
Chapter 4

Driver Training



Objective

This phase of instruction teaches the student driver:

1. Administrative procedures.
2. Basic features and characteristics of the vehicle.
3. Proper operating procedures.
4. How operating faults are detected and corrected.

Note. Students who have previously qualified to operate wheel vehicles need study only subjects peculiar to track vehicles.

Maintenance

The student is taught:

1. Major components of the vehicle and the functions they perform.
2. Emergency repair.
3. Field expedients.
4. How to start and warm up the engine.
5. Safety precautions.

For every two hours of driving instruction or preliminary training, the student should receive at least one hour of instruction and practical work on driver and crew maintenance services. This enables the student to form correct habits when checking and servicing his vehicle.

Give the student basic information on organizational, direct support, general support, and depot maintenance categories which make up the Army maintenance system.

Administrative Forms

Since publications, forms, reports, and historical records are used in the daily operation and maintenance of military vehicles, they are a very important part of the driver instruction program. These forms and publications insure proper maintenance and control of military vehicles (ref TM 38-750). Appendix H illustrates the proper way to fill out these forms.

Section I

Preliminary

Driver

Instruction

Equipment Historical Records —These are major elements of the equipment records system and are designed to present an accurate review of the use and maintenance of each vehicle. This record begins at the time of delivery and is maintained until the equipment is removed from the Army inventory. Most importantly, it provides commanders with current knowledge of equipment readiness. These records must be with the vehicle when it is serviced, repaired, modified, or transferred. Damage, loss, or destruction of these records as a result of negligence is cause for disciplinary action. Operators of vehicles on authorized dispatch must have DA Form 2408-1 (Equipment Log) or DD Form 1970 (Motor Vehicle Utilization Record) properly completed and DA Form 2404 (Equipment Inspection and Maintenance Worksheet) for listing deficiencies and shortcomings.

DA Form 2404 (Equipment Inspection and Maintenance Worksheet) —Must be used in conjunction with the appropriate technical manual. When used in the performance of daily Preventive Maintenance Checks and Services (PMCS), the operator records only deficiencies and shortcomings which cannot be corrected by the operator.

Standard Form 46 (U.S. Government Motor Vehicle Operator's Identification Card) —Stamped or marked "ARMY LEARNER" when issued to student drivers for use during driving instruction. Detailed instructions for completing SF 46 are found in paragraph 12, AR 600-55.

Standard Form 91 (Operator's Report of Motor Vehicle Accident)—Taught best by practical exercise instruction. All vehicles must carry SF 91 and all operators must be able to fill it out properly before being licensed (pp 62 and 63).

DD Form 518 (Accident-Identification Card)—Carried on all vehicles and used to identify a military vehicle and the organization to which it is assigned. Enter the driver's name, vehicle identification, organization, and identity of the responsible authority on DD Form 518 at the time of an accident. Then give the completed form to the operators of all other vehicles or pedestrians involved in the accident. Under the Privacy Act of 1974, the social security number need not be included.

Lubrication Order —Published for every type of tactical and combat vehicle used by the Army. It prescribes the correct lubricants, intervals to observe, and special precautions to follow under unusual operating conditions. These lubrication services are mandatory. The lubrication order must be carried on the vehicle and all crewmembers must thoroughly understand it.

DA Form 348 (Equipment Operator's Qualification Record [Except Aircraft])—Provides a means of recording the complete history of an individual's civilian and military driving experience. Initiate this form when the individual is administered the Battery I test. Translate the results of the test into a standard score and enter on DA Form 2-1 in addition to DA Form 348. If the student has not attained a score of 85 or higher on the Battery I, give the Battery II and record the results of it along with the results of the physical evaluation tests. When the individual is trained to operate a track vehicle, record the prescribed tests. When the student passes the qualification course for either wheel or track vehicles, enter the permit number, date, type of permit, and limitations with the specific vehicle qualification in the appropriate blocks. This form is a permanent record maintained in the individual's 201 file and remains with the file when transferred. When the student is assigned driver duties on a daily dispatch basis, this form is maintained by the officer responsible for unit motor vehicle operation.

