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JUL 77 R E O'BRIEN, J P FORD, J A BOLDOVICI

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ARMOR AND CAVALRY NATIONAL GUARD  
TRAINING CONSTRAINTS

by

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and John A. Boldovici

HUMAN RESOURCES RESEARCH ORGANIZATION  
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report describes the conduct and results of part of a project to develop training plans for Armor and Cavalry Reserve Components <sup>1</sup> which use the M48A5 tank. The purpose of the work described here was to identify the constraints that might affect designing and delivering training for Armor and Cavalry National Guard units. <i>cont rep 1473B</i>		

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Letters of inquiry and associated data-recording forms were sent to 210 Armor and Cavalry National Guard units which were identified with help from Readiness Region VI, the National Guard Bureau, and the Fort Knox TASO. The combined response rate for Armor and Cavalry units was 96 percent (201 of 210 units).

Data were presented on:

1. Unit identification.
2. Numbers and kinds of tanks at armories, WETS (Week-end Training Sites), and ATS (Annual Training Sites).
3. Travel by units to WETS, ATS, and subcaliber ranges.
4. Amounts and kinds of practice, including numbers of MUTA held at WETS and at armories, and frequency of subcaliber and service practice firing.
5. Availability of means for firing gunnery tables, and of support from TASO and Mobile Training Teams.

The survey data suggested several implications which will be used later in the project, when new training is designed for Armor and Cavalry National Guard units: --

1. Efforts to improve precision in defining, measuring, and reporting "qualification" should be continued;
2. Consideration should be given to having at least one tank at each armory;
3. New training for the M48A5 should: (a)
  - A. Be deliverable, as much as possible, at armories; (b)
  - B. Capitalize on similarities between M48A5 tasks and M48A1/A2 tasks. (c)
  - C. Incorporate increased use of subcaliber devices at armories; (This recommendation must be tempered by the reservation that little is known about the effectiveness of subcaliber devices.)
  - D. Not include central roles for TASO and Mobile Training Teams in delivering instruction.

1 "Reserve Components" as used in this report, refer to National Guard and U.S. Army Reserve units. With few exceptions, the only Reserve Components that are using or scheduled to use the M48A5 tank are Armor and Cavalry National Guard units.

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## BRIEF

This report describes the conduct and results of part of the work performed on a project to develop training plans for Armor and Cavalry Reserve Components which use the M48A5 tank.

### REQUIREMENT

The requirement to which the work described here was addressed was to identify the constraints that might affect designing and delivering training for Armor and Cavalry National Guard units.

### PROCEDURE

Letters of inquiry and associated data-recording forms were sent to 210 Armor and Cavalry National Guard units which were identified with help from Readiness Region IV, the National Guard Bureau, and the Fort Knox TASO. The combined response rate for Armor and Cavalry units was 96 percent (201 of 210 units).

### FINDINGS

Data were presented on:

1. Unit identification.
2. Numbers and kinds of tanks at armories, WETS (Week-end Training Sites), and ATS (Annual Training Sites).
3. Travel by units to WETS, ATS, and subcaliber ranges.
4. Amounts and kinds of practice, including numbers of MUTA held at WETS and at armories, and frequency of subcaliber and service practice firing.

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5. Availability of means for firing gunnery tables, and of support from TASO and Mobile Training Teams.

#### USE OF FINDINGS

The survey data suggested several implications which will be used later in the project, when new training is designed for Armor and Cavalry National Guard units:

1. Efforts to improve precision in defining, measuring, and reporting "qualification" should be continued.
2. Consideration should be given to having at least one tank at each armory.
3. New training for the M48A5 should:
  - A. Be deliverable, as much as possible, at armories.
  - B. Capitalize on similarities between M48A5 tasks and M48A1/A2 tasks.
  - C. Incorporate increased use of subcaliber devices at armories. (This recommendation must be tempered by the reservation that little is known about the effectiveness of subcaliber devices.)
  - D. Not include central roles for TASO and Mobile Training Teams in delivering instruction.

# ARMOR AND CAVALRY NATIONAL GUARD TRAINING CONSTRAINTS

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FIGURE

Figure 1. Numbers and locations of armor and cavalry units

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## ARMOR AND CAVALRY NATIONAL GUARD TRAINING CONSTRAINTS

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### INTRODUCTION

A major purpose of the Fort Knox resident contract ("Tank Systems Skills and Training Structure," DAHC 19-76-C-0001) is to design training plans for Armor and Cavalry Reserve Components. As part of meeting this purpose, it was necessary to identify the training resources available to Reserve Components, and the constraints that might affect the design and delivery of training. A summary of the training resources is presented in O'Brien, et al.<sup>1</sup> The training constraints are the subject of the present memorandum.

### DATA COLLECTION

The search for data on training constraints began early in the project -- before the project was in fact begun. The proposal for the project<sup>2</sup> discussed problems associated with:

- . Limited training time.
- . Personnel turbulence, due to the influx of new personnel, and to frequent redesignation of Reserve Component units.
- . Morale.
- . Unavailability of operational equipment.
- . Maintenance of Reserve Component equipment by civilians.
- . Reliance on lecture-based instruction.
- . Limited availability of training sites for conducting map maneuvers, field training exercises, and command post exercises.
- . Unavailability of training devices and supplemental instructional materials.
- . Limited use of available programs, materials, methods, and devices by Reserve Components, as the possible results of:

<sup>1</sup>O'Brien, Richard E., Ford, J. Patrick, and Boldovici, John A. Media Catalog for National Guard Armor and Cavalry Units. Project Memorandum No. 5 (DAHC 19-76-C-0001). Fort Knox, Kentucky, 1977.

<sup>2</sup>Boldovici, John A. Proposal for Tank Systems Skills and Training Structure. HumRRO: Alexandria, Virginia, 1975.

1. Unresponsiveness to training needs as perceived by unit commanders.
2. Limited knowledge on the part of commanders with respect to what is available.
3. High cost or "red tape" associated with accessing the means for training.
4. Attitudinal and other considerations.

The discussion of the problems noted above is reproduced as Appendix A of this memorandum.

In response to pre-contract negotiation questions, a summary of studies of Reserve Component problems was prepared<sup>1</sup> which encompassed studies by:

- . HumRRO.
- . The Board for Dynamic Training.
- . The Williamson Study.
- . The Office of Secretary of Defense.
- . The Strategic Studies Institute.
- . Research Analysis Corporation.
- . The American Institutes for Research, and Litton Systems, Inc.

The summary is attached to this memorandum as Appendix B.

Information from the sources cited above was supplemented during the conduct of the project by informal discussions with personnel from Readiness Region VI, the National Guard Bureau, and the Fort Knox TASO. Although some demographic and descriptive data were found, it soon became apparent that no comprehensive and detailed information on National Guard training constraints was available. A decision was therefore made to survey National Guard units<sup>2</sup> for information that might bear on the design of new training. Letters of inquiry and associated data-recording forms were sent to Armor and Cavalry National Guard units identified via the sources mentioned above. The letter of inquiry and a list of the survey questions are attached as Appendix C.

Information of the following kinds was elicited:

- . Unit identification.
- . Numbers and kinds of tanks.
- . Force characteristics.
- . Travel requirements.
- . Amounts and kinds of practice.
- . Support availability.

<sup>1</sup>Boldovici, John A. and Osborn, William C. Response to Technical Questions re. HumRRO's Response to RFQ DAHC 19-76-Q-0001 ("Tank Systems Skills and Training Structure"). HumRRO: Alexandria, Virginia, March 1976.

<sup>2</sup>The scope here was limited to Armor and Cavalry National Guard Units. To have included the few US Army Reserve units that use tanks would have complicated the analysis unnecessarily, with no obvious increase in the utility of the data.

## UNIT IDENTIFICATION

Several questions in the survey elicited identifying information about the Armor and Cavalry National Guard units. Personnel from Readiness Region VI, National Guard Bureau; Kentucky Adjutant General's Office; Armor School; and the Fort Knox Training Aids Services Office (TASO) also supplied information on unit identification.

Figure 1 shows the numbers and locations of Armor and Cavalry National Guard units, as determined from the sources mentioned above. One hundred thirty Armor units and 76 Cavalry units were identified. As can be seen in Figure 1, the units are concentrated in California, Texas, Ohio, New Jersey and the Southeastern United States. Twenty-three of the Cavalry and two of the Armor units are "split" units; that is, have subordinate units in more than one state.

