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Light Infantry Performance at the Combat Training Centers: Home Station Determinants

Jean L. Dyer, Gene W. Fober,
Robert J. Pleban, Margaret S. Salter,
Patrick J. Valentine, and Thomas J. Thompson

U.S. Army Research Institute

Field Unit at Fort Benning, Georgia
Seward Smith, Chief

Training Systems Research Division
Jack H. Hiller, Director

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13. ABSTRACT *(Maximum 200 words)*

The Training Systems Research Division of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) has been conducting a multiyear research program designed to increase unit combat capability. The program goal is to identify, develop, and evaluate improvements in unit home station preparation for combat based on changes in training management policies and procedures. A general officer advisory group identified six areas for unit capability research: resources, training management, personnel stability, personnel quality, cohesion, and leadership. Both heavy- and light-maneuver battalions are being examined. The ARI Field Unit at Fort Benning is responsible for research on Light Infantry capability.

The focus of the Fort Benning Field Unit is primarily on training management and resource issues. These issues target training events, procedures, and policies thought to impact unit performance. Follow-on research will evaluate the effectiveness of training enhancements in areas where findings show improvements are needed.

This report summarizes the results from the first year of research with Light Infantry battalions. The first year identified correlates of combat readiness and

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areas where training and/or training management innovations would improve unit performance. Combat readiness was measured by performance at combat training centers (CTCs), primarily the Joint Readiness Training Center (JRTC).

Questionnaires on training and training management were given to battalion and company staff in Light Infantry battalions 4 months before and immediately before CTC rotation. Records related to personnel stability and quality and to unit training conducted during this period were obtained. Interviews and questionnaires were administered to staff members after the CTC rotation. Complete data were available on two of the six battalions studied; both went to the JRTC.

For rifle platoons, several factors were associated with higher JRTC observer/controller ratings of performance: soldier quality, leadership experience/continuity, squad/platoon training, and collective training at night. Unit personnel perceived field exercises, particularly drills, and small-unit training as critical to combat readiness. Combat realism--including night training, an opposing force (OPFOR), and casualty evacuation in field exercises--was also viewed as essential. Improved training and preparation of staff officers in the functional areas of intelligence, logistics, and administration/personnel were recommended for enhancing unit readiness.

Performance trends identified many areas for training innovations and future research: staff training and synchronization, small-unit training for night operations, incorporation of combat realism in training, management of internal personnel stability, casualty evacuation procedures, and preparation of leaders to conduct home station training. Future research at the Fort Benning Field Unit will examine small-unit training for night operations and staff training and synchronization.

LIGHT INFANTRY PERFORMANCE AT THE COMBAT TRAINING CENTERS: HOME STATION DETERMINANTS

EXECUTIVE SUMMARY

Requirement:

This research was performed to determine Light Infantry combat readiness as measured by performance at the combat training centers (CTCs) and to identify improvements to home-station training that could lead to enhanced performance. The report covers the first year of a planned multiyear project.

Procedure:

Questionnaires were given to Light Infantry battalion and company staff approximately 4 months before and immediately before CTC rotation to obtain data on training and training management policies. In addition, archival records on unit personnel quality and stability and the training conducted during this period were obtained. Questionnaires were administered and interviews with unit personnel were obtained after CTC rotation to capture unique unit perceptions. Performance at the CTCs was assessed by observer/controller (O/C) ratings of company and platoon performance. Complete data were available for only two of the six battalions in the sample; these battalions received training at the Joint Training Readiness Center (JTRC).

Findings:

At the rifle platoon level, several factors were associated with higher O/C mission ratings. These were soldier quality, leadership experience and continuity, small-unit (squad/platoon) training, and collective training at night. Unit personnel perceived field exercises, particularly drills and small-unit training, as critical to achieving and maintaining combat readiness. Incorporating combat realism, such as night, an opposing force, and casualty evacuation, into many field exercises was also considered as essential. Both personnel turbulence and the inability to adhere to published training schedules were perceived as hindering maximum training effectiveness in the units. Finally, improving training of staff officers in the functional areas of intelligence, logistics, and administration/personnel and providing experiences to prepare them for operational missions were recommended to enhance unit readiness.

Utilization of Findings:

A procedure for tracking the stability of personnel in a battalion was developed. This procedure will help commanders to be aware of and control personnel turbulence in their units from battalion to fire team levels. Performance trends identified many important areas for training innovations and research including staff training and synchronization, small-unit training for night operations, incorporation of combat realism into training, management of internal personnel stability, casualty evacuation procedures, and preparation of unit personnel to conduct home station training. Future research will focus on staff training and synchronization and small-unit training for night operations.

LIGHT INFANTRY PERFORMANCE AT THE COMBAT TRAINING CENTERS: HOME STATION DETERMINANTS

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LIGHT INFANTRY PERFORMANCE AT THE COMBAT TRAINING CENTERS: HOME STATION DETERMINANTS

Introduction

The report summarizes the results from the first year of a multi-year research project examining home station determinants of Light Infantry combat readiness as measured by performance at the combat training centers (CTCs). The purpose of the project was to determine the home station training and support requirements essential for a unit to achieve and sustain combat readiness and to enhance that readiness through the identification, development, and application of training technologies and related innovations. During the first year, data were obtained on factors that might relate to achieving and sustaining combat readiness as indicated by unit performance at the Joint Readiness Training Center (JRTC) at Fort Chaffee, Arkansas, and the National Training Center (NTC) at Fort Irwin, California. Re-examination of initial trends in the data during years two and three had been planned with an increase in sample size and refined measures of home station predictors. However, this phase of the research program was terminated because of unexpected unit deployments.

A general officer advisory group identified six research areas for the multi-year effort: resources, training management, personnel quality, stability, cohesion, and leadership. The initial research, reported herein, focused on training management and resource issues.

- What is the optimum proportion of individual to collective training?
- What is the best mix of squad-, platoon-, company-, and battalion-level training?
- Which collective training exercises and evaluations contribute the most to unit proficiency?
- Of the training exercises and evaluations that contribute to proficiency, can resource-intensive events be supplanted by less expensive ones?
- Which combat-like conditions contribute the most to training realism and unit proficiency?
- How much personnel stability is required at different echelons to ensure unit proficiency?
- What combinations of leader and soldier qualities are associated with unit proficiency?

In general, these issues focused on identifying the optimum mix of training, e.g., the best balance of individual and collective training and the best mix of squad-, platoon-, company-, and battalion-level training. In addition, the issues included personnel stability and leader and soldier qualities, primarily as they influenced the training processes that affect combat readiness.

Unfortunately, it was not possible to provide definitive answers to all issues at this early stage of the research program. The small sample of units, the lack of precision of some measures of home station training, variations in the data collection periods across units, variations in measures of CTC performance, and unexpected events that changed the research design precluded definitive statements. The report does, however, summarize initial trends in the data. Implications regarding training and training management based on these trends are presented.

Method

Research Design and Sample

The research design is illustrated in Figure 1. The sample consisted of battalion-size units. Questionnaires (labeled "Base" in Figure 1) were given to unit personnel approximately three to four months prior to CTC rotation. During the months prior to rotation, archival training and personnel records were obtained. Questionnaires were again administered prior to rotation ("Pre"). Post-rotation questionnaires and interviews ("Post") were given to determine lessons learned and the unique perceptions of the CTC experience. Indicators of CTC performance were based on observer/controller (O/C) ratings of company and platoon mission performance.

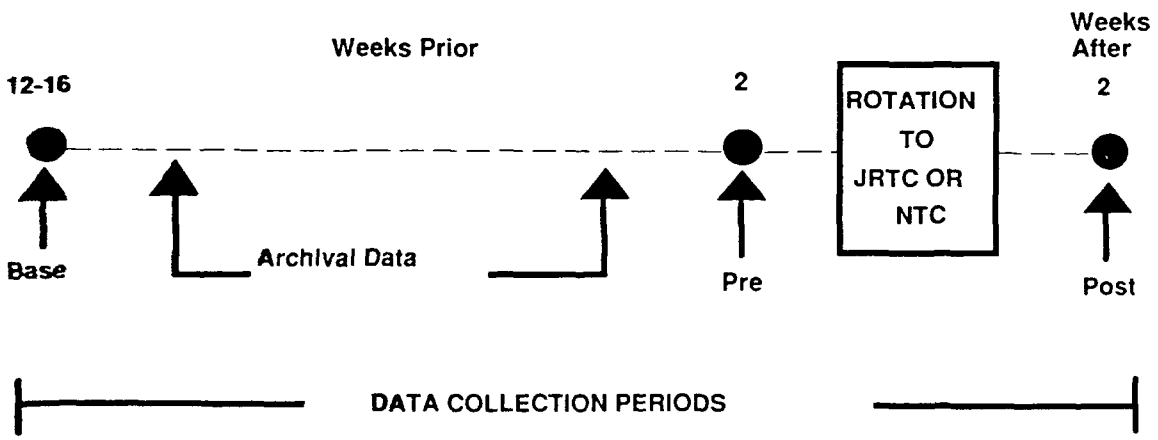

Figure 1. Research design.

Table 1 summarizes the data available for analysis. Due to circumstances beyond the control of the research staff, complete data existed for two units only, those labeled A and E. Each analysis was based on the maximum amount of data available, but some analyses were necessarily restricted to the two units for which complete information existed.

Table 1

Summary of Data and Sample

	UNIT					
Data Source	A	B	C	D	E	F
Predictors						
Base & Pre Questionnaires	X	X	X	X	X	
Post Questionnaires/Interviews	X	X	X	X	X	X
Unit Records	X	X	X	X	X	
Criteria						
ARI O/C Cards	X				X	X

Background Information from Participating Units

This section defines the background or home station variables obtained on the units that were, in turn, related to CTC performance. These variables also describe the research sample. Eight domains were identified. They were labeled personnel quality, personnel stability, leader experience, individual training, collective training, training realism, training with supporting slice elements, and self-ratings of proficiency. The individual variables within each domain are operationally defined in this section.

The relationship between the domains and JRTC performance was examined separately for the company O/C ratings and the platoon O/C ratings. However, the echelons for which home station data were available varied with the domain. For example, training schedule information was available at battalion and company, but not platoon, level. Measures of staff and leader experience were available from the battalion staff down to fire team leaders. Domain variables were generated to be as sensitive as possible to the two echelons of interest, company and platoon. Data sources for each domain are described below.

Personnel Quality. The Personnel Quality domain included the general technical (GT) scores from the Armed Services Vocational Aptitude Battery (ASVAB), physical training (PT) scores, and marksmanship (M16 rifle) qualification scores from company and/or battalion records. Leaders were addressed separately from nonleaders. At the rifle company level, leaders included the company commander, company executive officer, company first sergeant, platoon leaders, platoon sergeants, section leaders, squad leaders, and fire team leaders. At the rifle platoon level, leaders included the platoon leader, platoon sergeant, squad leaders, and fire team leaders. Six variables were used: leader GT, nonleader GT, leader PT, nonleader PT, percentage leaders qualifying expert on the M16 rifle, and percentage nonleaders qualifying expert. Company variables included all company personnel (rifle platoons and company headquarters); platoon variables included only platoon personnel.

Personnel Stability. Battle rosters were used for stability data. The battle roster for the battalion at the base data collection point was compared to the battle roster at the pre-rotation data point. The percentage of positions for which no personnel changes occurred between these two rosters was used as the measure of Personnel Stability. Leader and nonleader variables were generated, with leaders and nonleaders defined the same as for the Personnel Quality variables. Leader and nonleader stability variables were computed at both company and platoon levels.

Leader Experience. Leader Experience reflected both time in position and leader continuity. The Leader Experience variables were based on the average time (months) in position for battalion and company staffs, and the time (months) key leaders served together. The battalion commander's staff was defined as the executive officer, command sergeant major, S1, S2, S3, and S4. The battalion commander was also included with the staff for analysis purposes. The company staff was defined as the company commander, the executive officer, and the first sergeant. Continuity of key leaders was determined by the number of months key leaders served together. For battalion staffs, the key leaders were defined as the battalion commander, executive officer, S3 and S4. For company staffs the key leaders were the commander and first sergeant. Thus four variables (battalion and company staff experience, battalion and company key leader continuity) were generated. The values of these four variables were identical for company and platoon echelons.

For rifle platoons the Leader Experience domain was expanded to include data on leaders at the platoon level and below. Four variables were added: platoon leadership (platoon leader and platoon sergeant) experience, platoon leadership continuity, percentage of squad leaders at skill level III, and percentage of fire team leaders at skill level II.

Individual and Collective Training. Since home station training data were obtained from the quarterly training plans and the weekly training schedules rather than from on-site observations, it was not possible to

compute the actual number of hours devoted to different types of training. However, an estimate of training time was derived from the percentage of weeks during which a specific type of training occurred, as shown in the weekly training schedules.

The Individual Training domain included the three variables of weapons training, other individual training, and leader training. The Collective Training domain included squad and platoon training, training at company level and above, and night training. The night training category was used to emphasize extended operations during collective training. However, because night training was included in the other two collective categories, it was not independent of them. Because Individual Training and Collective Training information was not available at the platoon level, the platoon values corresponded to the company values.

Training Realism. Training Realism included pre-rotation questionnaire ratings given by battalion and company staff on the frequency and importance of eight training conditions which simulated combat conditions (MOPP, casualty evacuation (CASEVAC), loss of leaders, night operations, noise, opposing force (OPFOR), radio interference, and battlefield obscuration). The importance scale was a five-point scale where 5 corresponded to "essential," 4 to "very important," 3 to "important," 2 to "slightly important," and 1 to "not important." Frequency ratings were also on a five-point scale where 5 corresponded to "almost always," 4 to "usually," 3 to "sometimes," 2 to "not usually," and 1 to "almost never." All ratings were based on training conducted in the last four months.

Importance ratings for each of the training conditions were multiplied by the frequency ratings associated with each condition. These products were summed and an average computed. The resulting score represented the overall mean Training Realism rating. Realism ratings could range from 1 (not important and almost never trained) to 25 (essential and almost always trained). Two variables were computed: battalion staff and company staff ratings. Because Training Realism ratings were not available at the platoon level, the company ratings were used for the platoon data.

Slice Training. Pre-rotation ratings by battalion and company staff were also used to generate variables reflecting the adequacy of training with slice elements. Slice elements were divided into primary (FIST/FSO, engineers, air defense artillery (ADA), Army aviation) and secondary (military police, division chemical and signal, military intelligence, close air support, direct support artillery) elements. The adequacy of training scale was a five-point scale where 5 corresponded to "completely adequate," 4 to "very adequate," 3 to "adequate," 2 to "very inadequate," and 1 to "completely inadequate." A six-point scale was used for training frequency: 6 corresponded to "10 or more times," 5 to "5 to 9 times," 4 to "3 to 4 times," 3 to "twice," 2 to "once," and 1 to "no' done." As with Training Realism, all ratings were based on training conducted in the last four months.

Adequacy of training ratings for each of the primary slice elements were multiplied by the frequency of training ratings associated with each element. These individual products were summed and an average computed. The same procedure was applied to the secondary slice elements. The adequacy ratings could range from 1 (completely inadequate and not trained) to 30 (completely adequate and frequently trained).

Primary and secondary slice training variables were computed separately for the battalion and company staff ratings, yielding four variables (battalion and company staff primary slice ratings, battalion and company staff secondary slice ratings). Because slice training ratings were not available at the platoon level, the company ratings were used for the platoon data.

Self-Proficiency Ratings. Prior to CTC rotation, battalion staff rated company proficiency; company staff rated the platoons within their companies. These ratings are called self-proficiency ratings to distinguish them from ratings by personnel external to the battalion. The ratings were obtained on eight missions. These missions were Movement to Contact, Hasty Attack, Deliberate Attack, Raid, Ambush, Reconnaissance and Security, Defend, and Retrograde. The rating categories were: trained, needs a little training, needs a lot of training, and untrained. Ratings for each mission were summed and then averaged for each company and platoon. Two Self-Proficiency Ratings were computed for rifle companies: the average of all battalion staff member ratings for the company, and the average of the company staff ratings for the platoons within that company. There was only one platoon variable; the company staff rating for that specific platoon.