Operator's Manual —Carried on the vehicle and contains detailed procedures for operation and maintenance as well as a complete description of the vehicle and its components.

Visual Signals

If taught thoroughly, signals provide control in tactical situations, allow for fine adjustments of position in congested areas, and make orders easier to understand. Signals also permit commanders to control several vehicles without resorting to less secure communication measures. FM 21-60 illustrates and explains these signals in detail.

Hand and Arm Signals —Indicate direction, speed, caution, formation desired, and action expected. Signals can be added as the need arises; however, do not confuse the student with too many signals (app E).

Flag Signals —Limited by the colors and numbers of flags available. Green, orange, and red flags are included as part of the equipment on some track combat vehicles. Green normally means everything is operational and vehicle and crew are ready for orders. Red means danger. Orange usually indicates a vehicle out of action, but no help needed. By prearrangement, combinations of two or all three colors can be used to indicate action expected or serve as a warning of gas or chemical attack.

Light Signals —Indicate action expected or direction of movement and are used in night exercises to control formations and to move individual vehicles.

Signals are taught best by illustration, demonstration, and application and should be used throughout the course. Repeat signal drills until students are familiar enough with all signals to recognize them instantly, demonstrate them properly, and comply with them promptly.

Terrain Evaluation

Train the student driver to see terrain with the intention of crossing it with his vehicle. Emphasize map reading to include road maps, military maps, and military signs and symbols. Make terrain studies so that the student will develop a keen sense of terrain appreciation. During tactical operations or combat, it is often impossible to view the terrain over which vehicles must operate. A driver properly trained in map reading can often assist in selecting a good route.

Weight Classifications

Weight restrictions are imposed on many bridges, and these restrictions may not allow a track combat vehicle to cross over. Bridges and vehicles are marked with round yellow discs and black numerals to show the bridge weight limits and the approximate vehicle weight. For example, if the vehicle weighs 50 tons and the bridge limit sign indicates 35 tons as the limit, the vehicle may not cross the bridge. However, if the bridge limit sign indicates the bridge can carry 50 tons, but only 20 tons in both directions at the same time, the 50-ton vehicle may cross if it is the *only vehicle on the bridge* (Bridge and Vehicle Weight Classification, chap 4, TM 5-312).

Safety

Safety instruction is a command responsibility and is defined in the 385-series of Army regulations. Adequate safety instruction for the student prevents needless loss of manpower and damage to equipment.

Alertness —Be alert at all times, especially when on the outside of the vehicle. Metal decks become extremely slippery when wet, icy, or muddy. Contact with metal projections, gun mounts, guns, and hatches can cause injuries. Put the main gun in travel lock whenever possible.

Removal of Jewelry —Severe injuries to fingers and wrists, and even electrocutions can occur when personnel do not remove rings, bracelets, and wristwatches before mounting, dismounting, or operating equipment.

Mounting and Dismounting —This should only be done in the safe manner approved for each type of vehicle. These procedures are outlined in the operator's manual.

Riding Position —Crewmembers in a track combat vehicle should wear a combat vehicle crewmember's helmet (CVC) and ride with only their head and shoulders extended as necessary for safe operation. When a track combat vehicle collides or overturns, injuries usually result because crewmembers are improperly positioned.

Hearing Protection —When the vehicle is operating, the driver, crew, and all passengers should have hearing protection—either the CVC helmet or earplugs.

Hatch Covers —Injuries are common, and often result in smashed fingers or head concussions if the hatch cover latch is not locked.

Fire Prevention —Fire is an ever-present danger. If crewmen are trained thoroughly in this area, they are not likely to panic. Review the use of fire extinguishers and fire prevention equipment regularly. Stress that no track vehicle should be started unless its portable and fixed fire extinguishers are in operating condition and properly sealed.

Proper Tools —Many injuries result from using the wrong tools and equipment. During safety and mechanical training, stress the use of the proper tool for the job.

Shop Safety —Certain precautions must be taken when maintenance jobs are performed in the shop. Qualified shop personnel must take charge, and the driver must follow instructions carefully to insure the safety of all personnel.

