Technical Report 855

Tank Driving Commands Preferred by Armor Noncommissioned Officers

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For this report, researchers surveyed armor noncommissioned officers (NCOs) experienced as tank commanders (TCs) and driving instructors to identify preferred TC commands and driver actions. The results showed consistent preferences for specific commands to control forward movement, but less agreement for pivot and reverse turn commands. One finding suggested that pivot turn commands used with M60-series tanks may be transferred improperly to M1 tanks. Twelve commands were recommended for universal standard use in driver training, and 15 other commands were considered suitable for optional use in more advanced unit training and in standard operating procedures. Most NCOs favored using some standard tank driving commands, agreeing that teamwork between the driver and TC will be increased, thereby reducing driver errors. A majority of the NCOs also agreed that driver training will take more time but that training will be easier to conduct. About 20% of the NCOs were not in favor of adopting standard commands.

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Technical Report 855

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Training and Simulation

FOREWORD

The Army Research Institute for the Behavioral and Social Sciences (ARI) Field Unit at Fort Knox conducts research on armor training and simulation, and on human performance with armor weapon systems. This research examined an aspect of tank crew procedures as a basis for tank driver training and simulation requirements. The research was an initial step to examine the suitability of networked simulation (SIMNET) technologies to support driver training for individual tank crewmen. The SIMNET technologies were developed by the Defense Advanced Research Projects Agency in research on the technology base for large scale interactive combat simulation.

Three ARI reports have resulted from this project. The report recommends standard commands and associated driver actions acceptable to experienced armor noncommissioned officers for use in driving exercises with training devices or actual tanks. A second related report reviews tank driving research and presents prototype exercises requiring performance of basic control skills and a preliminary evaluation of the M1 SIMNET driver station as a training device. An earlier report contains observations on platoon gunnery and maneuver training with SIMNET conducted by U.S. Army Europe units preparing for the 1987 Canadian Army Trophy (CAT) competition (Kraemer & Bessemer, 1987).

The ARI research on tank driving was prompted by a request from the U.S. Army Armor School Directorate of Training and Doctrine to evaluate driver training in SIMNET, supplementing findings of the Concept Evaluation Program test of SIMNET sponsored by the U.S. Army Training and Doctrine Command. The research results and the findings of the report on SIMNET training for CAT contribute to the formulation of requirements for future devices and for device product improvements based on the SIMNET technologies.

The results of this research will be of interest to U.S. Army agencies that are concerned with track vehicle driving; with the development, evaluation, or implementation of driver training devices; or with driving performance research. The results are being used by U.S. Army Armor Center organizations responsible for driver training and related training literature, and for training device developments.

EDGAR M. JOHNSON
Technical Director

TANK DRIVING COMMANDS PREFERRED BY ARMOR NONCOMMISSIONED OFFICERS

EXECUTIVE SUMMARY

Requirement:

The purpose of this research was to identify tank driving commands acceptable to experienced tank commanders (TCs) and driving instructors that can be standardized for use in elementary driving exercises performed with training devices or tanks. Commands to elicit driver responses that control the speed and direction of the tank are needed to define driver training requirements, to evaluate driver training devices, and to conduct research on basic tank driving skills. Research on tank driving was prompted by a request from the U.S. Army Armor School Directorate of Training and Doctrine to evaluate driver training in networked simulators (SIMNET). The research supplements findings of the Concept Evaluation Program test of SIMNET sponsored by the U.S. Army Training and Doctrine Command.

Procedure:

The research was completed in two phases. In the first phase, a questionnaire was developed and administered to noncommissioned officers (NCOs) serving as TCs and tank driving instructors in 19E (M60-series) Basic Armor Training (BAT) at the U.S. Army Armor Center. Questionnaire items asked the NCOs to judge whether each command or the corresponding defined driver action should be (a) used as a standard, (b) not used, or (c) changed in some way. The questionnaire included 38 items on commands and actions, six items on the adoption and use of standard commands, and six items on the NCO's military background and experience. In the second phase of the research, the questionnaire was revised based on earlier results and administered to 71 NCOs at the Armor Center. The NCOs were (a) instructors in 19E BAT, (b) instructors in the 19K (M1 Abrams) BAT, or (c) students in the Advanced Noncommissioned Officer Course at the U.S. Army Armor School.

Findings:

The results showed consensus among NCOs in preferences for specific tank driving commands to control forward movement, but less agreement on pivot and reverse turn commands. One finding suggested that pivot turn commands used with M60-series tanks may be transferred improperly to M1 tanks. Twelve basic commands were recommended for universal standard use in driver training, and 15 other commands were recommended for optional use in more advanced unit training and in unit standard operating procedures. Most of the NCOs in the survey sample favored the use of standard driving commands, agreeing that teamwork between drivers and TCs will be increased, thereby reducing driver errors. A majority of the NCOs also agreed that driver training with standard commands will take more time (viz., the time needed to learn the commands), but that the training will be easier to conduct. About 20 percent of the NCOs had negative opinions about adopting standard commands.

Utilization of Findings:

The results of this research have been provided to Armor Center organizations responsible for entry-level tank driver training and for implementing driver training devices in institutional courses. Recommended driving commands were incorporated in the field manual on training track vehicle drivers. The commands and simple driving maneuvers will be useful in evaluations of device-based driver training and research on skilled driving performance.

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Introduction

This research examined the preferences of noncommissioned officers (NCOs) for driving commands issued by the tank commander (TC) to initiate the driver's execution of simple tank maneuvers. The purpose was to identify a set of driving commands and driver actions that provide valid content for elementary driving exercises conducted either with training devices or tanks. The criterion of content validity used in this research was consensus among experienced TCs and driving instructors who recommended standard commands and actions for official approval and use.

Background

This research was one step in the development of standard tank driving exercises to be used in evaluating the capability of relatively low-cost training devices to support tank driver training in institutional and unit settings. Specifically, the research was aimed at evaluating the feasibility and suitability of using the networked simulator (SIMNET) technologies, developed and demonstrated in a Defense Advanced Research Projects Agencies (DARPA) program on large-scale simulation, in a training device for tank drivers. For a description of the SIMNET system and an overview of the DARPA project, see Kraemer and Bessemer (1987). The Nonsystems Device Branch, New Systems Training Division, Directorate of Training and Doctrine, U.S. Army Armor School (USAARMS), requested an evaluation of driver training in SIMNET to supplement findings of the Concept Evaluation Program test of SIMNET (Gound & Schwab, 1988).

SIMNET provides a technology testbed for the Close Combat Tactical Trainer (CCTT), a networked simulator system being developed by the U.S. Army to provide combined arms collective training for units having close combat or combat support missions. Although SIMNET was designed as a tactical ground combat simulation for unit exercises, each M1 SIMNET crew module partially represents the operator stations in the M1 tank, and can support some individual training. To reduce cost, a concept of "selective fidelity" was used to develop SIMNET. Following this concept, only weapon system components and functions used in combat operations were simulated.

One issue of concern to the proponents for the CCTT, the U.S. Army Armor and Infantry Centers, is how the CCTT should depart from the SIMNET prototype to add features and functions important for individual training or sustainment of individual performance, although these features may not be needed for collective training. Driving exercises with validated content were to be used to address this issue and other driver training issues, such as the effectiveness of SIMNET training, and the difficulties TCs encounter when conducting training using SIMNET.

Additional reasons for validating standard driving commands and actions were contributed by (a) an interest in implementing standard commands expressed by members of a 1st Armor Training Brigade (1ATB) study group charged to upgrade entry-level driver training and later to incorporate device-based driver training in Basic Armor Training (BAT), (b) the usefulness of the commands and actions in detailing simulation and training exercise requirements for other driver training devices, and (c) the potential for reducing high yearly costs reported for tank accidents (Wardell, 1986; U.S. Army Safety Support Center, 1986, 1987a, 1987b), through widespread use of standard commands to improve TC-driver communication and teamwork. The 1ATB study group agreed that some common group of commands should be used and understood by all Armor crewmen. Differences between proper and improper actions in response to these commands also should be readily recognized and defined by experienced TCs.

Approach

Previous tank driving research was reviewed, methods for conducting driving exercises and measuring performance were designed, and prototype exercises were developed (Bessemer, in preparation). The exercises involved basic driving control tasks required to operate steering, braking, and accelerator controls to initiate or modify the speed and direction of tank movement in response to simple commands given by the TC. The specific TC commands and driver actions included in the exercises had been recommended by USAARMS subject matter experts (SMEs) to simulate driver control in an earlier training device development project (Hannaman, 1984; Hannaman, Drucker, and Childs, 1985).

The driving control tasks in the prototype exercises can be performed with a partial driver station given only the minimal sensory input necessary for perception of speed and direction, without reference to particular terrain features, objects, or environmental conditions. The skills needed to perform such tasks can be regarded as subordinate skills or component skill elements contributing to performance of procedures and more complex driving tasks. Exercises limited to basic skills have advantages for training and testing purposes because they allow conditions to be equated and performance to be measured in comparable terms across different devices and tanks.

Performance of procedural tasks (e.g., start the engine) depends on the completeness of the driver station represented in a device, and the ability to represent malfunctions in device or tank. Performance of complex driving tasks (e.g., obstacle crossing) depends on specific terrain features, objects, or other conditions in the environment, simulated or not. In contrast, basic tasks using vehicle control skills primarily depend on the more generic components and functions of a driver trainer (e.g., visual displays, driving controls, and vehicle dynamic response to control settings) that are shared with the tank. This allows

the same tasks to be performed and the same measurements taken on both the training device and tank.

The prototype exercises were tried out in SIMNET by U.S. Army Research Institute (ARI) staff to verify the training and performance measurement procedures. Accurate perception of the speed and direction of tank movement was found to be difficult both from the driver's and the TC's positions in the M1 SIMNET module. Proper execution of the basic tank control tasks and proper evaluation of driver performance in the planned exercises were virtually impossible. Under these conditions, the training and performance measurement procedures proved to be unusable with the prototype exercises. The results of the tryout are presented in detail elsewhere (Bessemer, in preparation). The conclusion that the SIMNET simulation is unsuitable for initial driver training has been confirmed by other findings (Kraemer & Bessemer, 1987; Paris, 1988, Gound & Schwab, 1988).

Rationale

The problems that were encountered in SIMNET driving may have been partly attributed to insufficient on-tank experience for the ARI staff. Additional investigations of the extent and nature of the problems with more experienced tank crewmen were needed to clarify reasons for the results. Plans were made to measure the ability of TCs to judge performance of the basic tank maneuvers and provide accurate performance feedback to the driver. It was not clear, however, that the control tasks in the prototype exercises included the most important TC commands, or that the driver actions corresponding to the commands were properly defined. No official set of tank driving commands and elementary maneuvers were standardized and precisely defined in USAARMS driver task lists or training objectives. The SMEs' earlier recommendations could not be assumed to represent a consensus among Armor Branch NCOs. A broader and more numerous sample of NCOs was needed to determine which commands normally should be used by TCs to control their drivers, and how the drivers should perform the maneuvers. Exercises with validated content could then be used to examine the driving control problems in SIMNET.

The present research was conducted in two phases: A questionnaire on driving commands and driver actions was developed first and tried out with a small sample of NCOs that have experience as TCs and driving instructors. After revision, the questionnaire was then administered to three groups of NCOs with varying backgrounds. Although a representative sample of NCOs from the population of tankers in Career Management Field 19 was not obtained, the differences in questionnaire responses between the groups would show the effects of experience with different types of tanks, and with institutional or unit training settings. If no important differences were found, the consensus among NCOs in the combined sample could be regarded as similar to that in the general population.

Preliminary Survey

Objective

The objective of the first phase of the research was to develop and refine a survey method for validating a content domain for tank driving exercises. The survey was designed to assess the preferences of experienced tank commanders (TCs) for particular driving commands, and their agreement with definitions of the actions associated with each command. A questionnaire based on a preliminary list of driving commands and defined actions was prepared and administered. The results from this preliminary survey were used to determine (a) if some commands and actions should be added to or deleted from the set included in the questionnaire, (b) if some actions should be redefined, and (c) if other revisions of the questionnaire were necessary.

Method

Participants. Ten noncommissioned officers (NCOs) serving as M60A3 TCs and driving instructors in 19E Basic Armor Training (BAT) responded in the preliminary survey. Table 1 summarizes personnel and background characteristics for these NCOs. One was a holdover BAT student, with brief experience as a TC and driving instructor. In the two-week period before the survey, the NCOs conducted tryouts of an expanded BAT program of instruction for tank driving. Common problems encountered in driver training and in the performance of BAT student drivers therefore were expected to be relatively fresh in the these instructors' memories.

