the Weaponeer for diagnosis and correction of firing technique.
Remediation Procedure	No special activities.	No special activities.	Fire additional rounds on the second Fire range.

For the Weaponeer supported corrective fire, trainees are sent to the Weaponeer facility. Here, under the guidance of the facility's personnel they fire and errors in firing technique are diagnosed. Once firing technique problems have been isolated, the trainees continue to fire on the Weaponeer until the problems have been corrected. Training in this case is on a one-to-one basis.

For the Fort Knox program, the trainees receive a brief lecture on the fundamentals of firing and then move to the firing line to attempt to zero their weapon. On-the-spot corrections are provided with the firing continuing until the instructor personnel are satisfied that deficiencies in firing technique have been corrected.

Day Record Fire Evaluation. In all of the programs this phase is used to evaluate the daylight marksmanship proficiency of the trainees. If a satisfactory firing score is achieved during this phase, the trainee qualifies and may continue with his basic training. If he doesn't, he is likely to be recycled. The conduct of this phase is for the most part the same in all of the programs. The trainees assemble on a Record Fire range and receive a lecture, they move to the firing line and complete the Record Fire firing exercise. For the programs surveyed, this exercise is summarized in Tables 19 and 20.

As shown in Tables 19 and 20, the exercises for all but the Fort Knox program are very similar in terms of the total rounds fired (40), the positions these are fired from (foxhole and prone unsupported) and the distribution of these rounds across the target-to-firer distances employed for the exercise. In contrast, trainees in the Fort Knox program fire 80

Table 19

SUMMARY OF THE RECORD FIRE EVALUATION: ROUNDS BY FIRING POSITION AND TARGET TYPE

Firing Position	Target Type	BRM Program			
		Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Foxhole	Single Targets	12	12	12	21
	Two Targets	8	8	8	6
	Three Targets	—	—	—	3
Prone Supported	Single Targets	5	4	4	5
	Two Targets	12	15	16	12
	Three Targets	3	—	—	3
Prone Unsupported (Move Out)	Single Targets	—	—	—	3
	Two Targets	—	—	—	14
	Three Targets	—	—	—	3
Standing (Hasty Aimed Fire)	Two Targets	—	—	—	10
Total		40	40	40	80

Table 20

SUMMARY OF THE RECORD FIRE EVALUATION: ROUNDS AND CUMULATIVE ROUNDS BY TARGET-TO-FIRER DISTANCE

Target-to-Firer Distance	BRM Program								Fort Knox	
	Fort Leonard Wood		Fort Jackson		Fort Dix		Fort Knox		Cumulative Rounds	
	Rounds	Cumulative Rounds	Rounds	Cumulative Rounds	Rounds	Cumulative Rounds	Rounds	Cumulative Rounds		
25 m	—	—	—	—	—	—	10	10		
50 m	5	5	5	5	5	5	7	7		
100 m	8	13	7	12	7	12	16	33		
150 m	5	18	6	18	6	18	13	46		
200 m	7	25	7	25	7	25	12	58		
250 m	7	32	7	32	7	32	12	70		
300 m	8	40	8	40	8	40	10	80		

rounds from not only the foxhole and prone unsupported positions, but also from the prone position in a "move-out" mode and from the standing position using the hasty aimed fire technique. The distribution of rounds across target-to-firer distances is, however, similar to that for the other programs. Scoring in all programs is in terms of the total number of hits achieved during firing. Table 20 presents the qualification requirements for the four programs and the number of target hits this translates into for the trainees. It should be observed that the requirements for qualification are higher at all levels in the Fort Knox program than in the other programs. Finally, comparing the minimum required target hits (from Table 21) with the cumulative hits over target-to-firer distance (from Table 20) shows that in all of the programs trainees need only to engage and hit all of the targets appearing out to about 150 meters to be able to qualify at the minimum level. That is to just qualify in any of the programs, a trainee can adopt the strategy: Fire only at targets at ranges of 150 meters or less and use rounds allocated for more distant targets to engage any 150 meter (or less) targets that were missed on a first engagement.

