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# BASIC RIFLE MARKSMANSHIP TEST: CADRE PRETEST AND POSTTEST ATTITUDES

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**August 1978**

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# U. S. ARMY RESEARCH INSTITUTE

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BASIC RIFLE MARKSMANSHIP TEST:
CADRE PRETEST AND POSTTEST ATTITUDES

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ARI FIELD UNIT AT FORT BENNING

August 1978

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Research Problem Reviews are special reports to military management. They are usually prepared to meet requests for research results bearing on specific management problems. A limited distribution is made--primarily to the operating agencies directly involved.
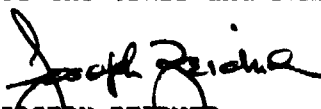
The research reported here was performed by the Army Research Institute's Fort Benning Field Unit. It is part of an ongoing program of research directed toward development of cost effective methods for individual and collective training. This program includes research on multiple aspects of the design, development, evaluation, and integration of cost and training effective training systems for the U.S. Army.

This report presents results of questionnaires administered to cadre during the Basic Rifle Marksmanship (BRM) Test conducted at Fort Jackson, S.C., during the spring of 1976. The questionnaires were designed and administered in response to a request by the U.S. Army Infantry School (USAIS) for support of the Training and Doctrine Command (TRADOC) sponsored field test. Test support provided by ARI included direct involvement in all phases of the test from design through analysis and reporting of results.

The BRM Test was a comparative evaluation of the cost and training effectiveness of four programs of instruction. Data collected included cost, performance, and demographic data, in addition to the attitude data. ARI and TRADOC Combined Arms Test Activity (TCATA) jointly reported the analyses of the demographic data in the Proceedings of the Fifteenth Annual Army Operations Research Symposium. Subsequent ARI reports will present analyses of trainee questionnaire data and an analysis of the training effectiveness of each block of instruction in the four BRM programs. The successful conduct of the BRM Test required close coordination between ARI, USAIS, and other TRADOC elements, particularly TCATA. The orchestration of the diverse participants by the Test Director, COL George Ball and the Test Officer, MAJ Jack Ball, insured the success of the test. Substantial and dedicated assistance was provided by SP5 Keith Evans and SP4 Frederick Heller during the instrument construction, data reduction, and data analysis phases of this project. CPT Michael Clayton, Mr. Jack Morris, and Mr. Don Walker at the TRADOC Combined Arms Test Activity (TCATA) provided ADP support. TCATA support included receiving the data for key punching, building, and editing the data base, and providing descriptive statistics on all questionnaire items.

The project was conducted as part of Army Project 2Q763731A773, FY 76 Work Program, and Army Project 2Q763743A773, FY 77. It was directly responsive to the requirements of the USAIS and TRADOC.

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BASIC RIFLE MARKSMANSHIP TEST:
CADRE PRETEST AND POSTTEST ATTITUDES

## BRIEF

Requirement:

To determine attitudes of cadre, *were studied for* ~~toward~~ each of four Programs of
Instruction (POI) used in the Basic Rifle Marksmanship (BRM) Test.

Procedure:

Pretest and posttest questionnaires were tiven to 59 male officers
and noncommissioned officers (NCO) from the BRM committee group at Fort
Jackson, S.C. Items were designed to request background information
and to elicit responses about program effectiveness, cadre confidence
in trainee performance, and miscellaneous training topics. Also, rep-
rosentatives of company cadres (male and female officers and drill
sergeants) from each test company participated in end-of-test struc-
tured group interviews.

Findings:

The data show a consistent pattern of strong negative attitudes
held by the cadre toward a reduction in instructional hours or rounds
for BRM training. These attitudes represent a bias which must be re-
duced to insure user acceptance and effective implementation of any
shortened BRM POI.

Instructional problems in marksmanship fundamentals and feedback
procedures are also discussed.

Utilization of Findings:

These results should be used in the redesign of rifle marksmanship
POI's and the implementation of a shortened BRM POI. We recommend that
TRADOC and the U.S. Army Infantry School not implement a shortened BRM
program without an accompanying training course for cadre. Such a
course would be most effectively conducted using a mobile training team
to provide specific instruction in the organization and delivery of the
POI and the scheduling of manpower and ranges for the efficient conduct
of the shortened POI.

BASIC RIFLE MARKSMANSHIP TEST:

CADRE PRETEST AND POSTTEST ATTITUDES

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## BACKGROUND

A field test comparing four Programs of Instruction (POI) for
Basic Rifle Marksmanship (BRM) training was conducted during the spring
of 1976 at the Army Training Center, Fort Jackson, S.C.  This report
presents the results of questionnaires administered to the BRM commit-
tee group cadre during that test.  BRM is a required course of instruc-
tion for all basic combat training (BCT) (male) and basic training (BT)
(female) trainees.  The four POI's in the test ranged in length from 77
instructional hours[1] [the current Army Subject Schedule (Department of
the Army, 1947a)] to 35 hours, and from 720 rounds of ammunition ex-
pended per trainee to 262 rounds (Table 1).


### Table 1

#### Total Hours of Instruction and Rounds of
#### Ammunition for BRM Test POI

| POI | Hours | Rounds |
|-----|-------|--------|
| 1   (ASUBJSCD)[a] | 77 | 720 |
| 2 | 62 | 513 |
| 3 | 49 | 262 |
| 4 | 35 | 334 |

[a]Army Subject Schedule Program (baseline program for rifle marksmanship).

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[1]The figure "72 hours" was erroneously used in the questionnaires.
See Appendix A for explanation.

The primary purpose of the BRM Test was to determine the training
effectiveness of the alternative POI and to perform a Cost and Training
Effectiveness Analysis (CTEA) on the programs. On the basis of this
CTEA, one of the four POI's will be selected for use Army-wide. A
final CTEA report, to be produced by Training and Doctrine Command
(TRADOC) Systems Analysis Activity (TRASANA), will integrate the re-
sults of analyses performed on the firing, cost, demographic (Tierney,
Cartner, and Clayton, 1977), and attitude data. A secondary purpose
of the test was to construct a data base for use in developing a long-
term, "threat-oriented" marksmanship program (i.e., a program designed
to meet anticipated demands of warfare of the future).

## PURPOSE

The primary criterion for evaluating the effectiveness of each of
the four BRM training programs was terminal marksmanship performance
measured as hit probability (pH). The attitudes and opinions of both
trainees and trainers (cadre) provided additional data in the evalu-
ation of each program. The questionnaires were also designed to
locate weak portions of the programs and to preview likely implemen-
tation problems.

Specifically, the questionnaires were administered to determine
reactions to each program and to measure the perceived effectiveness
of each program. The objectives of the cadre questionnaires were to
(1) determine cadre opinions toward each of the four BRM programs
prior to teaching experience with all four programs; (2) determine
cadre opinions toward each of the four BRM programs subsequent to teach-
ing experience with each program; and (3) collect background information
on the cadre (USAIS, 1976b).

Cadre received questionnaires both prior to the BRM Test and at
the conclusion of the test. Many items were repeated (pretest and
posttest) to detect attitude changes as a function of experience with
the four POI's. Trainees also completed questionnaires both before
and after BRM training. Results of the trainee questionnaires will
appear in a subsequent report.

## METHOD

### Research Design and Questionnaires

Figure 1 shows the test design. The cells labeled "LT" and "RT"
represent limited training control groups for each POI and regular
training experimental groups for each POI. The LT groups received an

early record-fire posttest[2] immediately after fundamentals training and then continued through the rest of the BRM program.[3] All trainees, both LT and RT, received a record-fire posttest after the completion of daytime record fire and again after the completion of BRM training. The test included male (n = 3,400) and female (n = 1,000) trainees, with five male basic training companies and one female basic training company per POI (USAIS, 1976b). Thus the design of the BRM Test was factorial, with four independent variables (program of instruction, LT versus RT, sex of trainee, and repeated measures). The cadre questionnaires focused primarily on aspects of the first variable, i.e., characteristics of the four POI's.

Questionnaire items were designed to request background information from respondents and to elicit responses about program effectiveness, cadre confidence in trainee performance, and miscellaneous training topics. The Cadre Pretest Questionnaire contained 87 items. Most were multiple-choice items, typically 5- and 7-point rating scales. There were a few rank-order items, and fill-in-the-blank items that required numeric responses. Items were in an objective format. The Cadre Posttest Questionnaire had 94 items; 80 items were repeated from the Cadre Pretraining Questionnaire, and 2 questions were open-ended for comments. (See Appendixes B and C for copies of the questionnaires, and see Appendix A for further description of procedures used for constructing the questionnaires.)
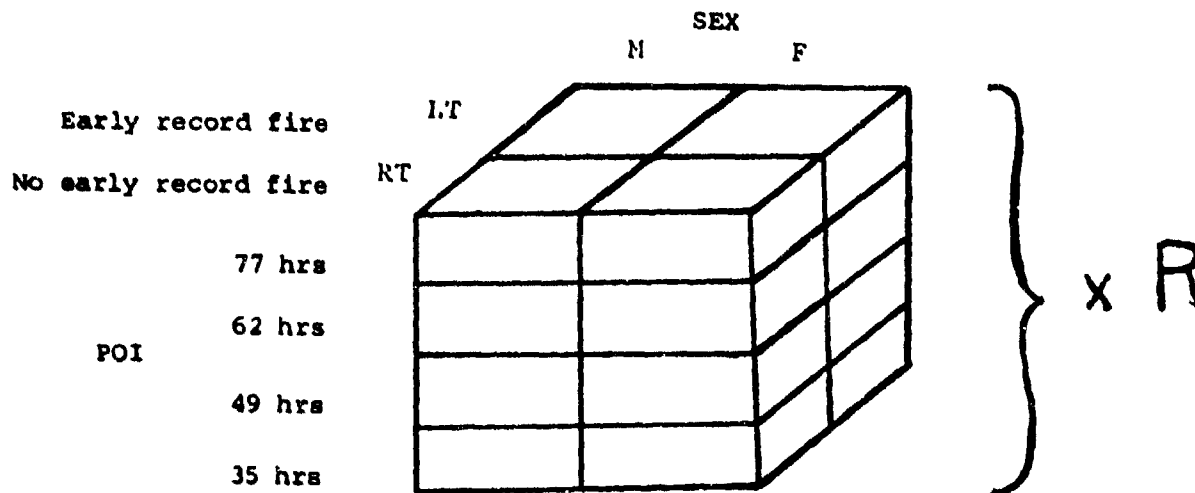


Figure 1. Experimental design of BRM field test.

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[2] This posttest was used at various points in the BRM Test. It was a specially constructed record-fire table that provided a common effectiveness measure for each POI.

[3] This represents the best approximation to a "no-training" control group practical in a test that involves trainees engaging in live firing.

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## Population

The BRM committee group at Fort Jackson has responsibility for conducting BRM training (e.g., delivering instruction and operating ranges). Group characteristics are based on questionnaire self-reports. The population was composed of 59 male officers and NOC's, reporting 15 years (median) Army service (R = 10 - 343 months). Median time of assignment to an Army Training Center was 15 months (R = 1 - 138), with a median of 10 months (R = 1 - 138) teaching BRM. A mean of 12.7 years (R = 11 - 18) of civilian education had been completed. Each instructor had experienced about 1 year of combat. About 10% of the cadre reported last Record Fire qualification as Sharpshooter; 80% reported Expert qualification.