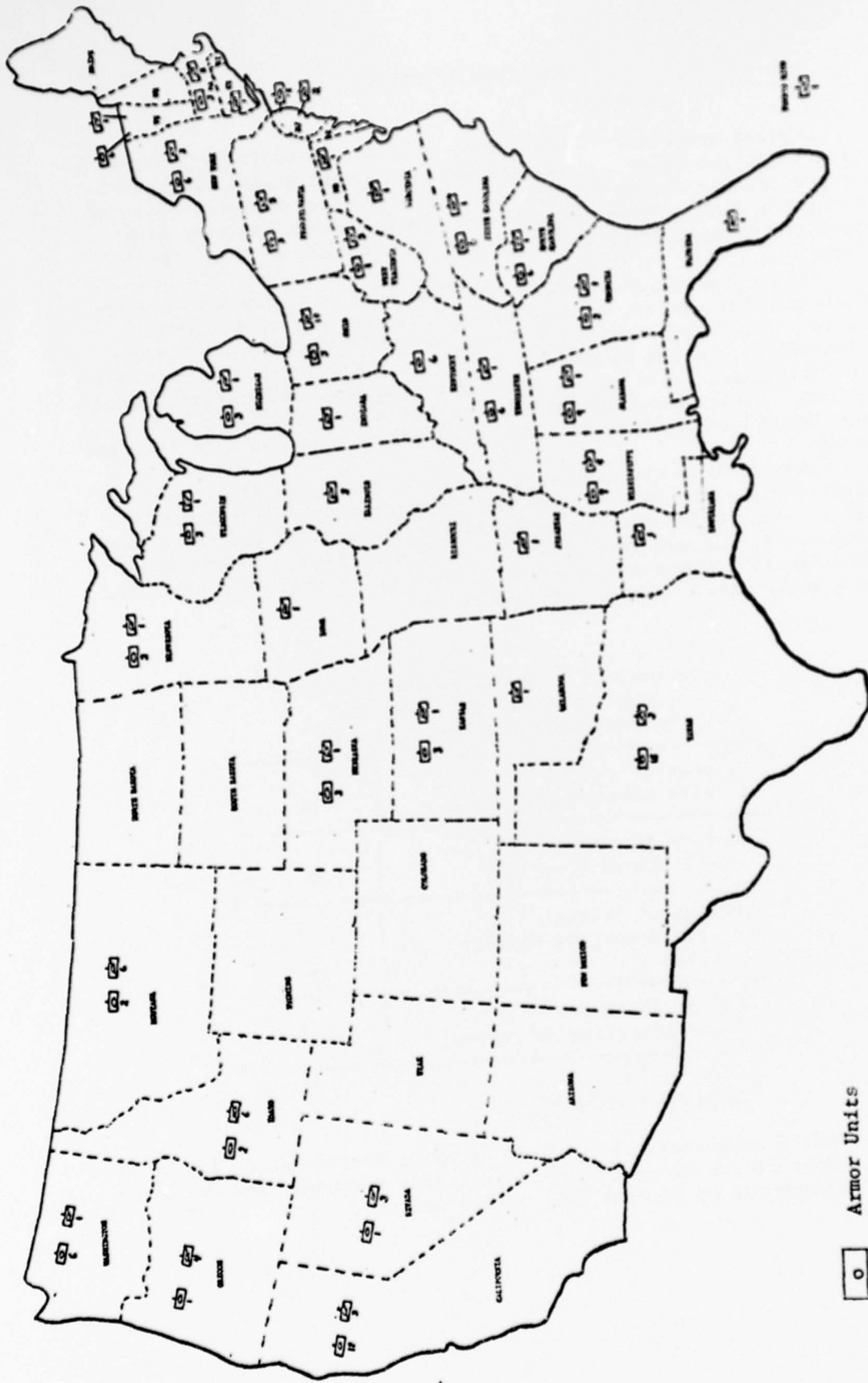
Table 1 shows the number of states in which the Armor and Cavalry units are located, and the number of states responding to the survey. Three states, representing three Armor and three Cavalry units, did not participate. Three additional Cavalry units were "lost." These were parts of larger units that were stationed in a state other than the responding one.

Table 1  
Numbers of States with Armor Units,  
Cavalry Units, and Both; and  
Number Participating in Survey

Number of states with Armor units	26
Number of states with Cavalry units	36*
Number of states with Armor and Cavalry units	19
Number of states participating in survey	33*

\* Includes Puerto Rico

Table 2 summarizes the numbers of units participating in the survey. Here it can be seen that the combined response rate for Armor and Cavalry was 96 percent (201 of 210 units).



○ Armor Units

□ Cavalry Units

FIG. 1. Numbers and Locations of Armor and Cavalry units.

Table 2

Numbers of Armor and Cavalry Units Identified, and Numbers Participating in Survey

	Number Identified	Number Responding	Percent Responding
Armor Units	134*	131*	98
Cavalry Units	76	70	92
All Units	210	201	96

\* Includes 11 Cavalry troops.

DATES ACTIVATED (ITEM 3)

A summary of the years when the Armor units and Cavalry units were activated is presented in Table 3, where it can be seen that 60 percent of the responding units were activated between 1950 and 1969.

Table 3

Dates of Activation for Armor Units and Cavalry Units

Activation Dates	Armor		Cavalry		All Units	
	Number	Percent	Number	Percent	Number	Percent
1970-1976	27	21	17	25	44	22
1960-1969	36	28	25	37	61	31
1950-1959	39	30	18	26	57	29
1940-1949	23	18	8	12	31	16
Pre-1940	3	2	0	0	3	2
TOTALS	128	99	68	100	196*	100

\* Three Armor units and two Cavalry units that participated in the survey did not respond to this item.

## TYPES OF PARENT UNITS (ITEM 15)

Respondents were asked to confirm or correct entries on the data recording forms, about the locations and types of their parent units. The responses about geographic location were used to check and revise the information in Figure 1 (page 4). The responses about parent units are summarized in Table 4, where it can be seen that the units are about evenly distributed between National Guard Divisions (84 units = 42 percent of 201 responding) and separate brigades (88 units = 44 percent of 201). A smaller number of units (29 = 14 percent of 201) are separate battalions or squadrons.

Table 4  
Numbers and Percents of Armor and Cavalry  
Units by Types of Parent Units

Types of Parent Units	Armor		Cavalry		All Units	
	Number	Percent	Number	Percent	Number	Percent
Armored Division	36	27	5	7	41	20
Mechanized Division	12	9	3	4	15	7
Infantry Division	15	11	13	19	28	14
Armored Brigade	18	14	3	4	21	10
Infantry Brigade	18	14	13	19	31	15
Armored Cavalry Regiment	9	7	27	39	36	18
Separate Armor Battalion	23	18	0	0	23	11
Separate Cavalry Squadron	0	0	6	9	6	3
TOTALS	131	100	70	101	201	98

## ACTIVE ARMY AFFILIATION (ITEM 16)

Twenty-five Armor and eight Cavalry units are affiliated with Active Army organizations. The types of Active Army organizations with which each of the 33 National Guard units is affiliated are shown in Table 5.

Table 5

Numbers and Types of Active  
Army Organizations with Which  
Armor/Cavalry National Guard  
Units are Affiliated

National Guard Units	Active Army Organizations					TOTALS
	Armored Division	Cavalry Division	Infantry Division	Airmobile Division	Cavalry Regiment	
Armor Units	6	6	12	0	1	25
Cavalry Units	0	0	4	1	3	8
TOTALS	6	6	16	1	4	33

PRESENT AND PROJECTED (FOR NEXT YEAR) TRAINING  
READINESS CONDITIONS (ITEMS 30 AND 31)

Details of present and projected training readiness conditions are classified and cannot be reported here. The progressive capability of the training system was reflected in a tendency to "project up" one readiness level: units in REDCON III this year, for example, being projected to be in REDCON II next year.

NUMBERS AND KINDS OF TANKS

Indirect indications of the extent to which inhibition or negative transfer will be a problem in training can be obtained by examining equipment turbulence; that is, equipment changes and differences from training site to training site, and from time to time. The survey included several questions about the numbers and types of tanks available at armories, available at week end training sites (WETS), and issued at annual training sites (ATS); and on the length of time that the tanks had been at the three training sites.

NUMBERS AND KINDS OF TANKS AT ARMORIES (ITEM 4)

Eighty-five of the 200 units (43 percent) responding to this item reported having no tanks at their armories. The remaining 115 responding units reported having a total of 274 tanks, of which 100 (37 percent) are M48A1 and 110 (40 percent) are M60. Additional details about the numbers and kinds of tanks available at armories are shown in Table 6.

Table 6

Numbers of Tanks at Armories,  
By Types of Tanks and Types of Units

		Types of Tanks							TOTAL
		M48A1	M48A2C	M48A5	M60	M60A1	M551	None	
Armor	Number of Tanks	83	0	6	77	17	0	--	183
	Number of Units	33	0	5	31	9	0	53	131
	Mean	2.5	0	1.2	2.5	1.9	0	0	1.4
Cavalry	Number of Tanks	17	6	7	33	14	14	--	91
	Number of Units	9	1	2	14	7	4	32	69
	Mean	1.9	6.0	3.5	2.4	2.0	3.5	0	1.3
Armor & Cavalry	Number of Tanks	100	6	13	110	31	14	--	274
	Number of Units	42	1	7	45	16	4	85	200
	Mean	2.4	6.0	1.9	2.4	1.9	3.5	0	1.4

TENURE OF TANKS AT ARMORIES (ITEM 5)

Table 7 summarizes the mean number of years that each type of tank has been at Armories of the 115 units. The two most numerous tanks, the M48A1 and the M60, have been at armories for an average of 5.85 and 2 years respectively.

Table 7

Mean Numbers of Years Tanks Have  
Been at Armories

	Types of Tanks						
	M48A1	M48A2C	M48A5	M60	M60A1	M551	All Tanks
Armor	5.93	0	0.38	2.26	2.81	0	3.76
Cavalry	5.52	5.75	0.54	1.53	2.28	1.93	2.75
Armor & Cavalry	5.85	5.75	0.42	2.03	2.58	1.93	3.43

TYPES OF TANK PREVIOUSLY AT ARMORIES (ITEM 6)

Table 8 shows the numbers of units that previously had various kinds of tanks at their armories. Over half (74 of 132 = 56 percent) of the units responding to this item reported having M48A1 and M48A3 tanks replaced with other tanks.

Table 8

Types of Tanks Previously  
at Armories

Types of Tanks	Armor Units	Cavalry Units	All Units
M41	4	7	11
M41A1	0	1	1
M41A3	0	1	1
M47	11	2	13
M48	1	0	1
M48A1	28	22	50
M48A2	5	6	11
M48A2C	9	1	10
M48A3	21	3	24
M60	3	1	4
M551	1	5	6
TOTALS	83	49	132

NUMBERS AND KINDS OF TANKS AT WETS (ITEM 7)

Eight of the 200 units (4 percent) responding to this item reported having no tanks at their WETS. Another 15 of the responding units (7.5 percent of 200) indicated the model of tank available at the WETS, but not the quantity. The response of the 177 units that provided data on both numbers and kind of tanks at their WETS are presented in Table 10, where it can be seen that the most numerous tanks at WETS are those that also were most numerous at armories (see Table 6): the M48A1 and the M60. The 177 units for which complete data were available reported having a total of 1185 tanks, of which 1000 are M48A1, M48A5, and M60.

