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TM 21-300

WAR DEPARTMENT TECHNICAL MANUAL

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DRIVER SELECTION TRAINING AND SUPERVISION, WHEELED VEHICLES

WAR DEPARTMENT • FEBRUARY 1945

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This manual supersedes TM 21-300, Driver Selection and Training, 10 November 1942, including C 1, 31 July 1943.

DRIVER SELECTION TRAINING AND SUPERVISION, WHEELED VEHICLES

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WAR DEPARTMENT

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BY ORDER OF THE SECRETARY OF WAR:

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Chief of Staff

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Major General
The Adjutant General.

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For explanation of Symbols, see FM 21–6.

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U.S. Army Transportation School
Fort Eustis, Virginia
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1945

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Chapter 1

GENERAL

1. Purpose

The purpose of this manual is to furnish a guide and aid to unit commanders and instructors in achieving and maintaining high standards in wheeled vehicle driving.

2. Scope

a. This manual contains an outline of the steps necessary to select and train driver instructors, and to select, train, and supervise drivers.

b. The training program is designed to develop competent military motor vehicle drivers capable of handling their vehicle in cross country as well as highway operation. The program is of general application and not confined to any particular type, make or model of wheeled vehicle. The instructional procedures are outlined in conformity with the principles laid down in TM 21–250. For specific information about the individual vehicle, see the Driving Controls and Operation Section and the Inspection and Preventive Maintenance Section of the appropriate vehicle technical manual.

c. Because conditions vary considerably, it is not practicable to provide in this manual a standard detailed schedule. In general, instructors should be advised to proceed as rapidly as is consistent with the ability and achievement of the students.

3. Effect of Driving on Combat Efficiency

The driver is the critical factor in maintaining the vehicle in fighting condition. The best designed and constructed vehicles plus the best mechanics in the Army cannot compensate for bad driving. Any unit in which driving is below satisfactory standards eventually fails in its mission because of lack of mobility, despite other measures taken to prevent it. This importance of the driver to combat efficiency is not always appreciated. Inadequate mobility is often assumed to result from faulty

For Military Terms not defined in this manual, see TM 20-205 and for list of publications, see FM 21-6.

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vehicles, unskilled mechanics, difficult terrain, and excessive operational demands when frequently it is due to improper driving and lack of or improper first echelon maintenance. Bad driving is not recognized as the source of trouble because its effects (save for accidents) are cumulative rather than immediate, and because officers and noncommissioned officers fail to detect bad driving practices. In spite of these bad practices, the excellence of the vehicle and the work of the mechanics keep the vehicle running for a time. But bad driving practices can and do reduce the normal life expectancy of a vehicle considerably, and increase the maintenance requirements.

4. General Nature of Problem of Selection, Training, and Supervision of Drivers

a. Selecting, training, examining and supervising drivers are responsibilities of commanders of all units equipped with motor transportation. In order to establish and maintain driver efficiency, certain definite and progressive steps are followed. AR 850–15 states that before a driver is issued an operator's permit, he must pass satisfactorily an examination on drivers aptitude, mechanical knowledge, operation (under the usual conditions of terrain and traffic), traffic regulations, road procedure, safety precautions, speed limits, vehicle abuse and maintenance. This manual covers the steps necessary in the driver training and supervision program. To be effective, this training must have the close cooperation and supervision of all commanders as well as the instructors. Higher commanders should select competent officer and enlisted instructor personnel and should allow time for their training. They should assure themselves that suitable men are selected for training as drivers. AR 850–15 directs that prevention of vehicle abuse is the commanding officer's responsibility. The best way to prevent vehicle abuse is through proper selection, training, examination and supervision of the drivers.

b. As a rule, driver training and examination should not be decentralized below battalion level. By centralizing this training in battalions, the fullest use can be made of the best instructors and assistant instructors in the battalion. The work can be better controlled and supervised and the most efficient and economical use can be made of special equipment needed. This centralization does not constitute an encroachment on the prerogatives and responsibilities of company commanders. The company commander selects the men to be trained as drivers and after training requires all drivers to meet specified minimum qualifications. He exercises close supervision of drivers personally as well as through his platoon and section leaders and crew chiefs.

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Chapter 2

PREPARATION FOR CONDUCT OF DRIVER TRAINING

5. Importance

Good driver training results from careful planning and thorough instruction. Well before the time for starting instruction, a careful and thorough estimate of the driver training situation must be made. Instructors and assistant instructors are selected, detailed, and trained. Equipment and facilities are obtained and placed in readiness.

6. Estimate of Driver Training Situation

a. When an officer is detailed to conduct a driver training program, he immediately makes an estimate of the driver training situation. He determines such matters as:

(1) New drivers to be qualified.
(2) Old drivers to be checked and retrained.
(3) The caliber and general experience of new drivers to be qualified.
(4) Time available.
(5) Number of assistants available.
(6) Special training required for the assistants.
(7) Facilities available, including classrooms, visual aids, shops, vehicles, driving ranges, and varied terrain.
(8) Additional facilities needed and how they can be obtained.
(9) Work necessary to place all equipment and facilities in readiness.

b. The officer charged with the conduct of the course analyzes the information obtained in answer to the above questions and develops a plan for organizing and carrying out preparations and actual conduct of the course.

7. Planning and Organizing the Course

a. The plan for organizing and carrying out instruction includes—

(1) Number of drivers to be trained or retrained.
(2) A schedule of instruction.
(3) How students are to be grouped and how groups will be rotated.
(4) Number of instructors and assistant instructors to be selected and trained and a schedule covering their instruction.

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(5) Assignment of duties and responsibilities to instructors and assistant instructors.

(6) A list of equipment and facilities to be obtained and the method to be used to place it in readiness.

b. The plan must be adapted to local requirements and conditions.

8. Selecting and Training Instructors

The success of the course depends in a large measure upon the proper selection and training of instructors and assistant instructors. A good noncommissioned officer or a good driver is not necessarily a good driving instructor. Neither should it be assumed that an otherwise well-qualified motor and maintenance officer makes a good driving instructor without some special training. In selecting instructors and assistant instructors, prospective instructors who can not be given a general rating of at least "good" on the qualifications listed on the rating form for evaluating instructors given in TM 21–250 are rejected. In using this form, special attention is given to determining the entry under "Mastery of subject matter." It is to be expected that even those accepted as instructors or assistant instructors need refresher training, but to be accepted, a prospect should at least be a qualified driver with 6 months of actual experience.

9. Training Instructors and Assistant Instructors

After instructors and assistant instructors have been selected, regardless of their apparent qualifications, they are given a preliminary course of instruction before they are permitted to teach. Even though it may be necessary to delay the time when instruction for student drivers may begin, time must be made available for this preliminary course for instructors and assistant instructors. This procedure pays dividends in the long run. The preliminary course for instructors and assistant instructors covers the following:

a. The entire course to be given to student drivers. It probably will not be necessary to spend as much time on this for instructors and assistant instructors as will be scheduled for students. However, the entire course should be covered and the most time given to those phases where instructors and assistant instructors prove to be the weakest.

b. Application of the principles laid down in TM 21–250 to driver training.

c. Special training in "Controlled Observation in Connection with Driver Training."

d. Special training in the conduct of driver aptitude tests, diagnostic checks, and qualification examinations.

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Chapter 3

SELECTION OF DRIVERS

10. Purpose

The purpose of a selection program for drivers is to eliminate the unfit, and to pick the best from the available prospects. All men who meet the Army's physical standards are not necessarily physically, temperamentally, and mentally capable of becoming satisfactory drivers. Unless these men who are definitely not good training risks are eliminated before training starts, they will cause loss of time and damage to equipment.

11. Aptitude Test

The chief means available for determining whom to eliminate in the beginning is the Aptitude Test (par. 13). Unless a man can meet the minimum requirements set up in this test, he is definitely not a good training risk. The required tests and qualifications described in paragraph 13 will eliminate those men who definitely do not possess sufficient aptitude to warrant training. In others, lack of aptitude will show at an early stage of training and they can be eliminated.

12. Number Tested

When the available personnel and training facilities are sufficient, the number of applicants taking the aptitude test should exceed by at least 50 percent the number of qualified drivers required.

13. Minimum Standards

The following are the minimum standards of candidates for training as combat drivers of military vehicles:

a. EDUCATION. Completion of fourth grade. This information can be obtained from the candidate Form 20.

b. VISUAL ACUITY. Correctible to 20/20 for each eye. This test should be conducted by the unit medical officer.

c. FIELD OF VISION. Not less than 75° each side.

(1) *Equipment.* Necessary equipment includes the simple device shown in figure 1 and a piece of white chalk or a similar object. The device itself can be made of plywood or heavy cardboard.

(2) *Procedure.* Have the subject hold this board horizontally against

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his face with the center notch at the bridge of his nose. Have him keep his eyes focused on the word "look" about 2 feet away from his eyes. Then, standing directly in front of the subject, slowly move the piece of chalk, beginning at his left ear, along the circumference of the board until he can notice it. In moving the piece of chalk, the hands and arms should be concealed under the device. The point at which the subject first sees the moving object represents the extent of vision to the left side. The edge of the board is marked in degrees so that a numerical value can be assigned quickly to the subjetts side vision. The same testing procedure is then followed on the right side. Make sure that during the test the subject does not shift his eyes to the side. It is desirable to repeat the test at least twice on each side to make sure that the score is reliable.

