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Transfer of Training and Skill Retention

by

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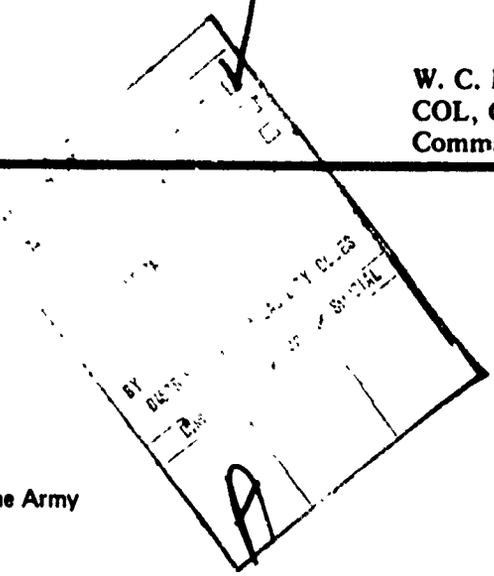

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To explore the relationship between retention of training content and transfer of that training to a criterion performance test, and to explore the impact of refresher training on transfer, a three-phase experiment was carried out over a 17-week period, utilizing 106 enlisted Army personnel divided into six groups. Training was provided by the Training Extension Course (TEC) materials on selection, maintenance, and use of hand grenades. Three groups were provided refresher training by reexposure to the TEC → next page 4B

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20. materials at varying intervals from the original training. Retention of training content was measured by a written posttest designed from the TEC materials. Transfer of training was measured by a criterion performance test (CRT) administered on an individual basis at varying intervals after original training. The posttest consisted of four subtests: I--Selection of Grenades, II--Maintaining the Hand Grenade, III--Arming the Hand Grenade, and IV--Throwing Positions. The CRT test contained the same four subtests, and in addition a fifth subtest, Identify Components of a Hand Grenade.

Increased delay between training and the CRT measure of transfer diminished performance in general, although the effects appeared to vary as a function of the kind of performance under consideration.

After a 6-week delay from initial training, subjects provided with refresher training outperformed those having no refresher training on Subtests I and II of CRT but not on Subtests III and IV. After 17 weeks, subjects given refresher training outperformed unrefreshed subjects on Subtests I, II, and IV. Thus, the two subtests (II and IV) most influenced by the transfer delay were the two most benefited by refresher training.

Retention of CRT transfer performance levels was not affected by time. Repeated testing on the CRT instrument (immediately after TEC training, 6 weeks after training, and 17 weeks after training) revealed no decline in proficiency. However, training content retention showed a rather consistent decline over time.

FOREWORD

Two primary concerns in using training devices are how well the learned skills will transfer to actual operating conditions and how well they are retained. This report explores the relationship between the two, in a continuation of training-device research reported by the Army Research Institute for the Behavioral and Social Sciences (ARI) in ARI Technical Report 76-A2. Research was conducted jointly by personnel of ARI's Unit Training and Evaluation Systems Technical Area and the American Institutes for Research under contract DAHC 19-74-C-0062, in response to special requirements of the Army Deputy Chief of Staff for Operations and Plans (DCSOPS) and RDTE Project 2Q762717A764.

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INTRODUCTION

A major problem continually confronting the designers of Army training programs is how to sequence training and skill development both within organized training experiences, such as Basic Combat Training (BCT) and Advanced Individual Training (AIT), and across an enlisted man or officer's total Army career. Traditionally, Army trainers and career planners have relied on one or more of the following kinds of criteria for making decisions regarding the sequencing of training experiences. In many cases development of training programs has taken into consideration the expectations of unit commanders regarding the skills of soldiers entering the unit from BCT, AIT, or specialized pre-unit training programs. Training programs have also been shaped by practical considerations regarding the availability of necessary training resources (time, instructors, training equipment, etc.) at various stages of training. These same programs have also been influenced by the opinions of experienced training managers who recognize that training is a "building block" process and who use their experience to determine the optimal points in a soldier's career to introduce various training experiences.

While these kinds of criteria must certainly be considered, there are additional criteria which are potentially even more important but which have received little explicit consideration in the formalized training allocation process. These criteria are retention of skill, transfer of training, and the interaction between them. These two notions represent similar but conceptually different phenomena. Retention is concerned with the extent to which a skill learned at Time 1 is still available at Time 2 given the passage of time and/or interpolated activity. Transfer may refer to the extent to which experience in one context at Time 1 facilitates performance in another context at some later Time 2.

Consideration of transfer and retention is critically important for Army training managers since the operational necessity to have critical tasks performed at the unit level frequently dictates that personnel be assigned to entry-level unit duties which differ from those for which they

were originally trained at the pre-unit level (i.e., in AIT). Similarly, the broadening of MOS's under the new Enlisted Personnel Management System (EPMS) increases the likelihood that the use of some skills will be delayed significantly following entry into the unit. At some future point, however, individuals will probably be called upon to perform the tasks for which they were originally trained. Thus, it is important not only to know the extent to which the original training will facilitate performance on the operational task (transfer), but also the extent to which the passage of time and the performance of other tasks affect both skill retention and transfer of training.

Such knowledge can prove useful in a number of specific ways. At the unit level, it can provide a partial basis for determining the sequence, timing, and amount of refresher training which might be necessary for personnel who have been performing tasks other than those for which they were trained. At the pre-unit level, this understanding can contribute to a number of important decisions, including: selection of tasks for BCT or AIT where equally critical training objectives must be reduced to meet limited resources; determination of the trade-offs between tasks, conditions and standards to meet available resources; and sequencing of selected learning objectives within BCT or AIT. For example, with respect to the first two decision areas, initial screening of task inventories developed for Army Subject Schedules has more often than not resulted in far more objectives than could be reasonably taught at the pre-unit level. Knowledge concerning the retention decay rate for particular tasks and the relationship between retention of training content and transfer to operational tasks at the unit could provide part of the basis for eliminating or deferring tasks, conditions, or standards. The research effort described in the present report was designed to explore these kinds of relationships.

Background

Hypothetical relationships between transfer of training and retention can be conceptualized in the matrix illustrated in Table 1. The six cells of the matrix represent a number of situations which might develop were a soldier exposed to a training program at Time 1 and called upon to recall the content of his training or perform the operational task for which the

training was designed at some later Time 2. Cell 4, for example, depicts a situation in which the soldier shows good retention of the training content, but negative transfer to the operational task. Such a situation might occur, for example, if the training program required the development of highly specific skills, many of which were related only to the specific training situation. Little knowledge of a general type which would facilitate performance on other, similar tasks would be developed, and the highly specific learning might actually impede performance on a new task. On the other hand, if the training program required the development of general skills which might be applicable in a number of situations, then the situation depicted in Cell 3 might occur. In this case there might be relatively poor retention of the training content but good transfer to the operational setting.

TABLE 1

Transfer-Retention Matrix

		Transfer to Operational Task		
		Negative (-)	Neutral (0)	Positive (+)
Training Content Retention	Low	1	2	3
	High	4	5	6

An examination of the experimental learning and applied training literature reveals that little is known about the nature of the possible relationships, depicted hypothetically in Table 1, between retention and transfer of training. Surprisingly, their interrelationship has not been studied with human subjects. One early study using white rats (Bunch, 1939) did find that retention was superior to transfer in a maze-learning situation, but only for the first 30 days following original learning. The generalizability of this finding to military training programs is, of course, questionable. Instead of addressing the relationship between

transfer and retention, most investigations have dealt with one while excluding the other from consideration. For example, most research on transfer has sought to relate similarities of stimuli and responses (Osgood, 1949) to degree of transfer.* Similarly, retention studies reveal, in general, that retention declines as a function of time and interpolated activity between original learning and measurement of retention (Briggs, 1954, 1957; Barnes & Underwood, 1959; Goggin, 1963). This effect has been found to decrease as the original material is overlearned (Ebbinghaus, 1885; Krueger, 1929; Postman, 1962) and may not occur at all for motor skills (Jahnke & Duncan, 1956; Lewis & Lowe, 1956; Bilodeau & Bilodeau, 1961; Adams, 1964).

Objectives of the Present Research

Given this background, the objective of the present research was to explore the relationship between retention of training content and transfer of that training to a performance-oriented transfer situation. More specifically, the study was conducted to gain an understanding of: (1) how transfer of training to a performance test situation differs as a function of the interval of time elapsing between training and transfer to the performance test; (2) the impact on transfer of providing refresher training at varying intervals since initial training; (3) how retention of training content varies as a function of time between training and testing for retention; and (4) how performance test scores hold up over several repeated administrations of the performance test. An overall consideration concerned the effect on the four questions above of different kinds of tasks.

In order to accomplish these objectives, training and testing materials were selected that contained the desired mix in the kinds of performance involved. These materials were then used in a three-phase longitudinal

*The degree of similarity between tasks is theoretically an important determinant of transfer between those tasks. In theory, the more closely tasks A and B are related, the more interaction there will be between learning A and performing B. The difficulty, however, lies in predicting whether the interaction will be favorable or unfavorable. There is ample evidence that the requirement of different responses between two tasks does not in itself make for negative transfer, either in verbal tasks (Kling & Riggs, 1971) or in motor tasks (Bilodeau & Bilodeau, 1961).

experiment carried out with six groups of enlisted Army personnel from the 1st Battalion, 3rd Infantry Division (The Old Guard) located at Fort Myer, Virginia. The next section of the report describes the experimental design and procedures that were used in the study. Following this section the results of the experiment are presented. These results are discussed in the final section and recommendations for Army training and further research are given.

METHOD

Training and Testing Instruments

The training and testing program upon which the study was based involved the use of Training Extension Course (TEC) materials which had been developed for instruction on hand grenades. Various theoretical and practical considerations dictated the choice of the hand grenade lessons. First, the grenade lessons appeared to contain sufficient task diversity and complexity to provide answers to the research questions addressed. A review of numerous TEC packages for training in such areas as mortars, radios, and anti-tank weapons indicated that while most were sufficiently complex or diverse in the underlying kinds of tasks represented, they could not be readily segmented into units of instruction meeting a variety of training and testing time contraints associated with the research effort. Secondly, the grenade lessons appeared to have a good deal of face validity in that the kinds of skills imparted could be of potential value to all soliders in combat arms MOS's. Such would not have been the case, for instance, had the research been conducted on highly abstract tasks which were studied within a laboratory context. In addition to these features of the grenade instructional materials, instruments were also available for measuring separately retention of the grenade TEC materials and for assessing the extent to which exposure to the course could be transferred to a performance test analogous to a transfer task. These features made the hand grenade TEC lessons ideal for the present experiment.