Table 9

Numbers of Tanks at WETS,  
By Types of Tanks and Types of Units

	Types of Tanks						Total	N	MEAN
	M48A1	M48A2C	M48A5	M60	M60A1	M551			
Armor Units	286	0	264	297	108	0	955	123	7.8
Cavalry Units	47	6	44	62	36	35	230	54	4.3
Armor and Cavalry	333	6	308	359	144	35	1185	177	6.7

TENURE OF TANKS AT WETS (ITEM 8)

Table 10 summarizes the mean number of years that each type of tank has been at the WETS of 177 responding units. As was the case with tanks at armories (see Table 7), the M48A1 is the "oldest" tank at WETS.

Table 10

Mean Numbers of Years  
Tanks Have Been at WETS

	Types of Tanks						All Tanks
	M48A1	M48A2C	M48A5	M60	M60A1	M551	
Armor	4.52	0	0.78	2.14	3.13	0	2.89
Cavalry	5.00	2.50	0.43	1.23	2.09	1.77	1.85
Armor & Cavalry	4.59	2.50	0.68	1.84	2.67	1.77	2.56

TYPES OF TANKS PREVIOUSLY AT WETS (ITEM 9)

Table 11 shows the numbers of units that previously had various kinds of tanks at their WETS. Over half (87 of 164 = 53 percent) of the units responding to this item reported having M48A1 tanks replaced with other tanks.

Table 11

Types of Tanks Previously  
at WETS

Types of Tanks	Armor Units	Cavalry Units	All Units
M41	1	6	7
M41A1	0	1	1
M47	1	2	3
M48	3	1	4
M48A1	54	33	87
M48A2	5	7	12
M48A2C	9	2	11
M48A3	18	8	26
M60	9	0	9
M60A1	0	0	0
M551	1	3	4
TOTAL	101	63	164

NUMBERS AND KINDS OF TANKS AT ISSUED ATS (ITEM 10)

Thirteen of the 197 units (6.6 percent) responding to this item reported the types, but not the numbers of tanks issued at their ATS. The remaining 184 responding units reported having a total of 1732 tanks issued, of which 606 (35 percent) were M60, 557 (32 percent) were M48A1, and 332 (19 percent) were M60A1. The number of tanks issued to each unit at ATS ranged from 7 to 17. Additional details about the numbers and kinds of tanks available at ATS may be found in Table 12.

Table 12

Numbers of Tanks Issued at ATS,  
By Types of Tanks and Types of Units

		Types of Tanks							All Tanks
		M48A1	M48A2	M48A2C	M48A5	M60	M60A1	M551	
Armor	Number of Tanks	477	0	0	141	504	276	0	1398
	Number of Units	46	0	0	14	42	23	0	125
	Mean	10.4	0	0	10.1	12.0	12.0	0	11.2
Cavalry	Number of Tanks	80	18	9	27	102	56	42	334
	Number of Units	16	3	1	4	16	9	10	59
	Mean	5	6.0	9.0	6.8	6.4	6.2	4.2	5.7
Armor & Cavalry	Number of Tanks	557	18	9	168	606	332	42	1732
	Number of Units	62	3	1	18	58	32	10	184
	Mean	9.1	6.0	9.0	9.3	10.4	10.4	4.2	9.4

Forty of the 197 units (20 percent) responding to this item indicated that some of the models they were issued at ATS were different from the tanks used at home station. Table 13 shows the number of units involved in various transitions from one model at home station to another at ATS.

Table 13

Numbers of Units Using One  
Model of Tank at Home Station, and  
Another at ATS

Models of Tanks		Number of Units
at Home Station	at ATS	
M48A1	M48A2	3
M48A1	M60A1	6
M48A2C	M60	1
M48A5	M48A1	6
M48A5	M60	3
M48A5	M60A1	2
M60	M48A1	12
M60	M60A1	3
M60A1	M48A1	3
M551	M60	1
TOTAL		40

TENURE OF TANKS AT ATS (ITEM 11)

The mean numbers of years that each type of tank was used at ATS by the reporting units is shown in Table 14. As was the case with tanks at armories (see Table 7) and at WETS (see Table 10), the "oldest" tank at ATS is the M48A1.

TYPES OF TANKS USED PREVIOUSLY AT ATS (ITEM 12)

Table 15 shows the numbers of units that previously had been issued various kinds of tanks at ATS. Forty-five percent of the units (77 of 172) responding to this item reported having been issued M48A1 tanks before being issued the tanks they now use.

Table 14  
 Mean Numbers of Years  
 That Units Trained  
 On Tanks Issued at ATS

	Types of Tanks							
	M48A1	M48A2	M48A2C	M48A5	M60	M60A1	M551	All Tanks
Armor	5.14	0	0	1.00	1.60	1.50	0	3.20
Cavalry	4.93	3.00	3.00	1.00	2.47	2.11	2.40	2.67
Armor & Cavalry	5.07	3.00	3.00	1.00	1.85	1.72	2.40	2.89

Table 15  
 Types of Tanks Used  
 Previously at ATS

Types of Tanks	Armor Units	Cavalry Units	All Units
M41	4	9	13
M47	12	2	14
M48	6	1	7
M48A1	44	33	77
M48A2	11	8	19
M48A2C	3	2	5
M48A3	18	6	24
M60	3	1	4
M60A1	4	0	4
M551	1	4	5
TOTALS	106	66	172

NUMBERS AND KINDS OF ANTICIPATED CHANGEOVERS (ITEM 13)

One-hundred-twenty-five of the 200 responding units (63 percent) reported anticipating no change in tanks during FY 77. The remaining 37 percent reported anticipating changes as shown in Table 16, where it can be seen that the most frequently reported anticipated change (43 of 69 units = 62 percent) was from the M48A1 to the M48A5.

Table 16

Numbers of Units Anticipating Various Changes in Tanks for FY 77

Anticipated Change		Armor Units		Cavalry Units		Totals	
From	To	Number	Percent	Number	Percent	Number	Percent
M48A1	M48A5	30	58	13	76	43	62
M48A1	M60	18	35	0	0	18	26
M48A2C	M48A2	0	0	1	6	1	1
M60	M48A5	3	6	0	0	3	4
M60A1	M60	0	0	3	18	3	4
M60A1	M551	1	2	0	0	1	1
TOTALS		52	101	17	100	69	98

DISCUSSION

The results on numbers and kinds of tanks at armories, WETS and ATS indicate that all units have access to tanks. Considerable variations in ease of access were, however, suggested. If ease of access to tanks affects frequency of access, and if frequency of access affects proficiency or readiness, then the finding that 43 percent of the units reported having no tanks at their armories deserves scrutiny. Unfortunately the survey contained no provision for determining why so many units do not have tanks at armories. Deliberate policy decisions may have been made to confine tanks to WETS and ATS, on the assumption that little realistic training could be accomplished using tanks at armories, and that sufficient "hands-on" training could be gotten during Multiple Unit Training Assemblies (MUTA) at WETS. As will be seen later though, units average only about six MUTA per year at WETS, and some units have no MUTA at WETS. Units without tanks at armories may not be getting sufficient practice for maintaining desired proficiency levels.

Decisions not to have tanks at armories also may be motivated by fiscal or logistic considerations: it may be easier or less expensive to transport troops to WETS than to move tanks to the armories. Regardless of the reasons for not having tanks at armories, consideration should be given to the possible training benefits that might accrue if at least one tank were available at each armory.

The M48A1 and the M60 predominate at armories, at WETS, and at ATS. At the same time, the M48A1 is the tank most frequently mentioned as a "previous tank" at all three training sites; that is, the M48A1 is one of the most predominant, and at the same time, the "most replaced" tank at armories, WETS and ATS. Of the 69 units (34 percent of 201 participating in the survey) anticipating replacement tanks in Fiscal 77, 61 (= 88 percent of 69) anticipate having their M48A1 tanks replaced, and 46 (= 66 percent of 69) are anticipating changes to the M48A5. This reflects the beginning of a program that is underway to issue the M48A5 to units equipped with the M48A1 and A2 series tanks: Plans call for delivering 1200 M48A5 tanks to Reserve Components by late 1978.

## FORCE CHARACTERISTICS

### CREWS AUTHORIZED, ON HAND, AND GUNNERY QUALIFIED (ITEMS 27, 28, 29)

The numbers and percents of crews authorized, on hand, and gunnery qualified are classified and cannot be reported here. The data, however, seemed consistent with available information about personnel turnover in the National Guard.

Data on gunnery qualification should, in any event, be regarded with caution, since the criteria for gunnery qualification vary from unit to unit and probably are not uniformly applied.

### MOS QUALIFIED CREWMEN (ITEM 14)

An unclassified source<sup>1</sup> reports that 67 percent of reservists are MOS qualified. The results of the present survey indicated that the percent of MOS qualified Armor and Cavalry unit was somewhat higher. An interesting sidelight of the data from the present survey was, however, that many units which reported having no gunnery qualified crews also reported having a majority of their crewmen MOS qualified.

## DISCUSSION

The data on force characteristics point up no compelling implications for training design. One hopes of course, that new training will increase the proportion of qualified crews -- a hope which realism demands be tempered by the knowledge that measuring gunnery qualification is subject to many influences other than training, including how qualification is defined, uniformity in applying standards, and impartiality in measurement and reporting.

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<sup>1</sup>DePuy, W.E. The Army Training System. Presented at DA Commanders' Conference, Washington, D.C., 1976.

Efforts to improve the measurement of gunnery performance should be continued, for only with precise, uniformly applied, and impartially reported measurement will it be possible to determine readiness and proficiency levels, and to design efficient training.

## TRAVEL REQUIREMENTS

Travel to and from training sites is done at the expense of training time. To the extent that the amount of time available for the delivery of training affects proficiency, the distance between units' home stations and training sites is important. The survey elicited information on the locations of each unit's:

- . WETS.
- . ATS.
- . Subcaliber range.
- . Service practice range.
- . Mobile training team.

