TC 21-306

HEADQUARTERS, DEPARTMENT OF THE ARMY

Tracked Combat Vehicle Driver Training

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TRACKED COMBAT VEHICLE DRIVER TRAINING

TABLE OF CONTENTS

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* This publication supersedes TC 21-306, 10 February, 2000.

PREFACE

This training circular (TC) provides the unit commander, vehicle commander, and the vehicle driver with the basis for developing a tracked combat vehicle driver training program and can assist commanders in selecting highly qualified drivers.

TC 21-306 is a result of the Chief of Staff of the Army's (CSA) direction to the Training and Doctrine Command (TRADOC) to develop tracked and wheeled vehicle driver training programs, to include the development of training support packages (TSPs) that will standardize driver training Armywide. The TSPs described in this publication fulfill that requirement for tracked vehicles by providing units with flexible training programs that can be implemented as stand-alone courses or integrated into existing training. The intent is not to burden unit commanders with unrealistic training programs that cannot be resourced. The goal is to provide units with TSPs to support driver training that promotes safe driving practices, accident avoidance, and technical competence. This TC deals with the training of tracked combat vehicle drivers in support of this program.

The information contained in this publication is applicable to the Active Army, the Army National Guard/Army National Guard of the United States, and United States Army Reserve that use these tracked combat vehicles unless otherwise stated.

The proponent of this publication is TRADOC. Record comments and recommendations on Department of the Army (DA) Form 2028 (Recommended Changes to Publications and Blank Forms) and send the form directly to Commander, U.S. Army Armor Center, ATZK-TDT-TD, 204 1st Cavalry Regiment Road, Suite 216, Fort Knox, KY 40121-5123.

Unless otherwise stated, masculine nouns and pronouns refer to both women and men.

CHAPTER 1

INTRODUCTION

1-1. PURPOSES

The primary purposes of this publication are to −

a. Supplement Army Regulation (AR) 600-55 (The Army Driver and Operator Standardization Program [Selection, Training, Testing, and Licensing]) by providing guidance on how to obtain and use lesson outlines, written and hands-on performance tests, and listings of supporting training materials for all tracked vehicles.

b. Provide leaders with the tools needed to meet the challenge of producing quality drivers. Leaders need to emphasize driver training because high-technology, high-performance tracked vehicles demand greater driver skills and knowledge.

c. Provide tracked vehicle drivers with the techniques to enhance their driving skills. The driver must know how to operate the equipment effectively in all environments. The driver must be challenged to use safe driving practices and increase his awareness for accident avoidance.

1-2. SCOPE

This TC does not replace AR 600-55 which specifies the regulatory requirements for selecting, training, testing, and licensing drivers. Instead, it provides guidance on how to obtain and use training support packages (TSPs) developed by the Army proponent for each tracked vehicle. Unit commanders have the flexibility to make minor modifications in these training support packages. Unit constraints on terrain and resources may limit the extent to which a TSP can be implemented. However, drivers must pass the tests in the TSPs to be issued an Optional Form (OF) 346 (US Government Motor Vehicle Operator's Identification Card) according to Chapter 6, AR 600-55.

1-3. SUPPORTING MATERIALS

The supporting materials unique to each tracked vehicle are listed at the end of the TSPs. The following materials apply to all tracked vehicles:

a. AR 600-55 describes the following:

(1) Responsibilities for conducting the motor vehicle driver program.

(2) Licensing requirements for applicants for motor vehicle driver positions.

(3) The process for choosing potential drivers.

(4) The training program for drivers of all types of vehicles and equipment.

(5) The testing program.

(6) Controls on issuing licenses.

(7) Types of licenses that may be issued.

(8) The procedures for renewing, revoking, or suspending licenses.

(9) Procedures for qualifying operators to use special equipment and night vision devices.

b. Soldier Training Publications. The individual tasks in the TSPs were derived from the Soldier training publications for military occupational specialties (MOSs) with tracked vehicles.

c. AR 385-55 (Prevention of Motor Vehicle Accidents). This regulation establishes responsibilities and procedures for carrying out the Army Safety Program's motor vehicle accident prevention effort.

1-4. CONTENTS

This TC is organized into five chapters, an appendix, a glossary, and references.

a. Chapter 1, Introduction – explains the purposes, focus, and contents of the manual.

b. Chapter 2, Driver Selection, Training, and Supervision – describes a system for identifying, selecting, and qualifying tracked vehicle drivers.

c. Chapter 3, Safety Awareness – examines the safeguards necessary to ensure tracked vehicle operators do not place the physical well being of people in jeopardy.

d. Chapter 4, Environmental Awareness – examines the safeguards necessary to make sure the environment is not placed in jeopardy by tracked vehicle operators.

e. Chapter 5, How to Use the Training Support Packages (TSPs) – describes the content of the TSPs referenced in this publication and how to implement them as stand-alone courses or integrate them into existing training.

f. Appendix A, Tracked Combat Vehicle Driver TSPs – lists all available TSPs.

g. Glossary – contains an explanation of abbreviations and acronyms used in this manual.

h. References – list all material necessary to manage and supervise the driver training program properly. Changes to these publications and current publication dates can be found in DA Pam 25-30 (Consolidated Army Publications and Forms Index).

1-5. RECOMMENDED CHANGES

As a user of this TC, you are encouraged to recommend changes and make comments for improvement. In your comments, note the specific page, paragraph, and line where changes should be made. Give reasons for each comment so your recommended change will be understood and completely evaluated. If you have detailed changes to recommend, prepare your comments on DA Form 2028 or write them on plain paper and forward directly to −

Commander
U.S. Army Armor Center
ATZK-TDT-TD
204 1st Cavalry Regiment Road
Suite 216
Fort Knox KY 40121-5123

E-mail address: DTDD.AnalysisBranch@knox.army.mil

Note: Your name, rank, and unit address must be printed clearly to make sure you receive a prompt reply.

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CHAPTER 2

DRIVER SELECTION, TRAINING, AND SUPERVISION

This chapter outlines a system (described in detail in AR 600-55) for identifying, selecting, and qualifying trainers and drivers. The driver's contribution to combat efficiency is not always recognized or appreciated; his performance is a critical factor in keeping a vehicle in operation. Even the best-designed and best-constructed vehicles, maintained by the best operators and mechanics in the Army, cannot compensate for poor driving practices. Poor driver training may cause a unit to fail in its mission.

2-1. PREPARATION FOR DRIVER TRAINING

Effective driver training is the result of careful planning and thorough instruction. Before instruction begins, make a careful and complete estimate of the driver training requirement. Based on this estimate, develop plans and schedules. Select and train instructors. Make sure adequate facilities and equipment are available.

Make sure the unit has a current file of all Army, post, and unit publications and policies that pertain to driver training. Students should be made aware of all regulations during the first phase of training.

2-2. ESTIMATE OF DRIVER TRAINING SITUATION

a. When preparing to conduct a driver training program, make an estimate of the driver training situation by answering these questions:

(1) How many personnel require qualification (monthly/annually)?

(2) How many previously licensed drivers need verification or recertification?

(3) What are the capabilities and general experiences of new drivers who need qualification?

(4) What are the seasonal requirements for unit location?

(5) How much time is available?

(6) What type of tracked-vehicle accidents has the unit experienced?

(7) How many instructors are available?

(8) Will the training be part of unit in-processing?

(9) What special training do the instructors require?

(10) What facilities, supplies, and equipment (including training aids, vehicles, and driving ranges with varied terrain) are available?

(11) What major training events are scheduled for the unit?

b. Analyze the answers to help develop and organize an effective plan to carry out the training. In organizing the training program, analyze the appropriate TSP to determine the following:

(1) The number of instructors who need training and a schedule for their instruction.

(2) The duties and responsibilities of each instructor.

(3) The number of drivers who require training or retraining and a schedule for their instruction.

(4) How students will be grouped and how each group will be rotated.

(5) What facilities, supplies, and equipment are needed and how to get them ready.

(6) The standards for training required by the appropriate TSP and your unit's needs.

2-3. INSTRUCTOR SELECTION

Select the best noncommissioned officers for vehicle drivers, maintenance personnel, and instructors. Normally a battalion-level officer will be responsible for the selection and training of instructors. All prospective instructors should −

- Be competent and well trained in their MOS.
- Be qualified to operate the equipment and licensed for one year.
- Have technical knowledge of the equipment.
- Have the knowledge and experience necessary to instruct.

2-4. INSTRUCTOR TRAINING

a. Instructors should be given refresher training to sharpen their skills and help them become more proficient instructors. It may not be necessary for instructors to take the entire course that the students receive; however, the entire course must be covered to make sure instructors are familiar with all teaching points. Refresher training should cover −

(1) Army, state, local, installation, and unit driving regulations.

(2) Safe driving procedures.

(3) Seasonal hazards.

(4) Operator maintenance and use of the operator’s manual.

(5) Environmental protection procedures.

b. Emphasize the importance of observing student driving techniques so errors can be corrected immediately.

c. Provide special training for giving the physical qualifications test, the written tests, and practical exercises. The instructor must know and understand the purpose and

nature of the tests given. He must adhere to the test administration guides in the TSPs. Prior to the examinations he must know and thoroughly understand the standards of the test and how it is scored. (This information will be outlined in the test administration guide for each examination.)