All of the cadre were actively participating in some aspect of BRM training at the time of the test; most had experience in more than one segment of that training. Table 2 presents the percentage of cadre reporting participation in each phase of BRM. The distribution of experiences in Table 2 corresponds to the cadre's mean rankings of their knowledges and skills in each of the seven parts of BRM training. For example, individuals most frequently reported having experience in teaching marksmanship fundamentals; this phase of training was also most frequently reported as the area of greatest BRM expertise.

Table 2

Percentage of Cadre Reporting Participation in
Each Phase of BRM Training

| Phase of BRM | Percentage[a] |
|---|---|
| Mechanical Training | 50 |
| Marksmanship Fundamentals | 70 |
| Battle Sight Zero | 60 |
| Field Fire | 43 |
| Automatic Fire | 33 |
| Night Fire | 37 |
| Record Fire | 39 |

[a]Individuals usually had experience in more than one phase of BRM training; hence percentages do not sum to 100%.

## Data Collection

Questionnaires were administered in a well-lighted classroom. All cadre were present simultaneously, and discussion was prohibited during the administration sessions; however, procedural questions were answered. The Cadre Pretest Questionnaires were given prior to the start of the BRM Test, but after the cadre had been certified by the Fort Jackson Training Center as knowledgeable about and prepared to teach each of the four POI's. The Cadre Posttest Questionnaires were given after posttest record firing was completed in all four POI's. All training and all firing were therefore completed prior to administration of this questionnaire.

## RESULTS

The BRM instructors were asked attitudinal questions that can be conveniently placed in six categories. Questions related to

- Overall instructional and specific POI effectiveness;

- Sufficiency of scheduled hours of instruction;

- Sufficiency of numbers of rounds fired by trainees during BRM;

- Confidence in trainees' abilities to hit targets at various ranges after completion of each POI;

- Comments about perceived difficulties in BRM training; and

- Attitudes toward miscellaneous BRM topics, such as

  - Early record fire practice,

  - Known distance (KD) firing,

  - Night firing,

  - Battle sight zero,

  - Various training aids, and

  - Scheduling of BRM within the BCT/BT cycle.

In general, no before-after differences were found. Unless otherwise indicated, data reported here are from posttest measurements. A quality control check performed on all answer sheets resulted in the loss of one Pretraining Questionnaire from the data base.

## Overall Effectiveness

The cadre rated the 77- and 62-hour POI's as more effective overall than the 49- and 35-hour POI's ($F = 25.98$, $p < .001$, $\eta^2 = .29$). Figure 2 depicts mean ratings of effectiveness for each POI.

The cadre also more frequently selected the longer programs as the more successful in "producing good rifle marksmen" ($\chi^2 = 12.07$, $p < .001$). When asked to rank the four POI's compared in the BRM test in terms of "overall effectiveness" in "teaching BRM," the cadre rank-ordered programs as follows:

1.  62-hour POI $\bar{X} = 1.85$  (44%),

2.  77-hour POI $\bar{X} = 2.00$  (28%),

3.  49-hour POI $\bar{X} = 2.70$  (16%), and

4.  35-hour POI $\bar{X} = 3.26$  (12%).

Mean rankings are shown for each POI. Parenthetical numbers indicate the percentage of the cadre assigning the rank of "1" to each program. Months of combat experience was positively, though modestly, correlated to the preference for the longer programs ($r = .33$, $p < .05$, $r^2 = .11$).

When cadre asked to rank the four POI's in terms of "effectiveness in building trainee motivation," the mean rankings were as follows:

1.  62-hour POI $\bar{X} = 1.85$  (40%),

2.  77-hour POI $\bar{X} = 2.08$  (28%),

3.  49-hour POI $\bar{X} = 2.64$  (16%), and

4.  35-hour POI $\bar{X} = 3.19$  (17%).

The percentage of cadre who assigned the rank "1" is again indicated in parentheses. Commenting about trainee motivation, one instructor pointed out that "[a problem with teaching BRM is that trainees are] not . . . motivated prior to coming to the ranges [and then are] not being properly instructed by their drill sergeants." Another stated, "Units should not be run to ranges in [the] mornings." Finally, one commented, ". . . trainees are afraid when . . . on the line from being yelled at."
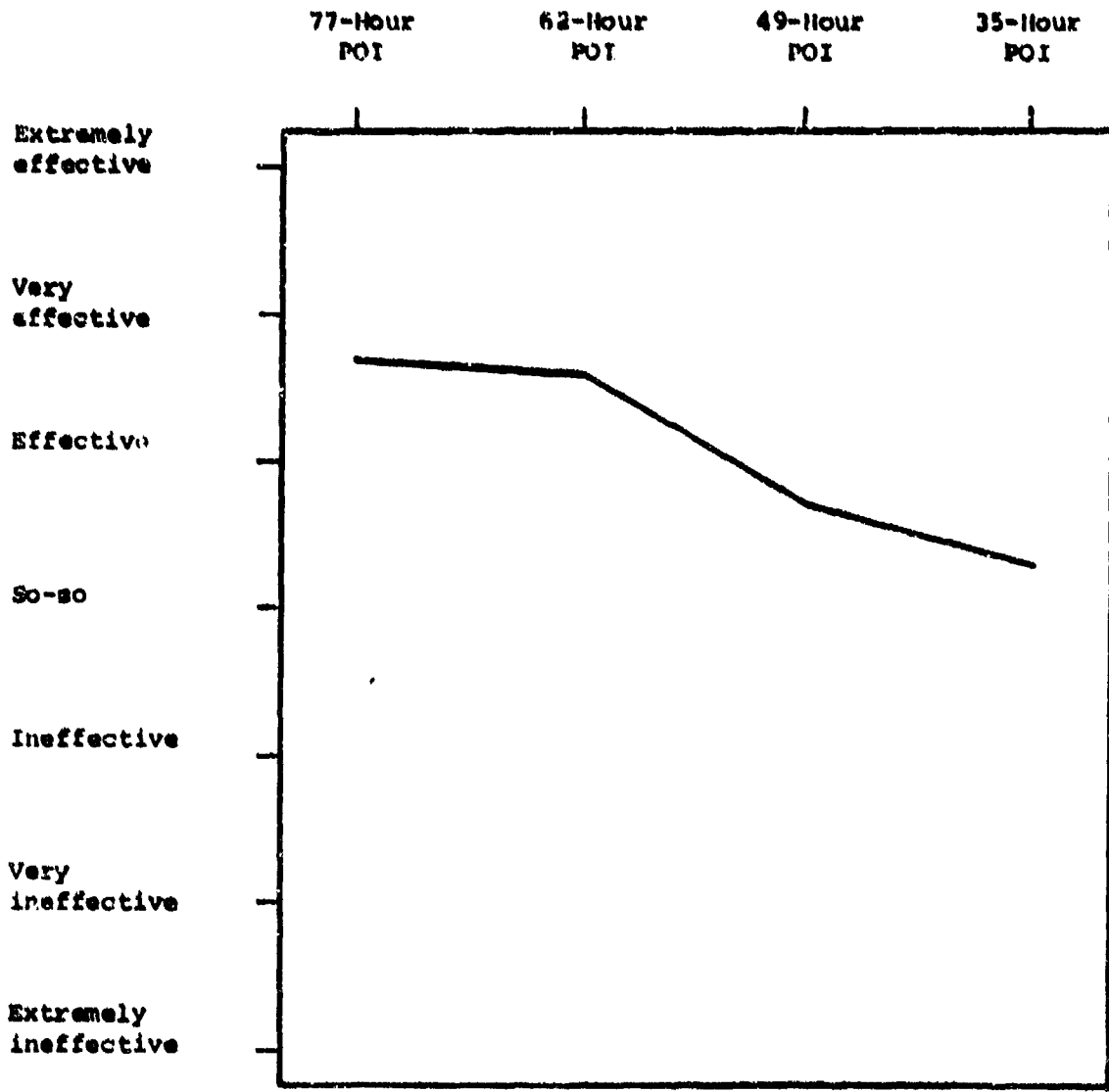
Figure 2. Mean ratings of overall effectiveness of four POI's.

The cadre anticipated "some, but not much" reinforcement training would be required in the two longer BRM programs. On the other hand, the need for "quite a bit" to "a great deal" of reinforcement training was anticipated for the two shorter programs ($F = 7.64$, $p < .001$, $\eta^2 = .10$). Instructors felt that they were able to "correct trainees' mistakes" "most of the time" during the longer programs but only "sometimes" during the shorter programs ($F = 3.25$, $p < .05$, $\eta^2 = .07$). Commenting on reinforcement training, a cadre member said, "Drill sergeants do not reinforce as much as they should; [they should] be more flexible." Another stated, "[there is] not enough individual attention given to firers . . . ."

About 80% of the cadre reported that instructor time was used "well" to "extremely well" in each of the BRM programs. The cadre (86%) also reported that it was "easy" to "extremely easy" for trainees to understand their instructors during training.

Instructors were asked, at the pretest measurement, "With which of the following programs are you most familiar?" Responses were (percentage responding per category):

- 77-hour POI 43%,

- 62-hour POI 47%,

- 49-hour POI 0%, and

- 35-hour POI 10%.

They were further asked, "Considering the four BRM training programs, which one do you think will be the most successful in producing good rifle marksmen?" Responses were (percentage responding per category):

- 77-hour POI 40%,

- 62-hour POI 40%,

- 49-hour POI 7%, and

- 35-hour POI 13%.

One-half of the respondents felt that the program of greatest self-reported familiarity would also be the program "most successful in producing good marksmen."

## Hours of Instruction

The instructors were asked whether or not "to become good rifle marksmen . . . trainees need more or less instructional time" in each block of each program. In every case they responded that progressively more instructional time was required to produce good rifle marksmen as they rated from the longest through the shortest POI. Table 3 shows hours of instruction by POI for each phase of training.

### Table 3

Comparison of Hours of Instruction Scheduled for Each
Phase of Each Test POI

| Subject | 77-hour POI | 62-hour POI | 49-hour POI | 35-hour POI |
|---|---|---|---|---|
| Mechanical Training | 4 | 4 | 4 | 4 |
| Marksmanship Fundamentals and Battle Sight Zero | 22 | 16 | 20 | 8 |
| Field Fire | 30 | 24 | 8 | 12 |
| Record Fire | 10 | 10 | 12 | 5 |
| Automatic Fire | 3 | 3 | 3 | 3 |
| Night Fire | 8 | 5 | 2 | 3 |
| Total hours | 77 | 62 | 49 | 35 |

Specifically, the cadre reported the following opinions.

Mechanical Training:
In spite of the equivalence of scheduled hours in all POI's (Table 3), the two longer POI's were rated "about right," whereas the two shorter POI's required "slightly more" to "a good deal more" time ($F = 6.87$, $p < .001$, $\eta^2 = .08$). Similar inconsistencies between ratings and scheduled hours or rounds appear below.