(3) *Scoring.* The score for each side is the average score for the number of trials given. The recommended minimum standard is a score of 75° on each side.

d. Night Vision, White Card Test. Measurement of night vision may be made by testing men outdoors on a clear night, before the moon has appeared, as follows: Construct a black target on which there is a movable white cardboard stripe, 6 by 24 inches. This target should be mounted on a post at one end of a level field, 5 yards wide and 40 yards long, away from all artificial light. Distances from the target should be marked off at 5-yard intervals. After the subject has been kept away from all artificial illumination for 20 minutes prior to testing, so that his eyes may become adapted to the darkness, he should start from the far end of the field, at the 40-yard mark, and walk slowly toward the target. The distance at which the subject is first able to identify the position of the white stripe correctly is noted. While the subject is walking back for another trial, the position of the white stripe is changed. Several trials are made. Correct recognition should take place at an average distance of not less than 17–yards (preferably at least 20–yards) from the target. It is necessary, however, that the condition of illumination be controlled as indicated, otherwise these standards cannot be used.

e. Color Test. Various methods may be used to determine whether the candidate lacks color perception. Red and green lights of low intensity viewed in a dark room may be used. The lights should be turned on separately because some color-blind men are able to distinguish these colors when seen together. Another simple method is to have several blocks of the same size and shape colored red and green. The candidate is required to distinguish the red blocks from green. In administering color tests, it must be remembered that a color-blind man is usually aware of his deficiency and may display considerable ingenuity in disguising it.

f. Character and Attitude. Recommended as dependable and con-

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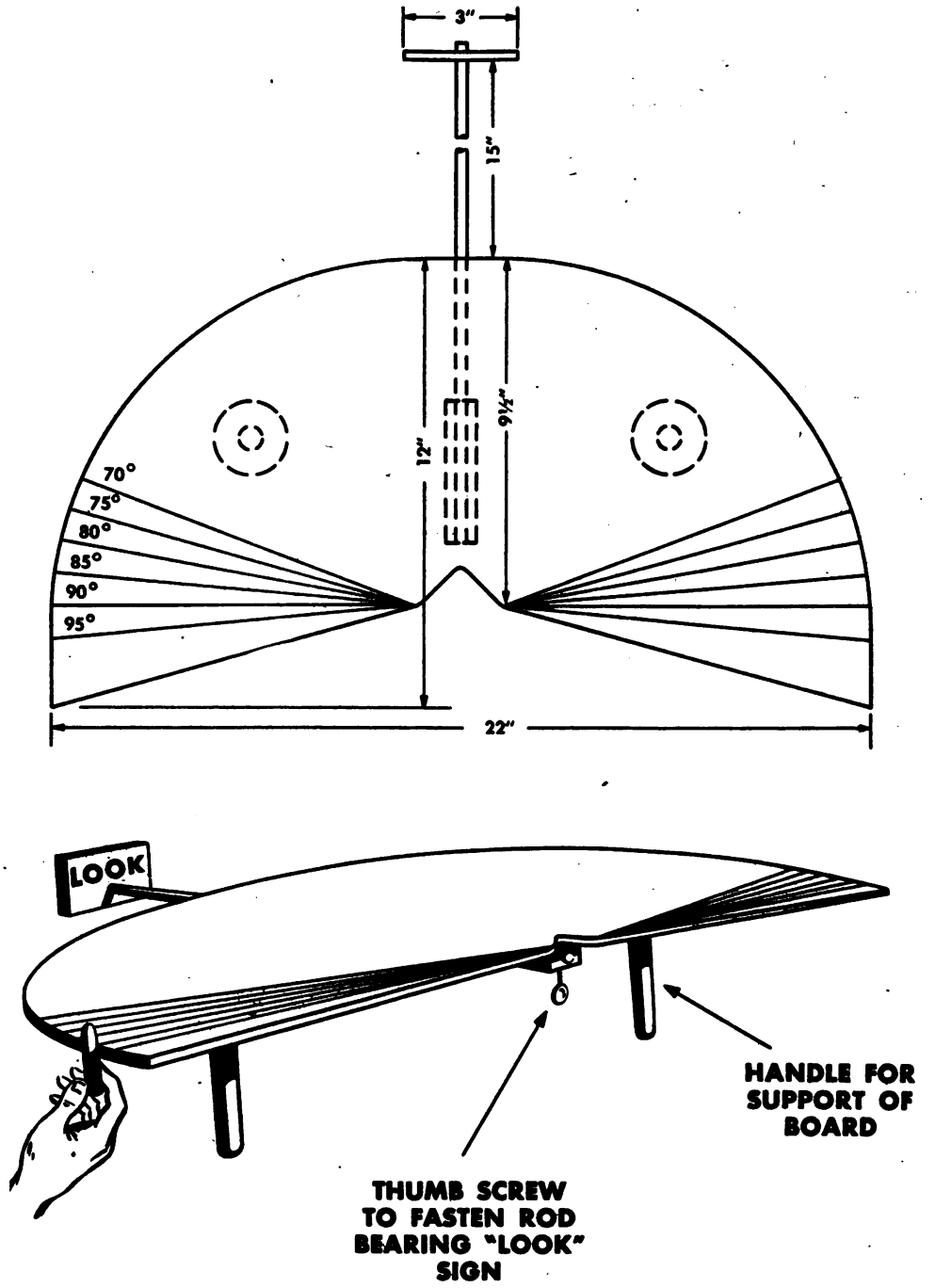


Figure 1.—Equipment for field of vision test.

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scientious by officers and noncommissioned officers who have observed the candidate.

14. Standards

a. Previous experience as a wheeled vehicle driver is desirable but not essential for a driver candidate. Out of a given number of applicants who meet the standards prescribed in paragraph 13, preference is given to those who have previous experience in wheeled vehicle driving. Regardless of previous experience or the rating the applicant receives on the classification tests, he receives instruction in all phases of instruction. If he learns quickly, he is passed on to the next phase of instruction as soon as possible.

b. Particular attention must be given to the individuals in the lower bracket as they probably will need individual attention and additional instruction. The men in the higher bracket should become proficient in the performance of each of the exercises more quickly and be passed on to the next exercise. Instructors must be on the alert for men who show a definite lack of aptitude or indifferent attitude and eliminate them early in the training.

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Chapter 4

TRAINING DRIVERS

Section I. INTRODUCTION TO COURSE

15. Principles of Instruction

Driver training, to be effective, must follow the principles of instruction presented in TM 21–250. In all of the steps of driver training the stages of instruction, preparation, presentation, application, examination, discussion and critique are followed. The instructor must be prepared to present his instruction properly. The presentation includes an explanation and, when practicable, a demonstration. After the student has had the subject explained and demonstrated, he is given an opportunity to apply what he has learned. When he has become proficient in the application he is given an examination; after the examination, a critique. *No student is passed to a new phase of training until he has become proficient in the previous phase.*

Section II. PHASES OF INSTRUCTION

16. Phases of Instruction

This course is divided into six phases:

a. Nonmechanical preliminary training.
b. Mechanical preliminary training.
c. Basic driving.
d. Driving on open road.
e. Cross-country driving.
f. Examining drivers.

Section III. NONMECHANICAL PRELIMINARY TRAINING

17. Objective

a. In addition to being able to handle his vehicle, there are certain

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things which a driver must know which are not directly related to the mechanics of the vehicle nor the actual handling of the controls. Included are such items as rules of the road, signals, safety precautions, march procedure, road maps and traffic circulation maps. (See TM 21–305 and FM 101–15.)

b. In addition to these subjects there is other nonmechanical training which should be given a driver before he is allowed to practice driving. Nonmechanical preliminary training includes fundamentals of driving, how a driver learns, and similar subjects.

18. Fundamentals of Driving

a. Skill in driving can be attained only by practicing correct methods. When the man starts to drive, he finds that judgment, coordination, speed and accuracy are the things that count. The rules of driving can be taught but it is only by closely supervised actual practice that a man becomes a skilled driver.

b. Driving a vehicle can be broken down into three steps—seeing, judging, and manipulating.

c. By seeing, is meant seeing the terrain or obstacle with "a driver's eye." For example, two drivers look at an obstacle. One sees that it is impassable and selects another route. The other looks but does not see, tries to crash on through, and is stuck. From quite a distance, the driver has to see these obstacles that may cause his vehicle to become mired or stuck.

d. Judging means deciding what manipulation is called for. As the driver approaches and sees an obstacle, he must decide whether he can cross it or will have to find another route, what gear he will select, at what speed he will approach and cross the obstacle and just how he will manipulate the clutch, accelerator and steering wheel while crossing it.

e. Manipulation means handling the controls. If a man can see and judge correctly but cannot handle the controls so as to make the vehicle do what his judgment calls for, he will not be able to drive. Handling the controls can be broken down into braking and steering and the coordinated manipulation of the clutch, gear shift lever, and accelerator. These simple procedures must be taught so well on flat terrain, where the driver can concentrate on them, that they will become habitual movements.

f. It is the job of the driving instructor to teach the driver these steps of seeing, judging, and manipulating. The only way this can be done is by first telling him how, then demonstrating, and finally supervising him while he practices what he has been shown. The instructor must be alert to catch and correct all errors the driver makes in seeing, judging,

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and manipulating. Show the driver his mistake and have him try again until he performs correctly.

19. How the Driver Learns (Conference—1 Hour)

a. If the instructor knows how his student learns he will be better able to teach him and can make sure that he learns correctly. If the driver has some understanding of the processes he must go through to become a skilled driver and the part the instructor plays in helping him, there will be better cooperation between instructor and student.

b. There are several ways to learn. They are by—

(1) Precept—being told by others or by reading books.

(2) Demonstration—followed by imitation.

(3) Trial and error.

(4) Guided practice.

c. You can get valuable information by reading or being told. Much of the hard-earned experience of others is packed into books. But skill cannot be acquired merely by reading or listening. Ideas about driving can be obtained by watching a good driver. That will help but will not make a skillful driver. Skill is acquired by practice.

d. Practice without guidance becomes learning by trial and error. Such practice is a process of trying first one method and then another, until finally, by accident, luck or common sense, a method that works is found. This is the method that beginners use unless they are closely supervised.

e. The trial and error method—

(1) Wastes time.

(2) Causes undue wear and breakage of equipment.

(3) Induces the student to form bad habits of which he may not be aware and which may persist through his entire driving career.

f. The best way to learn to drive is to practice under expert supervision. This insures correct driving habits, prevents undue wear on the equipment, makes learning much faster and produces a better driver. It is your job as instructor to guide the student's practice and prevent him from forming bad habits.

g. If you had to stop and think out everything you did and every move you made in preparing for a trip, it is unlikely that you would start at all. By habit we do things automatically, without thinking of them at all. This is especially true of movements which we make in carrying out the business of everyday living, or of movements we make in skills we have acquired.

h. Whenever we learn to do something new, new habits are acquired. If we analyze the new skill and find out just what new habits are necessary, we are able to shorten the time it will take to acquire that skill and also to improve its quality.

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i. In order to teach vehicle driving it is worthwhile to analyze the operation to discover what habits are necessary and most helpful in making reliable and efficient drivers.

j. Habits most necessary for good driving fall in three groups:

(1) Habits relating to simple mechanical operations.

(2) Habits related to more involved and thoughtful practices of driving.

(3) Emergency habits.

k. The following are habits relating to simple mechanical procedures:

Starting the engine.
Shifting gears.
Using the accelerator.
Using the clutch.
Steering and braking.

The foregoing habits involve muscular adjustments. Through repeated practice, the skillful driver makes the movements necessary to accomplish these things automatically or without thought.

l. Habits relating to the more involved and thoughtful practices of driving are:

Watching the instrument panel and being alert for any instrument reading that is unusual.
Being alert for unusual noises and odors.
Being alert to swerving of car indicating a flat or underinflated tire.
Operating in the correct gear and at the proper engine speed.
Selecting the route, whenever possible, which will cause the least wear and tear on the vehicle.
Observing all safety rules.
Being alert to all signals and obeying them promptly.
Performing a thorough inspection of the vehicle as prescribed in Technical and Field Manuals.