Overturned Vehicles —If a track combat vehicle begins to overturn, crewmembers should remain inside and hold on rather than attempt to jump out. It is far wiser to remain in the vehicle and sustain a few bruises than to jump out and risk being crushed by the vehicle.

Escort Vehicles —When contact with the enemy is not imminent and there is normal traffic, a wheel vehicle, with flashing lights, must precede a track vehicle or column of track vehicles traveling on a road. On high speed roads, such as interstates or autobahns, the escort vehicle should use flashing lights and follow the convoy.

Ground Guides —These are required when moving track combat vehicles in confined or congested areas such as cantonment, bivouac, or parking areas.

Fire Prevention

Make sure all crewmembers are aware of the danger of fire when operating their vehicle. Rags, extra oil, gasoline and diesel fuels, and cleaning fluids must be removed from the vehicle, and fire extinguishers must be kept full and serviceable—ready for instant use.

Fire Extinguishing

All track combat vehicles are equipped with fire extinguishers and crewmembers must know how and when to use them. All fire extinguishers must be periodically weighed by the post engineers (fire marshal) to determine serviceability and resealed if necessary.

Fixed Extinguishers —Installed to cover areas where fires are most likely to start and require only the action of a trip handle to put them in operation.

Portable Fire Extinguishers —Provided to fight fires not within effective range of the fixed extinguishers. A portable extinguisher should always be immediately available and manned when a vehicle is being refueled.

Track Combat Vehicle Characteristics

Several track combat vehicles have been standardized in the military services for a variety of uses. Although considerably different in appearance, they are similar in many ways. For instruction on a specific vehicle, use the operator's manual.

Track and Suspension Systems

Instruct the student carefully in the services and maintenance that will be performed on the vehicle's track and suspension system. The major components may include the track shoes, end connectors, center guides, road wheels, support rollers, compensating idler wheels, shock absorbers, torsion bars, and support arms. The operator's manual for the specific vehicle, TM 9-8000 and TM 9-2530-200-24 are the best sources of information.

Engines

Direct instruction specifically toward the engine in the vehicle the student will be assigned to drive. Basic information is found in TM 9-8000 and pertinent vehicle technical manuals.

Power Transmission System

Instruction on the power transmission system should include the transmission and final drive. Basic information is found in TM 9-8000 and pertinent vehicle technical manuals.

Instruments and Controls

A thorough knowledge of the functions of vehicle instruments and warning lights is essential. Stress their importance in the operation of the vehicle.

Controls to be taught will include: fuel shutoff, accelerator, brakes, range selector, steering, and light switches.

Electrical System

Use TM 9-8000 as a reference in teaching the major components of the electrical system. In the specific application of theory to the vehicle being taught, use the technical manuals for the vehicle.

Fuel Systems

Instruction should include the major components of the vehicle's fuel system. Stress that cleanliness is essential within the system; every effort must be made to keep the fuel clean and all connections must be kept tight and free from leaks. Air cleaners are extremely important in proper operation of the engine. To keep impurities out of the fuel system, air cleaners and fuel filters must be serviced as specified on the lubrication order and in the technical manuals.

Auxiliary Equipment

Items included in this training, as a minimum, are the fire extinguisher system, auxiliary engine/generator, ventilating blower, personnel heaters, bilge pumps, and radio interphone procedure, if the vehicle is so equipped. Detailed information on auxiliary equipment is found in the operator's manual for the vehicle. Every student must be familiar with this equipment.

Storage of Vehicle Equipment

All track combat vehicles are issued with the necessary maintenance tools and equipment. On and within the vehicle are compartments, brackets, hooks, and boxes for securing this equipment. In addition to this, there are provisions for stowage of the crew's personal equipment, including rations and water. Ammunition stowage is planned carefully for maximum use of space and convenience to the crewmembers. Correct stowage of equipment is outlined in the operator's manual.

Driver Maintenance

The driver must fully understand his operator's manual and have an intimate knowledge of the vehicle to assist in performing preventive maintenance checks and services (PMCS).

Tools and Equipment —Must be carried on the vehicle at all times. Every military vehicle has an authorized set of tools and equipment. Each item must be properly used, carefully accounted for, properly stowed, and maintained in a serviceable condition.