Marksmanship Fundamentals:
Longer POI's (77 and 62 hours) were "about right" or required "slightly more" instructional time, whereas the 49- and 35-hour POI's required "slightly more" to "a good deal more" time ($F = 13.29$, $p < .001$, $\eta^2 = .15$).

Battle Sight Zero:
Longer POI's were "about right," but the shorter POI required "slightly more" to "a good deal more" time to produce acceptable Battle Sight Zero performance ($F = 18.32$, $p < .001$, $\eta^2 = .20$).

Field Fire:
Longer POI's were "about right" or required "slightly more" time, whereas the shorter POI's required "slightly more" to "a good deal more" instructional time ($F = 21.40$, $p < .001$, $\eta^2 = .22$).

Automatic Fire:
Longer POI's were "about right," whereas the shorter POI's required "slightly more" instructional time ($F = 7.76$, $p < .001$, $\eta^2 = .09$).

Night Fire:
Longer POI's were "about right," whereas the shorter POI's required "slightly more" instructional time ($F = 10.22$, $p < .001$, $\eta^2 = .12$).

Figure 3 summarizes these data, using the mean rating and standard deviation for each instructional block in each POI. One cadre member suggested that training time should be redistributed within the BRM POI, i.e., "More hours [should be spent] on field fire and less time [on] zeroing."

Figure 3. Adequacy of instructional hours in each phase of
each POI, expressed as means and plus/minus one standard
deviation from each mean.

## Rounds Fired

The live fire phases of BRM require varying numbers of rounds (by POI) to be fired by trainees. Table 4 shows this variability, giving rounds programed for each phase of each POI.

### Table 4

Comparison of Rounds of Ammunition Programed
for Each Phase of Each Test POI

| Subject | 77-hour POI | 62-hour POI | 49-hour POI | 35-hour POI |
|---|---|---|---|---|
| Marksmanship Fundamentals and Battle Sight Zero | 93 | 45 | 48 | 42 |
| Field Fire | 293 | 214 | 48 | 118 |
| Record Fire | 80 | 80 | 100 | 40 |
| Automatic Fire | 90 | 42 | 36 | 45 |
| Night Fire | 164 | 132 | 30 | 89 |
| Total rounds | 720 | 513 | 262 | 334 |

Instructors were asked whether or not "to become good rifle marksmen . . . trainees need to fire more or less during . . ." each block of each program. Cadre responses to these questions generally corresponded to the responses favoring longer programs and greater numbers of hours for instruction. Their responses for each phase of training were as follows.

Battle Sight Zero: The 77- and 62-hour POI's were "about right," whereas the shorter POI's required "slightly more" to "a good deal more" rounds fired ($F = 10.95$, $p < .001$, $\eta^2 = .13$).

Field Fire: Longer POI's were "about right," whereas shorter POI's required "slightly more" to "a good deal more" rounds fired ($F = 9.59$, $p < .001$, $\eta^2 = .08$).

| Automatic Fire: | Longer POI's were "about right," whereas shorter POI's required "slightly more" rounds fired ($F = 4.93$, $p < .001$, $\eta^2 = .06$). |
|---|---|
| Night Fire: | Longer POI's were "about right," whereas shorter POI's required "slightly more" rounds fired ($F = 6.54$, $p < .001$, $\eta^2 = .08$). |
| Record Fire: | Longer POI's were "about right," whereas shorter POI's required "slightly more" rounds fired ($F = 13.06$, $p < .001$, $\eta^2 = .15$). |

Figure 4 depicts these findings with mean response and standard deviation for each item (phases of instruction by POI).

Instructors reporting longer combat experience tended to favor firing more rounds for training than did those with shorter combat experience ($r = .30$, $p < .05$, $r^2 = .09$). The cadre rated the number of rounds that should be required for BRM training against the number specified by the Army Subject Schedule as follows: 37% of the respondents said it was "about right," 33% said it required "slightly less" firing, and 7% said it required "a good deal less" firing; 14% judged that "slightly more" rounds were required, whereas 9% said that "a good deal more" rounds were required.

## Confidence in Trainee Performance

Instructors were asked, "How sure do you feel that [a trainee completing each program] can hit a target [at various ranges with the M16A1 rifle]?" Four ranges were specified, three in daylight and one at night:

- 200-400 m, in daylight;

- <200 m, in daylight;

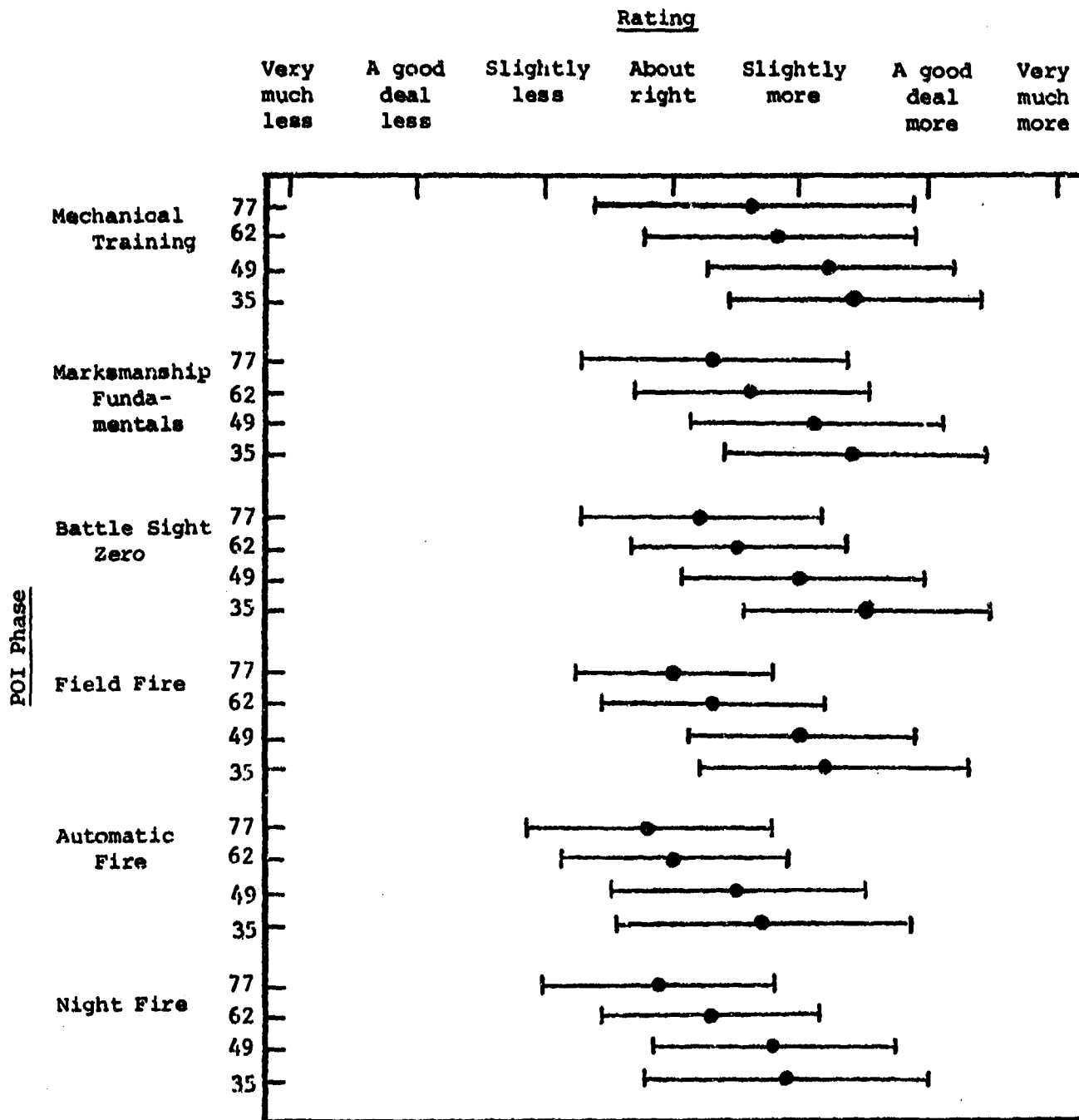- Battle Sight Zero at 25 m, given 18 rounds; and

- <50 m, at night.
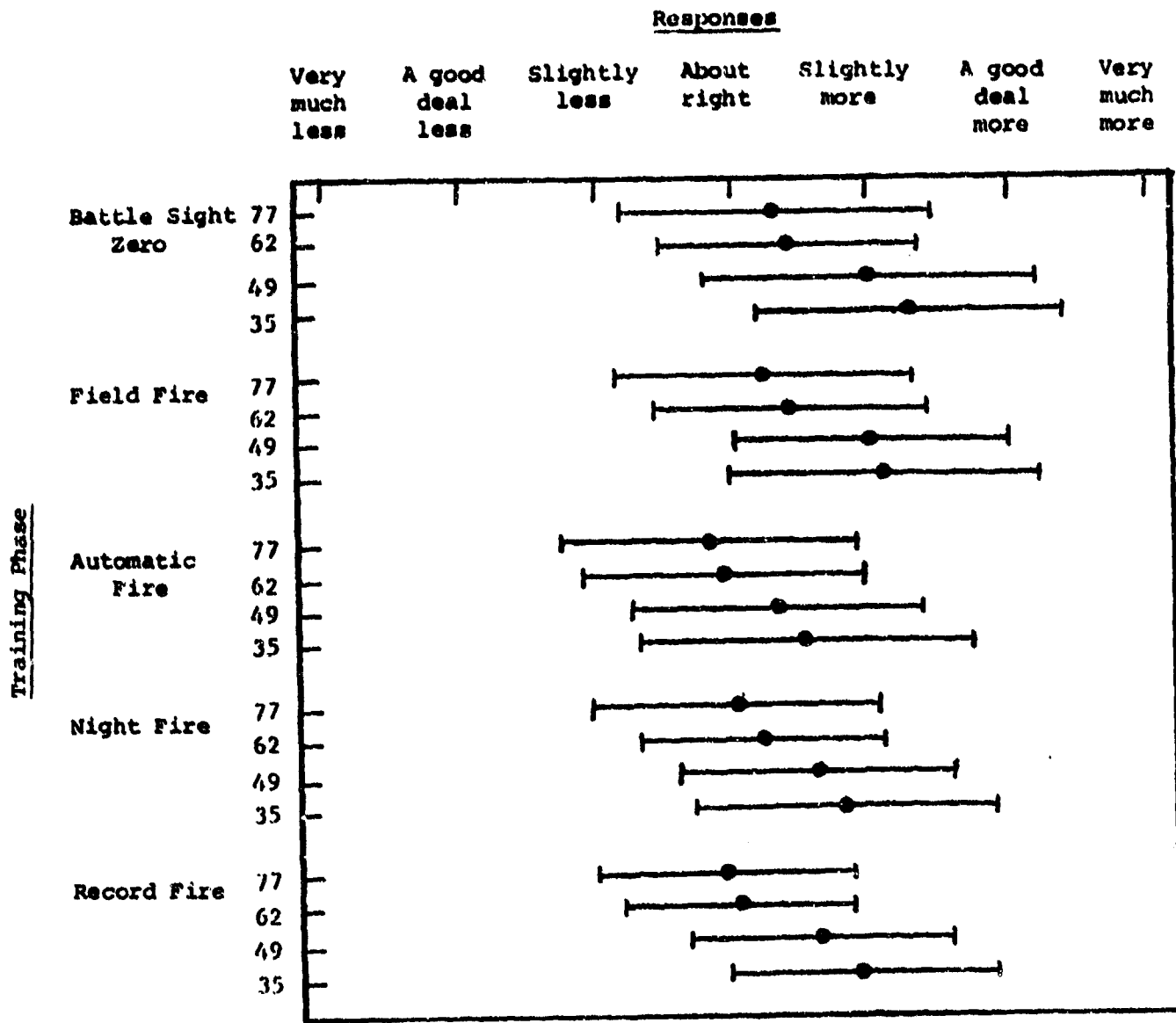
Figure 4. Adequacy of rounds fired during each phase of each POI, expressed as means and plus/minus one standard deviation from each mean.