These can be called more mental than physical habits and for this reason they are more easily overlooked by the instructor and the student than are the habits relating to simple mechanical operations. For example, unless the instructor is watching the student closely at the beginning of his driving, the student will not form the habit of glancing frequently at his instrument panel. Neglect in forming these habits correctly at the very beginning of instruction will cause just as much harm as neglect in any phase of instruction. The instructor is particularly alert to determine by observation and questioning the student that these habits are being formed correctly from the start.

m. EMERGENCY HABITS. (1) "Emergency habits" should enable the driver to do the right thing in an emergency without having to think

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about it. But an emergency presents an unforeseen combination of conditions and events and generally the situation requires very rapid reaction. At such times a background of sound driving habits comes to the rescue. Much that should be done is done automatically. Consequently, the driver's attention is freed to attend to whatever features of the emergency require immediate attention, judgment and quick decision. All habits named as relating to the "simple mechanical operations" or the "more involved and thoughtful practices of driving" are serviceable in an emergency. One habit that is a definite "emergency habit," is *the habit of attention:*

(*a*) To the vehicle.

(*b*) To the road or terrain.

(*c*) To other vehicles or troops in the vicinity.

(*d*) To probable sources of enemy action.

(2) Driving cannot be done with inattention and nonchalance.

n. Summarizing briefly—

(1) The best method of learning to drive is by closely supervised practice.

(2) A large part of driving becomes habit.

(3) It is impossible to turn out good drivers unless the practice is supervised so closely that only good driving habits are formed.

20. Army Maintenance System

Since drivers are keymen in the Army maintenance system, they should understand what this system is, how it works, and the part they play in it. The instructor should give a very basic conference on this subject, using simple charts and words which the driver can understand. Care should be exercised to present the subject from the driver's viewpoint. The conference should include importance of preventive maintenance services, echelons of maintenance, and maintenance organization within the battalion. References: AR 850–15, FM 25–10, TM 37–2810 and 37–250, and Technical Manuals for the vehicle.

21. Forms and Records

The paragraphs below cover the responsibility for the forms which the driver keeps, fills out, and turns in as prescribed in AR 850–15 and TM 37–2810.

22. Operator's Permit

Give copies of Operator's Permit (WD, O. O. Form 7360) to student drivers and point out that these fulfill the same purpose for military drivers as the driver's license does for civilian drivers. Emphasize that permits are evidence that the driver has demonstrated that he is com-

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petent to handle various types of army vehicles, and that all drivers endeavor to justify the confidence the Army has placed in them. Point out that the driver may operate only the types of vehicles specified on the motor vehicle operator's permit. Call attention to the provisions made on these permits for recording accidents and stress that the permit will be revoked when accidents or other causes warrant. After answering all questions concerning these forms, state that when the students complete the course and pass their examination, they will receive motor vehicle operator's permits.

23. Accident Report

Give copies of Standard Form 26 and identification card (AR 850–15) to student drivers, and discuss each item on the form and use of the identification card. Emphasize the importance of filling out this form in its entirety at the scene of the accident and delivering it as soon as possible after the accident to the immediate superior officer. Stress the importance of getting the names of witnesses and giving full and correct details concerning the accident. The driver's accident report form must be kept in the vehicle at all times, and a driver, before starting on any trip, makes sure that he has one of these forms.

24. Driver's Trip Ticket and Preventive Maintenance Service Record

Give copies of WD Form 48 to student drivers, and discuss procedure for checking each item on the form and explain the operations listed on the reverse side of the form. Make sure that drivers understand the way in which they are to fill out all items especially assigned to them, and point out those items which are not to be filled in by the driver. Emphasize the importance of having the form properly signed. Form 48 is explained in further detail in appropriate Technical Manuals and TM 37–2810 (when published).

25. Modification Work Order and Major Unit Assembly Replacement Record

Explain WD, AGO Form 478 and point out that it is a form to be placed in the vehicle and to be retained there until the vehicle is removed from service. It is a mechanical record. Personnel completing modification or major unit assembly replacement will record a clear description of the work completed, and initials, hours, mileage, and MWO number. When major unit assemblies (engine, transmissions, and transfer case) are replaced record date, mileage, and nomenclature of unit assembly. Minor repairs, parts, and accessories replaced are not recorded. While it is a mechanical record, it is the driver's responsibility to see that it is in the vehicle.

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26. Map Reading, Rules of the Road, and Safety Precautions

a. MAP READING. This instruction covers reading of military road maps and traffic maps (FM 21–25 and FM 101–15).

b. RULES OF THE ROAD AND SAFETY PRECAUTIONS. This subject is covered in the classroom by a conference on traffic rules and regulations, road signs, and safety rules. (TM 10–460 and FM 101–15).

27. Signals

This instruction makes the driver thoroughly familiar with hand, flag, and light signals. Explain the signals by conference and demonstration. Divide the students into groups of two and have them alternate in giving and identifying the signals. References: FM 17–5, 18–15, 19–5, 22–5, TM 21–305.

Section IV. MECHANICAL PRELIMINARY TRAINING

28. Objective

a. The objective of this phase of training is to give the driver sufficient knowledge of the nomenclature and functioning of the vehicle installations and major units and the characteristics of the vehicle so that he will be able to operate and maintain it intelligently. It is impossible to develop and maintain efficient drivers unless they are thoroughly grounded in these basic subjects. It is just as important for a driver to know the nomenclature and functioning of his vehicle and its characteristics before he starts actually driving as it is for a machine gunner to know the nomenclature and functioning of his weapon before going on the range to fire. Thorough ground work in these subjects will save much time and wear on equipment when the driver starts actually operating a vehicle. *He must know enough of the functioning of the major units to be able to recognize and prevent vehicle abuse, and to know why, when and how to perform first echelon maintenance.*

b. Because of the variety of standard vehicles in use, this manual gives no specific instruction on any one of them. *Instructors use the Technical Manual and Field Manual for the vehicle concerned.*

29. Vehicle Characteristics and Assemblies

The objective of this instruction is to teach the capabilities and limitations of the vehicle which concern the driver and to teach him the nomenclature, functioning, and *first echelon maintenance of the vehicle.* Give a short conference on the vehicle characteristics, and location and mainte-

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nance of assemblies, then give each student a sheet on which the assemblies are listed. Divide the students into groups of four with an assistant instructor and one vehicle for each group. Have the assistant instructor point out the assembly on the vehicle, explain its functioning, and the first echelon maintenance required to each of his students.

30. Brakes, Steering Mechanism, Suspension, Wheels and Tires

Teach the nomenclature, function, and first echelon maintenance of the brakes, steering mechanism, suspension, wheels and tires in a conference, using a vehicle or a chart to point out the various units, their construction, maintenance, and adjustments required. Then divide the students into groups of four with an assistant instructor and one vehicle for each group. Have the students make the inspections of the springs, shock absorbers, steering linkage and brake system. Have them remove a wheel and dismount and remount the tire and inspect the tire and wheel.

31. Engine

Teach enough of the functioning of the engine so that the student will be able to recognize and prevent vehicle abuse. By the use of simple charts or drawings, explain the principle of operation of an internal combustion engine. Then by the use of charts, drawings, and the engine itself, apply this principle to the actual operation or functioning of this engine. During the instruction stress the effects on the engine of improper operation, such as lugging, operating at too high rpm, too high temperature, low oil pressure, and failure to warm the engine up. Explain and demonstrate the first echelon maintenance of the engine and engine accessories.

32. Power Train

The students are taught the location, functioning, and first echelon maintenance of the power train units. Enough of the functioning of units must be taught so that the students will be able to operate and maintain them properly. Construct simple charts to be used in explaining the functioning of the clutch, transmission, transfer case, and differential. In explaining these units take the students to the shop and show them a clutch, transmission, and differential which have been disassembled. Explain and demonstrate first echelon maintenance required. Emphasize the importance of keeping the various gear case air vents free from dirt and clogging.

33. Electrical System

The student learns the locations and functions of the electrical units, first echelon maintenance required, and the trouble shooting and repair a driver is required to make. Divide the students into groups of four

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with one assistant instructor and one vehicle for each group. Have the assistant instructor point out the location and explain and demonstrate the operation and maintenance on units such as battery, generator, switches, fuse box, wiring conduits, and lighting systems.

34. Instruments and Controls

This instruction covers the locations, proper readings, and meaning of the readings of each of the instruments, the importance of constantly observing the instruments, and actions to be taken in case of abnormal readings. The location and operation of the controls are shown. Explain these in a conference and then divide the students into groups of four with one assistant instructor and one vehicle for each group. Have the assistant instructor point out each of the instruments and its correct readings and what would be considered an abnormal reading. Point out each of the controls and explain how to operate them.

35. Starting, Warm Up and Stopping the Engine

Teach the correct procedure in starting, warming up, and stopping the engine. Explain the importance of following the correct procedure. Cover this subject in a conference, then divide the students into groups of four with one assistant instructor and one vehicle for each group and have them practice the procedures explained in the conference.

36. Maintenance

a. First echelon. The maintenance performed by the crew, the frequency with which it is performed and the importance of performing it thoroughly, are taught here. Explain in conference, before operation, during operation, at halt, after operation, and weekly maintenance services. Divide the students into vehicle crews and have them actually perform all of the first echelon maintenance operations under the supervision of an assistant instructor. These maintenance operations should be performed by the students often and at each driving instruction period. (References: TM 37–2810, TM 37–250, WD Form 48, War Department lubrication orders, and Technical Manual for the vehicle concerned.

b. Second echelon. The objective of this instruction is to familiarize the student with the driver's part in second echelon maintenance of his vehicle. Explain that the driver accompanies the vehicle when it receives second echelon maintenance and may actually perform such work under the supervision of unit maintenance personnel. Show how inefficient drivers can overload the entire maintenance system (AR 850–15).

c. Care and use of tools. The objective of this instruction is to

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familiarize the student with the importance of the driver's care and use of vehicle tools.

37. Loads, Loading and Lashing

a. DRIVER RESPONSIBILITY. The driver is responsible at all times for the proper loading of the vehicle. The principles of loads and loading are prescribed in TM 21–305 and FM 25–10.

b. LOADING AND TRANSPORTING PERSONNEL. The following rules must be observed when transporting personnel:

(1) Only one person beside the driver is allowed in the cab.