2-5. DRIVER SELECTION

a. Select the best-qualified personnel (see AR 600-55). Eliminate poor training risks before training starts; poor drivers often cause units to lose valuable training time by causing injury to themselves or others or by damaging equipment. When selecting personnel for training as tracked vehicle drivers, it is best to pick those with previous driving experience; however, a person with no previous experience can be taught to operate a tracked vehicle if the requirements are met. Once you have selected a driver, record information obtained from the interview, battery tests, physical qualification tests, and the road test on DA Form 348 (Equipment Operator's Qualification Record [Except Aircraft]). (For proper use of this form, see AR 600-55.)

b. Records Review. The commander or his designated representative will review the following records:

(1) DA Form 2-1 (Personnel Qualification Record-Part II). Eighth grade reading comprehension level is required for filling out the required forms and records.

(2) DA Form 348.

(3) Medical profiles.

c. Interview. After reviewing the records, an interview will reveal useful information about the individual under consideration. During the interview, note any characteristics that might affect driver performance.

(1) Areas of concern include:

(a) Maturity.

(b) Attitude.

(c) Past driving record.

(d) Hearing.

(e) Extreme nervousness.

(f) Any abnormal characteristics that would negatively affect driver performance.

(g) Medication (used regularly) that causes drowsiness, impairs vision, or affects coordination. Check with medical personnel regarding concerns about medication.

(2) Suggested questions for the interview are −

(a) How much experience have you had in driving a passenger car?

(b) How many miles have you driven during the past 12 months?

(c) Have you ever driven a tracked combat vehicle?

(d) Have you operated any heavy equipment such as tractors, road graders, or bulldozers? If so, for how long?

(e) How much experience have you had driving a truck of ½-ton or greater capacity?

(f) Have you ever driven a truck with all-wheel drive?

(g) Have you had an accident in which someone was injured or property damage exceeded $1,000? If so, explain who was at fault and how, in your opinion, the accident could have been avoided.

(h) Have you had any traffic violations?

(i) How do you account for your good or bad driving record?

(j) Do you think you would make a good tracked vehicle driver? Why?

(k) Can you repair automobiles or related machinery? If so, what is your experience with this sort of work?

(l) Do you have any problems with your eyes that would affect your driving ability (day or night)? Do you wear corrective lenses?

(m) Do you have any hearing problems?

(n) Do you know of any physical problems that might affect your ability to drive?

(o) Have you ever been involved in a drug or alcohol offense?

2-6. PHYSICAL QUALIFICATIONS TESTS

a. General. Military personnel are required to undergo periodic medical examinations according to AR 40-501 (Standards of Medical Fitness). In addition, AR 600-55 requires that potential drivers undergo physical qualification tests. The purpose of these tests is to make sure that all operators of motor vehicles possess at least minimum physical requirements for safe driving. In addition, they are intended for diagnostic, guidance, and counseling purposes. AR 600-55 describes the procedures for administering the physical qualification tests in detail. This section summarizes the primary components.

b. Equipment. The Portable Driver Testing and Training Device contains all the materials and instructions necessary to conduct physical qualifications test. The equipment can be requisitioned through supply channels, or, if assistance is required, the post safety officer can properly identify the model and source of supply. Equivalent testing instruments may be constructed locally, provided they are made to accurately measure the physical characteristics as prescribed in the following paragraphs.

c. Testing Conditions. The general conditions of the test situation are prescribed in Section III, AR 611-5 (Army Personnel Selection and Classification Testing). In addition,

the rooms in which the tests are given must be well lighted (without glare) and well ventilated. The examinee should be made comfortable so that physical discomfort will not affect test results. If it is necessary to test more than one examinee at a time and the same room is used for more than one test, testing should be conducted to minimize distractions. The reaction time test must be given under conditions that are free from noise and other distractions.

d. Supplementary Instructions to Examiners. The following instructions apply to all physical evaluation testing and supplement the specific instructions accompanying the equipment.

(1) Before giving any test, become knowledgeable on the purpose of the test, the equipment to be used, and the prescribed procedure. Give a number of trial tests to become familiar with the test and test procedures.

(2) Before each test, explain its purpose to the examinee and tell him what is expected.

(3) Record measurements on DA Form 348, or an equivalent official form.

(4) On completion of testing, inform the examinee of specific physical limitations.

(5) Describe compensating measures that may be taken.

e. Physical Characteristics to be Tested. Measure physical characteristics in the order they are listed in the following paragraphs.

(1) Visual Acuity.

(a) Purpose. To determine whether the examinee can see well enough to drive safely.

(b) Minimum standard. Uncorrected distant visual acuity of any degree that is correctable to not less than 20/40 with a numerical designator of "1," "2," or "3" under the "E" factor of the physical profile serial. Tested with both eyes open, a visual acuity of 20/40 must be attainable with corrective lenses, as required. All Army drivers who require corrective lenses to attain 20/40 visual acuity will be required to wear their corrective lenses while operating any Army vehicle. Operator permits will be annotated to reflect this requirement.

(2) Field of Vision.

(a) Purpose. To determine whether the examinee can see to the side while looking straight ahead.

(b) Minimum standard: A lateral range of 75 percent on each side of the focus line is the minimum standard acceptable for each eye. If the standard is not met, the examinee will be referred to appropriate medical personnel to determine if his lateral vision is sufficient for safe driving.

(3) Depth Perception.

(a) Purpose. To determine how well the examinee can judge distances.

(b) Minimum standard: None; the results of this measure are used in driver counseling and training.

(4) Color Perception.

(a) Purpose. To determine if the examinee is colorblind.

(b) Minimum standard: The examinee will not be disqualified for a vehicle operator's license because of colorblindness. However, if there is any indication of colorblindness, he will be given additional training on traffic light sequence, observation of other traffic, etc., which will enable him to drive safely.

(5) Foot Reaction Time.

(a) Purpose. To determine whether the examinee can move his foot quickly enough in response to driving conditions.

(b) Minimum standard: Reaction time up to and including 0.60 second is acceptable. If the examinee's reaction time is faster than 0.40 second, he will be cautioned about the possibility of rear end collisions; that is, because of his fast reaction time, any sudden application of brakes invites collision from vehicles behind him driven by persons with slower reactions. If his reaction time is between 0.50 and 0.60 seconds, he will be made aware of this slower time and told to allow extra following distance to compensate for the deficiency. If the reaction time of the examinee is slower than 0.60 second, he will be referred to appropriate medical personnel to decide if his reaction time is too slow to permit him to drive safely.

(6) Hearing Test.

(a) Purpose. To determine whether the examinee can hear well enough to drive safely.

(b) Minimum standard: Examinees must attain a numerical designator of "1" or "2" under the "H" factor of the physical profile serial to unconditionally pass the hearing test. Those scoring a "3" or "4" will be referred to appropriate medical personnel to determine if their hearing is sufficient for safe driving. All driver personnel are required to have an annual hearing conservation examination.

2-7. INCENTIVE PROGRAMS

Army policy encourages incentive awards programs to motivate personnel to improve their skills. Every organization should have an incentive awards program for its drivers to make sure they receive recognition for their efforts.

Competitive operator maintenance inspections, obstacle driving, and vehicle maneuvers are a few programs the commander may initiate. These events give drivers a chance to demonstrate their abilities. They also give the commander a chance to evaluate the unit's overall driver training program.

Expert driver badges or certificates presented to qualified drivers give them due recognition. To emphasize the importance of the awards, the commander should present them during a ceremony or formation. Requirements for these awards can be found in AR 600-8-22 (Military Awards).

2-8. PROGRAM ADMINISTRATION

Publications, forms, historical records, and reports are part of daily operations. The forms and publications used at the unit level should be part of the driver training program to make sure proper management control and compliance with maintenance procedures. These forms are covered in detail in AR 600-55.

Both the commander and trainer must be familiar with the publications that govern driving Army vehicles. The manuals listed in the References section are necessary to properly manage and supervise the driver training program.

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CHAPTER 3

SAFETY AWARENESS

This chapter discusses safety and common causes of vehicle accidents, as well as the actions drivers, crews, and leaders should take to prevent accidents. Safety instruction is a command responsibility as defined in the AR 385-series. A training program emphasizing safety may prevent loss of life, damage to property and equipment, and personal injury. Safety practices and application must be monitored at all times during the training phase through performance to standards. Much of this information may already be incorporated in the TSP(s) for your unit's tracked vehicles. However, you may want to read this chapter, review your TSPs, and, where appropriate, supplement safety and environmental instruction for your unit's drivers.

3-1. FORCE PROTECTION

a. Safety is a component of force protection. Commanders, leaders, and Soldiers use risk assessment and management to tie force protection into the mission. Risk management assigns responsibility, institutionalizes commander’s review of operational safety, and leads to decision making at a level of command appropriate to the risk. The objective of safety is to help units protect combat power through accident prevention, which enables units to fight rapidly and decisively with minimum losses. Safety is an integral part of all combat operations. Safety begins with readiness, which determines a unit’s ability to perform its mission-essential task list (METL) to standard.

b. Risk management is a tool that addresses the root causes of accidents (readiness shortcomings). It assists commanders and leaders in not only identifying what the next accident is going to be, but it also helps identify who will have the next accident. Risk management is a way to put more realism into training without paying the price in deaths, injuries, or damaged equipment.

c. Safety demands total chain of command involvement in planning, preparing, executing, and evaluating training. The chain of command responsibilities include those listed below.