Table 21

SUMMARY OF QUALIFICATION REQUIREMENTS FOR BRM TRAINING: NUMBER AND PERCENT OF FIRINGS THAT MUST BE HITS

Qualification Level	BRM Program								Fort Knox Hits Percent	
	Fort Leonard Wood		Fort Jackson		Fort Dix					
	Hits	Percent	Hits	Percent	Hits	Percent	Hits	Percent		
Unqualified	16	40	16	40	16	40	42	52		
Qualified										
Marksman	17-23	42-58	17-23	42-58	17-23	42-58	43-52	54-65		
Sharpshooter	24-27	60-68	24-27	60-68	24-27	60-66	53-59	66-74		
Expert	28-40	70-100	28-40	70-100	28-40	70-100	60-80	75-100		

Automatic Rifle and Night Rifle Firing. All of the programs provide for these training phases. The purpose of the training is to familiarize the trainee in the use of his weapon in the automatic mode and under conditions of dark when visibilities are limited, i.e., not as great as during a clear, sunshiny day. There is no requirement placed on the trainee to develop weapon proficiency in either the automatic mode or under conditions of darkness.

In the programs surveyed, those phases are conducted back-to-back with the automatic rifle firing phase coming before the night phase. The general procedure for this training is to have the trainees report to a range designated for the training (either a field fire or a night fire range). A lecture is presented on the use of the rifle in the automatic mode. The details of and use of training aids for the lecture were found to vary with the program (see Table 22). Next, the trainees fire an exercise with the rifle in the automatic mode. The details of the exercise were also found to vary with the program (see Table 23).

Once the automatic rifle training is completed, the trainees take a break until darkness has fallen. When it is judged to be sufficiently dark, the trainees receive a lecture on the use of the rifle at night. The details of this lecture vary with the program (see Table 24). With the exception of the Fort Jackson program, following the lecture, the trainees complete a firing exercise under conditions of darkness (see Table 25). In the Fort Jackson program, just prior to dark, the trainees complete a practice exercise for night firing. Then, after dark they complete the night exercise. Once this is finished, the trainees leave the range and their

Table 22
SUMMARY OF AUTOMATIC RIFLE FIRING TRAINING: CONTENT OF LECTURE

Content of Lecture	BRM Program		
	Fort Leonard Wood	Fort Jackson ^a	Fort Dix Fort Knox
Sight Alignment		X	
Aiming in the Automatic Mode	X	X	X
Steady Hold Factors		X	
Rapid Reloading		X	X
Biped prone supported position	X	X	X
Opposite shoulder firing		X	
Night Fire Aiming Technique			X
Firing 3-round Bursts			X
Ammunition Conservation			X
Sling Adjustment			X

^a Used a chart to cover fundamentals of automatic firing. Other programs did not use any training aids.

Table 23

SUMMARY OF AUTOMATIC RIFLE FIRING EXERCISE: ROUNDS FIRED, POSITIONS EMPLOYED, TARGETS FIRED AT

BRM Program	Rounds	Positions	Targets
Fort Leonard Wood	30 24	Prone Bipod Supported Prone Bipod Supported	E-type silhouette at 50 m.
Fort Jackson	12	Prone Unsupported	F-type silhouette at 75 m.
Fort Dix	54	Prone Bipod Supported	Automatic Fire Target at 25 meters.
Fort Knox	45	Prone Bipod Supported	E-type silhouette at 175 m.

Table 24

SUMMARY OF NIGHT RIFLE FIRING TRAINING: CONTENT OF LECTURE^a

Content of Lecture	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Night Firing Technique	X	X	X	X
Dark Adaptation		X	X	X
Off Center Vision		X	X	X
Scanning Targets		X	X	
Foxhole Firing Position		X		
Bipod Prone Supported Position				X

^a Only Fort Jackson and Fort Dix employed training aids to support the night fire lecture.

