

CHAPTER 8

OPERATING PRACTICES AND MANEUVERS

The objective of your training as a military driver is to teach you how to do your job efficiently with maximum safety, comfort, and economy. Good driving habits are attained through constant practice. During your daily driving, review the techniques discussed below. Test yourself occasionally to see how you measure up. In this way, you can avoid slipping into bad, perhaps dangerous habits.

DRIVING PRACTICES

Make the following general practices part of your routine daily driving methods:

- Always sit in an erect, comfortable position with your shoulders parallel to the back of the driver's seat.
- Adjust the seat if necessary so that you can easily manipulate the vehicle controls and have a clear view to the front.
- Adjust side and rearview mirrors so that they give unobstructed views.
- Fasten shoulder and seat belts.
- Lock doors, if applicable.

The position of the hands on the steering wheel is of prime importance for vehicle control particularly in emergencies. Place your hands on opposite sides of the steering wheel at 10 and 2 o'clock or 10 and 4 o'clock positions. Hold the rim, not the spokes. Maintain a firm, but comfortable grip. Remove hands from the wheel only when signaling, adjusting controls, or performing other acts essential to driving. A driver should be ready for a complete, controlled turn of the wheel in a fraction of a second at all times.

Before putting the vehicle into motion, carefully check traffic conditions, particularly the immediate front and rear of the vehicle where children or objects difficult to see could be located.

Try to anticipate future situations. Continually glance far ahead and be prepared for other drivers' errors or unsafe maneuvers. Keep a close watch at all times on conditions behind your vehicle by regularly glancing at the rearview mirrors. Anticipation and good judgment can preclude a large percentage of emergency situations - drive defensively.

STARTING

Instructions on starting both manual and automatic shift vehicles are found in Chapter 16. However, the following points are given on specific starting conditions.

On Hills

When you have to start on an upgrade, use your parking brake to keep the vehicle from rolling backward. Keep the parking brake on while you shift into low gear and begin to release the clutch pedal slowly. When the vehicle begins to pull against the brake, release the brake slowly. In this way, you can start without danger of rolling back and losing control of your vehicle. It may not be necessary to use the parking brake in vehicles equipped with automatic transmission or special devices that prevent rolling back on hills.

On Slippery Surfaces

If you have to start on a slippery surface, such as ice or loose dirt, use second or a higher gear instead of low gear. Feed the gas and release the clutch pedal very slowly to avoid spinning the rear wheels.

STEERING AND TURNING

The best and safest position of the hands on the steering wheel is on either side of the wheel a little above the center (the 10 and 2 o'clock positions) or the right hand can be positioned a little below the center (10 and 4 o'clock positions). Two hands are necessary both for beginners and for experienced

drivers. Your grip on the wheel should be firm, but not tight.

When you round a corner or make any other sharp turn, use the hand-over-hand steering method (Figure 8-1). If you are turning to the right, begin by placing your right hand near the top of the wheel and pull the wheel down to the right. As the right hand nears the bottom of the circle, let the left hand take over, starting at a position on the left of the wheel, a little below the top. As the left hand nears the bottom of the circle, again place the right hand at the top of the wheel to continue the turn, if necessary. As you complete the turn and release pressure on the steering wheel it will slide through your hands because the front wheels tend to return to their normal straightforward position. At low speeds and on some old vehicles, the wheels must be brought back to their normal position by reversing the direction of steering.

Do not turn sharply to change lanes. Light pressure on the steering wheel will allow you to drift gradually from one lane to another. Before you change lanes, remember to look for traffic that may be coming up behind you and to give a turn signal.

BRAKING AND STOPPING

The proper use of brakes is one of the most important elements of good driving as well as one of the best indicators of driving capability. Your brakes are used in all stopping procedures, but they are seldom used alone. Emergency stops may be exceptional for the professional driver, but being prepared for them should be routine.

The heavier the vehicle, the more work the brakes must do to stop it, and the more heat they absorb. But the brakes, tires, springs, and shock absorbers on heavy vehicles are designed to work best when the vehicle is fully loaded. Empty trucks require greater stopping distances because they have less traction. They can bounce and lock up their wheels, braking poorly. This is not usually the case with buses.