Straight-line, one-way distances were estimated to the various training locations, and are summarized in the sections which follow.

### DISTANCES TO WETS (ITEM 17)

Distances to WETS are summarized in Table 17. Eighty-four percent of the Armor units and 83 percent of the Cavalry units traveled 100 or fewer miles to their WETS. The travel times presented in Table 17 are rough estimates, reflecting a maximum of 25 miles per hour for convoys, including rest and meal stops.

### LOCATIONS AND DISTANCES OF ATS (ITEM 20)

The locations of ATS and the number of units attending each are shown in Table 18, where it can be seen that the units traveled to 20 sites located in 15 states. Camp Drum, New York and Fort Hood, Texas were the ATS for over a third (35.5 percent) of the 200 units that responded to this item. Distances to ATS are summarized in Table 19. Ninety-one percent of the Armor units, and 86 percent of the Cavalry units traveled 400 or fewer miles to ATS. As with the travel times presented earlier, the times in Table 19 are rough estimates, reflecting a maximum of 25 miles per hour for convoys.

### DISTANCES TO SUBCALIBER FIRING RANGES (ITEM 22)

The distance traveled by units to fire subcaliber are summarized in Table 20. Nine units (six Armor and three Cavalry) some of which probably had not fired subcaliber, did not respond to this item. Seventy-two percent of the 125 responding Armor units, and 82 percent

Table 17

## Distances and Travel Times to WETS

Distance to WETS in Miles	Armor (N=131)		Cavalry (N=70)		All Units (N=201)		Estimated Travel Time in Hours
	Number	Percent	Number	Percent	Number	Percent	
0-5	10	7.6	4	5.7	14	7.0	0.5
6-25	22	16.8	14	20.0	36	17.9	1
26-50	32	24.4	14	20.0	46	22.9	2
51-75	28	21.4	15	21.4	43	21.4	3
76-100	18	13.7	11	15.7	29	14.4	4
101-125	9	6.9	6	8.6	15	7.5	5
126-150	4	3.1	0	0	4	2.0	6
151-175	1	.8	1	1.4	2	1.0	7
176-200	5	3.8	0	0	5	2.5	8
>200	2	1.5	5	7.1	7	3.5	>9

Mean Distance in Miles	63.1	70.4	65.6
Mean Travel Time in Hours	2.5	2.8	2.6

Table 18

Locations of ATS, and Numbers  
of Units Attending Each

ATS	Number of Armor Units	Number of Cavalry Units	All Units	
			Number	Percent
Fort Bliss, TX	1	3	4	2.0
Boise, ID	1	3	4	2.0
Fort Bragg, NC	0	1	1	.5
Camp Chaffee, AR	0	2	2	2.0
Camp Drum, NY	30	11	41	20.5
Camp Garcia, PR	0	1	1	.5
Gowan Airfield, ID	4	12	16	8.0
Camp Grayling, MI	6	12	18	9.0
Fort Hood, TX	27	3	30	15.0
Fort Irwin, CA	6	3	9	4.5
Fort Knox, KY	3	0	3	1.5
Camp McCain, MS	1	4	5	2.5
Camp McCoy, WI	3	1	4	2.0
Camp Pickett, VA	1	4	5	2.5
Fort Riley, KS	3	0	3	1.5
Camp Ripley, MN	3	1	4	2.0
Camp Roberts, CA	6	0	6	3.0
Camp Shelby, MS	18	3	21	10.5
Fort Stewart, GA	12	3	15	7.5
Yakama Firing Center, WA	6	2	8	4.0
<b>TOTALS</b>	<b>131</b>	<b>69</b>	<b>200</b>	<b>101.0</b>

Table 19

## Distances and Travel Times to ATS

Distance to ATS in Miles	Armor (N=131)		Cavalry (N=69)		All Units (N=200)		Estimated Travel Time in Hours
	Number	Percent	Number	Percent	Number	Percent	
0-100	17	13.0	18	26.1	35	17.5	4
101-200	50	38.2	11	16.0	61	30.5	8
201-300	38	29.0	21	30.4	59	29.5	12
301-400	14	10.7	9	13.0	23	11.5	16
401-500	1	.8	1	1.5	2	1.0	20
501-600	1	.8	5	7.2	6	3.0	24
601-700	2	1.5	1	1.5	3	1.5	28
701-800	1	.8	0	0	1	1.0	32
801-900	1	.8	3	4.3	4	2.0	36
901-1000	0	0	0	0	0	0	40
>1000	6	4.6	0	0	6	3.0	44

Mean Distance in Miles	257.4	250.3	254.9
Mean Travel Time in Hours	10.3	10.0	10.2

Table 20

Distances and Travel Times  
to Subcaliber Ranges

Distance to Subcaliber Range in Miles	Armor (N=125)		Cavalry (N=67)		All Units (N=192)		Estimated Travel Time in Hours
	Number	Percent	Number	Percent	Number	Percent	
0-5	18	14.4	19	28.4	37	19.3	0.5
6-25	15	12.0	4	6.0	19	9.9	1
26-50	23	18.4	6	9.0	29	15.1	2
51-75	23	18.4	14	20.9	37	19.3	3
76-100	11	8.8	12	17.9	23	12.0	4
101-125	13	10.4	6	9.0	19	9.9	5
126-150	14	11.2	1	1.5	15	7.8	6
151-175	1	.8	1	1.5	2	1.0	7
176-200	6	4.8	1	1.5	7	3.6	8
> 200	1	.8	3	4.5	4	2.1	9

Mean Distance in Miles	69.7	63.1	67.4
Mean Travel Time in Hours	2.8	2.5	2.7

of the 67 responding Cavalry units traveled 100 or fewer miles to subcaliber ranges. As noted earlier, the travel times are rough estimates, based on a maximum of 25 miles per hour for convoys.

#### LOCATIONS AND DISTANCES OF SERVICE FIRING RANGES (ITEM 24)

The locations of service practice ranges, and the number of units firing at each are shown in Table 21, where it can be seen that the units traveled to 19 ranges located in 18 states. Camp Drum, New York and Fort Hood, Texas were the live-fire sites for over a third (37 percent) of the 191 units that responded to this item. (Eight Armor and two Cavalry units did not conduct service firing during the last training year.)

Distances to the service firing ranges are summarized in Table 22. Ninety-one percent of the 123 responding Armor units, and 93 percent of the responding Cavalry units traveled 400 or fewer miles to fire service practice rounds.

#### LOCATIONS AND DISTANCES OF MOBILE TRAINING TEAMS (ITEM 33)

The locations of the Mobile Training Teams and the number of units supported by each are shown in Table 23. Nearly half (48 percent) of the units responding to this item are supported by Mobile Training Teams at four locations: Fort Knox, Kentucky; Fort Sam Houston, Texas; Fort Douglas, Vermont; and Redstone, Alabama.

Distances from the Mobile Training Team sites to the National Guard units are summarized in Table 24. Forty-three percent of the Armor units, and 39 percent of the Cavalry units are located within 200 miles of their Mobile Training Team site. Seventy-six percent of the Armor units, and 71 percent of the Cavalry units are located within 400 miles of their Mobile Training Team site.

The travel times shown in Table 24 are rough estimates, reflecting a maximum of 50 miles per hour for wheeled vehicles.

#### DISCUSSION

Travel times and distances to training sites do not on the whole seem excessive. More than 80 percent of the units travel 100 or fewer miles to WETS. Seventy percent travel 100 or fewer miles to fire subcaliber. And 90 percent travel 400 or fewer miles to ATS and service practice firing. Decreasing these distances probably would

Table 21

Locations of Service Firing Ranges,  
and Numbers of Units Attending Each

Service Practice Firing Ranges	Number of Armor Units	Number of Cavalry Units	All Units	
			Number	Percent
Camp Attebury, IN	0	1	1	.5
Fort Bliss, TX	1	3	4	2.1
Fort Bragg, NC	3	1	4	2.1
Camp Chaffee, AR	0	2	2	1.0
Camp Drum, NY	30	11	41	21.5
Camp Garcia, PR	0	1	1	.5
Gowan Airfield, ID	4	12	16	8.4
Camp Grayling, MI	5	9	14	7.3
Fort Hood, TX	27	3	30	15.7
Fort Irwin, CA	12	3	15	7.9
Indian Springs, NV	1	3	4	2.1
Fort Knox, KY	3	0	3	1.6
Camp McCoy, WI	3	1	4	2.1
Camp Pickett, VA	1	4	5	2.6
Fort Riley, KS	0	1	1	.5
Camp Ripley, MN	2	2	4	2.1
Camp Shelby, MS	19	6	25	13.1
Fort Stewart, GA	9	3	12	6.3
Yakama Firing Center, WA	3	2	5	2.6
<b>TOTALS</b>	<b>123</b>	<b>68</b>	<b>191</b>	<b>100.0</b>

Table 22

Distances and Travel Times to  
Service Firing Ranges

Distance to Service Firing Range in Miles	Armor (N=123)		Cavalry (N=68)		All Units (N=191)		Estimated Travel Time in Hours
	Number	Percent	Number	Percent	Number	Percent	
0-100	15	12.2	21	30.9	36	18.8	4
101-200	51	41.5	10	14.7	71	37.2	8
201-300	36	29.3	24	35.3	60	31.4	12
301-400	10	8.1	8	11.8	18	9.4	16
401-500	0	0	0	0	0	0	20
501-600	1	.8	2	2.9	3	1.6	24
601-700	1	.8	0	0	1	.5	28
701-800	2	1.6	0	0	2	1.0	32
801-900	1	.8	3	4.4	4	2.1	36
901-1000	0	0	0	0	0	0	40
>1000	6	4.9	0	0	6	3.1	>44