(2) The tail gate should be down when personnel are mounting and dismounting. After personnel are mounted, safety belts should be fastened before the vehicle is put in motion. Personnel must mount and dismount only when vehicle is stationary.

(3) Tail gate must be raised and secured before vehicle is put in motion.

(4) Personnel must remain seated while vehicle is in motion.

(5) Personnel must keep all parts of their bodies inside the vehicle while it is in motion.

c. LASHING. See TM 21–305.

38. Tarpaulins

Tarpaulins are used to protect cargo or passengers from bad weather, dust, and sand. Practice should be conducted in installing, removing, and stowing as many types of vehicle covers as are available. For details see appropriate Technical Manual for the vehicle.

39. Rope Tying

It is desirable for the driver to be able to tie various knots that will be useful to him in connection with loading the vehicle. Because it is often necessary for drivers to tie knots in the dark, drivers should become so familiar with the knots that they can tie them by using the sense of touch alone. For details on tying knots see TM 5–225.

40. Carbon Monoxide

It is important that drivers are taught the danger of this gas, how it is formed and how to combat it. For details see TM 21–305 and FM 21–11.

Section V. BASIC DRIVING

41. Objective

a. The objective of basic driving is to familiarize drivers with the characteristics of wheeled vehicles and teach correct driving habits under

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relatively easy conditions. Good basic driving form makes more difficult operations easier to learn.

b. In this phase of training, drivers acquire habits to which they cling all through their careers. Therefore, driving instructors and assistants carefully study the objectives described for each exercise, understand them thoroughly, and make them understood to student drivers.

42. Driving Range

A driving range for basic driving instruction should be selected using the best available area. An existing road net in the form of a square approximately 300 feet on a side or a large open area such as a motor park or a field of good solid earth will make a good driving range (fig. 2) on which the drivers may be trained in the elementary technique of wheeled vehicle driving. This type of area provides for continual supervision of all the vehicles by the officer in charge of the operation. The range will safely accommodate 10 vehicles at a time.

43. Exercises

Each of the following exercises covers one stage in the training of a driver. With each description of an exercise is a statement of the objective of the exercise and a check list for the use of the instructor in conducting the training. These exercises, planned for units of 10 students each, will require normally ten vehicles and ten assistant instructors. An assistant instructor is with each vehicle to explain and supervise each exercise. He is capable of demonstrating each exercise and critiquing the student during the entire training program. Each exercise is repeated until the student is proficient. It is desirable to set up troubles on the instruments from time to time to encourage the student to watch the instrument board.

a. EXERCISE No. 1. (1) *Description.* Manipulation of controls; moving in first and reverse gears and stopping.

(2) *Objective.* To teach the correct coordination of clutch and accelerator movements, putting vehicle in motion smoothly and confidently, putting vehicle in motion without lugging or racing the engine and slipping the clutch, and application of brakes and disengagement of the clutch at the right instant to achieve a smooth stop.

(3) *Set-up.* Driving range (fig. 2), vehicles are moved back and forth along the sides of the course.

(4) *Conduct.* The student and the assistant instructor are mounted in the vehicle. The assistant instructor sits in the seat with the driver. The instructor explains objective and execution of the exercise and demonstrates. The vehicles move back and forth until all drivers are proficient.

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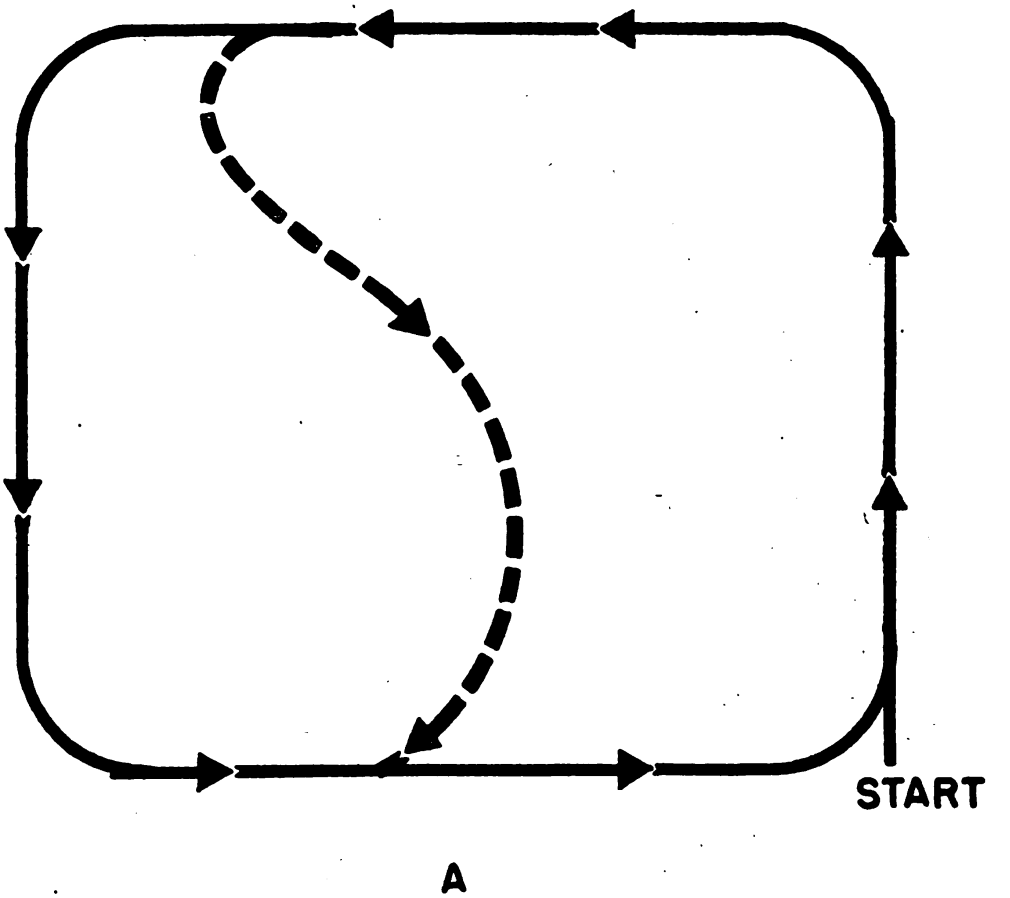


Figure 2. Driving range for wheeled vehicles.

(5) *Instructor's check list.* The instructor checks to see that the student—

(*a*) Maintains correct engine speed when starting to move forward.
(*b*) Engages clutch smoothly and without jerking.
(*c*) Fully releases clutch after vehicle starts to move.
(*d*) Stops smoothly.
(*e*) Disengages clutch smoothly when stopping.
(*f*) Drives carefully and slowly in reverse.
(*g*) Shows confidence and obtains smoothness of operation.
(*h*) Observes instruments.

b. EXERCISE No. 2. (1) *Description.* Shifting up in the forward gears. Move vehicle around the course using 1st, 2d, and 3d gear ratios, then stop.

(2) *Objective.* To teach the correct coordination of clutch, accelerator, and gear shift lever in executing smooth up-shift; steering vehicle around curves in course is included.

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(3) *Set-up.* Driving range (fig. 2), vehicles move in column at extended interval.

(4) *Conduct.* Seating arrangement is as in Exercise No. 1. The assistant instructor explains the objective of the exercise, how it is executed, and then demonstrates a smooth up-shift, calling to the students' attention all pertinent details such as the engine speed at which the shift is made, when the clutch is depressed, how the accelerator is coordinated and how the shifting lever is moved, and the proper position of the driver in the vehicle. Each student executes the exercises until proficient.

(5) *Instructor's check list.* The instructor checks to see that the student—

(*a*) Starts the shift at the correct engine speed.

(*b*) Finishes shift without undue delay.

(*c*) Does not lug or race engine.

(*d*) Does not slip clutch after shifting while gaining speed.

(*e*) By proper coordination of clutch and accelerator accomplishes smooth shift.

(*f*) Does not clash gears.

(*g*) Steers smoothly and stays on course.

(*h*) Maintains proper speed on turns.

(*i*) Observes instruments.

(*j*) Shows confidence and smoothness.

c. Exercise No. 3. (1) *Description.* Shifting down from third to second and second to first on level course.

(2) *Objective.* To teach the execution of a smooth down-shift, stressing coordination of clutch and accelerator, double-clutching and the relative engine and vehicle speeds in shifting.

(3) *Set-up.* The same as Exercise No. 2.

(4) *Conduct.* The assistant instructor explains the objectives and how the exercise is executed. He then demonstrates a smooth shift from third down to second and from second to first. The student then drives the vehicle paying close attention to the speeds at which he shifts into the lower gear. The use of double-clutching and how it is accomplished smoothly is stressed. It is emphasized at this time that shifting to lower gears is *not* used to slow the vehicle down when coming to a normal stop on level terrain.

(5) *Instructor's check list.* The instructor checks to see that the student—

(*a*) Starts shift at proper speed.

(*b*) Uses proper clutch-accelerator coordination.

(*c*) Completes shift in reasonable time.

(*d*) Does not clash gears.

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(*e*) Double clutches properly.

(*f*) Does not make the vehicle jerk or buck when releasing clutch.

(*g*) Observes instruments.

(*h*) Shows confidence and smoothness.

d. EXERCISE No. 4. (1) *Description.* Starting, shifting, and driving on level course.

(2) *Objective.* To teach the proper coordination in the driving of a vehicle on level road under ideal conditions. Includes shifting gears up and down through all forward speeds as the driving situation requires.

(3) *Set-up.* Same as Exercise No. 2.

(4) *Conduct.* The assistant instructor explains the objective of the exercise and how it is to be executed. Each student in turn then drives around the course until he has acquired the ability to handle the vehicle smoothly under these fairly ideal driving conditions. When half way through the exercise, at a signal from the group instructor, the vehicles are driven diagonally across the course, as indicated by the dotted line in figure 2, so that the course will be reversed and right turns instead of left will be made.

(5) *Instructor's check list.* The instructor checks to see that the student—

(*a*) Maintains correct engine speed when starting to move the vehicle.

(*b*) Uses proper clutch accelerator coordination.

(*c*) Does not clash gears.

(*d*) Engages clutch smoothly and without jerking.

(*e*) Fully releases clutch after shift is completed.

(*f*) Stops smoothly.

(*g*) Disengages clutch at proper instant when stopping.

(*h*) Shifts down smoothly and at proper time.

(*i*) Shows confidence and obtains smoothness of operation.

e. EXERCISE No. 5. (1) *Description.* Shifting into front axle drive under ideal conditions.

(2) *Objective.* To teach execution of shifting into front axle drive, stressing how and when the shift is to be made.