Table 25

SUMMARY OF NIGHT RIFLE FIRING EXERCISE: ROUNDS FIRED, POSITIONS EMPLOYED, TARGETS FIRED AT

BRM Program	Rounds	Positions	Targets
Fort Leonard Wood	50	Prone Bipod Supported	50 m E-type silhouettes
Fort Jackson - Day	32	Foxhole	25 & 50 m E-type silhouettes
	100	Foxhole	25 & 50 m E-type silhouettes
Fort Dix	21	Prone Bipod Supported	25 m E-type silhouettes
	21	Prone Bipod Supported	50 m E-type silhouettes
Fort Knox	15	Prone Bipod Supported	75 m F-type silhouettes

rifle marksmanship training is completed. It should be noted that the results of the firings in the automatic mode and under conditions of night do not contribute to their overall rifle marksmanship qualification. The only requirement with respect to these phases is that the trainee complete them.

Target Detection. While all of the programs surveyed make provisions for activities labeled "target detection" training, the exact nature and content of this training varies across the programs. This is shown in Table 26 which summarizes the content of this training across the four programs. For the most part, this training is oriented towards ground activities involved in the detection and/or range estimation process. In the Fort Knox program, two types of target detection training are conducted - one for ground activities and one for aerial detection and engagement.

Generally, the conduct of the training involves a lecture or series of lectures. Following the lecture portion of the training, a practical exercise is conducted which is supposed to allow for the application of the subject matter covered in the lecture. In practice, it was observed that these exercises were primarily demonstrations with insufficient time for any substantial learning on the part of the trainee. If the time and comprehensiveness of this training could be significantly expanded, however, particularly in terms of practical exercises, it is likely that the trainees would be much better prepared to perform target detection tasks, than they are now following this training.

TRAINING AIDS

Charts, equipment mock-ups, equipment models, and items of equipment

Table 26

SUMMARY OF TARGET DETECTION TRAINING: LESSON CONTENT AND PRACTICAL EXERCISES

Lesson Content	BRM Program			
	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Selection of Observation Position	X	X		X
Search Methods	X	X		X
Maintenance of Observation		X		
Target Indicators	X			X
Range Estimation	X	X		X
Moving Target Leads				X
Application of Camouflage			X	
Cover and Concealment			X	
Parapet Foxhole			X	
Pace Count		X		

(continued)

Table 26 (concluded)

	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Practical Exercise				
Range Estimation	X	X		X
Detect Personnel Targets	X	X	X	X
Pace Count Exercise		X		
Apply Camouflage			X	

designed to support practical exercises comprise the set of aids used in BRM training. Table 27 lists the aids used in the BRM programs surveyed according to the phase in which they are employed. The aids that were found in use appeared to be typical for a marksmanship program. Nothing unusual or different was observed in this area. In general, it was found that all types of aids are used extensively in the early phases of training and less frequently in the latter stages.

Table 27

SUMMARY OF TRAINING AIDS EMPLOYED TO SUPPORT 88M TRAINING

Program Phase	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Mechanical Training	Chart: Internal components of M16A1 Mock-Ups: M16A1 Ammunition	Chart: M16A1 Rifle	Chart: M16A1 Rifle	Chart: Immediate Action Safety Regulations Model: Enlarged version of M16A1 Mock-Ups: Front, Rear Sights
Preliminary Rifle Instruction	Chart: Explanation of Brass acronym Rifle Steady Hold Factors Correct Sight Picture Aiming Errors Incorrect Sight Alignment Effects	Chart: Rifle Steady Hold Factors Explanation of Brass acronym Correct Sight Picture Aiming Errors Incorrect Sight Alignment Effects	Equipment: Metal disk for Dime Drill Aiming Bar Target box, target disk, rifle rest for Target Box Exercise	Chart: Rifle Steady Hold Factors Enlarged Model: Magnetic backed cut outs of rifle rear sight, 25 meter aiming point and front sight Mock-Ups: Enlarged Rear Sight

