



Study Guide Supplement

This book is issued to you for use during your course of training. Bring it with you to class every day. Do not fold it, write, or make any marks in it. It remains the property of the school and must be returned at the conclusion of the classroom instruction period.

All information needed to pass the California Class "A" written examination is contained in the Commercial Driver Handbook ("the Handbook"). The material in this book is merely *SUPPLEMENTAL* to the material contained in the Handbook. Its use without the Handbook will be far less effective, take longer, and result in a less complete course of instruction.

Instructions for use: Look up each item and highlight it (or in the absence of a highlighter, underline it) in the Handbook. You will then have all the appropriate material marked for both current study and future refresher study, as the Handbook is yours to keep. To repeat for emphasis, use of the material in the book you now hold without the accompanying use of the Commercial Driver Handbook will result in incomplete instruction.

AIR BRAKES

1) (pg 77) Emergency stab braking is when you:

Brake as hard as you can, release the brakes when the wheels lock, and apply the brakes again when the wheels start rolling.

2) (pg 76) If air pressure does NOT build up to normal within the correct amount of time, then:

Your air pressure may drop too low during driving.

3) (pg 78) Which of these is NOT a proper time to apply the parking brakes?

You've just come down a steep grade and your brakes are very hot.

4) (pg 77) Excessive use of the service brakes results in overheating, which can lead to:

expansion of the brake drums.

5) (pg 78) The proper method of braking when going down long and/or steep grades after selecting the proper gear is to brake until your speed is about _____ miles per hour below your "safe" speed then release your brakes.

5

6) (pg 71) Under normal conditions, in order to engage the parking brakes the driver must first:

Let the air out of the air brake system.

7) (pg 77) Total stopping distance for vehicles with air brakes is longer than that for vehicles with hydraulic brakes due to ___ distance.

brake lag

8) (pg77) If you must make an emergency stop, you should brake so you:

can steer and your vehicle stays in a straight line.

9) (pg 71) If your truck or bus has dual parking control valves, you can use pressure from a separate tank to:

release the spring emergency/parking brakes to move a short distance.

10) (pg 70) The driver must be able to see a warning before air pressure in the service air tanks falls below _____ psi.

55

11) (pg 74) To check the free play of manual slack adjusters in S-cam brakes, you should park on:

level ground, chock the wheels, and turn off the parking brakes.

12) (pg 74-75) A straight truck or bus air brake system should not leak at a rate of more than _____ psi per minute with the engine off and the brakes released.

2

13) (pg 67) The air compressor governor controls:

when air is pumped into the air tanks.

14) (pg 70) The parking or emergency brake on a heavy vehicle can only be held in position by something that cannot leak away, like:

spring pressure.

15) (pg 68) The brake pedal in an air brake system:

controls the air pressure applied to put on the brakes.

16) (pg 68) Some air brake systems have an alcohol evaporator. What may happen if you don't keep the unit filled with alcohol?

Ice may form in the air storage tanks and cause the brakes to fail.

17) (pg 67) The brake system that applies and releases the brakes when the driver uses the brake pedal is the _____ brake system.

service

18) (pg 71) Before driving a truck or bus with a dual air brake system, the pressure in each system should be at least _____ psi.

100

19) (pg 72) Your truck or bus has a dual air brake system. If a low air pressure warning comes on for only one system, what should you do?

Stop right away and safely park. Continue only after the system is fixed.

20) (pg 76) How should you check that your service brakes are working properly?

Wait for normal air pressure, release the parking brake, move the truck forward slowly, and apply the brakes firmly using the brake pedal.

21) (pg 77) You should know that your brakes are fading when:

you have to push harder on the brake pedal to control your speed on a downgrade.

22) (pg 71) If the spring brakes are on, when should you push the brake pedal?

Never.

23) (pg 70) Truck and bus parking or emergency brakes must be held on by:

Mechanical force

24) (pg 68) The most common type of foundation brake found on heavy vehicles is the:

S-cam drum.

25) (pg 72) If your truck has a dual air system and one of the systems is low on pressure:

either the front or rear brakes will not be fully operational.

26) (pg 78) In air brake vehicles, the parking brake should be used:

any time the vehicle is parked.

27) (pg 70) The stop light switch:

turns on the brake lights to warn drivers behind you.

28) (pg 67) For air brake systems in good condition, the air compressor should start pumping at about _____ psi.

85

29) (pg 75) The air loss rate for a straight truck or bus with the engine off and the brakes on should not be more than:

3 psi in one minute

30) (pg 71) The braking power of the spring brakes:

depends on the service brakes being in adjustment.

31) (pg 75) How should you check that the trailer brakes come on when air pressure in the system drops below a certain level?

Chock the wheels, release the parking brake, shut the engine off, and pump the brake pedal to reduce air tank pressure.

32) (pg 78) You are driving on a steep downgrade and you have reached your "safe" speed of 40 mph. You would apply the service brakes until your speed drops to _____ mph.

35

33) (pg 77) The air brake lag distance at 55 mph on dry pavement adds about _____ feet to your stopping distance.

32

34) (pg 68) Repeatedly pressing and releasing (fanning) the brake pedal may result in:

the loss of brake air pressure.

35) (pg 67) If your truck's air compressor has its own oil supply, when should you first check the oil level?

Before driving.

36) (pg 68) If your vehicle has an alcohol evaporator, it is there to:

Reduce the risk of ice in air brake valves in cold weather.

37) (pg 70) The application pressure gauge shows how much air pressure you:

are applying to the brakes.

38) (pg 78) The most important thing to do when a low air pressure warning comes on is:

stop and safely park as soon as possible.

39) (pg 76) If your truck has a properly functioning dual air brake system and minimum size air tanks, the air pressure should build from 85 to 100 psi within:

45 seconds

40) (pg 68) When the brakes are applied the brake shoes (or linings) are pressed against the:

brake drum or disc.

41) (pg 77) Under ideal conditions, a truck with air brakes going 55 mph would require a stopping distance of:

more than 300 feet.

42) (pg 78) The use of air brakes on a long and/or steep downgrade under normal conditions is only a supplement to:

the braking effect of the engine.

43) (pg 75) The air compressor should stop pumping at about _____ psi.

130

44) (pg 70) All air brake equipped vehicles have:

an air supply pressure gauge.

45) (pg 77) Emergency controlled braking is when you:

apply the brakes as hard as you can without locking the wheels.

46) (pg 70) During normal driving, spring brakes are usually held back by:

air pressure.

47) (pg 68) The safety valve is usually set to automatically reduce pressure at _____ psi.

150

COMBINATION VEHICLES STUDY GUIDE

- 1) (pg 73) Glad hands are used for connecting the:
service and emergency air lines from the truck to the trailer.
- 2) (pg 81) Why should you be sure that the fifth wheel plate is greased as required?
to prevent steering problems.
- 3) (pg 81-82) After connecting the air lines but before connecting to the trailer, you should:
Supply air to the trailer system, then pull out the supply knob.
- 4) (pg 72) The trailer air supply control (or the tractor protection valve control) should automatically close when the air pressure falls to between _____ psi.
20 and 45
- 5) (pg81) When coupling, the proper position of the fifth wheel is:
tilted down towards the end of the tractor.
- 6) (pg 82) Which part of the kingpin should the locking jaws close around?
the shank
- 7) (pg 76) A trailer is most likely to jackknife when it is:
empty
- 8) (pg 73) If the spring brakes don't release when you push the trailer air supply control, you should:
check the air line connection.
- 9) (pg 80) The best way to tell if your trailer has started to skid is to:
see it in your mirrors.
- 10) (pg 83) To unlock the fifth wheel, pull the release handle to the _____ position.
open

11) (pg 72) When should you use the hand valve to park a combination vehicle?

never

12) (pg 73) If you cross the air lines when hooking up to an old trailer without spring brakes, what will happen?

You could drive away without trailer brakes.

13) (pg 82) You supply air to the trailer tanks by:

pushing in the trailer air supply valve.

14) (pg 83) The front trailer supports are up and the trailer is resting on the tractor. Make sure:

there is enough clearance between the tractor frame and the landing gear.

15) (pg 82) The safety catch for the fifth wheel locking lever must be _____ for a coupling to be complete.

over the locking lever

16) (pg 82) After you supply air to the trailer, make sure the air lines are not crossed and the trailer brakes are working. This is done by:

applying and releasing the trailer brakes and listening for the brake sounds.

17) (pg 74) You are driving a combination vehicle. If the service air line comes apart but the emergency line stays together, what will happen right away?

Nothing is likely to happen until you try to apply the brakes.

18) (pg 83) Where should the tractor be positioned when you inspect the landing gear after uncoupling a trailer?

With the tractor frame under the trailer.

19) (pg 83) In what gear should the tractor transmission be after you have uncoupled the trailer and are inspecting the trailer supports?

neutral

20) (pg 82) You should not back a tractor under a trailer until the whole air system is:

at normal pressure

21) (pg 79) Which of these statements is true?

"Bobtail" tractors can take longer to stop than a combination vehicle.

22) (pg 81) You are coupling a semitrailer to your tractor but have not yet backed under. The trailer is at the right height when:

it will be raised slightly when the tractor is backed under it.

23) (pg 83) When you are uncoupling a loaded trailer, you should lower the landing gear until it:

makes firm contact with the ground.

24) (pg 79) In general, the higher the "center of gravity" of your truck the:

easier it is to turn over.

25) (pg 79) Under good driving conditions, you should leave at least one second between your vehicle and the vehicle ahead for each _____ feet of your vehicle's length.

10

26) (pg 81) You are coupling a tractor to a semitrailer and have backed up but are not yet under it. What should you hook up before backing under?

The emergency and service air lines

27) (pg 79) A tractor with a (n) _____ trailer requires the shortest amount of stopping distance.

fully loaded

28) (pg 76) When checking the trailer's emergency brakes, the tractor protection control valve should be placed in the _____ position.

emergency

29) (pg 74) When do you need to use chocks to park a trailer that does not have spring brakes?

always

30) (pg 72) You are driving a combination vehicle. The trailer breaks away, pulling apart both air lines. You would expect the trailer brakes to come on and:

the tractor protection valve to close

COMMERCIAL DRIVER LICENSE KNOWLEDGE

31) (pg 81) When you get ready to back under a trailer, you should line up:
directly in front of the trailer.

32) (pg 80) To stop a trailer skid you should:
release the service brake.

33) (pg 74) The air leakage rate for a combination of two vehicles (engine off, brakes off) should not be greater than _____ psi per minute.

3

34) (pg 82) Before you back under a trailer, make sure the:
trailer brakes are locked.

35) (pg 79) Two things that a driver can do to prevent a rollover are: (1) go slow around turns; and (2):

keep the cargo as close to the ground as possible.

36) (pg 79-84) After the trailer has been coupled to the tractor, the tractor protection control valve should be placed in the _____ position.

normal

37) (pg 83) When uncoupling a trailer, after you have shut off the trailer air supply and locked the trailer brakes, you should:

back up gently to ease the pressure on the fifth wheel locking jaws.

38) (pg 82) After you lock the kingpin into the fifth wheel, you should check the connection by:

pulling the tractor ahead gently with the trailer brakes locked.

39) (pg 81) If you cannot make a turn without entering another traffic lane, you should:

turn wide as you complete the turn.

40) (pg 72) Loss of air pressure in the emergency line causes:

the trailer's emergency brakes to come on.

41) (pg 72) In normal driving, some drivers use the hand valve before the brake pedal to prevent a jackknife. Which of these statements is true?