(1) Commanders −

(a) Seek optimum, not adequate, performance.

(b) Specify the risk they will accept to accomplish the mission.

(c) Select risk reductions provided by the staff.

(d) Accept or reject residual risk, based on the benefit to be derived.

(e) Train and motivate leaders at all levels to effectively use risk management concepts.

(2) Staff −

(a) Assists the commander in assessing risks and develops risk reduction options for training.

(b) Integrates risk controls in plans, orders, METL standards, and performance measures.

(c) Eliminates unnecessary safety restrictions that diminish training effectiveness.

(d) Assesses safety performance during training.

(e) Evaluates safety performance during after action reviews (AAR).

(3) Subordinate leaders −

(a) Apply effective risk management concepts and methods consistently to operations they lead.

(b) Enforce risk management in accordance with the commander's guidance and intent.

(c) Report risk issues beyond their control or authority to their superiors.

(4) Individual Soldiers −

(a) Report unsafe conditions, and act and correct the situation when possible.

(b) Establish a buddy system to keep a safety watch on one another.

(c) Take responsibility for personal safety.

(d) Work as team members.

(e) Modify individual risk behavior.

d. Risk management is a five-step cyclic process that is easily integrated into the decision-making process outlined in FM 5-19 (Composite Risk Management). The five steps are:

(1) Identify Hazards. Identify hazards to the force. Consider all aspects of current and future situations, the environment, and known historical problems.

(2) Assess Hazards. Assess hazards using the risk assessment matrix in Figure 3-1. Assess the conditions listed in each category to derive a numeric value where two conditions intersect. Then add the numeric value of each category to determine the Risk Value. This number will represent the level of risk for the operation assessed.

RISK ASSESSMENT MATRIX						
		Probability				
Severity		Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic	I	E	E	H	H	M
Critical	II	E	H	H	M	L
Marginal	III	H	M	M	L	L
Negligible	IV	M	L	L	L	L
E – Extremely High		H – High		M – Moderate		L - Low

Figure 3-1. Risk assessment matrix.

(3) Develop Controls and Make Risk Decisions. Develop controls that eliminate the hazard or reduce its risk. As control measures are developed, risks are reevaluated until all risks are reduced to a level where benefits outweigh potential costs. Accept no unnecessary risks and make any residual risk decisions at the proper level of command.

(4) Implement Controls. Put controls in place to eliminate the hazards or reduce their risk.

(5) Supervise and Evaluate. Enforce standards and controls. Evaluate the effectiveness of controls and adjust/update them as necessary.

Note: FM 5-19 should be used to train personnel on the five-step risk management process and the risk assessment matrix. To obtain a risk management training support package, contact the U.S. Army Combat Readiness Center, Building 4905, 5th Avenue, Fort Rucker, AL 36362-5363. (Web site: https://crc.army.mil).

3-2. DRIVER RESPONSIBILITIES AND GOVERNMENT LIABILITY

All Soldiers are responsible for operating both tactical and nontactical vehicles in a safe and prudent manner and in accordance with all driving laws, regulations and procedures. Failure to operate a vehicle in a safe and prudent manner can lead to administrative and military justice consequences such as reprimand, report of survey, Article 15, or more serious actions. A Soldier can be held financially liable for the damage caused to his vehicle or another Government vehicle.

The Government is also responsible for your actions as a vehicle operator. Accidents and property damage caused by Army drivers result in millions of dollars in liability for the Government each year. More dollars for accidents mean fewer dollars for training.

3-3. GENERAL SAFETY GUIDELINES

Everyone in the chain of command should strictly supervise driver training for tracked vehicle drivers. The following guidelines have proven to be effective when integrated into training and should be included in programs of instruction:

- Conduct a complete and thorough safety briefing before the start of all training sessions.
- Make sure all drivers are trained and licensed to operate their assigned tracked vehicles. During training, student drivers should have an OF 346 (US Government Motor Vehicle Operator's Identification Card) stamped "LEARNER" (a learner's permit). A licensed instructor must accompany a student driver with a learner's permit when he drives. The student must never be permitted to operate a tracked vehicle without proper supervision.
- Use caution when driving through towns and villages. Streets are sometimes narrow and difficult to negotiate. If the driver is in doubt, he should stop so the track commander can dismount a ground guide. Pay attention to pedestrians, and be aware that tracked vehicles draw curious people who have no idea how dangerous the vehicles can be.
- Be aware of vehicle height when entering tunnels, underpasses, and building overhangs close to roadways.
- Beware of icy spots on roadways, especially overpasses, which ice over very quickly.
- Be alert to the presence of overhead power lines. Before driving on roadways, tie down antennas to make sure they do not come in contact with overhead power lines.
- Be aware of steep or excessively rough terrain.
- Be aware of potential soft soil conditions or soil erosion.
- Recon the route of travel when possible.
- Make sure drivers understand all road signs and traffic signals. Despite their size, tracked vehicles do not always have the right of way on roadways.
- Before crossing any bridge or overpass, note the bridge load classification and the height and width limitations of underpasses. If the vehicle exceeds the classification, it cannot cross.

3-4. HEARING PROTECTION

Hearing loss is a concern among armor crewmen because of improper fit, wear, and maintenance of combat vehicle crewman (CVC) helmets. Commanders must make sure that each Soldier is properly fitted with a helmet and that the helmet is properly maintained. All crew members will wear CVC helmets; passengers will wear ear plugs

and Kevlar when the vehicle is operating. When the CVC helmet is worn, make sure that the chinstrap is fastened. The CVC helmet will not properly reduce sound unless it is fastened. Personnel should also wear hearing protection while performing maintenance on a tracked vehicle.

3-5. COMMUNICATIONS

Do not move a tracked vehicle until intercommunications have been established between all crew members. If communications are lost, the vehicle must halt immediately. The crew should troubleshoot the system, and notify organizational maintenance if assistance is required. For safety, the unit commander can authorize the movement or removal of the disabled vehicle.

3-6. ESCORT VEHICLES

A wheeled vehicle with rotating amber warning lights (RAWLs) should precede a tracked vehicle or column of tracked vehicles traveling on a road. On high-speed roads (such as an interstate or autobahn), when contact with the enemy is not imminent and traffic is normal, escort vehicles equipped with RAWLs and any required convoy signs or flags should be positioned in the front and rear of the convoy in accordance with local command policy.

3-7. SHOP AND MOTOR POOL

Certain precautions must be taken in a maintenance shop or motor pool. Oil, water, and antifreeze spills can cause serious injury. To prevent injuries, all spills must be cleaned up immediately and the work area should be kept clean at all times. Many injuries result from using the wrong tools and equipment. All personnel should be instructed in the proper use of tools. To prevent severe injuries to fingers, wrists, and limbs, all jewelry must be removed before mounting, dismounting, or performing operator maintenance on a vehicle. All military vehicles must be equipped with chock blocks. The chock blocks must be used when the vehicle is parked on inclines or whenever maintenance is performed.

3-8. HATCH COVERS

Injuries caused by unsecured hatch covers are common. All crew members must check the hatches before operating the vehicle to make sure they are serviceable and locked in the proper position. Many vehicles are equipped with chains to secure the hatches. If the vehicles are equipped with chains, they must be used.

3-9. RIDING POSITION

Crew members in a tracked combat vehicle must wear CVC helmets and ride with only their heads and shoulders extended (name tag defilade) out of the hatches. When a tracked vehicle collides or overturns, injuries are usually the result of crew members being thrown from the vehicle. If seat belts are installed, they must be worn.

3-10. SPEED CONTROL

Elements in a column of any length may simultaneously encounter many different types of routes and obstacles; this causes different parts of the column to move at varying speeds at the same time. To increase safety and reduce column whipping, the movement or march order should give march speed, vehicle interval, and maximum catch-up speed.

3-11. EMERGENCY STOPPING PROCEDURES

The driver may have to apply emergency stopping procedures in response to the loss of brakes, steering, or engine power. Refer to the appropriate vehicle technical manual (TM) for detailed emergency stopping procedures. If the TM does not contain information on emergency stopping procedures, the crew should perform the following:

- Driver notifies the vehicle commander that the brakes, steering, or engine power have malfunctioned.

WARNING: All crew members must remain inside the vehicle.

- Driver moves the gear select to N (neutral).
- Driver centers the steering column or laterals.
- Driver lets the vehicle coast to a stop.
- Driver sets the parking brake if the vehicle has one.
- Driver shuts down the engine once the vehicle has stopped.
- Vehicle commander notifies the chain of command.