JRTC Performance Criteria

The performance criteria consisted of O/C ratings of company and platoon performance. The O/C ratings of mission performance were based on special cards developed by ARI (see Table 2). The ratings for the plan, prepare, and execute phases of each mission were averaged because little discrimination occurred among the phases. For 60% of the company missions (n = 15) and 65% of the platoon missions (n = 68), the plan, prepare and execute ratings were identical. In addition, only one factor was derived from principal components analyses of the platoon and company ratings. Performance measures were generated for three common company and platoon missions (Defend, Deliberate Attack, and Movement to Contact), as well as a summary measure for all missions. Specific analyses were not conducted on the other missions (e.g., Hasty Attack) since they were not performed by most units.

Unit Perceptions

Battalion and company staff perceptions of home station training, management of training resources, and general approaches to preparation for

Table 2

ARI JRTC O/C Company and Platoon Cards

Rate the performance of the company/platoon you observed this rotation.
Use this scale: A = Trained; B = Needs a little training;
C = Needs a lot of training;
D = Untrained; E = Not observed.

	PLAN	PREPARE	EXECUTE	# MISSIONS OBSERVED
HVT TO CONTACT				
HASTY ATTACK				
DELIBERATE ATK				
RAID				
AMBUSH				
RECON & SECURITY				
DEFEND				
RETROGRADE				

the CTC rotation were obtained from the pre-rotation questionnaires and from the post-rotation questionnaires and interviews.

In the post-rotation questionnaires, battalion and company staff members were asked how frequently they thought certain types of training should occur in order to achieve and maintain combat effectiveness. Four areas were examined:

Weapons training: M16 rifle, SAW, M60 machine gun, M203 grenade launcher, 81mm and 60mm mortars, TOW, Dragon, LAW/AT-4, and the pistol

Training exercises: Combat drills, Situational training exercise (STX), Field training exercise (FTX), Live-fire maneuver, Combined arms live-fire exercise (CALFEX), Battalion external evaluation

(XEVAL), Map exercise (MAPEX), Tactical exercise without troops (TEWT), Command post exercise (CPX), and Emergency deployment readiness exercise (EDRE)

Training with slice elements

Combat realism in training events

In addition, battalion and company staff members were asked to rate the adequacy of resources (training areas, ammunition and weapon training devices, transportation, training aids, vehicle maintenance), the effectiveness of communication within the chain of command, and platoon and company performance at the CTC.

Results

Home Station Variables

Unit results on the home station variables are presented in this section. These results describe the research sample in terms of soldier and leader characteristics and home station training. Typical unit scores, ratings, and patterns as well as unit variations are cited. The data are from the five units for which unit records and pre-rotation questionnaires were available (refer to Table 1, Units A, B, C, D, and E).

Personnel Quality. The Personnel Quality profiles generated from the GT scores are depicted in the top portion of Figure 2. Each vertical bar represents a rifle company. The companies are grouped by battalions as indicated by the unit labels. Two lines are shown in the middle of the graph. The dashed line is the average GT score ($\underline{M}$ = 106.5) for the rifle companies in the sample. The solid line is the average GT score ($\underline{M}$ = 103.8) for the 11B military occupational specialty (MOS) (Training Performance Data Center, personal communication, June, 1990). As shown in the graph, the individual company averages were typically above the 11B average.

PT scores are also shown in Figure 2. The two lines in the middle of the graph depict the average for the sample ($\underline{M}$ = 240), and the average PT score for the 11B MOS ($\underline{M}$ = 231.4). Again individual rifle company averages were typically above the 11B average (U.S. Army Fitness Center, personal communication, July, 1990).

For both GT and PT, leaders typically scored higher than nonleaders. Leaders averaged 5 points higher on GT ($\underline{M}$ = 109.6 versus 104.3), and 24 points higher on PT ($\underline{M}$ = 256.2 versus 232.4).

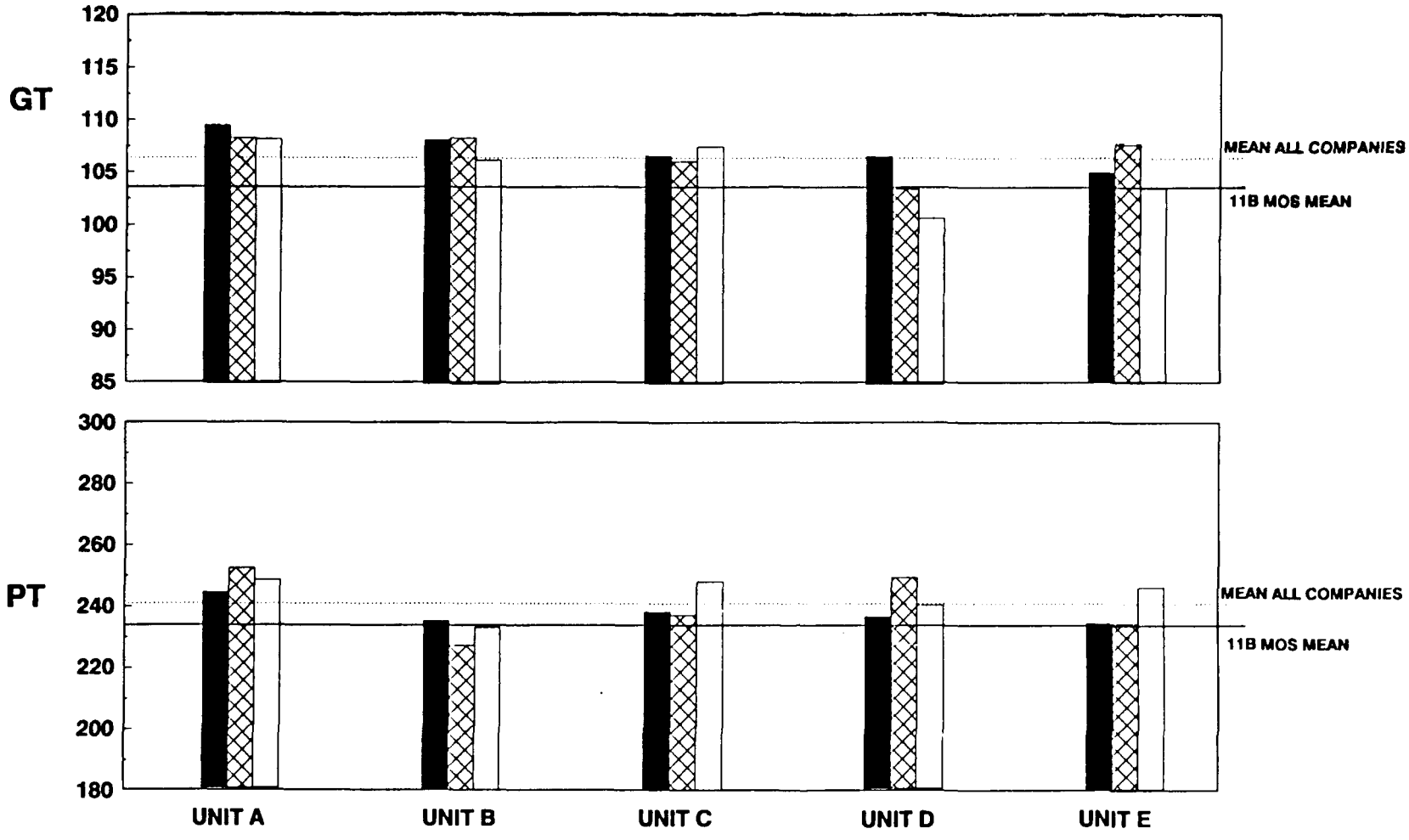

Figure 2. GT and PT scores for the rifle companies within each unit.

The other personnel variable was the percentage of soldiers qualifying expert on the M16 rifle. Rifle company percentages were high, averaging 86% and ranging from 64% to 100%.

Personnel Stability. Personnel Stability (percentage of positions unchanged from the base to pre data collection points) showed considerable variability within and between battalions (see Figure 3). Stability for rifle companies ranged from 20% to 81% with an average of 49%.

Additional stability data were available from one battalion. In this case, duty position changes were obtained every two weeks, as well as the source of each change (within the squad, platoon, company, or battalion and outside the battalion). The percentage of changes at monthly intervals prior to CTC rotation was determined for each company, as well as the type of change. These results are presented in Appendix A. They indicate very different patterns of internal turbulence for companies within the same battalion.

Leader Experience. The experience and continuity data for leaders at the battalion, company, and platoon levels are summarized in Table 3. A minimum value of 0 for continuity indicates a new individual was assigned to a key staff position less than one month prior to CTC rotation. The skill levels of squad and fire team leaders within platoons were also used to assess leader experience. On the average, 71.2% of the squad leaders were at skill level III with the percentages ranging from 33% to 100%; 53.6% of the fire team leaders were at skill level II with percentages ranging from 17% to 100%.

Table 3

Leader Experience and Continuity (months)

Echelon	M	Range
Battalion Staff		
Experience	13.3	6 - 20
Leader Continuity	4.6	0 - 10
Company Staff		
Experience	14.5	7 - 25
Leader Continuity	7.5	1 - 25
Platoon Staff		
Experience	15.1	1 - 27
Leader Continuity	8.3	1 - 17

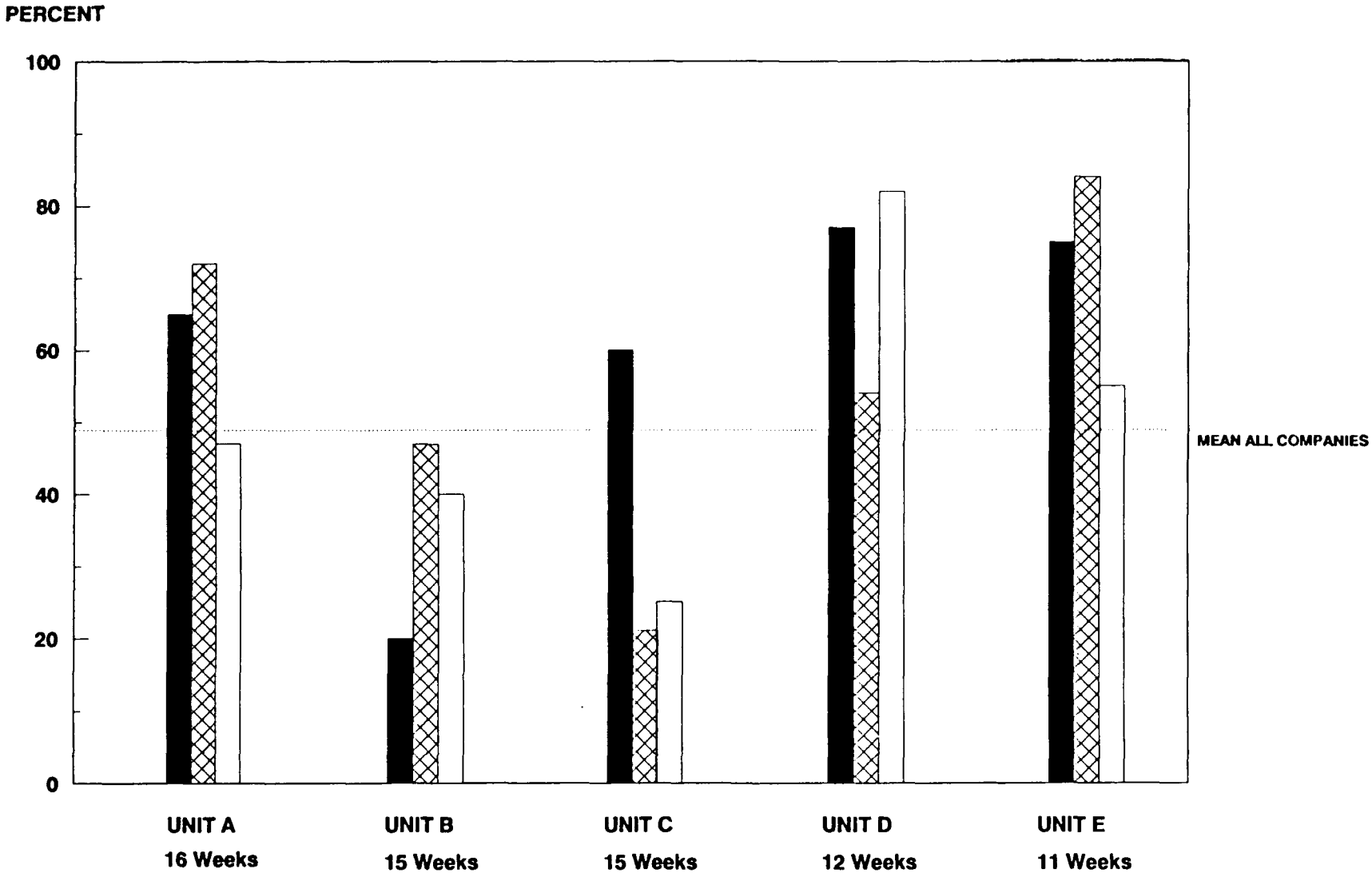

Figure 3. Percent positions unchanged for rifle companies within each unit.

Individual and Collective Training. The company training schedules and the battalion quarterly training plans were used to determine the types of individual and collective training conducted prior to CTC rotation. However, these data had limitations. The number and completeness of the training schedules and plans varied across and within battalions. The level of detail in the schedules also varied. In addition, unexpected events changed the training that was planned. Although some adjustments were made to the training schedule information as changes were made, not all on-the-ground changes are reflected in the data.

Figure 4 depicts the sequencing of major training events prior to rotation. The primary data source was the quarterly training plans supplemented by the training schedules. The top line within each block describes individual and small unit training; the second line, company and battalion training; the last line, leader training. This information is limited by the perishable nature of both the quarterly training plans and the weekly training schedules.

Figure 5 shows the percentage of weeks which included individual and leader training. The percentages were derived from the training schedules and adjusted for any known changes. As expected, training did not occur in each category every week. Generally, weapons training occurred in 40% of the weeks or less. Other individual training, such as nuclear, biological, and chemical (NBC) training and Skill Qualification Test (SQT) preparation, varied considerably across units. Leader training typically occurred in half the weeks sampled. However, for the reasons cited previously, the percentages for some units may reflect less training than actually occurred.

Figure 6 shows collective training. Squad and/or platoon training occurred during half of the weeks or less. The percentage of weeks during which training at company level and above occurred ranged from 15% to 70% of the weeks. Night training also varied across units, ranging from 20% to 70%. Again, it must be noted that these percentages reflect a limited number of weeks, and may not be representative of a battalion's overall training strategy.

Training Realism. The units felt they usually engaged in realistic training. Mean ratings ranged from 16.9 to 22.3 on the 25-point scale. There was some inter-unit variability, however. The ratings from two units suggested that they engaged in more realistic types of training than the other units.

Slice Training. Staff members also indicated that the time allocated for their units to train with both primary and secondary slice elements was adequate to meet or exceed unit standards. Mean ratings fell in the top third of the 30-point scale, ranging from 21.7 to 26.3.