The training materials consisted of three TEC lessons for the hand grenade. Each lesson was contained on an audio/visual cassette which was presented via a Bessler Cue-See machine. The machine is designed much like a classical programmed instructional teaching machine. Information is provided followed by questions. When a question is asked, the program of instruction pauses, and the subject writes down his answer. When the subject is ready to proceed he pushes a restart button and is provided with feedback on his answer. Subjects proceed at their own pace, although generally 30 to 45 minutes are required to complete each lesson.

In order to assess retention of the TEC lesson content, a POST-training test was synthesized from the testing materials provided with the TEC lessons (see Appendix A). This test is a group paper-and-pencil instrument consisting of a total of 75 items, scored right or wrong for a total possible score of 75. Further. 58 of these 75 items could be divided into four subtests corresponding to four of the five subtests of the transfer situation discussed below. Subtest I consisted of 18 items (items 5-14, 17-21, 25, 44, and 47) and was labeled "Selection of Grenades to Accomplish Tactical Missions." Questions in this subtest required the subject to recall the appropriate type of grenade to use in a given situation and to list situations where a particular grenade would be appropriate. Subtest II consisted of 18 items (items 27-43, and 46) and was labeled "Maintaining the Hand Grenade." Subjects were shown pictures of grenades and asked to identify what, if anything, was wrong and to indicate the appropriate corrective action. Subtest III consisted of 16 items (items 48-57, 60-62, and 69-71) and was labeled "Arming the Hand Grenade." Subjects listed steps to follow in arming various grenades and examined pictures of grenades to determine if they were ready to throw. Subtest IV consisted of six items (items 58, 59, and 72-75) and was labeled "Throwing Positions." Subjects read a hypothetical situation and indicated the appropriate throwing position.

In order to assess transfer, a performance-oriented Criterion Transfer Test (CRT) was developed from an earlier version prepared by the Army for a related TEC evaluation project (see Appendix B). This is an individually administered test designed to measure a soldier's ability to transfer TEC knowledge to a simulated field setting. Recognition of correct actions is stressed in addition to recall of factual information. Also, answers are given verbally or by demonstration rather than in writing.

The test consisted of 35 items scored right or wrong for a total possible score of 35.* Further, 34 of the 35 items were divided into five

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* Actually, the test originally contained 37 items. Two of these, however, pertained to safety clips which were not available. Accordingly, these items were not scored.

subtests to represent five different content areas. The 35th item is unique and could not be grouped with any other items. Subtest I consisted of 13 items (items 1-13) and was labeled "Selection of Hand Grenades to Accomplish Tactical Missions." It corresponded to Subtest I of the retention POST test and required subjects to select the appropriate grenade from a display after being read a description of a tactical situation. Subtest II consisted of four items (items 19-22) and was labeled "Maintaining the Hand Grenade." It corresponded to Subtest II of the POST test and required subjects to indicate possible defects and corrective actions on a grenade mock-up. Subtest III consisted of four items (items 28-31) and was labeled "Arming the Hand Grenade." It corresponded to Subtest III of the POST test and required subjects to demonstrate the arming procedures using a mock-up of a grenade. Subtest IV consisted of four items (items 32-35) and was labeled "Throwing Positions." It corresponded to Subtest IV of the POST test and required subjects to demonstrate appropriate throwing positions given various tactical situations. Subtest V consisted of nine items (items 14-18, and 24-27) and was labeled "Identify the Components of a Hand Grenade." No comparable subtest was included in the POST test. Subjects were given a mock-up of various grenades and asked to name the component parts.

Subjects

A sample of 150 enlisted personnel from the 1st Battalion, 3rd Infantry Division (The Old Guard) located at Fort Myer, Virginia, served as subjects in the experiment. Subjects ranged in age from 18 to 31, with a median age of 21. Ranks ranged from E-1 to E-6, with most being E-4. Total time in service ranged from 6 to 72 months, the median being 24 months. All subjects had received prior training in hand grenades during Basic Combat Training and Advanced Individual Training, but none had been previously exposed to the TEC lessons.

Design

A research design was selected which provided a basis for answering four questions which were important to the needs of the Army. The design is presented below in Table 2. The plan was to examine the retention

and/or transfer exhibited by six groups over time. After initial training, some groups were provided with refresher training and/or reexamined after six weeks while other groups were evaluated approximately 17 weeks after initial training.

Scheduling constraints made it impossible to assign subjects randomly to experimental groups. Each experimental group was comprised of 25 randomly selected members from each of six different companies of The Old Guard. Groups were randomly assigned to treatments. The resulting groups were equivalent in distribution of rank, age, and months of prior service; initial performance on the POST test revealed no differences among groups. Thus, it was concluded that the assumption of group equivalence in grenade ability after initial exposure to TEC was a reasonable one.

TABLE 2

Research Design

Group	TIME 1 (Feb. 24-26)	TIME 2 (April 10-11)	TIME 3 (June 23-30)
1 (Six-week transfer)	TEC-POST	POST-CRT	CRT
2 (17-week transfer)	TEC-POST	--	POST-CRT
3 (Immediate transfer)	TEC-POST-CRT	CRT	CRT
4 (Untrained control)	CRT-TEC-POST	--	TEC-POST-CRT
5 (Six-week refresher)	TEC-POST	TEC-POST-CRT	CRT
6 (17-week refresher)	TEC-POST	--	TEC-POST-CRT

TEC - Training Extension Course Training
POST - Post TEC training test to measure retention
CRT - Criterion performance test to measure transfer

This design allowed the following issues to be addressed:

1. Transfer from the TEC training to the criterion performance test as a function of time since TEC training was felt to be the most important issue. The design allows for an assessment of this issue

by comparing CRT performance scores of Group 3, Time 1 (immediate transfer), Group 1, Time 2 (transfer after six weeks), Group 2, Time 3 (transfer after 17 weeks), and Group 4, Time 1 (untrained control group). If performance upon transfer decreases as a function of the time since original training, we would expect a fall-off in the trained groups' levels of performance as we moved from Time 1 to Time 3.

2. Transfer to the criterion performance test following refresher training as a function of the interval between original and refresher training was examined by providing refresher training to Groups 5 and 6 at Times 2 and 3, respectively, by providing a second exposure to the TEC lessons. The effectiveness of the refresher training can be assessed by comparing CRT performance for Group 5, Time 2 (six-week refresher training), Group 1, Time 2 (six-week no-refresher training), Group 6, Time 3 (17-week refresher training), Group 2, Time 3 (17-week no-refresher training), and Group 4, Time 1 (untrained control group). If refresher training is beneficial for transfer we would expect the performance of the six- and 17-week refresher groups on CRT to exceed that of the six- and 17-week no-refresher groups, respectively.

3. Retention of criterion test performance level over time was examined by comparing the CRT scores of Group 3 at Times 1, 2, and 3, respectively, which represents retention after intervals of zero, six, and 17 weeks following initial exposure to the transfer performance test.

4. Retention of TEC training content over time can be estimated by comparing the POST test performance of Group 1, Time 2 (six-week retention), and Group 2, Time 3 (17-week retention), with Group 1, Time 1 and Group 2, Time 1 (immediate retention) test performance, respectively.

It should be kept in mind that the above design involves the acceptance of several assumptions. First, it is assumed that the POST and CRT tests do not in themselves have significant training value and do not influence each other; that is, performance on CRT is not affected by prior exposure to POST, and vice versa. Finally, it is assumed that all subjects have similar degrees of exposure to experiment-relevant tasks during the intervals between testings.

Procedure

TEC lessons were administered in classrooms located at the headquarters of The Old Guard, Fort Myer, Virginia. They were administered separately for each group, with two subjects using each of 12 Bessler Cue-See machines at the same time. Subjects completed the three lessons at their own pace, and, upon completion, were administered the written POST test which took about 20 minutes to complete. The POST test was not administered until all subjects in a group had completed the TEC lessons.

CRT testing took place in a large open room provided by Old Guard personnel. Two testing stations were each equipped with mock-ups of 10 grenades and a mat for the subject to demonstrate throwing positions. Each subject was tested individually by the experimenters. Untested subjects were not allowed to observe the testing procedure, and tested subjects were not allowed to return to the area where untested subjects were waiting. During testing, the subject stood in front of the grenade display and the experimenter read questions aloud and recorded the subject's answers in a test booklet. Questions were repeated once if the subject did not understand. Subjects were not provided with feedback as to the correctness of their answers. About 10 minutes per subject were required for testing.

During intervals between testing sessions (Times 1, 2, and 3) most subjects received some training in grenade identification as part of their normal activities. It was felt that this training would not interfere with the validity of the experiment since the training was constant across groups and was quite limited in scope relative to the training provided by the TEC lessons. During the course of the data collection, 44 subjects were lost due to transfers, scheduled leave, illness, etc. Subject attrition was equally distributed across groups.

RESULTS

In this section of the report results pertaining to the four research questions addressed by the design in Table 2 are presented for subtests of the CRT and POST instruments. The first series of analyses is concerned with Questions 1 and 2, namely: 1) the effect upon transfer to CRT subtests of different intervals of time since original TEC training; and 2) the effectiveness of refresher training for enhancing performance upon transfer to CRT subtests. The next set of analyses is concerned with Question 3: retention of CRT subtest performance levels over time. The final set of analyses addresses Question 4: retention of POST subtest performance levels over time.