3-12. MOUNTING AND DISMOUNTING TRACKED COMBAT VEHICLES

Commanders and crew members, especially drivers, must make sure the following rules for mounting and dismounting tracked vehicles are strictly observed by everyone:

- Use extreme caution when mounting or dismounting a vehicle.
- Never climb in front of a weapon to mount the vehicle. Tracked vehicle commanders must make sure that all weapon systems are clear and positioned to allow safe access.

- On stationary firing ranges, mount vehicles over the right rear sprocket, except vehicles with rear doors or ramps (M113/M2/M3) that are mounted from the rear.
- When mounting or dismounting a vehicle with the engine running, make sure the driver knows personnel are going to mount or dismount. On moving firing ranges, personnel should mount vehicles over the right front fender, except for tanks, which are always mounted over the right rear sprocket. Make sure the driver is aware of a crew member's intention to mount.
- Mount the M113, M577, and M901 vehicles from the front or rear (drivers only); crew members for these vehicles should mount from only the rear.
- Always maintain three points of contact (one hand and two feet or two hands and one foot) with the vehicle when mounting, dismounting, or moving around on the vehicle.
- Never mount or dismount a moving vehicle. Drivers must bring the vehicle to a complete halt before allowing anyone to mount or dismount.
- Never dismount a vehicle by jumping from it.

3-13. CREW EVACUATION DRILLS

Crew evacuation drills are often overlooked during training. The probability of an injury can be significantly reduced if crews practice proper evacuation techniques and conditions. Vehicle TMs provide emergency procedures, which should be incorporated into driver and crew training programs.

3-14. SLAVE STARTING

When slave starting a vehicle, always position the live vehicle alongside the dead vehicle. Never position the vehicles nose-to-nose. Do not stand between the moving vehicle and the dead vehicle; serious injury or death could result.

3-15. TRACKED VEHICLE ACCIDENTS

a. Fatigue and Sleep Loss. Fatigue and sleep loss are often factors in vehicle accidents. To minimize the effects of sleep loss, commanders must develop and follow a sleep plan based on the following considerations:

(1) At least five hours sleep is required to enable an individual to maintain optimal performance; humans do not adapt well to shortened sleep cycles.

(2) Physical strength remains unimpaired until extreme levels of sleep deprivation are reached.

(3) The most difficult jobs for the sleep-deprived are tasks requiring swift decisions or complex planning.

(4) Sleep loss typically causes errors of omission.

(5) Prolonged heat exposure, confinement, noise, and vibration (all of which are present in armored vehicles) degrade performance and ability to cope with sleep loss.

(6) Diminished awareness. Drivers should be checked for symptoms of fatigue or use of controlled substances. Personnel taking prescription drugs that may cause drowsiness should not drive.

b. Situational Awareness. To avoid situations conducive to accidental injury or to minimize the possibility of injury in those situations that cannot be avoided, drivers and crew members must be alert at all times. Take extra precautions when the vehicle's metal decks are wet, muddy, or snow covered. They become extremely slippery under those conditions. Likewise, drivers and crew members should remain alert to the position of guns, gun mounts, hatches, and other metal projections. Accidental contact with these or any other projected objects can result in serious injury.

c. Blind Spots. Most tracked vehicles have blind spots where the turret or hull blocks the forward or peripheral vision of the driver, preventing him from seeing objects on the ground. The vehicle commander and other crew members should help the driver identify objects in his blind spot. The driver should anticipate approaching objects that may fall into this blind spot as he nears them. If in doubt, the vehicle commander should use a ground guide to assist the driver.

d. Loss of Control. Driving too fast for the road conditions is the main cause for loss of control in tracked vehicles. If the driver loses control of his vehicle, he must take immediate steps to regain control of the vehicle. He must release the accelerator, avoid applying the brakes, and let the vehicle coast to a stop. If the vehicle is sliding, the driver must steer in the direction of the skid to regain control of the vehicle.

e. Rollovers. The safest place for a crew during a rollover is inside the vehicle. If a tracked vehicle is about to roll over, the driver must alert the crew members so they can drop inside the vehicle and assume a safe position by bracing themselves inside the vehicle. The driver must lower his seat and also brace himself inside the vehicle. Crews must practice rollover procedures.

f. Accident Prevention. To prevent accidents, drivers must −

(1) Adjust speed and interval to allow for wet road surfaces.

(2) Notify vehicle commander when he is getting sleepy.

(3) Employ proper techniques to prevent or recover from a skid.

(4) Be rotated frequently.

(5) Slow down after dropping off the edge of the roadway before pulling back on the pavement.

(6) Make sure vehicles have been safety inspected and maintained.

(7) Use the recommended pumping action in emergencies instead of locking the brakes.

(8) Allow for the added force of the weight of the vehicle when quick stops are necessary.

(9) Come to a complete stop and downshift at the crest of hills or steep grades to use the engine as a braking action to control speed.

(10) Know the distance required for braking at various speeds to make emergency stops safely. This factor is especially important for vehicles towing or moving heavy loads.

(11) React and brake when the brake lights of the vehicle ahead go on. Its driver has already reacted to something and the follow-on vehicles must slow down or stop in the remaining distance.

(12) After rest stops, inspect beneath vehicles for sleeping personnel.

(13) Use tow bars rather than cables to move disabled vehicles on roads. If tow cables are used, use a third tracked vehicle of equal weight or heavier as a braking vehicle.

(14) Always use a braking vehicle when towing an M1-series tank.

(15) Inspect personnel heaters to avoid carbon monoxide poisoning.

g. Fire Prevention.

(1) All crew members must be aware of the danger of fire when operating tracked vehicles. Flammables and miscellaneous items should not be stored in the vehicle. Leaders should establish some simple rules or an standing operating procedure (SOP) to help prevent fires on vehicles. (For details that apply to a specific vehicle, see the vehicle TM.

(2) Clean up all gasoline and diesel fuel spills immediately. Use only authorized cleaning agents. Never use gasoline or diesel fuel to clean up spills. All vehicles or convoys should have a spill kit. Follow the unit SOP to report spills, and the clean up and disposal of spill residue.

(3) All tracked combat vehicles are equipped with fire extinguishers, both fixed and portable; crew members must know how and when to use them. To make sure fire extinguishers are ready for instant use, periodically weigh or check them to determine operability and replace them if necessary.

(a) Fixed Fire Extinguishers. Fixed fire extinguishers that require only the action of a trip handle or sensor to operate are installed on vehicles to cover areas where fires are most likely to start. They should be inspected during the preventive maintenance checks and services, in accordance with the vehicle's TM. Do not start the engine of the tracked vehicle if the fixed fire extinguishers are inoperable or if they have been removed for maintenance.

(b) Portable Fire Extinguishers. Portable fire extinguishers are used to fight fires outside the effective range of the fixed extinguishers. The

portable extinguishers must be manned whenever the vehicle is being refueled. The portable fire extinguishers should be inspected during the preventive maintenance checks and services; if they are inoperable, they should be replaced or refilled before the vehicle is started.

h. Ground Guides. Ground guides are needed for tracked vehicles to be moved safely. Using ground guides is so routine that safety rules are sometimes overlooked. This must not happen. Train ground guides and drivers in standard hand and arm and flashlight signals before either guiding or driving a tracked vehicle. Drivers and ground guides must know and observe the following rules:

(1) Ground guides are required when a tracked vehicle is moved in a confined or congested area, during limited visibility, or if the driver is in doubt about adequate clearance; for example, on narrow bridges or in passages with low overhead clearances.

(2) Ground guides should never stand in front of a vehicle when the engine is running. The ground guide should stand beside the right or left fender when talking to or directing the driver.

(3) Ground guides must be used in cantonments, bivouac sites, and parking areas.

(4) Ground guides must never run in front of vehicles, or walk backwards while guiding vehicles.

(5) Flashlights with a colored filter should be used when vehicles are moved at night.

(6) Ground guides should walk 9 meters in front of, and to the left of, the left track to observe traffic to the front and rear of the vehicles. The ground guide is the correct distance from the tracked vehicle when the driver can see the ground guide’s feet.

(7) Any time a tracked vehicle is being moved in reverse and a ground guide is necessary, two ground guides must be used. The rear ground guide must always be visible to the front ground guide.

(8) If the driver loses sight of the signal, or if there is any question about the signal from the ground guide, the driver will stop until the signal is visible or the confusion is eliminated.

(9) The front ground guide will immediately signal the driver to stop if he loses sight of the signal of the rear ground guide.

(10) When a vehicle arrives at a night parking area (other than the occupation of an assembly area as a part of a tactical operation), a ground guide dismounts and establishes contact with the guard on duty. The guide and the driver must understand where the sleeping area is and where the vehicle is to be parked. The ground guide must search the area for people sleeping on the ground where the vehicle is to park before he moves the

vehicle into the parking area. As a minimum, blackout drive must be used, and if conditions permit, service drive turned on.

(11) All tactical sleeping areas must be marked with a chemical light or flashlight and have a guard equipped with night vision goggles (NVGs). The guard must hand carry a flashlight or chemical light to signal or guide vehicles. The guard must be briefed on his duties and on what actions he should take when a vehicle drives into the bivouac or assembly area. A loud, distinct, immediately audible warning device must either be carried by the guard or be accessible in case a vehicle enters the designated sleeping area. Troops who will sleep in the area must be briefed on what device is being used and what action they should take. (The unit SOP must specify the same information.) The first priority of the guard is to warn sleeping personnel; he then attempts to gain the attention of the vehicle driver or vehicle commander without endangering himself.