Use these general procedures for braking:

- Release the accelerator pedal.
- Downshift within the operating range of the engine (RPM) (if manual transmission).
- Depress the brake pedal.
- As the vehicle begins to reduce speed, decrease brake pedal pressure.
- Stop smoothly by releasing the brake pressure gradually as the stopping rate increases.
- As the vehicle halts, push in the clutch pedal (manual transmission), and release the brake pedal.
- After stopping, shift to neutral and reapply the brake just enough to keep the vehicle stationary. Now release the clutch pedal (manual transmission).
- Use the engine retarder for descending grades, in city traffic, or in any situation where slowing is required but not on slippery road surfaces (such as rain, snow, sleet, or ice).

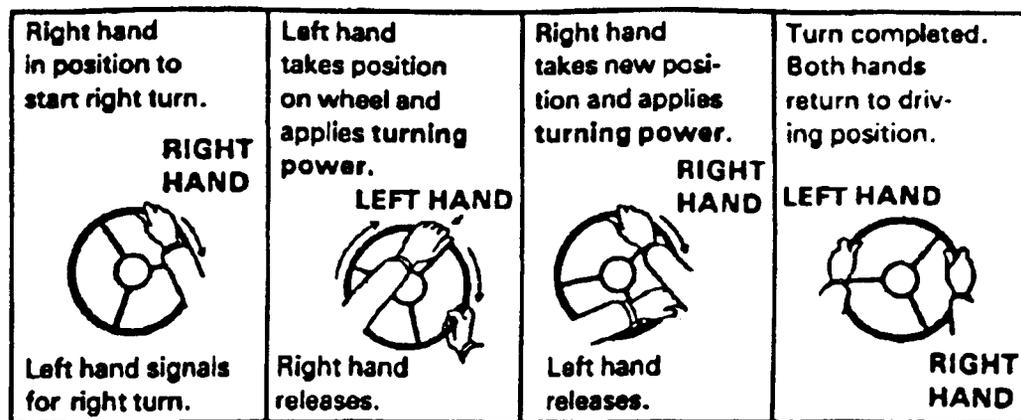


FIGURE 8-1. Hand-Over-Hand Steering Method.

NOTE: Apply the Jacobs brake (Chapter 18) only if wheels have good traction.

GROUND GUIDE SAFETY PROCEDURES

Ground guides must be trained in standard hand and arm signals and flashlight signals before guiding a wheeled vehicle. Hand and arm signals are the basic method used for ground guiding. Drivers and ground guides will coordinate signals before ground guide operations. Examples of hand and arm signals are in Appendixes A and B. Additional hand and arm signals are in FM 21-60. Voice signals between a ground guide and driver can be misunderstood and should not be used except in an emergency.

Before a wheeled vehicle is started for movement, a member of the crew or the driver must walk completely around the vehicle to ensure no one or no object is in danger from the vehicle's movement. At no time will ground guides run or walk backwards while guiding a vehicle.

CAUTION

The ground guides should keep 10 yards between themselves and the vehicle front or rear and corners. They should never be directly behind the vehicle. Ground guides will not position themselves between the vehicle being guided and another object where an inadvertent engine surge or momentary loss of vehicle control could cause injury. Drivers of vehicles will immediately stop their vehicles if they lose sight of ground guides or note that the guide is dangerously positioned between the vehicle and another object. Drivers of vehicles in such cases will secure their vehicle, dismount, and make an on-the-spot correction before commencing operations.

Use the procedure below when there is only one ground guide or when a ground guide is not available, such as in the civilian domain. The ground guide or the vehicle driver will dismount and walk completely around the vehicle to -

- Determine visual clear distance with a ground reference point from the cab of the vehicle.
- Mount the vehicle, sound the horn, and back to the rear of the preselected ground reference point. Stop and repeat the process as necessary until the desired vehicle position is obtained.