Questions 1 and 2 - Data Analysis Procedures

In order to address the transfer-over-time and refresher-training issues, CRT subtest scores (score equals the number of items answered correctly) were examined for six conditions. The mean number of items correct and the mean proportion of correct items on each subtest are presented in Table 3 for the relevant six conditions. In comparing these data the analytical strategy was, first, to determine whether the mean levels of performance exhibited on each subtest by the experimental groups differed from the mean of the control group (Group 4, Time 1). This was accomplished by performing Dunnett *t*-tests (Winer, 1962). Second, a one-way analysis of variance was conducted for each subtest on scores obtained under the five experimental conditions. Variance components obtained from these analyses were then used in a priori planned single-degree-of-freedom *F*-tests (Winer, 1962) in order to contrast the means underlying the research questions of specific interest. In all of these analyses only data from those subjects who completed all three phases of the experiment were included.

Question 1 Results - Transfer Over Time

To assess the effects on transfer of a delay between training and transfer, the mean CRT subtest scores for the immediate transfer group (Group 3, Time 1) were compared to those of the six-week transfer group (Group 1, Time 2) which were compared to those of the 17-week transfer group (Group 2, Time 3). The mean proportion of correct items for these

Table 3

Mean CRT Subtest Scores and Proportion Correct
for the Experimental Conditions Used
to Assess Transfer of Training

Condition	Subtest*				
	I (max=13)	II (max=4)	III (max=4)	IV (max=4)	V (max=9)
Group 4, Time 1 (Untrained)	4.94(.38)	1.83(.46)	1.61(.40)	1.89(.47)	4.56(.51)
Group 3, Time 1 (Immediate Transfer)	9.82(.76)	3.35(.84)	3.47(.87)	3.71(.93)	5.24(.58)
Group 1, Time 2 (Six-Week Transfer)	8.80(.68)	2.75(.69)	3.65(.91)	3.50(.87)	5.60(.62)
Group 2, Time 3 (17-Week Transfer)	8.72(.67)	2.61(.65)	3.44(.86)	2.39(.60)	5.39(.60)
Group 5, Time 2 (Six-Week Refresher)	10.35(.80)	3.41(.85)	3.76(.94)	3.35(.84)	6.41(.71)
Group 6, Time 3 (17-Week Refresher)	10.20(.78)	3.33(.83)	3.80(.95)	3.47(.87)	6.07(.67)

Note: ( ) = mean proportion of subtest questions correct.

* I = Selecting Grenades
II = Maintaining the Hand Grenade
III = Arming the Hand Grenade
IV = Throwing Positions
V = Identify the Components of a Hand Grenade

groups and for the untrained group (Group 4, Time 1) on each of the five CRT subtests is shown graphically in Figure 1. Dunnett t-tests revealed that each of the three trained groups achieved significantly higher levels of performance ($p < .01$) than did the untrained control group on CRT Subtests I (Selecting Grenades) and III (Arming the Hand Grenade). On Subtest IV (Throwing Positions) the immediate and six-week transfer groups were superior to the control group ($p < .01$), while the 17-week transfer group was not. A similar pattern was obtained on Subtest II (Maintaining the Hand Grenade) where the immediate transfer group was significantly superior to the control group ($p < .01$), as was the six-week transfer group ($p < .05$), while the 17-week transfer group was not. None of the trained groups differed significantly from the control group on Subtest V (Identify the Components of a Hand Grenade).

Planned single-degree-of-freedom F-tests revealed that on Subtest IV (Throwing Positions) the immediate and six-week transfer groups achieved significantly higher scores than did the 17-week transfer group ($p < .01$), but they were not significantly different themselves. On Subtest II (Maintaining the Hand Grenade) the immediate-transfer group obtained significantly higher scores than either the six- or 17-week transfer groups ($p < .05$). No other contrasts were significant.

Question 2 Results - Effect of Refresher Training on Transfer

The effects of refresher training on transfer were examined, after six weeks had elapsed since initial training, by comparing the CRT subtest scores of the six-week transfer group (Group 1, Time 2) with those of the six-week refresher group (Group 5, Time 2). Similarly, 17-week transfer group (Group 2, Time 3) scores were compared to 17-week refresher group (Group 6, Time 3) scores. The mean proportion of correct items on each of the five CRT subtests is shown graphically in Figure 2 for groups relevant to the refresher-training issue. Dunnett t-tests indicated that both the six-week and 17-week refresher groups achieved significantly higher scores ($p < .01$) than the untrained control group on CRT Subtests I (Selecting Grenades), II (Maintaining the Hand Grenade), III (Arming the Hand Grenade), and IV (Throwing Positions). On Subtest V (Identify the Components of a

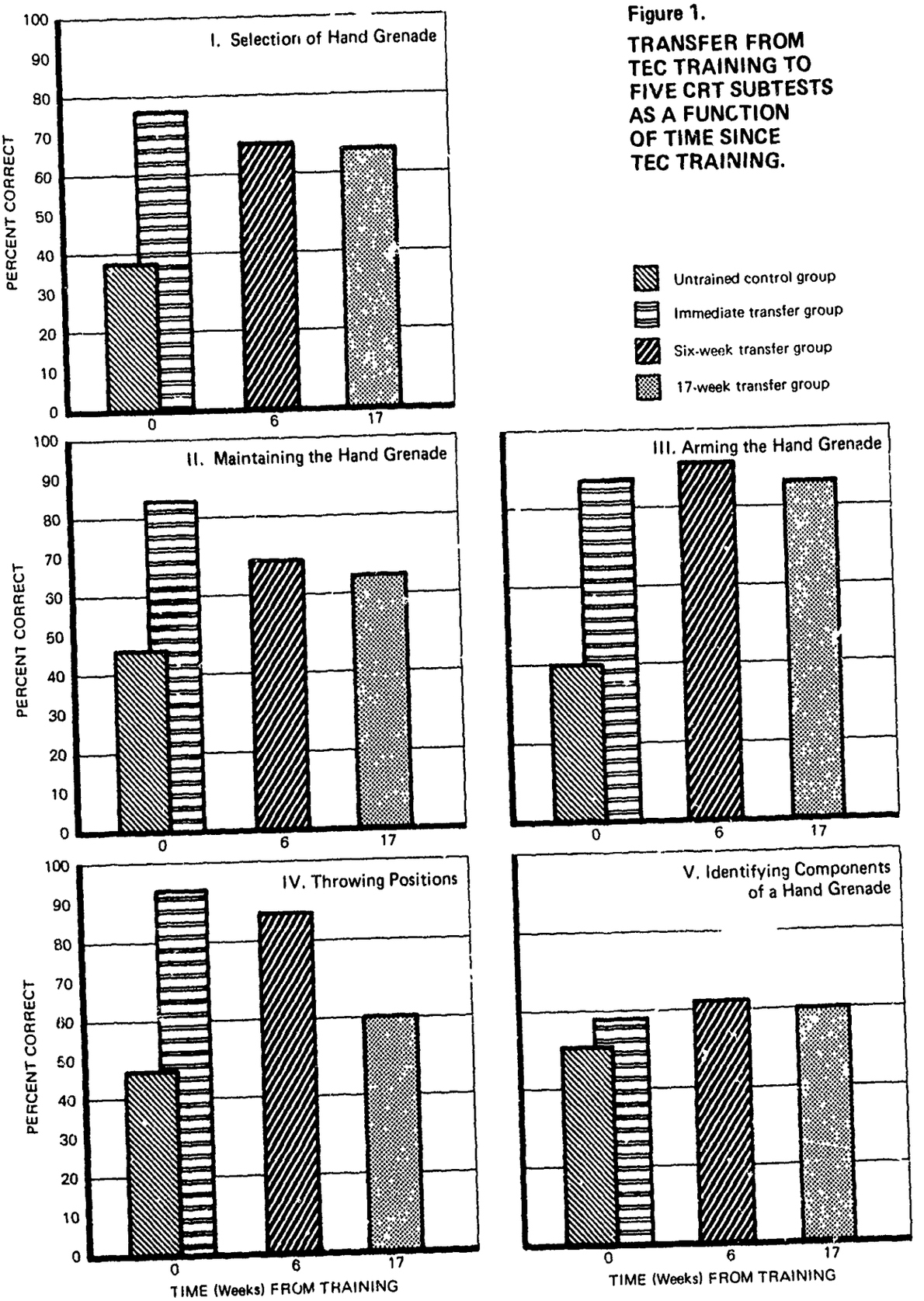

Figure 1.

TRANSFER FROM TEC TRAINING TO FIVE CRT SUBTESTS AS A FUNCTION OF TIME SINCE TEC TRAINING.