It should not be done.

42) (pg 74) The tractor protection valve will close and the trailer emergency brakes will come on when there is a major leak in the _____ brake line.

emergency

43) (pg 74) You have a major leak in the service line and you put on the brakes. Service air pressure will escape and cause the:

Trailer's emergency brakes to come on.

44) (pg 73) What will happen if the air lines are crossed when you hook up to an old trailer?

You could drive away with no trailer brakes.

45) (pg 82) You have pushed in the trailer air supply valve. You should not move the tractor until the whole air system is:

at normal pressure.

COMMERCIAL DRIVER LICENSE KNOWLEDGE

1) (pg 42) When a coolant container is part of a pressurized system, which of these is true?

You can check the coolant level of a hot engine.

2) (pg 39) Which of these is a good thing to do when driving at night?

Keep your speed slow enough that you can stop within the range of your headlights

3) (pg 28) Which of these statements is true about double clutching and shifting?

You can use the tachometer to tell you when to shift

4) (pg 41) You should avoid driving through deep puddles or flowing water. But if you cannot, which of these steps can help keep your brakes working?

Gently putting on the brakes while driving through water.

5) (pg 48) Stab braking:

Involves applying brakes and releasing them after the wheels lock up.

6) (class 'C' book pg 83) "Implied Consent" means that when you sign the application form, you:

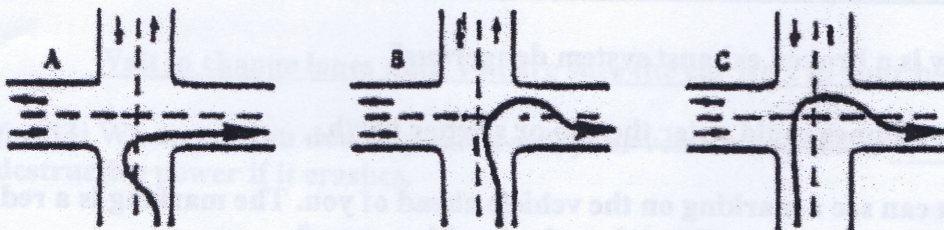
Give your consent to be tested for alcohol in your blood.

7) (pg 26) Which of these should be tested while the vehicle is stopped?

Hydraulic brake.

8) (pg 38) You wish to turn from one two-lane, two-way street to another. Your vehicle is so long that you must swing wide to make the turn. Which of these figures shows how the turn should be made?

Figure B



9) (pg 24) You must complete a written vehicle inspection report each day and you must sign the previous driver's report:

If the previous driver noted any defects.

10) (pg 49) Which of the following is NOT characteristic of a front tire failure?

Vehicle fishtail

11) (pg 27) What is the proper way to hold a steering wheel?

With both hands, on opposite sides of the wheel

12) (pg 30) Which of these is true about mirror adjustment?

You should adjust your mirrors prior to starting a trip.

13) (pg 47) What is countersteering?

Turning the wheel back in the other direction after steering to avoid a traffic emergency.

14) (pg 30) The distance that you should look ahead of your vehicle while driving amounts to about _____ mile at highway speed.

1/4

15) (pg 35) Why will your vehicle's speed naturally increase on downgrades?

Gravity.

16) (pg 26) Which of these pieces of emergency equipment should be carried in your vehicle?

Warning devices for parked vehicles.

17) (pg 52) During a vehicle inspection, checking the _____ will NOT help prevent a fire.

Battery fluid level

18) (pg 31) You should signal continuously while turning because:

You need both hands on the wheel to turn safely.

19) (pg 41) Why is a broken exhaust system dangerous?

Poison fumes could enter the cab or sleeper berth.

20) (pg 46) You can see a marking on the vehicle ahead of you. The marking is a red triangle with an orange center. What does the marking mean?

Slow moving vehicle.

21) (pg 29) The purpose of retarders is to:

Help slow the vehicle while driving and reduce brake wear.

22) (pg 50) Most serious skids result from:

Driving too fast for conditions.

23) (pg 32) When you are parked at the side of the road at night, you must:

Turn on your 4-way emergency flashers to warn others.

24) (pg 133) You are checking your steering and exhaust systems in a pre-trip inspection. Which of these problems should be fixed before the vehicle is driven?

Steering wheel play of more than 10° (2 inches in a 20-inch steering wheel).

25) (pg 4) CDL medical certificates must be renewed every:

Two years.

26) (pg 56) You do NOT have a HazMat endorsement on your commercial driver's license. You can drive a vehicle hauling hazardous materials when:

The vehicle does not require placards.

27) (pg 48) To avoid a crash, you had to drive onto the right shoulder. You are now driving 40 mph on the shoulder. How should you move back onto the pavement?

If the shoulder is clear, stay on it until your vehicle has come to a stop. Then move back onto the pavement when it is safe.

28) (pg 59) Containerized loads:

Are generally used when freight is carried part way by rail or ship.

29) (pg 30) In your mirror, you see a car approaching from the rear. The next time you check your mirror, you do not see the car. You wish to change lanes. You should:

Wait to change lanes until you are sure the car isn't in your blind spot.

30) (pg 33) Whenever you double your speed, your vehicle has about _____ times the destructive power if it crashes.

Four

31) (pg 27) You are starting your vehicle in motion from a stop. As you apply power to the drive wheels, they start to spin. You should:

Take your foot off the accelerator.

32) (pg 56) Placards must be:

Placed on all four sides of the vehicle.

33) (pg 43) You are driving a new truck with a manual transmission. What gear will you probably have to use to take a long, steep downhill grade?

A lower gear than you would use to climb the hill.

34) (pg 37) A car suddenly cuts in front of you, creating a hazard. Which of these actions should you NOT take?

Honk and stay close behind the car.

35) (pg 37) What should you do if you are unsure whether you have enough overhead clearance?

Find another route that will not require driving under the object.

36) (pg 29) You are driving a heavy vehicle. You must exit a highway using an off-ramp that curves downhill. You should:

Slow down to a safe speed before the curve.

37) (pg 33) You are driving a heavy vehicle at 55 mph on dry pavement. About how much stopping distance will you need?

The length of a football field.

38) (pg 132) Which of these is NOT part of the pre-trip inspection of the engine compartment?

Valve clearance

39) (pg 44) Truck escape ramps

Help avoid damage to vehicles.

40) (pg 52) On which fires can you use water?

Tires

41) (pg 80) What is the term for a commercial vehicle's tendency to swing wide on turns?

Off tracking

42) (pg 27) Backing a commercial vehicle is:

Always dangerous.

43) (pg 30) Convex (curved) mirrors:

Show a wider area than flat mirrors show.

44) (pg 44) If your brakes get wet while driving on a rainy day, what can happen when the brakes are applied?

Trailer jackknife

45) (pg 37) If someone is following you too closely (tailgating), you should:

Increase your following distance.

46) (pg 41) When driving in cold weather, your tire tread should:

Provide enough traction to steer and push the vehicle through snow.

47) (pg 53) Which of these statements about staying alert to drive is true?

Sleep is the only thing that can overcome fatigue.

48) (pg 74) You are checking your brakes and suspension system for a pre-trip inspection. Which of these statements is true?

Brake shoes should not have oil, grease, or brake fluid on them.

49) (pg 19) For the first offense of driving a commercial vehicle under the influence of alcohol or drugs, you will lose your CDL for at least _____.

1 year

50) (pg 44) A full stop is required at a railroad grade crossing when:

The nature of the cargo makes a stop mandatory under state or federal regulations.

51) (pg 31) Merging onto a road is safest if you:

Wait for a large enough gap in traffic to enter the road.

52) (pg 32) What three things add up to the total stopping distance for your truck or bus?

Perception distance, reaction distance, and braking distance

53) (pg 34) How does vehicle weight affect stopping distance?

Empty trucks can take longer to stop than loaded trucks.

54) (pg 41) When the roads are slippery, you should:

Make turns as carefully as possible.

55) (pg 51) Which of these is not a good rule to follow when caring for the injured at an accident scene?

Keep injured persons cool.

56) (pg 50) You are driving on a straight, level highway at 50 mph. There are no vehicles in front of you. Suddenly a tire blows out on your vehicle. What should you do first?

Stay off the brake until the vehicle has slowed down.

57) (pg 132) After starting the engine:

The coolant temperature should begin a gradual rise to normal.

58) (pg 27) You are driving a heavy vehicle with a manual transmission. You have to stop the vehicle on the shoulder while driving on an uphill grade. Which of these is a good rule to follow when putting the vehicle back in motion?

Use the parking brake to hold the vehicle until the clutch engages.

59) (pg 34) Which of these statements is true about speed management?

On slippery roads, it will take longer to stop and it will be harder to turn without skidding.

60) (pg 56) Where must you keep shipping papers when transporting hazardous materials?

In a pouch on the driver's door or on the seat.

61) (pg 31) You should use your mirrors to check:

Where the rear of your vehicle is while you make turns.

62) (pg 37) Take extra care to keep your vehicle centered in your lane because commercial vehicles:

Are often wider than other vehicles.

63) (pg 52) Which of these statements about causes of vehicle fires is true?

Poor trailer ventilation can cause flammable cargo to catch on fire.

64) (pg 42) Which of these is especially true about your tires in hot weather?

You should check tire mounting and air pressure before driving.

65) (pg 37) Which of these is usually true about driving in tunnels?

There may be strong winds when exiting.

66) (pg 45) When driving through work zones, you should:

Watch for sharp pavement drop-offs.

67) (pg 32) When you are passing another vehicle, pedestrian, or bicyclist, you should assume that they:

May move into the traffic lane.

68) (pg 52) If you're not sure how to put out a hazardous materials fire, you should:

Wait for qualified fire fighters.

69) (pg 34) What should you do if your vehicle hydroplanes?

Release the accelerator.

70) (pg 55) Which of these is true regarding the use of drugs while driving?

Prescription drugs are allowed if a doctor says the drug will not affect safe driving ability.

71) (pg 33) Which of these statements about brakes is true?

Brakes absorb more heat to stop heavier or faster moving vehicles.

72) (pg 60) Which of these statements about certain types of cargo is true?

Unstable loads such as hanging meat or livestock can require extra caution on curves.

73) (pg 33) Which of these statements is true about warning other drivers of a stopped vehicle?

Move the rear reflective triangle back if the drivers' vision is obscured within 500 feet.

74) (pg 50) Which of these is true about rear drive wheel braking skids?

Trailers can push the towing vehicle sideways.

75) (pg 37) Which of these is true about a vehicle's overhead clearance?

The weight of your cargo can change the height of the vehicle.

76) (pg 30) How far should a driver look ahead of the vehicle while driving?

12-15 seconds

77) (pg 48) If you need to leave the road in a traffic emergency, you should:

Avoid braking until your speed has dropped to about 20 mph.

78) (pg 28) Which of these statements is NOT true about backing a heavy vehicle?

You should back slowly until you slightly bump into the dock.

79) (pg 134) Which of these lights CANNOT be checked at the same time?

Turn signals, brake lights, and four-way flashers

80) (pg 47) Which of these is correct about emergency or evasive action?

To turn quickly, you must have a firm grip on the steering wheel.

81) (pg 35) You are driving in heavy traffic at 35 mph. The speed limit is 55 mph. The safest speed for your vehicle is _____.

35 mph

82) (pg 32) According to the Commercial Driver Handbook, why should you limit the use of your horn?

It can startle other drivers.