Questionnaire Development. Tank driving commands and their associated actions were compiled from a number of sources. The largest number of commands and actions were recommended by U.S. Army Armor School subject matter experts for use in the automated voice recognition system controlling simulated tanks in the Simulation for Combined Arms Training (SIMCAT) device (Hannaman, 1984; Hannaman, Drucker, and Childs, 1985). Other commands and actions were identified from review of previous tank driving research (Bessemer, in preparation), or observed during tank driver training and field exercises.

Some additional commands and actions were defined (a) to fill logical gaps among the commands (e.g., "HOLD SPEED" in addition to the common "SPEED UP" and "SLOW DOWN"), (b) to make commands more specific (e.g., "SLOW STOP" and "QUICK STOP" instead of the indefinite "STOP"), or (c) to represent different possible interpretations of the action performed in response to a command (e.g., "TURN RIGHT/LEFT can refer to a 90° turn or to a continuing turn). Questionnaire items were limited to commands interpretable in relation to movement of the tank hull. Thus, the driving domain considered in this research excluded object-oriented or environmentally-referenced directions to the driver, such as "FOLLOW THE ROAD" or "GO AROUND THE TREE."

Table 1

Personnel and Experience Characteristics Reported by NCOs in the Preliminary Tank Driving Instructor Survey

Personnel Status	Category	Frequency	Percentage
Primary Military Occupational Specialty	19E	10	100
Pay Grade	E-3	1	10
	E-4	5	50
	E-5	2	20
	E-6	1	10
	E-7	1	10

Military Experience	M	SD	Min.	Max.
Months in Service	54.8	42.47	13	144
Months in Armor Units	27.0	28.53	0	90
Months as Driver	14.1	11.93	0	36
Months as TC	27.2	38.73	1	132

Thirty-eight commands and defined actions were included in the first section of the questionnaire (see Appendix A). For each command and action, the survey participant was asked to choose among three alternative responses: "USE AS STANDARD", "DO NOT USE", or "USE ONLY WITH CHANGE". When the third response was chosen, the participant was directed to "Describe change needed" in the following two lines. This space could also be used to express any additional comment regarding that command or action. The expectation was that common or favorite commands and actions that were not included in the questionnaire would be offered in an open-ended response by the participant.

Following the command section of the questionnaire, six questions elicited opinions about the use of standardized driving commands. These included (a) whether any commands should be adopted as standard, (b) how many should be adopted, (c) how training difficulty would be affected, (d) how training time would change, (e) how driver-TC teamwork might be affected, and (f) how driver errors might be affected. An additional open-ended question allowed the participants to express any other opinions they wished to volunteer. In the final section of the questionnaire, six questions were asked about the participants' personnel status and military experience.

Procedure. The survey was administered at Fort Knox in a 1st Armor Training Brigade battalion classroom made available by

the 19E BAT instructors' unit. The instructors reported to the classroom one hour before the start of the training day. After a brief explanation of the background and purpose of the survey, the instructors were handed a copy of the questionnaire, and asked to read the Privacy Act statement and directions for completing the questionnaire. Following a brief question and answer period, the instructors were asked to write personal identification information in the form provided at the bottom of the first page of the questionnaire. The instructors were assured that confidentiality would be maintained by removing individual identification information from the forms before the responses were examined. After completing the questionnaire in about 40 minutes, most of the instructors voluntarily remained to briefly discuss additional questions and comments.

Privacy Protection. Before processing the questionnaire data, sequential identification numbers were marked on each questionnaire copy, the identification forms with a copy of the number were removed from the bottom of the first page and sealed in an envelope. The envelope then was placed in a locked office file to maintain the participants' anonymity.

Results

Driving Commands. The responses of the 19E BAT instructors to the driving command items are summarized in Table 2. Appendix B, Table B-1 gives the exact number of responses in each category for each command. The percentage of "USE AS STANDARD" responses to the driving command items varied widely between 0% and 100%, with the median at 60%. The response "USE ONLY WITH CHANGE" was chosen infrequently. Only three of the 38 commands had as many as 30-40% responses in this category. Answers were omitted in just three instances, and were counted as "DO NOT USE" responses to simplify the statistical analyses.

Inspection of Table 2 shows that a large majority of BAT instructors approved commands that are simple and direct. Commands that specify turn angles or clock directions had low percentages of approval, and a number of NCOs suggested changes in these commands. The only approved driving commands with quantities were those making reference to speed. There was no clear consensus on most commands for reverse or pivot turns.

Statistical Analyses. With a sample of only ten soldiers, useful statistical analyses that can be performed on these data are limited. However, a Cochran Q-test (Li, 1964; Bishop, Fienberg, and Holland, 1975) for differences among nonindependent proportions showed that the frequency (and percentage) of "USE..." responses vary among the driving command items. The approximate Q-test statistic was significant, chi-square(37) = 113.45, $p < .001$. This result indicated that the agreement among instructors in approving some commands and failing to approve others was greater than normally could be expected by chance.

Table 2

Driving Commands Grouped According to the Percentage of "USE AS STANDARD" Responses by 19E BAT Instructors

Range	Type of Command	Driver Commands	
80-100%	Forward Speed	MOVE OUT[a]	STOP
		SPEED UP	SLOW DOWN
		SLOW DOWN TO XX[a]	SPEED UP TO XX[a]
		HOLD SPEED AT XX	HOLD SPEED
	Forward Turn	HARD RT/LFT[a]	TURN RT/LFT
		GUIDE RT/LFT	
	Reverse Speed	BACK UP[a]	EASE BACK[a]
		SPEED UP	SLOW DOWN[a]
		STOP[a]	
50-70%	Forward Speed	SLOW STOP	QUICK STOP
		MARCH SPEED	CATCHUP SPEED[b]
		EASE OUT	
	Forward Turn	TURN TO RT/LFT	HARD RT/LFT XX
	Reverse Speed	MOVE BACK	QUICK STOP
	Reverse Turn	BACK RT/LFT	BACK TO RT/LFT
	Pivot Turn	PIVOT RT/LFT[b]	PIVOT TO RT/LFT
0-40%	Forward Speed	SPRINT[c]	DASH[c]
	Forward Turn	TURN TO XX O'CLOCK	TURN RT/LFT XX[c]
	Reverse Turn	BACK RT/LFT XX	STEADY ON[b]
		BACK TO XX O'CLOCK[c]	
	Pivot Turn	PIVOT RT/LFT XX[c]	STEADY ON[c]

Note. Angles or times in commands are indicated by XX.

[a]The command had 90-100% responses of "USE AS STANDARD."

[b]The command had 30-40% responses of "USE ONLY WITH CHANGE."

[c]The command had 0-30% responses of "USE AS STANDARD."

Another way of looking at the degree of agreement among the instructors is to compare the frequency distribution of number of "USE..." responses to the theoretical binomial distribution that

would be obtained if the solders responded independently to each command with the same average probability of response. The observed frequencies of items are presented in Table 3 together with the expected frequencies computed using the mean proportion in the sample as the binomial parameter. The observed distribution is much flatter and more spread out than the binomial, with frequencies in the extreme categories that are greater than would be expected if the instructors were choosing commands at random. This distribution may also reflect some dependence in individual instructor's responses to the commands.

Table 3

Observed Distribution Compared to Expected Binomial Distribution of "USE AS STANDARD" Responses to Driver Command Items

	Percentage						
Command Items	0-30%	40%	50%	60%	70%	80%	90-100%
Observed Number	6	3	5	6	2	8	8
Expected Number[a]	1.6	3.6	7.0	9.5	8.8	5.3	2.2

[a]Estimates for a binomial distribution (P = .61842, N = 38).

A goodness-of-fit test on the frequencies, assuming both independence and equality of response probabilities, demonstrated a statistically significant lack of fit between the observed and expected distributions, chi-square(5) = 36.46, $p < .001$. Given the small expected frequencies at the extremes (0-30% and 90-100%), most of the driving commands falling in these categories can be judged reliably to be highly approved or disapproved, relative to the average command. Commands in the extreme categories are noted in Table 2.

Written Comments. The written comments (see Appendix C) elicited by the command items were few in number and diverse. Comments were made on 14.2% of command items, numbering 54 in all. Responses of "USE ONLY WITH CHANGE" frequently were not accompanied by a written description of the change desired. Only 34 comments, or 8.9% of items, made recommendations for change, as opposed to more general comments.

Among the written comments, the main consistent suggestion worth noting was to use the word "neutral" in place of "pivot" in commands for pivot turns. This derives from the use of the neutral transmission setting to pivot the M60-series tanks. In the discussion period following completion of the survey, the instructors stated that the most usual form of command used for

this purpose in 19E BAT was "NEUTRAL RIGHT/LEFT," because it refers directly to the shift position to be set, and therefore is less confusing to 19E students.

Opinion Questions. The distribution of responses to each opinion question is shown in Table 4. Most of the instructors agreed that a set of standard commands should be adopted. Assuming a .50 response probability ($P = .50$), the 80% agreement observed among ten NCOs has a nonsignificant binomial probability ($p = .11$, two-tailed) of occurring by chance. Although the data suggest consensus on the question, even this degree of agreement is not statistically reliable for this small sample.

Six instructors provided an estimate of the number of commands that should be included in the standard group. The number suggested was small ($M = 10.0$, $SD = 7.67$). In contrast, twice as many commands were judged acceptable by this same group ($M = 20.0$, $SD = 10.46$). For the entire group of 10 NCOs, the number of acceptable commands was similar ($M = 23.5$, $SD = 5.15$).

The instructors did not entirely agree whether standard driving commands would make training easier or harder, although a small majority thought they would make it easier. On the other hand, agreement was high that (a) training time would increase, (b) teamwork between driver and TC would be better, and (c) driver errors would be lessened. For these last four items with ordered responses, the Wilcoxon Signed-Ranks Test was performed to examine the symmetry (Lehmann, 1975) of the distributions. Values of the approximate normal-deviate test statistic (z) are in Table 4. Significant asymmetry was found for the last three questions, providing statistical evidence that a majority of NCO driving instructors were in agreement on these questions.

Discussion

The results of the preliminary survey showed that the questionnaire form was adequate for determining the relative acceptability of driving commands, and that no major revisions of the question formats were required. Agreement was sufficiently high to obtain significant differences among the commands with a small sample of driving instructors. The most common, direct commands were generally preferred. Commands that specified speed were favorably evaluated, while commands for turns that specified angles or clock directions were disapproved.

The instructors did not oppose adopting a standard set of commands, although they believed training time would be increased (presumably because more detailed task elements would be covered in training, requiring more material to be presented and more practice time). However, they did not agree whether training would be more or less difficult. On the average, the instructors would adopt fewer standard commands than the number they judged acceptable. There was a clear consensus that standard commands would improve driver-TC teamwork and reduce driver errors.

Table 4

Responses to Opinion Questions by 19E BAT Instructors

Question	Responses	Frequency	z
39. Should a group of standard driving commands be approved by the Armor School, included in manuals and SOPs, and be used consistently in all units?	YES	8	
	NO	2	
40. How many commands (or right/left pairs) should be approved? (Enter Number)	Number (0, 6, 7, 10, 15, 22)	6	
	No response	4	
41. Using a group of standard driving commands will make training drivers:	Much easier	1	
	Somewhat easier	4	
	No change	1	
	Somewhat harder	2	
	Much harder	1	
Wilcoxon Test			1.52
42. Using a group of standard driving commands will make the time needed for training drivers:	Much more	1	
	Somewhat more	6	
	No change	2	
	Somewhat less	0	
	Much less	1	
Wilcoxon Test			3.00*
43. Using a group of standard driving commands will make teamwork between the TC and driver:	Much better	3	
	Somewhat better	6	
	No change	1	
	Somewhat worse	0	
	Much worse	0	
Wilcoxon Test			2.86*
44. Using standard driving commands (after training) will make driver errors:	Many more	0	
	Somewhat more	0	
	No change	2	
	Somewhat less	7	
	Many less	1	
Wilcoxon Test			3.03*

*$p < .01$, two-tailed.