Only one ground guide gives signals to the driver. Be sure that everyone involved (the driver and ground guides) understand who will give the signal and who will receive it before any movement is done. If sight between the driver and the ground guide making the signal is lost, the driver must stop the vehicle until the signal is again visible or the confusion is cleared up.

During movement within an assembly area, wheeled vehicles require ground guides when moving forward and when backing. Ground guides are also required when vehicles enter a field site operations area.

At night the best method to ground guide a vehicle into the area is to use a screened flashlight. Guides move forward to make sure the way is clear, then turn around to face the vehicle, and give the proper signal with the flashlight. The driver moves the vehicle forward until the flashlight signal goes out. Then he stops the vehicle. This process is repeated as the vehicle is moved forward to its final stop.

Ground guides are required when wheeled vehicles are backed. However, the number of ground guides used is determined by visibility restrictions (cargo, darkness, and so forth). The horn will be sounded before any backing operation is done. When backing at night, use the same flashlight procedures to safely back the vehicle.

Figure 8-2 shows where the ground guides will be positioned when backing and moving vehicles forward.

BACKING

To turn while backing, turn the steering wheel in the same direction as you would if you were going forward. To back to the right, turn the wheel to the right. To back to the left, turn the wheel to the left. Back slowly. In a vehicle with standard gears, you cannot control your speed safely while backing

- Verify clearance.

unless you use the clutch as well as the accelerator. Always come to a full stop before shifting into forward gear.

Keep looking back until you have stopped. If you shift your eyes to the front as soon as you are ready to stop, you will be backing blindly for several feet. When backing in very close quarters such as a driveway or when visibility through the rear window is poor, you may find it necessary to use your right hand on the steering wheel while you look out the left window to see where you are going.

WARNING

NEVER OPEN EITHER DOOR WHILE YOUR VEHICLE IS IN MOTION. At best, backing is more dangerous than going forward. You cannot see as well and your vehicle is harder to control. Before you back even a short distance, make sure there are no children around. Many youngsters have been crushed under the wheels of the family car while playing in their own backyards or driveways. Never back long distances unless absolutely necessary. It is much safer to turn around and cover the distance going forward.

TURNING AROUND

The best, safest, and often quickest way to turn around is to drive around the block, making three right turns and a final left turn. This eliminates the problems of most left turns. In some cases, however, such as a dead-end street or other tight space, you have to turn the vehicle completely around. Carefully follow these suggestions:

- Select a place where you have at least 500 feet of clear visibility in each direction.
- Do not attempt any turnaround near hills or curves or where visibility is limited.
- Be sure there are no signs prohibiting the turn.
- Be sure there is enough space to complete the turn safely.
- Check for vehicular and pedestrian traffic before and during the turn.