83) (pg 34) Which of these is true about bad weather and driving conditions?

When the temperature drops, bridges will freeze before roads.

84) (pg 54) To determine Blood Alcohol Content (BAC) for a person, it is necessary to know:

How much a person weighs.

85) (pg 49) Which of these happens when a tire blows out at highway speed?

A vibrating feeling

86) (pg 36) You are driving a 40-foot vehicle at 35 mph. The road is dry and visibility is good. What is the least amount of space that you should keep in front of your vehicle to be safe?

4 seconds

87) (pg 49) When hydraulic brakes fail while driving, the system won't build up pressure and the brake pedal will feel spongy or go to the floor. What action should you take?

Pump the brake pedal to generate pressure.

88) (pg 132-138 (136)) Which of these items is not checked in a pre-trip inspection?

Fuel level

89) (pg 41) Which of these systems should receive extra attention during a winter weather inspection?

Exhaust

90) (pg 57) The total weight of the power unit, the trailer, and the cargo is called:

Gross combination weight

91) (pg 38) You are driving a long vehicle that makes wide turns. You want to turn left from one street onto another. Both are two-lane, two-way streets. You should:

Begin turning your vehicle when you are halfway through the intersection.

92) (pg 53) Which statement is true?

Many heavy vehicle accidents occur between midnight and 6am.

93) (pg 48) Controlled braking:

Is used to keep a vehicle in a straight line.

94) (pg 38) If you must drive into the oncoming lane to turn, you should:

Allow enough space to get completely across the intersection.

95) (pg 47) The best drivers are those who watch and prepare for hazards. This is called being:

Defensive

96) (pg 51) If you do not have a CB radio, what is the first thing you should do at an accident scene?

Protect the area

97) (pg 32) The *Commercial Driver Handbook* suggests several things to do when you pass a vehicle. Which of these is not one of them?

At night, turn on your high beams before you start to pass and leave them on until you have completely passed the vehicle.

98) (pg 60) One reason that dry bulk tanks require care is:

The load can shift.

99) (pg 133) Optional safety equipment may include emergency phone numbers, tire chains, and:

Tire changing equipment.

100) (pg 32) "Perception distance" is the distance your vehicle travels from the time:

The eyes see the hazard to the time the brain knows it is a hazard.

101) (pg 43) If you have a heavy load that is slowing you down on an upgrade, you should:

Shift into a lower gear.

102) (pg 49) Which of these may be a sign of tire failure?

Wheels fishtailing

103) (pg 37) When do strong winds most affect driving?

Upon exiting tunnels

104) (pg 135) You are checking your tires for a pre-trip inspection. Which of these statements is true?

Tires of mismatched sizes should not be used on the same vehicle.

105) (pg 40) What should you do if a car coming toward you at night keeps its high beams on?

Look to the right hand edge of the road or of your own traffic lane.

106) (pg 135) How many missing or broken leaves in any leaf spring will cause a commercial vehicle to be placed out of service?

One-fourth of the total number

107) (pg 42) What will keep the engine cool in hot weather?

Making sure the engine has the right amount of oil.

108) (pg 27) Which of these is Not caused by rough acceleration?

Tire damage

109) (pg 47) Which of these is a good thing to do when steering to avoid a crash?

Don't turn the steering wheel more than needed.

110) (pg 43) When you drive in the mountains, you will have to use lower gears to drive safely down grades. Which of these do not affect your choice of gears?

Tire tread type

111) (pg 29) Which of these is Not a type of retarder?

Robotic

112) (pg 42) Which of these is not true about engine belts in hot weather?

Cracking is likely to occur but is not a safety threat.

113) (pg 54) Which of these is not true?

A drinker can control how fast his or her body absorbs and gets rid of alcohol.

114) (pg 27) You should try to park so that:

You can pull forward when you leave.

115) (pg 29) The engine braking effect is greatest when the engine is _____ the governed RPM's and the transmission is in the _____ gears.

Near, lower

116) (pg 37) Which of these is not a proper use of vehicle lights?

Flashing your brake lights to stop someone tailgating.

117) (pg 44) What should you do before driving in mountains?

Know the escape ramps on your route.

118) (pg 56) Which of these statements is true about shipping hazardous materials?

A four-inch, diamond shaped hazardous materials label must be on the container.

119) (pg 50) If a straight vehicle (no trailer or articulation) goes into a front-wheel skid, it will:

Go straight ahead even if the steering wheel is turned.

120) (pg 30) Retarders:

Can cause the drive wheels to skid when they have poor traction.

121) (pg 31) Which of these is the proper way to signal a lane change?

Signal clearly before you begin, and change lanes slowly and smoothly.

122) (pg 33) When you must stop on a one-way or divided highway, you should place your reflective triangles at:

10 feet, 100 feet, and 200 feet toward approaching traffic.

123) (pg 32) For your safety, when you place your reflective triangles you should:

Hold the triangles with the reflective side between yourself and oncoming traffic.

124) (pg 49) What is the first thing you should do if your brakes fail while driving downhill?

Get off the road as soon as possible.

125) (pg 40) What is the best advice for drivers when a heavy fog occurs?

Park at the rest area or truck stop until the fog has lifted.

126) (pg 55) Which of these is true about hazardous materials?

Hazardous materials can be a risk to health and safety.

127) (pg 50) How do you correct a rear wheel braking skid on ice or snow?

Stop accelerating.

128) (pg 54) Which of these things is a good thing to remember about drinking alcohol?

Alcohol first affects judgment and self-control, which are necessary for safe driving.

129) (pg 27) You are stopped. You want to start driving uphill. You should:

Partly engage the clutch and then release the parking brake.

130) (pg 33) Whenever you double your speed, it takes about ____ times as much distance to stop.

Four

131) Your headlights must be on:

Any time your windshield wipers are on

SMITH SYSTEM IS NO ACCIDENT



DRIVER GUIDE

Truck Version

PART I

"THE FIVE KEYS TO SAFETY"

FOREWORD

Every year, thousands and thousands of people die in pointless traffic accidents. *Why?* There are many answers to this question. The most important answer is that *precautions* were rarely taken to prevent these tragic events. True, some accidents are inescapable. But of the millions of accidents happening every year, only a small percentage are truly non-preventable. The right *precautions* do prevent accidents.

If the Smith System could be defined in one word, the word would be *precaution*. The Smith System is a series of interlocking techniques for preventing accidents. They help drivers to see, think and act their way through the multitude of driving environments, challenges and changes that exist no matter where they travel or what types of vehicles they operate. Total awareness, perceptive anticipation, accurate forecasting, early detection, and deliberate reaction are the primary features of these techniques.

While preventing loss of life and property, the Smith System also prevents financial losses by helping drivers to reduce insurance claims, fuel consumption, and a substantial amount of vehicle repair, replacement and maintenance. Use of the System can also reduce the stress that often accompanies driving.

This booklet is for the experienced driver who has driven hundreds of thousands, if not millions, of miles. This information can help you build on the knowledge you have gained from years of on-road experience. Our mission is to share with you, or remind you of, the advanced driving techniques that have been tested and proven by many thousands of drivers since 1952.

The Smith System has endured throughout the years because it is based upon common sense and logic. It's easy to learn and to remember. It's easy to practice, and it works day or night, in any kind of weather, in any kind of vehicle, anywhere, in both directions—forward and reverse.

The system consists of five "Keys", and the techniques for using each Key. The techniques are largely "interlocking", because they work in unison to provide you with a true *system* for enjoyable, economical, safe driving.

THE SMITH SYSTEM

1. AIM HIGH IN STEERING®
2. GET THE BIG PICTURE®
3. KEEP YOUR EYES MOVING®
4. LEAVE YOURSELF AN OUT®
5. MAKE SURE THEY SEE YOU®

COMMON CAUSES OF ACCIDENTS

As an experienced driver, you know about the countless variables that can make an accident happen. Behind the variety of unique reasons for every accident are *common* contributing factors that repeatedly come into play. Most of these factors involve human error. They include:

- 1. Inattention.** Many drivers just don't pay enough attention to the serious business of driving through the ever-changing, ever-moving traffic world. *Change* is the most consistent thing on the road. There is an endless variety of important items to be identified and analyzed at every moment.
- 2. Too Much Attention to Too Little.** Some drivers concentrate too much attention for too long on one item, while missing others of equal or greater importance.
- 3. Not Enough Time.** Drivers often do not allow themselves adequate time to make important decisions and act upon them. This problem is usually caused by not seeing enough, soon enough.
- 4. Not Enough Space.** Drivers frequently accompany each other in close-knit packs, leaving themselves no maneuvering room if they need to stop, or steer clear of a sudden problem. And they tailgate, both inside and outside of packs.
- 5. Not Allowing for the Mistakes of Other Drivers.** When driving, people often fail to see or anticipate the mistakes of others in time to avoid conflict.
- 6. Not Enough Training.** Drivers of small vehicles can pose a variety of threats to traffic safety because their fundamental training may be inadequate. Qualifying for a driver's license requires only limited knowledge of

local laws and the basics of vehicle handling. In many states, drivers are tested *only once* in a vehicle, and receive further on-road tests in rare cases. Truck drivers, although better trained, also may be required to operate heavy equipment only once to obtain a license. The point is that state tests for all types of licenses do not require demonstrations of the special skills needed to avoid accidents. Moreover, it's probably true that most small vehicle drivers are never educated about the special problems of truck drivers. This lack of understanding often adds to the traffic safety hazards that truck drivers must face.

7. Failure to Adjust to Conditions. Changing road, load and weather conditions that effect vehicle handling characteristics are often not acknowledged. Other conditions evolve due to actions of other motorists, but these too are often overlooked as requirements for adjustment. Many accidents can be prevented if drivers form habits allowing for early recognition of, and adaptation to, changing conditions.

8. Attitude. People tend to vent their emotions when driving. Attitudes caused by emotions cause accidents. They diminish full concentration on driving, and often result in unsafe actions.

9. Driver Impairment. The influences of alcohol, drugs, fatigue and illness can lead to accidents.

10. Vehicle Failure. This causes a very small percentage of accidents. Many of them can be avoided if drivers take the proper precautions.

Our goal is to help you avoid accidents that can be caused by these and many other factors. This booklet contains a system of skills for seeing, thinking, and acting that can be indispensable to your driving safety from this day forward.

KEY ONE.

AIM HIGH IN STEERING®

Set your sights high—look far into the future that you plan to enter. See and react to future problems before they become unavoidable hazards.

Introduction

Human beings are accustomed to operating mechanical devices—especially the motor vehicle. But humans came into this world with certain limitations. Our eyes were designed to help us gather information at a traveling speed of about three to four miles an hour, which is about the speed at which we walk. Unfortunately, driving a motor vehicle—especially heavy equipment—requires adaptation.