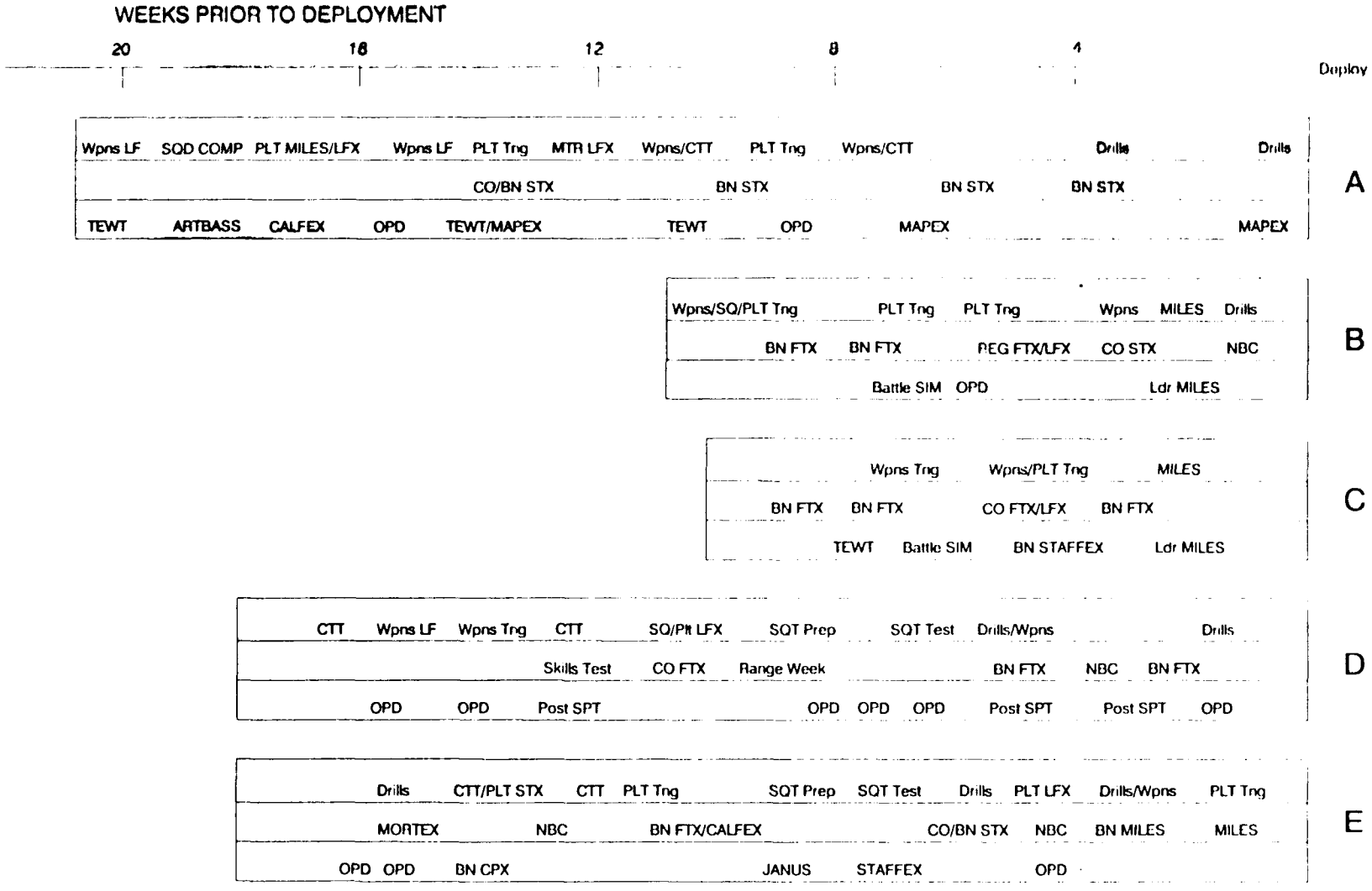

Figure 4. Training events prior to CTC deployment.

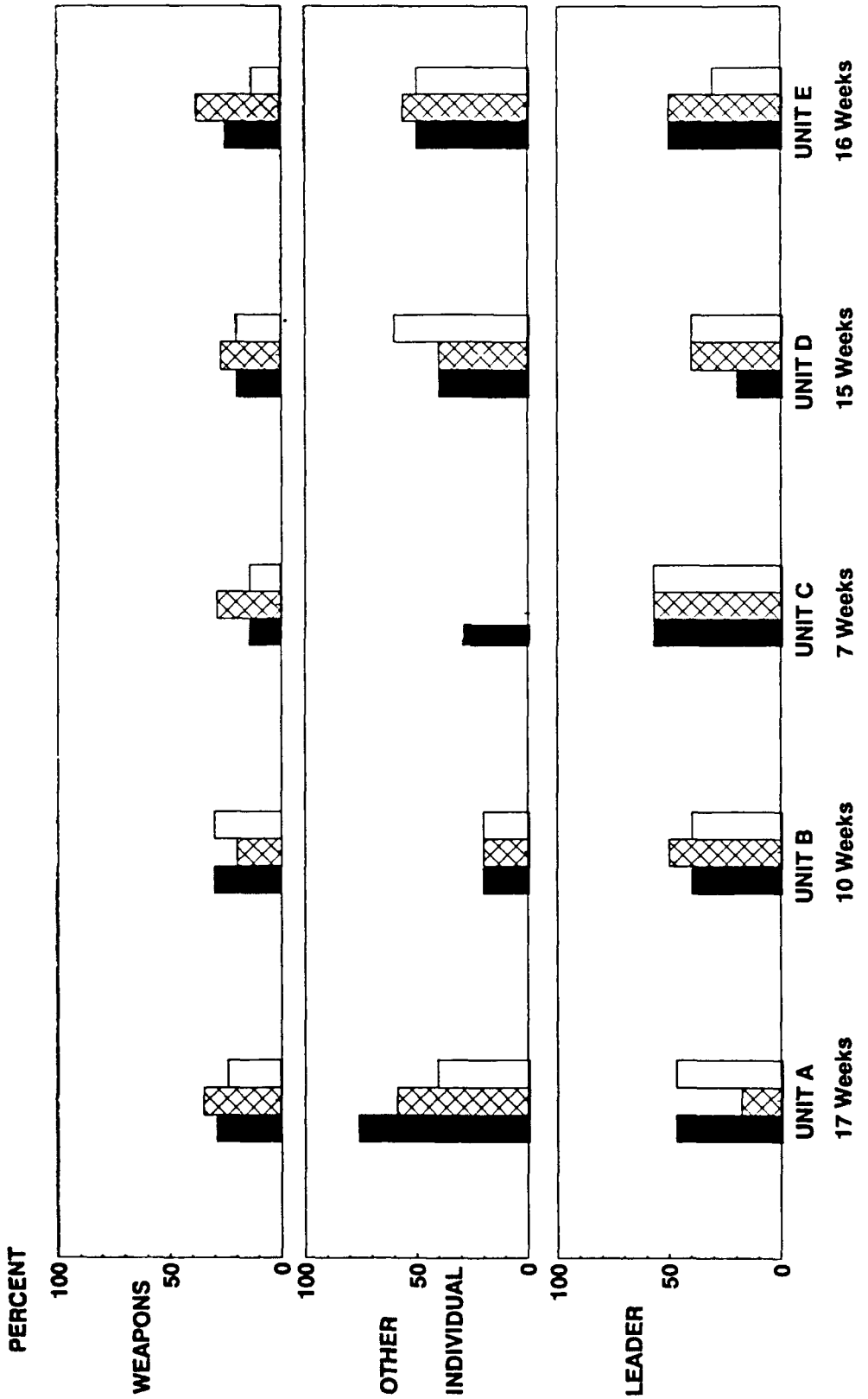

Figure 5. Percentage of weeks including individual training for rifle companies.

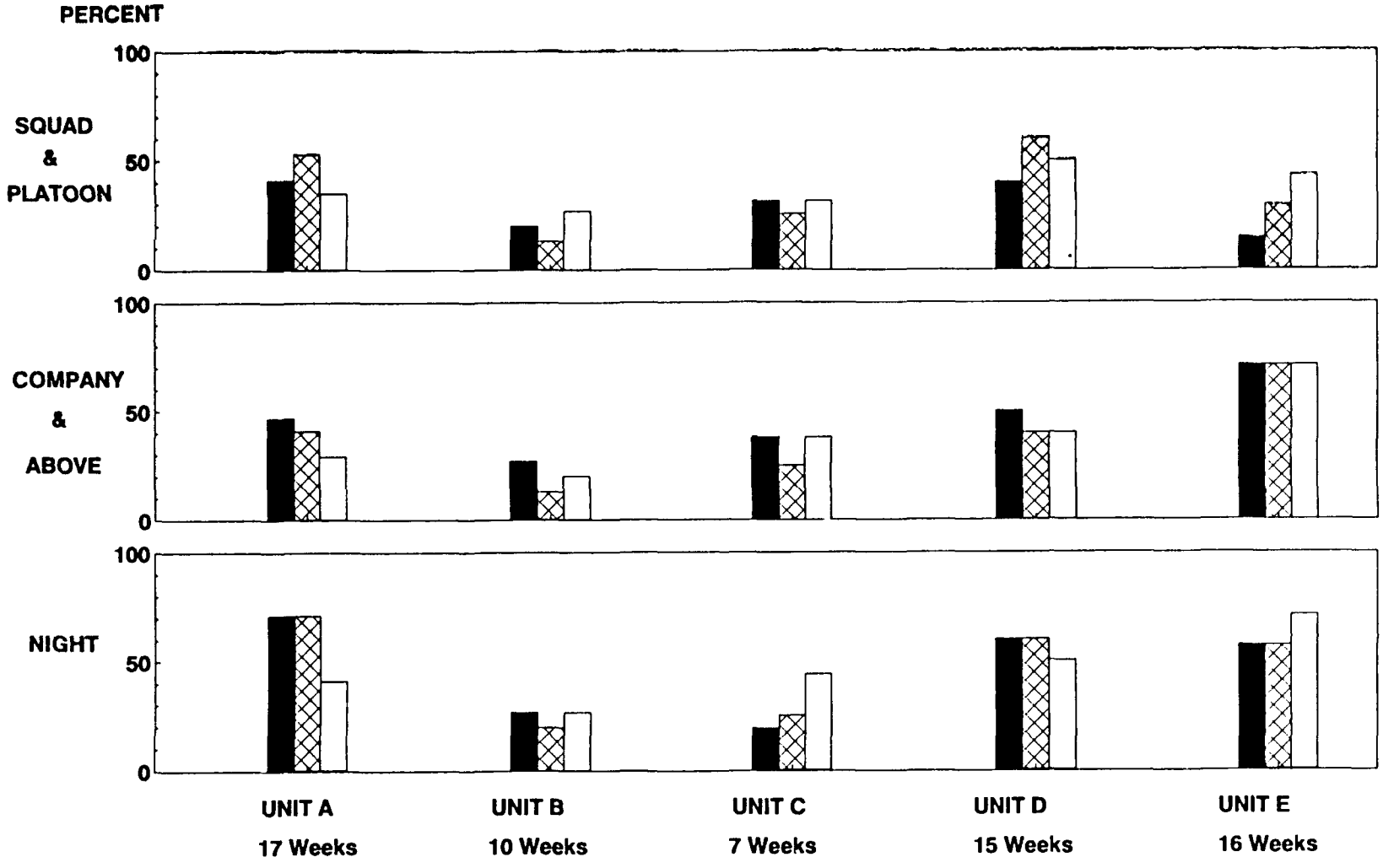

Figure 6. Percentage of weeks including collective training for rifle companies.

Self-Proficiency Ratings. Mean ratings of platoon proficiency in rifle companies ranged from 1.68 to 3.26 on a scale where 4 corresponded to a rating of "trained," 3 to a rating of "needs a little training," 2 to a rating of "needs a lot of training," and 1 to a rating of "untrained." Most ratings indicated that the platoons needed "a little training." However, three rifle platoons, all in the same company, were rated as needing "a lot of training."

In general, the ratings indicated the staff perceived that the companies also needed "a little training." Mean ratings for companies by the battalion staff ranged from 2.57 to 3.38. With the exception of the three platoons noted above, the ratings suggested that the platoons and companies were perceived to be adequately trained prior to their CTC rotation.

O/C Ratings of Proficiency

O/C ratings derived from the special ARI O/C cards shown in Table 2 were available on only three units. However, since home station variables were available only on two of these units (refer to Table 1, Units A and E), the results in this section are restricted to these units. Both went to JRTC.

O/C ratings on Movement to Contact, Deliberate Attack, and Defend were available for at least four of the six rifle companies. No other company missions were rated. These same missions were executed at the platoon level, with O/C ratings available on at least 13 rifle platoons. The average ratings are summarized in Table 4 and displayed separately for the two units. In addition, O/C ratings on Hasty Attack, Ambush, and Reconnaissance and Security were available for 50% of the platoons. The means in Table 4 indicate that the typical rating reflected a need for "a lot of training." The top rating of "trained" was never used by the O/Cs. Given the limited sample, it was not possible to determine whether these ratings were typical of units at JRTC.

The ratings by company O/Cs showed no consistent pattern favoring either unit. Platoon O/C ratings were consistently higher for Unit A, although this difference was statistically significant for only the movement to contact mission (Appendix B).

Relationships between Home Station Variables and JRTC Performance

Relationships between the home station variables (stability, training, leader experience, etc.) and CTC performance could be examined only for the two units on which O/C ratings were available at JRTC. The small sample size (6 rifle companies and 18 platoons) prevented application of the planned regression analysis and the use of other inferential statistics. Therefore, this section summarizes the most stable trends within the data and considerations that should be applied in making inferences from the data.

The restricted range for the O/C ratings has been mentioned previously (i.e., no unit was rated "trained"). In addition, for the Deliberate Attack

Table 4

Mean O/C Ratings for Rifle Companies and Platoons

Mission	Company			Platoon		
	Both Units	Unit A	Unit E	Both Units	Unit A	Unit E
All Missions						
M	1.93	1.96	1.89	2.10	2.28	1.95
n	6	3	3	17	8	9
Defend						
M	2.06	2.23	1.89	1.97	2.17	1.80
n	6	3	3	17	8	9
Deliberate Attack						
M	1.67	1.33	1.89	2.09	2.33	1.93
n	5	2	3	15	6	9
Movement to Contact[a]						
M	1.50	1.16	1.83	2.33	2.61	2.09
n	4	2	2	13	6	7

Note. Scale: 4=trained; 3=needs a little training; 2=needs a lot of training; 1=untrained.

[a] Significant difference between Unit A and E platoon ratings on Movement to Contact.

and Movement to Contact missions there were three instances where the O/Cs rated the platoons higher than their parent company. In each case, the company was rated as "untrained," but the platoons were rated as either "needs a lot of training" or "needs a little training."

From a psychometric perspective, the Personnel Quality, Personnel Stability, and Leader Experience domains included the "best" variables. First, the variables were stable, since most were based on a large sample (every soldier within the unit). Second, they were generated uniquely for company and platoon echelons. Third, they did not involve self-ratings, which are frequently subject to bias. Fourth, their face validity is fairly high.

However, there were some substantial differences between the two units across these three domains at the company level. These differences were

repeated at the platoon level, and because of this, within-unit analyses were conducted. These analysis determined whether the home station variables discriminated between the more and less successful companies and platoons within Units A and E.

Company means by unit on each variable within the Personnel Quality, Personnel Stability, and Leader Experience domains are detailed in Table B-1. The major differences were as follows. Within Unit A, company averages were higher on the Personnel Quality variables than company averages within the other unit. GT scores for nonleaders were 6 points higher for nonleaders; PT scores for leaders were 9 points higher; PT scores for nonleaders were 13 points higher; 15% more leaders fired expert on the M16 rifle; and 34% more nonleaders fired expert. On the other hand for Unit E, the Personnel Stability and some Leader Experience variables were higher. The average experience of the battalion staff was 8 months more than in the other unit: key leaders within the battalion staff had been together 9 months longer; key leaders within the company staff had been together 5 months longer; and the stability rate for nonleaders within the typical company was 13% higher.

Company Relationships. Within each unit, one rifle company consistently received "low" ratings from the O/Cs. Within one unit, the lowest company received below average ratings on all missions, as compared to all the companies on which O/C ratings were available. Within the other unit, the lowest company was the only one receiving below average ratings. Discriminations in performance could not be made between the other two companies within each unit, and they were designated as "high" performing companies. The O/C mission ratings for these groups are documented in Table B-2. It should be noted that differences in O/C ratings for the "high" and "low" companies within a unit were consistent across missions, but not necessarily large (differences ranged from .33 to 1.11 points).

Within each unit, a comparison was then made between the "low" and "high" companies to determine which, if any, of the home station variables discriminated these groups. Given the limited sample size, the analysis was strictly descriptive. Variables computed at the battalion level could not, of course, differentiate companies within a battalion. The company data are in Table B-3. Large differences between companies within the same unit are marked in the table. The definition of a large difference was subjective. For variables measured in percentages, only differences greater than 10% were considered large. A large difference on GT was five points or greater; for PT, ten points or greater.

In summary, only two variables consistently discriminated the "high" and "low" performing companies in both units. The companies rated highest by the O/Cs had a higher percentage of nonleaders (26% and 36% points higher) who fired expert on the M16 rifle and had higher stability rates (27% and 30% points higher) in nonleader positions. Other variables discriminated companies within each unit, but were unique to that unit (see Table B-3). The

battalion staffs viewed all their companies as being equally proficient prior to CTC rotation.

Platoon Relationships. Unit differences on the home station variables were repeated at the platoon level. However, because of the greater sample size, it was possible to determine the statistical significance of these unit differences with a one-way analysis of variance. These results are summarized in Tables 5 and B-4. Variables computed at the battalion level are included in Table 5 for comparison purposes only (analysis of variance was not possible because of identical scores for each platoon within a battalion). As indicated in Table 5, significant unit differences occurred at the platoon level on 12 home station variables. Three favored Unit E, and nine favored Unit A.