Several specific revisions of the questionnaire form were indicated by these results and the instructor's written comments. All of the commands that referred to angles or clock directions were eliminated from further consideration. As suggested by the 19E BAT driving instructors, some pivot turn commands should be added that use the term "neutral," or that alter the definition

of the action. However, there are grounds for retaining other commands using the term "pivot," since 19K BAT instructors that train M1 drivers can be expected to prefer this term. The extent of differences in preferences for these commands, therefore, becomes an important point of comparison between NCOs that are qualified in the 19E and 19K MOS.

The M1 tank has separate "neutral" and "pivot" gearshift positions, and drivers are cautioned by the operator's manual not to turn the steering handles with the gearshift in neutral, since damage to the transmission could result. For the M1 driver, confusion between "neutral" and "pivot" can have serious consequences, and the former term should definitely be avoided in M1 pivot commands. As a matter of fact, both the M60A3 and M1 operator's manuals (U. S. Department of the Army, 1979, 1981) refer to "pivot steering" and "pivot turns," and the manuals never use the terms "neutral steering" or "neutral turn."

A few additional commands (such as STRAIGHT AHEAD/BACK and HALF RIGHT/LEFT) were suggested by the comments or discussion. In several items, slight revisions in the wording of the action definitions were required to improve clarity, based on possible confusions suggested by the written responses. Comments also indicated that minor changes were needed to clarify several background questions.

Final Survey

Objective

The objective of the final survey was to identify driving commands and actions approved by a consensus of experienced noncommissioned officers (NCOs), and therefore valid for use in standard driving exercises. The questionnaire was revised and administered to measure preferences in different groups of NCOs. The results of the final survey were used (a) to determine which driving commands and actions are preferred by a majority of the NCOs in the combined group, both in absolute terms and relatively within the set of commands, (b) to reliably estimate the rank order among commands and actions, and (c) to test how preferences vary among groups of NCOs, especially those indicating different commands that should be used with M1 Abrams vs. M60-series tanks.

Method

Participants. The Tank Driving Instructor Survey was administered to three groups of NCOs. The groups consisted of (a) tank commanders (TCs) and instructors in 19E (M60-series) Basic Armor Training (BAT), (b) TCs and instructors in the 19K (M1 Abrams) BAT, and (c) students in the Advanced Noncommissioned Officer Course (ANCOC). No NCOs included in the preliminary survey were among the 19E BAT instructors in this survey. The number of soldiers in each group and their characteristics are shown in Table 5. Each group's composition in terms of primary

military occupational specialty (PMOS) and grade level indirectly reflects factors that determine selection as a BAT instructor or ANCOC student. The differences between groups are significant statistically, both in (a) comparing the numbers of 19E and 19K PMOS NCOs between the groups, chi-square(2) = 38.95, $p < .001$, and (b) comparing the numbers of NCOs with grades 2-5 and 6-7 between groups, chi-square(2) = 19.90, $p < .001$.

The ANCOC students tended to have longer terms of military service and more TC experience in comparison with groups of BAT instructors, as expected from their higher grade level. However, as the descriptive statistics in Table 6 show, the ANCOC students have spent about the same time in armor units and have somewhat less experience as drivers. Analyses of variance showed that group means differed significantly only for months in service, $F(2,61) = 3.48$, $p < .05$. The differences were not statistically significant for months in armor units, $F(2,54) = 1.41$, for months as a driver, $F(2,52) = 0.44$, but was near significant for months as a TC, $F(2,57) = 2.32$, $p < .20$. Corresponding to these analyses, planned t-tests of orthogonal contrasts revealed no significant differences between the 19E and 19K BAT instructor group means on any experience variable. Two differences were significant when comparing the ANCOC student mean to the combined BAT instructor mean, for months in military service, $t(62) = 2.16$, $p < .05$, and for months as a TC, $t(58) = 2.17$, $p < .05$.

The reported time differences between driver and TC experience in months were also tested, corresponding to the interaction effect for Group x Crew Position in a repeated measure analysis of variance. In Table 6, only the ANCOC students reported considerably more TC experience than driver experience, while the BAT instructors estimated similar amounts of experience in both positions. For those NCOs that reported both driver and TC values, the mean differences were 0.5 months for 19E BAT instructors, 12.9 months for 19K BAT instructors, and -28.1 months for ANCOC students, respectively. An analysis of variance performed on this measure indicated significant differences among the group means, $F(2,51) = 5.58$, $p < .01$. The 19E and 19K BAT instructor group means were not significantly different, $t(30) = 0.93$, but the mean for the ANCOC students differed significantly from the mean for these groups combined $t(52) = 3.22$, $p < .01$.

Questionnaire Revision. The Tank Driving Instructor Survey was revised based on the conclusions of the preliminary survey. Seven commands were removed, five new commands were added, and four commands were presented twice with differing definitions of the driver action. Several command items that were disapproved were kept to provide a lower "frame of reference" for judgments on the other items. Forty command items are contained in the final version of the questionnaire (see Appendix D). The opinion questions were not changed. Two background questions were changed to clarify reported experience as a driver and as a TC.

Table 5

Personnel Status Reported by NCOs in the Final Tank Driving Instructor Survey

Personnel Status	Group			
	19E BAT[a] Instructors	19K BAT Instructors	ANCOC Students	Total
Primary Military Occupational Specialty (PMOS)				
19E	18	0	11	29
19K	0	21	11	32
Other	1	0	1	2
Missing	3	3	2	8
Total	22	24	25	71
Pay Grade				
E-2	1	0	0	1
E-3	2	0	0	2
E-4	0	1	0	1
E-5	8	9	0	17
E-6	4	7	22	33
E-7	3	3	1	7
Missing	4	4	2	10
Total	22	24	25	71

Note. Values are numbers of soldiers.

[a]One NCO filled out the survey form improperly and was excluded.

Procedure. The survey was administered to the three groups of NCOs on separate occasions. The ANCOC students were assembled in an Army Research Institute (ARI) conference room following their lunch break. The BAT instructors completed the form in their Battalion classrooms early in the morning, before the start of the training day. In this instance, unlike the preliminary survey, the instructors were required to assemble following physical training and before breakfast. This may have had a negative impact on their motivation to participate. While they cooperated fully, the instructors seemed less thoughtful in responding to the questions, and completed the form much more rapidly than did the instructors in the preliminary survey.

A number of NCOs in all three groups arrived after the appointed time, and small groups of stragglers appeared after various intervals. This required the instructions for each group to be given repeatedly, and in a progressively more abbreviated manner. Any discussion following completion of the questionnaire was also prevented. In all other respects, the procedure was the same as that used in the preliminary survey.

Table 6

Military Experience Reported by NCOs in the Final Tank Driving Instructor Survey

	Statistic				
Group	n	Mean	S. D.	Min.	Max.
		Months in Service			
19E BAT Instructors	20	91.0	63.37	6	194
19K BAT Instructors	21	113.7	45.23	21	196
ANCOC Students	23	130.5	36.49	36	218
Total	64	112.6	50.90	6	218
		Months in Armor Units			
19E BAT Instructors	17	70.3	51.40	0	156
19K BAT Instructors	19	75.1	37.81	0	132
ANCOC Students	21	91.2	32.84	10	157
Total	57	79.6	41.03	0	157
		Months as Driver			
19E BAT Instructors	16	57.3	49.78	5	180
19K BAT Instructors	17	56.8	40.18	9	144
ANCOC Students	22	45.0	48.93	0	192
Total	55	52.2	46.19	0	192
		Months as TC			
19E BAT Instructors	18	51.8	42.10	3	132
19K BAT Instructors	20	51.2	32.43	7	120
ANCOC Students	22	73.1	37.85	5	192
Total	60	59.4	38.34	3	192

Note. Values exclude NCOs that did not respond to the question.

Results

Driver Commands. The responses of the total group of NCOs to the driving command items are summarized in Table 7. The exact numbers in each category of response for each command are in Appendix E, Table E-1. Most of the commands approved by a large majority of NCOs (more than 75%) involved forward speed and direction. Only three of the 17 commands in the first three categories in Table 7 involved driving in reverse, and only one concerned pivot turns. Several relatively complicated and less well-regarded commands that were retained from the preliminary survey also met disapproval in the final survey.

The incidence of missing (no answer) responses in the final survey increased from the preliminary survey. Missing responses were widely distributed and not concentrated in just a few items. Overall, 1.7% of responses were missing, compared to only 0.8% in the preliminary survey. Twenty-seven items had 1-4 responses missing. Correcting for the effect of missing responses, the results of the final survey were examined in terms of the proportion of responses relative to the total number of answers to an item. Table E-2 shows the proportion of "USE AS STANDARD" responses for each group, and for all groups combined. The proportions correlate very well with the frequencies in each group, indicating that the results are much the same regardless of which measure is used. The product-moment correlations (*rs*) were .998, .996, and .998 for the 19E and 19K BAT instructors and for the ANCOC students, respectively.

Statistical Analyses. The percentage of "USE AS STANDARD" responses per item varied from 30.4% to 97.2%, with a median of 67.9%. A Group x Item analysis of variance using the proportions in Table E-2 indicated that the differences among items are statistically significant, $F(39, 78) = 18.01$, $p < .001$, but that the three groups have similar average levels of approval for this set of commands, $F(2, 78) = 1.11$. Such results indicate agreement among groups in the proportion of "USE..." responses for the command items, relative to the variation between groups on the items. Rank ordering the items by this measure, the coefficient of concordance (*W*; Kendall, 1975) was .906, about equal to an mean rank-order correlation (*rho*) of .859. The test for *W* was significant, *chi-square*$(39) = 106.00$, $p < .001$.

The degree of reliability of the rank-ordering of the commands indicated by the coefficients above is best understood in terms of the standard error of estimate (i. e., the standard deviation of the sampling distribution) of the average rank for an individual command. This standard error is 1.7 ranks, meaning that the observed average rank, according to a 99% confidence interval, will be no more than 4.4 ranks above or below the actual average rank in the population of such rankings. This interval also applies to ranks of the total proportions, since they are nearly identical to observed average ranks (*rho* = .997).

Table 7

Driver Commands Grouped According to the Percentage of "USE AS STANDARD" Responses in the Final Survey

Range	Driver Commands		
95-100%	SPEED UP	STOP (FWD)	STRAIGHT AHEAD
	SLOW DOWN	STOP (REV)	STRAIGHT BACK
85-94%	MOVE OUT	TURN RT/LFT	SLOW DOWN (REV)
	BACK UP	HARD RT/LFT	
75-84%	HOLD SPEED	SPEED UP TO XX	NEUTRAL RT/LFT
	CATCHUP SPEED	SLOW DOWN TO XX	SPEED UP (REV)
65-74%	EASE OUT	HOLD SPEED AT XX	GUIDE RT/LFT
	MARCH SPEED	SLOW STOP (FWD)	HALF RT/LFT
	EASE BACK		
55-64%	BACK RT/LFT	SLOW STOP (REV)	
	TURN TO RT/LFT	NEUTRAL RT/LFT (90^{o})	
45-54%	QUICK STOP (FWD)	STEADY ON (FWD)	PIVOT RT/LFT
	BACK TO RT/LFT	STEADY ON (REV)	
35-44%	DASH	STEADY ON (PVT)	MOVE BACK
	QUICK STOP (REV)	PIVOT RT/LFT (90^{o})	
25-34%	SPRINT	BACK RT/LFT (90^{o})	

The specific differences between groups were also tested for each item separately to determine if there were particular command preferences related to PMOS, or the greater TC experience of the ANCOC students. Among the 40 chi-square statistics that were computed (see Table E-2), only four approached significance (for $p < .10$) which is the exact number that are expected by chance. Of these four largest values, only one was significant (with $p < .05$) although two are expected. The distribution of the 48 values followed the theoretical chi-square(2) distribution fairly closely, so that a goodness-of-fit test (chi-square(6) = 9.38) was not statistically significant. These analyses provide no statistical evidence for anything other than chance variations in the proportions of "USE..." responses between groups.

Possible group differences are of specific interest in relation to the commands for pivot turns. Preliminary survey results suggested the hypothesis that 19E instructors will prefer the term "NEUTRAL" for such commands, whereas 19K instructors will prefer the term "PIVOT" because of the difference in the gearshift positions and labeling between the M60-series and M1

tanks. The differences in proportions of "USE..." responses, as shown in Table 8 for Items 24 and 25, were compared among groups to examine this hypothesis. Although the differences were in the direction predicted, they were not statistically significant, chi-square(2) = 3.17. Other data for commands with the terms "NEUTRAL" and "PIVOT," but requiring a 90° angle turn (Items 22 and 23), were not compared in a similar manner since these command variants were relatively nonpreferred.