Mean Distance in Miles	255.1	218.6	242.1
Mean Travel Time in Hours	10.2	8.7	9.7

Table 23

Locations of Mobile Training Teams,  
and Numbers of Units Supported by Each

Location of Mobile Training Team	Number of Armor Units	Number of Cavalry Units	All Units	
			Number	Percent
Fort Benning, GA	0	1	1	0.6
Fort Bragg, NC	3	1	4	2
Fort Carson, CO	12	3	15	9
Fort Devins, MA	9	1	10	6
Fort Dix, NJ	3	0	3	2
Fort Douglas, UT	4	12	16	10
Fort Gillem, GA	3	1	4	2
Huntsville, AL	3	1	4	2
Fort Hood, TX	9	0	9	5
Fort Jackson, SC	3	0	3	2
Fort Knox, KY	13	15	28	17
Fort Lewis, WA	4	5	9	5
Fort Ord, CA	1	3	4	2
Redstone, AL	10	4	14	8
Fort Riley, KA	6	2	8	5
Fort Sam Houston, TX	18	3	21	13
Fort Snelling, MN	0	1	1	0.6
St. Paul, MN	2	1	3	2
Selfridge AB, MI	3	1	4	2
Fort Sill, OK	0	2	3	1
Yakama Firing Center, WA	3	0	3	2
<b>TOTALS</b>	<b>109</b>	<b>57</b>	<b>166</b>	<b>99.0</b>

Table 24

Distances and Travel Times Between  
Mobile Training Team Sites and National  
Guard Units

Distance to National Guard Units	Armor (N=109)		Cavalry (N=57)		All Units (N=166)		Estimated Travel Time in Hours
	Number	Percent	Number	Percent	Number	Percent	
0-100	26	24.0	5	9.0	31	19.0	2
101-200	21	19.3	17	30.0	38	23.0	4
201-300	25	23.0	7	12.2	33	20.0	6
301-400	11	10.0	16	28.1	27	16.3	8
401-500	0	0	3	5.3	3	2.0	10
501-600	5	5.0	4	7.0	9	5.4	12
601-700	1	1.0	2	4.0	3	2.0	14
701-800	8	7.3	3	5.3	11	7.0	16
801-900	6	6.0	0	0	6	4.0	18
>900	6	6.0	0	0	6	4.0	>22

Mean Distance in Miles	321.5	304.3	315.6
Mean Travel Time in Hours	6.4	6.1	6.3

not materially affect proficiency or readiness. To the extent that new training can be made usable at armories though, the interests of most units, and especially the 20 to 30 percent that travel more than 100 miles to WETS and subcaliber ranges, would seem well served.

The distance between the unit's and the Mobile Training Team's location is, in 60 percent of the cases, greater than 200 miles. This seems somewhat excessive. Plans for new training therefore probably should not include heavy reliance on Mobile Training Teams for delivering instruction.

As was the case with the locations of WETS and ATS, a relatively small number of Mobile Training Teams serves a relatively large number of National Guard units. (One-half the units are supported by Mobile Training Teams in four of 21 locations.) Initial reactions to such "lopsided" proportions of supported units to supporting units or sites are to recommend:

- . "Leveling" the proportions; that is, re-routing some units from heavily used to less-used units or sites.
- . Abandoning completely the less-used units or sites in favor of the heavily used one.

Either recommendation would be premature however, since the low-use sites serve functions other than supporting the National Guard, and the capability of the heavily used sites to accommodate additional activities is unknown.

## AMOUNTS AND KINDS OF PRACTICE

Multiple Unit Training Assemblies (MUTA), subcaliber firing, and service practice (live, main gun) firing are the main vehicles for "hands-on" practice in Armor and Cavalry National Guard units. To the extent that proficiency or readiness is affected by amounts and kinds of practice, descriptive data on MUTA, subcaliber, and service firing seem important. The survey elicited information on:

- . Number of MUTA held at WETS.
- . Number of MUTA held at armories.
- . Number of times subcaliber firing was performed.
- . Number of times service practice firing was performed.
- . Frequency of firing various gunnery tables at service practice ranges.

### NUMBERS OF MUTA HELD AT WETS AND AT ARMORIES (ITEMS 18 AND 19)

Tables 25 and 26 summarize the data on frequency and locations of MUTA held by the units during the last year. The mean number of MUTA for all responding units was 12.1. Slightly less than half (5.8) of the MUTA were held at WETS, and slightly more than half (6.3) at armories. Notice however that some units reported having no MUTA at WETS during the past year, and others reported having no MUTA at their armories. The main determiners of where MUTA are held probably are distance and availability: MUTA are more likely to be held at WETS if the WETS is near to the armory and available, than if the WETS is far from the armory, unavailable, or both.

Table 25

#### Numbers of MUTA at WETS<sup>\*</sup>

MUTA at WETS	Armor (N=130)	Cavalry (N=70)	All Units (N=200)
Number	772	377	1149
Range	0-10	0-12	0-12
Mean	5.9	5.4	5.8

<sup>\*</sup>Two Armor and five Cavalry units reported having no MUTA at WETS during the last training year. Another Armor unit did not respond to this item.

Table 26  
 Numbers of MUTA at Armories\*

MUTA at Armory	Armor (N=130)	Cavalry (N=70)	All Units (N=200)
Number	811	448	1259
Range	2-12	0-12	0-12
Mean	6.2	6.4	6.3

\* Four Cavalry units reported having no MUTA at armory during the last training year. One Armor unit did not respond to this item.

FREQUENCY OF SUBCALIBER FIRING (ITEM 21)

Frequency of subcaliber firing by Armor units and Cavalry units is summarized in Table 27, where it can be seen that 95 percent of the units fired subcaliber at least once during the past year.

Table 27  
 Frequency of Subcaliber Firing

Number of Firings	Armor		Cavalry		All Units	
	Number	Percent	Number	Percent	Number	Percent
0	6	4.6	2	2.9	8	4.0
1	95	72.5	52	74.3	147	73.1
2	19	14.5	6	8.6	25	12.4
3	3	2.3	8	11.4	11	5.5
4	3	2.3	1	1.4	4	2.0
5	5	3.8	1	1.4	6	3.0
TOTALS	131	100.0	70	100.0	201	100.0

FREQUENCY AND KINDS OF SERVICE PRACTICE  
FIRING (ITEMS 23 AND 25)

Frequency of service practice firing by Armor units and Cavalry units is summarized in Table 28, where it can be seen that 95.5 percent of the responding units fired service practice last year. (One Armor unit did not respond to the item about frequency of service practice firing.)

Table 28

Frequency of Service Practice Firing

Number of Firings	Armor		Cavalry		All Units	
	Number	Percent	Number	Percent	Number	Percent
0	7	5.4	2	2.9	9	4.5
1	101	77.7	55	78.6	156	78.0
2	12	9.2	3	4.3	15	7.5
3	1	0.8	8	11.4	9	4.5
4	9	6.9	2	2.9	11	5.5
TOTALS	130	100.0	70	100.1	200	100.0

The numbers of units firing each service table and various combinations of tables are shown in Table 29, where it can be seen that 189 (96 percent) of the 198 responding units fired at least one service table during the past year. Only 54 percent of the responding units (106 of 198) met the minimum FORSCOM requirement for firing Tables IV, V, and VI. These units included 43 Cavalry units (63 percent of 69 reporting), and 63 Armor units (49 percent of 129 reporting). Eighteen of the units meeting the minimal requirement also fired Tables VII and VIII.

Table 29  
 Numbers of Units Firing Various  
 Gunnery Tables

Gunnery Tables	Number of Armor Units	Number of Cavalry Units	All Units	
			Number	Percent
None	7	2	9	4.5
IV	10	7	17	8.6
IV, V	37	12	49	24.7
IV, V, VI	38	25	63	31.8
IV, V, VI, VII	9	14	23	11.6
IV, V, VI, VII, VIII	3	2	5	2.5
IV, V, VI, VII, VIII, IX	13	0	13	6.6
IV, VI	0	1	1	0.5
IV, V, VI, IX	0	2	2	1.0
IV, VI, IX	3	0	3	1.5
V	0	1	1	0.5
V, VI, VII	0	1	1	0.5
V, VII	3	0	3	1.5
VI, IX	1	0	1	0.5
VII, VIII	0	1	1	0.5
IX	5	1	6	3.0
<b>TOTALS</b>	<b>129</b>	<b>69</b>	<b>198</b>	<b>99.8</b>

## DISCUSSION

The reporting units averaged six MUTA per year at WETS and six at armories, with some units reporting that all of their MUTA were held at armories. The desirability of decreasing reliance on real estate, and of developing new training that is deliverable at armories seems apparent.

Nearly all units (95 percent) fired subcaliber last year. Over two-thirds of the units had to travel more than five miles to fire subcaliber, suggesting that subcaliber devices are not plentiful at armories. The inclination to recommend increased use of subcaliber devices at armories must be tempered by the reservation that little is known about their effectiveness.

Nearly all units (96 percent) fired service practice last year, but only 54 percent met the minimum FORSCOM requirement for firing Tables IV, V, VI. Finding an explanation for this shortfall is not easy. Most units do not have to travel very far to WETS and ATS (see Tables 17 and 19); and all units reported having access to the means for firing Tables IV, V, and VI, at least at ATS. A possible explanation is that there are no differential consequences associated with meeting and not meeting the minimal requirements; that is, the FORSCOM regulation simply has no teeth. In addition, a conflict may exist between the FORSCOM regulation and recent TRADOC guidance that says training needs will be determined by unit commanders. A question naturally arises as to what happens when training needs as perceived by unit commanders differ from "training needs" that would lead to firing Tables IV, V, and VI. The answer may be that the FORSCOM regulation gets ignored. The need then seems to be not only for increased uniformity and precision in defining what is expected of National Guard units, but also for attaching differential consequences to meeting and not meeting the expectations.