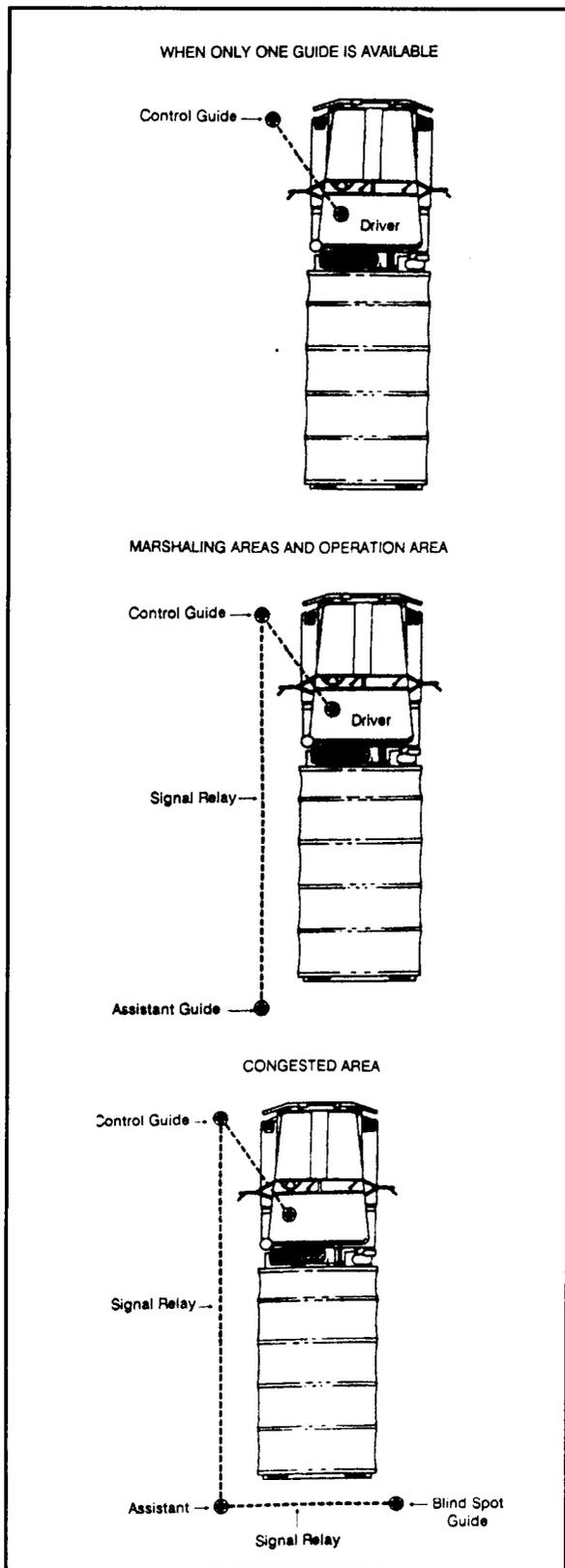


FIGURE 8-2. Recommended Ground Guide Positions.

Remember that the responsibility for avoiding an accident rests with you. Neither of the following turns should be made on roads with heavy traffic.

U-Turns

U-turns are not legal everywhere, so be sure to look for prohibiting signs before making one. **IN CITIES AND TOWNS, U-TURNS ARE ALLOWED AT INTERSECTIONS ONLY.** To make a U-turn, follow these steps (Figure 8-3):

- Move into the proper lane. On a two-lane street move as far right as possible. On four-lane and divided streets, move into the left-turn lane.
- Check for traffic signal, stop, and then signal a left turn.
- Check for oncoming traffic and for room to complete the turn; then make a sharp left turn.
- Slowly finish your turn, positioning your vehicle in the far right lane. Straighten your wheels and proceed.

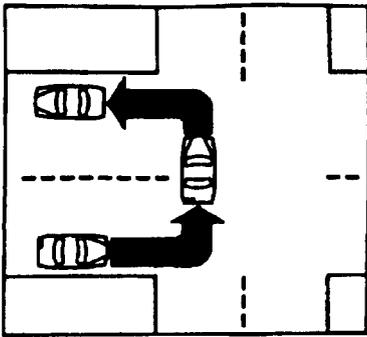


FIGURE 8-3. U-Turn.

Road Turns

If you cannot make a U-turn and no side road is available, use the road turn. There are two ways of making a road turn. The easiest is to come to a complete stop at the right curb or edge of the road, using the shoulder if available. After checking to see that the road is clear of traffic in both directions, start turning to the left. Turn your steering wheel as quickly as possible as far to the left as it will go. Just before you get into the opposite curb or edge, reverse the steering wheel as far to the right as it will go. Now back up, keeping the steering wheel to the

right. AS you approach the opposite curb or edge, turn your steering wheel back again to the left. By going forward and keeping your wheel to the left, you should now be able to clear the curb or edge on your right and complete your turn. If the road is very narrow, you may have to repeat the above steps.

You can also make a road turn by stopping close to the right curb or road edge and backing to the left. Just before you get to the opposite curb or edge, turn your wheel hard to the right and then go forward. When you use this method, you have to be careful to start far enough away from the right curb or edge so that your front wheels will not run into the curb or go off the road when you start backing to the left. When you make these turns, it is not necessary to reverse your steering wheel just before you stop moving. You can do this after you have stopped. However, turning the wheels while you are still moving is easier and saves wear on the tires and steering mechanism.