Table 8

Differences in Approval of the Commands "NEUTRAL RIGHT/LEFT" Compared to the Commands "PIVOT RIGHT/LEFT"

	Group			
Command	19E BAT Instructors	19K BAT Instructors	ANCOC Students	Total
"NEUTRAL.."	.950	.708	.792	.809
"PIVOT.."	.350	.583	.541	.500

Lacking evidence of statistically significant differences among the groups for specific items, the central questions then become (a) which commands are approved by a majority of NCOs in absolute terms, and (b) among the commands that are approved, which commands are preferred by the NCOs in relative terms? The statistical answer to the first question is to determine those commands that have reliably more than 50% "USE..." responses. Given a proportion in the population ($P = .50$) that approve of a command, the standard error of an observed proportion with a sample of 71 is 0.0593. Using the normal approximation to the binomial for large samples, the probability is small ($p = .01$) that an observed proportion would be greater than 0.6529. Thus, it is very improbable that a percentage greater than 65.29% will be observed when $P < .50$. Therefore, the inference is that an absolute majority of NCOs approve the commands in the top four categories in Table 7.

The statistical analog to the second question is to identify those commands that have a higher level of approval than the average command. Reasoning in a similar fashion to that above, the standard error of an observed proportion is 0.0550 when the population proportion equals the mean proportion ($P = .68687$) averaged over all commands. With a population proportion at that value, the probability is small ($p = .01$) that an observed proportion would be greater than 0.8287. Thus observing a percentage more than 82.87% is very improbable when $P < .68687$. Therefore, commands in the top two categories in Table 7 are

preferred relative to the average command. One command ("SLOW-DOWN TO XX") in the next lower category also qualifies as relatively preferred by this criterion.

Written Comments. The frequency of written comments on the command items was considerably smaller than that observed in the preliminary survey. Comments were made on 6.7% of the items, for a total number of 191 comments. Recommended changes were described 135 times, or 4.8% of items. Removal of several nonpreferred commands from the preliminary questionnaire probably reduced the number of comments. This number probably also was affected by time pressure for completion caused by circumstances in the administration of the final survey, as described in the Procedure section. A transcript of the comments is provided at Appendix F.

More than half of the written comments related to just 11 commands, with 7-13 comments each. Most of these comments merely confirmed a negative judgment evident in the quantitative data for the command, or pointed to an alternative command in the set that was preferred. However, several of the commands had comments that are noteworthy. For the command "HOLD SPEED," several of the NCOs suggested the use of the alternative "STEADY" or "STEADY SPEED." On the other hand, some NCOs indicated that "STEADY ON" should not be used in connection with forward, reverse, or pivot turns because "STEADY ON" is a gunnery command, and either the gunner or driver might become confused in some circumstances. This argument is convincing, and should also apply to the term "STEADY" used in a speed command.

Numerous comments suggested that "STRAIGHT AHEAD/BACK" are preferable for ending forward and reverse turns, and that "STOP" should be used with pivot turns. While the use of "STOP" in that context was omitted from the survey, it was highly approved in other uses, and appears to fill a logical gap in the command set.

A number of comments concerned driving commands for reverse turns. None of these commands met with approval by a majority of NCOs. The most frequent comments were to use "HOLD RIGHT/LEFT" or "HOLD RIGHT/LEFT TRACK" in preference to any version of "BACK RIGHT/LEFT." However, this command requires that the command "BACK UP" be issued first. Consensus approval should be verified with a new sample of NCOs before a reverse turn command using either "BACK" or "HOLD" are adopted.

Opinion Questions. In response to Question 39, 78.3% of the NCOs favored adopting standardized driving commands, close to the 80% observed in the preliminary survey. Using the large-sample approximation to the binomial to test the null hypothesis ($P = .50$), the normal deviate supported rejecting the hypothesis, $z = 4.76$, $p < .001$. Between groups of participants, the majority favoring adoption tended to increase, suggesting a partial association of grade, time in service, and TC experience with perception of the need for such commands. For the 19E and 19K

BAT instructors and the ANCOC students, respectively, 77.3%, 63.6%, and 92.0% approved adopting standardized commands. The statistical test for the group differences, however, was not quite significant, chi-square(2) = 5.55, $p = .062$.

Table 9 shows the average number of commands recommended for adoption in response to Question 40, together with the average number of commands that were judged acceptable in Items 1-40. There were no statistically significant differences among NCO groups in either case for those that favored, or for those that opposed adopting standard commands. The recommended number of commands was much larger for those approving adoption, and the difference was significant, $t(49) = 2.50$, $p < .01$. Most of those opposing adoption responded consistently to this question by entering zero or by failing to respond, while only two NCOs provided positive numbers (5 and 10 commands). Those favoring adoption also approved slightly more commands than those opposed, but the difference was not significant, $t(67) = 1.01$. Like the results of the preliminary survey, the number of commands that the NCOs approved was considerably larger than the number they recommended, even when only those NCOs that favor adoption are considered.

No significant differences in response to opinion questions 41-44 were found between the three groups of NCOs sampled in this survey. Combining the three groups, Wilcoxon tests of symmetry were statistically significant for each question, indicating that a consensus of opinion existed in the total group. The values of the approximate normal deviate Wilcoxon test statistics (z) are given in Table 10.

The NCOs'attitudes toward adopting standard commands were found to have a substantial relationship to their response to each question. The relationship is demonstrated by comparing the response distributions between those favoring and opposed to adoption. These distributions are shown in Table 10. A clear majority of those favoring standard commands thought training would be easier, while those opposed thought training would be no different or harder. Most of the NCOs that were opposed to using standard commands believed that training time would be increased, while those favoring such commands were more divided on the question. Large majorities of those favoring standard commands agreed that TC-driver teamwork will be improved and driver errors reduced, while most of those opposed felt the commands will make no difference. The rank-order Kruskal-Wallis H-statistics (distributed approximately as chi-square(1);Lehmann, 1975) given in Table 10 were significant, supporting the conclusion that the two subgroups differ in their distributions of response on every question.

Discussion

Group Differences. The groups sampled in the final survey were distinct in several ways. The BAT instructor groups had

PMOS related to different tanks, and were engaged in teaching driving on those same tanks. The ANCOC students differed from the BAT instructors by having (a) longer time in service, (b) longer experience as a TC, and (c) more experience as a TC than as a driver. Despite these differences, there was no statistical evidence for differences in their evaluation of the individual driving commands included in the survey. Even in the case of commands for pivot turns, where a difference was expected based on a difference in the M1 and M60-series tank controls, the observed differences can be attributed to sampling variability.

Table 9

Effect of Attitude Toward Adoption of Standardized Commands on the Number of Commands Recommended or Approved for Adoption

	Group			
Attitude	19E BAT Instructors	19K BAT Instructors	ANCOC Students	Total
	Number of Commands Recommended[a]			
Favor				
n	12	11	18	41
M	8.17	5.55	9.22	7.93
SD	8.52	7.20	7.97	7.89
Oppose				
n	2	7	1	10
M	0.00	1.43	5.00	1.50
SD	0.00	3.78	0.00	3.37
	Number of Commands Approved			
Favor				
n	17	14	23	54
M	25.94	29.14	27.43	27.41
SD	6.46	5.67	6.29	6.19
Oppose				
n	5	8	2	15
M	27.60	25.12	22.50	25.60
SD	8.05	3.76	9.19	5.99

[a] Values exclude NCOs that did not provide a recommended number.

The present results therefore establish generalizable preferences among driving commands that should closely approximate those in most groups of Armor enlisted personnel.

Table 10

Responses to Opinion Questions by NCOs that Differ in Attitude Toward Adopting Standard Driving Commands

Question	Responses	Attitude: Favor	Attitude: Oppose	$\frac{Z}{H}$
41. Using a group of standard driving commands will make training drivers:	Much easier	35	1	
	Somewhat easier	13	4	
	No change	4	6	
	Somewhat harder	2	3	
	Much harder	0	1	
Wilcoxon Test				5.14^{**}
Kruskal-Wallis Test				25.12^{**}
42. Using a group of standard driving commands will make the time needed for training drivers:	Much more	9	5	
	Somewhat more	15	6	
	No change	12	4	
	Somewhat less	12	0	
	Much less	5	0	
Wilcoxon Test				3.90^{**}
Kruskal-Wallis Test				5.32^{*}
43. Using a group of standard driving commands will make teamwork between the TC and driver:	Much better	35	1	
	Somewhat better	13	4	
	No change	4	6	
	Somewhat worse	2	3	
	Much worse	0	1	
Wilcoxon Test				5.63^{**}
Kruskal-Wallis Test				17.98^{**}
44. Using standard driving commands (after training) will make driver errors:	Many more	1	1	
	Somewhat more	2	2	
	No change	6	10	
	Somewhat less	29	1	
	Many less	16	0	
Wilcoxon Test				5.92^{**}
Kruskal-Wallis Test				19.35^{**}

$^{*}p < .05$, two-tailed. $^{**}p < .001$, two-tailed.

Driving Commands. The consensus rank ordering of driving commands proved to be highly reliable. The placement of an individual command in the groups shown in Table 7 can possibly be one category too high or too low, but misplacement by two categories is very improbable. By means of statistical criteria, commands in the two highest groups in Table 7 were identified as preferred relative to the average level of approval for all commands in the survey. These commands approximate a minimal number of consistent commands that appear to be logically sufficient to control tank movement in most circumstances, and that should be acceptable to the majority of TCs in most training situations. This set is consistent in that both members of functionally similar pairs of commands that are logical opposites or complementary alternatives are included, such as "MOVE OUT" and "BACK UP," "SPEED UP" and "SLOW DOWN," or "TURN RIGHT/LEFT" and "HARD RIGHT/LEFT." One exception is the command "SPEED UP" applying to reverse movement, and that appears in the next lower category of approval. With the addition of this command to the set, it becomes nearly logically complete, since almost every major form of change in tank movement is covered. One important omission that remains is a command for pivot turns.

The final selection of commands that are recommended for training are shown in Table 11. Based on the NCOs' preferences in the present survey, the commands in Table 11 provide validated content for driving exercises. Leaving aside for the moment the question of pivot turns, the basic set of twelve preferred commands (eleven in the first two categories of Table 7, plus one more) that have been identified are not many more than the average number of eight commands that the NCOs recommended be adopted (i.e., among those approving the idea of having standard commands).

In addition to the basic commands, twelve other commands in the next lower two categories of Table 7 were approved by a majority of NCOs in absolute terms. These commands are listed as optional in Table 11, for selective use at a more advanced levels of driving practice, or possibly included in unit standard operating procedures (SOPs) to facilitate somewhat more precise control of tank movement. However, use of more than a few optional commands may prove to have little benefit, encouraging over-control by the TC, or even confusing the driver in some situations. Except for pivot turns as explained later, the best policy may be to allow the TC to choose how to direct his driver, as he does now.

Reverse Turns. It should be noted that neither the basic nor the optional group of commands include a preferred choice for reverse turns. "BACK RIGHT/LEFT" had the highest approval among those included in the survey, but did not reach the criterion level required for absolute approval. This command and the alternatives using "HOLD" that were suggested in the written comments are included in Table 11 as possible options pending further investigation.

Table 11

Tank Driving Commands Recommended for Training

Type	Speed	Direction
	Standard Commands	
Forward	MOVE OUT SPEED UP SLOW DOWN STOP	TURN RIGHT/LEFT HARD RIGHT/LEFT STRAIGHT AHEAD
Reverse	BACK UP SPEED UP SLOW DOWN STOP	STRAIGHT BACK
	Optional Commands	
Forward	SPEED UP TO XX SLOW DOWN TO XX HOLD SPEED AT XX HOLD SPEED CATCHUP SPEED[a] MARCH SPEED[a]	GUIDE RIGHT/LEFT HALF RIGHT/LEFT
Reverse	EASE BACK HOLD SPEED[c]	HOLD RIGHT/LEFT[b] BACK RIGHT/LEFT[d]
Pivot	STOP[c]	PIVOT RIGHT/LEFT[d] NEUTRAL RIGHT/LEFT[e]

[a]This command is primarily recommended for use in units when defined by the unit SOP.

[b]This command was not included in the survey, but was suggested by some participant's written comments.