(3) *Set-up.* Same as for Exercise No. 2.

(4) *Conduct.* The assistant instructor explains the objective and how the exercise is to be conducted. He explains that normally the front axle drive is not engaged while driving on level, even terrain with good footing. However, the manipulation and technique is taught while on the driving course so that the student will know how to use it when needed in the cross-country driving phase of the instruction. The instructor demonstrates a shift into front axle drive, explains the reasons for not using the front axle on a hard surface, and demonstrates how to disengage the front axle drive. Students drive the course, engaging

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the front axle until proficiency is acquired. Vehicle speed is kept very slow during this exercise.

(5) *Instructor's check list.* The instructor checks to see that the student—

(*a*) Uses proper care in engaging front axle drive.

(*b*) Does not clash gears.

(*c*) Appreciates the reasons for normally not using front axle drive on hard surface road.

(*d*) Disengages front axle drive properly.

(*e*) Observes instruments.

(*f*) Shows confidence and smoothness.

f. Exercise No. 6. (1) *Description.* Shifting the transfer case into low range.

(2) *Objective.* To teach shifting the transfer case into low range, stressing the technique of shifting, and the circumstances under which low range is to be used.

(3) *Set-up.* Same as for Exercise No. 2.

(4) *Conduct.* The assistant instructor explains the objective and how the exercise is executed. He explains that low range is not normally used for driving on a level, hard surface road, but that the exercise is being performed as preparation for the later cross-country driving phase of the instruction. He demonstrates how to shift into low range. The students then drive around the course engaging the front axle and shifting into and out of low range and the disengaging front axle drive until all students have become proficient.

(5) *Instructor's check list.* The instructor checks to see that the student—

(*a*) Engages and disengages the front axle drive properly.

(*b*) Uses the clutch properly in shifting into low range.

(*c*) Uses proper clutch-accelerator coordination in shifting from high range into low range.

(*d*) Does not clash gears.

(*e*) Maintains control of his vehicle while manipulating the controls.

(*f*) Observes instruments.

(*g*) Shows confidence and smoothness.

g. Exercise No. 7. (1) *Description.* Precision driving.

(2) *Objective.* To teach the technique of handling the vehicle in precision movements, stressing the limited turning radius of the vehicle, the limitations on visibility from the driver's seat, the technique of giving and following guiding signals, and the importance of judging distances accurately.

(3) *Set-up.* The exercise is conducted on the course shown in figures 3 and 4.

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(4) *Conduct.* The assistant instructor explains the objective and how the exercise is executed. The vehicles are distributed among the various stations and drivers are sent to other stations when they have become proficient at one station. Continue until each student is proficient at each station.

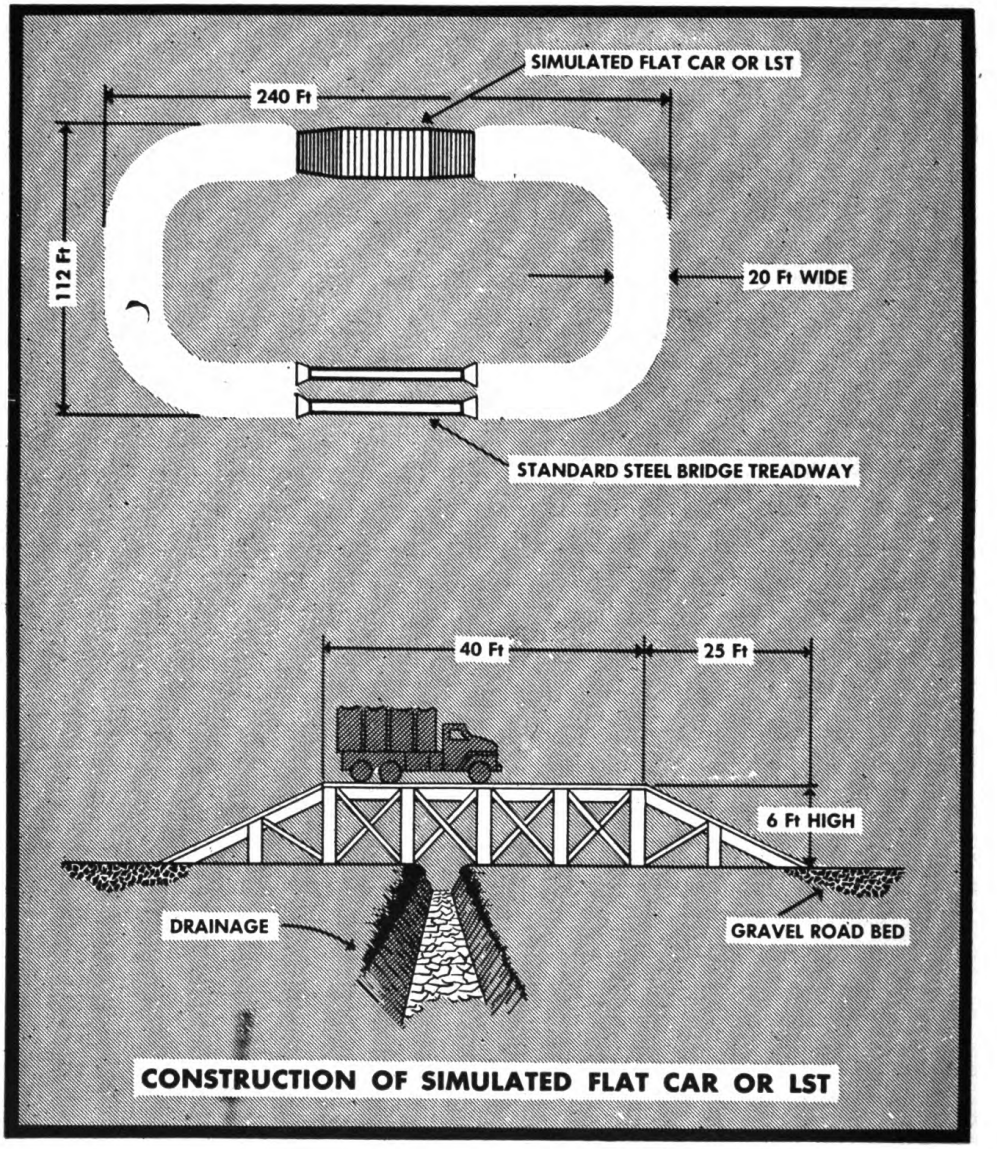


Figure 3. Wheeled vehicle driving course. Precision driving.

(5) *Instructor's check list.* The instructor checks to see that the student—

(*a*) Obeys signals promptly.

(*b*) Stays between guide posts when moving into the stall.

(*c*) Stays on treads of simulated treadway bridge.

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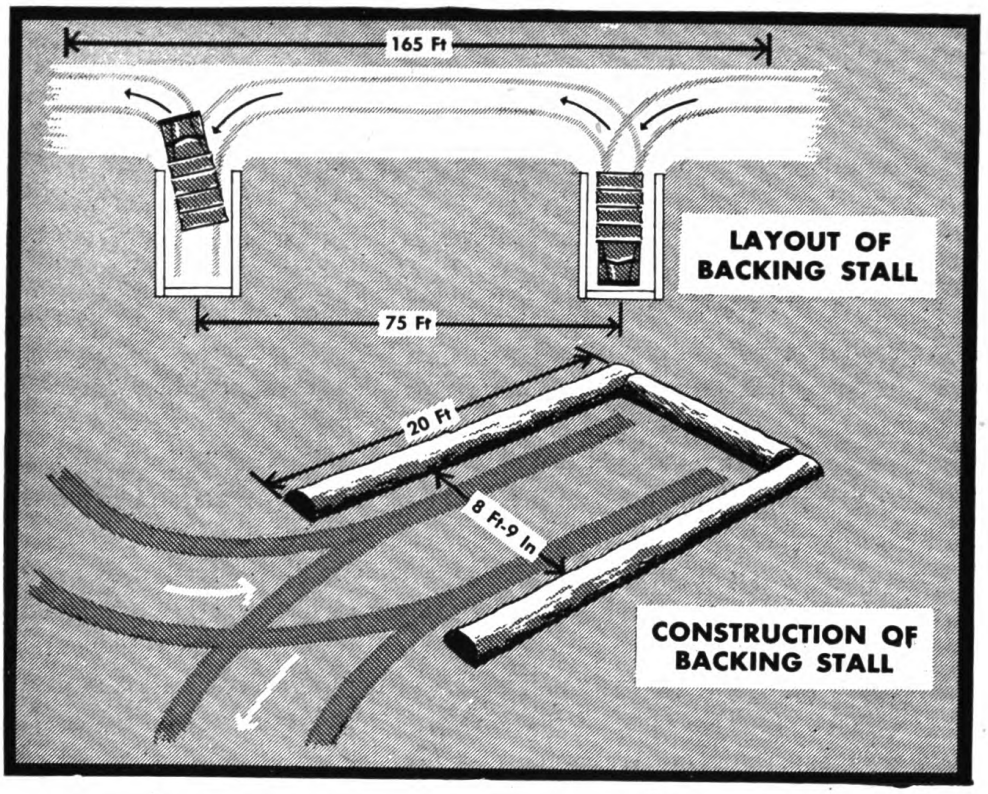


Figure 4. Backing-stall lay-out for wheeled vehicles.

(*d*) Does not run off the loading ramp.

(*e*) Makes proper use of power in climbing ramp. Does not stall or lug the engine.

(*f*) Does not ride or slip the clutch.

(*g*) Obeys safety rules in following a dismounted guide.

(*h*) Shows confidence and smoothness.

Section VI. ROAD DRIVING

44. Objective

The objective of the road driving phase of vehicle driver instruction is to develop in the student a smooth, coordinated driving skill. By gaining considerable road driving experience under the close supervision of a competent instructor, the student will develop good driving habits from the principles that were taught him in the basic driving exercises. In this driving practice he will get the "feel" of his vehicle so that in the

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later stage of cross-country driving he will be able to judge the performance of his vehicle and know its capabilities.