(12) All road accesses into the bivouac or assembly area must have a guard posted to warn vehicle crews that there are troops on the ground. The guard should help ground guide the vehicle to its destination, ensuring that, as a minimum, blackout drive is used. If conditions permit, use service drive.

i. Refueling Operations.

(1) Refueling is a total crew effort; assign each crew member specific duties and responsibilities during refueling. Drivers normally refuel the vehicle while other crew members take care of the remaining petroleum, oils, and lubricants (POL) requirements. The unit SOP must include the following refueling requirements:

(a) Any vehicle approaching a refueling point must have two ground guides, one front and one rear. The POL handler may act as ground guide.

(b) All vehicles should park on level ground with the parking brake on.

(c) The vehicle engine must be off.

(d) A crew member or fuel handler on the ground will have a portable fire extinguisher available.

(e) Vehicles must be grounded while refueling.

(f) No smoking will be allowed within 15 meters of the vehicle refueling point.

(g) Any spilled fuel on the vehicle should be cleaned up prior to moving out.

(h) All POL products stowed on board must be secured prior to moving out.

(i) Use drip pans under connections and valves to catch spills and drips.

(j) Ensure proper personal protective equipment is available and used.

(k) Ensure spill kit is available.

(l) Follow unit SOP for spill clean up, reporting, and disposal of waste.

(2) During tactical operations, the vehicle may be refueled under combat or simulated combat conditions. Assign each crew member specific duties and responsibilities during refueling. During tactical refueling, the driver remains in the driver's compartment, while the crew refuels the vehicle. Refueling under combat or simulated combat conditions should be the same as under usual conditions except −

(a) The vehicle will continue to run.

(b) The track commander and one crew member refuels the vehicle, while one crew member maintains security.

(c) A portable fire extinguisher must be held by the second crew member outside the vehicle.

(d) A fuel handler will be on the ground to supervise the refueling operation. He should have a fire extinguisher available in case of fire, as well.

j. Railhead Operations. A safety briefing should be conducted before railhead operations. The briefing should include the following:

(1) Do not smoke during loading operations. A smoking area should be designated at least 15 meters away from the nearest vehicle.

(2) Wear protective headgear until you are clear of the railcars.

(3) Be alert for hazards that could cause electrocution. All antennas and equipment stored on the outside of the vehicle should be removed or secured before moving onto the railcar.

(4) Do not stand on top of vehicles.

(5) Secure all gun tubes, M88 booms, and M578 cranes in travel lock before loading them onto the railcar.

(6) Do not stand on moving flatcars.

(7) Guide from at least a one-car interval away from the vehicle you are guiding. Ground guides will never guide from the railcars onto which their vehicles are loading.

(8) Do not walk backward while ground guiding on railcars or when you are in the path of a moving vehicle.

(9) Secure all hatches when the rail master has inspected the train and released it for movement.

(10) Loading is complete when the rail master has inspected the train and released it for movement.

k. Disabled Vehicles. If a vehicle becomes disabled, the crew should do everything possible not to obstruct traffic or create conditions that might cause an accident. If possible, the crew should move the vehicle out of the way and post guides. Approaching vehicles must be warned; flares, warning triangles, flashlights, and reflective vests are normally available as warning devices. At least two warning triangles should be carried on each vehicle. To alert traffic to a disabled vehicle, the crew should place the triangles on the shoulder of the road 100 meters behind the vehicle.

l. Rough Terrain.

(1) Tracked vehicles travel easily and quickly over rough terrain, which may give drivers false confidence in their driving ability. Many accidents occur when a tracked vehicle is moving tactically cross-country, and the driver either fails to see or underestimates an obstacle, such as a hole or ditch, and attempts to negotiate it too quickly. This can break a track and cause steering loss or stress the vehicle and cause mechanical failure, either of which may result in crew casualties or serious injuries. Drivers often forget that other crew members may not be in secure seating positions and may be thrown around inside of vehicles because they cannot see the terrain and brace themselves accordingly. The driver and tracked vehicle commander must warn crew members when driving under tree limbs and man-made features so crew members can react and seek safety.

(2) The difficulty of negotiating rough terrain is compounded when visibility is poor (such as driving through snow, rain, sleet, fog, dust, sand, or battle smoke). Drivers and tracked vehicle commanders must adjust their vehicle speed accordingly to ensure the safety of the crew and vehicle. Some of the reasons drivers may lose control of a tracked vehicle are –

(a) Loss of steering.

(b) Loss of brakes.

(c) Loss of track.

(d) Excess speed.

(e) Oversteering.

(f) Improper braking and downshifting.

(g) Adverse weather conditions.

(h) Faulty roadbed.

(i) Very rough or unstable terrain.

(3) Tracked vehicle drivers and commanders should observe the following rules when negotiating rough terrain:

(a) Alert crew members when approaching rough or unstable terrain.

(b) Scan the area ahead of the vehicle to detect obstacles, holes, and ditches as early as possible.

(c) Use common sense to judge a safe speed to negotiate obstacles, holes, and ditches.

(d) Make sure all equipment inside the vehicle, especially ammunition and empty canisters, are secured before negotiating rough or unstable terrain.

(e) Make sure crew members and passengers wear installed seatbelts at all times.

(f) Make sure all hatches are in the locked position before encountering rough terrain. Have crew members periodically inspect open hatches to make sure they stay in the locked positions. Safety pins must be in place.

(g) Warn the crew when approaching overhead obstacles.

(h) Warn the crew when the vehicle goes out of control.

(4) Unit commanders and tracked vehicle commanders must remember that the urgency of tactical maneuvering does not outweigh the safety of the crew and vehicle. It is the tracked vehicle commander's responsibility to make sure the driver operates the vehicle at safe speeds to allow control of the vehicle at all times. Safe vehicle operation is directly affected by the terrain and weather conditions.

m. Night Operations

(1) Limited Visibility.

(a) Night driving operations demand extraordinary precautions by the driver and tracked vehicle commander. They must adjust the speed of the vehicle to ensure the safety of the crew and vehicle. Limited visibility will cause the driver to lose sight of emerging terrain, obstacles, or oncoming traffic. Drivers should not look directly into oncoming headlights because this may cause temporary blindness. The driver should watch the right edge of the road until the oncoming vehicle has passed. Once night vision is lost, it takes several minutes to regain it.

(b) If a life-threatening situation occurs in a training environment during limited visibility or night driving conditions, the vehicle's service driving lights and interior white lights should be turned on (subject to the unit commander’s policies). This action warns other vehicles of the presence of the tracked vehicle, indicates there is an emergency, and lets the crew see. Radio the emergency on the unit frequency and explain the nature of the problem and the required help. Commanders should specify in the unit SOP that blackout marker, or blackout drive as a minimum, be used during all night maneuvers.

(c) When driving during limited visibility in a nontactical mode, service drive lights should be turned on. These rules should be in the unit SOP and applied during normal operations. During limited visibility or blackout operations, the unit commander and tracked vehicle crew should make sure that −

- Before moving a vehicle in an assembly area, a member of the crew walks completely around the vehicle to make sure that moving the vehicle will not endanger anyone. The tracked vehicle commander gives the command "CLEAR" to indicate it is safe to start and move the vehicle.
- During combined operations, a safe distance is maintained between dismounted troops and moving vehicles.
- Personnel assigned dismounted tasks during blackout conditions are given ample time to complete their tasks. If possible, conduct a detailed daytime reconnaissance of the terrain.
- Individuals assigned dismounted tasks are authorized to halt an exercise in order to correct a hazardous situation, to adjust speed to conditions, or to maintain proper interval during convoy operations.
- The vehicle is halted if the driver's vision is blocked or the tracked vehicle commander's vision devices become obscured.
- The driver's night vision viewers are properly adjusted for maximum resolution.

(2) Night Vision Devices (NVD).

(a) Night tactical operations increase the problems facing the driver and vehicle commander. Night vision devices give the driver a limited field of view and distorted depth perception, so vehicle speed must be slower at night than during the day. The vehicle commander should wear NVDs so he can help the driver negotiate the terrain. During practice sessions, maintain a maximum vehicle speed of 22 kilometers until night vision driving experience is obtained; however, avoid overconfidence. NVD skills deteriorate without use, so they must be practiced and maintained. When driving with NVDs, the driver must wear the head harness so both hands remain free for driving. Wearing NVDs for extended periods causes eyestrain, so drivers should stop a minimum of every 30 minutes to rest the eyes for at least 3 minutes.

(b) During periods of reduced visibility, such as at night during severe weather (especially during heavy rain, frequent lightning flashes, or heavy overcast conditions), the night vision viewer cannot be relied upon for safe vehicle operations. The unit SOP should specify whether or not to slow down or stop field exercises when severe environmental hazards exist.

n. Dust and Smoke. During normal operations, dust can be a concern when driving in any formation; smoke will most likely present a problem during field training exercises. Drivers and vehicle commanders should observe the following rules when traveling under dust or smoke conditions:

(1) Regardless of visibility conditions, wear goggles when driving in an open-hatch position. Wear clear-lensed goggles at night unless NVDs are used. Wear a bandanna or surgical mask over the nose and mouth to avoid breathing heavy dust or smoke.