Each variable favoring Unit E came from a different domain: company staff continuity within the Personnel Quality domain, stability of nonleaders within the platoon from the Leader Experience domain, and company staff ratings on Training Realism. Compared to Unit A, the company staffs within Unit E had been together 5.4 months longer, the percentage of nonleader positions which were unchanged over the data collection period was 24% higher, and the Training Realism ratings by company staff were 2.2 points higher.

The variables which favored Unit A were also from three domains: Personnel Quality, Leader Experience, and Collective Training. Each of the three nonleader Personnel Quality variables (PT, GT and marksmanship) favored Unit A as did the PT score for leaders. PT scores for leaders within Unit A were 11 points higher than in Unit E; nonleader PT scores were 14 points higher; GT scores for nonleaders were 6.6 points higher; the percentage of nonleaders firing expert on the M16 rifle was 39% higher. Leader Experience and continuity at the platoon level and fire team leader experience also favored Unit A. Platoon staffs within Unit A averaged 9 more months of experience in position than Unit E and had been together 8 months longer; the percentage of team leaders at skill level II was 35% higher. Finally, the amount of squad/platoon training and night training favored Unit A. The percentage of weeks indicating squad/platoon training was 14% higher for Unit A; for night training, 32% higher.

Variables within a domain were often interrelated (Appendix C). The relatively strong correlations at the platoon level may partially account for the significant unit differences favoring Unit A on variables within the Personnel Quality, Leader Experience, and Collective Training domains.

It is important to point out that the O/C mission ratings for platoons consistently favored Unit A (refer to Table 4). In summary, a trend in the data was that measures of soldier quality, leader experience and continuity at the small unit level, and the amount of squad/platoon and of night training related to higher O/C mission performance ratings for rifle platoons.

Table 5

Means on Home Station Variables for Platoons by Unit

Variable	Unit A	Unit E
Personnel Quality		
GT Score - Leaders	109.6	110.5
GT Score - Nonleaders[a]	107.7	101.1
PT Score - Leaders[a]	259.5	248.7
PT Score - Nonleaders[a]	241.6	227.5
% Expert on M16 - Leaders	90.6	75.7
% Expert on M16 - Nonleaders[a]	87.4	48.7
Leader Experience		
Bn Staff Experience (months)	5.8	13.7
Bn Staff Continuity (months)	1.0	10.0
Co Staff Experience (months)	12.1	11.6
Co Staff Continuity (months)[b]	4.3	9.7
Plt Staff Experience (months)[a]	20.3	11.2
Plt Staff Continuity (months)[a]	12.5	4.4
% Sqd Leaders at SL III	85.3	70.4
% Tm Leaders at SL II[a]	70.3	35.2
Personnel Stability		
% Leader Positions Unchanged	82.0	79.8
% Nonleader Positions Unchanged[b]	52.1	76.3
Individual Training (% weeks)		
Weapons	29.3	25.3
Other Individual	58.7	52.0
Leader	37.3	43.7
Collective Training (% weeks)		
Squad/Platoon[a]	43.0	29.0
Company & Above	39.0	33.7
Night[a]	61.0	29.3
Training Realism (25-pt scale)		
Battalion Staff Ratings	18.5	17.5
Company Staff Ratings[b]	16.9	19.1
Slice Training (30-pt scale)		
Battalion Staff Ratings - Primary	23.6	24.9
Company Staff Ratings - Secondary	21.7	24.3
Company Staff Ratings - Primary	23.6	23.9
Company Staff Ratings - Secondary	21.6	21.9
Self-Ratings of Proficiency[c]		
Company Staff Platoon Ratings	2.1	2.3

[a] Significant difference favoring Unit A.
[b] Significant difference favoring Unit E.
[c] Scale: 4=trained; 3=needs a little training; 2=needs a lot of training; 1=untrained.

The next question addressed was whether the home station variables discriminated platoons within each unit. "High" and "low" performing platoons within each unit were designated based on their relative position to the O/C mean for all platoons. The O/C ratings for these groups are in Table B-5. As with companies, O/C ratings between "high" and "low" performing platoons within each unit were consistent across missions, but not necessarily large (differences ranged from .33 to 1.25 points). On the home station variables, few large differences occurred between the "high" and "low" performing platoons within each unit (Table B-6). No difference was replicated across units. Therefore, no analysis of the relationship to O/C ratings was conducted using these within-unit platoon comparisons.

Perceptions Prior to CTC Rotation

The results in this section are based on the five units for which pre-rotation questionnaires were available (refer to Table 1). Common themes occurred in staff responses to questions on training resources and training management prior to rotation. For these units, cyclic schedules were seen as a help in scheduling training. Fixed training schedules (i.e., adherence to the published schedule) would allow leaders and trainers to prepare for instruction. The overwhelming problem identified by trainers was insufficient time to prepare. The most common change requested in training management was adherence to the five- to six-week training schedule lock-in by brigade and division headquarters. Battalion training was disrupted routinely by activities such as out-of-cycle post support (if the unit was on a cycle system) or by short-notice, unscheduled requirements.

Company level surveys typically reflected a desire for more training at squad and platoon levels. Leaders wanted more control over planning future training and a significant reduction in training distractors. Of the training tasks reported to receive the least emphasis, military operations in urban terrain (MOUT) was clearly first. NBC training and river crossing exercises were also reported to have little emphasis. Existing sleep policies were not consistently enforced, particularly for leaders.

Battalion and company staff also prioritized five areas to emphasize when training trainers. For all units, the areas were ordered from high to low in importance as follows: subject matter expertise, ability to present subject matter, ability to diagnose and correct soldier errors, skill in managing training resources, and effective use of training devices and aids.

Perceptions after CTC Rotation

The findings in this section are based on the five units for which pre-rotation questionnaires were available (refer to Table 1).

Recommended Training Frequencies. The recommended training frequencies for weapons, training exercises, training with slice elements, and incorporating combat realism in training events are presented in Table 6.

With regard to weapons training, the majority of staff members thought weapons training should occur at least quarterly, with the exception of pistol training. As indicated in Table 6, small arms should be trained the most often. Mortars, the M203 and antiarmor weapons should be trained on a slightly less frequent basis.

For training exercises, drills were clearly viewed as the type of exercise to be conducted most frequently. In fact, 43% of the staff thought drills should be trained weekly; 90% at least monthly. Responses were generally consistent on the training frequencies for STX, FTX, live fire maneuver, and battalion external evaluations. However, for CALFEX and EDRE responses were split between quarterly and twice a year or less.

For leader training, although the most common response for MAPEX, TEWTs and CPX was quarterly, there was considerable diversity of opinion. Staffs saw no great need to attend battle simulations (e.g., ARTBASS) on a frequent basis. The diversity of responses resulted, in part, from a tendency for battalion staff members from some units to recommend a higher frequency for leader events than did company staffs. Of all the slice elements, staffs felt training with the FIST/FSO should be the most frequent. Training should be the least frequent with military police, and division chemical and signal units.

The questionnaire results, as well as the post-rotation interviews, reflect a need to incorporate combat realism into as many training exercises as possible. The conditions were ordered as shown in Table 6, with night operations, noise, resupply, OPFOR, and casualty evacuation rated the highest. The training frequency for the "loss of key leaders" dimension was unexpectedly low. This may be because the phrase "key leaders" was interpreted to mean battalion staff only. However, the intent was to elicit recommendations regarding the need to simulate leader casualties and/or exchange of leaders down to the fire team level during field exercises.

Importance of Training Events. Questions were also asked regarding the relative importance of weapons live-fire training and the relative importance of the training exercises. There was very strong agreement between the ordering of weapons on importance of live-fire training and frequency of training (r (rho) = .95), with small arms (M16, SAW, M60) the highest and the pistol the lowest.

Overall, staff members grouped the training exercises into two categories regarding importance to combat readiness (see Figure 7). Drills, field exercises, and battalion external evaluations were perceived as the most

Table 6

Recommended Training Frequencies (% Battalion and Company Staff Responses at Post-Rotation)

Training Domain	Training Frequency: Every 2 Weeks or Weekly	Monthly	Every 2 Months or Quarterly	Twice a Year	Yearly
Weapons					
M16, SAW & M60	6%	42%	42%	10%	0
M203, 81mm & 60mm mortars	2%	36%	53%	7%	1
TOW & Dragon	6%	34%	45%	12%	3%
LAW/AT-4	1%	28%	44%	21%	6%
Pistol	2%	19%	27%	39%	12%
Training Exercises					
Drills	60%	29%	10%	0%	1%
STX	19%	26%	46%	6%	3%
FTX & LFMAN	6%	32%	55%	7%	0%
CALFEX & EDRE	1%	3%	42%	46%	8%
BN XEVAL	1%	0%	12%	27%	60%
Leader Training					
MAPEX	12%	17%	62%	6%	3%
TEWT	6%	16%	55%	13%	10%
CPX	4%	10%	53%	22%	11%
Simulations	1%	5%	27%	44%	23%
Slice Element					
FSO/FIST	24%	44%	31%	0%	0%
Engineers, Army Aviation, DS ARTY	8%	32%	55%	2%	2%
ADA & Close Air Support	5%	19%	62%	12%	2%
MI	5%	24%	50%	12%	8%
MP, Div Chemical & Signal	3%	13%	45%	25%	14%
Realism					
Night Operations	25%	60%	14%	0%	1%
Noise, Resupply, OPFOR & CASEVAC	25%	41%	33%	1%	0%
Loss of Key Leaders & Radio Interference	15%	37%	41%	5%	1%
CONOPS, MOPP & Obscuration	10%	29%	51%	9%	1%

Note. N ranged from 65 to 87 depending on item.

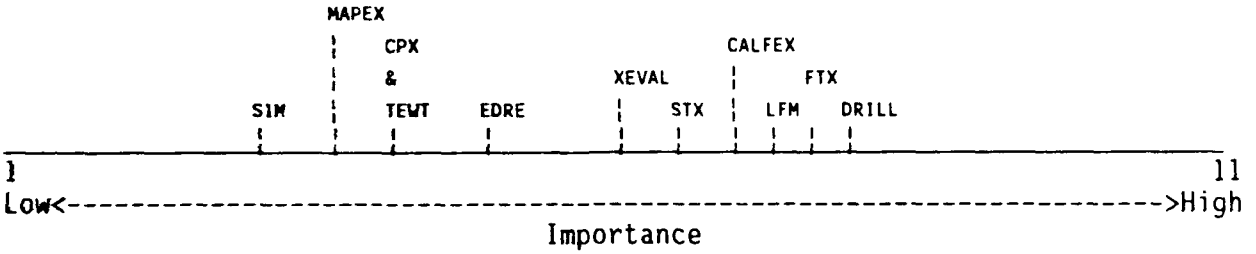

Figure 7. Perceived importance of training events to combat readiness: Mean ranks over all units (Scale ranges from 1 to 11).

important. All the leader training events plus EDRE were rated as the least important.

Although the ordering of the training exercises was relatively consistent across units, the units did differ in the extent to which they discriminated between exercises. The groupings for each unit are illustrated in Figure D-1 at Appendix D. The priorities assigned to these exercises by some units were quite distinct as shown by the great spread between the ranks. Other units perceived many exercises as similar in importance, as reflected in the little spread between the ranks assigned.

There was only a moderate relationship (r (rho) = .46) between training frequency and importance for these training exercises. Perceived importance was not necessarily associated with the need to train frequently. Combat drills were rated highest in both cases, and battle simulations were consistently rated low. Although battalion external evaluations and CALFEX were perceived as relatively important, the recommended training frequencies were low (e.g., external evaluations - annually). In addition, leader training events (MAPEX, TEWT, CPX) were rated low in importance, but there was less consistency in the training frequency recommendations for these leader events.

Adequacy of Training Resources. Respondents also indicated the adequacy of training resources. Deficiencies identified were MOUT training areas, gunnery training devices, close air support, and Army aviation (Table 7).

Commander and Staff Comments

Battalion and company level commanders and staff also responded to open-ended items as part of the structured questionnaires administered prior to CTC rotation and again upon return to home station. Perceptions regarding training resources and management were derived from the pre-rotation questionnaires from five battalions (n = 93) and from the post-rotation

Table 7

Percentage (%) of Staff Rating Training Resources as Adequate

Resource	%	N
Training Areas		
Maneuver Training Areas	90%	83
Local Training Area	89%	82
Live Fire Ranges	85%	78
Off-Post Training Areas	72%	68
MOUT	29%	49
Ammunition & Training Devices/Aids		
MILES	84%	82
Marksmanship Training Devices	79%	68
Small Arms Ammunition	78%	81
Mortar Ammunition	78%	76
Training Aids	63%	73
Gunnery Training Devices	55%	65
Transportation		
Ground	80%	81
Air Support (MAC)	52%	61
Army Aviation	32%	80
Vehicle Maintenance		
Fuel	99%	77
Batteries	92%	79
Repair Parts	78%	74

questionnaires from six battalions (n = 109). Many of the comments received either expanded on specific issues addressed elsewhere in the questionnaires or permitted the respondents to offer their own insights based on CTC preparation and experience.

Training Aids and Devices. Post-rotation questionnaire comments about the use of the multiple integrated laser engagement system (MILES) equipment were numerous, varied, and sometimes detailed. MILES was reported as the most critical training device or aid in preparing for the rotation (n = 41). The limited availability of MILES equipment for routine training at some locations was a concern. Insufficient quantities and maintenance difficulties constituted the majority of the problems units had with MILES. Expansion of the applications of MILES simulators to include .50 caliber machine guns, antipersonnel and antiarmor mines, light antitank rockets, and grenades was

seen as desirable. A few respondents thought MILES equipment should be permanently distributed at company level for training.

Other training devices and aids were mentioned. Those respondents who were familiar with, or who had recently trained with marksmanship devices such as Weaponeer or MACS, the Multipurpose Arcade Combat Simulator, wanted to see distribution levels of one per company. Positive comments were made regarding use of large terrain models of the CTC terrain.

Critical Position Continuity. Commanders and staff members who offered an opinion were almost universally in agreement about the best way to assure duty position continuity within their units. They would assign new personnel to duty positions five or six days prior to the departures of position incumbents whenever possible to allow familiarization with routines. Overlapping personnel was seen as the best way to maintain continuity. Cross training of key personnel in duty positions and within staff sections was also perceived as important. Some respondents indicated that field problems which emphasized simulating the loss of key leaders and staff members were very effective. Such exercises forced staff sections and secondary leaders to remain constantly familiar with operations since they could be filling key roles at any time. Members of one unit emphasized familiarity and routine use of standing operating procedures (SOPs) for the maneuver battalion, the supporting units, and slice elements. This unit actually updated portions of its tactical SOP for increased operational efficiency during the CTC rotation. Current and useful SOPs were not seen as substitutes for overlapping personnel to maintain continuity, but they certainly helped.

Planning for Combat Simulation and Operational Readiness. The execution of missions at the CTCs permits units to identify weaknesses in planning and preparation. Staff officers, primarily logistic officers (S4s), indicated the need to constantly move resupply materials forward. They learned how limited their transportation assets were during their rotations. Most battalions indicated resupply loads had to be prepackaged and as far forward as possible before the execution of the operations order. Barrier materials and other engineering support were viewed as difficult to obtain in sufficient quantities and in a timely manner because of limited available transportation. One respondent stated strongly that not only should the support platoon leader be an infantryman, but that he should "own" all the battalion's transportation assets to be certain that resupply activities could be maintained.

Casualty play was seen as a critical component to all field exercises. Many units routinely included casualty evacuation as a part of their training. However, some indicated that they were not as prepared for the casualty play at the CTCs as they thought. Comments indicated that units benefitted from having casualty collection points as close to the front line as possible and from having well planned evacuation procedures. However, there was some criticism of the effects of the gaming at the training centers on casualty play. A few commanders and staff members thought that the simulation at the

training centers was unrealistic in that more casualties occurred than might be expected in actual combat. A couple of respondents indicated that units appeared more willing to accept excessive casualties in training, thus placing a greater strain on evacuation procedures and resources than would occur in combat.

Soldier Strength and Stamina. The overwhelming response to questions about physical conditioning and training was that the soldiers in Light Infantry units were superbly prepared for their CTC rotations. The only potential enhancement to unit physical training programs that emerged consistently from post-rotation responses related to changing road march requirements. Several respondents thought there would be benefit in increasing the cross county marches, using varied terrain. Another expressed the opinion that road marches with all assigned equipment, not just personal gear and weapons, would be helpful. Distributing and transporting a unit's mortars and antiarmor weapons for road marches was seen as an important change.