## SUPPORT AVAILABILITY

A unit's proficiency or readiness may be affected by the availability of supporting materials and services for training. Provision was therefore made in the survey for eliciting information on:

- . Which gunnery tables can be fired at each unit's service practice location.
- . Locations and distances of units' TASO.
- . Frequency of visits to units by Mobile Training Teams.
- . Numbers and kinds of training devices at armories and WETS.

### GUNNERY TABLES AVAILABLE (ITEM 26)

All of the 189 units which went to Annual Training during the past year reported that the available service firing ranges were adequate to meet the minimum FORSCOM requirements for firing Tables IV, V, and VI. The numbers of units that had access to various gunnery tables are shown in Table 30.

Table 30

#### Availability of Gunnery Tables to Units Attending ATS

Tables Available at ATS	Number of Armor Units	Number of Cavalry Units	All Units	
			Number	Percent
IV thru IX	82	30	112	59.3
IV thru VIII	25	11	36	19.0
IV thru VII	9	25	34	18.0
IV thru VI	6	1	7	3.7
TOTALS	122	67	189	100.0

#### LOCATIONS AND DISTANCES OF UNITS' TASO (ITEM 32)

The locations of TASO and the number of units supported by each are shown in Table 31, where it can be seen that about a third (31 percent) of the 201 units are supported by TASO at three locations: Fort Hood, Texas; Fort Lewis, Washington; and Fort McClelland, Alabama.

Distances to TASO are summarized in Table 32. Eighty-three percent of the Armor units and 53 percent of the Cavalry units traveled 200 or fewer miles to their supporting TASO. The travel times in Table 32 are rough estimates, reflecting a maximum of 50 miles per hour for wheeled vehicles.

#### FREQUENCY OF MOBILE TRAINING TEAM VISITS (ITEM 34)

The frequency of visits by Mobile Training Teams to the Armor and Cavalry units during the past year is summarized in Table 33. Forty-two of the 184 reporting units (23 percent) indicated that no visits had been made by the Mobile Training Team. Many of the 17 units not accounted for in Table 33 responded "N/A" to this item. Determinations of whether "N/A" meant that no visits were made or that the unit had no Mobile Training Team associated with it could not be made. In either event, these 17 units probably received no visits. If so, then a total of 59 of the 201 canvassed units (29 percent) receive no visits. The remaining 71 percent received from 1 to 14 visits, with a mode of 2 for both Armor and Cavalry.

#### NUMBERS AND KINDS OF TRAINING DEVICES AT ARMORIES AND WETS (ITEM 35)

The numbers and kinds of training devices at the armories and WETS of 194 responding units are shown in Table 34. Three Armor and four Cavalry units reported having no gunnery training devices at their Armories or WETS. The responding units have 104 laser and 99 subcaliber devices (79 caliber 22 inbore, 13 caliber 22 exterior, and seven caliber 50 inbore devices).

Table 31

Locations of TASO, and Numbers  
of Units Supported by Each

Location of TASO	Number of Armor Units	Number of Cavalry Units	All Units	
			Number	Percent
Fort Benjamin Harrison, IN	3	2	5	2.5
Fort Bragg, NC	6	1	7	3.5
Fort Buchanan, PR	0	1	1	0.5
Fort Campbell, KY	12	1	13	6.5
Fort Carson, CO	2	6	8	4.0
Fort Chaffee, AR	0	1	1	0.5
Fort Devins, MA	9	3	12	6.0
Fort Dix, NJ	12	2	14	7.0
Fort Drum, NY	6	0	6	3.0
Fort Gordon, GA	0	1	1	0.5
Fort Hood, TX	18	3	21	10.4
Indiantown Gap, PA	3	3	6	3.0
Fort Johnson, SC	6	1	7	3.5
Fort Knox, KY	3	9	12	6.0
Fort Lewis, WA	9	11	20	10.0
Fort McArthur, CA	9	3	12	6.0
Fort McClelland, AL	16	5	21	10.4
Camp McCoy, WI	6	4	10	5.0
Fort Meade, MD	1	4	5	2.5
Fort Ord, CA	4	3	7	3.5
Fort Riley, KA	3	1	4	2.0
Fort Rucker, AL	3	0	3	1.5
Fort Sill, OK	0	1	1	0.5
Fort Stewart, GA	0	1	1	0.5
Fort Wadsworth, NY	0	3	3	1.5
TOTALS	131	70	201	100.3

Table 32

## Distances and Travel Times to TASO

Distance to TASO in Miles	Armor (N=131)		Cavalry (N=70)		All Units (N=201)		Estimated Travel Time in Hours
	Number	Percent	Number	Percent	Number	Percent	
0-50	33	25.2	17	24.3	50	24.9	1
51-100	33	25.2	9	12.9	42	20.9	2
101-150	27	20.6	6	8.6	33	16.4	3
151-200	15	11.5	5	7.1	20	10.0	4
201-250	10	7.6	6	8.6	16	8.0	5
251-300	4	3.1	2	2.9	6	3.0	6
301-350	3	2.3	5	7.1	8	4.0	7
351-400	3	2.3	10	14.3	13	6.5	8
401-450	0	0	0	0	0	0	9
451-500	0	0	2	2.9	2	1.0	10
501-550	2	0.2	2	2.9	4	2.0	11
551-600	0	0	0	0	0	0	12
>600	1	0.7	6	8.6	7	3.5	>12

Mean Distance in Miles	123.8	234.9	162.5
Mean Travel Time in Hours	2.5	4.7	3.2

Table 33

Frequency of Visits by Mobile  
Training Teams

Number of Visits During Past Year	Armor		Cavalry		All Units	
	Number	Percent	Number	Percent	Number	Percent
0	31	25.0	11	18.3	42	22.8
1	17	13.7	1	1.7	18	9.8
2	22	17.7	14	23.3	36	19.6
3	15	12.1	7	11.7	22	12.0
4	10	8.1	6	10.0	16	8.7
5	1	0.8	5	8.3	6	3.3
6	5	4.0	9	15.0	14	7.6
7	4	3.2	0	0	4	2.2
8	15	12.1	0	0	15	8.2
9	3	2.4	4	6.7	7	3.8
10	0	0	1	1.7	1	0.5
11	0	0	0	0	0	0
12	1	0.8	1	1.7	2	1.1
13	0	0	0	0	0	0
14	0	0	1	1.7	1	0.5
<b>TOTALS</b>	124	99.9	60	100.1	184	100.1

Table 34

Numbers and Kinds of Training  
Devices at Armories and WETS

Device	Armor			Cavalry		
	Armory	WETS	Total	Armory	WETS	Total
Laser Gun Firing Device 17-33	24	9	33	8	3	11
Laser M55 (Late Version 17-33)	26	20	46	13	3	16
Stout Device (Tgt. Board for M55) 17-94	9	6	15	9	3	12
SIMFIRE SM56	0	0	0	0	0	0
C of F Gunnery Trainer (Green Hornet) 17-4	31	5	36	0	3	3
BOT Trainer 17-4M	31	4	35	2	0	2
BOT Trainer (Slides and Laser) 17-B4	6	0	6	0	0	0
Tank Gunnery Trainer 90mm 17-40	3	4	7	0	0	0
Tank Gunnery Trainer 90mm 17-41	0	0	0	0	0	0
Tank Gunnery Trainer 105mm 17-42	1	0	1	0	0	0
Telefare Device Cal. 50 M2 (Exterior) 17-88	1	0	1	5	0	5
Subcaliber Device Cal. 22 (Inbore) 17-53	36	12	48	24	7	31
Subcaliber Device Cal .22 (Exterior) 17-85	0	13	13	0	0	0
Snakeboard	17	0	17	0	0	0
Track Vehicle Driver Trainer M60 17-45	3	0	3	1	1	2
Bessler CUE/SEE for TEC lessons Cal. 50 (Inbore)	195	65	260	73	8	81
Azimuth Indicator 17-21	6	0	6	2	0	2
BOT Transparency 17-25	1	0	1	0	0	0
Boresight & Zero Procedure 90mm	1	0	1	0	0	0
Turret Training M48A1 17-20	0	0	0	1	0	1
Tank & Azimuth Indicator -Simulator 17-10	3	0	3	1	0	1
Tank Turret Trainer 17-7	0	0	0	1	0	1
Sony TV Rover	5	0	5	1	0	1
Sony TV Reel to Reel	1	0	1	0	0	0

## DISCUSSION

The data on support availability indicate that all units have access to the means for meeting the minimum FORSCOM requirements (that is, for firing Tables IV, V, and VI), and that nearly all units (96 percent of 194 reporting) have laser devices, subcaliber devices, or both. Thus any new training that incorporates firing subcaliber and firing service practice through Table VI would seem compatible with the resources available to nearly all units.

Plans for new training probably should not include central roles for TASO and Mobile Training Teams in delivering instruction. About 30 percent of the units reported no visits from Mobile Training Teams last year; and the distance of TASO from Cavalry units (greater than 200 miles in 47 percent of the cases) would seem to make effective interaction difficult.

## IMPLICATIONS

Review of the survey data suggests several implications for designing and delivering new training for Armor and Cavalry National Guard Units:

1. Efforts to improve precision in defining, measuring, and reporting "qualification" should be continued. Without such efforts, determining proficiency or readiness levels and designing efficient training will continue to be very elusive goals. Once policy makers are confident in the quality of the data on which "qualification" is based, consideration should be given to designing and implementing means for attaching differential consequences to meeting and not meeting minimal qualification requirements.
2. Consideration should be given to having at least one tank at each armory. All units responding to the survey indicated having some access to tanks, at armories, at WETS, or at ATS. But considerable variations in ease of access were noted. The findings that nearly half of the units reported having no tanks at their armories, that units average only about six MUTA per year at WETS, and that some units have no MUTA at WETS suggest that units with limited access to tanks may not get sufficient practice to maintain desired proficiency levels.
3. New training for the M48A5 should:
  - A. Be deliverable, as much as possible, at armories.
  - B. Capitalize on similarities between M48A5 tasks and M48A1/A2 tasks. The use of pre-tests to determine areas of mastery and deficiency is appropriate.
  - C. Incorporate increased use of subcaliber devices at armories. User resistance to subcaliber devices probably will not be great, since nearly all units have subcaliber devices, laser devices, or both at their armories; and nearly all units reported having fired subcaliber at least once last year. Any recommendation for using subcaliber devices, however, must be tempered by the reservation that little is known about their effectiveness.
  - D. Not include central roles for TASO and Mobile Training Teams in delivering instruction. The distances to armories from TASO and Mobile Training Teams is excessive in many cases, and the frequency of visits by Mobile Training Teams to many units is not great.