45. Exercise No. 8

The same general principles govern the conduct of this exercise as for the basic driving exercises.

a. DESCRIPTION. Driving on the open road, including good and bad road surfaces, hills, and level stretches.

b. OBJECTIVE. To teach and develop smooth coordination in driving and develop sound driving judgment.

c. SET-UP. A previously reconnoitered road route marked with standard guide symbols so that vehicles can proceed individually along the route. It includes as great a variety of road conditions as possible such as hills, various road surfaces, winding and straight stretches and, in the latter part, some congested areas.

d. CONDUCT. The assistant instructor explains the objective and how the exercise is to be conducted. The vehicles then proceed independently over the prescribed course with each student driving the entire course and then the other student driving the course until each student shows the necessary degree of proficiency. The instructor is continually alert for proper driving technique and for safety precautions.

e. INSTRUCTOR'S CHECK LIST. The instructor checks to see that the student—

(1) Starts the vehicle smoothly.
(2) Shifts easily and with good clutch-accelerator coordination.
(3) Controls the vehicle well using good driver-judgment.
(4) Observes the rules of the road and adequate safety precautions.
(5) Exhibits good driver technique in regard to posture, grip on the steering wheel, road signals, and alertness.
(6) Observes instruments.
(7) Shows confidence and smoothness.

Section VII. CROSS-COUNTRY DRIVING

46. Objective

The objective of the cross-country driving phase is to teach the student to apply the skill, judgment and knowledge he has learned in the preceding training, and to increase his knowledge of the capabilities and limitations of his vehicle. Much of the tactical driving of the vehicle is cross-country and it is important to develop his appreciation for the problems he will encounter in these situations.

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47. Exercises

The same general principles govern the conduct of these exercises as for the previous driving exercises.

a. EXERCISE No. 9. (1) *Description.* Learning the vehicle's capabilities and limitations.

(2) *Objective.* To teach the students to recognize terrain and obstacles that their vehicle will or will not traverse.

(3) *Set-up.* Select and mark a course containing various types of terrain and obstacles, such as grades, woods, ditches, mud, sand, stumps or boulders. Some of these vehicles, driven by the best drivers available, will traverse, and some they will not traverse.

(4) *Conduct.* At the beginning of the course, have the students dismount and walk over the course with the vehicles following them. As they reach each obstacle have each decide whether the vehicle will negotiate it and the best method of approaching and crossing it. Then have one of the vehicles attempt to take the obstacle. Hold a critique on the method used and on the way the vehicle negotiated or failed to negotiate the obstacle. Repeat this procedure for each obstacle in the course.

b. EXERCISE No. 10. (1) *Description.* The driver is required to—

(*a*) Drive over vertical obstacles.

(*b*) Drive through the woods.

(*c*) Drive through mud and sand.

(*d*) Ascend and descend steep hills; stop, back up and start while ascending and descending steep hills.

(*e*) Ford.

(2) *Set-up.* Ten vehicles with one assistant instructor and one student per vehicle. Lay out a course containing each of the types of driving listed in (1) above. The vertical obstacle can be constructed with logs, or a suitable ditch with vertical banks may be used. If a suitable course through woods is not available, a substitute course can be constructed with stakes to represent trees. Select short grades of about 25° slope. To avoid possible drowning out of engines, the depth of the ford should be about 1 foot less than the maximum fording ability of the vehicle. In order to save time in moving from one obstacle to another, have them as close together as practicable.

(3) *Conduct.* At the first obstacle the assistant instructor explains the objective and explains and demonstrates how to negotiate the obstacle. The vehicles are assembled in close column, and the students drive them across the obstacle, forming again in close column after crossing it. The instructor holds a critique on each student, using the instructor's check list as a guide. When all students are proficient on one obstacle, they are moved on to the next and the procedure is repeated.

(4) *Instructor's check-list.* The instructor checks to see that the student—

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(*a*) Approaches the obstacle at the correct speed.
(*b*) Crosses in the correct gear.
(*c*) Maintains correct engine speed.
(*d*) Uses the clutch, accelerator, and brakes at right time.
(*e*) Negotiates the obstacle smoothly.
(*f*) Shows confidence and smoothness.

c. EXERCISE No. 11. (1) *Description.* Cross-country driving.

(2) *Objective.* To teach the selection of routes from within the vehicle, and the operation of the vehicle across country over varied terrain.

(3) *Set-up.* Ten vehicles with one assistant instructor and one student per vehicle. Select a training area which contains various types of terrain, and mark a number of starting points and objectives with a distance of 100-yards or more between the starting point and objective.

(4) *Conduct.* At point No. 1 point out objective No. 1. Explain the objective of the exercise. Have each of the students drive over the ground to the objective, selecting what he considers to be the easiest route as he goes. When all of the vehicles have reached objective No. 1, repeat the procedure between starting point No. 2 and objective No. 2. Repeat until all students are proficient. Hold a critique when each objective is reached.

(5) *Instructor's check list.* The instructor checks to see that the student—

(*a*) Uses clutch-accelerator properly when starting.
(*b*) Does not slip the clutch.
(*c*) Keeps the engine within correct rpm limits.
(*d*) Does not lug the engine.
(*e*) Does not ride the clutch.
(*f*) Maintains control of the vehicle at all times.
(*g*) Shows good judgment in selection of gears, speeds, and routes.
(*h*) Shifts up and down smoothly and makes proper use of clutch and accelerator.
(*i*) Maintains proper distance and interval with respect to other vehicles.
(*j*) Observes instruments.
(*k*) Shows confidence and obtains smooth operation.

d. EXERCISE No. 12. (1) *Description.* Operation of winch.

(2) *Objective.* To teach drivers to operate the winch and to utilize the winch in moving the vehicle equipped with the winch, or other vehicles, or loads.

(3) *Set-up.* Sufficient number of vehicles equipped with winches to enable all drivers to get necessary amount of practice in available time, and one assistant instructor for each student driver. Any open area will suffice as a training area.

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(4) *Conduct.* The assistant instructor explains the objective. He then explains and demonstrates the operation of the winch. The student then explains and demonstrates the operation under close supervision of the assistant instructor. This procedure is repeated until students are proficient in operating winch.

(5) *Instructor's check list.* The instructor checks to see that the student—

(*a*) Engages sliding clutch.

(*b*) Depresses clutch pedal and shifts power take-off control lever into proper position.

(*c*) Releases clutch pedal, at same time accelerates engine as necessary.

(*d*) Does not exceed maximum engine speed necessary to operate winch.

(*e*) Uses hand throttle properly when operating winch and maintains a uniform engine speed.

(*f*) Depresses clutch pedal and shifts power take-off control lever into neutral position to stop winch.

(*g*) Understands the operation of the automatic brake and reasons for releasing the sliding clutch when reeling out cable.

(*h*) Does not ride clutch.

(*i*) Selects proper gears.

(*j*) Shows confidence and obtains smooth operation.

Section VIII. EXAMINING DRIVERS

48. Examinations

a. GENERAL. After the student has completed the vehicle operator's course, he should not only be able to handle a vehicle skillfully but he should also know the relevant Army Regulations and practices and be able to perform authorized preventive maintenance services. Three tests are provided to determine whether he meets military vehicle driver standards. They are an information test, an inspection test, and a road test. Tests are conducted by a qualified commissioned officer. Authorization to drive vehicles is given individuals who pass this examination by the signature and rank of the qualifying officer in the "authentication" column after appropriate vehicle, on the student's Army Motor Vehicle Operator's Permit, WD O.O. Form 7360.

b. *Driver's information test.* (1) This test is to determine whether the driver has acquired enough knowledge, after taking the driver's course, to be qualified as a driver of a wheeled vehicle.

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(2) *Answers.* The correct answers are listed on the page following the test. Scoring of a test paper is facilitated by placing the first column of the answer key beside the student's answers on the first page of the test. The number of correct answers on that page can then be determined immediately. Use the same system for scoring all pages. The recommended minimum standard is 30 questions answered correctly.

DRIVER INFORMATION TEST

(For final qualification)

Instructions

Read each question carefully. Select the best answer to each question. On the blank line to the left of the question number, write the letter preceding what you think is the best answer. Notice how the sample is marked.

Sample question:

A The right foot is used to step on the brake pedal.
(A) true. (B) false.

The right foot is used to step on the brake pedal, so the statement is true. Therefore, the letter A has been placed on the blank line preceding the question number.

Mark only one answer to each question.

—— 1. Holding your left foot on the clutch pedal while driving is known as "riding the clutch" and results in—
(A) excessive clutch wear. (B) the rear wheels turning more slowly. (C) more control over the car. (D) easier gear shifting.

—— 2. In backing down a hill, the driver should put the vehicle in neutral.
(A) true. (B) false.

—— 3. When skidding on a slippery road, you should—
(A) use the emergency brake. (B) depress the clutch. (C) steer in the direction in which the rear end is moving.

—— 4. Hitchhikers, if in military uniform, may be given a ride in an Army vehicle.
(A) true. (B) false.

—— 5. Tire pressure should be checked—
(A) daily. (B) weekly. (C) every other day.

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—— 6. To check for leaks the driver crawls under the vehicle while the engine is running.
(A) true. (B) false.

—— 7. A cranking motion with the right arm is a signal to—
(A) decrease speed. (B) start engine. (C) reverse. (D) mount vehicle.

—— 8. Cleaning of an Army motor vehicle is the responsibility of the driver.
(A) true. (B) false.

—— 9. If the lights change when pedestrians are in the center of the street, the driver should—
(A) wait until the pedestrians are out of the way.
(B) start before the pedestrians get in the way.
(C) sound the horn and proceed.

——10. Convoy speeds, with headlights in good condition, are generally the same night and day.
(A) true. (B) false.

——11. In traveling in a convoy, a driver of one of the convoy vehicles may—
(A) pass slower moving vehicles in the convoy.
(B) pass a vehicle that has engine trouble.
(C) exceed the local speed limit.

——12. When you drive out of a filling station yard, street traffic on your left has the right of way.
(A) true. (B) false.

——13. Army drivers must obey the same laws as civilian drivers, except on special occasions.
(A) true. (B) false.

——14. When you are not in convoy, you are allowed to pass a convoy without special authority.
(A) true. (B) false.

——15. The left arm extended at a 45° angle above the horozintal is a signal for—
(A) a right turn. (B) a left turn. (C) slowing down. (D) stopping.

——16. If the driver discovers a mechanical condition injurious to further operation of the vehicle while in convoy, he should—
(A) continue at reduced speed. (B) drop to the back of the column. (C) signal the driver behind for assistance. (D) stop and signal for other vehicles to pass.

——17. When vehicles of a convoy are halted, they should—
(A) pull on to the shoulder. (B) stay in the middle of the road. (C) place the right side in a ditch.

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——18. The distance between vehicles in a convoy should be—
(A) equal to the speedometer reading in yards.
(B) as the column commander directs.
(C) twice the speedometer reading in yards.
(D) 150 feet.

——19. At a halt the driver should first—
(A) rest. (B) unload troops. (C) inspect the vehicle.
(D) talk with the other drivers to see if they need help.

——20. You should notice what the instrument panel gauges indicate—
(A) each time you visit the filling station.
(B) frequently in the course of driving.
(C) every 500 miles.
(D) once a week.