[c]This command was not defined for this use in the survey, but was approved by the participants for forward use and is recommended for completeness of control.

[d]Although not approved by the survey participants, this command is supported by training and/or technical considerations.

[e]This command should be used only with M60-series tanks.

A command such as "HOLD RIGHT/LEFT" specifies the tank track that must be slowed down to turn the tank in that direction. Logically, the command also can apply to forward turns, since the

same track must be slowed to turn to a particular side whether moving forward or backward. In terms of conceptual organization and its probable effects on learning and memory, it is advantageous to have a distinct word in the command that can become uniquely associated with the driver's response to the command. The command "TURN RIGHT/LEFT" requires the driver to "pull" the handle of the steering control toward his body on the side corresponding to the direction of the turn, and the effect is to "hold" the track on that side. In reverse gear, the driver must "push" the steering control handle away from his body on the side corresponding to the direction of the turn, and the effect is to "hold" the track on the same side. Until the driver learns which response produces the desired effect, some confusion and driver errors can be expected. However, errors may be cut short as soon as the driver gets direct feedback from the tank motion.

Driver training should be aided by using the terms "pull" and "push" to emphasize the distinction between forward and reverse turns, thus aiding the association between each response required, the effect on track speeds, and the resulting turn. If drivers are taught to associate a command like "BACK RIGHT/LEFT" with "push," learning proper actions for reverse turns also should be made easier. On the other hand, using a command with "HOLD" may interfere with learning, through its association with the track effects common to forward and reverse turns.

Pivot Turns. The survey results do not support any fully satisfactory choice of a command for pivot turns. While the Operator's Manuals suggest that "PIVOT RIGHT/LEFT" should be the doctrinally preferred form, this command was not approved by an absolute majority of respondents in this survey. In contrast, the command "NEUTRAL RIGHT/LEFT" was almost universally preferred by M60-series tankers. This command also had majority approval among the more experienced NCOs in ANCOC, and even among the M1 tankers who definitely should not be using it. Apparently, the tradition of use built up over the years with the M60-series tanks has perseverated to interfere with the adoption of more proper terminology in M1 driving. This is a point that may need more emphasis in M1 driver and TC training. A stronger warning or other revisions of the M1 Operator Manual may also be needed to point out and clarify the doctrinally approved position on these commands.

Opinions. Considering the entire group of NCOs, substantial majorities were in agreement on all of the opinion questions asked in the survey. The majority approved of adopting standard commands, thought they would make training easier but more time consuming, and felt that the commands would approve TC-driver teamwork and reduce driver errors. A major additional finding was that the minority who opposed adopting standard commands also had considerably different, and more negative responses on each question. This result has important implications when attempting to implement standard commands. The relatively negative opinions held by 20% of TCs may interfere with the adoption and use of the

commands by this subgroup. Some attention should be devoted to modifying the attitudes of the skeptical minority in any training plans or training literature that utilize standard driving commands.

Conclusions

The major findings of this research are summarized below:

1. The survey of Armor NCOs, including BAT driving instructors and ANCOC students, produced results validating basic driving commands for standardized use in driver training and testing.

a. The NCOs showed a high degree of consensus in preferences for specific basic tank driving commands for forward movement, but less consensus on pivot and reverse turn commands.

b. The survey sample showed a good consensus of opinion favoring the use of standard driving commands, agreeing that teamwork between drivers and TCs should increase and thereby reduce driver errors. They also agreed that the time for driver training would increase, but that the difficulty of conducting training would be reduced. About 20% of the sample were unconvinced of the benefits of such commands, or had negative opinions.

c. The Army does not now have an official doctrinal position on tank driving commands. Commands recommended for approval as universally recognized standards are listed in Table 11, along with some optional commands for use in unit training and standard operating procedures. These commands and their associated driver actions provide validated content for driving exercises.

2. Evidence was found that traditional pivot turn commands using the word "NEUTRAL" with the M60-series tanks have been improperly carried over to M1 driving. This usage has potential for confusion by inexperienced drivers causing damage to the M1 drive train. The recommended solution is to require the use of commands with the word "PIVOT" with both types of tanks, despite the labeling of the gearshift in M60-series tanks.

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Appendix A

Preliminary Tank Driving Instructor Survey

DATA REQUIRED BY THE PRIVACY ACT OF 1974

AUTHORITY: Title 10, USC, Sec 4503.
PRINCIPAL PURPOSE: The data collected with this form are to be used for research puposes only.
ROUTINE PURPOSE: This is an experimental personnel data collection form developed by the U.S. Army Research Institute for the Behavioral and Social Sciences pursuant to its research mission as prescribed in AR 70-1. When identifiers (name or Social Security Number) are requested they are to be used for administrative and statistical control purposes only. Full confidentiality of the responses will be maintained in the processing of these data.
DISCLOSURE: Your participation in this research is strictly voluntary. Individuals are encouraged to provide complete and accurate information in the interests of the research, but there will be no effect on individuals for not providing all or any part of the information.

TANK DRIVING INSTRUCTOR SURVEY

Tank commanders frequently give their drivers brief commands to control the speed and direction of tank movement. Standard driving commands have been suggested to help avoid confusion and driving errors that sometimes result in accidents. Use of a standard group of driving commands, much like the gunnery fire commands, will require training for both tank commanders and drivers. Both will have to learn the meaning of each command and the proper driver actions to be executed when each command is given.

A number of driving commands, like MOVE OUT or STOP, are listed on the following pages together with a brief description of the correct action to be done by the driver. Commands for turns are listed in pairs, like TURN LEFT and TURN RIGHT. Based on your experience as a tank commander and instructor, your best judgement is needed to help select a standard group of commands. For each command and action (or pair), place a check mark in one blank to make your choice among the three alternatives shown below:

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

If you think the command and action should be used exactly as stated, then check the first blank (USE AS STANDARD). If you think it should not be used, check the second blank (DO NOT USE). If you think it should be used, but with a specific change in the command or action, then check the third blank (USE ONLY WITH CHANGE). When you check the third blank, describe clearly and completely the change that is needed.in the additional space provided below. At the end of the survey, there are a few questions about your reaction to using and training with standard driving commands, and your background.

NUMBER_____ PT 5695

(This portion of the page will be removed before survey responses are examined)

NUMBER_____ NAME _____ SSN ___-___-____

CURRENT DUTY POSITION _____ UNIT_____

BASIC TANK MOVEMENT COMMANDS AND DRIVER ACTIONS

FORWARD SPEED:

1. EASE OUT — Accelerate slowly from a halt to 3-5 mph.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

2. MOVE OUT — Accelerate rapidly from a halt to 12-15 mph.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

3. SPEED UP — Accelerate to increase speed by about 50%.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

4. SLOW DOWN — Decelerate to decrease speed by about 50%.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

5. SPEED UP TO XX — Accelerate to stated speed in mph.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

6. SLOW DOWN TO XX — Decelerate to stated speed in mph.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

7. HOLD SPEED — Maintain current speed.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

PT 5695

8. HOLD SPEED AT XX Set and maintain stated speed.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

9. MARCH SPEED Set and maintain speed at 12-15 mph.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

10. CATCHUP SPEED Set and maintain speed at 20-25 mph.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

11. SPRINT Set and maintain maximum comfortable speed.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

12. DASH Set and maintain maximum safe/feasible speed.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

13. SLOW STOP Decelerate gradually and gently to a halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

14. STOP Decelerate rapidly and smoothly to a halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

15. QUICK STOP Decelerate abruptly to a halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

PT 5695

FORWARD DIRECTION:

16. GUIDE RIGHT Turn to right through a 5-10 degree arc while maintaining speed.
GUIDE LEFT Turn to left through a 5-10 degree arc while maintaining speed.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

17. TURN RIGHT Turn to right through a 90 degree arc while maintaining speed.
TURN LEFT Turn to left through a 90 degree arc while maintaining speed.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

18. TURN RIGHT XX Turn to right through the stated arc while maintaining speed.
TURN LEFT XX Turn to left through the stated arc while maintaining speed.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

19. TURN TO RIGHT Turn to right continuing until countermanded.
TURN TO LEFT Turn to left continuing until countermanded.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

20. TURN TO XX O'CLOCK Turn to stated clock direction while maintaining speed.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

21. HARD RIGHT Reduce speed, turn sharply through a 90 degree arc, resume speed.
HARD LEFT Reduce speed, turn sharply through a 90 degree arc, resume speed.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

PT 5695

22. HARD RIGHT XX Reduce speed, turn sharply through the stated arc, resume speed.
HARD LEFT XX Reduce speed, turn sharply through the stated arc, resume speed.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

23. PIVOT RIGHT Neutral-steer to right through a 90 degree arc.
PIVOT LEFT Neutral-steer to left through a 90 degree arc.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

24. PIVOT RIGHT XX Neutral-steer to right through the stated arc.
PIVOT LEFT XX Neutral-steer to left through the stated arc.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

25. PIVOT TO RIGHT Neutral-steer to right continuing until countermanded.
PIVOT TO LEFT Neutral-steer to left continuing until countermanded.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

26. STEADY ON End forward turn and hold current orientation.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

REVERSE SPEED:

27. EASE BACK Accelerate in reverse slowly to 2-3 mph.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

PT 5695

28. BACK UP — Accelerate in reverse gradually to 5-7 mph.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

29. MOVE BACK — Accelerate in reverse rapidly to 8-12 mph.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

30. SPEED UP — Accelerate in reverse to increase speed by about 50%.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

31. SLOW DOWN — Decelerate in reverse to decrease speed by about 50%.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

32. STOP — Decelerate in reverse rapidly and smoothly to a halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

33. QUICK STOP — Decelerate in reverse abruptly to a halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

<u>REVERSE DIRECTION:</u>

34. BACK RIGHT — Turn in reverse to right through a 90 degree arc.

BACK LEFT — Turn in reverse to left through a 90 degree arc.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

PT 5695

35. BACK RIGHT XX Turn in reverse to right through the stated arc.
BACK LEFT XX Turn in reverse to left through the stated arc.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

36. BACK TO RIGHT Turn in reverse to right continuing until countermanded.
BACK TO LEFT Turn in reverse to left continuing until countermanded.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

37. BACK TO XX O'CLOCK Turn in reverse to stated clock direction.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

38. STEADY ON End reverse turn and hold current orientation.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

OPINION QUESTIONS (CHECK ONLY ONE BLANK FOR EACH QUESTION):

39. Should a group of standard driving commands be approved by the Armor School, included in manuals and SOPs, and be used consistantly in all units? ____YES ____NO
Comments: _____

_____

40. How many commands (or right/left pairs) should be approved? (Enter Number) _____
Comments: _____

_____

41. Using a group of standard driving commands will make training drivers:
____Much easier ____Somewhat easier ____No change ____Somewhat harder ____Much harder
Comments: _____

_____

PT 5695

42. Using a group of standard driving commands will make the time needed for training drivers:
_____Much more _____Somewhat more _____No change _____Somewhat less _____Much less
Comments: _____

_____

43. Using a group of standard driving commands will make teamwork between the TC and driver:
_____Much better _____Somewhat better _____No change _____Somewhat worse _____Much worse
Comments: _____

_____

44. Using standard driving commands (after training) will make driver errors:
_____Many more _____Somewhat more _____No change _____Somewhat less _____Many less
Comments: _____

_____

45. Other general comments about using or training with standard driver commands:

_____

_____

_____

BACKGROUND QUESTIONS:

1. Primary MOS/ Speciality _____ Secondary MOS/Speciality _____
2. Pay Grade (Check One): ☐ E-4 ☐ E-5 ☐ E-6 ☐ E-7 ☐ E-8 ☐ E-9
3. Time in Service ___ years ___ n onths Time in TOE Armor Units ___ years ___ months
4. Current Duty Position _____
Unit Type (Circle One): TOE or TDA Time in Current Duty Position ___ years ___ months
5. Months Experience as Tank Driver _____ Months Experience as Tank Commander _____
6. (Answer only if you are an OSUT driving instructor)
Average hours per week spent in conducting driver training _____
What percent of this time is spent doing each type of activity (make percents add to 100%):
Platform Instruction _____ Practical Exercises _____ Testing _____ Other _____
What are the other activities? _____