Related to the distribution of equipment for stamina building road marching is the entire issue of soldier load. The average weight carried by a Light Infantryman during training and at the CTCs, according to questionnaire respondents, was 65 to 70 pounds. That amount did not include unit equipment. Many thought load tailoring could be improved, that it should take place at the lowest level possible to meet mission requirements and be part of every planning activity. For example, members of some units mentioned reducing sleeping gear to one set per two men.

Post-rotation responses revealed a stronger awareness of the need for establishment and enforcement of a sleep policy. The requirement to emphasize enforcement was seen as particularly important for leaders. A difficulty identified with the operations at the CTCs was the fact that leaders attended after action reviews at the conclusion of each mission, thus missing opportunities for rest. Units without sufficient depth or overlap in leadership and staff areas suffered from the inability to enforce a consistent sleep policy.

Unit Strengths. The key factors cited as contributing to successful unit performance at the CTCs were rehearsals, good non-commissioned officers (who were permitted to do their jobs), and clear statements of the commander's intent. Members of units who were familiar with current and effective SOPs, rehearsed in preparation for missions, and understood what the commander expected of them felt they executed well.

Unit Weaknesses. The factors which contributed to weaknesses in performance were poor staff synchronization and action, too much direct supervision by staff members, and not permitting NCOs to do their jobs. The comments regarding weaknesses in performance contrast with those regarding strengths. Members of units where the commander's intent was clear and where

commanders and staff knew what to do from training, let their personnel prepare more autonomously and with more confidence based on prior experience.

Discussion

The Home Station Environment as a Predictor of CTC Performance

The small sample size available prohibited definitive statements regarding home station variables which predict or correlate with Light Infantry performance at the CTCs. The most consistent data were reflected in the platoon profiles. Platoons which had higher levels of soldier quality, leader experience, leader continuity (an indicator of stability), squad/platoon training, and collective training at night also received higher performance ratings by the O/Cs at JRTC. Correlates of company performance were less consistent. However, greater instability of leaders and nonleaders at the company level and lower scores on some personnel quality variables appeared to characterize the lower performing companies within units.

Other researchers have found that other variables within the leader experience, training, and personnel and stability domains related to performance at NTC. For example, Hayden (1987) examined armor and mechanized infantry battalion performance at NTC as a function of home station factors. Results showed that company commander experience, junior grade (skill levels I through III) turnover rates prior to NTC deployment and the number of nontraining days distinguished effective and ineffective evaluations of battalions. Also important were interactions between such factors as the time the unit had its major equipment, and task force, company, and small unit training. O'Mara (1989) found relationships between platoon performance at NTC and the number of months platoon personnel had been in their company and the time in grade for squad leaders.

It may also be that factors associated with company performance may not be identical to those associated with platoon or battalion performance. Further, different unit profiles on home station variables may lead to the same levels of performance at the CTC. For example, high personnel stability may compensate for low levels of personnel quality and vice versa. However, it was not possible to determine if such compensatory patterns existed in the present sample.

Enhancements to the data collection procedures would increase the sensitivity of home station measures in future research and contribute to a better understanding of performance correlates. In particular, methodological improvements could be made to the manner in which training and stability data are collected. The training data should reflect training as it occurred, rather than as it was planned, to allow for greater accuracy of measurement.

The percentage of personnel changes per month and the sources of the changes, as reported in the case study at Appendix A, should be added to the personnel stability measures. As indicated at Appendix A, much of this turbulence is internal and can be controlled by the commander. It may be that companies with high turbulence percentages just prior to rotation will not perform well at the CTC. But this can be determined only if changes are recorded at monthly or smaller intervals during at least a six-month period prior to CTC rotation. The source of change would allow an assessment of the echelon (e.g., squad, platoon, company, battalion) at which personnel movement has a major negative impact upon performance. In addition, such a personnel tracking system could greatly assist commanders in understanding personnel turbulence within their units, and in providing guidance which would provide greater stability at the desired echelons. The importance of developing improved reporting procedures which reflect unit, rather than individual, turbulence in order to assess and manage small unit integrity has also been stressed by Boice and Jacobs (1989).

The analysis of the relationships between home station factors and CTC performance was based entirely on company and platoon O/C ratings. Ideally, a multi-trait, multi-method approach would establish more clearly the generality and stability of such findings. Analysis of the correspondence among performance criteria based on O/C ratings, take home packages, training and evaluation outline ratings, and other data sources is needed to develop a method which provides the most reliable and valid measures of CTC performance.

Training Resources and Management

Most of the training resources identified as inadequate are also costly (e.g., MOUT facilities, close air support, and Army aviation). Thus it is not surprising that units found them inadequate. Although a shortage of most training devices and aids did not appear to exist, some were viewed as particularly critical. There was a desire for an increased basis of issue, particularly for MILES equipment and marksmanship and gunnery devices.

Several training management issues arose. In post-rotation interviews and questionnaires, company commanders routinely reported that battalion staffs (and higher) determine the requirements for training and set the schedules. The companies did not have sufficient control of the training schedule to address specific training needs, nor did they always have the time to prepare properly for training. They also reported that the training schedule was altered frequently to accommodate post-wide requirements.

Personnel stability was perceived, in some cases, to be related to CTC performance. Staff interviews and questionnaires reinforced the importance of ensuring duty position continuity and of developing procedures to reduce the disruptive impact of turbulence. One procedure cited was cross training of key personnel. Dougherty (1990) cited the benefits of conducting rotating chain of command field training exercises at the platoon level. Platoon

leaders have opportunities to observe soldiers more objectively; individual platoon members are more sensitive to the pressures of being in charge and do not have to wait for orders to anticipate requirements. Other techniques recommended by staff members were to overlap personnel and to stress SOPs. Research needs to be conducted on the relative impacts of these different approaches to solving a critical training and personnel management problem.

Training Events

The recommended training frequencies for different events varied greatly. In general, weapons training followed the typical monthly and quarterly patterns recommended in many weapons manuals. Specific leader training exercises were not viewed as important as collective exercises, nor was the recommended training frequency as high. Battle simulations were cited as the least important leader exercise. Small unit training such as drills was clearly viewed as critical and should typically be conducted on a weekly basis. Other field exercises were also important, but the recommended training frequencies were typically monthly and quarterly, and sometimes twice a year. The resources involved in conducting many of these exercises (e.g., CALFEX, live fire maneuver) may have influenced the training frequencies suggested by the unit staffs. The fact that staffs recommended that many of the training realism factors (e.g., night, resupply, CASEVAC, loss of key leaders, OPFOR) should occur on a weekly or monthly basis indicates a need to incorporate combat realism in most training exercises in order to achieve effective training and combat readiness. Training with most slice elements corresponded to the monthly and quarterly training recommendations for most field exercises. The exception to this was more frequent training with the FSO and/or FIST.

It was not possible to determine the extent to which pre-rotation training corresponded to the training frequencies which were recommended after a unit's CTC experience. Nor was it possible to describe in detail the content of collective and leader training exercises to determine if there was a relationship to the rifle company strengths and weaknesses cited in other data sources such as the take home packages. Such methodological refinements are needed in future research.

Staffs agreed that units were physically well-prepared for their CTC rotations. Recommended enhancements were to increase cross country road marches over varied terrain and with all assigned equipment. These recommendations coincide with Knapik and Drews (1987) findings that a light unit physical training program of 29 weeks incorporating regular road marches of up to 25 miles with a 30 to 40 pound pack, weight training, running, and interval or speed work had positive aerobic and anaerobic effects. The load-bearing road marches were viewed as a contributor to the maintenance of aerobic fitness for this particular Light Infantry unit which was in a high state of aerobic fitness at the beginning of the program.

Casualty Evacuation Process at the CTCs

In the post-rotation interviews, casualty play and evacuation at the CTCs were cited specifically by staff members as requiring modification. Staff members indicated that casualty play is not the same at JRTC and NTC. Individual MILES casualties are assessed at the JRTC and the casualty has a MILES card describing his wounds and evacuation requirements. Sometimes the system is not in place to support evacuation, or it is played unrealistically. At the NTC, entire vehicle crews are commonly "killed in action" when the vehicle is neutralized in combat simulation.

Small Units and Night Operations

An integral part of Light Infantry doctrine is the ability to fight at night. Despite the emphasis upon night operations in Infantry doctrine, the research findings point to the need to improve the proficiency of small units at night through enhanced training.

Units were stressed at JRTC by the fast pace, the requirement to operate day and night in every mission, and the back-to-back missions. In fact, 30% of the commanders and staff attributed lack of initiative by leaders to the cumulative effects of these extended operations. The influence of this environment was also reflected in the training frequency recommended by staff members for night operations. After their CTC rotation, 85% indicated that night operations should occur on at least a monthly basis (see Table 6). Night operations topped the list of combat realism factors in terms of training frequency. In a survey by Crawford and Hensler (1990), nine of 11 battalions experienced problems with night movement at JRTC (e.g., absence or limited use of graphic control measures and key terrain, inappropriate formations, and night infiltration).

Both the post-rotation interviews and questionnaires showed that small-unit training was viewed as critical to achieving and sustaining combat readiness. For example, very high ratings were assigned to drills as a contributor to combat readiness (See Figures 7 and D-1). In addition, the majority of staff members thought drill training should occur very frequently, at least every two weeks. When staff members were asked to describe the best mix of individual, squad, platoon, company, and battalion training in terms of time spent on each, they typically recommended the bulk of training (i.e., 50%) be at platoon level and below. Such training was viewed as not only providing the necessary small-unit time, but also as allowing leaders at the company and platoon levels to go through repeated and varied planning exercises.

The JRTC performance results reinforce these staff opinions on the role of small-unit and night training in improving combat readiness. The critical finding here is that platoons with higher levels of squad/platoon training and

of training at night prior to JRTC received higher performance ratings by the O/Cs.

Improved training appears to be the key to improving small-unit proficiency at night. In the post-rotation interviews, company commanders and first sergeants did not hesitate to mention the small-unit tasks and drills they would stress in follow-on training. Based on problems encountered at JRTC, they cited reaction to contact, breaking contact, reaction to indirect fire, hasty ambushes, and tactical movement as critical to unit performance. Each task/drill must be executed well at night for mission success. Training on these tasks was also perceived as a critical pathway for cross-training skills and developing small-unit leadership.

Night training should incorporate the other combat realism factors. One recommendation by Crawford and Hensler (1990) was to stress quality night training against a realistic OPFOR. Dougherty's (1991) discussion of the search and attack mission, where night operations are an integral part, supports this recommendation. Night training which incorporates an OPFOR and casualty evacuation is essential for preparing units and leaders for the contingencies within night operations.

Finally, training for technical proficiency with night devices/aids must also be considered. Soldiers must be skilled in the operation, use, and maintenance of this equipment. Mission success also requires soldiers to be knowledgeable in such areas as dark adaption, night viewing techniques, and visual illusions (Menning & Sands, 1991).

Questions remain unanswered as to which training strategies are the most effective and efficient to ensure small-unit proficiency at night. Future research needs to address these questions.

Staff Functional Areas

The limited number of battalions in the first year of the research meant that relationships between battalion staff expertise and unit performance could not be examined. However, in the post-rotation interviews, most leaders stressed this area. They agreed with JRTC O/Cs that staff functional areas required training and coordination. Future research should incorporate demographic instruments which document the experience and training of staff officers.

Battalions usually have a Military Intelligence branch officer filling the S2 (Intelligence) staff position. If this officer is fairly junior, it is not uncommon for critical S2 contributions to mission planning (the intelligence preparation of the battlefield) to be either neglected by the S2 or not given enough emphasis. Interviews also revealed circumstances in which S2s attempted to meet all the planning and intelligence update requirements of

that staff section because other section personnel were not adequately trained.

The S4 or logistics support section of Light Infantry battalions must plan resupply very carefully, both in terms of specific items and quantities because of limited transportation support. In the majority of the maneuver battalions the S4 is typically an Armor or Infantry officer with little formal training, at either the Logistics Center or the two- or three- week maintenance management courses at home station. If officers do not receive training before getting to the unit (very few do), there is little chance that they will be spared to attend training. On-the-job training and "trial by fire" during the first field exercise were offered as the common descriptions of training for S4 assignment.

The S1, personnel-administration officer, in the majority of units has similar training limitations. Either a relatively junior officer or a captain in transition waiting to assume company command or to leave the battalion is assigned as the S1. The responses to questions about this practice reflect the assumption that the administrative NCOs can handle most of the work which is routine and garrison oriented. Missed by the units is recognition of the duties that should be performed by the S1 section in planning, preparation, and execution of operational missions. Even if the S1 positions were stabilized, the officers filling them are as inadequately trained as those in S4 positions.

Prior to a CTC rotation, staff members generally viewed their training with slice elements as adequate. However, after rotation, principal staff sections in the majority of the units were concerned about the infrequency with which they trained with engineer, aviation, fire support, and other support elements. The O/Cs have documented this problem as well. In all, the synchronization of command and staff actions, within the battalion and with supporting elements, was seen to need improvement. Supporting elements are commonly unfamiliar with the maneuver battalion's SOPs, and as a result, operations are not coordinated.

Conclusions

Each battalion's training activities were driven by a unique mission essential task list (METL), the nature of its relationship with its brigade and division, and its operational environmental characteristics. Although each battalion presented a unique training and operational picture, performance trends and experiences emerged which suggest areas for meaningful research and development.

In this research, unit performance at JRTC was based entirely on the company and platoon O/C's mission ratings. However, multiple measures of unit performance would establish more clearly the generality and stability of the

findings. An additional analysis of the data sources in the JRTC archive is planned. The consistency in the performance data from these sources and their relationship to the home station variables will be examined.

Performance trends identified many important areas for training innovations and future research. These areas include staff training and synchronization, small-unit training for night operations, incorporation of combat realism in training, management of internal personnel stability, casualty evacuation procedures, and preparation of leaders to conduct home station training. Of these areas, staff synchronization and small-unit night operations were viewed as especially critical to mission success. Future training research will focus on these domains.

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APPENDIX A

UNIT TURBULENCE: A CASE STUDY

Background

The following unit turbulence data came from one battalion participating in the research project. The purpose was to identify movement of personnel through and within the unit, including movement for any given position. Both the amount and type of movement were documented. Movement, or turbulence, was monitored beginning 120 days prior to the CTC rotation in order to identify if and when stability occurred, and at what echelons. Data requirements were the specific position affected, the source of replacement, and the date of the transaction.

The research effort provided not only a detailed description of patterns of stability/turbulence, but also a procedure which can be used by units to describe and monitor personnel movement. This information would permit the unit to identify turbulence patterns within the battalion and make desired adjustments.

Method

The personnel tracking system in use within the battalion recorded transactions at a level of detail which exceeded the research requirements. Personnel within the unit's S1 section filtered all personnel transactions from the data base which did not result in a position change, and then provided a separate printout for the research project. For example, any data entries for promotion or military occupational specialty (MOS) changes were excluded, even though they would eventually lead to movement. In themselves, they did not reflect actual changes within given positions.

The specific position affected was identified, e.g., rifleman, Alpha team, first squad, third platoon, Bravo company. This level of detail provided a picture of changes, or personnel turbulence, at all levels within the unit from the battalion down to the squad and individual. The source of replacement was labeled to reflect one of five levels. Codes were assigned to identify the lowest level affected by the move and did not include higher level changes. These codes were:

Code 1: Replacement came from within the squad.

Code 2: Replacement came from another squad/section within the platoon or section.

Code 3: Replacement came from another platoon or section within the company.

Code 4: Replacement came from another company within the battalion.

Code 5: Replacement came from a unit external to the battalion.

Code 6: Vacancy was created.

The pattern of replacement within a company, that is, how much turbulence was generated at each of the different echelons, was then determined by the distribution of these replacement codes recorded for the company.

The effective date of the transaction was used to describe movement trends occurring prior to CTC rotation. In particular, movement patterns for the companies were compared.

Leadership positions were identified as well, and coded to permit comparison of the turbulence patterns of leaders and nonleaders at all echelons. Leader positions were: battalion commander, battalion command sergeant major, battalion executive officer, company commanders, company executive officers, company first sergeants, platoon leaders, platoon sergeants, squad leaders; section leaders, and fire team leaders.

Overall stability was defined as the percentage of all positions unchanged during the reported period. Stability percentages were calculated for both leader and nonleader positions from the battalion down to each company.