——21. Blackout lights are always used for travel at night.
(A) true. (B) false.

——22. The front wheel drive should be engaged only after a vehicle becomes stalled.
(A) true. (B) false.

——23. With a front-wheel drive truck, you are most likely to get stuck if—
(A) both rear wheels are in mud. (B) both front wheels are in mud. (C) both right wheels are in mud.

——24. Scales are the only means of determining whether a truck is overloaded.
(A) true. (B) false.

——25. If the driver ahead of you in a convoy gives the signal to pass, you should pass him.
(A) true. (B) false.

——26. Convoys are not required to observe speed laws.
(A) true. (B) false.

——27. When stopping a car while driving in low, you should first—
(A) depress the clutch. (B) apply the brake. (C) put the gear shift in neutral.

——28. The front wheel drive should not be used for—
(A) 6 percent grades on hard roads. (B) cross-country driving. (C) slippery roads.

——29. In small towns it is desirable to park a convoy on a deadend street.
(A) true. (B) false.

——30. The maximum load of a truck may be exceeded in an emergency without special authorization.
(A) true. (B) false.

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——31. In crossing ditches, the driver should depend largely on momentum to carry the truck through.
(A) true. (B) false.

——32. Blackout lights are used primarily to—
(A) make the vehicle visible to others on the highway.
(B) illuminate the road a short distance ahead.

——33. When approaching an unguarded railroad crossing in an Army vehicle, you should—
(A) slow to 5 mph. (B) slow down so a stop can be made if necessary. (C) come to a stop, if visibility is restricted. (D) stop.

——34. During freezing weather, vehicles should be parked on brush or weeds in preference to the bare ground.
(A) true. (B) false.

——35. Brakes should not be applied when the front-wheel drive is engaged.
(A) true. (B) false.

——36. Standard form No. 26 is—
(A) trip ticket. (B) an Army license. (C) an accident report form. (D) a gasoline ticket.

——37. In driving in a convoy at night, you should use—
(A) parking lights. (B) upper beam of headlights. (C) lower beam of headlights.

——38. A closed fist thrust upward from the shoulder several times means to—
(A) shift to higher gear. (B) increase space between vehicles. (C) load vehicles. (D) increase speed.

——39. The person loading a vehicle is responsible for its safety until the destination is reached.
(A) true. (B) false.

——40. An Army vehicle is normally operated in—
(A) low range. (B) high range.

——41. For a given speed on the road, the engine runs faster in low range than in high range.
(A) true. (B) false.

——42. The brake should be applied "off and on" when used in descending a long grade.
(A) true. (B) false.

——43. Extending the left arm horizontally and describing small circles toward the front means to—
(A) increase speed. (B) close up. (C) make a right turn. (D) pass and keep going.

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——44. When the gas tank is being filled, sparks from static electricity are most likely to occur if the nozzle is held in contact with the tank.
(A) true. (B) false.

——45. The air filter prevents dust from getting into the oil in the crankcase.
(A) true. (B) false.

——46. Three long blasts of a whistle repeated several times indicates—
(A) approach to motor park. (B) dangerous hill ahead. (C) grave danger. (D) desire to pass.

——47. You are driving on a snow-covered road and have to make a stop quickly. The best way to do this is to—
(A) slam the brakes on hard. (B) roll down the window and signal. (C) turn off the ignition and apply the hand brake. (D) pump the brake pedal.

——48. During freezing weather, all water may be drained by opening the petcock at the bottom of the radiator.
(A) true. (B) false.

——49. The oil gage indicates—
(A) the amount of reserve oil. (B) the pressure at which the oil pump is pumping oil. (C) how much oil is in the transmission. (D) the viscosity of the oil in the engine.

——50. Trip tickets should be turned in—
(A) at the end of the day. (B) once a week. (C) at the conclusion of the trip.

TEST ANSWERS

A 1.	B 14.	A 27.	B 40.
B 2.	A 15.	A 28.	A 41.
C 3.	D 16.	B 29.	A 42.
B 4.	A 17.	B 30.	D 43.
A 5.	B 18.	B 31.	B 44.
B 6.	C 19.	A 32.	A 45.
B 7.	B 20.	D 33.	C 46.
A 8.	B 21.	A 34.	D 47.
A 9.	B 22.	B 35.	B 48.
B 10.	C 23.	C 36.	B 49.
B 11.	B 24.	C 37.	C 50.
A 12.	A 25.	D 38.	
A 13.	B 26.	B 39	

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49. Vehicle Inspection Test

One or more vehicles are prepared with about five defects and five items missing, such as one headlight not working, missing fire extinguisher, oil low in crankcase, underinflated tire, or loose fan belt. The student to be tested is given the following instructions: "You are to make an inspection of a vehicle." Assume you know nothing about the previous use of the vehicle but have been asked to drive it on a 200-mile trip. Perform the Before-Operation Service using the vehicle Technical Manual and WD Form 48. On WD Form 48 list the defects found. If he omits any, it is cause for failure on the test.

50. Road Test

a. Study the road test check list. Before beginning the test, carefully work out the necessary route and procedure, so that a maximum of testing may be done in a minimum of time; at least 20 minutes should be allowed for each man to be tested. A vehicle is required for this purpose. The first part of the test course should be straight and level to allow the driver to become familiar with the operation of the vehicle. Every time an error is made, it should be noted on the check list. In some cases a given item may be checked several times during the course of the test.

b. The check list is based on errors most likely to be made by a driver of an Army vehicle. The elements have been selected which are the best indicators of general driving ability. The items have been weighted in terms of their correlation with general driving ability. In giving the test a check mark is recorded each time an error is made or repeated. Obviously, careful judgment by the examiner is of greatest importance.

Following is a suggested "road test check list."

Name ———————— Serial Number ————————

Organization ———————— Date ————————

ROAD TEST CHECK LIST

Point score ————— Final rating: 1 2 3 4 5

Weight	
	Starting vehicle (O.K. ————).
1————	1. Starts engine with gears engaged.
1————	2. Starts engine with clutch engaged.
1————	3. Fails to release handbrake.
1————	4. Kills engine in starting.
4————	5. Jerks in starting.
	Stopping on level (O.K. ————).
1————	6. Engine not used for braking.
1————	7. Jerks in stopping.
	Use of controls (O.K. ————).

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4——— 8. Does not double clutch when necessary.
3——— 9. Strains engine.
1———10. Rides clutch.
1———11. Clashes gears.
1———12. Uses brake excessively.
1———13. Tries over 1, shifting 4th to 3d.
1———14. Tries over 1, engaging f. w. d.
1———15. Tries over 1, engaging low range.

Hand signals (O.K. ———).

1———16. Not given for STOP.
1———17. Not given for RIGHT TURN.
2———18. Not given for LEFT TURN.

Stop signs (O.K. ———).

1———19. Goes through 0 to 5 mph.
2———20. Goes through over 5 mph.

Driving on hills (O.K. ———).

4———21. Goes up in wrong gear.
2———22. Stops to shift while going up.
3———23. Stalls engine while starting on hill.
3———24. Jerks in starting on hill.
2———25. Rolls back over 1 foot in starting.
1———26. Coasts driving down hill.
3———27. Coasts backing down hill.

Driving through mud (O.K. ———).

1———28. Engages f. w. d. late.
2———29. Fails to use f. w. d.
2———30. Stops while in mud.

Steering (O.K. ———).

1———31. Fails to keep to right.
1———32. Drives off road.
1———33. Cuts corners.
1———34. Swings wide on turns.

Parallel parking (O.K. ———).

2———35. Backings over 1.
1———36. Markers or curb hit.
1———37. Left wheels outside (feet).

Backing to platform (O.K. ———).

1———38. Backings over 1.
1———39. Feet over 1 from platform.
1———40. Markers or platform hit.

Miscellaneous.

1———41. Speed excessive for conditions.
20———42. Accident.
10———43. Near accident.

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Years of driving experience———Miles last year———
Driving of 1½-ton truck or heavier — Civilian (years) ———
Army (hours) ———
Hours of driving type of truck used for test———
Comments: ———

———

———

Examined by ———

c. SUGGESTED PROCEDURE FOR ROAD TEST. (1) *Starting vehicle.* (*a*) Before the driver gets into the vehicle to take the test, the hand brake should be set, the ignition turned off, the transmission engaged, the front wheel drive disengaged, and the transfer case placed in high range.

(*b*) Ask the driver to start the engine and proceed down the road. Place a check mark before items 1 to 5 for any error made. Each time any of these errors are repeated use additional check marks. By the time the test is completed some items may have a large number of check marks.

(2) *Stopping on the level.* At some place in the course ask the driver to come to a stop. Check item 6 if the clutch is depressed before the brake so that the engine is not used for braking. Check item 7 if a jerk is made.

(3) *Use of controls.* (*a*) The coordination of the driver in the manipulation of brake, clutch and gear shift, is observed throughout the test and checks made when errors occur. Check item 8 if the driver has trouble in shifting because he does not double clutch when necessary. If on a heavy pull, the driver strains the engine instead of shifting to a lower gear, check item 9. Check the other items each time an error is made. Some time during the test when the vehicle is in the 4th gear ask the driver to shift to 3d. If the shift is made on the first try, do not check item 13. However, if the driver must try more than once, use a check mark for each try in excess of 1. If the gears are clashed, check item 11.

(*b*) At another part of the course ask the driver to engage front wheel drive and at still another place ask him to shift to low range. Use a check mark for each try necessary in excess of 1.

(4) *Hand signals.* The test route should include at least three right and three left turns. Check items 16, 17, and 18 each time a signal is not given. If signals are given improperly, make a note under "Comments."

(5) *Stop signs.* The route should include at least two stop signs. Check item 19 if a complete stop is not made.

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(6) *Driving on hills.* If the terrain permits, part of the course should include steep hills and mudholes. If the driver must stop to shift while going up, check item 22. When part way up a hill, have the driver stop, shut off the engine, then start it again and proceed up the hill. Check items 23, 24, and 25 for errors made in starting. Ask the driver to back part way down a hill. If the driver does not use reverse gear, check item 27.

(7) *Driving through mud.* If the driver fails to engage front wheel drive before getting into mud, check item 28. Check item 29 if front wheel drive is not used even though the driver gets through the mud. If the driver has to stop while in the mud for any reason, check item 30.

(8) *Steering.* Observe the steering throughout the test and check each time an error is made.