In business districts, where traffic is usually heavy, no method of turning around may be practical or safe. In such places, the best way to reverse your direction is to drive around the block.

NOTE: Use turn signals, four-way flashers, and if possible, a ground guide/road guard.

PARKING

Parallel Parking

Parallel parking to the curb between vehicles is difficult for many, if not most, drivers. You can parallel park easily if you follow this step-by-step method (Figures 8-4 and 8-5):

- Select a large enough space. You need at least 6 feet more than the length of your vehicle. About 1 1/2 car lengths or 25 feet are adequate for a sedan in almost any case. The width of the parking space should be approximately 8 feet for 1/2-ton vehicles or sedans.
- Give the hand signal for stopping. Pull up alongside the vehicle parked in the space ahead of the space you intend to use. Your vehicle should be 1 to 2 feet away from that vehicle, and the rear bumpers of both vehicles should be even.

- Start backing slowly. Turn your steering wheel as hard as you can to the right as soon as your vehicle starts moving. With your wheel all the way over to the right, continue backing until your vehicle is at a 45-degree angle to the curb. At this point your right front door will be opposite the rear bumper of the other vehicle.
- Straighten the front wheels. Go straight back a short distance until the right end of your front bumper is opposite the left end of the rear bumper of the other vehicle.
- Pause a moment. Now turn your steering wheel hard to the left and back slowly the rest of the way into the space, straightening your front wheels just as they approach the curb. (If you find that you cannot get all the way into the space, usually the best thing to do is to drive all the way out, get your vehicle ahead of the space, and start all over again.)
- Pull forward Your vehicle should divide the parking space, leaving as much distance between your vehicle and the vehicle ahead as there is between your vehicle and the vehicle behind. Your front and rear wheels should be an equal distance from the curb and no more than a foot away from it.
- Turn off the engine. Before you leave your vehicle, turn off the engine, set the hand brake, and put the vehicle in reverse gear. If your vehicle has an automatic transmission, place the lever in the park position. For multifuel (diesel) engine vehicles, pull the engine fuel stop out and set the gearshift in the neutral position. Otherwise, the engine may start if the vehicle moves slightly while the transmission is in gear. When parking on a downgrade, if there is a curb, turn your wheels so that the front of your right tire is against the curb. When parking on an upgrade, turn the wheels left away from the curb so that the back of the right front tire locks against the curb. Doing this will ensure that your vehicle does not roll. When parking uphill without a curb, use chocks behind the front tires. When parking downhill without a curb, place chocks in front of the front tires.

- The parking brake is the primary safety item. Only use chock blocks as a secondary safety item in conjunction with the parking brake. Using chock blocks alone is not safe or effective. The parking brake must be set at all times when the vehicle is parked.

Except on one-way streets, always park on the right side of the street. Remember to lock the ignition switch on vehicles of commercial design and take the key with you. Turn off the master switch on tactical vehicles. (Exceptions may be directed by local commanders.)

Diagonal Parking

Diagonal or angle parking is easy enough for most drivers. However, you should remember the following:

- Give the hand signal for stopping.
- Begin turning into the parking space from a position about 5 feet from the row of parked vehicles.
- Turn your steering wheel in the direction of the space and enter the space with your vehicle as straight as possible with the angle of the space.
- Use the parked vehicle or line marking on the left as a guide, but be very careful to allow enough clearance between your vehicle and the vehicles parked on either side.

When coming out of a diagonal parking space, back very slowly until you are out far enough to see traffic that may be coming and stop if necessary. Turn your steering wheel sharply when your left front wheel is opposite the rear bumper of the vehicle parked on your left. If you turn sooner, you are likely to side-swipe the other vehicle as you back out.

Improper Parking

Parking improperly may inconvenience and endanger other drivers. Do not park -

- In violation of local traffic laws.
- In an intersection or in front of a driveway.