(2) Vehicles in an extended convoy should maintain a distance of twice the normal interval, or as specified in the unit SOP, during dusty conditions to allow the dust to dissipate. When driving on extremely dusty roads or trails, use a staggered column formation if traffic conditions permit. If vehicles in a convoy become engulfed in dust, the convoy commander should adjust his convoy's speed accordingly. Any vehicle commander who becomes engulfed in dust should alert the convoy commander by radio, move to the right side of the road, and stop to allow the dust to dissipate. Do not back up vehicles while engulfed in dust. Observe extreme caution to ensure oncoming vehicles are not jeopardized. The lead vehicle must warn trail vehicles to return to column formation if traffic is encountered.

(3) While driving on-line, vehicles should maintain their horizontal distance and adjust speed to dust or smoke conditions. If dust or smoke becomes so thick that total disorientation or vertigo should occur, the platoon leader/sergeant should radio to halt the formation. Do not back up vehicles while engulfed in dust or smoke.

o. Shallow Water Fording Operations. A pre-operation plan with an emphasis on safety is the key to reducing unnecessary risks. The following are some important shallow water fording considerations that should be incorporated into the unit SOP:

(1) Make sure the fording site has adequate entrance and exit points and a firm bottom.

(2) Make sure the water depth at the fording site is below the vehicle fording limits and the site is clear of submerged obstacles.

(3) Make sure dismounted troops crossing are attached to a safety line.

(4) Do not cross more than one tracked vehicle at the same time, and do not cross a tracked vehicle beside dismounted troops.

(5) During training exercises, make sure drivers and crew members wear life vests if water is over 1.5 meters deep.

(6) Do not exceed 8 kilometers.

(7) Make sure all vehicle fording and swimming instructions are followed in accordance with the vehicle TM.

(8) Do not wear load bearing equipment (LBE) during fording or swimming

operations. It could snag on vehicle components and prevent crew members from evacuating through the top hatches during emergencies.

(9) Turn tank turrets over their left or right side in case the driver needs to evacuate his compartment. This also provides a platform for the crew to stand on if they need to exit the vehicle.

(10) Leave top hatches open in case the crew needs to evacuate.

(11) Store sensitive items, such as chemical alarms, muzzle boresight devices, and small arms inside the vehicle. If the vehicle sinks, these items can be recovered easily.

p. Cold Weather Operations. Cold weather conditions require additional precautions and actions by the driver. The driver must adjust speed, following distance, and driving techniques to counter the hazards of snow, ice, and freezing conditions. Additional maintenance precautions must be enacted to prevent damage to track, suspension, and drive train components. The unit SOP should list winter clothing that will be carried by crews during cold weather operations. Tracked vehicle commanders should inspect crew members to make sure the required clothing is worn during maneuvers and while conducting vehicle maintenance.

q. Vehicle Recovery. Vehicle recovery is difficult and time consuming. FM 4-30.31 (Recovery and Battle Damage Assessment and Repair) explains in detail the various techniques and methods of vehicle recovery.

r. Convoy Driving. The planning and coordination involved in convoy operations require aggressive staff action. FM 55-30 (Army Motor Vehicle Transport Units and Operations) describes convoy operations, tells how to plan, organize, and control them, and provides a guide for training individual drivers.

3-16. FORCE PROTECTION (FRATRICIDE)

a. Fratricide is a component of force protection and is closely related to safety.

(1) Fratricide is the employment of weapons, with the intent to kill the enemy or destroy his equipment, that results in unforeseen and unintentional death, injury, or damage to friendly personnel or equipment.

(2) Fratricide is by definition an accident.

(3) Risk assessment and management is the mechanism with which incidence of fratricide can be controlled.

b. The primary causes of fratricide are:

- Direct fire control failures. These occur when units fail to develop defensive and, particularly, offensive fire control plans.
- Land navigation failures. These result when units stray out of sector, report wrong locations, and become disoriented.

- Combat identification failures. These failures include gunners or pilots being unable to distinguish thermal and optical signatures near the maximum range of their sighting systems and units in proximity mistaking each other for the enemy under limited visibility conditions.
- Inadequate control measures. Units fail to disseminate the minimum maneuver and fire support control measures necessary to tie control measures to recognizable terrain or events.
- Reporting communication failures. Units at all levels face problems in generating timely, accurate, and complete reports as locations and tactical situations change.
- Weapons errors. Lapses in individual discipline lead to weapon charging errors, accidental discharges, mistakes with explosives and hand grenades, and similar incidents.
- Battlefield hazards. Unexploded ordnance, unmarked or unrecorded minefields, and booby traps litter the battlefield. Failure to mark, remove, record, or anticipate these hazards increases the risk of friendly casualties.

c. Fratricide results in unacceptable losses and increases the risk of mission failure. Fratricide undermines the unit's ability to survive and function. Units experiencing fratricide often observe these consequences:

- Loss of confidence in the unit leadership.
- Increasing self-doubt among leaders.
- Hesitation to use supporting combat systems.
- Over-supervision of units.
- Hesitation to conduct night operations.
- Loss of aggressiveness during fire and maneuver.
- Loss of initiative.
- Disrupted operations.
- General degradation of cohesiveness, morale, and combat power.

d. Actions to control fratricide should include the following:

- Establish a restricted fire line or other spatial separation from supporting fires.
- Reconnoiter and mark the entire route with key leaders.
- Train vehicle recognition and identification continually.
- Complete full-force rehearsals of all phases and possible contingencies.

- Coordinate with any adjacent units that will move mounted or dismounted.
- Enforce absolute compliance with sleep plan.

Note: Fratricide risk assessment and reduction measures are provided in the Center for Army Lessons Learned (CALL) Handbook No. 92-3 (Fratricide Risk Assessment for Company Leadership). To obtain this handbook, contact the Center for Army Lessons Learned, U.S. Army Combined Arms Command, ATTN: ATZL-LL, 10 Meade Avenue, Fort Leavenworth, KS 66027-1314. (Web site: http://call.army.mil).

3-17. ABRAMS EMERGENCY WATER EGRESS PROCEDURES

Always perform composite risk management and a map reconnaissance prior to all maneuver operations. When possible, a route reconnaissance should also be conducted. All obstacles, to include water obstacles, should be pointed out to all personnel and hazard mitigation procedures should be established and followed during the operation. When traveling as part of a task force/team the lead vehicle must radio all follow on vehicles that they have encountered an obstacle and provide specific details about the location of the obstacle and how to maneuver around or through the obstacle. When traveling beside a river, canal, or any waterway, tank crews need to be aware of the stability of the surface they are traveling on. If the surface is sand, loose soil or gravel, be aware that the weight of the tank may cause a shifting of the surface which could cause your tank to slide or roll down the embankment and into the water. The tank commander (TC) must take extra precautions when conducting night operations that require the driver to use the NVD. It is extremely difficult for the driver to identify water while using the NVD. When using the NVD and if the situation/mission allows, the turret should be positioned so the main gun is over the rear deck. In the event your tank becomes partially submerged, all crew members may have to perform the following emergency procedures.

WARNING: At the first indication of water submersion, brace for impact. Do not attempt to leave your station until the vehicle has stabilized and the TC/gunner has attempted to power traverse the gun tube to the rear.

WARNING: If you are buttoned up, DO NOT open any hatch until you have visually determined that the hatch you are about to open is not submerged.

Note: The steps below are listed in the order they should be performed; some steps will be performed simultaneously by different crew members. The steps should be performed as quickly as possible to increase the probability of all crew members safely evacuating the tank. Crew members should be aware that the driver is particularly vulnerable to becoming trapped while submerged especially if he has the NVD installed and the gun tube is not over the rear deck.

a. Announce: “WATER, WATER, WATER”.

WARNING: The driver must not attempt to open the driver’s hatch if the NVD is installed. With the NVD installed the hatch can only be partially opened, which will increase the amount of water entering the driver’s station.

Note: The material change Modification Work Order 9-2350-200-50-29 was released 1 October 2004 and eliminates the wing nuts to mount the driver’s NVD. When this modification has been made to all Abrams tanks, the steps regarding tightening and removal of the wing nuts should be disregarded.

WARNING: When installing the NVD with wing nuts, the wing nuts are ONLY to be tightened with your fingers. If pliers are used to tighten the wing nuts and a rollover or accident occurs and the driver cannot find the pliers, he will be unable to remove the NVD. If the vehicle has lost power and the turret cannot be traversed to the rear, the driver will be trapped in the driver’s station.

b. TC – send flash report across FM radio as soon as possible.

c. TC – caution all crew members not to open a hatch without verification that it is not submerged and to begin emergency water egress procedures.

Note: If you determine that the driver or another crewman is injured, follow the procedures for removing an injured crewman.

d. If the vehicle has power, perform the following steps.

Note: If the crew compartment becomes submerged, you may be forced to evacuate before these steps can be performed.