(9) *Parallel parking.* Mark off a space with lines for parallel parking, 8 feet wide and 6 to 10 feet longer than the vehicle from bumper to bumper. Use a log for a curb if one does not exist. Use 5-foot posts or stakes set in kegs filled with dirt to mark the ends and corners of the space. Do not allow over three backings. Check item 35 for each backing over 1, item 36 each time a marker or the curb is hit, and item 37 once for each foot the wheels or tracks are outside the 8-foot limit line when parking is completed. Count the left wheel that is farthest out of the parking space.

(10) *Backing to platform.* Mark off a space 10 feet wide and extending 20 feet from a loading platform. Use posts or stanchions to mark the edges. Check item 38 for each backing required in excess of 1. Check item 40 each time a marker or the platform is touched. When the driver is parked, measure the distance from rear bumper to platform. Place 1 check mark for item 39 for each foot in excess of 1. (If the vehicle is 3 feet away, use 2 check marks.)

(11) *Miscellaneous.* Check these items each time they occur.

d. Scoring Road Test. The "point score" is the sum of the check marks multiplied by their weightings. For example, item 9 checked twice would count 6 points. The addition of all points from items 1 to 43 will give the point score. After a number of drivers have been tested a scale should be worked out so that a "final rating" can be given on the basis of the point score. A rating of 1 includes the best drivers—those with the lowest point scores. Any driving faults not included in the check list should be listed under "Comments." As an educational measure the various driving faults are explained to the driver at the conclusion of the test.

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Chapter 5

SUPERVISION OF DRIVERS

51. Necessity

Driver training and examination does not stop with the examination and issuing of the operators permit. In order to maintain driver efficiency, training and examination must be continuous. This continuous training and examination is supervision. Any work not carefully and continually supervised will eventually deteriorate below satisfactory standards. When drivers are not supervised deterioration is rapid. Drivers form one bad habit after another until all of the maintenance facilities will not keep their vehicles off the dead line. Usually a large dead line or an unusually heavy maintenance load can be traced directly to lack of supervision.

52. Requirements

Supervision is one of the main duties of every officer and noncommissioned officer in the Army. In order for anyone to supervise driving he must know how the vehicle should be driven, be able to recognize vehicle abuses, and where and when these abuses are most likely to occur. He must have a definite list of items to check on. He must be at the right place to check these items, and know how to correct the faults he discovers.

53. Use of Check List

a. IN PARK. A practical method of discovering driver faults and vehicle abuse is to use the instructors check list as a guide and spot check the drivers before, during and after a march or exercise. While these vehicles are warming up, observe for correct warm-up procedure and question the drivers on correct engine speed; length of warm-up period; normal readings of instruments, first echelon maintenance and the drivers during operation inspection. Make a note of any deficiencies found so that the driver can be given instruction, at the first opportunity, on the subjects in which he is weak.

b. DURING MARCH. During the march or exercise, ride the column in a ¼-ton truck or other light vehicle and observe for current speeds, gear selection, and smoothness in clutch, accelerator and gear shift use. A

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vehicle which is being driven correctly will not rock and pitch when the driver is shifting gears. Take the number of any vehicle that is being operated improperly and give the driver additional instruction upon completion of the march or problem.

c. CRITIQUE. Finally, check the stopping procedure upon returning to the motor park and correct any deficiences noted. As soon as possible assemble all drivers who were discovered operating their vehicles improperly and give them individual instruction to correct their driving faults.

54. Periodic Examination

a. NECESSITY. Drivers who apparently are competent will form bad habits which may not be apparent from observation of their driving. For this reason it is essential to hold periodic drivers tests and examinations. At least monthly, hold a short written test covering the vehicle abuses and drivers' faults most prevalent as judged from observation as described in preceding paragraphs. Discuss the test with the drivers, explaining the correct answer, and post each man's grade.

b. REEXAMINATION. Every 6 months reexamine each driver in the organization. As a result of the examination the weak points of each driver will be discovered. Give each man additional training as needed. After retraining the drivers, give the examination again to everyone who failed it, and if he still fails to pass, revoke his operator's permit. This reexamination and retraining procedure is essential in maintaining driver efficency. It is the only method which will discover and correct the bad habits which even the best of drivers form. The same care and thoroughness is used in carrying out this reexamination and retraining as in training and examining new drivers.

55. Drivers' Qualification Badges

a. The award of a qualification badge is authorized for drivers and assistant drivers who have successfully passed prescribed aptitude and qualification tests; who have performed duty for a minimum of three months as a driver or assistant driver of an Army vehicle without traffic violations, and with an accident free record and a rating of excellent.

b. It is definitely a function of driver supervision to see that drivers and assistant drivers who are entitled to this award receive it, that they wear the badge, and to see that it has such meaning that they are proud to wear it. An officer in each unit should be made responsible for continuous supervision of this matter. When drivers and assistant drivers have served 3 months, this officer should give a check examination to insure that they are still qualified for the award and then arrange for the award to be made at an appropriate ceremony.

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56. Summary

Supervision is essential to maintaining driver efficiency. A good supervisor must be able to see, recognize and correct driving faults. Supervision is the duty of every officer and noncommissioned officer in the Army. If drivers are properly selected, trained, examined and supervised, their vehicles will give long service and require little corrective maintenance.

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DRIVER INSTRUCTION FOR AMPHIBIOUS OPERATIONS

1. Preliminary

a. Special training is required for drivers participating in amphibious operations. Drivers of nonamphibious vehicles are reexamined and those who do not meet the requirements are removed as drivers. Emphasis is on backing and parking with strict adherence to both night and day signals of guides. The driver's training should be so thorough on amphibious operations that he operates the vehicle automatically. (See FM 31–5.)

b. WATERPROOFING. The training of drivers in all stages of waterproofing their vehicles and the special maintenance required before waterproofing is of the greatest importance. One faulty seal on a vehicle component might easily stall the vehicle and immobilize the succeeding vehicles with disastrous results. (See TM 9–2853.)

2. Discipline

The naval commander is responsible for the safety of the craft and personnel and full cooperation is given him.

3. Loading

a. PARKING AREA. A parking area is set aside where vehicles are arranged in the right order for loading onto the craft. Vehicles are loaded in reverse order to that in which they will be unloaded. A careful check is made of gears used. Front wheel drives are engaged.

b. GEAR. In heavy sand or mud the lowest gear is used. When beach is alternately hard and soft, a gear which will permit the vehicle's momentum to carry through the soft spots is permitted. On hard ground when the distance to the ship is great enough so that the waterproofed vehicle is in danger of overheating in low gear, higher gears are permitted.

c. ALIGNMENT. Before driving up the ramp of a landing ship, a guide is posted to see that each driver aligns his vehicle correctly. The driver then centers his steering wheel, so that the vehicle may be backed into the ship with a minimum of steering. The practice of leaning out

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of compartment openings to watch the movement of their own vehicles is prohibited.

4. Aboard Ship

a. CONTROL. Once aboard the vessel, the navy is in complete control. Stowage is directed by naval personnel; however, drivers are responsible for lashing and wedging their vehicles. As soon as one vehicle is stowed, the next one in order of priority in the stowage plan must be ready to load.

b. LASHING. Vehicles are left in gear with brakes set. Wooden blocks and wedges are placed forward and aft of the wheels. Wire, chains, or lashings are attached to eye bolts in the deck plates or to stringers. Lashings are attached, when possible, to the tow hooks of the vehicle. Care is taken not to damage assemblies such as the brake system, steering linkage, and transmission of the vehicle.

c. SIGNALS. Since lighting in the hold of the vessel may be deficient or absent, the drivers are required to depend entirely on the signals of guides.

5. Unloading

Unloading is undertaken when and as directed by the commander of the ship. For unloading operations the driver is practiced in driving down steep slopes into water. It is while driving the vehicle down the ramp into the sea that the greatest experience, skill, and confidence are required. At this time, most cases of drowning of engines occur. The majority of these are due to inexperience rather than ineffective waterproofing. The following is applicable to all types of landings:

a. Ample warning is given by the commander of the ship of the time of landing, and permission is granted to start engines. Ordinarily this is approximately 45 to 60 minutes before the hour of beaching. Engines are run for about 15 minutes at fast idling speed, then stopped and started again about 5 minutes before beaching. No further warming up is permitted unless extreme cold is encountered.

b. Chokes are not used once waterproofing is completed. Starting can be assisted by placing the hand over the end of the inlet extension.

c. With the permission of the commanding officer of the craft, chocks and lashings are removed from the vehicles.

d. A final check is made of the waterproofing.

e. Persons are kept under cover or remain in their vehicle.

6. Procedure on Beaching

a. LEAVING SHIP. Frontwheel drive is used without exception. All vehicles are driven off the craft in the lowest forward gear with the

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hand throttle halfway out. Vehicles are driven slowly and steadily down the ramp until the front wheels or the front of the tracks touch the ground; then the accelerator is pushed all the way down. Full power is applied to move the vehicle against the pressure of water. Drivers have a tendency to let up on the accelerator when they hit the water. Delay in opening the throttle until the rear of the vehicle touches the ground may cause it to dig itself in. The driver keeps his foot on the accelerator pedal firmly, taking care to see that it does not slip off or that it does not relax momentarily. The clutch is not used while the vehicle is moving down the ramp or in the water. The use of the choke at that point will cause the immediate failing of the engine. Tow cables are shackled to the vehicle or all hooks are moused.

b. EMERGENCY ACTION. Under no circumstances is the vehicle halted in such a position that it blocks the way for the next vehicle leaving the craft. In an emergency, drivers must be alert to do exactly what they are ordered to do by responsible naval personnel. If it is ordered that a vehicle be jettisoned, the driver will take such action to jettison the vehicle as may be required. Under no circumstances is any single vehicle allowed to delay or block vehicles still on the vessel.

7. On Reaching the Beach

a. Vehicles are driven straight across the beach, as directed, to exits. Drivers do not change gear on a beach until a roadway is reached. Exceptions to this rule may be made on long, firm beaches where such permission is given specifically or where higher vehicle speed is required to cross strips of soft sand or mud. Except in cases where vehicles land prior to daylight or prior to the time the beaches are swept, vehicles are never stopped at the water's edge.

b. It will be found that brakes are ineffective until the water dries off the brake shoes and drums. Brakes are applied for short distances while moving; otherwise, when the vehicle is parked, the shoes may stick to the drum, due to the action of salt water.

c. Immediately upon landing, vehicles move to a designated dewaterproofing area. All engine openings are unplugged or unsealed.

d. As soon as practical after landing remove the remainder of the waterproofing, wash the vehicle with fresh water, lubricate and change oil and gear lub, if water is found in them.

e. The shore party commander assisted by beach master and beach commander have control of unloading and getting the vehicles off the beach to the beach transit area and thence to the assembly areas.

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