_____

_____

PT 5695

Appendix B

Command Item Responses in Preliminary Survey

Table B-1

Distribution of Responses for Commands in the Preliminary Survey

Item	Command	Response Frequency		
		Use	Not Use	Change
1	EASE OUT	5	3	2
2	MOVE OUT	9	0	1
3	SPEED UP	8	0	2
4	SLOW DOWN	8	0	2
5	SPEED UP TO XX	9	1	0
6	SLOW DOWN TO XX	9	1	0
7	HOLD SPEED	8	2	0
8	HOLD SPEED AT XX	8	2	0
9	MARCH SPEED	5	4	1
10	CATCHUP SPEED	5	2	3
11	SPRINT	1	8	1
12	DASH	0	10	0
13	SLOW STOP	7	2	1
14	STOP	8	0	2
15	QUICK STOP	6	2	2
16	GUIDE RIGHT/LEFT	8	1	1
17	TURN RIGHT/LEFT	8	1	1
18	TURN RIGHT/LEFT XX	3	5	2
19	TURN TO RIGHT/LEFT	6	3	1
20	TURN TO XX O'CLOCK	4	6	0
21	HARD RIGHT/LEFT	10	0	0
22	HARD RIGHT/LEFT XX	6	3	1
23	PIVOT RIGHT/LEFT	5	2	3
24	PIVOT RIGHT/LEFT XX	2	7	1
25	PIVOT TO RIGHT/LEFT	5	4	1
26	STEADY ON	4	3[a]	2
27	EASE BACK	10	0	0
28	BACK UP	9	1	0
29	MOVE BACK	6	3	1
30	SPEED UP (REVERSE)	8	1	1
31	SLOW DOWN (REVERSE)	9	0	1
32	STOP (REVERSE)	9	0	1
33	QUICK STOP (REVERSE)	6	2	2
34	BACK RIGHT/LEFT	7	2	1
35	BACK RIGHT/LEFT XX	4	5[a]	0
36	BACK TO RIGHT/LEFT	6	3	1
37	BACK TO XX O'CLOCK	1	8[a]	0
38	STEADY ON (REVERSE)	8	2	0

[a]The number includes one missing response.

Appendix C

Written Comments in Preliminary Survey

Recommended Command Changes[1]

1. EASE OUT

   4) *DO NOT USE-The wording can be misunderstood for something else.
   7) "Move out slowly".
   8) *Ease out would be sufficient when in a battle position, or recovery operations.
   9) "Move out slowly".
   10) Stay with "Move Out".

2. MOVE OUT

   1) "7-12 MPH".

3. SPEED UP

   1) "25%".
   10) *You tell them 50% they will be lost, too many questions at that statement.

4. SLOW DOWN

   1) "25%".
   10) *Same as 3.

5. SPEED UP TO XX

6. SLOW DOWN TO XX

7. HOLD SPEED

8. HOLD SPEED AT XX

9. MARCH SPEED

   8) *As long OIC or NCOIC puts it out prior to moving.
   9) "Convoy speed".

10. CATCHUP SPEED

   5) Just use "catch up", the driver knows he'll be speeding up.
   6) *Causes a lot of drivers to go overboard trying to "catch up", needs to be reworded.
   10) *For basic training, you will speed on any course or road.

---

[1]Responses marked by the asterisk (*) state general comments rather than recommend changes in the command.

11. SPRINT

6) *I think this should be used for #12.

12. DASH

13. SLOW STOP

10) "Slow Down and Stop".

14. STOP

5) If used but with "Slow and Stop", this tells the driver what you want.
10) He will throw you out of the couple (sic), use "Slow Down and Stop".

15. QUICK STOP

5) "Stop" is enough to get the message across.
8) *Use in field environment, it plays a large part in field maneuvers, war games.
10) Same as #14.

16. GUIDE RIGHT/LEFT

8) *Drivers have a tendency to neutral steer the tank, needs to be reworded.

17. TURN RIGHT/LEFT

5) The command "Hard Right" or "Hard Left" works better.
10) *Will never happen in Basic, he is still scared of the tank.

18. TURN RIGHT/LEFT XX

5) *The speed should be given before the turn--less confusion.
8) *This would be good for those gradual turns which require a maintained speed.

19. TURN TO RIGHT/LEFT

5) Just "Turn Right".

20. TURN TO XX o'CLOCK

21. HARD RIGHT/LEFT

22. HARD RIGHT/LEFT XX

6) *If you use #19, why would you need this one?

23. PIVOT RIGHT/LEFT

2) "Neutral Steer Right" easier to understand, driver knows exactly what to do.
3) "Neutral-Steer Right"--"Neutral-Steer Left".
9) "Neutral Right", "Neutral Left".

24. PIVOT RIGHT/LEFT XX

9) "Neutral Right XX", "Neutral Left XX".
10) *Don't think it can be done.

25. PIVOT TO RIGHT/LEFT

9) "Neutral Right", "Neutral Left".

26. STEADY ON

1) "Straight Ahead".
5) The word "Steady" gets the meaning across.
10) *Don't understand.

27. EASE BACK

28. BACK UP

10) Better than #27, understand more.

29. MOVE BACK

9) "Accelerate Back".

30. SPEED UP

1) "25%".
10) *Tell: you are his eyes.

31. SLOW DOWN

1) "25%".

32. STOP

5) "Slow Down and Stop" get's the meaning across better.

33. QUICK STOP

5) Just "Stop" is enough.
9) "Hard-Stop".

34. BACK RIGHT/LEFT

9) "Back-Hard-Right", "Back-Hard-Left".

35. BACK RIGHT/LEFT XX

36. BACK TO RIGHT/LEFT

5) "Back- Little Left" or "Back-Little Right".

37. BACK TO XX O'CLOCK

3) *Most drivers will have trouble backing up to a clock position.
10) *Use because they get confused.

38. STEADY ON

1) "Straight Back".
5) *Just the word "Steady" is enough.
9) "Straight On" or "Right On".
10) "Hard Left or Right".

Responses to Opinion Questions

39. APPROVAL?

2) A good idea, but don't give too many commands to do the same thing (left turn, right turn, etc.). New drivers could get confused.
5) It would save a lot of confusion if driver knew exactly what the TC wanted.
7) I (sic) will make training easier and the driver know a little better
what the TC wants.
9) It would make less variations.
10) But when he gets in the tank it's his tank and what goes on; but it would be good.

40. NUMBER?

7) Shouldn't have too many. They might get confused on a lot of things.
10) "Easy to the Right or Left": "Hard Left or Right".

41. TRAINING DIFFICULTY

1) Have to teach and test plan.
5) They know what TC wants.
7) The driver knows somewhat what the TC wants.
8) In a TO & E unit yes. In a training unit no.
9) Somewhat easier, but it (sic) you are still going to have some trainees confused.
10) Save the tank wear and keep tank com. headaches & phy. harm.

42. TRAINING TIME

2) Reason for this is that you must make sure the new driver knows his commands.
5) To learn the commands.
9) Because us as tank commanders would have to train & retrain theses soldiers.
10) What tank commander says the trainees understand, kick it in the ass.

43. TEAMWORK

2) With commands to the driver, TC's will not have to communicate with their drivers so much.
10) More experience and confidence for trainees.

44. ERRORS

8) This would be excellent in TO & E.
10) With good changes.

45. GENERAL

2) It's a very good idea, but if not set up properly, it will add confusion into the new "trainee" driver's head. This would not be a smart thing to do.
4) The situation and the soldier that is being taught determines how well EM can learn or pickup on the proper response.
6) I think tank drivers should get more experience driving a tank in different traffic situations. They get enough experience driving in the field but none in city type environments.

Appendix D

Final Tank Driving Instructor Survey

DATA REQUIRED BY THE PRIVACY ACT OF 1974

AUTHORITY: Title 10, USC, Sec 4503.
PRINCIPAL PURPOSE: The data collected with this form are to be used for research puposes only.
ROUTINE PURPOSE: This is an experimental personnel data collection form developed by the U.S. Army Research Institute for the Behavioral and Social Sciences pursuant to its research mission as prescribed in AR 70-1. When identifiers (name or Social Security Number) are requested they are to be used for administrative and statistical control purposes only. Full confidentiality of the responses will be maintained in the processing of these data.
DISCLOSURE: Your participation in this research is strictly voluntary. Individuals are encouraged to provide complete and accurate information in the interests of the research, but there will be no effect on individuals for not providing all or any part of the information.

TANK DRIVING INSTRUCTOR SURVEY

Tank commanders frequently give their drivers brief commands to control the speed and direction of tank movement. Standard driving commands have been suggested to help avoid confusion and driving errors that sometimes result in accidents. Use of a standard group of driving commands, much like the gunnery fire commands, will require training for both tank commanders and drivers. Both will have to learn the meaning of each command and the proper driver actions to be executed when each command is given.

A number of driving commands, like MOVE OUT or STOP, are listed on the following pages together with a brief description of the correct action to be done by the driver. Commands for turns are listed in pairs, like TURN LEFT and TURN RIGHT. Based on your experience as a tank commander and instructor, your best judgement is needed to help select a standard group of commands. For each command and action (or pair), place a check mark in one blank to make your choice among the three alternatives shown below:

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

If you think the command and action should be used exactly as stated, then check the first blank (USE AS STANDARD). If you think it should not be used, check the second blank (DO NOT USE). If you think it should be used, but with a specific change in the command or action, then check the third blank (USE ONLY WITH CHANGE). When you check the third blank, describe clearly and completely the change that is needed in the additional space provided below. At the end of the survey, there are a few questions about your reaction to using and training with standard driving commands, and your background.

NUMBER_____ PT 5695A

(This portion of the page will be removed before survey responses are examined)

NUMBER_____ NAME _____ SSN ___-___-____

CURRENT DUTY POSITION _____ UNIT_____

BASIC TANK MOVEMENT COMMANDS AND DRIVER ACTIONS

FORWARD SPEED:

1. EASE OUT — Accelerate slowly from a halt to 3-5 MPH.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

2. MOVE OUT — Accelerate rapidly from a halt to 12-15 MPH.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

3. SPEED UP — Accelerate to increase speed by half.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

4. SLOW DOWN — Deccelerate to decrease speed by half.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

5. SPEED UP TO XX — Accelerate to the stated speed in MPH.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

6. SLOW DOWN TO XX — Deccelerate to the stated speed in MPH.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

7. HOLD SPEED — Keep moving at the current speed.

   _____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

   Describe change needed: _____

   _____

PT 5695A

8. HOLD SPEED AT XX Reach and keep moving at the stated speed in MPH.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

9. MARCH SPEED Reach and keep speed at 12-15 mph.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

10. CATCHUP SPEED Reach and keep speed at 20-25 mph.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

11. SPRINT Reach and keep the maximum comfortable speed.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

12. DASH Reach and keep the maximum safe/possible speed.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

13. SLOW STOP Deccelerate gradually to a gentle halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

14. STOP Deccelerate rapidly to a smooth halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

15. QUICK STOP Deccelerate immediatly to an abrupt halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

PT 5695A

FORWARD DIRECTION:

16. GUIDE RIGHT Turn to right through a 5-15 degree arc while keeping speed.
GUIDE LEFT Turn to left through a 5-15 degree arc while keeping speed.
___ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

17. TURN RIGHT Turn to right through a 90 degree arc while keeping speed.
TURN LEFT Turn to left through a 90 degree arc while keeping speed.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

18. HALF RIGHT Turn to right through a 45 degree arc while keeping speed.
HALF LEFT Turn to left through a 45 degree arc while keeping speed.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

19. TURN TO RIGHT Turn to right continuing until countermanded.
TURN TO LEFT Turn to left continuing until countermanded.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

20. STEADY ON Stop turning and continue forward in the current direction.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

21. HARD RIGHT Reduce speed, turn sharply through a 90 degree arc, resume speed.
HARD LEFT Reduce speed, turn sharply through a 90 degree arc, resume speed.
____ USE AS STANDARD ____ DO NOT USE ____ USE ONLY WITH CHANGE
Describe change needed: _____

_____

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21a. STRAIGHT AHEAD Continue moving forward in the current direction.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

PIVOT TURNS:

22. NEUTRAL RIGHT Neutral-steer to right through a 90 degree arc.

NEUTRAL LEFT Neutral-steer to left through a 90 degree arc.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

23. PIVOT RIGHT Neutral-steer to right through a 90 degree arc.

PIVOT LEFT Neutral-steer to left through a 90 degree arc.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

24. NEUTRAL RIGHT Neutral-steer to right continuing until countermanded.

NEUTRAL LEFT Neutral-steer to left continuing until countermanded.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