The cadre had greater confidence in the performances of trainees who had completed the longer programs. For specific ranges, the cadre responded as follows.

200-400 m in daylight:    The longer POI's would produce trainees who were "fairly sure to hit," whereas the shorter POI's would produce trainees who "might hit or miss" (F = 17.18, p < .001, $\eta^2$ = .19).

<200 m in daylight:    The longer POI's would produce trainees who were "fairly sure to hit" to "extremely sure to hit," and trainees in shorter POI's "might hit or miss" or would be "fairly sure to hit" (F = 14.29, p < .001, $\eta^2$ = .16).

Battle sight zero:    The longer POI's would produce trainees who were "fairly sure to zero" to "very sure to zero" given 18 rounds, whereas shorter POI's would produce trainees who "might or might not zero" (F = 11.49, p < .001, $\eta^2$ = .13).

<50 m at night:    The longer POI's would produce trainees who were "fairly sure to hit," whereas shorter POI's would produce trainees who "might hit or miss" (F = 8.55, p < .001, $\eta^2$ = .10).

Note that trainee terminal performances measured as $\bar{pH}$ were approximately equivalent across the four POI's (USAIS, 1976a).

Overall mean probability of hit, $\bar{pH}$, is defined by

$$\bar{pH} = \left( \sum_{i=1}^{n} \sum_{j=1}^{m} H \right) / n \cdot m ,$$

where

H = a hit on target;

m = number of targets presented, irrespective of range; and

n = number of trainees firing.

Thus, $\bar{pH}$ is calculated by summing hits across target presentations and trainees, then dividing by the product of target presentations and trainees for a given POI.

## Comments

Instructors' comments regarding perceived "difficulties in teaching BRM" were categorized in three general groups. The categories used were sighting, motor control, and miscellaneous problems; these groupings are not necessarily mutually exclusive.

Sighting. Fifty-seven percent of the cadre's comments related to difficulties in instruction in sighting. The following are ranked subcategories (1 = most frequent) of sighting problems.

1. Zeroing

2. Adjusted aiming point

3. Sight alignment

4. Sight changes

5. Transposition exercise

Motor Control. Nineteen percent of cadre comments concerned motor control. The comments are ranked by subcategories as follows.

1. Steady hold

2. Firing positions

3. Trigger control

4. Integrated act of shooting

Miscellaneous Problems. The remaining responses (24%) were distributed among night fire, correcting malfunctions, mechanical training, safety, field fire, target detection, and record fire. Among these topics, night fire and correcting malfunctions were mentioned most frequently (7% each). Approximately one-half of the comments pertaining to night fire referred to difficulties in teaching or using the pointing technique.

One percent of the responses were not interpretable and therefore not classified.

## Miscellaneous BRM Topics

Instructors were asked about their attitudes toward the following assortment of BRM topics.

- Early record fire practice

- Known distance firing

- Battle-sight-zero shot group sizes

- Various training devices

- Night fire

Early Record Fire Practice. Instructors were asked if they thought that "trainees getting a chance to practice their record fire early in training" was "a good or bad idea?" Fifty-seven percent thought that it was "good," 29% thought that it was "bad," and 14% were undecided. Those with greater time (months) in service tended to be more in favor of such early record fire practice than those with less experience ($r = .36$, $p < .05$, $r^2 = .13$).

Company cadre who participated in the test attended posttest discussion groups. At the conclusion of the test, representatives of the company cadres (officers and drill sergeants) from each test company participated in a structured group interview. There were four such meetings, one for each of the four POI's. Participants typically included the battalion commanders, their executive officers (or S3, training officer), the company commanders of the test companies, and company senior drill sergeants (n ≈ 20 per POI). These groups included both male and female officers and NCO's.

During these sessions, attitudes favorable to an early record fire practice were frequently expressed. These cadre members were, in fact, favorably inclined toward any practice record fire experience, whether early or late in training. It was generally expressed that such practice "warms the firer up" and gives him familiarity with the Record-Fire range. Some believed practice record firing could profitably supplant portions of field firing.

Known Distance Firing. Instructors were asked "How effective are known distance firing exercises in confirming a trainee's battle sight zero?" In response, 62% thought KD exercises were "effective" to "extremely effective," 11% thought KD exercises were "ineffective" to "extremely ineffective," and 27% were undecided. Those with greater combat experience (months) felt that KD exercises were more effective than those with lesser combat experience ($r = .46$, $p < .01$, $r^2 = .22$).

The cadre were favorably inclined toward the motivational value of KD exercises in "building trainees' confidence"; 77% rated those exercises as "effective" to "extremely effective," and only 2% rated them as "ineffective." The more combat-experienced instructors felt that KD exercises were "effective" in improving trainee confidence ($r = .66$, $p < .001$, $r^2 = .44$). Those instructors favoring longer programs, however, tended to report that KD exercises did not build trainee confidence ($r = -.49$, $p < .01$, $r^2 = .24$). Note that only the two shorter programs in the BRM Test contained KD exercises. These exercises were fired in the initial part of the field fire phase of training, using a KD range with targets at 200 yards (49-hour POI) or 250 m (35-hour POI). They were intended to serve as a transition exercise between 25 m firing and firing at the more distant (50-300 m) pop-up targets.

Company cadre who participated in the two BRM programs calling for KD firing were divided in their opinions about its value. Many agreed that it had some merit "on paper," but the consensus of both groups was that the quality of instruction and problems in KD range operation during the test by and large reduced the value of the KD exercises.

Battle-Sight-Zero Shot Group Size. Instructors were told, "Currently a 3-cm shot group is used for zeroing the M16A1 rifle during BRM training." Five circles with diameters of 1.5, 3.0, 4.5, 6.0, and 7.5 cm were presented with the question "Which of [these] shot group sizes do you think is best for BRM training?" Responses showed that

- 4% favored 1.5 cm;

- 45% favored 3.0 cm;

- 39% favored 4.5 cm;

- 7% favored 6.0 cm; and

- 5% favored 7.5 cm or larger.

One instructor commented, "Requirements [currently] are for [a battle-sight-zero shot group of] 3 rounds within a 3-cm circle. [A trainee] can fire 2 in and 1 out consistently, but this is not accepted [even though this indicates] a man (sic) is zeroed." Another stated drill sergeants ". . . should be able to use discretion [in telling] a man he is (sic) zeroed to build his confidence." Another concluded, "Too much emphasis is placed on BSZ. Most trainees can be effective with a tentative zero. The current standard . . . is too demanding." However, another instructor answered that ". . . more time [should be spent] on zeroing. Once learned, the trainee needs very little field fire." Generally, those instructors having less experience (months) in teaching BRM favored larger shot group sizes ($r = -.32$, $p < .05$, $r^2 = .10$)

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Training Devices. Instructors were asked to rank six training aids according to "helpfulness in teaching marksmanship skills." In order of helpfulness (1 = most helpful), cadre responded (mean ranks in parentheses) as follows:

1.  Transposition exercise    (2.5),

2.  Dime/washer exercise    (2.6),

3.  Paige sighting device    (3.0),

4.  Target box exercise    (3 5),

5.  M-15 sighting device    (3.9), and

6.  M-16 sighting device    (4.3).
    (the "cheater")

Night Fire. Instructors were asked to select the best technique for night fire. Their alternatives were "'pointing techniques' with automatic fire"; "promethium sights with single shots"; "both" of these techniques; and "other." Cadre responded 39% in favor of "pointing techniques"; 18% in favor of "promethium sights"; 39% in favor of both "pointing techniques" and "promethium sights"; and 4% in favor of "other" techniques. It was pointed out by company cadre who participated in the 35-hour POI that the muzzle-flash simulators on the night fire range created an ambient level of illumination that may have been too high to evaluate properly the use of a low-level-light sight system such as the promethium sights. Promethium sights were used exclusively in the 35-hour POI during the test.

Scheduling of Instruction. Two-thirds of the cadre reported that BRM training should be scheduled "without other basic training subjects given among blocks of BRM training." When interviewed, many of the company cadre suggested that BRM training would be more effective if scheduled somewhat later in the training cycle, when trainees had become more accustomed to military life.


DISCUSSION

POI Effectiveness

The primary conclusion that can be drawn is clear. The cadre responding to these questionnaires held a strong bias against reducing the length of BRM training. The Fort Jackson BRM committee group cadre was in favor of limiting reductions to the 62 hours and 513 rounds of ammunition fired per trainee that were in effect at Fort Jackson prior to the BRM Test.

Diverse questionnaire items produced consistent results. Rating the effectiveness of programs, rank-ordering the programs, judging the time available for correcting mistakes, estimating the amount of reinforcement training required in each program, and rating confidence in trainees completing each program showed the same trends. When asked to rate the adequacy of hours and rounds programed during each phase of instruction for each POI, the two longer POI's were generally rated "about right"; the shorter POI's were found wanting. The data in Figure 2 typify those collected. The single exception to this tendency was the perception that cadre time was used about equally well in all four POI's.

In our judgment, the cadre opinions about the programs are biased, because cadre attitudes failed to shift from pretest to posttest. In fact, a tendency was noted for variance of responses to decrease from pretest to posttest, suggesting a consolidation of opinions during the test. This perception of substantial differences in POI effectiveness disregarded the fact that no significant performance differences between the four POI's were exhibited by trainees at the end-of-day Record Firing (Posttest 1) (USAIS, 1976a). The cadre, of course, did not know the results of the analyses of firing data when they completed the posttest questionnaire. But it seems reasonable to assume that the marksmanship instructors would have had a general awareness of the Record Fire performance of the test companies. The biggest (though statistically insignificant) pretest-to-posttest attitude change was in confidence in trainees' predicted night fire performances. This result, however, was not related to POI. It probably reflected an improvement in the reliability of the automated scoring system on the night fire range, made prior to the test, which resulted in test troops scoring higher on night fire than their predecessors had scored.