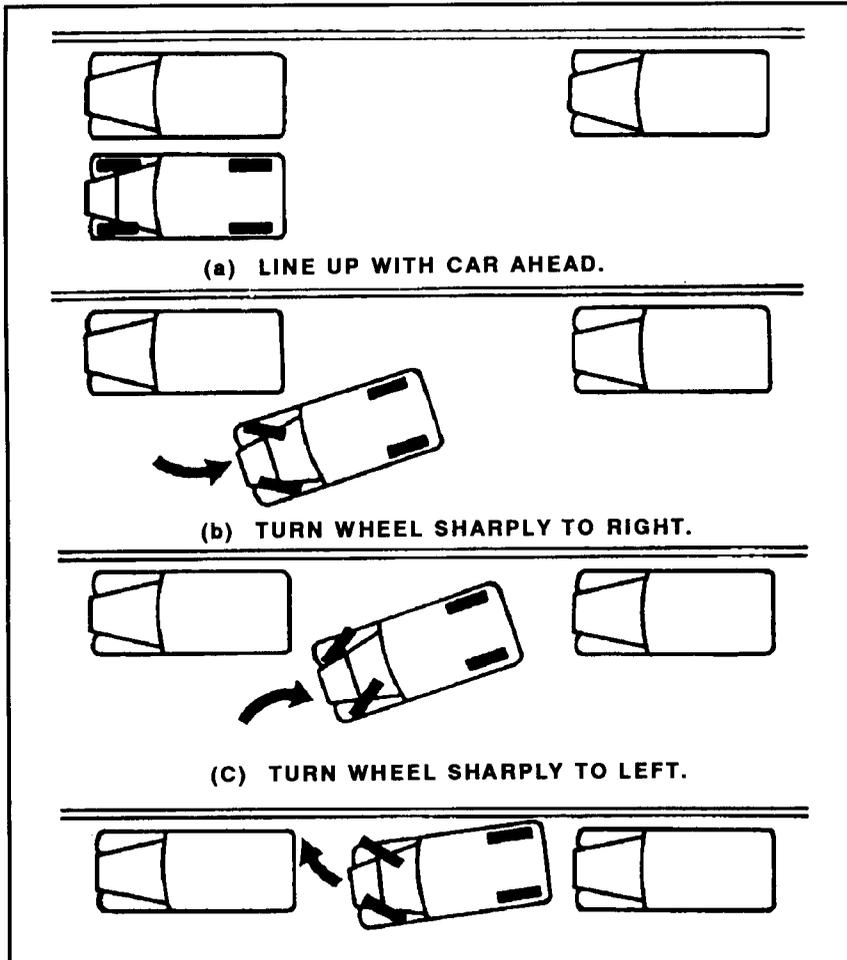


FIGURE 8-4. Parking Parallel to a Curb.