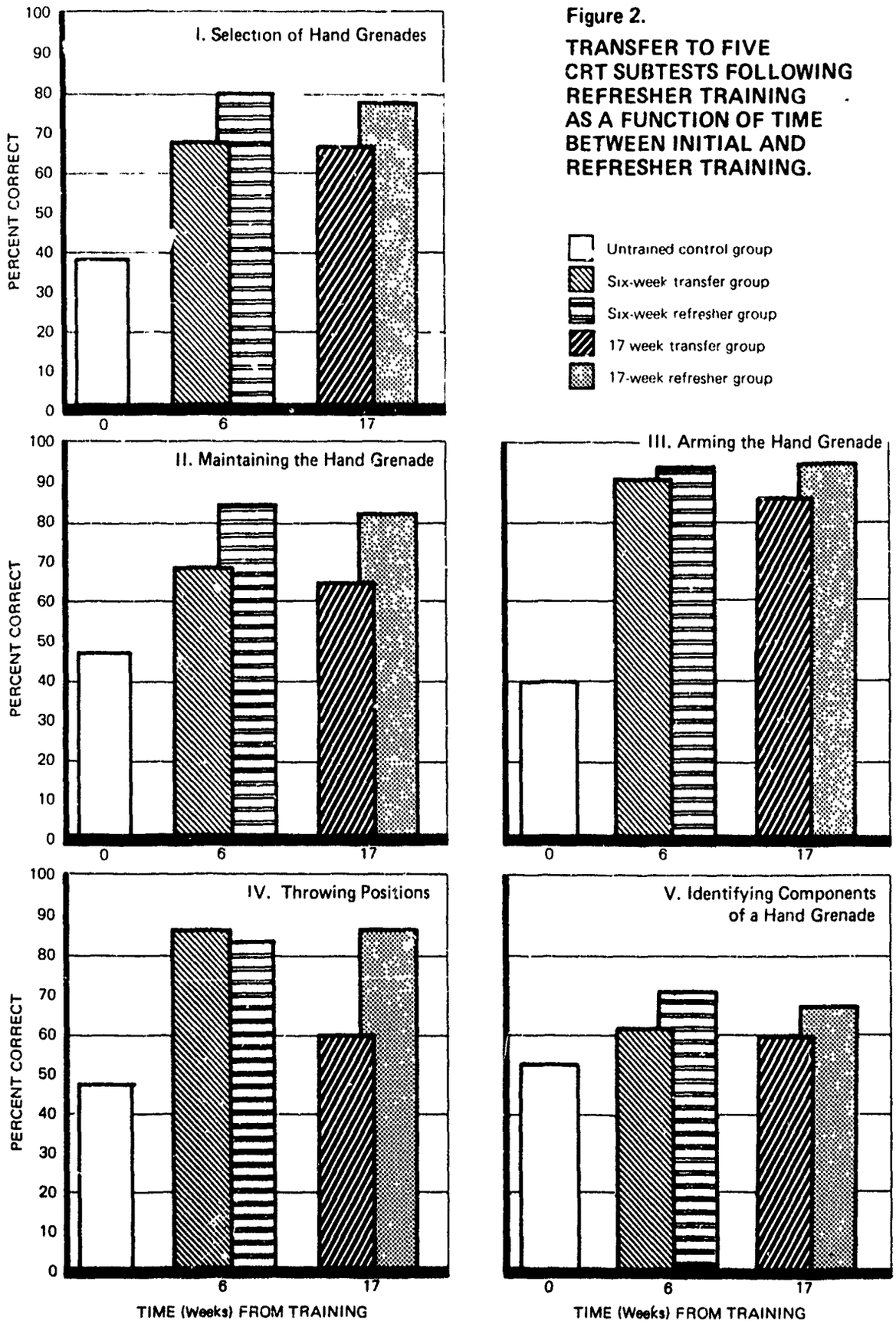

Figure 2.

TRANSFER TO FIVE CRT SUBTESTS FOLLOWING REFRESHER TRAINING AS A FUNCTION OF TIME BETWEEN INITIAL AND REFRESHER TRAINING.

Hand Grenade) the six-week refresher group had a significantly higher mean level of performance than the control group ($p < .05$), while the 17-week refresher group did not.

Single-degree-of-freedom F-tests were used to contrast the performance of the six-week refresher group with that of the six-week transfer group on each CRT subtest. These analyses revealed that the six-week refresher group achieved significantly higher scores ($p < .05$) on two of the Subtests, I (Selecting Grenades) and II (Maintaining the Hand Grenade). Comparable analyses of the 17-week groups showed that the 17-week refresher group scored significantly higher on these same subtests than did the 17-week transfer group ($p < .05$). Finally, the 17-week refresher group also performed at a significantly higher level than the 17-week transfer group ($p < .01$) on Subtest IV (Throwing Positions).

Question 3 Procedure and Results - Retention of CRT Performance Levels

An examination of the retention of CRT performance levels over time was conducted by casting the scores on each CRT subtest obtained from Group 3 at each of the testing periods (see Table 2) into a one-way repeated measures analysis of variance. None of the analyses was significant, indicating that the levels of performance on the five CRT subtests were unaffected by the passage of either six or 11 weeks between assessments. The mean number of items correct and the mean proportion of correct items on each subtest are presented in Table 4.

Question 4 Procedure and Results - Retention of Training Content

Retention of training content was examined by casting the POST subtest data from Group 1 (tested at zero and six weeks) and from Group 2 (tested at zero and 17 weeks) into a 2 x 2 mixed model analysis of variance with unequal n's. The mean number of items correct as well as the proportion correct for each subtest are presented in Table 5 and plotted in Figure 3 for the four cells in the analysis.

Results for three of the four subtests were highly similar, the analyses revealing a highly significant main effect for test-retest interval. In Subtests I (Selecting Grenades), II (Maintaining the Hand Grenade),

Table 4

Mean CRT Subtest Scores and Proportion Correct
for Group 3 Tested Over Time

Subtest	Time 1 (Zero Weeks)	Time 2 (Six Weeks)	Time 3 (17 Weeks)
I (Selecting Grenades)	9.82(.76)	9.82(.76)	9.41(.72)
II (Maintaining the Hand Grenade)	3.35(.84)	2.94(.74)	2.88(.72)
III (Arming the Hand Grenade)	3.47(.87)	3.41(.85)	3.29(.82)
IV (Throwing Positions)	3.71(.93)	3.47(.87)	3.65(.91)
V (Identify the Components of a Hand Grenade)	5.24(.58)	6.00(.67)	5.94(.66)

Note: ( ) = mean proportion of subtest questions correct.

Table 5

Mean POST Subtest Scores and Proportion Correct

		Subtest I*		Subtest II	
		Time		Time	
		Initial	Retest**	Initial	Retest**
Groups	1 (six-week)	13.45 (.75)	10.30 (.57)	15.85 (.88)	15.05 (.84)
	2 (17-week)	13.33 (.74)	7.67 (.43)	16.61 (.92)	13.15 (.73)

		Subtest III		Subtest IV	
		Time		Time	
		Initial	Retest**	Initial	Retest**
Groups	1 (six-week)	14.60 (.91)	13.90 (.87)	5.60 (.93)	5.25 (.88)
	2 (17-week)	15.38 (.96)	12.11 (.76)	4.90 (.82)	3.75 (.63)

Note: ( ) = mean proportion of subtest questions correct.

* I = Selecting Grenades
II = Maintaining the Hand Grenade
III = Arming the Hand Grenade
IV = Throwing Positions

** Retest interval for Group 1 = six weeks
Retest interval for Group 2 = 17 weeks

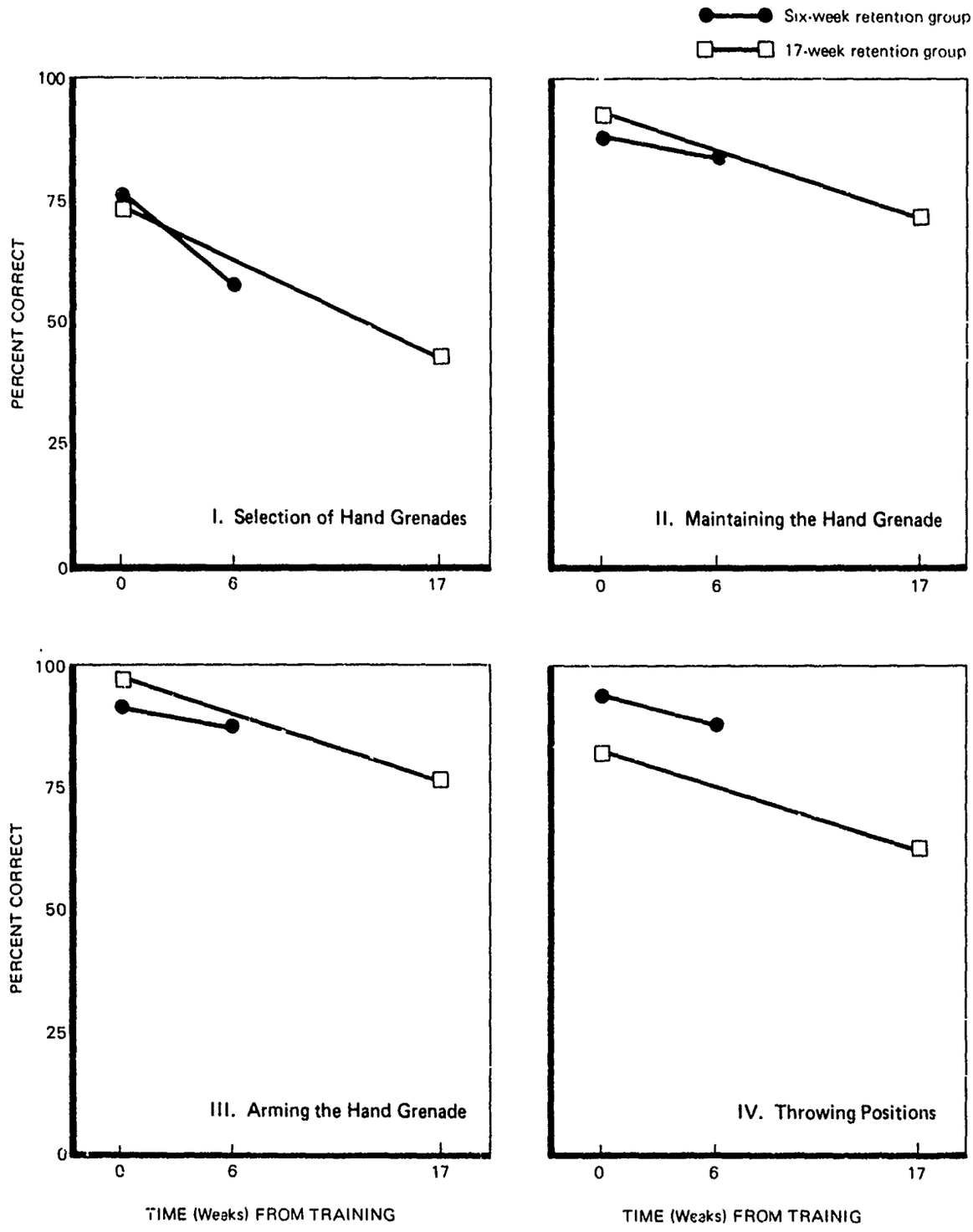

Figure 3. RETENTION OF TRAINING CONTENT OVER TIME FOR FOUR POST-SUBTESTS.

and IV (Throwing Positions), significantly lower levels of performance were obtained upon retesting ($p < .001$). Retention of training content, as indicated by retest scores, fell off substantially with the passage of time.