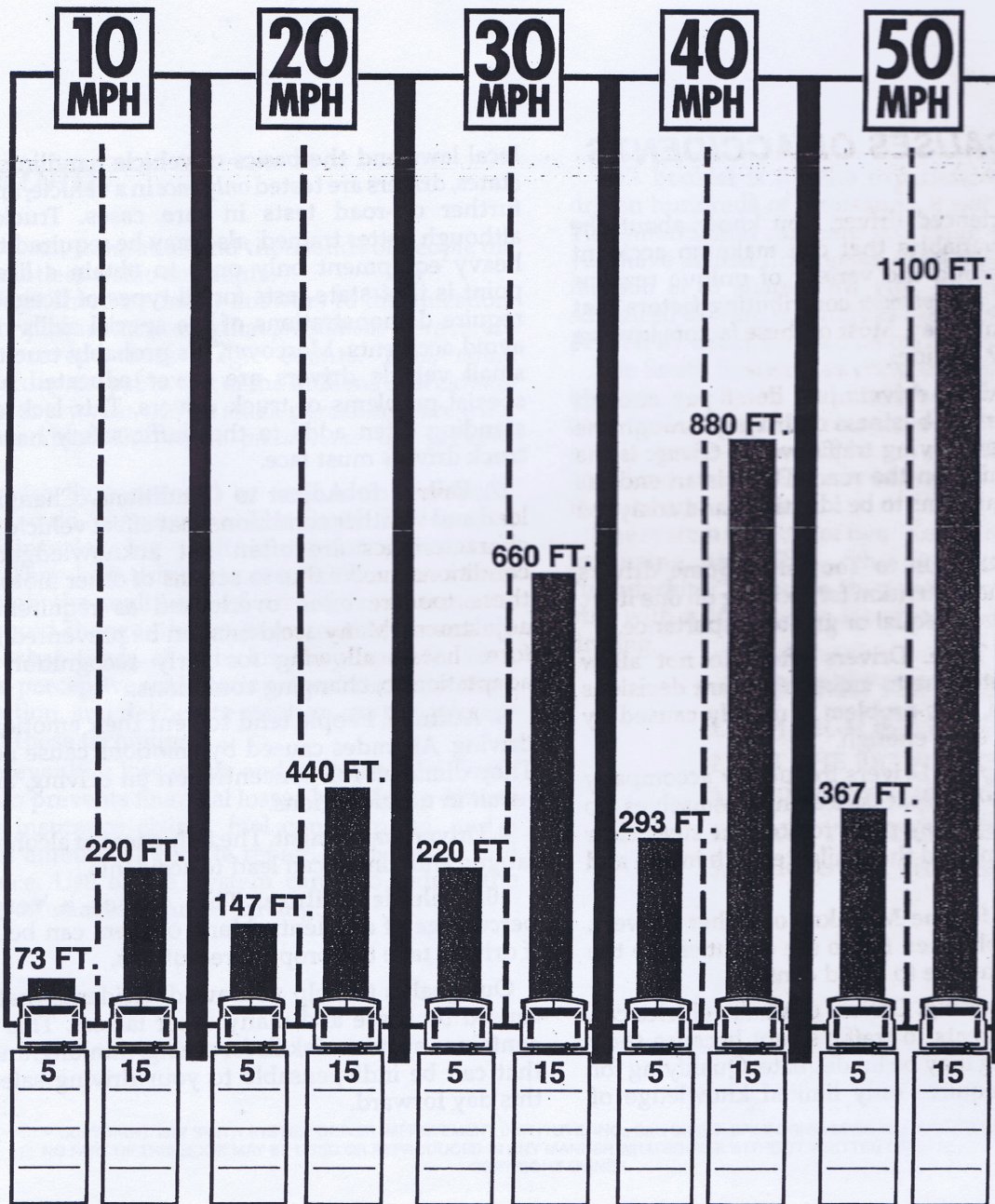


FIGURE 1

KEY TWO
GET THE BIG PICTURE

Have most people really *adapted* to uncovering information and making decisions while operating vehicles traveling many times faster than walking speed? Have they *developed* habits to not only keep up with, but ahead of, the various conditions presented by traffic? If the answer were "yes", far fewer accidents would be caused by human error.

Increased traveling speed requires the mind to process increased quantities of data—faster. This data processing involves decisions. One study suggests that it takes as many as 115 decisions to safely travel one mile in average traffic. Accurate decisions cannot be made without adequate information, and time.

Proper and Improper Seeing Habits

The development of proper seeing habits is of critical importance to acquiring a full inventory of information, and buying time to make decisions. Among these seeing habits is one which we call *15-second eye-lead time*. Eye-lead time is defined as the distance ahead that your eyes lead your vehicle as measured in seconds. You see ahead to where you will be in a given number of seconds.

The average driver looks only three to six seconds ahead. This is *low-aim steering*. It denies drivers the time they need to acquire information, make reliable decisions, and act safely in response to hazards. FIGURE 1 shows the amount of eye-lead time many drivers use, compared to what they should use.

Low-aim steering concerns itself almost exclusively with the nearest objects. This causes dangerous habits like tailgating, last-second lane changes and excessive braking.

Low-aim steering is like pitching a baseball while watching your feet instead of the batter. It doesn't give you a view of the target. When a low-aim steerer finally does see the target, three to six seconds are inadequate for reliable decisions and accident-preventing actions.

As a truck driver, you sit high, but this doesn't automatically lead to *aiming* high with your eyes. High aim steering involves *distance*, not height. It's a conscious, constant habit of scanning far ahead to acquire future information. This habit is of special importance when driving heavy vehicles that require additional maneuvering and stopping room.

The Key #1 Technique for Seeing the Future.

- Utilizing the 15 second eye lead time is as simple as scanning further ahead. At 30 miles per hour, you should see at least a block and a half ahead. (FIGURE 2) At 50 miles per hour, you should see about a quarter mile ahead.
- When possible, *double* your eye-lead time to 30

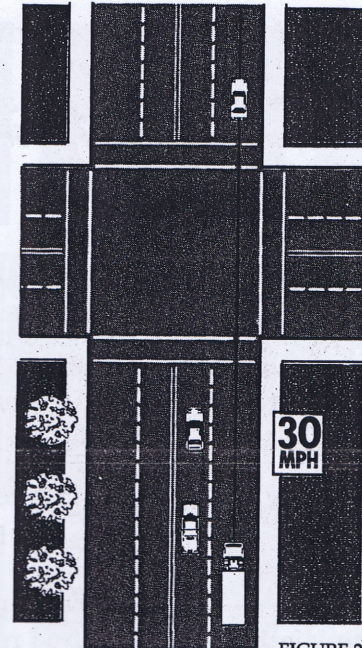


FIGURE 2

seconds, looking three blocks ahead on surface streets, and a half mile ahead on highways.

- Determine the existence of potential road hazards ahead, and the status of distant traffic lights. Pace yourself to avoid unnecessary stops and starts. This saves fuel, brakes, tires, transmissions and often, time. It also reduces rear-end collisions, which often occur when stopped at a light. The idea is to keep the vehicle moving.
- Look, think and plan ahead for low overhangs, low tree branches and bridges. Seeing them early gives you time to consider them as potential problems. Remember that the height of your trailer can vary according to loads and road conditions. Identify grades in advance so you can prepare for them with the proper speed and gearing.
- Let drivers ahead telegraph information to you. Sometimes their actions or brake lights can be warnings that they see a problem ahead which may not yet be visible to you.
- At night, look well beyond your headlight spray.

High-aim steering and 15-second eye-lead time are specialized habits that cannot be formed without constant practice. These techniques give you time to evaluate more information, sooner. You can make relaxed, knowledgeable decisions. Driving will become not only safer, but more enjoyable and more economical. AIM HIGH IN STEERING.®

KEY TWO. GET THE BIG PICTURE.®

To make the right decisions, your information must be complete. The information you need lies not only 15 seconds ahead, but all around you. Use your eyes to establish a 360-degree circle of constant awareness.

Introduction

Adequate eye-lead time is only one of the seeing habits needed to acquire the vast amount of information that exists in the traffic scene. The Big Picture includes everything you can possibly see ahead, to the rear, and to the sides during every second of your progress. Proper seeing habits must obviously include frequent use of your mirrors. But they should also lead to certain thinking habits, which then lead to safer driving habits.

The Selection and Rejection Process

Since there are so many objects in The Big Picture, you need to think in terms of their true relevance to your safety. This requires a rapid selection and rejection process where you sift out the objects that are not potentially hazardous, and leave room in your mind for dealing with those that are. A house, or a man mowing the lawn, require no decisions from you, so they are unimportant. The important things include anything that moves on the sidewalk or the street—from vehicles, pedestrians and animals, to the shadows they cast from locations that are hidden from your view. Of course, traffic signs are also very important. So are those frequently overlooked drivers in vehicles at intersections or at curbside, preparing to make their moves.

Proper Following Distance

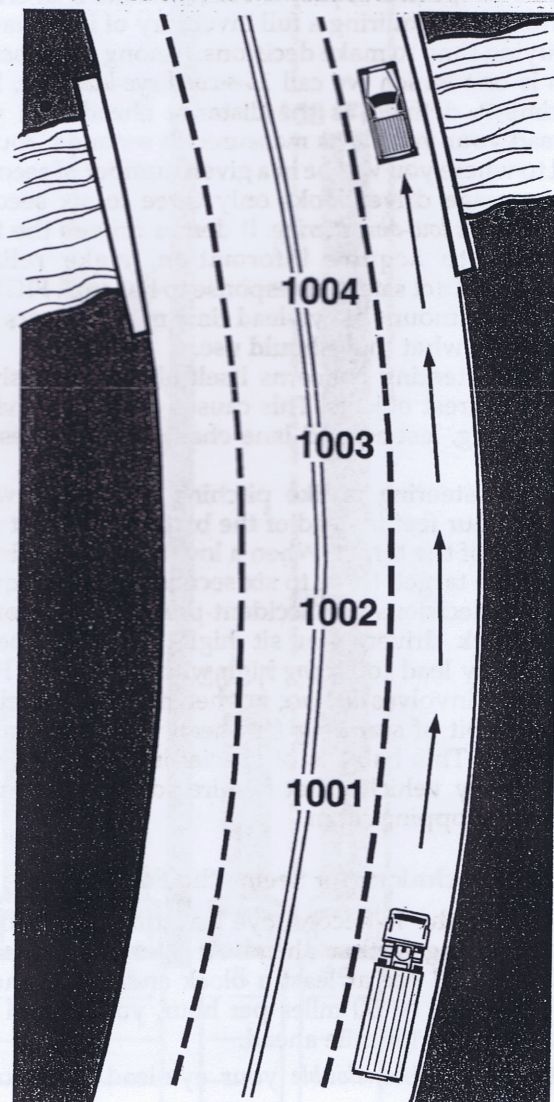
Seeing objects either directly or in your mirrors is not enough. You must also avoid barriers that can interfere with your vision.

Vision barriers come in all shapes and sizes, from trucks to motorcycles. If you must stay behind them, the only way to keep them from interrupting your vision is to maintain the proper following distance. Following a large truck too closely guarantees the loss of adequate eye-lead time and a vital part of The Big Picture. Following a smaller vehicle too closely doesn't block your vision, but it can distract you from The Big Picture. The closer you are, the more you will find your eyes falling to the rear of the vehicle ahead. This is because subconsciously you know that if the driver ahead makes a surprise move, you'll need to know immediately if conflict is to be avoided.

Calculating Proper Following Distance

If you insist on removing vision barriers, you will automatically establish increased following distance. To calculate a minimum proper following distance, count four seconds: one thousand one ... one thousand two ... one thousand three ... one thousand four. Start counting when the rear of the vehicle ahead passes a fixed reference point such as a bridge (FIGURE 3). If you reach the bridge in less than four seconds, you're following too closely.

This method of establishing proper following distance works at any speed. It's called the four-second rule. This rule relates to the minimum following distance for trucks



KEEP YOUR EYES MOVING
KEY THREE

under good driving conditions. Reduced visibility and tire traction resulting from poor weather should cause you to increase your following distance even more.

Who is Driving Your Vehicle?