APPENDIXES

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Page

Appendix

- A. Discussion of Reserve Component Problems<sup>1</sup>  
[from Boldovici, J.A. Proposal for Tank  
Systems Skills and Training Structure.  
HumRRO: Alexandria, Virginia: 1975] 44
  
- B. Summary of Studies of Reserve Component  
Problems [from Boldovici, J.A. and Osborn,  
W.C. Response to Technical Questions re.  
HumRRO's Response to RFQ 19-76-Q-0001,  
("Tank Systems Skills and Training Structure").  
HumRRO: Alexandria, Virginia: 1976.] 46
  
- C. Letters of Inquiry and List of Survey  
Questions for Armor and Cavalry National  
Guard Units. 51

<sup>1</sup>The author is grateful for the assistance of Mr. Jack Reeves,  
Chief, Audio-Visual Branch, TASO, Fort Knox, who wrote the  
first draft of this discussion while he was with HumRRO.

## Appendix A

### DISCUSSION OF RESERVE COMPONENT PROBLEMS

National Guard units maintain the reserve armor force of the nation. Over 20 states have National Guard tank battalions in their military force. The tank battalions have representatives of the entire gamut of tanks in their inventory, beginning with the M48A1. Many of the Guard units had M60 tanks, but lost them when they were given to the Israeli Army during the 1974 War. Some high priority Guard units were able to retain a few M60 tanks, with hopes of acquiring the M60A1 in the near future. Other units were compelled to use the M48 series tanks and hoped to be given the M60 tank later. Neither of these hopes seems likely to materialize in the near future. A plan is underway to issue units equipped with the M48A1 and A2 series tanks the new M48A5 tank. Priority units which have the M60 tank will receive additional M60 or M60A1 tanks. As a result of these plans, new training programs must be developed for National Guard units that receive the M48A5 tank.

The training problems faced by the Reserve and the National Guard are in many respects identical to those that confront active Army units. But in training the citizen soldier, the problems are compounded by greater personnel turbulence, and unavailability of equipment, training sites, training devices, and supplemental instructional materials. The Guard nevertheless is required to achieve training and readiness standards almost comparable to those of active Army units.

The Guard has 48, 4-hour drill periods per year. All personnel also are required to attend 2 weeks of active duty training (ADT) per year. The time allocated for reserve training is considerably less than that of active Army units.

Personnel turbulence also presents problems for reserve training. Many of the Guardsmen who were drafted or entered service during the Vietnam build-up will have completed their 8-year commitment and will be leaving Reserve and National Guard units. Some experienced personnel will remain, but a large influx of new recruits soon will appear. The new personnel will require training not only on new equipment, but also on the complete array of military subjects. Another problem here is in the frequent redesignation of units. Units which have been designated infantry or some other branch of service frequently are redesignated to meet changing military priorities and needs. Several infantry battalions have in the past been expected to become tankers almost overnight. This type of change requires flexible transition-training programs. Redesignation from infantry to armor also creates morale problems: Infantrymen, who for years have been trained to kill tanks and are indoctrinated to believe that tanks are the most vulnerable targets on the battlefield, suddenly become tankers.

One of the more serious problems in the Guard is the unavailability of operational equipment. Few tank battalions have their full complement of tanks at home station. Instead, equipment pools are spread throughout various locations in the nation. To keep these vehicles running, each tank battalion is supported by a permanent force of mechanics. The mechanics are full time civil service employees who also are normally members of the Guard unit during drills. To move personnel to remote locations to conduct training on weekends is time consuming and expensive. Consequently, most units do not receive "hands-on" training until they arrive at summer camp for their ADT. The conduct of training at home station without equipment requires ingenuity on the part of unit commanders. Some units have taken one or two tanks and relocated them near or in the armory itself. Others have developed training devices to meet their training needs. But most units continue to rely heavily on lecture-based classroom instruction.

As noted earlier, "hands-on" training is normally conducted at large military installations or reserve training sites. In most units, tank firing ranges are not available for firing on weekends. Some units are more fortunate. The 123rd Armor National Guard, for example, is close to Fort Knox, and the 112th is close to Fort Hood, and thus have access to realistic training environments and equipment. In other units commanders have had subcaliber firing ranges constructed, have fabricated terrain tables, and have composed complexes for map maneuvers to conduct field training exercises and command post exercises. Crew training in these units probably is not as effective as it is in the units that attend installations and training sites. But individual training can be extremely effective without operational equipment, especially for junior enlisted grades who require training to master basic skills and knowledge.

Finally, and perhaps the most puzzling of the problems associated with reserve training is the limited use of available programs, materials, methods, and devices. The U.S. Army is a repository of a vast array of potential means for accomplishing the objectives of armor training. We do not know whether failure to capitalize on these means is attributable mainly to their unresponsiveness to training needs as perceived by unit commanders, to limited knowledge on the part of commanders with respect to what is available, to high cost or "red tape" involved in accessing the means of training, or to attitudinal or other factors.

## Appendix B

### STUDIES OF RESERVE COMPONENT PROBLEMS

Our brief summary of Reserve Component training problems (pp. 3.24-3.26 of the proposal) was based on informal telephone and face-to-face interviews with personnel who currently are active in Reserve Component training and evaluation. Respondents included Reserve Component Commanders, and members of the Armor Evaluation Field Test Team.<sup>1</sup> The summary, which was drafted by a HumRRO employee who is a Reserve Major and an active member of the Armor Evaluation Field Test Team, noted the following problems:

- . Limited training time.
- . Personnel turbulence, due to the influx of new personnel, and to frequent redesignation of Reserve Component units.
- . Morale problems.
- . Unavailability of operational equipment.
- . Maintenance of Reserve Component equipment by civilians.
- . Reliance on lecture-based instruction.
- . Limited availability of training sites for conducting map maneuvers, field training exercises, and command post exercises.
- . Unavailability of training devices and supplemental instructional materials.
- . Limited use of available programs, materials, methods, and devices by Reserve Components, as the possible results of:
  1. Unresponsiveness to training needs as perceived by unit commanders.
  2. Limited knowledge on the part of commanders with respect to what is available.
  3. High cost or "red tape" associated with accessing the means for training.
  4. Attitudinal and other considerations.

Our discussion of Reserve Component problems, inasmuch as it emphasized training and excluded problems of deployment, organization, and force utilization, was by no means exhaustive. It does, however, seem totally consistent with the results of "broader-brush" studies of Reserve Component problems, including studies by:

<sup>1</sup>The Armor Evaluation Field Test Team is a unit (under the Military Testing Command) of the 100th Division, U.S. Army Reserves. The unit is responsible for administering ATTs, FTXs, ARTEPs, CPXs, and MAPs to National Guard and U.S. Army Reserve units in a four-state mid-west area.

- . HumRRO.
- . The Board for Dynamic Training.
- . The Williamson Study.
- . The Office of Secretary of Defense.
- . The Strategic Studies Institute.
- . Research Analysis Corporation.
- . The American Institutes for Research, and Litton Systems, Inc.

#### HUMRRO

Work Unit SHOCKACTION III (1958) may have been the "granddaddy" of studies to identify training strengths and weaknesses in the National Guard, U.S. Army Reserve, and the Active Army.

The Armor Proficiency Test, a 198-item paper-and-pencil test, was administered to more than 5,000 armor personnel at five levels of training and experience:

- . Armor personnel with no armor training.
- . Armor personnel with eight weeks of Advanced Individual Armor Training.
- . Tank crew personnel in TOE armor organizations within the continental United States.
- . Tank crew personnel maintained at "combat-ready" status in Europe.
- . Tank crew personnel from National Guard and U.S. Army Reserve armor units.

Information was obtained on aptitude, crew assignment, enlisted rank, previous training and experience in armor, and combat experience of the individuals tested. Information also was obtained from the unit commander or Army advisor, or both, at each of the reserve units on strength, training status, and problems.

#### BOARD FOR DYNAMIC TRAINING

The Board for Dynamic Training, which led to the creation of CATB, convened from September to December 1971 under GEN Westmoreland, concluding that Reserve Component training was less effective than Active Army training. Problems in Reserve Component training, as specified by the Board, included:

- . Limited time for training and supporting activities.
- . Time lag in assimilating new doctrine.
- . Difficulty in obtaining MOS qualification.
- . Obsolete equipment.
- . Lack of support (administrative, material) for use of new equipment.
- . Preoccupation with equipment maintenance (to the detriment of proficiency maintenance).

- . Personnel turnover.
- . ATT fixation (because greater rewards for Unit Commanders are associated with ATT performance than with individual MOS proficiency).
- . Inadequate training facilities.
- . Lack of flexibility for Unit Commanders in specifying training objectives.
- . Lack of Active Army support.
- . Inadequate instructor preparation.
- . Over-emphasis of administrative functions.
- . Mandatory instruction in subjects that are not mission-related.

#### THE WILLIAMSON STUDY

MG Ellis T. Williamson headed a committee to identify problems and recommend solutions in Reserve Component Training. Most of the results of this study were classified SECRET, so cannot be presented here. It is well known, however, that the study identified areas for later investigation by the Office of the Secretary of Defense.