Results

Figure A-1 depicts the relative overall stability of the battalion, including each company. In this illustration C company has a much higher rate of nonleader turbulence as depicted by its relatively low stability percentage.

Figure A-2 shows the pattern of turbulence over time for both leader and nonleader positions in the battalion. The percentages on top of each bar provide a common measure of stability. Comparing the actual number of changes for leaders and nonleader is misleading due to the smaller number of leader positions as compared to the nonleader positions.

Figures A-3 through A-6 provide the monthly changes for each company. These figures depict the changing levels of stability as the CTC rotation neared and clearly indicate distinct personnel movement patterns within the companies. Headquarters and Headquarters Company (HHC) held its leader positions very stable throughout the four-month period (Figure A-3). Most of the nonleader movements occurred within the first 30 days. For A company (Figure A-4) the stability percentages for leaders and nonleaders were similar. Movement was most frequent at the beginning and diminished gradually over time. Company B (Figure A-5) held its leader positions stable throughout. The nonleader position changes were also relatively low compared to the other companies and occurred generally in the first 90 days. The low percentage of movement in the last 30 days reflects a settling of turbulence as the company prepared for CTC rotation. Company C (Figure A-6) had the most unique turbulence pattern. During the two months immediately prior to CTC rotation nearly half of all the nonleader positions changed. The first two months were relatively stable compared to the other companies and the battalion overall.

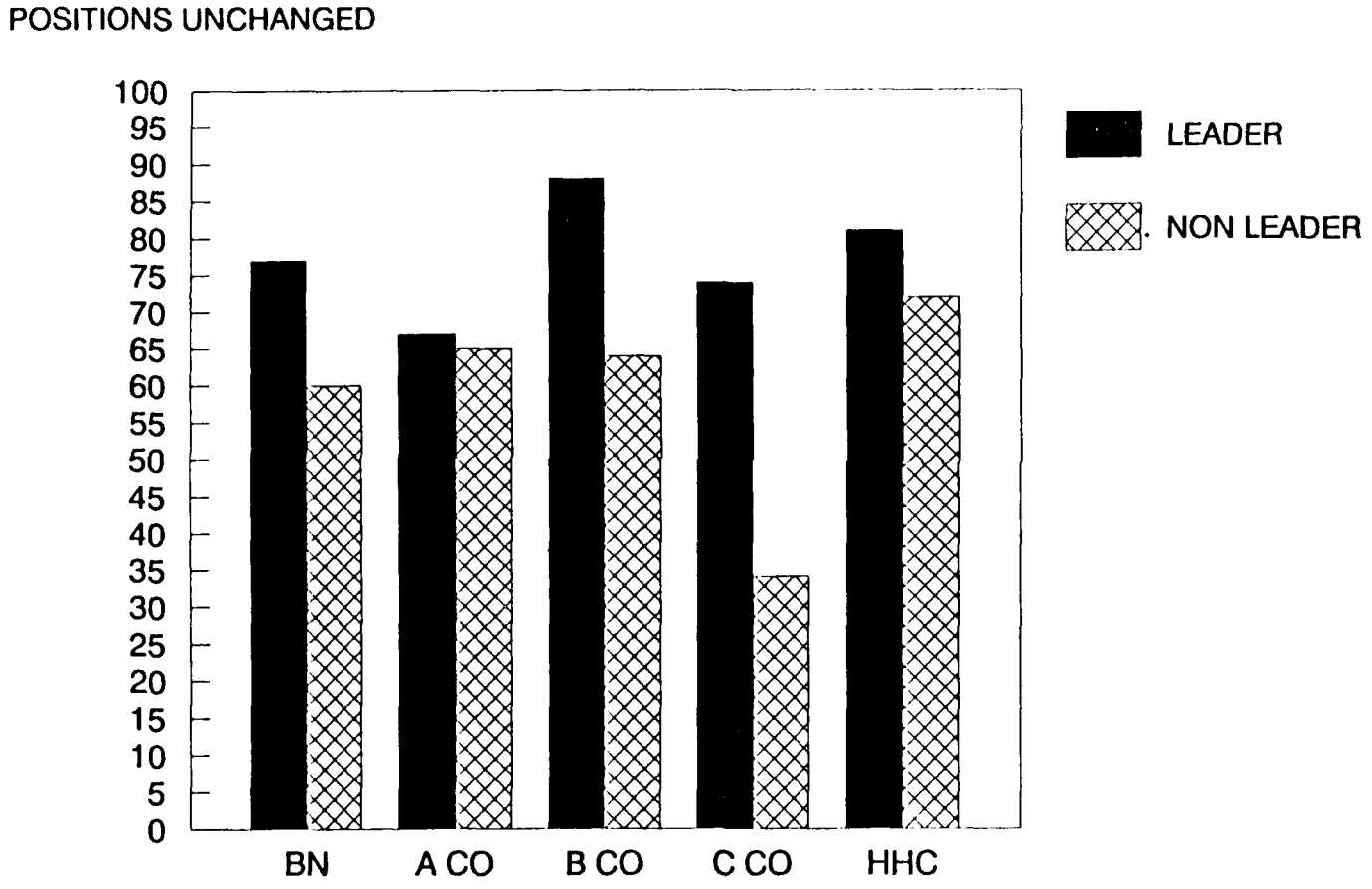

Figure A-1. Stability percentages for leaders and nonleaders in the battalion and individual companies

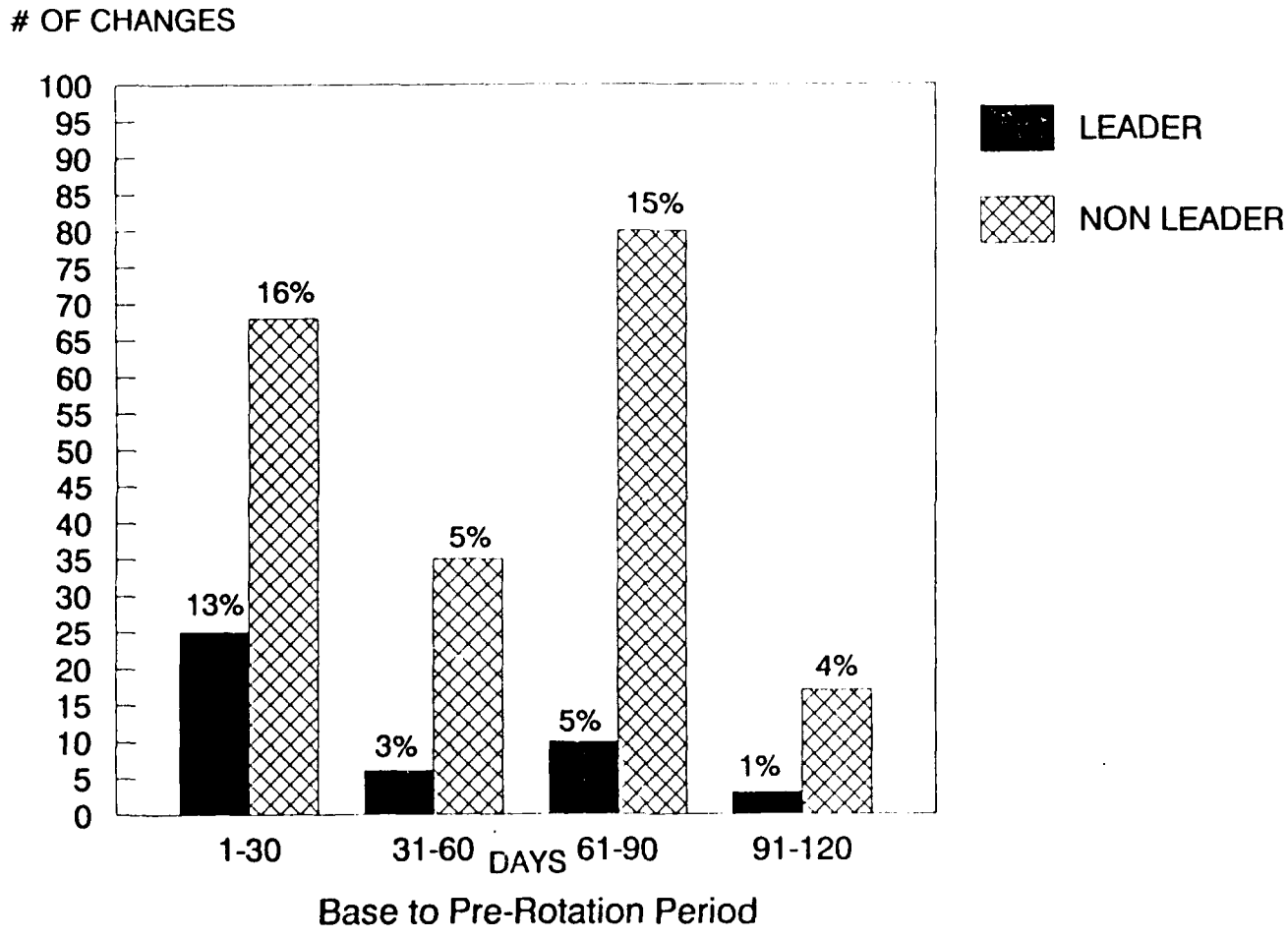

Figure A-2. Monthly leader and nonleader changes for the battalion (number on top of each bar is the % positions affected by the changes)

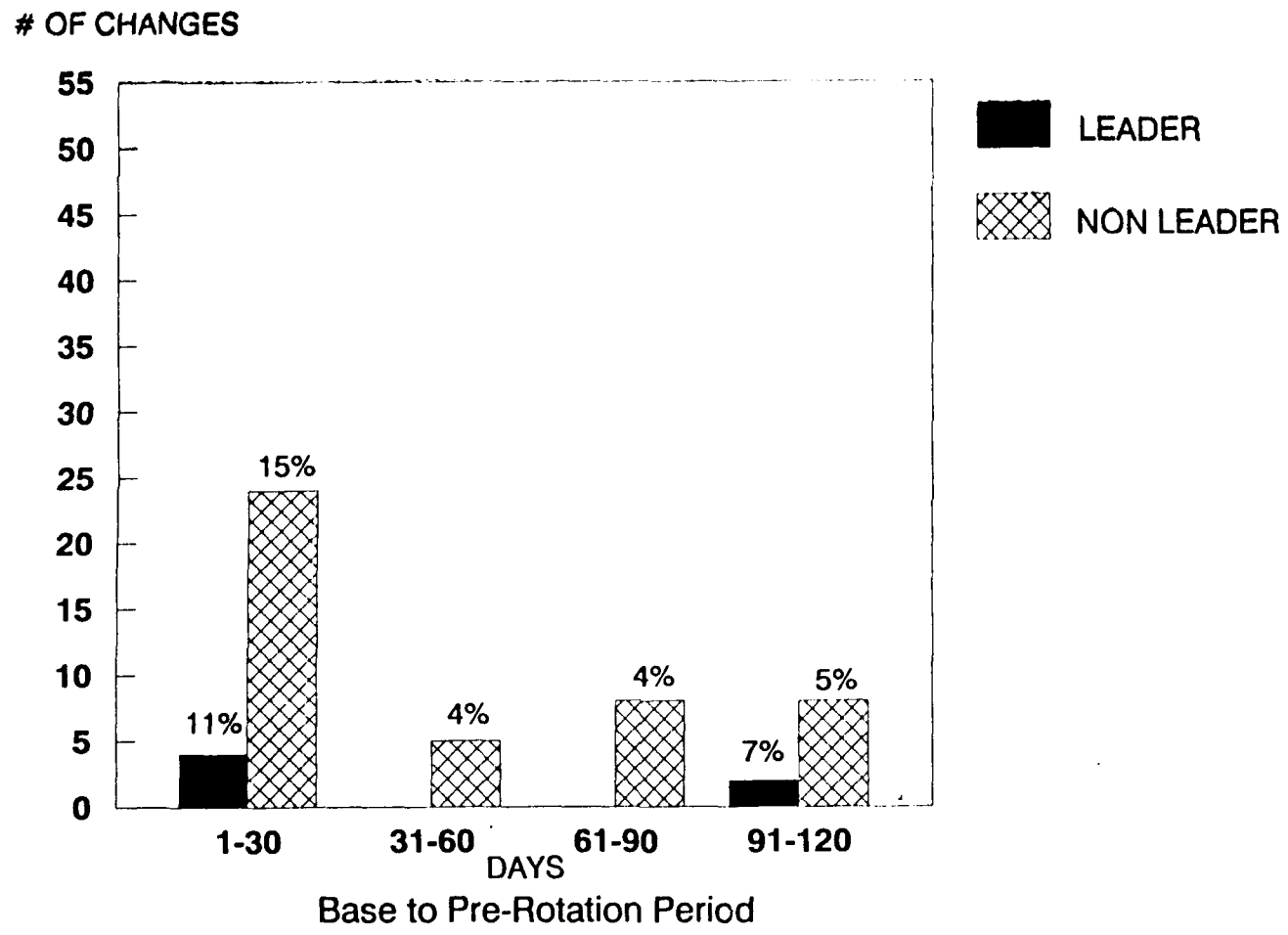

Figure A-3. Monthly leader and nonleader changes for HHC
(number on top of each bar is the % positions affected by the changes)

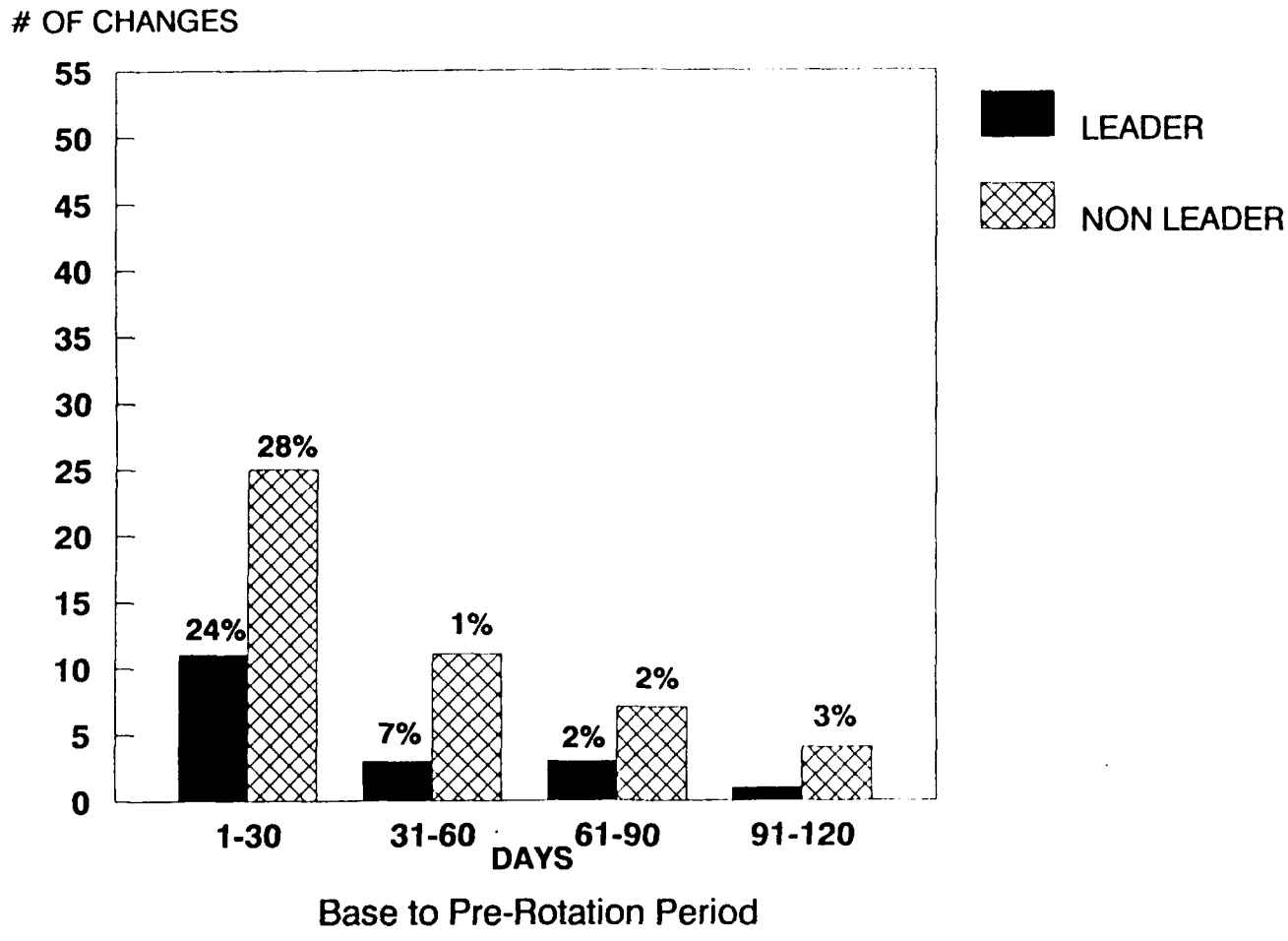

Figure A-4. Monthly leader and nonleader changes for A company
(number on top of each bar is the % positions affected by the changes)