Daily Services —Performed each day the vehicle is operated. They are detailed inspections by driver and crew before operation, observation of instruments and controls during operation, and inspection, servicing, and corrective action during and after operation. The preventive maintenance checks and services required for each track combat vehicle are found in the -10 technical manual for that vehicle.

Quarterly Services —Performed by organizational mechanics at battalion or squadron level who are assisted by the vehicle crew every 75 hours, 90 days, or 750 miles (whichever comes first). This is a thorough inspection and service of the vehicle to detect and correct equipment faults. The driver and crew accompany the vehicle during this service, assist the mechanics, and bring known equipment faults to their attention.

Engine Operations

The operator's manual outlines the correct procedure for operating a vehicle's engine. Follow this procedure carefully to avoid damaging the engine.

Starting —Track combat vehicles are simple to start under normal conditions. Do not engage the starter for more than 15 seconds at a time or longer than specified by the vehicle operator's manual.

Warm-up —Before moving the vehicle, warm-up the engine. The proper engine rpm for warmup is prescribed in the operator's manual. Rapid acceleration or deceleration is extremely harmful to an engine; the hand throttle should be used to hold the engine at a constant rpm until it is completely warmed up and the engine oil pressure is normal. Proper warmup allows the metals of the engine to expand uniformly and the engine oil to circulate thoroughly.

Idling —After operation, an engine should be idled for a short period before it is stopped. This allows the engine to cool uniformly from operating to idling temperature and prevents uneven cooling and distortion of metal.

Stopping —Most track vehicles have a fuel cutoff switch for actually stopping the engine. However, if the fuel cutoff switch fails to operate properly, the student must know the proper method of stopping the engine. The correct procedure is prescribed in the operator's manual.

Washing and Cleaning Vehicles

Clean track combat vehicles carefully after each day's operation. Mud must be removed so that the vehicle can be thoroughly inspected. Spilled oil, grease, or fuel must be wiped up promptly.

Washing —During washing, never allow cold water to strike any part of a hot engine or enter the exhaust pipes. Do not use water inside the vehicle except in small quantities from a container, and always leave hull drain valves open during washing. The valves must also be left open when the vehicle is parked outside so that rain water can drain. In freezing weather when thorough cleaning is impractical, hose off the track and suspension system to remove frozen mud which can cause severe damage.

Cleaning —Vision and sighting devices are the eyes of the track vehicle in combat. Wipe all optical devices with lens tissue or similar soft material and clean their encasements at periodic intervals. When you know that devices will not be used for a long period, store or cover them carefully to prevent exposure. When viewing devices are removed, cover the encasements to prevent damage that might cause difficulty in reinstallation.

Field Expedient Recovery

Field expedient recovery is an improvised method of recovering vehicles with the materials on hand. Detailed information is found in FM 20-22, Vehicle Recovery Operations.

Two Types of Disablement

Mechanically Disabled —Drivers and crewmembers with a thorough knowledge of their vehicle can often make temporary repairs to a mechanically disabled vehicle. Expedient repair must be taught carefully. Since some expedient measures might be harmful to the vehicle, they should be used *only* as a last resort.

Terrain Disabled —Knowledge of field expedients often makes it

possible to recover a vehicle disabled by terrain. Study the situation carefully. To succeed without causing damage, consider the capabilities and limitations of the vehicle and make sure that leverage and mechanical advantage are applied properly. Careful planning, although time-consuming, results in a successful recovery operation.

Section II

Training in Driving

Preliminary Training Applied

The student is now ready to apply the knowledge he gained during preliminary training. The student must complete each phase satisfactorily before going on to the next. Rigid supervision prevents trial-and-error driving. Therefore, one instructor should supervise no more than five vehicles at a time and then only if the courses to be driven are compact and planned carefully.