WARNING: Do not extend any part of your body between the turret and the driver’s station unless the turret lock is set to LOCKED. You can be seriously injured or killed if the turret is traversed while you are between the turret and the driver’s station.

(1) TC – power traverse the turret to position the main gun over the rear deck.

(2) TC/Loader – determine which hatches are submerged and which are clear. Announce to crew which hatches are submerged and warn them not to attempt to open those hatches.

(3) Loader – lock the turret.

(4) Loader – remove all safety screens and guards.

(5) Loader – announce “CLEAR”.

(6) Driver – be prepared to turn on the bilge pump if water enters and covers the bilge pump intake valve.

(7) TC – determine if the crew should remain with or on top of the vehicle and the method for getting to the shore. Announce the method to the crew.

(8) TC – determine the best route of evacuation for the driver and announce "DRIVER EVACUATE THROUGH THE TURRET" or "DRIVER REMOVE THE NVD AND EVACUATE THROUGH THE DRIVER'S HATCH".

(9) TC – announce "CREW EVACUATE".

e. If the vehicle does NOT have power, perform the following steps.

(1) TC – if at any time the crew compartment becomes submerged, announce "CREW EVACUATE" and the method of getting to shore.

WARNING: Do not extend any part of your body between the turret and the driver's station unless the turret lock is set to LOCKED. You can be seriously injured or killed if the turret is traversed while you are between the turret and the driver's station.

(2) TC – check the power source and switch to emergency mode. If power is restored, perform the steps above for evacuation with power. If the power is not restored, continue with the steps below.

(3) TC – tell the gunner to manually traverse the turret to position the main gun over the rear deck.

(4) TC/Loader – determine which hatches are submerged and which are clear. Announce to the crew which hatches are submerged, and warn them not to attempt to open those hatches.

(5) Gunner – traverse the turret to position the main gun over the rear deck.

(6) Loader – lock the turret.

(7) Loader – stow the loader's safety guard and other equipment to allow the driver to exit through the turret.

(8) Loader – announce "CLEAR".

(9) TC – if the gun tube cannot be traversed, request M88s be dispatched for emergency recovery and that other element vehicles position their vehicle to perform recovery operations.

f. If the gun tube cannot be power or manually traversed and the driver is trapped in the driver's compartment with rising water or already submerged, and the driver is in imminent danger of drowning, perform the following steps.

(1) Loader – evacuate the vehicle with a flash light and determine the source of the resistance.

WARNING: Do not put yourself in a position to be pinned or injured by the gun tube in case of sudden movement.

(2) Loader – remove the source of resistance if possible, if not continue with the steps below.

WARNING Recovering vehicles need to be in a position that will not allow them to be pulled into the water.

WARNING: Do not get between tanks while they are moving into position or when the recovering vehicle is attempting to pull the gun tube free from the resistance or you could be injured.

(3) TC – communicate by radio or hand and arm signals for one of the other task force vehicles to position their vehicle close enough to wrap the tow cables around the gun tube and attempt to move the gun tube enough to allow driver to evacuate the vehicle through the crew compartment.

(4) TC – communicate to other task force vehicles to begin preparing their vehicles for self-recovery operations. Begin self-recovery as soon as it is apparent that you will not be able to traverse the turret to the rear.

(5) Gunner – attempt to locate any kind of tubing that could be used to provide air to the driver and thread the tubing through the turret/driver's hatch and into the driver's compartment.

Note: If the tubing is too long or too narrow, the driver mostly likely will not be able to pull in enough air to prevent him from drowning.

g. If self-recovery is unsuccessful, notify higher headquarters and again request immediate M88 recovery and medical assistance. Wait for recovery.

CHAPTER 4

ENVIRONMENTAL AWARENESS

Protection of natural resources is an ever-increasing concern to the Army. It is the responsibility of all unit leaders to decrease, and if possible, eliminate damage to the environment when conducting training, operations other than war, and (as appropriate) during combat. Instructors should reconnoiter potential driving course sites to make sure vehicle maneuver minimizes damages to vegetation and waterways.

4-1. ENVIRONMENTAL RISK MANAGEMENT

Environmental risk management consists of the following steps:

a. Identify Hazards. Identify potential sources for environmental degradation during analysis of mission, enemy, terrain, troops, time, civilians (METT-TC) factors. This requires identification of environmental hazards. An environmental hazard is a condition with the potential for polluting air, soil, or water and/or destroying significant natural or cultural resources.

b. Assess Hazards. Analyze potential severity of environmental degradation. Severity of environmental degradation must be considered when determining the potential effect an operation will have on the environment. The risk impact value is defined as an indicator of the severity of environmental degradation. Quantify the risk to the environment resulting from the operation as extremely high, high, moderate, or low, using risk categories in Chapter 2 of FM 3-100.4 (Environmental Considerations in Military Operations). The environmental risk impact value should be determined conservatively. Consult with the environmental office for other local requirements relating to wildlife and natural vegetation.

c. Make Environmental Risk Decisions. Make decisions by analyzing the environmental risk. Determine if alternate actions will better protect the environment while still accomplishing the mission. Determine if the mission needs to be adjusted by the commander.

d. Brief Chain of Command. Brief the chain of command (to include the installation environmental office, if applicable) on proposed plans and pertinent high-risk environmental effects. Risk decisions are made at a level of command that corresponds to the degree of risk. Gather the appropriate land-use and digging permits.

e. Implement Controls. Implement environmental protection measures by integrating them into plans, orders, packing lists, SOPs, training performance standards, and rehearsals.

f. Supervise. Supervise/enforce environmental protection standards.

Note: Each U.S. installation is subject to local and state environmental regulations in addition to federal legislation. For information specific to your activity, contact the installation environmental office. If you are overseas or on deployment, contact your higher S-3/G-3.

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CHAPTER 5

HOW TO USE TRAINING SUPPORT PACKAGES (TSPs)

5-1. PURPOSES

The purposes of this chapter are to −

a. Describe the contents of a TSP.

b. Describe how to use the tracked vehicle driver training TSPs.

c. Describe how to obtain the tracked vehicle driver TSPs referenced in this publication.

5-2. OVERVIEW

A TSP is a complete, exportable package for integrating training products, materials, and information necessary to train one or more critical tasks. TRADOC Regulation 350-70 (Systems Approach to Training Management, Processes, and Products), Appendix E (9 March 1999), defines the contents and format of a TSP. The TSPs referenced in this publication prescribe "model" tracked vehicle training programs for units. Unit commanders have the authority to make minor modifications necessary to conform to unit training restrictions. However, the TSP proponent must approve major modifications. The Chief of Staff of the Army mandated development of these TSPs to standardize tracked vehicle driving requirements and stress accident avoidance.

5-3. CONTENTS OF A TSP

Each tracked vehicle TSP contains the following:

a. Title Page. The title page contains general information such as the TSP number, title, individual tasks addressed, effective date, proponent, and address for sending comments and recommendations.

b. Preface. The preface contains the conditions and standards for all tasks covered in the TSP as well as a table of contents. It also specifies if the TSP includes more than one lesson.

c. Lesson(s). Each lesson consists of five sections:

(1) **Section I - Administrative Data.** This section contains information needed to manage training. It includes the following information:

(a) All Courses Including This Lesson. The lesson plan(s) contained in the TSP may also be taught as part of a residential course or contained in another exportable training program. Some lessons are simply taught as part of unit training.

(b) Task(s) Taught or Supported. If the TSP contains only one lesson, then the tasks listed here will be the same as the ones listed in the preface.

(c) Reinforced Task(s). These tasks are not taught as part of the TSP. However, the TSP provides refresher or integrated training.

(d) Academic Hours. This paragraph specifies the time required to train each task, administer each lesson (if more than one) and conduct student testing. It also specifies an overall time for implementing the TSP.

(e) Test Lesson Number. If the test is not included in this lesson, list the test lesson number in which this lesson's terminal learning objective is tested and the test results are reviewed with the students. Put "N/A" if not tested in a separate lesson.

(f) Prerequisite Lesson(s). Some TSPs or lessons within a TSP may build on the contents of other ones. In such cases, this paragraph lists TSPs or lesson plans in the recommended training sequence.

(g) Security Clearance/Access. Most TSPs will be unclassified. Any statement that limits distribution will be listed here.

(h) Foreign Disclosure Restrictions. List the appropriate foreign disclosure restriction statement. Refer to TR 350-70 Chapter I-1 for foreign disclosure restriction statements.

(i) References. This paragraph lists references used to develop the TSP. It may differ from the training materials required by the instructor and the students.

(j) Student Study Assignments. The instructor may require students to study material prior to implementation of the TSP. In such cases, the instructor needs to prepare a student handout describing the study assignment and make provisions for students to pick up study materials.

(k) Instructor Requirements. This paragraph specifies the number of instructors, to include whether a primary instructor and small group instructors are needed. It also describes any special qualifications instructors must possess to train the task(s) to standard.

(l) Additional Support Personnel Requirements. This paragraph lists support personnel and their qualification requirements. Support personnel could include bus drivers, audiovisual equipment operators, range operators, etc.

(m) Equipment Required. This paragraph lists all equipment and tools needed to accomplish instruction. Examples include the number and type of tracked vehicles, night vehicle devices, protective masks, and dummy mines, etc.