Another line of evidence suggesting bias in the cadre responses comes from items that dealt with adequacy of hours or rounds as scheduled. The ratings assigned were frequently inconsistent with the hours or rounds programed for each POI. For example, the 49-hour POI scheduled 100 rounds for day record firing; yet the cadre judged that this POI required "slightly more" rounds compared to the 77- and 62-hour POI that were "about right" with their 80 rounds. It seems evident that a response set was operating.

What accounts for these strongly held opinions on program length? Length of combat experience was significantly related to preference for longer BRM training. Other background characteristics, however, such as time in service, time teaching BRM, and years of civilian education, showed no consistent relationship to attitudes concerning BRM. Familiarity with the two longer programs appeared to be a factor in accounting for the cadre's preference for these programs. Only 10% of the cadre reported greatest familiarity with either of the two shorter programs, but 50% of the cadre selected the program of greatest familiarity as the program of greatest effectiveness. The significance of program

familiarity is supported by the results of two other questions. When asked to fill in the number of hours required for "best" BRM training, approximately half the respondents filled in the exact number of hours (72 or 62) available in one of the two longer programs. Further, only 23% responded that more rounds should be fired in BRM than the 720 rounds required by the Army Subject Schedule; 70% reported 720 rounds was "about right" or that "slightly less" might be required. Thus, in both questions the majority chose the status quo rather than more or less training compared to current practice.

We conclude that the cadre's bias is due, at least in part, simply to habit. These attitudes about the effectiveness of the four POI's are not supported by the trainees' record firing performances in the various POI's. In fact, trainee performances were about the same in each of the programs. Implications of these findings will be discussed.

## Training Problems and Instructional Effectiveness

The committee group cadre believed that their time was well used in all the programs, that they had time to correct trainees' mistakes "most of the time" during the longer programs, and that they could be easily understood by the trainees. There were indications in their comments, however, that instructional problems (aside from a specific POI) did exist. Problems mentioned most frequently involved the teaching of marksmanship fundamentals and attaining battle sight zero. Related problems included trainee motivation and the need for individual attention to trainee performance.

Attainment of battle sight zero by each trainee with the M16A1 rifle presents one of the major challenges of BRM training. When asked to identify the areas in BRM creating the greatest difficulties for trainees, 57% of the cadre responses involved sighting and zeroing. This is threefold the comments offered on any other topic. It is notable, too, that all but one of the training devices used in BRM at Fort Jackson are designed to teach principles of sighting and zeroing. This situation reinforces the view that sighting and zeroing are quite difficult. Further, the cadre generally perceived a greater need for more training in preparatory marksmanship. That is, mechanical training, marksmanship fundamentals, and battle sight zero, where principles of sighting and zeroing are established, were held to be more important than firing against pop-up targets (e.g., field fire, automatic fire, night fire, and record fire). (See Figures 3 and 4.)

To a considerable degree, the problems in preparatory marksmanship appear to be related to the requirement for a 3-cm shot group size. Fifty-one percent of the cadre reported that this standard should be relaxed. In meetings, the company cadre frequently mentioned the shot group requirement as overly stringent and frustrating; the cadre believed that training time might be better spent concentrating on other problems.

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The results of a side test conducted during the BRM Test are consistent with these opinions. The data suggest that the shot-group standard could be increased to 5.2 cm with no degradation in trainees' performance. Further, with this standard, 98% of the trainees attained battle sight zero within 18 rounds (USAIS, 1976a). This standard has now been adopted by the Army's Training and Doctrine Command.

The change in shot group size, along with the introduction of KD firing, should reduce some of the problems and frustrations attendant to learning sighting and zeroing. In the opinion of the cadre, KD exercises are an effective tool in building trainee confidence and motivation when moving from battle sight zero to firing against more distant pop-up targets.

## Feedback

It appears that feedback during instruction is often nonspecific and not conducive to improving individual trainee performance. Instructions such as "Tighten up that shot group" do not provide sufficient information for a trainee to modify his own behavior. Further, excessive use of negative reinforcement and punishment adds to a trainee's anxiety. There is no reason to conclude that increasing anxiety will aid the problem firer; on the contrary, higher anxiety levels are likely to degrade his performance. Our observations are consistent with the comments "Trainees are afraid when . . . on the line from being yelled at" and "Not enough individual attention [is] given to firers . . . ."

Negative reinforcement and punishment are two training procedures that use aversive stimuli as feedback. In negative reinforcement, behaviors producing escape from an aversive stimulus (e.g., yelling) are strengthened. Thus a probable response of a trainee who is frequently yelled at will be to minimize his contact with the persons yelling at him, the cadre. In punishment, the application of a stimulus reduces the occurrence of a behavior.[4] Punishment is, however, frequently an ineffective technique of behavior control that has the additional disadvantage that it can produce undesirable side effects (e.g., Church, 1963; Azrin and Holz, 1966; Campbell and Church, 1969). High anxiety, which degrades rather than facilitates learning, is one such characteristic side effect; avoidance of the punishing individual is another. Most importantly, negative reinforcement and punishment are not well suited for teaching correct behaviors.

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[4]The terms negative reinforcement and punishment are used in this discussion to operationally express the relationship between a procedure (withdrawal or presentation of a stimulus consequent to a behavior) and a behavioral process (an observed change in the frequency of a given response class). For a more detailed presentation of this usage see Catania (1973); also see Church (1972) for a similar usage.

Punishment only identifies for the trainee those behaviors the trainer considers incorrect; and negative reinforcement is very difficult to use in rewarding "correct" behavior. An example of a negative reinforcement contingency would be "If you do it correctly, I will stop yelling at you." It would be more effective to identify for the trainee what he is doing incorrectly, show him how to do it correctly, and reward any progress he makes toward correcting his behavior. We are not suggesting that trainees should never be yelled at. We are suggesting, as a matter of pragmatics, that techniques of training that properly use positive reinforcement will be more effective than those that rely on aversive procedures.

We conclude that methods should be explored that afford increased individual attention to trainees and increased frequency of diagnostic feedback and positive reinforcement. Methods permitting more self-pacing may facilitate such individualization of instruction for the problem firer. This need for more attention to these firers was reinforced in the meetings with company cadre. The potential advantages of self-paced instruction and the need for improved quality of instruction also received comment.

## User Acceptability

Questionnaires and interviews were used not only to assess opinions, but also to identify problems that may attend the Army-wide implementation of any of the four POI's. The above discussion identifies some problems in BRM (e.g.; 3.0-cm shot group size for battle sight zero, increased personal attention to problem firers) transcending specific POI's. The primary purpose of the test, however, was to select one POI for Army-wide use. The success of such a selection rests in large part on user acceptance, particularly cadre acceptance. Our results strongly argue against easy acceptance by this group.

## Exceptions

Interviews with the company cadre indicate at least two exceptions to the consensus against shortening BRM. Cadre participating in the 77-hour POI observed that their trainees became bored during this POI. They reported that this resulted in fewer trainees qualifying as Expert. They also contended, however, that the long POI produced fewer unqualified marksmen. They concluded that the 77-hour POI allowed insufficient flexibility for time and effort to be dedicated to other subjects, and it did not aid those who needed extended BRM training with repeated reinforcement of skills. A second exception to the cadre's thesis that "more is better" was the opinion expressed that female trainees become bored during the longer BRM programs. This opinion was heard in each end-of-test discussion group with company cadre. They also contended that female trainees perform better with less BRM training. Female members of the company cadre were notable in verbalizing this opinion.

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## Conclusions and Recommendations

Perhaps the expressed attitudes that shorter POI's must concentrate on qualifying trainees and that longer POI's allow greater expertise to be instilled typify the concerns of the cadre. Long-term success of any BRM training program that substantially reduces training rounds and scheduled hours of instruction hinges on the cadre. Cadre members must see the program work and understand how it can be used to train effectively. This is particularly important because substantially shortening the POI places emphasis on efficient use of training time, requiring alteration of long-established practices and habits. This implies the need for a course of instruction for instructors that teaches the POI and gives them "hands on" training. Under test conditions, training is highly visible, and concerted attention is given to quality control. Accordingly, POI effectiveness attained in a test will not necessarily be equal to POI effectiveness when the POI is fielded. Without sufficient investments made to insure proper implementation, savings accruing from a shortened POI may mask large, hidden liabilities in the form of performance decrements.

We therefore recommend that a concerted cadre training program accompany any implementation of a shortened POI for BRM. At the same time, training effectiveness research should be directed toward finding ways to facilitate increased and improved feedback to the individual trainee.

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# APPENDIX A

## QUESTIONNAIRE CONSTRUCTION

The construction of the BRM cadre questionnaires is described herein. Copies of these questionnaires can be found in Appendixes B and C.

The cadre questionnaires were constructed with primary focus on the major test issues. These issues were the training effectiveness of the alternative POI and the effects of reducing hours of instruction and rounds fired. Questions addressed both overall POI effectiveness as well as the individual parts of current BRM training. Questions concerning miscellaneous issues were also included.

An initial item pool was prepared by civilian psychologists and military research specialists. Item topics were based on information gained from source documentation [e.g., Army Subject Schedule 23-72 (Department of the Army, 1974a), Field Manual 23-9, (Department of the Army, 1974b)], discussions with the proponent for the M16A1 rifle (U.S. Army Infantry School), and the senior author's involvement in the preparation of the test plan for the BRM Test.

A primary technical source used was a draft copy of the _Questionnaire Construction Manual_ (Dyer et al., 1976). Particular attention was given to using a basic English vocabulary, balanced rating scales, and descriptors for those scales having demonstrated discriminability.

Pretesting for the cadre questionnaires involved a progressive administration and revision process. Items were first screened for appropriateness and ease of comprehension. The questionnaires were then administered to two officers and three NCO's attached to the ARI Fort Benning Field Unit and one officer in the BRM Test Directorate. The next revision was administered to approximately 17 members of the Small Arms Committee Group at the U.S. Army Infantry School (Weapons Department). Two officers and seven NCO's completed the Pretraining Questionnaire and one officer and six NCO's completed the Posttraining Questionnaire. The questionnaires then received ARI review.

At the time of printing, it was planned that the Army Subject Schedule POI would be conducted using 72 instructional hours. Subsequently it was determined that this POI would be run using 77 hours of instruction. Thus the description of this POI in the questionnaires as 72 hours in length was in error in light of the later decision.
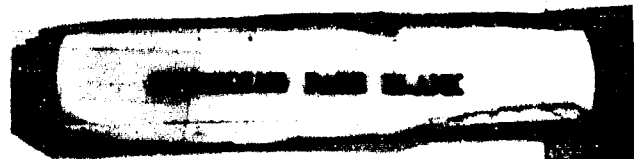
## CADRE PRETEST QUESTIONNAIRE

For each question, choose the one answer that is most correct for you.
All answers are to be placed on the Answer Sheets, including fill in the blank questions.