#### OFFICE OF THE SECRETARY OF DEFENSE

The Office of the Secretary of Defense directed several studies aimed at improving the readiness of Reserve Components. Major findings included:

- . Reduction of post-mobilization training time from ten to six weeks produced intolerable deficiencies in units' capabilities to perform TOE missions.
- . An attempt to increase Reserve Component unit proficiency by closer association with Active Army forces (using the Mobile Training Team concept) was unsuccessful.
- . When an Active Army battalion was augmented by the addition of a Reserve company, the battalion failed its ATT due to deficiencies in the Reserve unit's performance.

## STRATEGIC STUDIES INSTITUTE

The Strategic Studies Institute, under the auspices of the DCS for Military Operations, identified problems in Guard and Reserve Forces training, and made short- and long-term action recommendations.

Short-term recommendations included:

- . Increase the use of civilian skills in Reserve and Guard Units.
- . Reduce administrative and logistical requirements.
- . Redistribute equipment for easier access by high priority units.
- . Exploit available training resources; e.g., USAR Schools, Service Schools, and Mobile Training Teams.
- . Increase materiel support to Reserve and National Guard by the Active Army.
- . Increase the specificity of training plans for Reserve Component units developed by CONARC (FORSCOM).
- . Increase manning and training of high priority units at the expense of lower priority units.

SSI also reviewed the last five mobilizations of Reserve Component forces, concluding that these were "marginally effective" because of:

- . Inexperienced personnel.
- . Lack of training equipment.
- . Inadequate training sites.
- . Organizational complexity.

Finally, SSI noted the absence of specific and valid operational readiness criteria, and recommended studying the Air Force Operational Readiness inspection for implications relevant to the evaluation of Reserve Component units.

## RESEARCH ANALYSIS CORPORATION

In anticipation of problems associated with an all-volunteer Army, DA funded research by Research Analysis Corporation to recommend incentives for acquiring and retaining Reserve Component personnel. Economic incentives (e.g., better retirement benefits and proficiency pay for key MOSs) were suggested, as were non-economic incentives (e.g., more freedom of choice in personal appearance, and greater use of civilian skills). We do not know whether the recommendations were implemented, but suspect that because of recessive economic conditions outside the military, problems in recruiting and retaining personnel proved not to be as severe as originally anticipated.

AMERICAN INSTITUTES FOR RESEARCH AND LITTON MELLONICS

The U.S. Army Research Institute awarded a contract to the American Institutes for Research, with a sub-contract to Litton Systems, Inc., for work entitled, "Development of Appropriate Training System for Reserve Component Personnel and Units." Visits and discussions with Army personnel were used to identify the following problems:

- . Inadequate armory facilities.
- . Inadequate equipment.
- . Inadequate weekend training sites.
- . Inadequate support from higher headquarters.
- . Failure of Reserve Component units to use training means available through the USAR School System, the Service Schools, and the Army Correspondence Course Program.
- . Training planning and training management problems.
- . Administrative overload.
- . Performance evaluation problems.

The solutions to many of the problems noted above must be drastic and administrative. The transfer of readiness evaluation functions from the hands of personnel with vested interests in high scores to independent evaluation agencies, for example, might increase the accuracy of information on "where we are" with respect to Reserve Component proficiency and readiness. Such solutions obviously are outside the scope of the present project. As noted in our proposal, though, many of the problems are amenable to solution via intelligent application of modern instructional technology. To the extent that the training designed during the present project is made self-paced, individualized, and "exportable," for example, reliance on operational equipment and real estate will decrease, as will problems associated with the vagaries of instructor expertise. And to the extent that identifying skill communalities within and across tank systems will eliminate redundancies and provide orderly instructional sequences, training efficiency will increase.

HUMAN RESOURCES RESEARCH ORGANIZATION

WESTERN DIVISION

Fort Knox Office

Appendix C

P.O. Box 293  
Fort Knox, Kentucky 40121  
(502) 624-5618

LETTERS OF INQUIRY AND LIST OF  
SURVEY QUESTIONS FOR ARMOR  
AND CAVALRY NATIONAL GUARD UNITS

Dear Sir:

The purpose of this letter is to request your assistance in a project that the Human Resources Research Organization (HumRRO) is conducting under contract to the U.S. Army Research Institute. The title of the project is "Tank Systems Skills and Training Structure."

A major part of the project is to:

"Develop a training structure (or alternate training structure), including enabling objectives, qualification scoring and standards, and an optimal media/device mix for M48A5 crew and individual training for reserve component units."

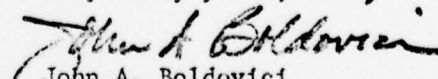
One step in achieving this objective is to gather basic data on Armor/Cavalry units.

We would very much appreciate your efforts to supply us with the information requested in the enclosures. The data forms are arranged so that one person (for example the training officer) can supply the information for each Armor company or Cavalry troop in the state. If answers to any question are not available, the column should be left blank. We are anxious to collect as much current information as possible on Armor companies and Cavalry troops. Therefore, please return the enclosures with as much of the requested information as possible in the self-addressed envelope by 26 November 1976.

If you have any questions about this request, our project, or if I can assist you in any way, please call. Our AUTOVON number is 464-5618 or 464-8113.

Thank you.

Very truly yours,

  
John A. Boldovici  
Project Director

HUMAN RESOURCES RESEARCH ORGANIZATION

WESTERN DIVISION

Fort Knox Office

P.O. Box 293  
Fort Knox, Kentucky 40121  
(502) 624-5618

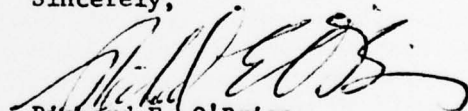
22 November 1976

Dear Sir:

We sent you a request on 30 October for information on Armor training in your state. The request was sent by mistake before we had coordinated the request with the National Guard Bureau. We have now coordinated with the Bureau and received their permission to work directly with each state that has Armor units. (LTC Long, AUTOVON 227-5217, NGB Action Officer).

We would appreciate your cooperation in providing the data by 31 December 1976. If the request and data forms have been thrown away, please call us, and we will send another set. Our AUTOVON no. is 454-8113.

Sincerely,



Richard E. O'Brien  
Administrative Associate

REO/gls

RESERVE UNIT DATA-ARMOR/CAVALRY

(Note: The information requested concerns the following vehicles: M551, M41, M48 series tanks and M60 series tanks. Please do not include information on M113, M114, M88 or other tracked vehicles)

1. What is the unit's designation? (Please confirm or correct entry)
2. Where is the unit located? (Please confirm or correct entry)
3. When was the unit activated as an Armor company or Cavalry troop? (Year)
4. How many and what kinds of tank are at the unit's armory? (Please enter the quantity for each kind of tank, for example, 1 M48A1, 1 M60A1)
5. When did armory receive the current tanks? (Please enter the year for each type of tank)
6. What was previous tank at the armory?
7. How many and what kinds of tanks are available for crew use at the unit's Weekend Training Site? (Please enter the quantity for each kind of tank)
8. When did Weekend Training Site receive current tanks? (Please enter the year for each type of tank)
9. What was previous tank used at the Weekend Training Site?
10. How many and what kinds of tank were issued to unit at its Annual Training Site? (Please enter the quantity for each kind of tank.)
11. How many years has unit trained on current tanks at Annual Training Site?
12. What was previous tank used during the Annual Training?
13. What changes in type of tank are anticipated? (Please enter location, type of expected tank, and projected date of change -- for example, Armory, M48A5, Mar 77 -- please include information for all 3 locations)
14. What percentage of tank crewmen are Armor MOS qualified?
15. Where is higher Division or Brigade/Regiment Headquarters located? (Please confirm or correct entry)
16. What is the unit's Active Unit affiliation? (Please confirm or correct entry)
17. Where is unit's Weekend Training Site?
18. How many Multiple Unit Training Assemblies did unit hold at its Weekend Training Site last year?

19. How many Multiple Unit Training Assemblies did unit hold at its armory last year?
20. Where did unit receive Annual Training last year?
21. How often did unit fire sub-caliber tank tables last year?
22. Where did unit fire sub-caliber tank tables last year?
23. How often did unit fire service practice (live fire) last year?
24. Where did unit fire service practice?
25. What tank tables did unit fire at service practice location?
26. What tank tables are available at service practice location?
27. How many crews are authorized for the unit?
28. How many full crews are on hand?
29. How many crews qualified on gunnery last year?
30. What was unit's Training REDCON last year?
31. What is unit's projected Training REDCON this year?
32. Where is unit's TASO support located?
33. Where are Mobile Training Teams for unit located?
34. How many visits did Mobile Training Team make to unit last year?
35. Which of the training devices listed on page 3 are at the unit's armory or Weekend Training Site? (Please enter the quantity and code number under the column for the location. For example, 1 BOT Trainer (17-4) at the armory and 2 at the Weekend Training Site would be:
 

Armory	WETS
1-B1	2-B1)

Training Devices

<u>Code #</u>	<u>Device</u>	<u>Device #</u>
A1	Laser gun firing trainer	17-33 3A102B
A2	M55 laser (later version of 17-33)	3A110
A3	Stout Device (target board for M55)	FKD 17-29-6
A4	SIMFIRE	XM56
B1	Conduct-of-fire tank gunnery trainer (Green Hornet)	17-4
B2	Burst-On-Target Trainer	17-4M
B3	Burst-On-Target Trainer (slides and laser)	17-B4
C1	Tank gunnery trainer: 90MM	17-40 M20
C2	Tank gunnery trainer: 90MM	17-41 M26
C3	Tank gunnery trainer: 105MM	17-42 M30
D1	Telfare Device (cal. 50 M2 exterior mounted)	
D2	Subcaliber training device, .22 caliber ( <u>in bore</u> device)	17-53
D3	Subcaliber training device, .22 caliber ( <u>exterior mounted</u> device)	
E1	Snake board	
F1	Tracked vehicle driving trainer: M60	17-45 M34
G1	Beseler CUE/SEE for TEC lessons	
	<u>Other Training Devices for Gunnery or Maintenance</u>	
H1	_____	
H2	_____	
H3	_____	