We acknowledge that increased following distance creates opportunities for other vehicles to cut into the open space ahead of you. It may *seem* that if you increase your following distance, the people who cut in are taking advantage of you and delaying your progress. But we maintain that letting others have that space, while re-establishing proper following distance behind *them*, has little if any impact on your schedule. Most importantly, letting others have that space actually *prevents* them from taking advantage of you. Why? Consider your alternative.

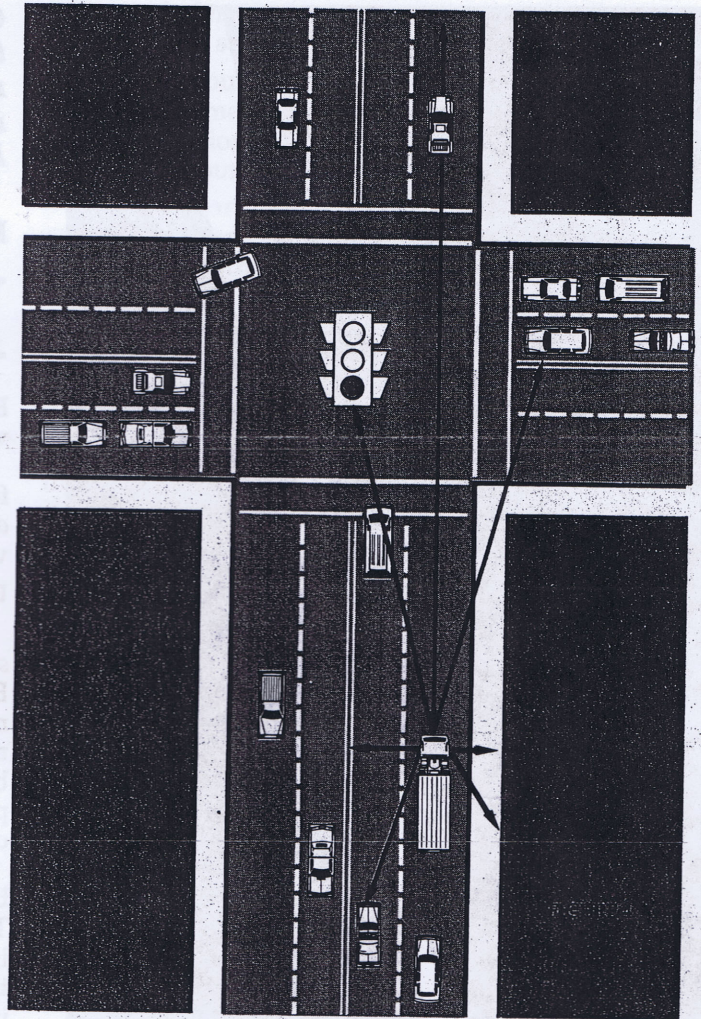
To keep others from taking your space, you fill the space yourself, and thus follow another vehicle too closely. This reduces both your visibility and your safety. It means that the driver who wants to cut in is *indeed taking advantage of you*. In this scenario, that driver virtually makes your decisions, and has decided your following distance for you. You wind up taking unnecessary risks that can only create stress and compromise your safety—without really improving your schedule. Is it worth it?

The Distracted Driver

So far we've discussed several ways to see The Big Picture. There's one threat to seeing capabilities which is so obvious that it's sometimes overlooked. It lurks inside moving vehicles in the form of activities that can interrupt full concentration on driving. Some drivers gaze for long periods at distant scenery, or at each other in conversation. Some drivers fumble with things on the seat or floor. Some appear to be in another world, thinking intently about matters other than driving. The alert driver has long learned to avoid these fundamental errors. Many other drivers have not. They are missing their own Big Picture, so they are potentially dangerous to you.

The Key #2 Technique for Getting The Big Picture.

- Acquire *full* information on which to base decisions. Use your eyes to create a 360-degree circle of constant awareness (FIGURE 4).
- Maintain at least a 15-second eye-lead time while keeping up with your side views, and while repeatedly checking your mirrors. Eliminate any vision barriers in front of you by keeping your distance from them.



- To establish proper following distance, use the four-second rule. Keep even more distance in poor weather. Without enough following distance you can't consistently aim high in steering, your picture will be limited, and as you will see, the next three keys of the Smith System will be adversely affected.

The serious business of driving demands utmost attention to every detail of a Big Picture that constantly changes. Driving requires you to maximize your information and decision-making time. The size, weight and sluggish maneuverability of your truck make superior seeing and thinking habits especially important for you. The Key #2 techniques help you to anticipate the actions of others. By seeing The Big Picture, you, not others, can decide what *your* actions should be. GET THE BIG PICTURE.®

KEY THREE. KEEP YOUR EYES MOVING.®

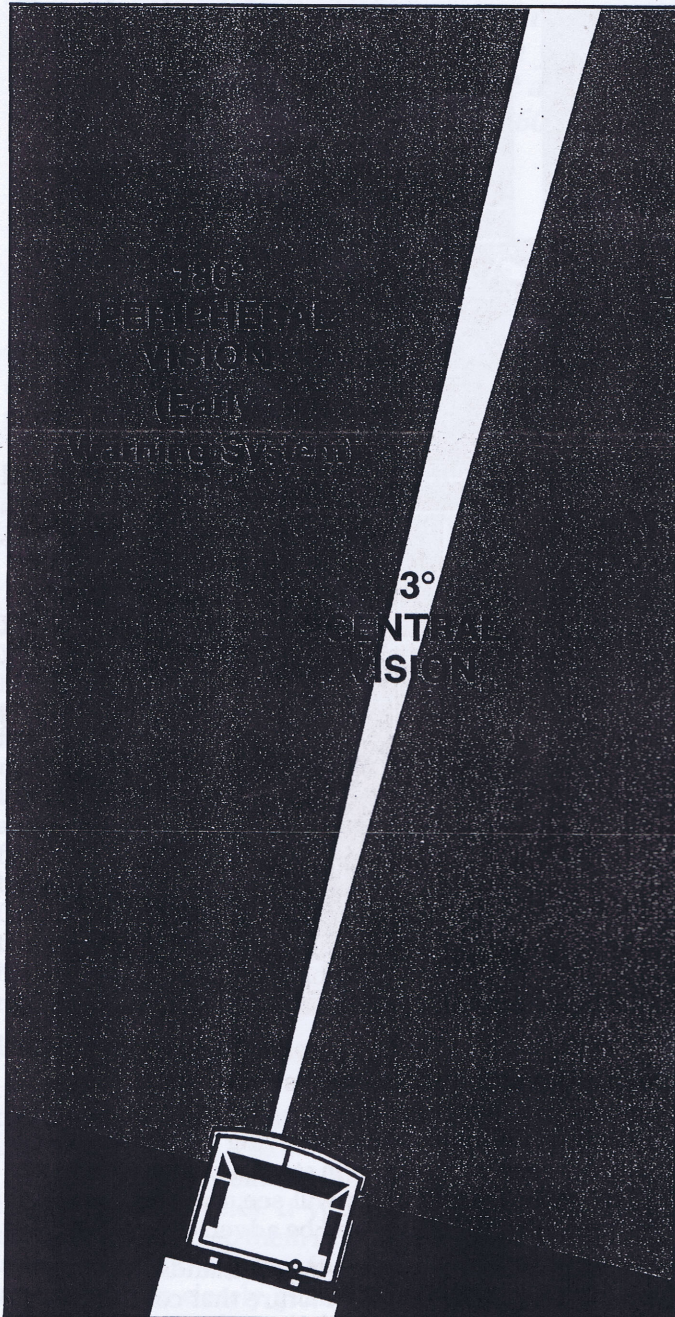


FIGURE 5

Getting and keeping The Big Picture requires the proper scanning techniques. Scanning requires constant eye movement. Eye movement activates your full visual potential and keeps you alert to the changing Big Picture.

Introduction

Many drivers do not Get The Big Picture® because they don't use their full seeing capabilities.

We have two types of vision: Peripheral, and central. Peripheral vision essentially detects objects of interest, while central vision investigates.

Most people can see about 90 degrees to each side for a total picture of about 180 degrees. In this picture, *only three degrees* (FIGURE 5) can be seen clearly by central vision. The remainder is not in sharp focus.

Using Your Full Seeing Capabilities

To improve your perception of the peripheral area, *scan with your central vision*. In other words, **KEEP YOUR EYES MOVING.®** Frequent eye movement lets you take maximum advantage of peripheral vision. Infrequent eye movement means that you're using your central vision, but you have diminished the effectiveness of your peripheral vision. Thus your Big Picture shrinks dangerously.

For example, try reading an entire line on this page by looking at only one word without moving your eyes. The other words are out of focus. More importantly, if you continue concentrating your central vision on that one word, your peripheral vision becomes increasingly less effective, especially at its outside borders. The point is:

Don't let your eyes pause on any object for more than two seconds.

The value of peripheral vision cannot be overemphasized. *Peripheral vision is your early warning system*, keeping you constantly up-to-date on rapidly changing conditions in your Big Picture. This early warning system is triggered by color, motion, and light. But it will not be triggered if the eyes are in a *fixed stare* or *blank stare* condition.

KEY FOUR
LEAVE YOURSELF AN OUT

Not Using Full Seeing Capabilities

When in a *fixed stare* condition, the eye concentrates on one object. When in a *blank stare* condition, the eye sees things, but the brain is not necessarily alert to the meaning of the visual input. This is referred to as day-dreaming.

Fixed stares and blank stares can occur when you look at anything for more than two seconds, or when you simply don't scan broadly enough. A typical example is the driver who is first in line at an intersection, waiting for a red light to turn green. The driver's central vision concentrates on the light. When the light changes, the driver simply readjusts central vision to the straight-ahead view, and accelerates forward. Although little if any peripheral vision is active, and although no attention is paid to the left, right, or rear, the driver usually makes it through the intersection safely. Usually, but not always.

Another consequence of the fixed stare habit must be considered with regard to speed. For example, reading a roadside billboard for four seconds while traveling at 55 miles per hour can be disastrous. In four seconds, a serious problem could have developed directly in front of you.

Think about this. Four seconds have already passed. Add time to recognize the problem, time to react, and time to brake your vehicle to a stop. Traveling at 81 feet per second, consider how far you will have traveled. Granted, as you brake, you cover fewer feet per second. But the point is, you could easily travel much more than the length of a football field without being aware of the ground you are covering.

The phrase "speed too fast for conditions" applies to more than road, traffic, or weather conditions. It also applies to the condition of your vision, your mind, and your ability to perceive things through the proper use of your eyes.

The Key #3 Technique for Keeping The Big Picture.

- KEEP YOUR EYES MOVING® *every two seconds*. Observe things in quick glances. This scanning technique maximizes your use of both central and peripheral vision. It keeps your early warning system continuously engaged, and it keeps your

mind alert. It assures your avoidance of the fixed or blank stare.

- Check your mirrors *every five to eight seconds*. The formation of this habit is *critical* to your information-gathering abilities as you scan the large areas around your truck.
- Before starting up at an intersection, look left, then right, then left again. Look left twice because normally, the first vehicle that could hit you would come from the left.

If a driver says "I didn't see him until it was too late," this driver's early warning system may not have been turned on. The Big Picture is a *moving picture* that must be continuously scanned. Scanning keeps peripheral vision effective, allowing you to detect problems in the making. You can get and keep a high-aim big picture if you KEEP YOUR EYES MOVING.®

KEY FOUR. LEAVE YOURSELF AN OUT.®

Using your eyes properly gives you time to make decisions. In addition to time, you need space. Space is your out. It's a cushion, and an escape route, from the seen and the unforeseen.