(n) Materials Required. Instructor materials include manuals, checklists, terrain boards, audiovisual supplies, and other instructional aids. Student materials include anything students need before or during the class, such as maps, compasses, and flashlights.

(o) Classroom, Training Area, and Range Requirements. For exportable TSPs, these requirements may be general in nature since they are dependent on unit resources.

(p) Ammunition Requirements. This paragraph lists all ammunition requirements using official nomenclature and approved basis of issue. The TSPs in this publication do not require the use of ammunition.

(q) Instructional Guidance. This paragraph describes what the instructor needs to accomplish prior to training. It may include information about scheduling resources, preparing other instructors, preparing the training site, etc.

(r) Branch Safety Manager Approval. If not required, put N/A. See Chapter I-2 of TR 350-70 for requirements.

(s) Proponent Lesson Plan Approvals. The lesson plans in this publication's TSPs have been approved by the Chief of the Staff of the Army and by the school proponent for each tracked vehicle. Any significant changes cannot be implemented without coordination with the proponent.

(2) **Section II - Introduction.** This section specifies the method of instruction for the TSP or lesson, the instructor-to-student ratio, the time required to teach the lesson, and the media used (if applicable). It also contains the following:

(a) Motivator. This short motivational introduction to the lesson can be a discussion, short demonstration, or videotape designed to peak the student's interest to focus them on the material they are about to learn and should include at least one Army value.

(b) Terminal Learning Objective. This objective describes what the student will be able to do at the completion of the lesson. It specifies an action, conditions, and an overall standard.

(c) Safety Requirements. This paragraph describes the general safety requirements for the lesson, to include potential hazards. Warnings and cautions should be listed in the presentation section of the lesson, since they will be more meaningful to students when presented in the context of job performance.

(d) Risk Assessment Level. The TSP will list an initial risk assessment of low, medium, caution, or high. The TSP proponent assigned this rating based on an analysis of potential hazards that could be encountered during the training. A hazard is defined as any condition with the potential to cause injury to personnel, damage to equipment, or loss of materiel. Training with a risk assessment of "high" must approved by the unit or installation commander.

(e) Environmental Considerations. This paragraph describes how to ensure the training does not have an adverse impact on the environment. It does not address how the environment affects task performance. The training developer or instructor should include environmental issues when conducting risk assessment for the training. If there are any environmental risks or controls, they should be highlighted in this section.

(f) Evaluation. This paragraph describes how the terminal learning objective will be tested, and the minimum passing score.

(g) Instructional Lead-in. The purpose of the instructional lead-in is to tie the terminal learning objective to previous learning or student experience and lead into the actual presentation.

(3) **Section III - Presentation.** This section describes the instructional methods and content. It consists of the following:

(a) Enabling Learning Objective. The enabling learning objective specifies the action, conditions, and standards for a task or part of a task. Some TSPs may not have enabling learning objectives.

(b) Learning Steps/Activities. For each learning step/activity, the TSP will list the method of instruction, instructor-to-student ratio, time of instruction and media (if required). If this information remains the same for a large number of learning steps/activities, then it may be listed once following the enabling learning objective and prior to the first learning step/activity.

(c) Notes. The lesson may include notes throughout the learning steps/activities to remind instructors to check on student learning, ask questions, etc.

(4) **Section IV - Summary.** This section provides guidance on summarizing instruction and soliciting student feedback prior to testing. It consists of the following:

(a) Review/Summarize Lesson. This paragraph provides a brief summary of the material covered the lesson or TSP.

(b) Check on Learning. This paragraph includes specific questions that the instructor can use to determine the students' mastery of the lesson or TSP.

(c) Transition to Next Lesson. This paragraph explains how the next lesson relates to this one. This paragraph may be deleted if there is not a follow-on lesson.

(5) **Section V - Student Evaluation.** This section describes how students will be evaluated and how they will receive feedback. It consists of the following:

(a) Testing Requirements. This paragraph describes the testing method and pass/fail criteria. It includes a full description of the test administrative procedures, to include setting up the test site, providing instructions to students, and using a scoring checklist.

(b) Feedback Requirements. This paragraph describes how students can learn their test scores and schedule remedial/refresher training.

d. Tests. Each TSP contains a written test and one or more hands-on, criterion-referenced performance exercises. Each test consists of a test administration guide, an answer key or test scoring checklist, and a evaluation feedback statement that tells the students how to get remedial training if required. The test administration guide provides the following information:

(1) Task number and title.

(2) Personnel, equipment, and material required.

(3) Test planning time.

(4) Site requirements (and a layout diagram if appropriate).

(5) Pretest preparation.

(6) Instructions for administering the test and instructions for scoring the test. The scoring checklist contains instructions to the students and the performance measures evaluated by the instructor.

e. Supporting Materials. Some TSPs may contain viewgraphs or student handouts that enhance the instruction.

5-4. HOW TO OBTAIN COPIES OF TRACKED COMBAT VEHICLE DRIVER TSPs

The Army Training Support Center (ATSC) is responsible for distributing driver TSPs as part of the CSA directive to support standard driver training at unit level. However, additional copies of the driver TSPs can also be obtained in the following ways:

a. Call the Training Media Support Directorate at ATSC at DSN 826-4668 or commercial (757) 878-4668.

b. Log on to the internet site for the General Dennis J. Reimer Training and Doctrine Digital Library at (https://www.train.army.mil) or the Army Knowledge Online (www.us.army.mil). This site contains digital copies of the TSPs that can be downloaded.

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APPENDIX A

TRACKED COMBAT VEHICLE DRIVER TSPS

TSP 051-12B-U01	Drive an AVLB 4 October 1999
TSP 051-12B-U02	Drive an ACE 4 October 1999
TSP 051-12B-U03	Wolverine Driver Training Support Package 4 October 1999
TSP 061-226-B0002	Drive an M109-Series Howitzer 4 October 1999
TSP 061-266-B0001	Drive an M922 4 October 1999
TSP 061-310-M0001	Drive an M993 4 October 1999
TSP 071-U-M113	Drive an M113-Series Vehicle 4 October 1999
TSP 071-W-BFVS	Bradley Fighting Vehicle (BFV) Driver Training Support Package 4 October 1999
TSP 091-M88-1001	M88A1/M88A2 Driver Training Support Package 4 October 1999
TSP 171-A-1002	M1/M1A1 Tank Driver Training Support Package 4 October 1999
TSP 171-A-1136	M1A2/M1A2 (SEP) Tank Driver Training Support Package 4 October 1999

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GLOSSARY

AAR after action review

AR Army regulation

ATSC Army Training Support Center

CALL Center for Army Lessons Learned

CSA Chief of Staff, Army

CVC combat vehicle crewman (helmet)

DA Department of the Army

FM field manual; frequency modulation

LBE load bearing equipment

METL mission-essential task list

METT-TC mission, enemy, terrain, troops, time, civilians

MOS military occupational specialty

NVD night vision device

NVG night vision goggle

OF optional form

PAM pamphlet

POL petroleum, oils, and lubricants

RAWL rotating amber warning light

SOP standing operating procedure

TC training circular; tank commander

TM technical manual

TRADOC Training and Doctrine Command

TSP training support package

U.S. United States

REFERENCES

This list of publications includes all material necessary to manage and supervise the driver training program properly. Changes to these publications and current publication dates can be found in DA Pam 25-30.

Department of the Army Regulations

AR 40-501	Standards of Medical Fitness 27 June 2006
AR 190-5	Motor Vehicle Traffic Supervision 22 May 2006
AR 385-10	The Army Safety Program 29 February 2000
AR 385-55	Prevention of Motor Vehicle Accidents 12 March 1987
AR 600-55	The Army Driver and Operator Standardization Program (Selection, Training, Testing, and Licensing) 31 December 1993
AR 600-8-22	Military Awards 25 February 1995
AR 611-5	Army Personnel Selection and Classification Testing 10 June 2002
AR 614-200	Enlisted Assignments and Utilization Management 2 August 2005

Department of the Army Forms

DA Form 2-1	Personnel Qualification Record-Part II
DA Form 348	Equipment Operator's Qualification Record (Except Aircraft)
DA Form 2028	Recommended Changes to Publications and Blank Forms

Department of the Army Pamphlets

DA Pam 25-30	Consolidated Army Publications and Forms Index

Field Manuals

FM 3-100.4	Environmental Considerations in Military Operations 15 June 2000

FM 4-30-.31	Recovery and Battle Damage Assessment and Repair 19 September 2006
FM 5-19	Composite Risk Management 21 August 2006
FM 55-30	Army Motor Transport Units and Operations 27 June 1997

Miscellaneous Publications

CALL Handbook No. 92-3	Fratricide Risk Assessment for Company Leadership 6 January 2006
TRADOC Reg 350-70	Systems Approach to Training, Management, Processes, and Products 9 March 1999

Optional Forms

OF 346	US Government Motor Vehicle Operator's Identification Card

Training Circulars

TC 21-305	Training Program for Wheeled Vehicle Accident Avoidance 19 August 1996

TC 21-306
27 March 2007

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army

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