01*. How long have you been in the Army? _____ Months

02*. How many months of combat experience do you have? _____ Months

03*. How long have you been assigned to a Basic Training Center? _____ Months

04*. How long have you taught Basic Rifle Marksmanship (BRM)? _____ Months

05. What was your last Record Fire Qualification? (Choose One)

    A. Did not qualify
    B. Marksman
    C. Sharpshooter
    D. Expert

06. With which of the following programs are you most familiar? (Choose One)

    A. 72 Hour Program
    B. 62 Hour Program
    C. 49 Hour Program
    D. 35 Hour Program

Using each of the numbers 1 through 7, rank the following BRM training areas in terms of your knowledge and skill. Assign a "1" to your best area, a "2" to your second best area, and so on. Assign a number to all seven (7) areas.

07a*. _____ Mechanical Training such as Assembly and Disassembly and Care and Cleaning of the M-16 Rifle

07b*. _____ Marksmanship Fundamentals such as Steady Hold Factors and Aiming Techniques

07c*. _____ Zeroing the M-16 Rifle

07d*. _____ Field Firing exercises

07e*. _____ Automatic Firing exercises

07f*. _____ Night Firing exercises

07g*. _____ Record Fire exercises

During the next several weeks, a TRADOC sponsored project will compare four Basic Rifle Marksmanship (BRM) programs. These programs teach marksmanship fundamentals to basic trainees. The results of this project will be used to select the most cost/training effective BRM program for the Army.

Your attitudes and opinions toward each program are a very important part of this project. The general purpose of the questionnaire you are about to receive is to obtain your attitudes and opinions toward each of the four BRM training programs.

Please answer each question on this questionnaire by choosing the word or statement that best describes your answer to the question. Since there are no right or wrong answers, choose the one answer that best describes your feelings about the question. In certain questions, you will be asked to fill in a blank. Please answer all questions on the Answer Sheet provided.

It is important that you fill out the Answer Sheet heading very carefully. The spaces with boxes around them are the only ones you need to fill in. Please print.

---

**PLEASE DO NOT CONTINUE WITH THESE INSTRUCTIONS UNTIL**

**YOU ARE TOLD TO DO SO BY YOUR TEST ADMINISTRATOR**

---

1. In the space marked Today's Date, put in the six (6) numbers your test administrator will give you.

2. In the space marked Unit ID, fill in the four (4) numbers your test administrator will give you.

3. In the space marked Sex, circle M if you are male or F if you are female.

4. In the space marked SSAN, fill in your Social Security Account Number.

5. In the space marked Name, print your Last Name followed by a comma (,), then your First Name and then your Middle Initial.


Thank you for your time and effort. If you have any questions, please raise your hand for assistance.

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**PLEASE DO NOT MARK IN THIS TEST BOOKLET**

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In which of the following BRM training areas have you participated as an instructor? (Answer Yes or No for each training area)

| | | YES | NO |
|---|---|---|---|
| 08a. | Mechanical Training such as Assembly and Disassembly and Care and Cleaning of the M-16 Rifle | A | B |
| 08b. | Marksmanship Fundamentals such as Steady Hold Factors and Aiming Techniques | A | B |
| 08c. | Zeroing the M-16 Rifle | A | B |
| 08d. | Field Firing exercises | A | B |
| 08e. | Automatic Firing exercises | A | B |
| 08f. | Night Firing exercises | A | B |
| 08g. | Record Fire exercises | A | B |

The following questions deal with instructing __basic trainees__ in BRM.

09. Considering the four Basic Rifle Marksmanship training programs, which one do you think will be the most successful in producing __good__ rifle marksmen? (Choose One)

    A. 72 Hour Program
    B. 62 Hour Program
    C. 49 Hour Program
    D. 35 Hour Program

10. Compared to the number of rounds fired in the Army Subject Schedule BRM training program (23-72), how many rounds do you think should be fired for BRM training? (Choose One)

| Very Many More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Many Less |
|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G |
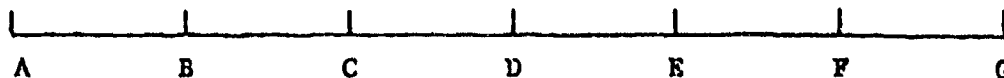
11*. For the best BRM training, how many hours of instruction do you think are needed? _____ Hours

Rate what you believe will be the overall effectiveness of each of these BRM programs. (Choose one for each program)

| | Extremely Effective | Very Effective | Effective | So-So | In-effective | Very In-effective | Extremely Ineffective |
|---|---|---|---|---|---|---|---|
| 12. 72 Hour Program | A | B | C | D | E | F | G |
| 13. 62 Hour Program | A | B | C | D | E | F | G |
| 14. 49 Hour Program | A | B | C | D | E | F | G |
| 15. 35 Hour Program | A | B | C | D | E | F | G |

If a trainee completes one of these programs, how sure do you feel that he can hit a target closer than 200 meters, in daylight, with the M-16 Rifle? (Choose one for each program)

| | Extremely Sure to Hit | Very Sure To Hit | Fairly Sure To Hit | Might Hit or Miss | Fairly Sure To Miss | Very Sure To Miss | Extremely Sure To Miss |
|---|---|---|---|---|---|---|---|
| 16. 72 Hour Program | A | B | C | D | E | F | G |
| 17. 62 Hour Program | A | B | C | D | E | F | G |
| 18. 49 Hour Program | A | B | C | D | E | F | G |
| 19. 35 Hour Program | A | B | C | D | E | F | G |

If a trainee completes one of these programs, how sure do you feel that he can hit a target between 200 and 400 meters away, in daylight, with the M-16 Rifle? (Choose one for each program)

| | | Extremely Sure To Hit | Very Sure To Hit | Fairly Sure To Hit | Might Hit or Miss | Fairly Sure To Miss | Very Sure To Miss | Extremely Sure To Miss |
|---|---|---|---|---|---|---|---|---|
| 20. | 72 Hour Program | A | B | C | D.. | E | F | G |
| 21. | 62 Hour Program | A | B | C | D | E | F | G |
| 22. | 49 Hour Program | A | B | C | D | E | F | G |
| 23. | 35 Hour Program | A | B | C | D | E | F | G |

If a trainee completes one of these programs, how sure do you feel that he can hit a target closer than 50 meters, at night, without night vision devices? (Choose one for each program)

| | | Extremely Sure To Hit | Very Sure To Hit | Fairly Sure To Hit | Might Hit or Miss | Fairly Sure To Miss | Very Sure To Miss | Extremely Sure To Miss |
|---|---|---|---|---|---|---|---|---|
| 24. | 72 Hour Program | A | B | C | D | E | F | G |
| 25. | 62 Hour Program | A | B | C | D | E | F | G |
| 26. | 49 Hour Program | A | B | C | D | E | F | G |
| 27. | 35 Hour Program | A | B | C | D | E | F | G |

If a trainee completes one of these programs, how sure do you feel that he can Zero the M-16 Rifle, given eighteen (18) rounds? (Choose one for each program)

| | Extremely Sure To Zero | Very Sure To Zero | Fairly Sure To Zero | Might Or Might Not Zero | Fairly Sure Not To Zero | Very Sure Not To Zero | Extremely Sure Not To Zero |
|---|---|---|---|---|---|---|---|
| 28. 72 Hour Program | A | B | C | D | E | F | G |
| 29. 62 Hour Program | A | B | C | D | E | F | G |
| 30. 49 Hour Program | A | B | C | D | E | F | G |
| 31. 35 Hour Program | A | B | C | D | E | F | G |

BRM training is divided into several parts. In questions 32-51 we ask your opinion about the number of rounds trainees need to fire in different parts of each program.

The Army's goal in BRM training is to produce good rifle marksmen. To become good rifle marksmen, do trainees need to fire more or less during:

Zeroing the M-16 Rifle. (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 32. 72 Hour Program | A | B | C | D | E | F | G |
| 33. 62 Hour Program | A | B | C | D | E | F | G |
| 34. 49 Hour Program | A | B | C | D | E | F | G |
| 35. 35 Hour Program | A | B | C | D | E | F | G |

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Need to fire more or less during:

Field Firing.   (Choose one for each program)

|  |  | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|---|
| 36. | 72 Hour Program | A | B | C | D | E | F | G |
| 37. | 62 Hour Program | A | B | C | D | E | F | C |
| 38. | 49 Hour Program | A | B | C | D | E | F | G |
| 39. | 35 Hour Program | A | B | C | D | E | F | G |

Need to fire more or less during:

Record Fire.   (Choose one for each program)

|  |  | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|---|
| 40. | 72 Hour Program | A | B | C | D | E | F | G |
| 41. | 62 Hour Program | A | B | C | D | E | F | C |
| 42. | 49 Hour Program | A | B | C | D | E | F | G |
| 43. | 35 Hour Program | A | B | C | D | E | F | G |

Need to fire more or less during:

## Automatic Firing.    (Choose one for each program)

| | | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|---|
| 44. | 72 Hour Program | A | B | C | D | E | F | G |
| 45. | 62 Hour Program | A | B | C | D | E | F | C |
| 46. | 49 Hour Program | A | B | C | D | E | F | G |
| 47. | 35 Hour Program | A | B | C | D | E | F | G |

Need to fire more or less during:

## Night Firing.    (Choose one for each program)

| | | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|---|
| 48. | 72 Hour Program | A | B | C | D | E | F | C |
| 49. | 62 Hour Program | A | B | C | D | E | F | G |
| 50. | 49 Hour Program | A | B | C | D | E | F | G |
| 51. | 35 Hour Program | A | B | C | D | E | F | C |

In questions 52-75 we ask your opinion about the amount of instructional time trainees need to receive in different parts of each program.

To become good rifle marksman, do trainees need more or less instruction in:

Mechanical Training. (Such as Assembly and Disassembly and Care and cleaning of the M-16 Rifle). (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 52. 72 Hour Program | A | B | C | D | E | F | G |
| 53. 62 Hour Program | A | B | C | D | E | F | G |
| 54. 49 Hour Program | A | B | C | D | E | F | G |
| 55. 35 Hour Program | A | B | C | D | E | F | G |

Need more or less instruction in:

Marksmanship Fundamentals. (Such as Steady Hold Factors and Aiming Techniques). (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 56. 72 Hour Program | A | B | C | D | E | F | G |
| 57. 62 Hour Program | A | B | C | D | E | F | G |
| 58. 49 Hour Program | A | B | C | D | E | F | G |
| 59. 35 Hour Program | A | B | C | D | E | F | G |

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Need more or less instruction in:

Zeroing the M-16 Rifle.    (Choose one for each program)

| | | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|---|
| 60. | 72 Hour Program | A | B | C | D | E | F | G |
| 61. | 62 Hour Program | A | B | C | D | E | F | G |
| 62. | 49 Hour Program | A | B | C | D | E | F | G |
| 63. | 35 Hour Program | A | B | C | D | E | F | G |

Field Firing.    (Choose one for each program)

| | | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|---|
| 64. | 72 Hour Program | A | B | C | D | E | F | G |
| 65. | 62 Hour Program | A | B | C | D | E | F | G |
| 66. | 49 Hour Program | A | B | C | D | E | F | G |
| 67. | 35 Hour Program | A | B | C | D | E | F | G |

Automatic Firing.    (Choose one for each program)

| | | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|---|
| 68. | 72 Hour Program | A | B | C | D | E | F | G |
| 69. | 62 Hour Program | A | B | C | D | E | F | G |
| 70. | 49 Hour Program | A | B | C | D | E | F | G |
| 71. | 35 Hour Program | A | B | C | D | E | F | G |