1. In each vehicle, an assistant instructor acts as track commander; one student drives while another observes.
2. Periodically, students halt the vehicles and exchange positions. There should be no more than two students per vehicle.
3. On each new exercise, before the student attempts to drive, the assistant instructor demonstrates the correct procedures.
4. Intercommunication equipment must be used on all instructional vehicles. Radios should be netted with the instructor's radio for communication with assistant instructors and students.
5. The senior instructor observes all instructional driving. During road march instruction, the senior instructor may act as convoy commander or choose to move in the center of the group to better observe actions of the entire group.
6. Allow at least a half-hour of maintenance for each hour of operation. Emphasis on proper instruction and supervision prevents much vehicle abuse during driver training, although instructional vehicles receive hard wear even when drivers are properly supervised.
7. Each student maintains a DA Form 2404. At the end of the instruction period, the senior instructor reviews these DA Forms 2404 to determine the effectiveness of the student's inspections and services.

Basic Driving

In this course, the student performs before-, during-, and after-operation services on an operational vehicle. He must follow the

starting procedures, place the vehicle in motion, stop the vehicle, and follow the procedures for stopping the engine. The driving is elementary in nature, i.e., moving forward and backward in a straight line and making easy turns and simple maneuvers on a level course. The goal of basic driving instruction is to teach the student correct driving procedures, proper maintenance, and visual signals, while emphasizing the importance of developing good driving habits.

Training in basic driving is conducted on two types of terrain:

Level Terrain —Conduct training away from congested areas, obstructions and distractions. See the next page for a suggested course.

1. The student first performs a before-operation inspection independently.
2. The student then starts the engine and is checked for correct procedure. (See operator's manual for proper procedure.)
3. Actual driving follows. Emphasized are prompt, smooth response to orders, and the proper procedures for starting, stopping, and reversing. The course will be driven as follows:
 - a. Drive forward during daylight and:
 - (1) Stop within 5 meters from a speed of 10 mph.
 - (2) Stop within 7 meters from a speed of 15 mph.
 - (3) Make a right turn of 22 ft. radius.
 - (4) Make a left turn of 44 ft. radius.
 - (5) Make a left turn of 44 ft. radius.
 - (6) Make a right turn of 22 ft. radius.
 - (7) Pivot turn the vehicle 360° within 2 times the tank's length (for tanks only).
 - b. Drive in reverse and:
 - (1) Stop within 3 meters from a speed of 5 mph.
 - (2) Stop within 5 meters from a speed of 10 mph.
 - (3) Make a right turn of 20 ft. radius.
 - (3) Make a left turn of 20 ft. radius.
 - c. Drive at night using the driver's night viewer and IR lenses and:
 - (1) Stop within 7 meters from a speed of 10 mph.
 - (2) Stop within 10 meters from a speed of 15 mph.
 - (3) Make a right turn of 24 ft. radius.

- (4) Make a left turn of 48 ft. radius.
- (5) Make a left turn of 48 ft. radius.
- (6) Make a right turn of 24 ft. radius.

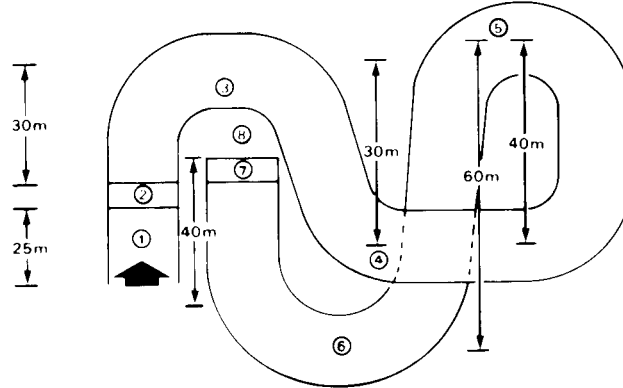
4. Whenever vehicles' are halted for more than a few minutes, require students to stop the engines. Check for correct stopping procedure. (See the operator's manual.)

Basic Driving Course (Level Terrain)

Drive Forward:

1. Start point
2. 5 meter stopping area from a speed of 10 mph
3. 22-foot radius right turn
4. 44-foot radius left turn
5. 44-foot radius left turn
6. 22-foot radius right turn
7. 7 meter stopping area from a speed of 15 mph
8. 18 meter diameter pivot turn area

(Not to scale.)