(continued)

Table 27 (continued)

Program Phase	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
	<u>Model:</u> Magnetic backed cut out of rifle rear sight, 25 meter aiming point and front sight, magnetic backed shot group dots	<u>Model:</u> Magnetic backed cut out of rifle rear sight, 25 meter aiming point and front sight, magnetic backed shot group dots		
	<u>Equipment:</u> Metal disk for Dime Drill Target box, target disk, rifle rest for Target Box exercise	<u>Equipment:</u> M15 Sighting Device 3" disk with hole and dime for Washer & Dime Exercise Paige Sighting Device Rifle lock-rest, target box, target disk for Transposition Exercise		
Familiarization Firing	-	-	-	-

(continued)

Table 27 (continued)

Program Phase	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Pre-Battlesight Zero Firing	Model: Metal board with magnetic shot group dots to illustrate problems in shot group analysis	—	—	Chart: Correct Sight Picture
Battlesight Zero Firing	Chart: Correct Sight Picture Errors in Technique of Fire and Their Effect on shot groups	Chart: Correct Sight Picture Correct & Incorrect Sight Alignment Rifle Steady Hold Factors	Chart: Rifle Steady Hold Factors Model: Magnetic cut-out of rear sight, 25 meter aiming point and front sight, magnetic backed shot group dots	Chart: Rifle Steady Hold Factors Model: Magnetic cut-out of rear sight, 25 meter aiming point and front sight, magnetic backed shot dots
Position Firing	None	None	Mock-Ups: Enlarged Front and Rear Sights	None
Battlesight Zero Firing (Medial)	None	Same as Battlesight Zero Firing	None	Same as Battlesight Zero Firing
		(continued)		

Table 27 (continued)

Program Phase	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Transition Firing	None	None	None	None
Field Target Engagement	None	None	E-type targets	M13A1 Target Mechanisms E-, F-type targets
Practice Record Fire	<u>Chart:</u> Range Layout Range Procedures	<u>Chart:</u> Outline of Record Fire	None	<u>Chart:</u> Range Layout Score Card E-, F-type targets
25 Meter Corrective Fire	None	—	None	Same as Battlesight Zero Firing
Day Record Fire Evaluation	<u>Chart:</u> Range Layout Range Procedures	<u>Chart:</u> Outline of Record Fire	None	<u>Chart:</u> Score Card for Record Fire
Automatic Rifle Firing	None	<u>Chart:</u> Fundamentals of Automatic Firing (continued)	None	None

Table 27 (concluded)

Program Phase	Fort Leonard Wood	Fort Jackson	Fort Dix	Fort Knox
Night Rifle Firing	None	Chart: Firing Position, bullet trajectory, and use of point- ing technique at night	Chart: Principles of Night Vision Scanning the Tar- get	None
Target Detection Training	None	Principles of Night Vision	Chart: Target Indicators Target Detection Fundamentals Range Estimation Scanning	None

PERFORMANCE EVALUATION

During the course of a training program, two types of evaluation may be employed to assess trainee performance and progress: formal and informal evaluations. Formal evaluations are those tests or exercises conducted to determine if the trainee is able to meet specific, pre-determined goals or objectives. In these evaluations, objective measures of performances are collected and assessed to determine whether a given level of excellence has been achieved. Informal evaluations are those conducted by instructor personnel, to determine if the trainee is performing up to the instructor's expectations. In these cases the instructor generally observes without collecting any data. Such evaluations are subjective with their value dependent on the intuitive skills of the instructor and the extent to which he is knowledgeable in the subject matter of the training program. In the BRM programs surveyed, both formal and informal evaluations were found to be integral parts of the training process.