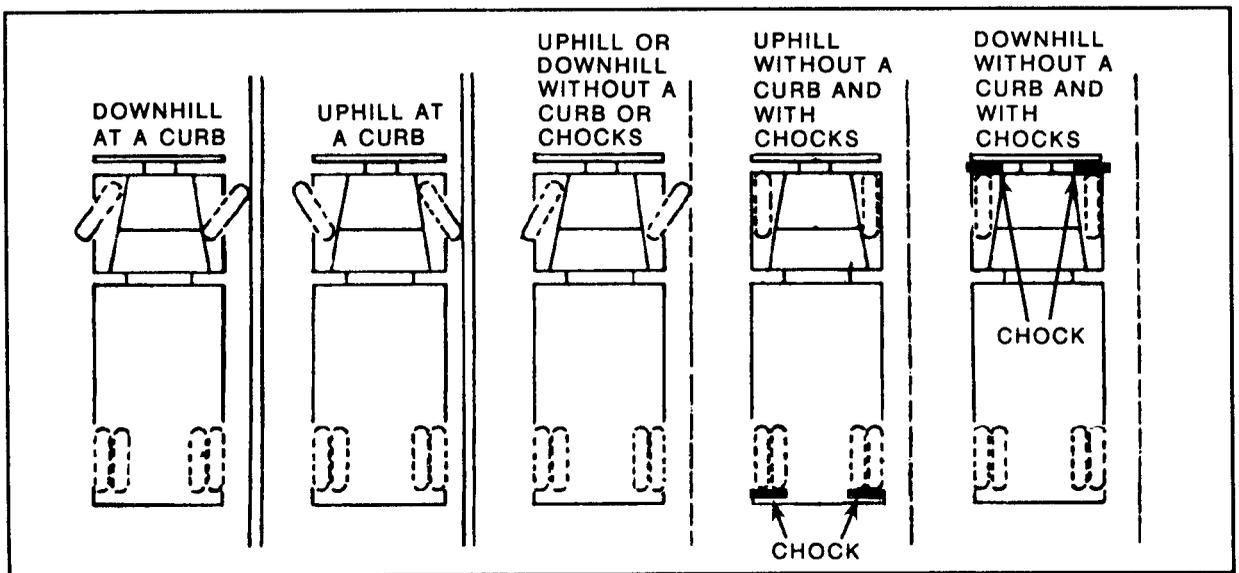


FIGURE 8-5. Parking on a Hill.

ELEMENTS OF SAFE DRIVING

The ability to mechanically operate a motor vehicle is not the only qualification of the safe driver. This skill must be augmented by a definite sense of personal responsibility and by a knowledge of and unceasing respect for the laws of physics, physiology, and psychology as they affect the driver and his vehicle. Since safety is a command responsibility, it is the duty of commanders at all levels to ensure compliance with these nonstatutory laws. Instruction for military drivers should include an explanation of these elements and examples of the results of common violations.

Physiological Considerations

To operate a vehicle with the maximum degree of safety, the driver must maintain top physical condition. Any deterioration in physical condition will reduce this degree of safety. Prospective drivers having physical defects that will interfere with safe vehicle operation should be eliminated from the driver training program. Instructors and supervisors should be constantly alert to evidence of any incapacitating disease such as heart trouble, asthma, or epilepsy; of vision deficiencies not detected in physical examination and of dangerously slow reaction time. Although temporary, the effects of fatigue, drugs, and alcohol seriously impair the physical condition of the driver and may be regarded as a contributing factor to accidents.

Psychological Considerations

To drive properly and safely, a driver must have a proper attitude toward driving and must have emotional control. Faulty attitudes toward driving may often be detected by instructors and supervisory personnel. These attitudes may be eliminated to some degree through instruction and counseling. If the driver does not respond to corrective measures and continues to show evidence of faulty attitudes, it is advisable to drop him from the program.

Other psychological considerations include overconfidence, egotism, rationalization, and impatience. Overconfidence encourages the taking of unnecessary chances. Egotism disregards the rights of others. Rationalization prevents the driver from recognizing and correcting his own faults. Impatience leads to unsafe driving through refusal to adjust to driving conditions.

Since emotions such as anger, fear, and grief affect the driver's ability to think clearly and react promptly, safe driving requires a high degree of emotional control. Emotional control may be developed in the driver through self-discipline. This, however, requires his full cooperation and the will to overcome emotional instability. Avoid selecting drivers who show evidence of unregulated emotion.

Effect of Physical Laws

The laws of nature are constant and automatic. It is impossible to drive properly and safely without recognizing such natural forces as gravity, friction, centrifugal force, and kinetic energy. Instructions for the military driver should include, but not be limited to, the following paragraphs.

Gravity. Gravity is the force that pulls a body toward the center of the earth. It is measured in terms of weight. Without the force of gravity, the wheeled vehicle would be weightless and impossible to control by conventional means (starting, stopping, or steering). The force of gravity increases downhill speeds and stopping distances. It exerts a rearward pull on upgrades requiring increased power to the vehicle at rest, making it necessary to take precautions while parking. Absolutely level terrain is the exception rather than the rule. Therefore, the driver must always be aware of the power of gravity (Figure 8-6).