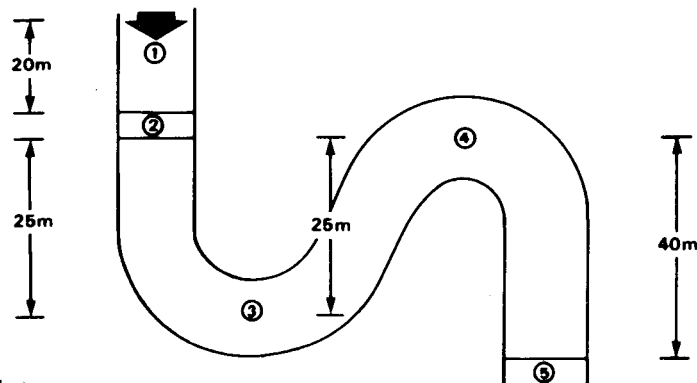
Drive At Night:

- | | |
|---|--|
| 1. Start point | 5. 48-foot radius left turn |
| 2. 7 meter stopping area from a speed of 10 mph | 6. 24-foot radius right turn |
| 3. 24-foot radius right turn | 7. 10 meter stopping area from speed a of 15 mph |
| 4. 48-foot radius left turn | 8. Not used |

Drive In Reverse:

1. Start point
2. 3 meter stopping area from speed at 5 mph
3. 20-foot radius right turn
4. 20-foot radius left turn
5. 5 meter stopping area from a speed of 10 mph

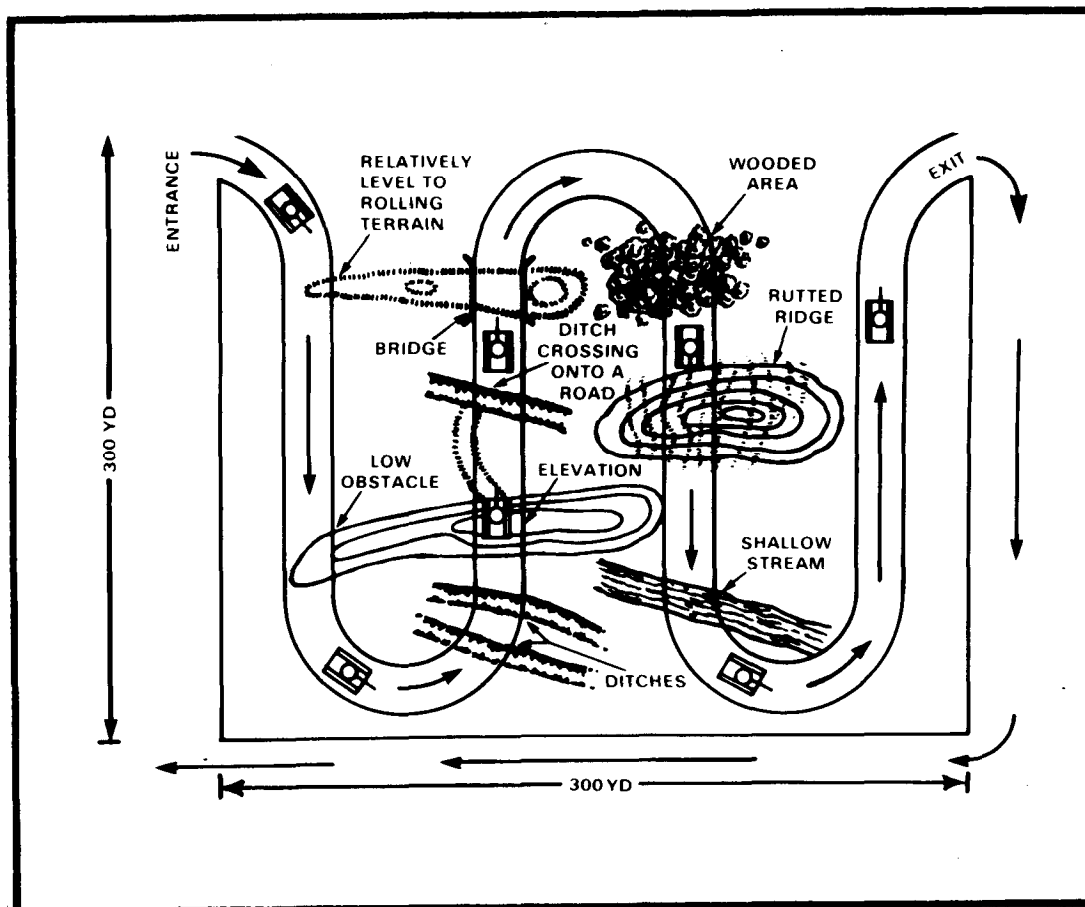
(Not to scale.)