For Subtest III (Arming the Hand Grenade) the analysis revealed a significant Time x Group interaction ($p < .05$). In order to explain this interaction, simple main effects analyses (Winer, 1962) were conducted. One analysis examined retention over time for both Group 1 and 2. For Group 1, POST Subtest III performance did not decline from initial testing to the retest given six weeks later. However, there was a marked decline in retention for Group 2 from initial testing to the retest given 17 weeks later ($p < .01$). Complementary analyses were also conducted in which the scores of both groups were compared at the initial and final points in time. A comparison between the groups on the initial test revealed no difference in POST Subtest III mean performance, a finding reflecting the initial equivalence of the two groups. However, when the two groups were compared on their final test (Group 1 at six weeks and Group 2 at 17 weeks), Group 2 performance was significantly poorer than that of Group 1 ($p < .05$). Thus, for this subtest, a marked decline in retention of training content becomes apparent only after an interval of 17 weeks since initial training.

DISCUSSION

In discussing the results of this study it is important to bear several cautions in mind, particularly if one is concerned about generalizing the results to other military populations and settings. First, the present study was limited by the type of task employed. The hand grenade lessons used were essentially recall tasks and did not require a great deal of cognitive processing or complex procedure following, higher order kinds of performance associated with a great many other tasks in the Army job inventory. Further research would be needed to determine the extent to which the present results are generalizable to other kinds of Army tasks.

A second caveat concerns the subject population used in the present study. Members of The Old Guard are regarded as somewhat "special" in that membership in the unit is selective and on a voluntary basis. Thus, basic ability levels and motivation may be different from that found in other Army units.

A final limitation that should be considered is the relatively short time period covered by the present study. All data were collected during a 17-week period, in just about four months. Some relationships that were not significant at six weeks were significant at the end of 17 weeks. Others remained nonsignificant over the 17 weeks but might have become significant had a longer interval been examined. In actual practice, Army personnel may be called upon to perform the tasks for which they were originally trained after delays of six, 12, or even more months. Therefore, the present data should be regarded as only suggestive of what effects these longer intervals might produce.

Question 1 - Transfer Over Time

On all CRT subtests except the fifth (Identify the Components of a Hand Grenade), the TEC training promoted significantly higher levels of performance, upon immediate transfer, than were achieved by the untrained control group. The relatively poor showing of the trained groups on Subtest V implies that the TEC materials simply did not cover the content underlying performance of this CRT subtest. Consequently, poor transfer does not appear

to be the issue so much as a lack of training specifically relevant to Subtest V. This problem is avoided in actual Army training contexts by having the job performance objectives dictate training content.

The contribution of training to transfer was evident after six weeks elapsed before soldiers were asked to apply their TEC training in performance of the CRT subtests. Again, with the exception of Subtest V, the trained groups outperform the untrained control group. The passage of time, however, is starting to show an effect. In three of the four subtests (I, II, and IV) a downward trend in performance is becoming noticeable relative to the level achieved upon immediate transfer, and in the case of Subtest II (Maintaining the Hand Grenade), this reduced proficiency is significant.

The impact of delay on transfer becomes more apparent after 17 weeks have elapsed. On only Subtests I and III (Selecting and Arming Grenades, respectively) is the advantage of the trained groups over the untrained control group maintained. In both Subtests II and IV (Maintaining Grenades and Throwing Positions), a significant loss in transfer performance has occurred relative to immediate or six-week delayed transfer such that the levels achieved are indistinguishable from those attained by the untrained group.

Considered jointly, these results strongly suggest that the time course of transfer varies as a function of the kind of performance under consideration. Some transfer performance remains relatively high (Subtests I and III) while others fall off over time (Subtests II and IV). In the cases of these latter two subtests, for example, if transfer must be delayed for 17 weeks or more, then there is reason to suggest deferring training until more immediate transfer can be provided for. It is difficult to account for these differences by examining different skill requirements of the subtests. For example, Subtest III (Arming the Hand Grenade) requires the accurate recall of a sequence of procedures and should be more difficult than Subtest II (Maintaining the Hand Grenade) which requires recognition of the possible defects in a grenade. Further research should attempt to uncover other dimensions of tasks related to this phenomenon.

Question 2 - Effect of Refresher Training on Transfer

On all but Subtest V (Identify the Components of a Hand Grenade), refresher training resulted in levels of performance significantly higher than those obtained by the untrained control group, even when refresher training was delayed for 17 weeks. The relatively poor performance exhibited on CRT V, even given refresher training, adds credence to the earlier conclusion that TEC simply did not contain much material relevant to this subtest.

After six weeks, subjects provided with refresher training outperformed those having no refresher training on Subtests I and II (Selecting and Maintaining Grenades). No advantage was noted on Subtests III and IV (Arming Grenades and Throwing Positions). After 17 weeks, subjects given refresher training again outperformed unrefreshed subjects on Subtests I and II. In addition, refresher training was very advantageous for Subtest IV (Throwing Positions). Without such refresher, transfer performance after a 17-week delay was indistinguishable from that of the untrained group. With it, they were far superior. Thus, the findings regarding refresher training fit in nicely with the transfer findings. The two subtests (II and IV) most influenced by the transfer delay were the two most benefited by refresher training.

The findings with regard to refresher training are potentially quite useful to Army training managers since one problem frequently encountered is that a newly trained soldier is assigned to initial duties in a unit that bear little relationship to his formal training. At some point later, a need for his particular training may develop and the soldier is expected to perform satisfactorily. In other words, he is expected to transfer his training after some unspecified delay during which he was performing other duties. While the present data suggest that transfer may not fall off markedly in the short run, they also suggest that transfer can be enhanced by the application of refresher training. Thus, when the Army is faced with the situation of having personnel perform duties other than those for which they were trained, with the expectation that they will return to their trained duties later, the judicious application

of refresher training might serve to enhance the efficiency with which normal duties are resumed. Of course, the present data leave unanswered questions regarding the type and amount of refresher training which are optimal. In the present study, refresher training consisted of reexposure to the total original training program. Quite likely the amount and type needed vary with the skill being considered. Also, as mentioned, it is difficult to extrapolate the present results beyond a 17-week interval. These questions would seem fruitful areas for further research.

Question 3 - Retention of CRT Performance Levels

Performance levels on all CRT subtests at Times 2 and 3 were comparable to those obtained upon initial transfer, which, with the exception of Subtest V, were far above those of the untrained group. Given the opportunity to transfer immediately to these tests, subsequent performance on them remained high. Thus, another strategy to retain high levels of proficiency would be to provide periodic exposure to (practice on) the transfer situation as an alternative to periodic refresher training.

Question 4 - Retention of Training Content

The general picture was that performance on POST subtests was lower upon retest than upon initial testing, there being a suggestion that the longer the retest interval was, the greater the decrease became in POST scores.

Summary

The most striking findings of the present study concerned the pattern of transfer and retention effects among the subtests. There was a significant decline in transfer for both six- and 17-week delays in only one subtest (II, Maintaining the Hand Grenade). One additional subtest (IV, Throwing Positions) revealed a transfer decline only after 17 weeks. Time had no effect on transfer for subtests I (Selecting Grenades), and III (Arming the Hand Grenade). On the other hand, retention of POST content declined for both six- and 17-week intervals in subtests I (Selecting Grenades), II (Maintaining the Hand Grenade), and IV (Throwing Positions), and declined only after 17 weeks in Subtest III (Arming the Hand Grenade). This finding provides empirical support for the Army's policy of evaluating training

programs with performance-oriented criterion tests rather than relying on measures of training content retention, a procedure which could seriously underestimate a training program's true value.

Finally, several problems that were encountered with the TEC training materials are worth mentioning. The Bessler Cue-See machines employ separate tapes for the audio and visual portions of the program. The video portion is rewound completely by pushing a single button on the front of the machine while the audio portion can be rewound partially just like an ordinary tape recorder. Unfortunately, the video rewind button is located adjacent to the "continue" button which the subject presses to restart the program after he has answered a question. It is quite easy to confuse the buttons and once the video rewind button has been pressed there is no alternative but to rewind the audio portion as well and start the program over. Since the programs are 30-45 minutes in length, the necessity to start over can waste considerable time. Also, the use of separate video and audio tapes makes it quite easy for the two to be out of phase, especially if the audio tape is not fully rewound from the previous use. It would seem that these features could be corrected by a fairly simple modification of the Bessler Cue-See machine since the overall value of the machines appears to be high.

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APPENDIX A

HAND GRENADE POST MEASURE

HAND GRENADE POST MEASURE

Name_____ Date_____

Unit_____

Social Security Number _____

Rank_____

Please list prior training that you have had with hand grenades

_____

_____

Scores:

Part one _____

Part two _____

Part three _____

PART ONE

Types and Uses of the Hand Grenade

1. What are the four general categories of grenades?

_____1

_____2

_____3

_____4

2. The major use of a fragmentation grenade is to _____

_____5

3. What are the three types of chemical smoke grenades and their respective uses?

_____6-7

_____8-9

_____10-11

4. When temporary disability is the goal, the appropriate type of grenade to be used is?

_____12

5. What is the purpose of the incendiary grenade?

_____13

6. If you are in extremely close range (i.e., 2 meters) or in a confined area the grenade you would use to destroy enemy personnel is?

_____14

7. What are the two types of fragmentation grenades?

_____15 and _____16

8. If you are in a situation where you are unable to see between you and the target, you should use what grenade?

_____ 17

9. Given an example when you would use the impact grenade.

_____ 18

10. Three uses of white phosphorus smoke grenades are?

_____ 19

_____ 20

_____ 21

11. What is a good safety rule to remember regarding the effective range of the white phosphorus grenade?

_____

_____ 22

12. How do you extinguish a white phosphorus fire?

_____ 23

13. The method of achieving an air burst over an entrenched enemy position with an M67 time delay grenade is called?

_____ 24

14. In riot control, when there is a possibility that a crowd could throw a grenade back at you you would use the ___riot control grenade.