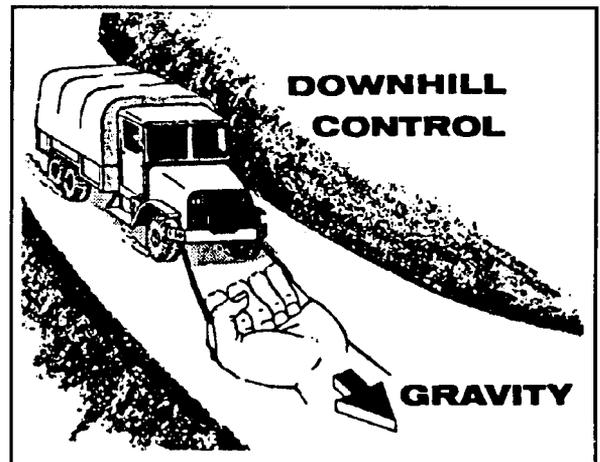


FIGURE 8-6. Gravity Increases Downhill Speed.

Friction. Friction is the resistance to motion caused by contact between two surfaces (Figure 8-7). It results from the interlocking of slight irregularities on surfaces in contact. When an attempt is made to

slide one surface over another, the grip of the interlocked irregularities resists the motion. The greater the contact pressure and the coarser the surfaces, the greater the friction. More road friction is produced by a heavy vehicle than a light one because there is greater contact pressure. More driving control is possible on a dry road than on an icy one because the dry surface is rougher. Thus, although friction is responsible for many maintenance problems and necessitates the use of lubricants, without friction it would be impossible to get the vehicle in motion, control its direction, or stop it.

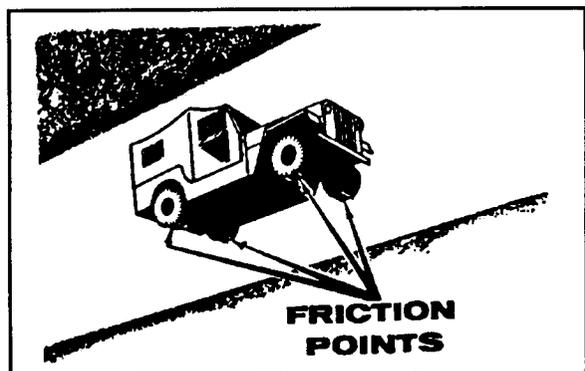


FIGURE 8-7. Friction Points Between Vehicle and Road Surface.

Kinetic Energy. Kinetic energy is the energy of motion. It is the kind of energy that a body has because it is moving. Weight and speed determine the kinetic energy of a vehicle. The kinetic energy does not increase uniformly with speed, but with the square of the speed. In other words, if the speed is doubled, the kinetic energy becomes four times as

great. A vehicle cannot be stopped until all of its kinetic energy is dissipated. The only safe way this can be done is by the controlled use of friction (proper braking) and engine compression. The speed with which the kinetic energy is dissipated has a direct relation with the force of impact when a moving vehicle strikes another object.

Centrifugal Force. Centrifugal force is that force which, acting upon an object traveling in a curve, tends to force it from the curved path into a straight one. The magnitude of centrifugal force depends upon the degree of the curve and the weight and speed of the object. In driving, road curvature and vehicle weight are fixed. The only variable is speed. The following example illustrates the effect of speed. An 11,000-pound vehicle, making a turn of 500-foot radius at 20 MPH has to overcome centrifugal force of only about 583 pounds. At 30 MPH, the force is increased to 1,312 pounds. At 60 MPH, it is over 3,644 pounds – six times as great as at 20 MPH. The vehicle is prevented from skidding off the road by friction. If the wheels hit a patch of ice or water, friction may be reduced to the point where it cannot hold the vehicle against centrifugal force. If the vehicle enters the curve at too great a speed, centrifugal force will overcome friction even if the road is dry and free of ice. Whenever centrifugal force is greater than friction, the vehicle will skid. Centrifugal force also tends to tip over large vehicles on curves. This tendency is caused by loss of tire-road friction holding the tires on the road on the inside of the curve while centrifugal force pulls the upper part of the vehicle toward the outside of the curve.