Introduction

The first three Smith System Keys can keep you well aware of your driving environment. But awareness is of no value unless you have a way to escape from impending traffic hazards. That's why you must also work to use the Key called LEAVE YOURSELF AN OUT.®

The Space Cushion: A Way Out of Trouble

"Space cushion driving" is one of the most important terms in the Smith System vocabulary because of its enormous influence on accident prevention. It's a concept that requires constant planning and constant adjustment to *change* as you move through the traffic scene.

Change can cause surprise. In traffic, surprise can be unpleasant and often dangerous. But the danger of surprise can be minimized if you consistently respond correctly. The correct response is usually possible if you LEAVE YOURSELF AN OUT.® This Key

increases your ability to deal with the unexpected and to prevent the ultimate surprise: an accident.

The safest position in traffic is where few or no objects surround you. The objective is to surround yourself with *space*. (FIGURE 6). If you build a space cushion around your vehicle, you can cushion yourself against conflicts. When your space cushion becomes smaller because someone has entered it, learn to feel uncomfortable—then adjust your speed or position to regain the lost space. Cushioning yourself and learning to feel uncomfortable when crowded are two very important thinking habits to develop.

The Key #4 Technique for Preventing Accidents.

- Build a space cushion all around your vehicle—to the front, rear, and sides.
- Start by using the features of high-aim steering, where you select a safe path through traffic and establish at least a 15-second eye lead time (Key #1). Also establish your four-second following distance (Key #2). By now, the front quarter of your space cushion is in place.
- Open up the sides and rear by adjusting speed or changing lanes when safe, and when legal. As you know, traffic tends to travel in clusters. Traffic packs are not only unsafe, they limit your options. Avoid them whenever you can.

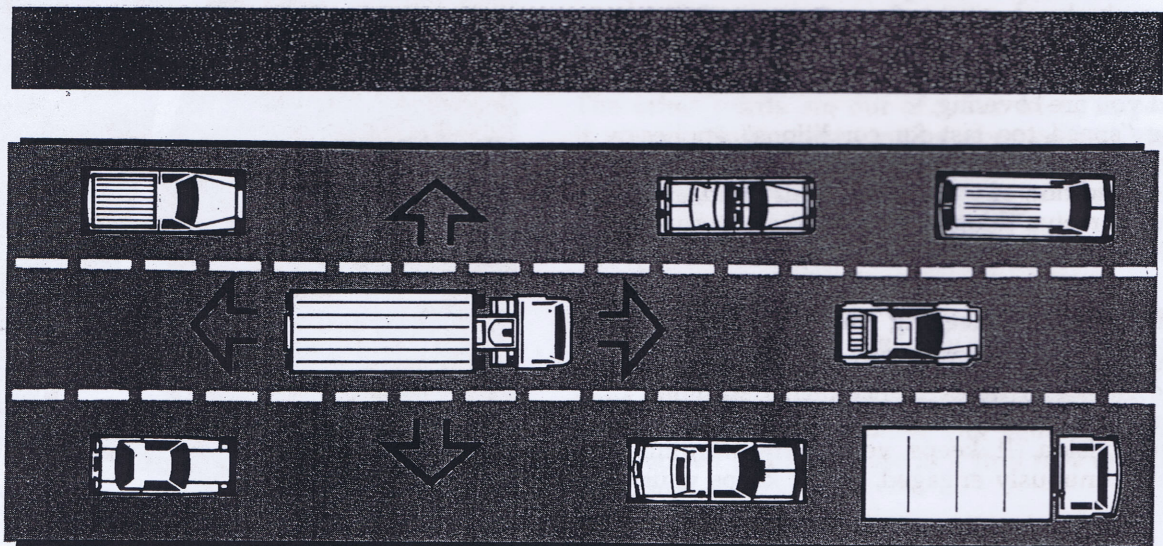


FIGURE 6

- We know that the size and low maneuverability of your truck are handicaps when adjusting to build a complete space cushion. If a four-sided cushion is impossible, work to keep at least the front open for that all-important visibility and stopping room. Then try to re-open at least one side to maintain maneuvering room.
- Whether or not you keep a full cushion, remain aware of the space you have and *do not* have for maneuvering room. Stay up to date on the sides and rear by constantly checking your mirrors. Spot vehicles *before* they slip into your blind areas.
- On streets with parked vehicles at curbside, don't use the lane nearest to them if an alternative lane is available, practical and legal. Parked vehicles keep one side of your cushion closed, and they may give you very little time to react. If you must travel in the lane next to an occupied curb, scan for signs of danger including drivers in vehicles, tires turned outward, brake lights on and of course, pedestrians. Be ready for their sudden moves, and use space, if available, as your out.
- The size of your truck may allow small vehicles to follow, and often tailgate, completely undetected. See them, and encourage them to pass. Don't let them ride your bumper for extended periods of time. This type of situation is just too dangerous.
- When stopped behind another vehicle, stay about 20 or 25 feet back. (FIGURE 7). This leaves room to pull away without backing if a vehicle ahead of you stalls.

Even though you Aim High in Steering®, Get The Big Picture®, and Keep Your Eyes Moving®, you must form the all-important space cushion driving habit so you can LEAVE YOURSELF AN OUT.®

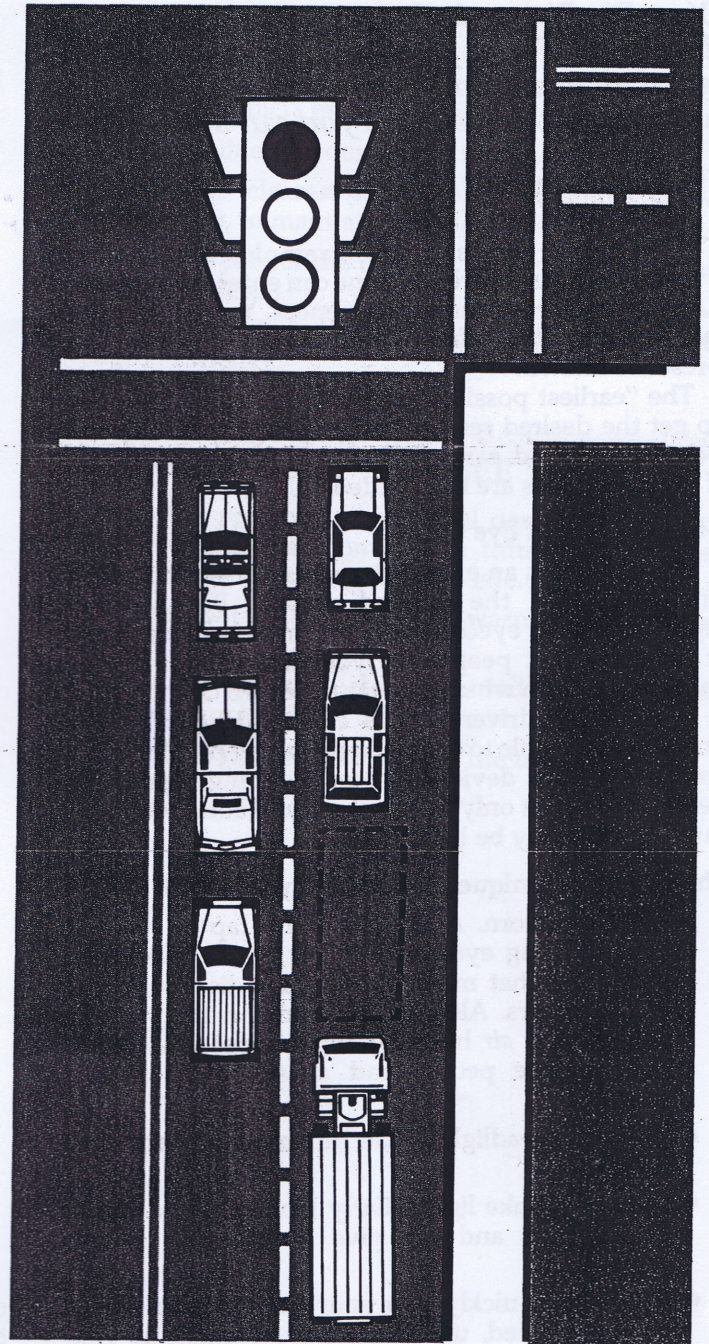


FIGURE 7

KEY FIVE. MAKE SURE THEY SEE YOU.®

Your Big Picture includes people who may not be aware of your presence, but should be. To get their attention, get eye contact. There are various warning signals you can use.

Introduction

Figure 8 shows a few examples of the many situations where someone can enter your path and cause disastrous consequences. You must *establish eye contact at the earliest possible moment* to make your presence known.

The "earliest possible moment" means early enough to get the desired results; early enough to alert people behind you; and early enough to take evasive action if your warnings are not heeded.

The Meaning of Eye Contact

Eye contact is an excellent means of communication, and can bring the desired results. But we must emphasize that eye contact does not *guarantee* safety. It indicates that people see you. It does not promise that they will do what you want them to do.

As a skilled driver who is constantly on the alert, you should be able to detect an emerging problem early, and use various devices to send warning signals. You need to warn not only those who could enter your path, but whoever may be behind you.

The Key #5 Technique for Getting Eye Contact.

- Use your horn. A light, friendly tap or two can usually bring eye contact. There's no need for a long blast that might imply your disapproval, or annoy others. Also, we recommend that you do not use the *air* horn for this purpose. Air horns can surprise people and cause them to react unsafely.
- Use your headlights. The human eye is attracted to light.
- Use your brake lights. Early braking alerts people behind you, and can give them more time to respond.
- Be ready to quickly alter your plans. If your signals are not heeded, use your space cushion as your out.

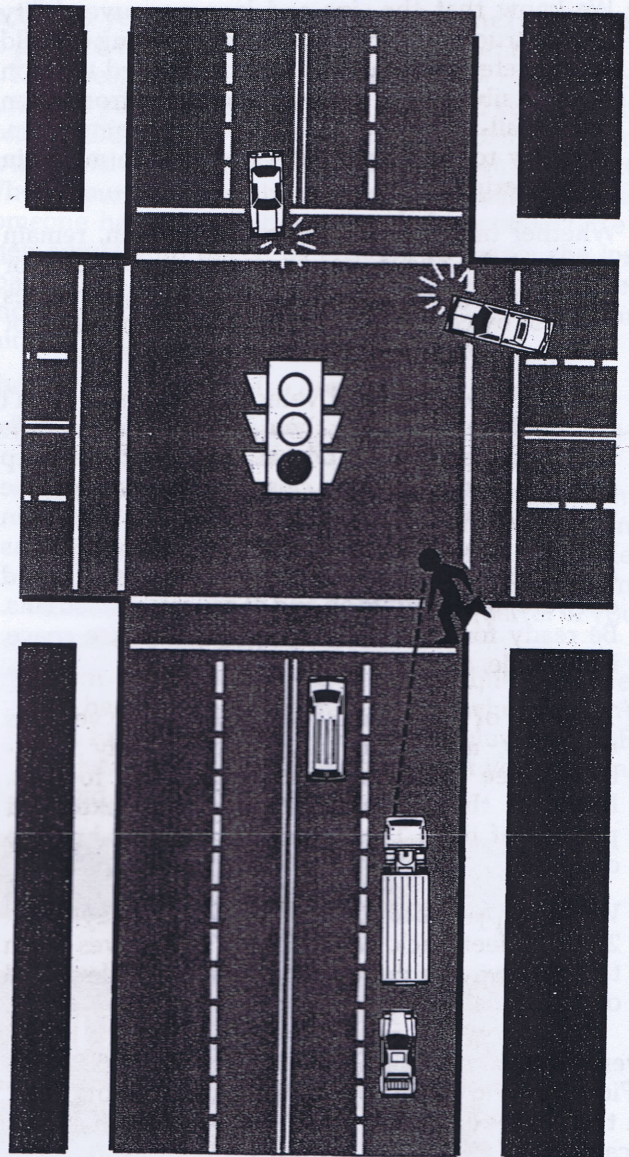


FIGURE 8

Remember the importance of timing. A timely, effective warning can usually be achieved if you form the seeing and thinking habits described throughout this booklet. MAKE SURE THEY SEE YOU.®

SUMMARY: PART I

"THE FIVE KEYS TO SAFETY"

AIM HIGH IN STEERING®

1. Our eyes are designed to work for us at walking speeds.
2. The average person has not fully adjusted visually and mentally to gathering information at the higher speeds traveled in motor vehicles.
3. Look ahead to where you will be *at least* 15 seconds from now.
4. 15-second eye-lead time provides advance warning of pending danger, and gives you an additional margin of safety.
5. Use improved eye-lead time for safer, more efficient, more economical driving.