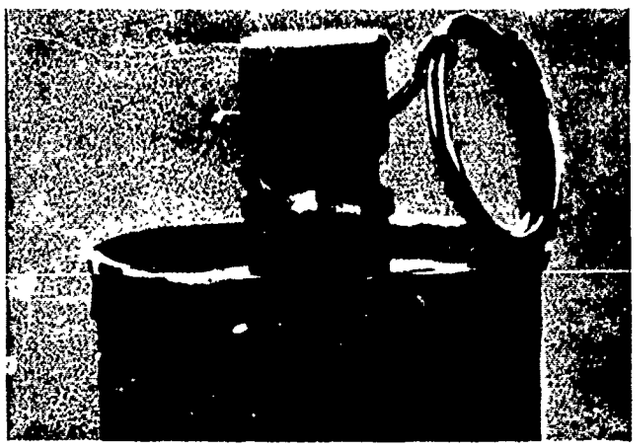
_____ 25

15. An impact grenade can safely be converted to a time delay by arming the grenade and waiting 1 second--True or False?

_____ 26

THE HAND GRENADE MAINTENANCE AND IDENTIFICATION

Study the following seven pictures of hand grenades. In each case if there is nothing wrong with the hand grenade, put a check mark (✓) in the space next to the phrase - nothing wrong. If the grenade is not n proper working order, write down what is wrong with it and what action you would take to correct it.

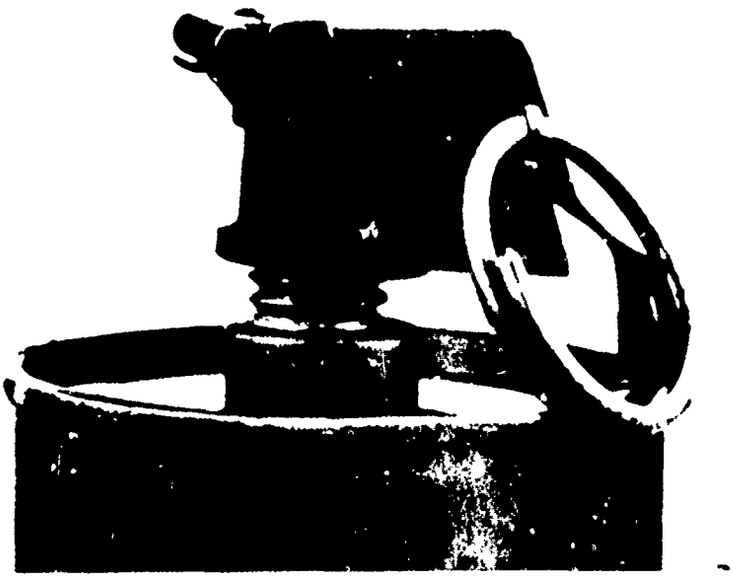


1. ( ) Nothing Wrong.

*Defect: _____ 27

Correction: _____ 28

THE HAND GRENADE MAINTENANCE AND IDENTIFICATION



2. ( ) Nothing Wrong.

*Defect: _____ _____29

Correction: _____ __30

THE HAND GRENADE MAINTENANCE AND IDENTIFICATION

3. ( ) Nothing Wrong.

Defect: _____ 31

Correction: _____

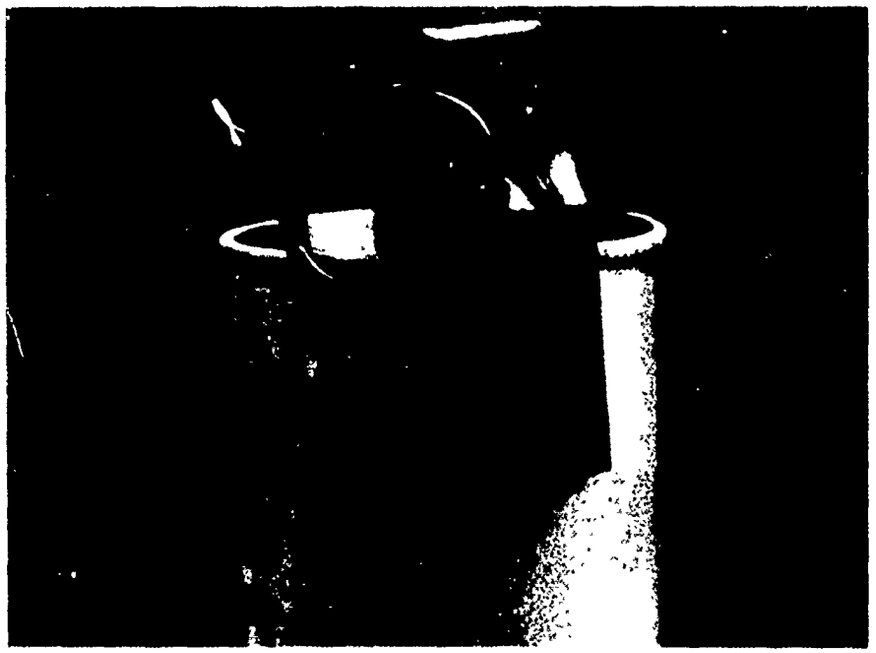
THE HAND GRENADE MAINTENANCE AND IDENTIFICATION

4. ( ) Nothing Wrong.

*Defect: _____ 32

Correction: _____ 33

THE HAND GRENADE MAINTENANCE AND IDENTIFICATION



5. ( ) Nothing Wrong.

*Defect: _____ 34

Correction: _____ 35

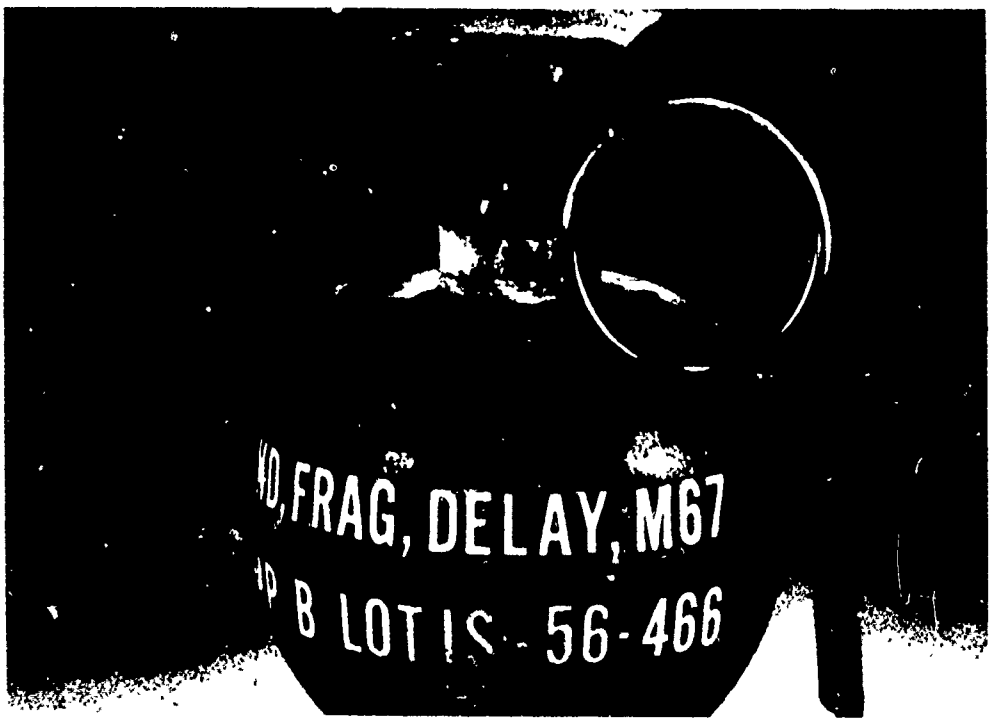
THE HAND GRENADE MAINTENANCE AND IDENTIFICATION

6. ( ) Nothing Wrong.

*Defect: _____ 36

Correction: _____ 37

THE HAND GRENADE MAINTENANCE AND IDENTIFICATION



*7. ( ) Nothing Wrong.

Defect: _____ 38

Correction: _____ 39

8. When inspecting grenades, state four defects you would check for.

_____ 40

_____ 41

_____ 42

_____ 43

9. A colored smoke grenade can be identified by its beer-can shape and ____?

_____ 44

10. A grenade that is upside-down in its packing case should be carefully removed and reinserted right side up. True or False?

_____ 45

11. A grenade that is only slightly rusty can be wiped off with a clean cloth and used. True or False?

_____ 46

12. A white phosphorus grenade can be identified by its beer-can shape. True or False?

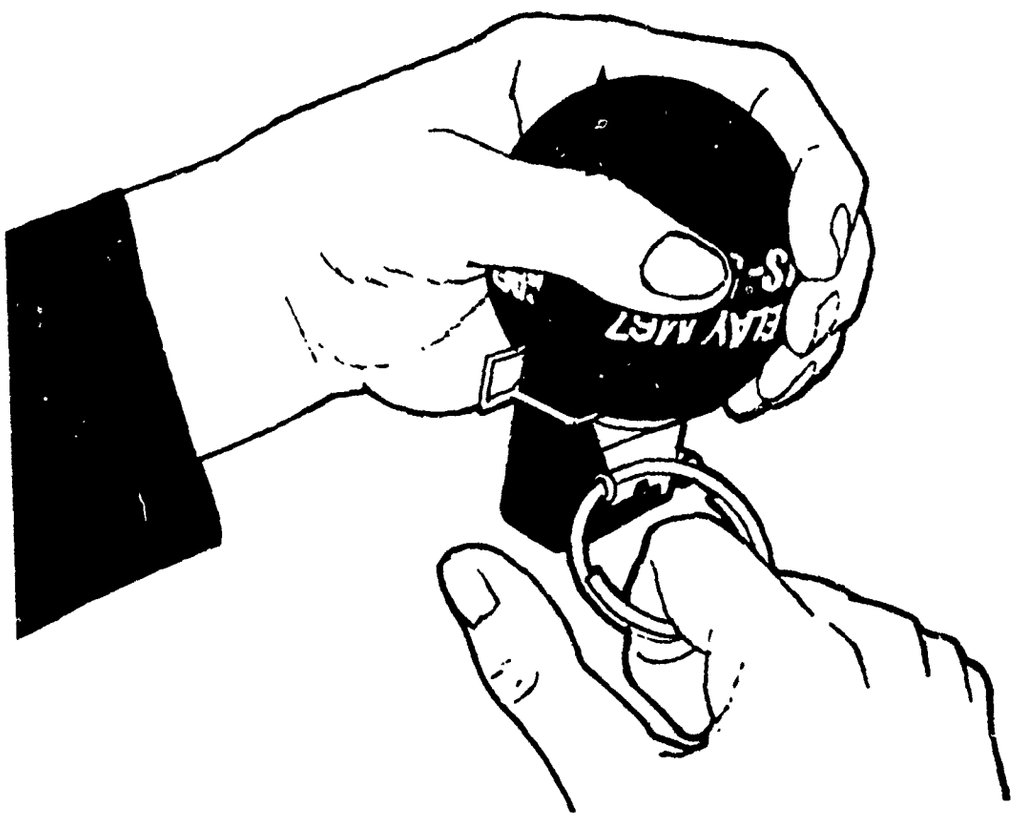
_____ 47

THE HAND GRENADE-CARRYING, ARMING, AND THROWING

*Study the picture. Mark YES or NO to show whether it is the correct method of holding a hand grenade.