Need more or less instruction in:

Night Firing.    (Choose one for each program)

| | | Very Much<br>More | A Good<br>Deal More | Slightly<br>More | About<br>Right | Slightly<br>Less | A Good<br>Deal Less | Very Much<br>Less |
|---|---|---|---|---|---|---|---|---|
| 72. | 72 Hour<br>Program | A | B | C | D | E | F | G |
| 73. | 62 Hour<br>Program | A | B | C | D | E | F | G |
| 74. | 49 Hour<br>Program | A | B | C | D | E | F | G |
| 75. | 35 Hour<br>Program | A | B | C | D | E | F | G |

76.    At times, some trainees get a chance to practice their record fire early in training.  Do you think this is a good or bad idea?    (Choose One)

| Extremely<br>Good | Very<br>Good | Good | So-So | Bad | Very<br>Bad | Extremely<br>Bad |
|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G |

How much remedial or reinforcement training do you think would be needed in each of these programs?    (Choose one for each program)

| | | A Great<br>Deal | Quite A<br>Bit | Some, But<br>Not Much | Very<br>Little | Hardly<br>Any |
|---|---|---|---|---|---|---|
| 77. | 72 Hour<br>Program | A | B | C | D | E |
| 78. | 62 Hour<br>Program | A | B | C | D | E |
| 79. | 49 Hour<br>Program | A | B | C | D | E |
| 80. | 35 Hour<br>Program | A | B | C | D | E |

Rank the four (4) BRM training programs on the basis of what you think their overall effectiveness will be in <u>teaching basic rifle marksmanship</u>. Assign a "1" to the most effective, a "2" to the second most effective, etc. Assign a number to each of the four BRM training programs.

81a*. _____ 72 Hour Program

81b*. _____ 62 Hour Program

81c*. _____ 49 Hour Program

81d*. _____ 35 Hour Program

Rank the four (4) BRM training programs on the basis of what you think their overall effectiveness will be in <u>building trainee motivation</u>. Assign a "1" to the most effective, a "2" to the second most effective, etc. Assign a number to each of the four BRM training programs.

82a*. _____ 72 Hour Program

82b*. _____ 62 Hour Program

82c*. _____ 49 Hour Program

82d*. _____ 35 Hour Program

83*. How many years of civilian education have you completed? _____ Years

84. Sex.

    A. Male
    B. Female

Question 85 and 86 administratively deleted prior to administration.

87. To produce good rifle marksmen, how should BRM training be scheduled? (Choose One)

   A. With other basic training subjects given between blocks of BRM training
   B. Without other basic training subjects given between blocks of BRM training
   C. It does not matter

88. Which technique do you think is best for night firing (without night vision devices)? (Choose One)

   A. "Pointing Techniques" with automatic fire
   B. Promethium sights with single shots
   C. Both·A and B
   D. Other

89. Currently, a three centimeter (CM) shot group is used for zeroing the M-16 Rifle during BRM training. Which of the following shot group sizes do you think is best for BRM training? (Choose One)

A.

7 1/2 CM or Larger

B.

4 1/2  CM

C.

1 1/2CM

E.

6 CM

D.

3 CM

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## APPENDIX C

### CADRE POSTTEST QUESTIONNAIRE

The following questions deal with instructing <u>basic trainees</u> in BRM. All answers are to be placed on the Answer Sheets, including fill in the blank questions.

For each question, choose the one answer that is most correct for you.

01. Considering the four Basic Rifle Marksmanship (BRM) training programs, which one do you think will be the most successful in producing <u>good</u> rifle marksmen? (Choose One)

    A.  72 Hour Program
    B.  62 Hour Program
    C.  49 Hour Program
    D.  35 Hour Program

02. Compared to the number of rounds fired in the Army Subject Schedule BRM training program (23-72), how many rounds do you think should be fired for BRM training? (Choose One)

| Very Many More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Many Less |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| A | B | C | D | E | F | G |
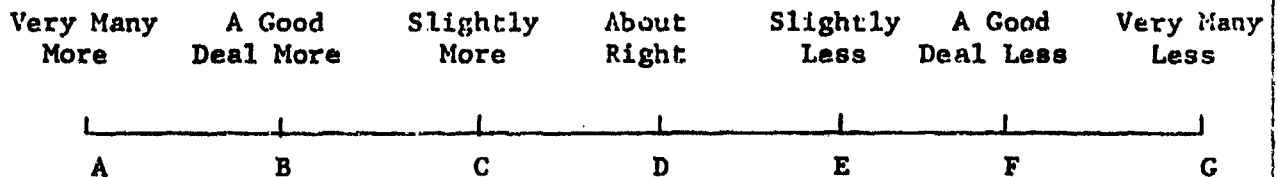
03*. For the best BRM training, how many hours of instruction do you think are needed? _____ Hours

04. With which of the following programs are you most familiar? (Choose One)

    A.  72 Hour Program
    B.  62 Hour Program
    C.  49 Hour Program
    D.  35 Hour Program
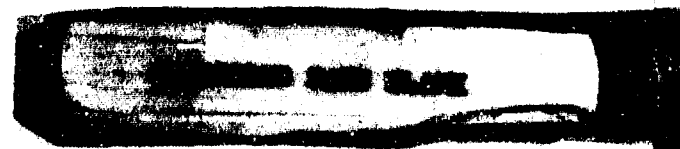
Using each of the numbers 1 through 7, rank the following BRM training areas in terms of your knowledge and skill. Assign a "1" to your best area, a "2" to your second best area, and so on. Assign a number to all seven (7) areas.

05a*. _____ Mechanical Training such as Assembly and Disassembly and Care and Cleaning of the M-16 Rifle

05b*. _____ Marksmanship Fundamentals such as Steady Hold Factors and Aiming Techniques

05c*. _____ Zeroing the M-16 Rifle

05d*. _____ Field Firing exercises

05e*. _____ Automatic Firing exercises

05f*. _____ Night Firing exercises

05g*. _____ Record Fire exercises

In which of the following BRM training areas have you participated as an instructor? (Answer Yes or No for each training area)

|  |  | YES | NO |
|---|---|---|---|
| 06a. | Mechanical Training such as Assembly and Disassembly and Care and Cleaning of the M-16 Rifle | A | B |
| 06b. | Marksmanship Fundamentals such as Steady Hold Factors and Aiming Techniques | A | B |
| 06c. | Zeroing the M-16 Rifle | A | B |
| 06d. | Field Firing exercises | A | B |
| 06e. | Automatic Firing exercises | A | B |
| 06f. | Night Firing exercises | A | B |
| 06g. | Record Fire exercises | A | B |

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Rate what you believe will be the overall effectiveness of each of these BRM programs. (Choose one for each program)

| | | Extremely Effective | Very Effective | Effective | So-So | In-effective | Very In-effective | Extremely Ineffective |
|---|---|---|---|---|---|---|---|---|
| 07. | 72 Hour Program | A | B | C | D | E | F | G |
| 08. | 62 Hour Program | A | B | C | D | E | F | G |
| 09. | 49 Hour Program | A | B | C | D | E | F | G |
| 10. | 35 Hour Program | A | B | C | D | E | F | G |

If a trainee completes one of these programs, how sure do you feel that he can hit a target closer than 200 meters, in daylight, with the M-16 Rifle? (Choose one for each program)

| | | Extremely Sure to Hit | Very Sure To Hit | Fairly Sure To Hit | Might Hit or Miss | Fairly Sure To Miss | Very Sure To Miss | Extremely Sure To Miss |
|---|---|---|---|---|---|---|---|---|
| 11. | 72 Hour Program | A | B | C | D | E | F | G |
| 12. | 62 Hour Program | A | B | C | D | E | F | G |
| 13. | 49 Hour Program | A | B | C | D | E | F | G |
| 14. | 35 Hour Program | A | B | C | D | E | F | G |

If a trainee completes one of these programs, how sure do you feel that he can hit a target between 200 and 400 meters away, in daylight, with the M-16 Rifle?   (Choose one for each program)

| | Extremely Sure To Hit | Very Sure To Hit | Fairly Sure To Hit | Might Hit Or Miss | Fairly Sure To Miss | Very Sure To Miss | Extremely Sure To Miss |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G |
| 15. 72 Hour Program | A | B | C | D | E | F | G |
| 16. 62 Hour Program | A | B | C | D | E | F | G |
| 17. 49 Hour Program | A | B | C | D | E | F | G |
| 18. 35 Hour Program | A | B | C | D | E | F | G |

If a trainee completes one of these programs, how sure do you feel that he can hit a target closer than 50 meters, at night, without night vision devices?   (Choose one for each program)

| | Extremely Sure To Hit | Very Sure To Hit | Fairly Sure To Hit | Might Hit or Miss | Fairly Sure To Miss | Very Sure To Miss | Extremely Sure To Miss |
|---|---|---|---|---|---|---|---|
| 19. 72 Hour Program | A | B | C | D | E | F | G |
| 20. 62 Hour Program | A | B | C | D | E | F | G |
| 21. 49 Hour Program | A | B | C | D | E | F | G |
| 22. 35 Hour Program | A | B | C | D | E | F | G |

If a trainee completes one of these programs, how sure do you feel that he can Zero the M-16 Rifle, given eighteen (18) rounds?  (Choose one for each program)

| | Extremely Sure To Zero | Very Sure To Zero | Fairly Sure To Zero | Might Or Might Not Zero | Fairly Sure Not To Zero | Very Sure Not To Zero | Extremel Sure Not To Zero |
|---|---|---|---|---|---|---|---|
| 23. 72 Hour Program | A | B | C | D | E | F | G |
| 24. 62 Hour Program | A | B | C | D | E | F | G |
| 25. 49 Hour Program | A | B | C | D | E | F | G |
| 26. 35 Hour Program | A | B | C | D | E | F | G |

BRM training is divided into several parts.  In questions 27-46 we ask your opinion about the number of rounds trainees need to fire in different parts of each program.

The Army's goal in BRM training is to produce good rifle marksmen.  To become good rifle marksmen, do trainees need to fire more or less during:

Zeroing the M-16 Rifle.  (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 27. 72 Hour Program | A | B | C | D | E | F | G |
| 28. 62 Hour Program | A | B | C | D | E | F | G |
| 29. 49 Hour Program | A | B | C | D | E | F | G |
| 30. 35 Hour Program | A | B | C | D | E | F | G |

Need to fire more or less during:

Field Firing. (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 31. 72 Hour Program | A | B | C | D | E | F | G |
| 32. 62 Hour Program | A | B | C | D | E | F | G |
| 33. 49 Hour Program | A | B | C | D | E | F | G |
| 34. 35 Hour Program | A | B | C | D | E | F | G |

Need to fire more or less during:

Record Fire. (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 35. 72 Hour Program | A | B | C | D | E | F | G |
| 36. 62 Hour Program | A | B | C | D | E | F | G |
| 37. 49 Hour Program | A | B | C | D | E | F | G |
| 38. 35 Hour Program | A | B | C | D | E | F | G |

Need to fire more or less during:

Automatic Firing.    (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 39. 72 Hour Program | A | B | C | D | E | F | G |
| 40. 62 Hour Program | A | B | C | D | E | F | G |
| 41. 49 Hour Program | A | B | C | D | E | F | G |
| 42. 35 Hour Program | A | B | C | D | E | F | G |

Need to fire more or less during:

Night Firing.    (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 43. 72 Hour Program | A | B | C | D | E | F | G |
| 44. 62 Hour Program | A | B | C | D | E | F | G |
| 45. 49 Hour Program | A | B | C | D | E | F | G |
| 46. 35 Hour Program | A | B | C | D | E | F | G |

In questions 47-70 we ask your opinion about the amount of instructional time trainees need to receive in different parts of each program.