GET THE BIG PICTURE®

1. While glancing ahead, don't forget the sides and the rear. Consistently update your information.
2. Eliminate vision barriers by establishing proper following distance. Stay far enough behind vehicles to obtain the visibility required to make *your own* decisions.
3. Avoid distractions inside your truck or in your thinking. Recognize and avoid drivers who seem distracted.

KEEP YOUR EYES MOVING®

1. Focusing on any object for too long disables your peripheral vision—your early warning system.
2. Keep your eyes moving at least every two seconds.
3. Check your mirrors every five to eight seconds.

LEAVE YOURSELF AN OUT®

1. Your safest location in traffic is where the fewest potential conflicts exist.
2. When possible, surround your truck with space.
3. Choose the clearest legal lane, and adjust speed accordingly, to maintain the space cushion.
4. If you lose part of the cushion, work to keep at least the front open.
5. Don't allow vehicles to enter your blind areas without your knowledge.

MAKE SURE THEY SEE YOU®

1. Detect the presence of potential danger *early*. Send your warnings as soon as you think they will be recognized—not too soon or too late.
2. Get eye contact by using the warning devices on your vehicle.
3. Don't take eye contact for granted. Be sure your warnings are heeded.
4. Eye contact is insurance against the unexpected.

PART II

“BACK TO SAFETY”

FOREWORD

Backing accidents happen too often, and too many good drivers are involved.

Backing accidents represent more than half of the motor vehicle accidents reported by many of the nation's largest fleets. That's an amazing statistic, since most drivers travel *forward* most of the time. It's even more amazing because many of these drivers are skilled, highly trained professionals.

Not so amazing is the cost of backing accidents. The dollar figures are extremely high. So are the costs in terms of inconvenience, injury, and death.

There are some simple solutions to this complicated problem. They involve a little knowledge, a little effort, and a lot of logic.

The information that follows contains these simple solutions. It's for drivers who want to increase their awareness and prevent that awful moment of contact with an unexpected obstacle when backing.

COMMON CAUSES OF BACKING ACCIDENTS

There is not enough space here to list *all* the causes of backing accidents. Every driving environment presents its own set of variables that may contribute to hazardous circumstances. But most backing accidents share in common one or more of these fundamental causes:

1. Backing Unnecessarily. Naturally, the type of truck, the job, and specific conditions are factors in determining whether backing avoidance is possible. But avoidance of backing is an option that is often overlooked by many drivers.

2. Blind Areas. Obviously, backing requires travel into areas that can't be seen from the driver's seat. And for trucks, of course, blind areas can be quite large. These areas often contain a variety of hazards that drivers don't detect in advance.

3. Vehicle Design. Because most vehicles are primarily designed to move forward, backing creates an awkward relationship between front and rear wheels where the rear wheels are leading, not led as originally intended. This awkwardness is increased by tractor-trailer combinations. There are aspects of this rear-wheel pushing maneuver that can cause accidents for drivers who fail to acknowledge the difference or compensate for it.

Vehicle design can also be a factor if drivers don't adjust to differences in handling characteristics caused

by various loads, or by differences between various vehicles they may operate.

4. Infrequent Backing Practice. Because *most* drivers move forward most of the time, their experience in driving backward is relatively low. Thus, their backing skills are not well developed. Truck drivers, however, must develop exceptional backing skills to compensate for the special problems caused by the vehicles and environments they work in. But the fact remains that even truck drivers have more experience driving forward than in reverse.

5. Inadequate Mental Preparation for Backing. Perhaps the most common cause of backing accidents is the driver who doesn't think things through before acting. This driver doesn't gather enough advance information about the backing environment and its surroundings. Inadequate mental preparation has many causes. For example, the driver may be preoccupied, or in a hurry, or having a bad day. Whatever the reason, the driver who is not fully aware of the environment is the most frequent victim of backing accidents.

6. Inadequate Information During Backing. Blind areas are one thing, but visible objects are another. Many drivers don't watch for the obvious objects they can hit as they negotiate the backing maneuver. Often, because they focus on one object, they overlook others.

BACKING CAN BE HAZARDOUS, BUT ...

The hazards can be minimized, or avoided. The Smith System's Five Keys to Space Cushion Driving work as well for backing as they do for driving forward.

KEY ONE. AIM HIGH IN STEERING.®

Aim for the safest location. The safest location is the one where you don't need to back at all. If you can't avoid backing, aim your thoughts at the safest backing plan.

Introduction

Backing avoidance does, of course, mean that you can't have a backing accident. But backing avoidance is difficult for some drivers, and impossible for others. The reasons range from lack of alternative parking sites to the very nature of the truck driver's job.

Nevertheless, the *first* principle of Key #1 is to avoid backing whenever possible and practical. This principle applies if the driver's job does not make backing *mandatory* for performance of every operation. It applies if the driver's individual circumstances permit the use of alternative *parking* sites where backing is not required. In this context, Key #1 simply asks the driver to seek and use every realistic opportunity to avoid backing by aiming high for alternatives.

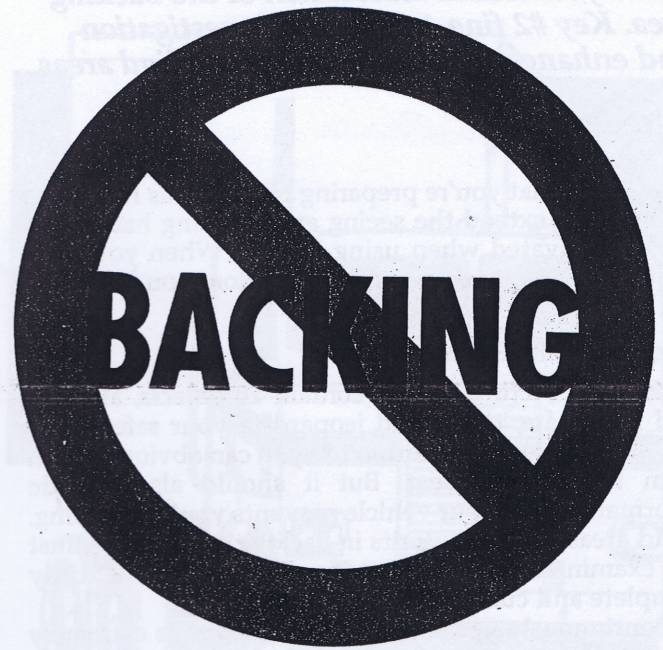
The *second* principle of Key #1 applies if you *must* back. This principle emphasizes the need to look, think and plan ahead with regard to every detail of the backing environment and the backing maneuver.

The Key #1 Technique for Backing Avoidance.

This technique applies if you need to park for an objective where backing is not mandatory for job performance. The technique is merely a simple, logical *thinking habit*—one that comes naturally to truck drivers because of the hard work that backing requires.

- Think backing avoidance. Look for opportunities at corners, behind red zones and other environments where people can't park in front of you.
- Think about the inconvenience of backing and backing accidents; and think about the cost.
- Consider possibilities for parking parallel to buildings near their loading docks, instead of backing into a dock. Such an option depends on the status of other dockside traffic and on the type of load you are handling—but sometimes, the option does exist.

When your eyes seek options, when your mind analyzes information properly, and when your circumstances are flexible, backing avoidance may be possible.



The Key #1 Technique for Backing Preparation.

If you *must* back—look, think and plan ahead. This technique emphasizes careful advance planning that focuses on your most important objective: Safety.

- On arrival, as soon as you can direct your attention to your target backing area, start scanning the whole environment. Do this while your view of the area is unobstructed.
- Aim high with your eyes to detect hazardous objects above you including cables, wires, branches and low building overhangs.
- Identify other potentially hazardous objects in the area.
- Don't allow your eyes to dwell on the closest objects while overlooking those at slightly greater distance.
- Watch for any changes in your surroundings as you approach the stopping point.

The Key #1 technique for backing preparation is the starting point for your use of the next four Keys. The act of acquiring advance information, and planning how to safely deal with it, automatically leads to your use of Keys 2 through 5 for every backing situation.

KEY TWO.

GET THE BIG PICTURE.®

If you can't avoid backing, Key #1 has already led to your initial assessment of the backing area. Key #2 fine-tunes your investigation and enhances your knowledge of blind areas.

Introduction

Now that you're preparing to back, this Key helps you extend the seeing and thinking habits you activated when using Key #1. When you have acquired a full inventory of information, you have The Big Picture.

The Complete, Updated Picture

Your Big Picture should contain all objects, animate and inanimate, that could jeopardize your safety. The Big Picture presents information you can obviously gain from the driver's seat. But it should also include information that your vehicle prevents you from seeing. Blind areas—major culprits in backing accidents—must be examined before your Big Picture can be truly complete and current.

Continuously updating your Big Picture is extremely important, since the picture moves and changes quickly. Once you have selected your parking site, you should check the Big Picture repeatedly during all phases of approach, arrival, backing, stopping, and departure.

The Key #2 Technique for Backing Preparation.

- As you began doing in Key #1, continue your search for potentially dangerous objects. If necessary, stop and solve the problem before moving further.
- If you're not absolutely sure of conditions in blind areas, do a walk-around inspection. (FIGURE 9) This may be somewhat inconvenient, but it beats the guesswork that often leads to collisions with unseen objects.