25. PIVOT RIGHT Neutral-steer to right continuing until countermanded.

PIVOT LEFT Neutral-steer to left continuing until countermanded.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

26. STEADY ON Stop turning and keep the current orientation.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

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REVERSE SPEED:

27. EASE BACK Accelerate backwards slowly to 2-3 mph.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

28. BACK UP Accelerate backwards gradually to 5-7 mph.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

29. MOVE BACK Accelerate backwards rapidly to 8-12 mph.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

30. SPEED UP Accelerate backwards to increase speed by half.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

31. SLOW DOWN Deccelerate backwards to decrease speed by half.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

32. STOP Deccelerate backwards rapidly to a smooth halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

33. QUICK STOP Deccelerate backwards immediately to an abrupt halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

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33a. SLOW STOP Deccelerate backwards gradually to a gentle halt.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

REVERSE DIRECTION:

34. BACK RIGHT Turn backwards to right through a 90 degree arc.

BACK LEFT Turn backwards to left through a 90 degree arc.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

35. BACK RIGHT Turn backwards to right continuing until countermanded.

BACK LEFT Turn backwards to left continuing until countermanded.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

36. BACK TO RIGHT Turn backwards to right continuing until countermanded.

BACK TO LEFT Turn backwards to left continuing until countermanded.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

37. STRAIGHT BACK Continue moving backwards in the current direction.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

38. STEADY ON Stop turning and continue backwards in the current direction.

_____ USE AS STANDARD _____ DO NOT USE _____ USE ONLY WITH CHANGE

Describe change needed: _____

_____

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OPINION QUESTIONS (CHECK ONLY ONE BLANK FOR EACH QUESTION):

39. Should a group of standard driving commands be approved by the Armor School, included in manuals and SOPs, and be used consistantly in all units? _____YES _____NO

Comments: _____

_____

40. How many commands (or right/left pairs) should be approved? (Enter Number) _____

Comments: _____

_____

41. Using a group of standard driving commands will make training drivers:

_____Much easier ____Somewhat easier ____No change ____Somewhat harder____Much harder

Comments: _____

_____

42. Using a group of standard driving commands will make the time needed for training drivers:

_____Much more _____Somewhat more _____No change _____Somewhat less _____Much less

Comments: _____

_____

43. Using a group of standard driving commands will make teamwork between the TC and driver:

_____Much better ____Somewhat better ____No change ____Somewhat worse _____Much worse

Comments: _____

_____

44. Using standard driving commands (after training) will make driver errors:

_____Many more _____Somewhat more _____No change _____Somewhat less _____Many less

Comments: _____

_____

45. Other general comments about using or training with standard driver commands:

_____

_____

_____

_____

_____

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BACKGROUND QUESTIONS:

1. Primary MOS/ Speciality _____ Secondary MOS/Speciality _____

2. Pay Grade (Check One): ☐ E-4 ☐ E-5 ☐ E-6 ☐ E-7 ☐ E-8 ☐ E-9

3. Time in Service ____years ____months Time in TOE Armor Units: ____years ____months

4. Current Duty Position: _____
   Unit Type (Circle One): TOE or TDA Time in Current Duty Position: ____years ____months

5a. Total Months Experience as a Tank Driver _____:
   Months as a Driver on M1 Tanks _____ Months as a Driver on M48/M60 Tanks _____

5b. Total Months Experience as a Tank Commander _____:
   Months as a TC on M1 Tanks _____ Months as a TC on M48/M60 Tanks _____

6. (Answer only if you are an OSUT driving instructor)
   Total hours you spend in conducting driver training during one training cycle _____

   What percent of this time is spent doing each type of activity (make percents add to 100%):
   Platform Instruction _____ Practical Exercises _____ Testing _____ Other _____

   What are the other activities? _____
   _____
   _____
   _____
   _____
   _____

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Appendix E

Command Item Responses in Final Survey

Table E-1

Distribution of Responses for Commands in the Final Survey

Item	Command	Response Frequency				
		Use	Not Use	Change	Missing	Answers
1	EASE OUT	48	21	2	0	71
2	MOVE OUT	64	2	3	2	69
3	SPEED UP	67	1	2	1	70
4	SLOW DOWN	68	1	2	0	71
5	SPEED UP TO XX	57	11	2	1	70
6	SLOW DOWN TO XX	60	10	3	0	71
7	HOLD SPEED	56	10	5	0	71
8	HOLD SPEED AT XX	52	14	4	1	70
9	MARCH SPEED	48	16	6	1	70
10	CATCHUP SPEED	53	12	3	3	68
11	SPRINT	21	46	2	2	69
12	DASH	25	46	0	0	71
13	SLOW STOP	48	18	4	1	70
14	STOP	69	1	1	0	71
15	QUICK STOP	37	30	4	0	71
16	GUIDE RT/LFT	50	15	5	1	70
17	TURN RT/LFT	63	5	3	0	71
18	HALF RT/LFT	47	21	2	1	70
19	TURN TO RT/LFT	42	22	4	3	68
20	STEADY ON	33	31	5	2	69
21	HARD RT/LFT	64	4	3	0	71
22	NEUTRAL RT/LFT(90°)	38	30	1	2	69
23	PIVOT RT/LFT(90°)	29	36	2	4	67
24	NEUTRAL RT/LFT	57	11	1	2	70
25	PIVOT RT/LFT	34	33	2	2	69
26	STEADY ON	30	34	6	1	70
27	EASE BACK	47	21	2	1	70
28	BACK UP	65	5	1	0	71
29	MOVE BACK	29	38	1	3	68
30	SPEED UP	55	12	3	1	70
31	SLOW DOWN	63	5	3	0	71
32	STOP	68	2	1	0	71
33	QUICK STOP	31	36	3	1	70
34	BACK RT/LFT(90°)	21	38	8	4	67
35	BACK RT/LFT	43	20	5	3	68
36	BACK TO RT/LFT	32	32	4	3	68
37	STRAIGHT BACK	68	3	0	0	71
38	STEADY ON	33	29	8	1	70
21a	STRAIGHT AHEAD	68	2	0	1	70
33a	SLOW STOP	40	29	1	1	70

Table E-2

Proportion of "USE AS STANDARD" Responses for Commands in the Final Survey & Tests of Group Differences

Item	19E BAT Instructors	19K BAT Instructors	ANCOC Students	Total	chi-square	p
1	.5455	.6250	.8400	.6761	5.067*	.079
2	.8571	1.0000	.9200	.9275	3.366	.186
3	.9545	.9583	.9583	.9571	0.005	.997
4	.9545	.9167	1.0000	.9577	2.109	.348
5	.7619	.8750	.8000	.8143	1.000	.607
6	.8182	.8333	.8000	.8451	0.188**	.910
7	.9545	.7917	.6400	.7887	6.950**	.031
8	.7273	.8750	.6250	.7429	3.967*	.138
9	.5000	.7826	.7600	.6857	5.163*	.076
10	.6190	.8261	.8750	.7794	4.078*	.095
11	.2857	.3043	.3200	.3043	0.063	.969
12	.3636	.3333	.3600	.3521	0.057	.972
13	.7619	.6667	.6400	.6857	0.848	.654
14	1.0000	.9583	.9600	.9718	0.925	.629
15	.5455	.4167	.6000	.5211	1.725	.422
16	.6190	.7500	.7600	.7143	1.339	.512
17	.9545	.9167	.8000	.8873	3.108	.211
18	.6190	.5833	.8000	.6714	2.979	.226
19	.7143	.6087	.5417	.6176	1.425	.490
20	.3636	.4783	.5833	.4783	2.220	.330
21	.9091	.9167	.8800	.9014	0.206	.902
22	.6667	.5000	.5000	.5507	1.640	.440
23	.2222	.5000	.5200	.4328	4.467	.107
24	.9524	.7500	.7600	.8143	3.496	.174
25	.3500	.5417	.5600	.4928	2.313	.315
26	.2857	.5000	.4800	.4286	2.520	.284
27	.6364	.6667	.7083	.6714	0.273	.872
28	.9091	.9167	.9200	.9155	0.019	.991
29	.4091	.5000	.3750	.4265	0.773	.679
30	.8182	.8333	.7083	.7857	1.315	.578
31	.9545	.8333	.8800	.8873	1.707	.426
32	1.0000	.9583	.9200	.9577	1.851	.396
33	.4545	.5000	.3750	.4429	0.778	.678
34	.3333	.3333	.2727	.3134	0.252	.882
35	.6190	.6250	.6522	.6324	0.060	.970
36	.4762	.4583	.4783	.4706	0.023	.989
37	1.0000	.9583	.9200	.9577	1.851	.396
38	.4091	.5417	.4583	.4714	0.835	.659
39	1.0000	.9583	.9600	.9714	0.884	.643
40	.5000	.6667	.5417	.5714	1.434	.448

Note. Degrees of freedom = 2 for each chi-square test.

*$p < .10$. **$p < .05$.

Appendix F

Written Comments in Final Survey

Recommended Command Changes[1]

1. EASE OUT

301) *Speed determined by mission (Battle Drills do as the leader do). Rd march speed determined by SOP.
316) Move out slow.
416) Move out slowly.

2. MOVE OUT

301) *Speed determined by mission (Battle Drills do as the leader do). Rd march speed determined by SOP.
318) It should mean from halt to moving.
320) Use to move slowly from halt.
411) *Depends on the tone of voice "Driver move out!!" means move as fast as possible.

3. SPEED UP

202) Until countermanded.
206) *Cutting speed by half may be too much or not enough.
408) Speed up 60xxx.

4. SLOW DOWN

202) Until countermanded.
206) *Cutting speed by half may be too much or not enough.

5. SPEED UP TO XX

202) Except in KPH.
203) *Too much said, drivers tend to look at speedometer instead of road.
306) Speed 20.

6. SLOW DOWN TO XX

202) Except in KPH.
203) *Too much said, drivers tend to look at speedometer instead of road.
212) A T.C. will not say 10mph, he will say approx 10mph. That way, the driver won't constantly be looking at the speedometer.
309) *Emergency.

---

[1]Responses marked by the asterisk (*) state general comments rather than recommend changes in the command.

7. HOLD SPEED

206) Steady means the same thing and is used in other parts of training to hold speed or move at same pace.
221) Steady.
321) Steady platform.
404) Use the word STEADY.
406) Commander should say steady to hold speed.
416) Maintain speed.
418) Steady.
425) Steady.

8. HOLD SPEED AT XX

412) Keep moving at stated speed
416) Maintain speed at XX
418) Steady speed
423) Hold speed

9. MARCH SPEED

212) Each tactical road march has a different speed range, IAW SOP.
216) March speed at 12-15 mph.
222) Road march speed.
409) *Not needed.
411) Road march speed.

10. CATCHUP SPEED

216) Catchup speed at 20-25 mph.
310) Just the word catchup should be used.
322) 20 mph should be catchup speed for M60 series tanks.
409) *Not needed.

11. SPRINT

203) *What is comfortable for him may be too fast.
206) *Use more military commands.
207) *Maximum comfortable speed could be any speed (use mph).
211) TC should announce comfortable speed.
214) *Unnecessary command.
215) *Use only if the environment that you are in is isolated from personnel or buildings, etc.
307) Speed up.
409) *Not needed.
423) Haul ass.

12. DASH

206) *Use more military commands.
211) TC should announce comfortable speed.

214) *Unnecessary command.
409) *Not needed.

13. SLOW STOP

202) Glide stop.
208) Step easy on the brakes.
411) Decelerate gradually until told different.

14. STOP

425) Quick stop.

15. QUICK STOP

203) *Explain that only if necessary.
206) Halt is more commonly used for the same thing in military.
212) *Due to reaction time of the gunner and loader before the driver slams on brakes.
220) *Only if the gunner doesn't have his head to the sight.
320) Use stop w/emphasis.
411) State "stop, stop!!" (Your first reaction in an emergency).
425) Stop.

16. GUIDE RIGHT/LEFT

204) 5-45 degree arc.
222) Bear right.
306) Go right. Go left.
313) Not needed, driver needs to know where he's trying to get to, micromanagement of driver's skills.
401) Why say "guide way," not just say "Go right-go left."

17. TURN RIGHT/LEFT

207) *Guide right and turn right is confusing.
401) Why say "guide way," not just say "Go right-go left." You just need to teach that drive before he gets in a tank.
416) Right turn-left turn.