Varied Terrain —The course progresses from a flat, smooth area to a more difficult area where the student is rated on his ability to negotiate the terrain. Precision will be developed by operating the vehicle through confined spaces and on a road.

The course should be compact to allow maximum supervision by the senior instructor. A secondary road net is necessary to teach convoy procedures. A short circular route may suffice if it extends at least one mile.

Basic Driving Course (Varied Terrain)



Exercises

1. Before-operation inspection and starting procedures.
2. Crossing a narrow, shallow ditch.
3. Driving over a slight elevation.
4. Moving through a small stream or waterhole.
5. Climbing over a short, steep elevation.
6. Crossing a wide, deep ditch.
7. Moving through a narrow defile or across a narrow bridge (real or simulated).
8. Road marching with emphasis on maintaining the correct interval and complying promptly with hand and arm signals.
9. Stopping the vehicle and after-operation maintenance.

All instructors must observe how the student:

1. Selects range.
2. Applies brakes.
3. Accelerates.
4. Steers.
5. Negotiates obstacles.

On-the-spot corrections must be made. Repetition of the exercises develops student self-confidence and smoothness of operation.

Note. See page 42 for a sample scoring checklist. When scoring the road marching exercise, consider errors *and* overall performance. For example, a delay in complying with the above five signals may warrant a loss of five points. However, if 20 signals are given and 15 promptly complied with, a deduction of 2.5 points is more reasonable.

Advanced Driving

This phase of training teaches the student how to operate the vehicle properly in all kinds of weather, in convoy, and over the most difficult and varied terrain. When possible, this course should include night driving (including buttoned up and use of passive sights), stream crossings, hilly areas, marshy places, sandy soil, rocky hillsides, cutover land with second growth, and road marching. If such terrain is not available, improvise using the best area available. When weather does not permit practical training, give oral instruction on operation in the extremes of cold and heat.

For maximum use of available terrain features, it may be necessary to subdivide the course.

Exercises

1. Before-operation inspection and starting procedures (same as basic).
2. During-operation maintenance.
3. Road marching to the advanced driving area using both combat and noncombat techniques.
4. Driving through wooded areas.
5. Crossing vertical obstacles.
6. Approaching, fording or swimming, and emerging from a shallow stream.
7. Ascending and descending steep hills.
8. Crossing deep ditches or gullies.
9. Cross-country driving using the periscope during daylight.
10. Cross-country driving using the passive night driving device.
11. Formation driving.
12. Formation driving using the periscope during daylight.
13. Formation driving using the passive night driving device.
14. Road marching for a distance of several miles.
15. Stopping procedures and after-operation maintenance (same as basic).

Current Army training programs show increased emphasis on night combat training. Infrared or passive equipment is provided with each armored vehicle and special training and practice time are required for the student to be able to use this equipment properly and gain confidence in blackout driving.

The use of amphibious track combat vehicles and deep water fording kits on vehicles that are not floatable demands emphasis on driver training during water operations. This training should be provided only after the student is thoroughly familiar with the vehicle. The student must be able to demonstrate ability to drive the vehicle under all conditions listed in the above exercises. Correct procedures during water operations are listed in the operator's manual.

Teaching and scoring points in the advanced phase vary slightly from those of basic driving since you attempt to determine whether the student has developed good judgment and can apply it (p 43). Driver confidence is reflected in the way the student operates the vehicle.

Base qualification largely upon driving ability, but do not neglect inspections, services, and procedures. Adequate instruction, followed by supervised maintenance periods and inspections, help the student become more efficient.

Advanced driver training continues throughout the driver's career. The best drivers will normally be those with the most experience under the greatest variety of conditions.