1.	YES	NO
	___	___ 48

THE HAND GRENADE-CARRYING, ARMING, AND THROWING



*Study the picture. Mark YES or NO to show whether it is the correct method of holding a hand grenade for left-handed throwers.

2. YES NO

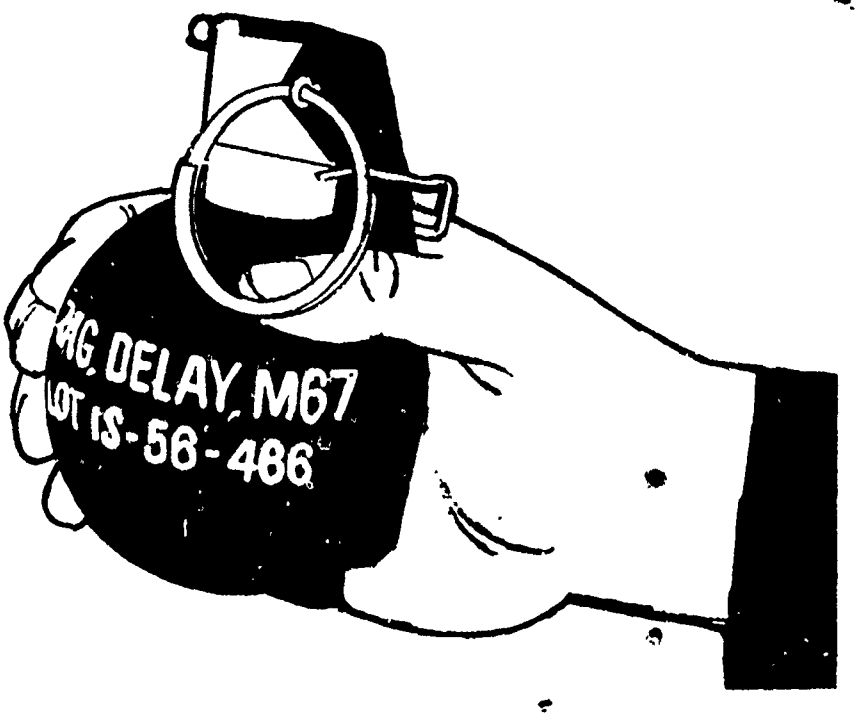
___ ___ 49

THE HAND GRENADE-CARRYING, ARMING, AND THROWING

*Study the picture. Mark YES or NO to show whether it is the correct method of holding a hand grenade.

3.	YES	NO
	___	___ 50

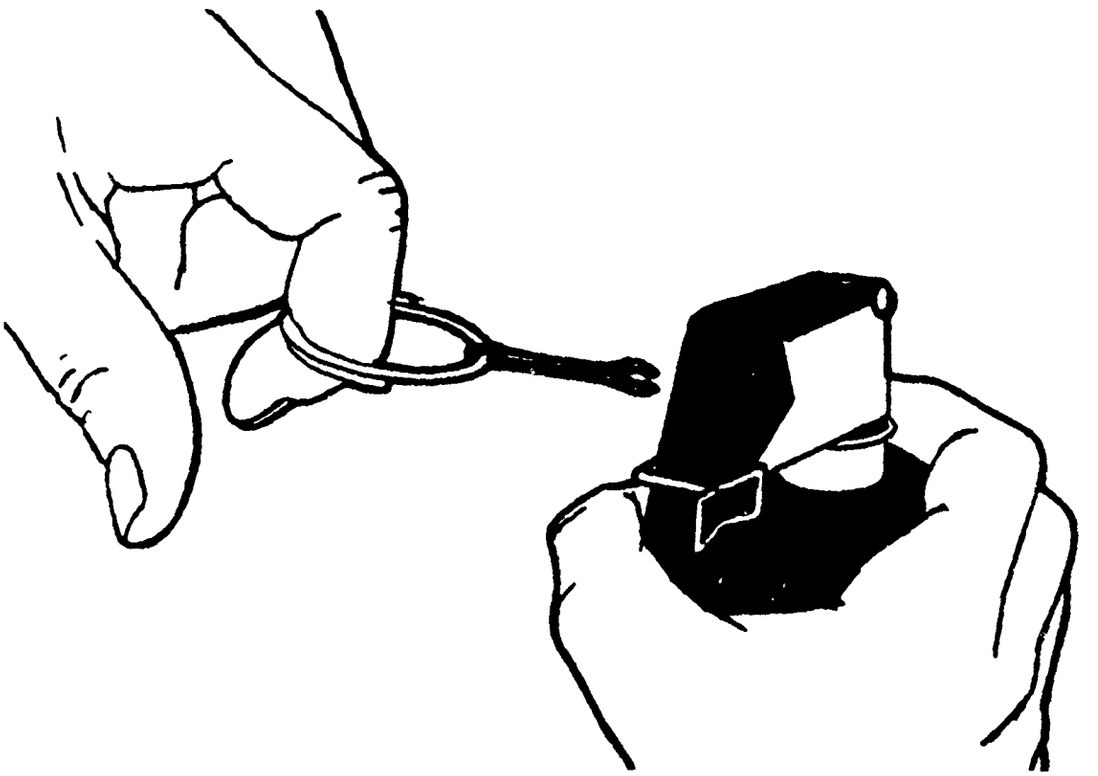
THE HAND GRENADE-CARRYING, ARMING, AND THROWING



*Study the picture. Mark YES or NO to show whether it is the correct method of holding a hand grenade for right-handed throwers.

4.	YES	NO
	___	___ 51

THE HAND GRENADE-CARRYING, ARMING, AND THROWING



*Study the picture. Mark YES or NO to show if the hand grenade is ready to be thrown. If you mark NO, explain why.

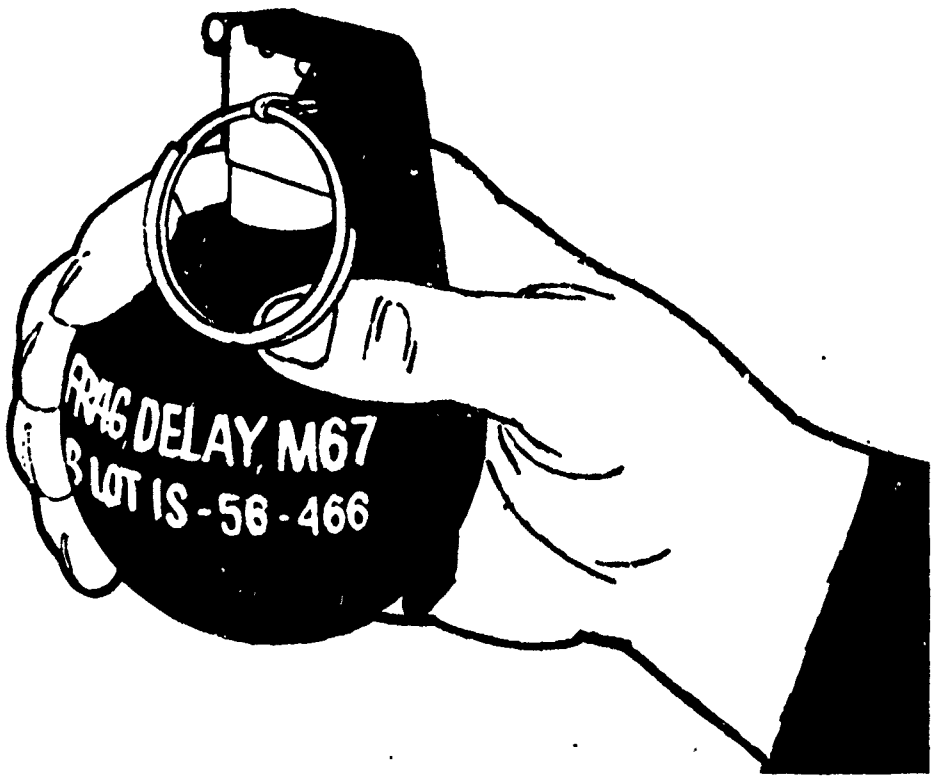
5.	YES	NO	If NO, Why?
	___	___	_____ 52-53

THE HAND GRENADE-CARRYING, ARMING, AND THROWING

*Study the picture. Mark YES or NO to show if the hand grenade is ready to be thrown. If you mark NO, explain why.

6. YES ___ NO ___ If NO, Why? _____ 54

THE HAND GRENADE-CARRYING, ARMING, AND THROWING



*Study the picture. Mark YES or NO to show if the hand grenade is ready to be thrown. If you mark NO, explain why.

7.	YES	NO	If NO, Why?	
	___	___	_____	55-56

8. How do you arm the M25 riot-control hand grenade? (Ball-shaped, bursting type)

_____

_____ 57

9. Name one advantage and one disadvantage of the standing position when throwing a grenade.

Advantage: _____ 58

Disadvantage: _____ 59

10. List the three steps for arming a fragmentation grenade.

_____ 60

_____ 61

_____ 62

11. How many grenades can be safely held in the carrying pouch?

_____ 63

12. When attatching grenades to the carrying sleeve what should you never do?

_____ 64

13. What are three safety devices found on most grenades?

_____ 65

_____ 66

_____ 67

14. What safety device is found only on fragmentation grenades?

_____ 68

15. What are the three steps in correct sequence for throwing a fragmentation grenade?

_____ 69

_____ 70

_____ 71

16. What positon provides the best distance and requires the most cover?

_____ 72

17. In a situation which has very little cover, and you only need to throw a very short distance, which position would you use?