To become good rifle marksmen, do trainees need more or less instructional time in:

Mechanical Training.  (Such as Assembly and Disassembly and Care and Cleaning of the M-16 Rifle).  (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 47. 72 Hour Program | A | B | C | D | E | F | G |
| 48. 62 Hour Program | A | B | C | D | E | F | G |
| 49. 49 Hour Program | A | B | C | D | E | F | G |
| 50. 35 Hour Program | A | B | C | D | E | F | G |

Need more or less instructional time in:

Marksmanship Fundamentals.  (Such as Steady Hold Factors and Aiming Techniques).  (Choose one for each program)

| | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 51. 72 Hour Program | A | B | C | D | E | F | G |
| 52. 62 Hour Program | A | B | C | D | E | F | G |
| 53. 49 Hour Program | A | B | C | D | E | F | G |
| 54. 35 Hour Program | A | B | C | D | E | F | G |

Need more or less instructional time in:

Zeroing the M-16 Rifle.    (Choose one for each program)

|  | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 55. 72 Hour Program | A | B | C | D | E | F | G |
| 56. 62 Hour Program | A | B | C | D | E | F | G |
| 57. 49 Hour Program | A | B | C | D | E | F | G |
| 58. 35 Hour Program | A | B | C | D | E | F | G |

Need more or less instructional time in:

Field Firing.    (Choose one for each program)

|  | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 59. 72 Hour Program | A | B | C | D | E | F | G |
| 60. 62 Hour Program | A | B | C | D | E | F | G |
| 61. 49 Hour Program | A | B | C | D | E | F | G |
| 62. 35 Hour Program | A | B | C | D | E | F | G |

Need more or less instructional time in:

Automatic Firing.    (Choose one for each program)

|  | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|
| 63. 72 Hour Program | A | B | C | D | E | F | G |
| 64. 62 Hour Program | A | B | C | D | E | F | G |
| 65. 49 Hour Program | A | B | C | D | E | F | G |
| 66. 35 Hour Program | A | B | C |  | E | F | G |

Need more or less instructional time in:

Night Firing.   (Choose one for each program)

|  |  | Very Much More | A Good Deal More | Slightly More | About Right | Slightly Less | A Good Deal Less | Very Much Less |
|---|---|---|---|---|---|---|---|---|
| 67. | 72 Hour Program | A | B | C | D | E | F | G |
| 68. | 62 Hour Program | A | B | C | D | E | F | G |
| 69. | 49 Hour Program | A | B | C | D | E | F | G |
| 70. | 35 Hour Program | A | B | C | D | E | F | G |

In general, how well or poorly was <u>instructor</u> time used during BRM training in each of these programs?   (Choose one for each program)
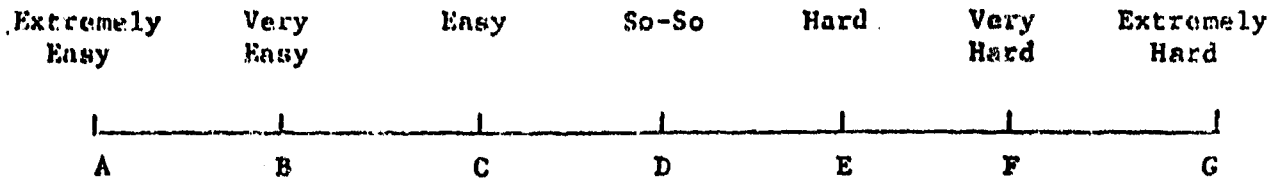
|  |  | Extremely Well | Very Well | Well | So-So | Poorly | Very Poorly | Extremely Poorly |
|---|---|---|---|---|---|---|---|---|
| 71. | 72 Hour Program | A | B | C | D | E | F | G |
| 72. | 62 Hour Program | A | B | C | D | E | F | G |
| 73. | 49 Hour Program | A | B | C | D | E | F | G |
| 74. | 35 Hour Program | A | B | C | D | E | F | G |

How often were you able to correct a trainee's mistakes during practice firing with the M-16 Rifle in each of these programs?   (Choose one for each program)
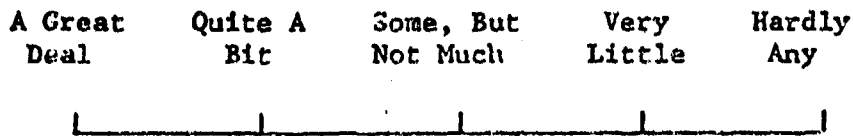
|  |  | Almost Always | Most of The Time | Sometimes But Not Much | Hardly Ever | Almost Never |
|---|---|---|---|---|---|---|
| 75. | 72 Hour Program | A | B | C | D | E |
| 76. | 62 Hour Program | A | B | C | D | E |
| 77. | 49 Hour Program | A | B | C | D | E |
| 78. | 35 Hour Program | A | B | C | D | E |

79. How easy or hard do you think that it was for trainees to understand you when you were teaching? (Choose One)

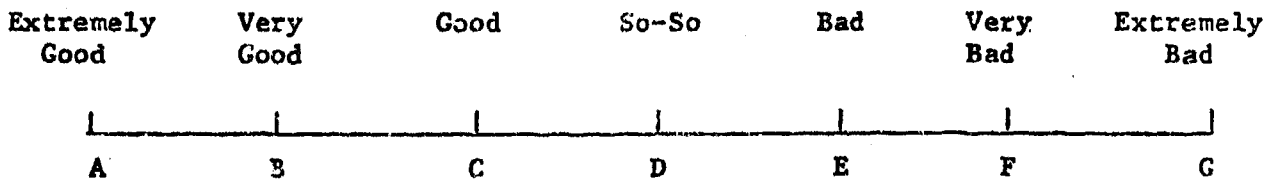| Extremely Easy | Very Easy | Easy | So-So | Hard | Very Hard | Extremely Hard |
|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G |

How much remedial or reinforcement training do you think would be needed in each of these programs? (Choose one for each program)

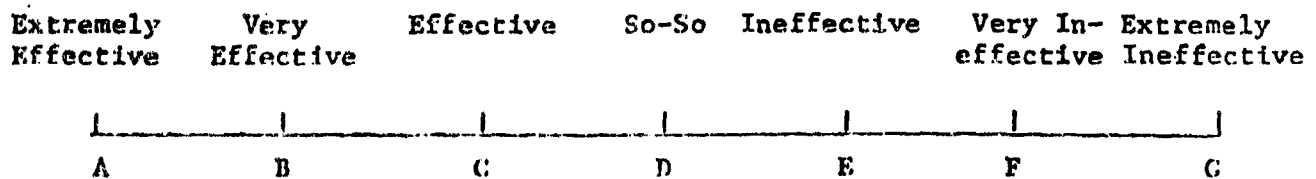| | A Great Deal | Quite A Bit | Some, But Not Much | Very Little | Hardly Any |
|---|---|---|---|---|---|
| 80. 72 Hour Program | A | B | C | D | E |
| 81. 62 Hour Program | A | B | C | D | E |
| 82. 49 Hour Program | A | B | C | D | E |
| 83. 35 Hour Program | A | B | C | D | E |

84. At times, some trainees get a chance to practice their record fire early in training. Do you think this is a good or bad idea? (Choose One)

| Extremely Good | Very Good | Good | So-So | Bad | Very Bad | Extremely Bad |
|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G |

85. How effective are Known Distance Firing exercises in confirming a trainee's battle sight zero? (Choose One)

| Extremely Effective | Very Effective | Effective | So-So | Ineffective | Very In-effective | Extremely Ineffective |
|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G |

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86.     How effective are Known Distance Firing exercises in improving trainee
        confidence?    (Choose One)

    Extremely      Very     Effective     So-So     Ineffective Very In-  Extremely
    Effective    Effective                                      effective Ineffective

    |_____|_____|_____|_____|_____|_____|
    A            B           C           D           E           F           G

    Using each of the numbers 1 through 4, rank the four (4) BRM training programs
    on the basis of what you think their overall effectiveness will be in teaching
    basic rifle marksmanship.  Assign a "1" to the most effective, a "2" to the
    second most effective, etc.  Assign a number to each of the four BRM training
    programs.

87a*.    _____ 72 Hour Program

87b*.    _____ 62 Hour Program

87c*.    _____ 49 Hour Program

87d*.    _____ 35 Hour Program

    Using each of the numbers 1 through 4, rank the four (4) BRM training programs
    on the basis of what you think their overall effectiveness will be in building
    trainee motivation.  Assign a "1" to the most effective, a "2" to the second
    most effective, etc.  Assign a number to each of the four BRM training programs.

88a*.    _____ 72 Hour Program

88b*.    _____ 62 Hour Program

88c*.    _____ 49 Hour Program

88d*.    _____ 35 Hour Program

    Using each of the numbers 1 through 6, rank the following Training Aids used
    to teach marksmanship skills for the M-16 Rifle.  Assign a "1" to the most
    helpful, a "2" to the second most helpful, etc.; with "6" as the least helpful.
    Assign a number to each of the six (6) Training Aids.

89a*.    _____ Paige Sighting Device

89b*.    _____ M-15 Sighting Device

89c*.    _____ M-16 Sighting Device (the "cheater")

89d*.    _____ Dime/Washer Exercise

89e*.    _____ Target Box Exercise

89f*.    _____ Transposition Exercise ("New Rifle Rest Exercise")

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90. To produce good rifle marksmen, how should BRM training be scheduled? (Choose One)

   A. With other basic training subjects given between blocks of BRM training
   B. Without other basic training subjects given between blocks of BRM training
   C. It does not matter

91. Which technique do you think is best for night firing (without night vision devices)? (Choose One)

   A. "Pointing Techniques" with automatic fire
   B. Promethium sights with single shots
   C. Both A and B
   D. Other

92. Currently, a three centimeter(3-CM) shot group is used for zeroing the M-16 Rifle during BRM training. Which of the following shot group sizes do you think is best for BRM training? (Choose One)

A.

7 1/2-CM or Larger

B.

4 1/2- CM

C.

1 1/2CM

D.

3-CM

E.

6-CM

93. List two areas of BRM training that you think are most difficult for trainees to learn.

   (Place your answer on page 3 of the Answer Sheet)


94. Please feel free to identify and discuss any problem areas you see in BRM.

   (Place your answer on page 3 of the Answer Sheet)

76-5114A