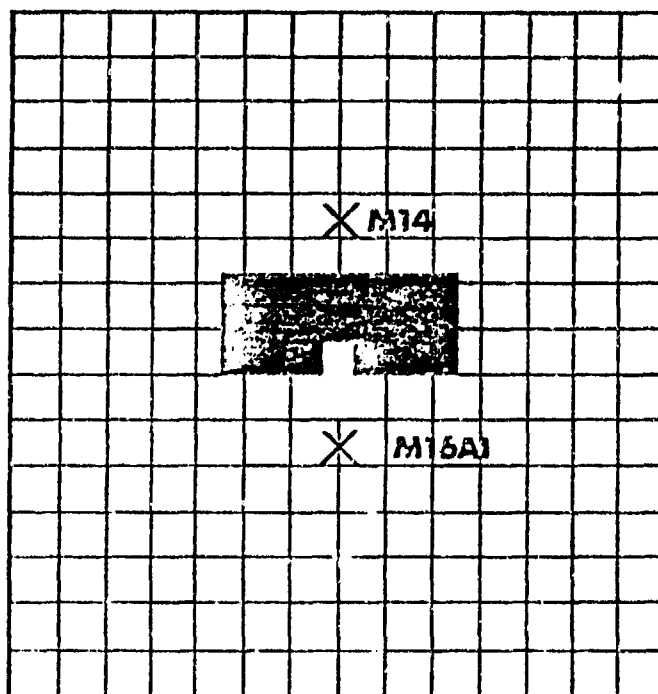
Formal Evaluations. During marksmanship training, the firing exercise is the only formal evaluation employed to assess the development of trainee firing proficiency. Three types of firing exercises are employed:

- o 25 Meter exercises
- o Field Fire exercises
- o the Practice Record Fire exercise.

For the most part, 25 meter exercises are designed to teach the trainee to consistently fire tight shot groups from designated firing positions. The

measure of performance in these cases is the degree of physical closeness of (usually) three round shot groups. For selected of these exercises, trainees are also required to achieve a battlesight zero. Ability to zero is measured by whether the trainee can fire three successive rounds at the 25 meter zero target so that these rounds fall within a 5.2 cm circle having a center located 2.4 cm below the aiming point. (see Figure 3). To complete training, all trainees are supposed to zero their weapons. If this can not be accomplished during the time allotted, additional time is usually taken at either scheduled or unscheduled points during training. In some instances, trainees receive remedial training prior to a second or third attempt to zero.

Field Firing exercises and the Practice Record Fire are designed to teach the trainee the skills necessary for achieving high target hit rates when engaging specified numbers of successively presented targets. For Field Fire exercises targets are presented at three ranges: 75, 175, and 300 meters. For the Practice Record Fire Exercise, targets are presented at six ranges: 50, 100, 150, 200, 250, and 300 meters. The measure of performance in these exercises is the hit rate, i.e., number of hits achieved out of the number of opportunities to score a hit. As a practical matter, hit rate is seldom computed. Instead only the number of hits achieved is counted and evaluated. These hit scores are evaluated by instructor personnel who compare obtained scores with pre-established training standards. What is done with the results of the evaluation is solely a function of the particular BRM program.



NOTE: TWO CLICKS UP ELEVATION OR WINDAGE WILL MOVE THE STRIKE OF THE BULLET ONE SQUARE ON THIS TARGET.

Figure 3. 25 Meter zero target.

Informal Evaluations. Instructor personnel informally evaluate trainee performance in a non-systematic way during training. These evaluations are generally limited to the trainee who is obviously doing something wrong (assuming an incorrect firing position) or who is unable to perform a particular practical exercise to standard (the trainee consistently misses all targets presented to him). In these cases the instructor observes the trainee and makes suggestions to him that will hopefully serve to correct problems. These evaluations are highly subjective. Further, because of the instructor's limited experience, it frequently happens that the trainee is unable to profit from the evaluation. Further, it was frequently the case that the instructor was unsure of what would correct a trainee's performance problem. In these cases "pat" directions (e.g., "try harder") were given to the trainee, which appeared to do little or nothing to help the trainee. Significant improvement could be achieved in this area if the instructors were better able to diagnosis and remediate problems of firing technique.