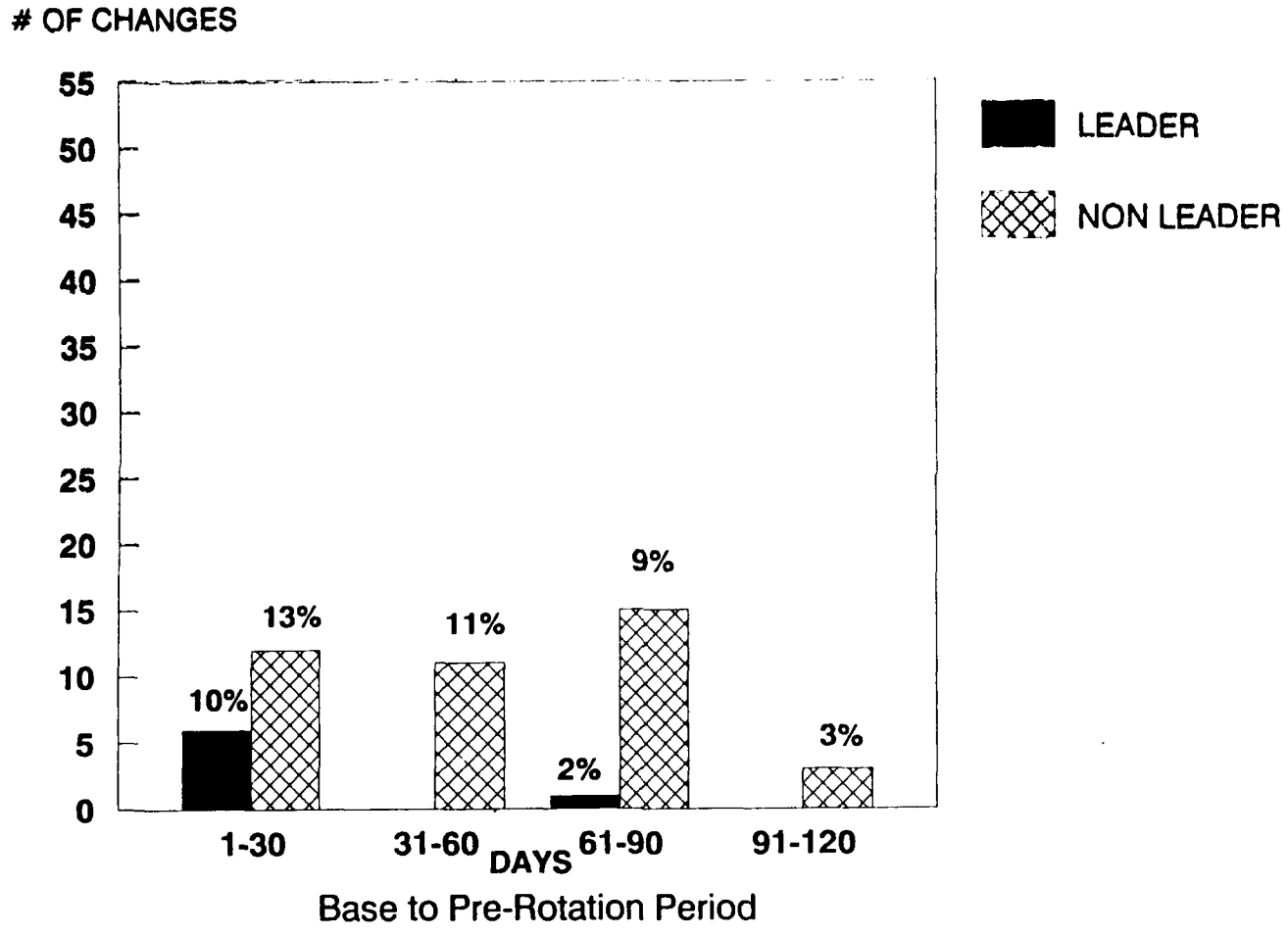

Figure A-5. Monthly leader and nonleader changes for B company
(number on top of each bar is the % positions affected by the changes)

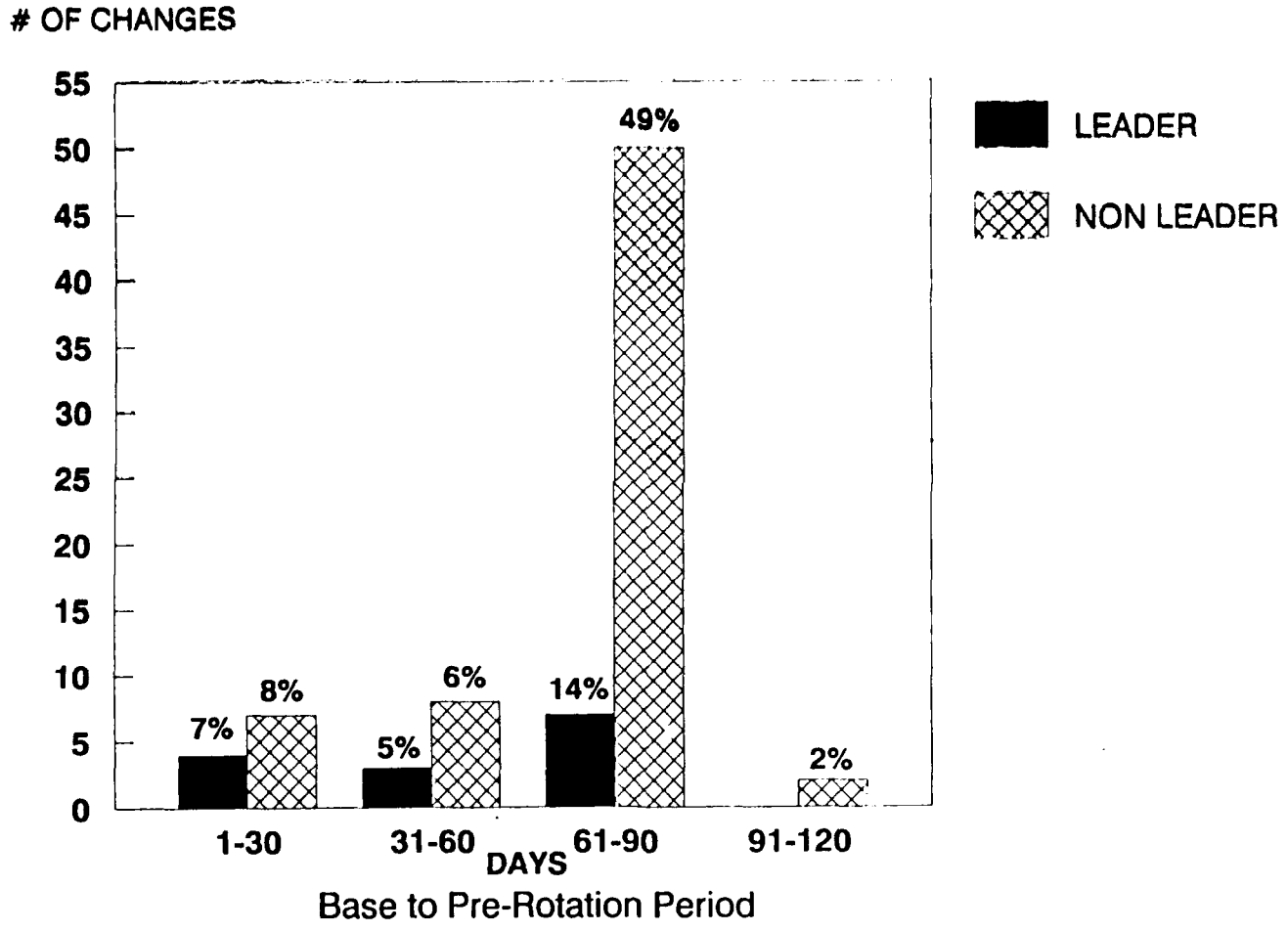

Figure A-6. Monthly leader and nonleader changes for C company
(number on top of each bar is the % positions affected by the changes)

Figure A-7 provides an overview of the distribution of replacement sources within the battalion for all changes. The first three bars represent the turbulence which originated within the company, i.e., the individuals moved from one position to another within their own company. Within company movement accounted for the majority of the overall battalion turbulence (72%).

Figure A-8 presents the distribution of the sources of replacement by individual company. The distinctly different approach each company took regarding internal company replacements can be seen in this figure. Company A processed most of its replacements by moving personnel between platoons. Company B conducted most of its replacement actions within and between squads in the same platoon. Company C distributed position replacement actions fairly evenly across the company structure, without regard to platoon or squad integrity. Sources of replacement for HHC were distributed equally within the battalion structure.

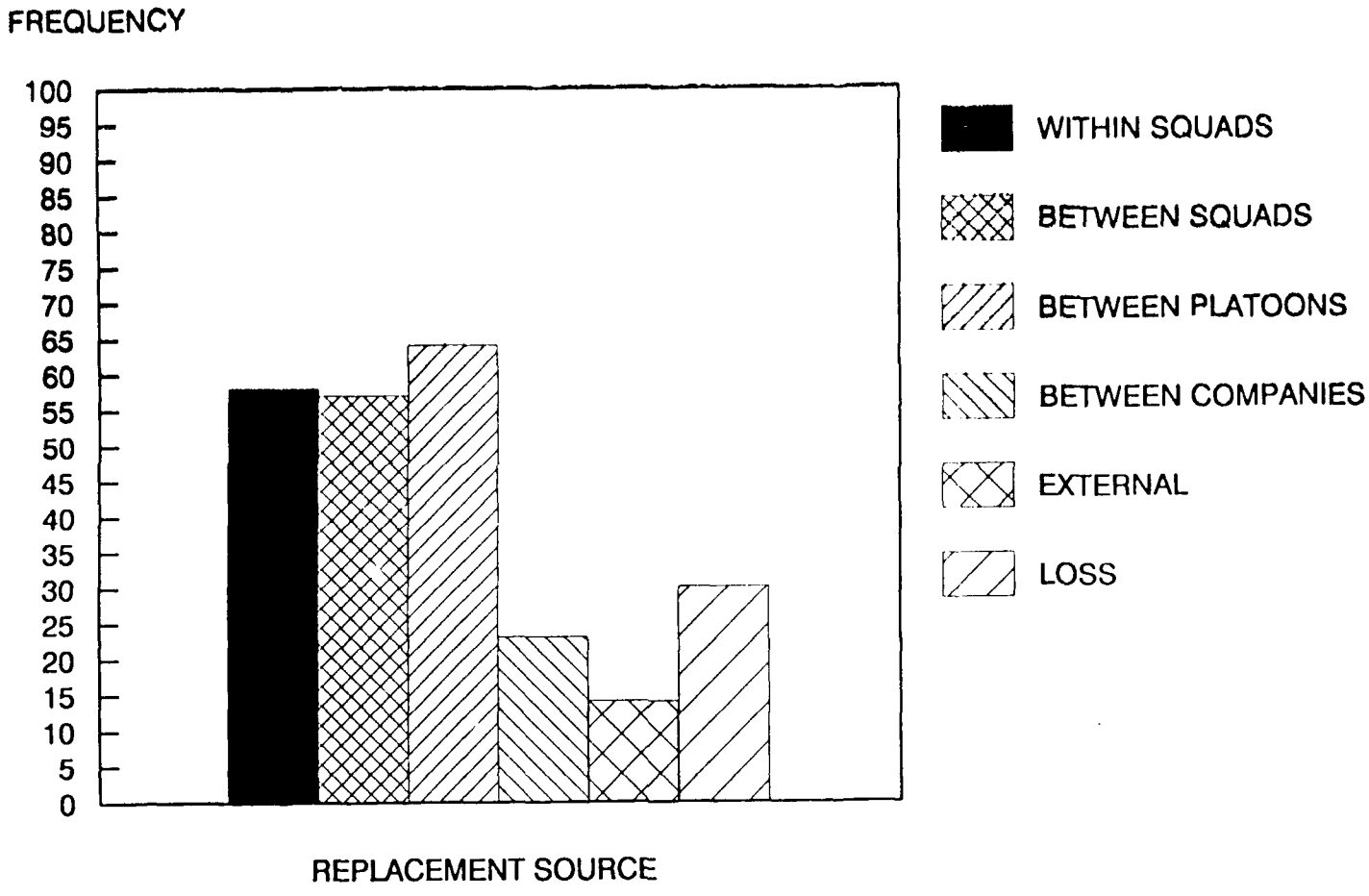

Figure A-7. Sources of personnel replacement for the battalion

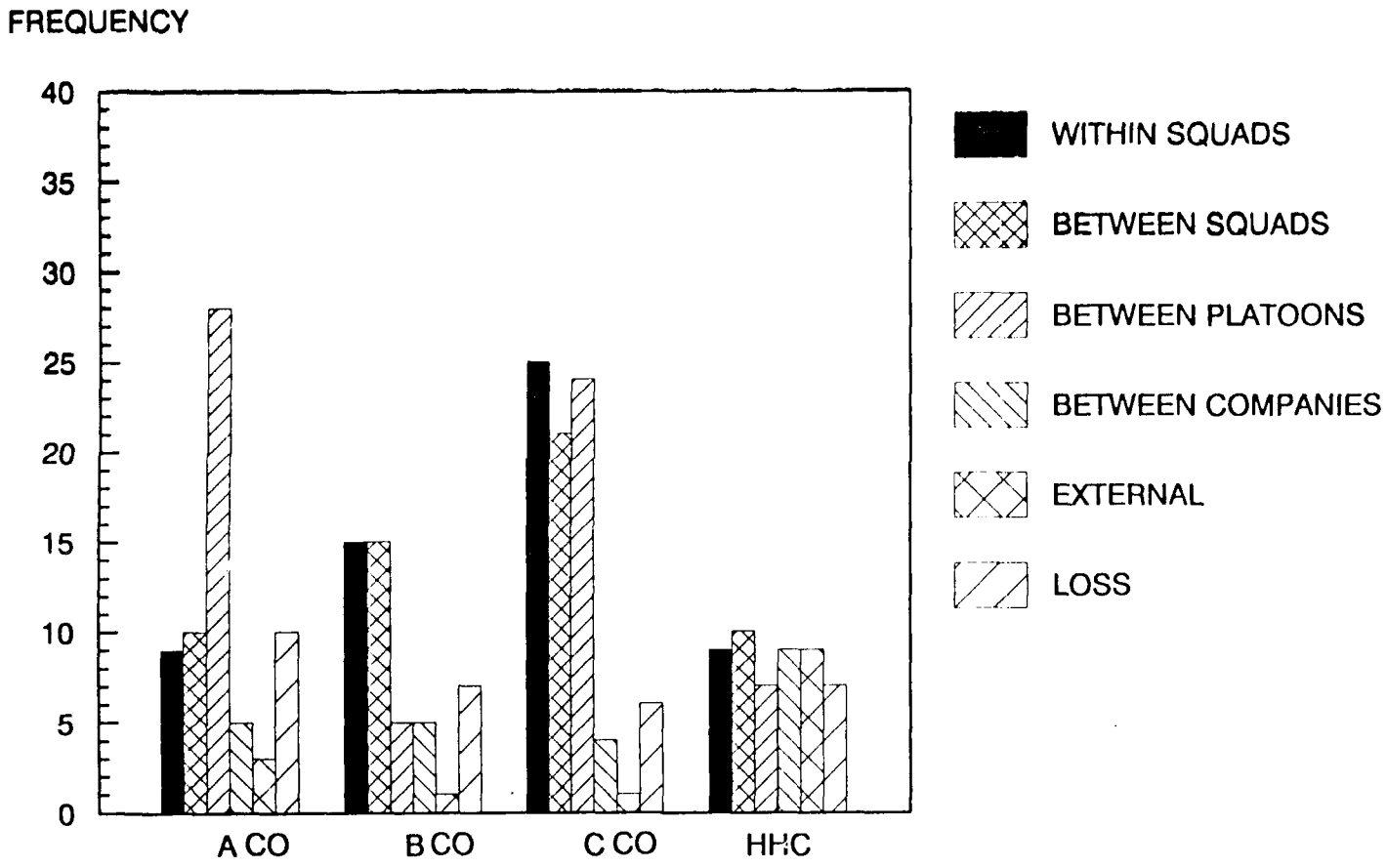

Figure A-8. Sources of personnel replacement for individual companies

APPENDIX B

UNIT COMPARISONS

Table B-1

Means on Personnel Quality, Leader Experience, and Personnel Stability Variables for Rifle Companies by Unit

Variable	Unit A $\underline{n}$ = 3	Unit E $\underline{n}$ = 3
Personnel Quality		
GT Score - Leaders	109.9	110.5
GT Score - Nonleaders	108.3	102.0
PT Score - Leaders	258.0	249.8
PT Score - Nonleaders	242.5	229.4
% Expert on M16 - Leaders	90.7	75.3
% Expert on M16 - Nonleaders	82.0	47.7
Leader Experience (months)		
Bn Staff Experience	5.8	13.7
Bn Staff Continuity	1.0	10.0
Co Staff Experience	12.1	11.6
Co Staff Continuity	4.3	9.7
Personnel Stability		
% Leader Positions Unchanged	76.3	78.7
% Nonleader Positions Unchanged	54.3	67.3

Table B-2

Mean O/C Ratings for High and Low Performing Rifle Companies within Units

Mission	Unit A O/C Ratings		Unit E O/C Ratings	
	High Companies n = 2	Low Company n = 1	High Companies n = 2	Low Company n = 1
All Missions	2.33	1.22	2.00	1.67
Defend	2.50	1.67	2.00	1.67
Attack	1.67	1.00	2.00	1.67
Movement to Contact	1.33	1.00	2.00	1.67

Note. Scale: 4=trained; 3=needs a little training; 2=needs a lot of training; 1=untrained.