_____ 73

18. There is not any one best way to actually throw a grenade. True or False?

_____ 74

19. Follow-through is an important step in throwing the grenade. True or False?

_____ 75

APPENDIX B

HAND GRENADE PERFORMANCE TEST

HAND GRENADE PERFORMANCE TEST

Four (4) performance tests will be administered:

1. Selection of grenades
2. Inspect and service a practice grenade
3. Identify parts of a riot control grenade and prepare to throw
4. Select appropriate throwing positions and demonstrate

Equipment required for the tests includes:

1. Display of grenades (M68, M67, M34, AN-M8, MT8, M6 or M7, M25, AN-M14 TH3, M69, and MK3A2)
2. M69 practice grenade
3. M69 practice grenade inserted upside down in a grenade fiber container
4. Display of an M25 riot control grenade showing all component parts

Soldiers will be tested in an area where the tester can observe his actions. Soldiers waiting to be tested will wait in a holding area where they cannot observe the tests.

_____	_____
Soldier's Name	Group Identification
_____	_____
Performance Tester's Name	Date

Test Scores: 1 _____

2 _____

3 _____

4 _____

Total Score: _____

Hand Grenade Performance Test

Performance Test 1: SELECTION OF GRENADES

Test Situation
(tester will read to trainee):

"At this station, you will be tested on selection of hand grenades for use in accomplishing tactical missions. I will read descriptions of thirteen (13) situations. For each situation, you will select the grenade best suited for the job. This display shows the types of hand grenades.

Test Condition:

The soldier is shown a display containing one each of the following hand grenades. The grenades are placed on display with no particular pattern as to use.

A. Fragmentation grenade (M68) with impact detonating fuze.

B. Fragmentation grenade (M67) with time delay fuze.

C. White Phosphorous (M34).

D. White smoke (AN-M8).

E. Colored Smoke (M18), red, green, yellow, or violet.

F. Riot control (M6 or M7) [beer can type].

G. Riot control (M25 series, CNI, DMI, or CSI) [baseball type].

H. Incendiary (AN-M14 TH3).

I. Practice (M69).

J. Offensive Concussion (MK3A2).

Necessary Equipment:

Examples of the hand grenades named under the test conditions.

Performance Measures:
The tester will read the situation in quotation marks to the soldier. The soldier will name and point to the correct hand grenade to use for each situation.

A. "You are in a recon patrol that has made contact; you want to break contact and cover your withdrawal. Name and point to the grenade that you would use."

B. "You are rehearsing the conduct of a raid; aggressor forces will be used. Name and point to the grenade that you would use."

C. "You are signaling for an aerial medical evacuation mission. Name and point to the grenade that you would use."

D. "You need to prevent enemy use of a mortar barrel. Name and point to the grenade that you would use to destroy it."

E. "You are attacking enemy troops located uphill and 25 meters from you. Name and point to the grenade that you would use."

F. "Civilians are holding a power station; you are attempting to retake that station; you want no casualties and no damage. Name and point to the grenade that you would use."

G. "You are to destroy an enemy supply point of flammable items. Name and point to the grenade that you would use."

H. "You are attacking enemy personnel who are in tunnels; you want prisoners. Name and point to the grenade that you would use."

	GO	NO GO
A			1
B			2
C			3
D			4
E			5
F			6
G			7
H			8

I. "Enemy personnel are located in the open 10 meters from you. Name and point to the grenade that you would use."

J. "Enemy personnel are located 20 meters from you; you must throw through heavy foliage. Name and point to the grenade that you would use."

K. "You want to achieve an aerial burst over an enemy position to destroy personnel using the cook-off method. Name and point to the grenade you would use."

L. "You wish to screen your advance from enemy personnel. Name and point to the grenade you would use."

M. "A group of rioting students might throw a grenade back at you. Name and point to the grenade you would use."

	GO	NO GO
I		9
J		10
K		11
L		12
M		13

Test Standards:

The correct hand grenades for the situations are:

A. White Smoke

B. Practice

C. Colored Smoke

D. Incendiary

E. Fragmentation, impact detonating

F. Riot control, baseball type

G. White Phosphorous

H. Riot control, beer can type

I. Offensive, Concussion

J. Fragmentation, time delay

K. Fragmentation, time delay

L. White Smoke

M. Riot control, baseball type

Performance Test 2: INSPECT AND SERVICE A PRACTICE GRENADE

Test Situation
(tester will read to trainee):

"At this station, you will be tested on your ability to identify the component parts of a hand grenade, and to inspect and service a hand grenade. Using this practice grenade, identify the component parts of the grenade."

Test condition:

The soldier is shown a practice hand grenade (M69).

Necessary Equipment:

Practice hand grenade (M69).

Performance Measure A:

The soldier will name and point to the following parts of the practice grenade:

1. Fuze
2. Body
3. Pull ring
4. Safety pin
5. Safety clip
6. Safety lever

	GO	NO GO	
1			14
2			15
3			16
4			17
5			
6			18

Test Standard:

Component parts may be identified in any sequence to be scored as correct.

Test Situation
(tester will read to soldier):

"Using the practice grenade, demonstrate how to inspect and service the grenade. Say what problems you should look for in inspecting each part, and say what to do for each problem."

Test Condition:

The soldier uses the practice grenade that he used during the previous performance measure. Actual defects in the grenade parts are not provided.

Necessary Equipment:

Practice hand grenade (M69).

Performance Measure B:

The soldier will perform the following inspections and state the service for each problem.

1. Body and fuze: Inspect for dirt and rust. Correction would be to clean with a dry rag.

2. Fuze: Inspect for proper tightness. If loose, hand tighten.

3. Safety pin: Inspect for cracks; assure that split ends are not bent flush with fuze body, and that it is fully in position. Correction would be to straighten so that split ends are bent only slightly outward; if not fully positioned, reseat and slightly bend split ends.

4. Safety clip: Inspect to assure that it is present and not bent out of shape. Correction would be to use caution and replace if extra one is available.

5. Safety lever: Inspect for cracks and assure that it is not broken. Correction would be to report it to squad leader (reject it).

	GO	NO GO	
1			19
2			20
3			21
4			
5			22

Test Standard:

Grenade parts may be inspected in any sequence to be scored as correct. The soldier must state one possible defect for each part of the grenade and explain the corrective action. He need not perform corrections since actual defects are not present.

Test Situation
(tester will read to soldier):

"Look at this grenade and explain what you should do when you detect a grenade in this condition."

Test Condition:

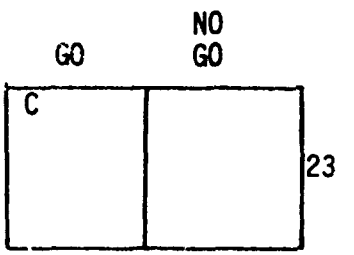
The soldier is shown a practice grenade inserted upside down in a grenade fiber container.

Necessary Equipment:

An M69 practice grenade inserted upside down in a grenade fiber container.

Performance Measure C:

The soldier must indicate that he would not attempt to remove an upside down grenade from its container. He would notify his immediate supervisor if he detects a grenade in this condition.



Performance Test 3: IDENTIFY PARTS OF A RIOT CONTROL GRENADE AND PREPARE TO THROW

Test Situation
(tester will read to soldier):

"At this station, you will be required to identify the component parts of a riot control grenade. You will also be required to grip the grenade and pull ring as you would when preparing to throw. Now, name and point to the parts of this grenade."

Test Condition:

The soldier is shown a riot control grenade (M25 series).

Necessary Equipment:

Riot control grenade (M25 series).

Performance Measure A:

The soldier will name and point to the following parts of the riot control grenade:

	GO	NO GO	
1. Body	1		24
2. Pull ring	2		25
3. Safety pin	3		26
4. Arming sleeve	4		27

Test Standard:

Component parts may be identified in any sequence to be scored as correct.

Test situation
(tester will read to soldier):

"Using the same riot control grenade, demonstrate how to grip the grenade and pull ring as you would when preparing to throw."

Test Condition:

The soldier will use the same riot control grenade as used for the previous performance measure.

Performance Measure B:

The soldier must:

	GO	NO GO	
1. Grip the body of the grenade with the fingers of his throwing hand, arming sleeve upward, pull ring toward the non-throwing hand.	1		28
2. Apply a constant pressure downward on the arming sleeve with the thumb of his throwing hand.	2		29

	GO	NO GO	
3. Insert the index finger of the non-throwing hand into the pull ring.	3		30
4. Remove the pull ring while maintaining pressure on the arming sleeve.	4		31

(Replace the pull ring)

Test Standard:

Actions must be performed in sequence.

Performance Test 4: SELECT APPROPRIATE THROWING POSITIONS AND DEMONSTRATE

Test Condition:

The soldier is given an M69 practice grenade.

Necessary Equipment:

M69 Practice grenade

Performance Measure A
(tester will read to the soldier):

	GO	NO GO	
"You are attacking an enemy foxhole that is a moderate distance away. Cover is very poor. Demonstrate how you would throw the grenade."	A		32

Test Standard:

Soldier must demonstrate the prone to kneeling position and throw grenade.

Performance Measure B
(tester will read to the soldier):

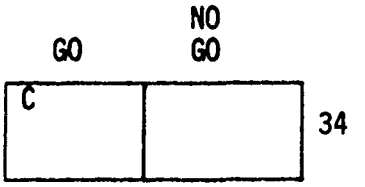
	GO	NO GO	
"Your target is 30 meters away. You have good cover and concealment. Demonstrate how you would throw the grenade."	B		33

Test Standard:

Soldier must demonstrate the standing position and throw the grenade.

Performance Measure C
(tester will read to the soldier):

"Your target is close and cover is poor. Demonstrate how you would throw the grenade."



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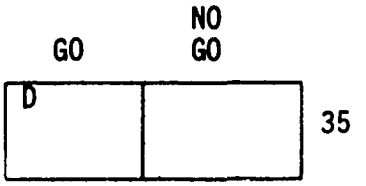
Test Standard:

Soldier must demonstrate the prone position.

Performance Measure D
(tester will read to the soldier):

"Your target is a moderate distance away and cover is fair. Demonstrate how you would throw the grenade."



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Test Standard:

Soldier must demonstrate the kneeling position and throw the grenade.