DIAGNOSTIC PROCEDURES AND REMEDIATION ACTIVITIES

Diagnostic procedures are designed to discover why a trainee is having difficulty completing a particular task. Remediation activities are designed to help the trainee correct those aspects of his performance that are contributing to poor or unacceptable task performance. In the BRM training programs surveyed for this report it was found that the use of diagnostics and remediation activities was poorly developed and limited in scope. For the most part, diagnosis of firing difficulties was found to be in the hands of the instructor personnel at the firing lines. It was generally observed that these instructors were often unsure as to what aspect of a trainee's

firing technique was creating a firing problem, i.e., a failure to zero in the Battlesight Zero phase or a failure to achieve high hit rates in the Field Target Engagement phases. In these cases, the instructors tended to encourage the trainee to try different corrections in firing technique until something worked.

At those installations having a Weaponeer facility (Fort Dix and Fort Leonard Wood) a somewhat different approach was found to be in use. In these programs, trainees having a problem (inability to achieve a battlesight zero or failing to hit field targets with a degree of consistency) are frequently sent to this facility for diagnosis and remediation.

In general, though, the lack of planned diagnosis and remediation was found to be a major limitation of current BRM training. It is likely the inclusion of easily applied diagnostic procedures would significantly aid the instructor in providing assistance to the trainee having marksmanship problems. Further, by including a variety of specific remediation activities to solving specific firing problems, it is likely instructors would be in a better position to help the trainee having a firing problem.

TRAINING MATERIALS

One goal of the BRM training survey was to determine what types of written materials were made available to the trainee during the marksmanship training process. It was discovered that only two programs (Fort Jackson and Fort Leonard Wood) distributed written materials to trainees. At the beginning of the Fort Jackson program trainees are issued the SMART Book which contains a section on M16 Mechanical training. Nothing,

however, is included in this pamphlet that addresses rifle marksmanship fundamentals or field firing. Thus, the usefulness of this material is limited to only a small part of marksmanship training.

The materials issued to the trainees in the Fort Leonard Wood program, however, have much more relevance to the training process. There is a "fact sheet" of the M16 rifle (general data, operational characteristics, and definitions of selected marksmanship terms) and the BRM booklet. The "fact sheet" provides a summary of general information presented during the Mechanical Training phase. The BRM booklet, on the other hand, is used as an aid in much of the BRM instructional process, particularly fundamentals training. It addresses the following subject matter areas:

- o Rifle Steady Hold Factors
- o Basic firing positions
- o the BRASS acronym
- o Shot group analysis
- o Correct sight picture
- o Sight alignment errors and their effect.

During fundamentals training, as the instructor lectures on selected topics in the booklet, the trainees follow the major points of the lecture in their booklet. This is viewed as a valuable aid because it not only puts down in writing what is being lectured on, but it also serves as a readily available reference for the trainee when he has a problem or a question on marksmanship fundamentals.

CONCLUSIONS

The objective of the marksmanship survey was to update the existing information base for BRM training. It was hoped that in the diversity of the programs surveyed, ideas and improvements could be identified that would be appropriate for inclusion in a new BRM program. The results of the survey, as discussed in the previous sections, show that current BRM training is doing little that is new or innovative. The results, however, point to a number of areas where improvements are likely to result in a better trained marksman. These are:

- o Improvement in the process of instruction,
- o Improvement in the knowledge of the instructor staff, both at the company and committee level,
- o Increased use of diagnostics and remediation activities,
- o Improvement in the measurement and evaluation process during training,
- o Improved quality control of the complete BRM training process.

It is suggested that if attention is paid to these areas in future BRM training development that a significant improvement will accrue in the quality of the marksmen produced during basic training in the U. S. Army.

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