Table B-3

Home Station Variable Means for High and Low Performing Companies within Units

Variable	Unit A		Unit E	
	High Companies	Low Company	High Companies	Low Company
Personnel Quality				
GT Score - Leaders	109.6	110.4	112.7	106.0
GT Score - Nonleaders	108.7	107.4	102.3	101.5
PT score - Leaders	259.1	258.0	244.3	260.9
PT score - Nonleaders	242.7	242.0	227.1	233.8
% Expert on M16 - Leaders	90.0	92.0	88.0	50.0
% Expert on M16 - Nonleaders	93.5	59.0	56.5	30.0
Leader Experience				
Co Staff Experience (months)	13.7	9.0	11.3	12.0
Co Staff Continuity (months)	4.5	4.0	9.5	10.0
Personnel Stability				
% Leader Positions Unchanged	77.5	74.0	84.5	67.0
% Nonleader Positions Unchanged	64.5	34.0	76.5	49.0
Individual Training (% weeks)				
Weapons	32.0	24.0	31.5	13.0
Other Individual	67.5	41.0	53.0	50.0
Leader	32.5	47.0	50.0	31.0
Collective Training (% weeks)				
Squad/Platoon	47.0	35.0	28.0	31.0
Company & Above	44.0	29.0	31.5	38.0
Night	71.0	41.0	22.0	44.0
Training Realism (25-pt scale)				
Company Staff Ratings	18.3	17.1	19.9	20.4
Slice Training (30-pt scale)				
Company Staff Ratings - Primary	25.7	24.5	25.0	24.5
Company Staff Ratings - Secondary	22.8	22.1	23.3	22.0
Self-Ratings of Proficiency[a]				
Battalion Staff	2.8	2.8	3.4	3.4
Company Staff (from Plt ratings)	3.1	3.3	3.1	3.6

Note. Large differences within units are shaded.

[a] Scale: 4=trained; 3=needs a little training; 2=needs a lot of training; 1=untrained.

Table B-4

One-way Analysis of Variance Results on Home Station Variables and O/C Ratings: Comparison of Platoon Means for Units A and E

Variable	df	MS	F	p
Personnel Quality				
GT Score - Leaders				
Model	1	3.18	0.20	0.6614
Error	16	15.99		
GT Score - Nonleaders				
Model	1	196.81	27.95	0.0001
Error	16	7.04		
PT Score - Leaders				
Model	1	526.28	6.86	0.0186
Error	16	76.71		
PT Score - Nonleaders				
Model	1	899.87	14.39	0.0016
Error	16	62.51		
% Expert on M16 - Leaders				
Model	1	997.56	2.75	0.1166
Error	16	362.39		
% Expert on M16 - Nonleaders				
Model	1	6766.72	18.17	0.0006
Error	16	372.39		
Leader Experience				
Co Staff Experience (months)				
Model	1	1.38	0.13	0.7218
Error	16	10.49		
Co Staff Continuity (months)				
Model	1	128.00	51.20	0.0001
Error	16	2.50		
Plt Staff Experience (months)				
Model	1	304.80	9.46	0.0089
Error	13	32.23		
Plt Staff Continuity (months)				
Model	1	247.54	22.53	0.0004
Error	13	10.99		

Table B-4 Cont'd

Variable	df	MS	F	p
% Sqd Leaders at SL III				
Model	1	997.55	2.02	0.1742
Error	16	493.26		
% Tm Leaders at SL II				
Model	1	5547.56	22.42	0.0002
Error	16	247.47		
Personnel Stability				
% Leader Positions Unchanged				
Model	1	22.22	0.08	0.7773
Error	16	268.47		
% Nonleader Positions Unchanged				
Model	1	2640.22	6.01	0.0261
Error	16	439.31		
Individual Training (% weeks)				
Weapons				
Model	1	72.00	1.03	0.3256
Error	16	70.00		
Other Individual				
Model	1	200.00	1.68	0.2139
Error	16	119.37		
Leader				
Model	1	180.50	1.20	0.2893
Error	16	150.25		
Collective Training (% weeks)				
Squad/Platoon				
Model	1	882.00	24.50	0.0001
Error	16	36.00		
Company & Above				
Model	1	128.00	2.43	0.1384
Error	16	52.63		
Night				
Model	1	4512.50	25.58	0.0001
Error	16	176.37		

Table B-4 Cont'd

Variable	df	MS	F	p
Training Realism				
Company Staff Ratings				
Model	1	20.93	16.95	0.0008
Error	16	1.23		
Slice Training				
Company Staff Ratings - Primary				
Model	1	0.24	1.03	0.3259
Error	16	0.23		
Company Staff Ratings - Secondary				
Model	1	0.32	0.59	0.4540
Error	16	0.54		
Self-Ratings of Proficiency				
Company Staff Platoon Ratings				
Model	1	0.07	1.16	0.2966
Error	16	0.06		
Mission Ratings by O/Cs				
All Missions				
Model	1	0.46	2.68	0.1224
Error	15	0.17		
Defend				
Model	1	0.58	2.13	0.1649
Error	15	0.27		
Deliberate Attack				
Model	1	0.60	1.04	0.3270
Error	13	0.58		
Movement to Contact				
Model	1	0.86	8.38	0.0146
Error	11	0.10		

Table B-5

Mean O/C Ratings for High and Low Performing Platoons by Unit

Mission	Unit A O/C Ratings		Unit E O/C Ratings	
	High Plts n=4	Low Plts n=4	High Plts n=4	Low Plts n=5
All Missions	2.60	1.96	2.06	1.86
Defend	2.50	1.83	2.04	1.60
Attack	2.75	1.50	2.17	1.73
Movement to Contact	2.83	2.16	2.33	2.00

Note. Scale: 4=trained; 3=needs a little training; 2=needs a lot of training; 1=untrained.

Table B-6

Home Station Variable Means for High and Low Performing Platoons within Units

Variable	Unit A		Unit E	
	High Plts	Low Plts	High Plts	Low Plts
Personnel Quality				
GT Score - Leaders	108.1	111.1	108.2	112.3
GT Score - Nonleaders	106.4	109.1	100.9	101.3
PT score - Leaders	260.9	258.2	252.7	245.5
PT score - Nonleaders	244.3	240.8	228.4	226.8
% Expert on M16 - Leaders	94.3	87.0	56.0	91.4
% Expert on M16 - Nonleaders	91.0	84.8	46.5	50.4
Leader Experience				
Co Staff Experience (months)	9.2	13.6	11.0	12.0
Co Staff Continuity (months)	4.0	4.5	8.5	10.6
Plt Staff Experience (months)	20.8	21.0	10.8	11.5
Plt Staff Continuity (months)	12.2	12.5	2.8	5.5
% Sqd Leaders at SL III	91.7	83.5	75.0	66.8
% Tm Leaders at SL II	66.7	70.8	33.5	36.7
Personnel Stability				
% Leader Positions Unchanged	82.0	86.5	82.0	78.0
% Nonleader Positions Unchanged	47.8	57.5	66.3	84.4
Individual Training (% weeks)				
Weapons	29.5	29.3	19.0	30.4
Other Individual	50.0	63.0	50.0	53.6
Leader	32.5	39.8	40.5	46.2
Collective Training (% weeks)				
Squad/Platoon	44.0	42.5	31.0	27.4
Company & Above	35.0	41.0	38.0	30.2
Night	56.0	63.5	31.5	27.6
Training Realism (25-pt scale)				
Company Staff Ratings	18.4	17.6	19.7	20.3
Slice Training (30-pt scale)				
Company Staff Ratings - Primary	24.8	24.5	25.1	24.7
Company Staff Ratings - Secondary	22.7	22.5	22.3	23.3
Self-Ratings of Proficiency[a]				
Company Staff Platoon Ratings	2.8	2.9	2.5	2.9

Note. Large differences are shaded.

[a] Scale: 4=trained; 3=needs a little training; 2=needs a lot of training; 1=untrained.

APPENDIX C

CORRELATION COEFFICIENTS: PLATOON O/C RATINGS AND HOME STATION VARIABLES

Table C-1

Correlations among the O/C Mission Ratings for Platoons

	All Msns	Def	Del Atk	MTC
All Missions	...	.65**	.91***	.93***
Defend		...	.63*	.79**
Del Attack			...	.79**
MTC				...

Note. N ranged from 13 to 17 depending on mission.
* p < .05 ** p < .01 *** p < .001

Table C-2

Correlations among Variables within Home Station Domains for Platoon Measures

	Personnel Quality				
	b	c	d	e	f
a. Ldr GT	.26	-.41	-.48*	.27	.24
b. Nonldr GT	...	.33	.42	.40	.81***
c. Ldr PT		...	.65**	-.09	.20
d. Nonldr PT			...	.24	.38
e. Ldr Expert				...	.50*
f. Nonldr Expert					...

Table C-2 Cont'd

Leader Experience

	h	i	j	k	l	m	n
g. Bn Staff Exp	1.00	-.09	.87***	-.65**	-.79***	-.33	-.76***
h. Bn Staff Cont	...	-.09	.87***	-.65**	-.79***	-.33	-.76***
i. Co Staff Exp		...	.15	-.22	.35	-.10	.11
j. Co Staff Cont			...	-.62*	-.71**	-.24	-.63**
k. Plt Staff Exp				...	.58*	.42	.44
l. Plt Staff Cont					...	.37	.61*
m. Sqd Ldr SL III						...	.06
n. Tm Ldr SL II							...

Personnel Stability

	o	p
o. Leader	...	.16
p. Nonleader		...

	Individual Training			Collective Training		
	q	r	s	t	u	v
q. Weapons	...	.39	.05	.25	-.20	.11
r. Other Ind		...	-.04	.39	.67**	.63**
s. Leader			...	-.71**	-.36	-.60**
t. Sqd/Plt				...	.63**	.85***
u. Co & Above					...	.69**
v. Night						...

Training Realism

	w	x
w. Bn Staff Ratings	...	-.72**
x. Co Staff Ratings		...

Table C-2 Cont'd

	Slice Training			
	y	z	aa	bb
y. Bn Staff-Prim	...	.25	1.00	.19
z. Co Staff-Prim		...	.25	.15
aa.Bn Staff-Sec			...	.19
bb.Co Staff-Sec				...

Note. N ranged from 15 to 18 depending on home station domain. Unit differences at the platoon level were not partialled out and should be considered when interpreting the correlation coefficients. This factor is particularly important when variables within a domain were measured at different echelons (e.g., Leader Experience variables were assessed at battalion, company, and platoon echelons).

* $p < .05$ ** $p < .01$ *** $p < .001$

APPENDIX D

IMPORTANCE OF TRAINING EVENTS

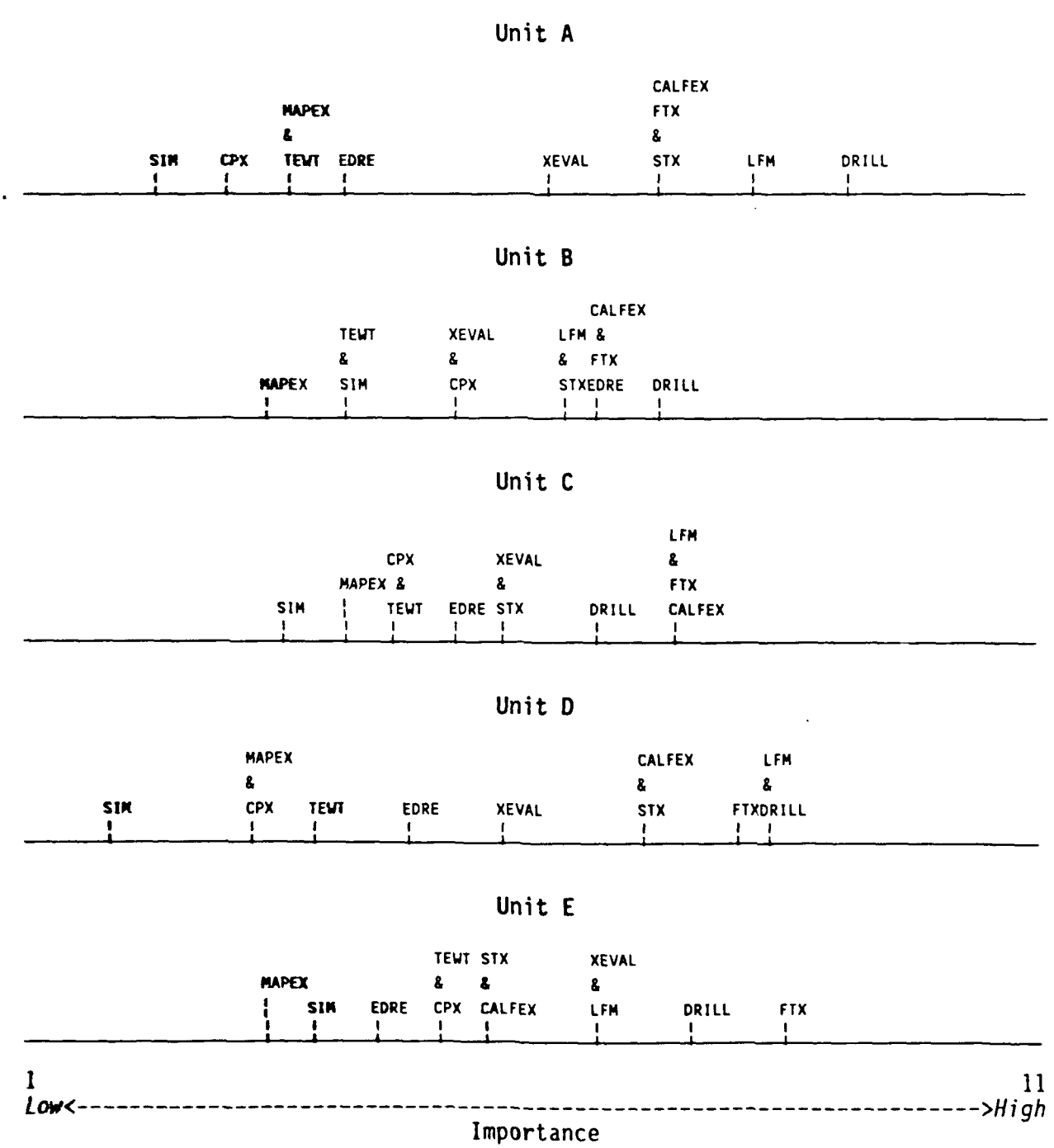

Figure D-1. Perceived importance of training exercises to combat readiness: Mean ranks by unit (Scale ranges from 1 to 11).