18. HALF RIGHT/LEFT

207) Hard left or right.
222) Turn right until the TC gives straight ahead.
313) *Not needed, driver needs to know where he is trying to get to, micromanagement of driver's skills.

19. TURN TO RIGHT/LEFT

207) Hard right or right.
214) *Unnecessary command.

313) *Not needed, driver needs to know where he is trying to get to, micromanagement of driver's skills.
319) *Only in a training environment.
407) Hold left, hold right.
409) *No one will hear "Turn TO right, turn right-move out."
411) Turn to the right.
415) Turn right, turn left.
416) Turn around right or left.
417) *Depending on the speed traveling, number 17 could counteract.

20. STEADY ON

202) Hold position.
207) Forward.
211) Steady straight.
221) Straight ahead.
307) This is used by the gunner.
313) *Could easily be confused with the TC command to the gunner.
316) Stop and move out.
403) Straight.
407) Straight.
409) Move out-straight ahead.
415) Straight.
419) *Reason being the command to gunner may be steady on.
421) *Could confuse with gunner CMD.

21. HARD RIGHT/LEFT

318) Continuing to turn until countercommand.
409) *Slow down, turn right-speed up-too many commands for any action will not be remembered.
411) Do not reduce speed. (In combat I'm not slowing down!)
415) Reduce speed, turn sharply until countermanded.

21a. STRAIGHT AHEAD

22. NEUTRAL RIGHT/LEFT (90°)

214) *Use for any neutral or pivot steer.
220) Tell the driver when to stop.

23. PIVOT RIGHT/LEFT (90°)

220) Tell the driver when to stop.
409) *Both uses.

24. NEUTRAL RIGHT/LEFT

416) Neutral around right or left.
417) *Number 22 would serve for neutral steering.

25. PIVOT RIGHT/LEFT

409) *Both uses.

26. STEADY ON

202) Hold position.
211) Steady stop.
307) *This is used by gunner.
313) *Another term for the same thing should be used.
403) Straight.
406) Change to stop.
407) Stop.
409) Straight ahead on move-out.
414) Stop.
415) Stop.
417) *This is part of a fire command.

27. EASE BACK

203) *I like to keep commands easily understood, backup works great.
307) Slow down.
316) Backwards slow.
403) Back slow.
411) Back slow.

28. BACK UP

202) Back up at XX speed.
406) Commander should repeat backup until he wants the driver to stop, then say stop.
410) *I don't think a driver needs to accelerate 5-7 mph backwards unless he was in a combat environment. (You need ground to backup)

29. MOVE BACK

315) Command not needed.
403) Backup.
409) *Confusing.
410) *I don't think a driver needs to accelerate 5-7 mph backwards unless he was in a combat environment. (You need ground to backup)
418) Back up quickly.

30. SPEED UP

202) Until countermanded.
206) *Half of your speed may be too much or not enough.
410) *I don't think a driver needs to accelerate 5-7 mph backwards unless he was in a combat environment. (You need ground to backup)
418) Faster.

31. SLOW DOWN

202) Until countermanded.
206) *Half of your speed may be too much or not enough.
208) Steady backwards.
410) *I don't think a driver needs to accelerate 5-7 mph backwards unless he was in a combat environment. (You need ground to backup)

32. STOP

211) Slow stop.
410) *I don't think a driver needs to accelerate 5-7 mph backwards unless he was in a combat environment. (You need ground to backup)
425) Quick stop.

33. QUICK STOP

206) Use halt.
307) Stop.
320) Use stop w/emphasis.
403) Stop.
410) *I don't think a driver needs to accelerate 5-7 mph backwards unless he was in a combat environment. (You need ground to backup)
411) Stop, stop!!
425) Stop

33a. SLOW STOP

307) Stop.
407) Stop slowly.

34. BACK RIGHT/LEFT (90°)

208) Back up, hold left or right track.
214) Hold right or hold left.
219) Hold your right track for left turn. Hold your left track for right turn.
220) *Guide the driver to the degree of turn.
302) Back up hard right/left.
306) Back up hold right. Back up hold left.
320) Hold your right or left track.
323) Tell driver which track to hold while backing up.
401) It's hold left or right track.
407) While in reverse, just say "Hold left track." While in reverse, just say "Hold right track."
418) Right track left track when going in reverse.
416) Right track or left track.
422) Right track or left track.

35. BACK RIGHT/LEFT

209) Hold your left track or right track.
215) *Needs to signify some difference in commands.
320) Hold your right or left track.
323) Tell driver which track to hold while backing up.
401) It's hold left or right track.
407) While in reverse, just say "Hold left track." While in reverse, just say "Hold right track."
418) Right track, left track.
422) Right track or left track.

36. BACK TO RIGHT/LEFT

215) *Need to signify some difference in commands.
320) Hold your right or left track.
323) Tell driver which track to hold while backing up "Hold your right or left."
401) It's hold left or right track.
407) While in reverse, just say "Hold left track." While in reverse, just say "Hold right track."
409) *Confusing-no one will hear back to right.
422) Right track or left track.

37. STRAIGHT BACK

38. STEADY ON

202) Hold position.
302) Straight back.
307) *This is used by the gunner.
316) Stop and straight back.
320) Straight.
403) Straight back.
407) Straight back.
414) Stop.
418) Straight back.
415) Straight.

RESPONSES TO OPINION QUESTIONS

39. APPROVAL?

202) But not too many to confuse drivers.
204) It's not necessary.
207) Most units used to the old system.
211) Once the soldier understands standard driving comments, driver training will be much safer for the crew.
212) As long as they don't have to be verbatim like fire commands.
213) The Tank Commander already has enough commands to issue without having to learn more.

214) It is more or less like this already with the exception of being in manuals.
301) Driving commands should be incorporated with the missions of the tank unit - (shoot, move, communicate).
307) Each Tank Commander controls his tank in different ways.
310) It would be a waste of money and time to print it up because no one will follow it.
313) Most (80%) of these commands are already in common usage, the ones that are not have very little use.
318) Less confusions.
402) There should.
403) TCs will or have developed commands needed for the situation. 407) Because we replace one driver with another, he should be used to the same commands.
409) Non-standard cause confusion-must be simple.
414) That way, drivers (AIT grads) will have a working knowledge of Dr. Cmds when they come to the units.
415) Could avoid irate TC's and accidents caused by confusion.
423) Aid in adapting new drivers to unit.

40. NUMBER?

212) Two right, two left.
214) One per action.
221) Small amount keeping commands simple and very basic, commands should be self-explanatory.
309) Two left and right.
310) That's hard to say, if you have a good crew, you might need 5, but then again, you might need 15.
313) Most (80%) of these commands are already in common usage, the ones that are not, have very little use.
319) Only as many as are needed to move the vehicle quickly and safely (right turn/left turn)(hard right/hard left).
320) As few as possible-keep it simple and direct.
323) As few as possible KISS.
402) Driver should be able to understand and to respond to them.
403) (1) Move out, (2) Stop, (3) back up, (4) turn right or left, (5) neutral right or left.
406) Only enough to get the job done safely.
409) Too many commands will not be remembered. Keep them as simple and few as possible.
411) 5 to 10 tops. (Keep it simple, people forget under stress).
414) Commands should be kept to a minimum-if you have too many CMDs, the drivers will be totally confused.

41. TRAINING DIFFICULTY

202) Have too many new drivers get confused.

203) But if individual does not understand English or know his right from his left?

204) There is already a basic set of commands used that are easily understood. Why waste more money on trying to develop new commands?

208) If they understand them.

210) First of all, you have to have all TCs to learn these standards which will take a while.

213) They are trying to learn the equipment and don't need to be confused trying to learn specific commands.

216) With everything else IET soldiers have to remember, if you tried to give direct commands for turning and such they're going to be worse off than if you just try to describe the maneuver needed.

220) Even if driving commands were set, it will go too much for T.C. (Old one) T.C.s today use good commands.

222) Because most T.C. use the same command already.

307) Each tank commander controls his tank in different ways. 313) Things will continue as they have for years.

403) Too many different driving commands would confuse people with different types of backgrounds.

414) Drivers will have a foundation to build on. There will be no changes from unit to unit or TC to TC.

425) Put tentpeg has enough to remember but still try to use standard commands.

42. TRAINING TIME

204) Because they will require extra class time to explain commands. More money wasted and time lost.

213) They are confused by the equipment itself.

224) Because of extra time for extra commands to learn.

311) Because trainees will now need to have a formal block of instruction on standard driving commands, and TCs will still use the same commands.

414) Initially it will take more time to retain drivers, but once the system is learned, it will take less time.

416) Depends on how sharp the soldier is.

423) Current TCs getting used to the system will have a problem.

43. TEAMWORK

204) Commands already exist.

212) TC will then have two types of commands he must learn verbatim.

222) In a line unit.

313) Need to learn MTOE driver commands.

401) How long will you have that same driver?

414) Right now there is some confusion between T.C., gunner, and driver. Many T.C.s do not train their drivers.

419) You don't want TC to have to tell driver every move to make.

44. ERRORS

203) New drivers make mistakes.
204) All the driver needs is common sense.
212) The direction of the driver depends all on the T.C.
217) Because drivers still will panic when driving.
224) The T.C. is always supposed to be in command of his vehicle.
414) If standard driving commands are clear and concise-if they are not, you're just wasting time and money.

45. GENERAL

203) I personally think that tight control by the tank commanders and a quick brief before driving helps a lot. But people who have not driven anything prior to tank will still have problems.
204) Why fix something that's not broken?
208) Some changes should be used, but most now are good.
212) I think driver commands are not necessary.
214) Using standard driving commands will help in training drivers, however, I don't feel like the results after training will be that great, for the simple reason you have experienced drivers who make mistakes.
219) Backing up commands are no problem to a trained crew even though they are opposite (in essence of direction). These only work well when trained and coordinated.
221) Small amount keeping commands simple and very basic, commands should be self explanatory.
223) Leave it to T.C. on how to control his own tank.
301) Most of the speed and commands are given in - 17-12-3.
302) Sometimes it takes three or four times saying a command for a driver to do what you want! It costs the Army a lot of money for repair parts when you go off the course or road, (i.e. $9000.00 last Feb 87).
309) Trainees just ain't never drove a tank. That's why nothing will make a difference.
311) Trainees have enough information shoved into their heads. It won't make them better driver, just more confused.
313) A waste of time. A crew will work best using its own system anyway.
315) You have too many different commands.
318) If you can tell your driver exactly what direction you want to go in a command, there is less confusion, more time for T.C. to evaluate the situation.
320) Keep simple and direct, i.e. backup, hold right, straight back, stop, move out - you can supplement to basic command when needed.
401) I think the only thing we need to do is train our drivers before they get to the unit. By this, I mean me as a T.C. or PLTSGT, we have more things on our minds then telling our drivers what to do all the time. If he is sent to school, he will know how to handle any situation that he comes up against. Driving, in one sense, is experience and it's hard to teach, but

on the other hand, if we take time and work with them to let them see what type of situation they are up against and let them deal with it, then they learn from it. I, as T.C. even put the driver in the T.C's position and I drove and I told him what to look for and after that I really didn't have that much problem.

402) Driver training should be implemented in the driver compartment, needs over 110 hrs of training in the vehicle itself.

403) Recommend only the 5 basic commands as stated in item #40.

407) Standardizing commands for drivers is a good thing, but once it happens, we have to enforce it and use it correctly.

408) Yes it will.

409) Keep commands very straight forward-simpler the better, fewer the better.

412) Yes, it should be standard throughout the Army and taught in basic training.

414) They should be clear, easily understood by all. Also, the gunners should be trained when the drivers are trained. You don't want the gunner traversing the main gun, knocking off a bus or building because he thought the command was directed to him, and the same goes for the driver.

415) If OSUT training uses standard commands-new troops will respond to the TC much more rapidly with fewer mistakes.

416) Standard drivers' commands are just fine, but if your CVC equipment is in poor shape, i.e. missing ear pads, too much static, these new commands will also be hard to hear. In addition, other radio nets coming across you intercom will interfere.

417) This helps new personnel move from one station to another. He will fall into place much easier.

418) Only a few changes should be made, but the rest, in my opinion, should stay as standard.

419) I say, yes, we need to standardize, but we don't need to blow it out of proportion. Keep it simple.

423) A lot of times, a driver gets an idea of degree by inflection of TCs voice i.e. stop and STOP!!

425) Tell your driver one thing and he can still think you say another.