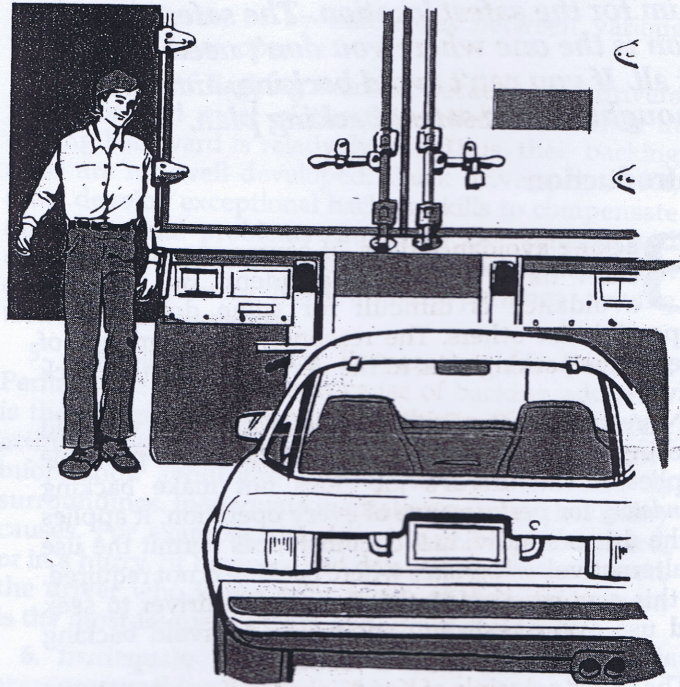


FIGURE 9

- If someone is available, an additional way to navigate blind areas is to obtain backing guidance from a person on the outside. You should be able to trust that person. Also, the signals used should be those that you both understand.

The only alternative to these techniques is guesswork. Guesswork causes accidents. Blind areas conceal very large portions of the information you need. Knowledge is your best defense against blind areas. Maximize your knowledge and minimize risks by obtaining all possible information about the task you are about to perform—before you perform it. GET THE BIG PICTURE.®

KEY THREE. KEEP YOUR EYES MOVING.®

Your eyes give your mind most of the information required to make decisions about driving. Getting the Big Picture is primarily a function of your alert eyes and mind. To stay alert when backing, KEEP YOUR EYES MOVING.®

Introduction

An everyday reality that makes backing so risky is the forward-facing position of your body in a backward-moving vehicle. This awkward relationship is compounded by the fact that your vehicle itself creates large blind areas. Furthermore, The Big Picture constantly changes as you move, and as others move.

These unfavorable conditions must be compensated for by very efficient seeing habits. But because moving a vehicle backward requires exceptional concentration, the driver can easily fall into the "fixed stare" habit without realizing it. The eyes quite naturally pay a lot of attention to the rear—but often to the exclusion of equally important areas like the front and sides.

The only way to break the fixed stare habit is to KEEP YOUR EYES MOVING.® Our earlier discussion of how the eye works should be briefly recalled here.

Effect of Eye Movement on Peripheral Vision

Frequent eye movement activates peripheral vision so it can work in concert with central vision. Normal peripheral vision can see nearly 180 degrees of unfocused information. Normal central vision sees about 3 degrees of a scene clearly. Prolonged use of central vision disables peripheral vision, thereby shutting down much of a driver's early warning system, and comprehension of a large area. "Prolonged use," in the case of driving, means concentration on any object for more than two seconds.

The Key #3 Technique for Safe Backing.

- To KEEP YOUR EYES MOVING.®, scan the entire area in quick glances with your central vision. This expands the area that your peripheral vision covers. Thus, you can collect more information.
- KEEP YOUR EYES MOVING.® not just to the rear, but to the front and sides. Never overlook the possibility of an unknown or forgotten object that your front quarter can hit when you turn the vehicle during backing. (FIGURE 10).
- Recognize that your mirrors deliver a large part of a truck driver's available picture, but only a small

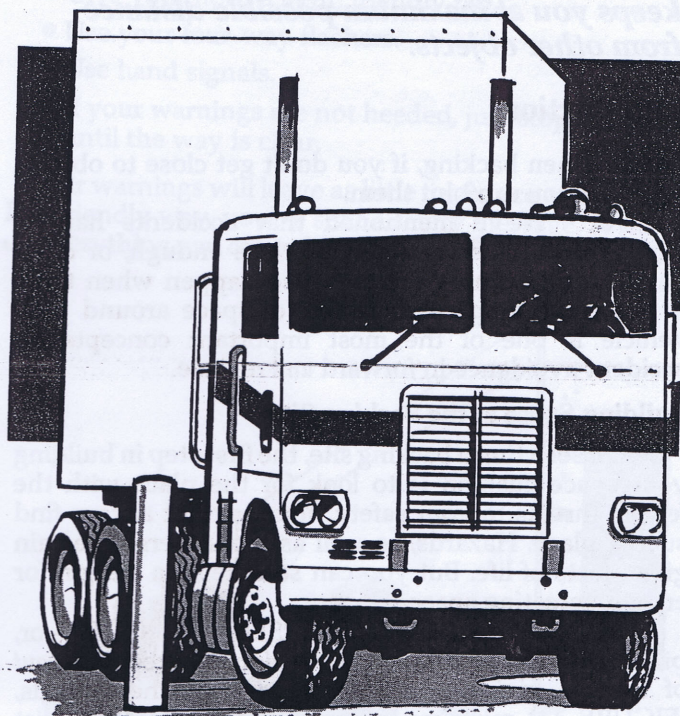


FIGURE 10

part of the *total* picture surrounding the truck. Don't overlook combined use of your standard *and* convex mirrors. The latter can be a major part of your early warning system.

- To KEEP YOUR EYES MOVING.®, you need time. *Move your vehicle slowly* while moving your eyes rapidly. Proceeding slowly gives you the needed time for decisions. It also creates a buffer against the unseen or unexpected. Should an accident occur despite your precautions, there will be less damage. And if people have suddenly entered your Big Picture, your slow movement gives them time to react. The extra time you take won't make a dent in your schedule, but it can prevent an accident.

Most accidents happen when people either misjudge something, don't see enough, or don't have time enough. You can usually see enough by using your eyes properly. You can make time for important decisions, judgments and safeguards if you move slowly and KEEP YOUR EYES MOVING.® The Big Picture is a moving picture, and your eyes must move with it.

KEY FOUR. LEAVE YOURSELF AN OUT.®

Cushion yourself against conflicts by building a space cushion around your vehicle. It keeps you at maximum possible distance from other objects.

Introduction

When backing, if you don't get close to objects, you can't hit them. We've mentioned that accidents happen when people miscalculate, don't see enough, or don't have enough time. Accidents also happen when there is not enough space. A pocket of space around your vehicle is one of the most important concepts for accident avoidance in forward *and* reverse.

Building Space at the Backing Site

When selecting a backing site, the first step in building your space cushion is to look for the place with the fewest threats to your safety. You may not always find such a place. Hazards, as well as human error, remain given facts of life. But you can still create a margin for error by creating space.

Space lets you LEAVE YOURSELF AN OUT®—or, preferably, *OUTS*. The space cushion can keep you *out* of trouble, giving you a way *out* from the hazards, (FIGURE 11) mistakes and variables that often exist when backing.

The Key #4 Technique for Safe Backing.

- If options exist, select the backing site containing the fewest hazards.

- If there are any hazards that you could collide with, your space cushion, which should be thought of as a margin for error, should keep you at the safest possible distance from them. In other words, when backing, cut no closer to other objects than you must.

Backing is dangerous. The more you back, and the farther you travel when backing, the greater are your chances of becoming one more backing accident statistic. In any case—whether or not you back—add the space cushion to the other techniques we've suggested. LEAVE YOURSELF AN OUT.®

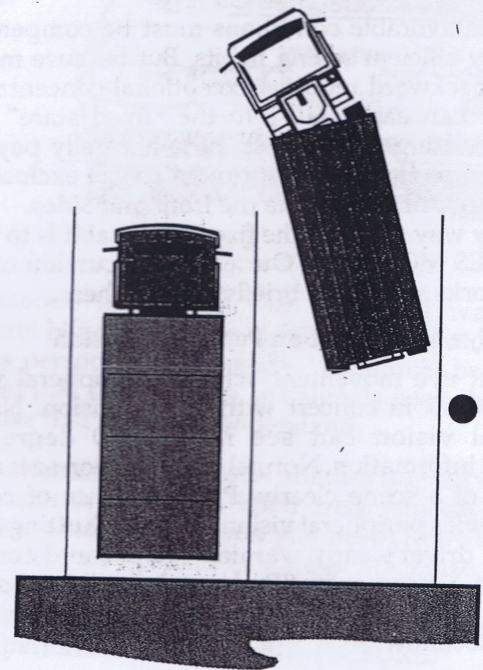


FIGURE 11

KEY FIVE. MAKE SURE THEY SEE YOU.®

If you believe people have the slightest potential for entering your path, get their attention. If they remain unaware of your presence or fail to heed your warnings, stop until it is safe to continue.

Introduction

The first four keys keep you fully aware of your surroundings while cushioning you against conflict. But what about the person who suddenly enters your path after you have so meticulously followed the rules? That person must be made aware of *you*. Your goal is to make *eye contact*.—even if you believe the right-of-way is yours.

As previously mentioned, eye contact is a communication tool that must be used to prevent accidents, but it should not be taken for granted, since it doesn't actually reveal the other person's exact intentions.

The Importance of Eye Contact in Backing Situations

Before you get eye contact with another person, (FIGURE 12) that person is most likely preoccupied with something other than your presence. Also, when backing, you're not moving at high speed—making you perhaps less noticeable than usual. Remember these facts when someone is near your backing site.

When you *do* establish eye contact, you wake up the other person. Don't be shy about doing this. It can prevent a tragedy.

The Key #5 Technique For Behind the Wheel Communication.

- Give your horn a light, friendly tap.
- Use your four-way flashers.
- Use hand signals.
- If your warnings are not heeded, just stop and wait until the way is clear.

Your warnings will leave as little to chance as possible. In a friendly way, you've sent a safety message. Always do everything you can to MAKE SURE THEY SEE YOU.®

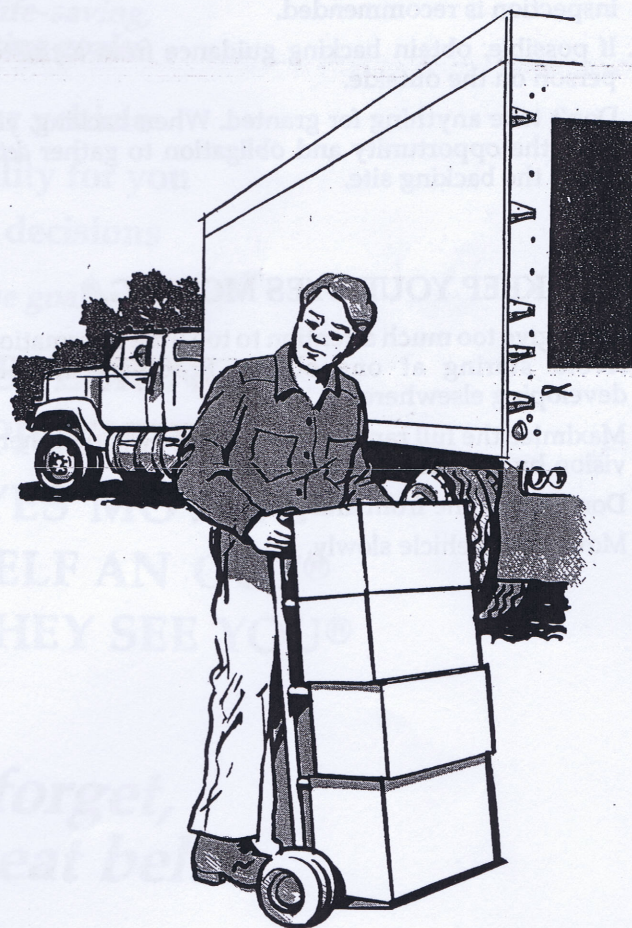


FIGURE 12

SUMMARY: PART II

"BACK TO SAFETY"

AIM HIGH IN STEERING®

1. When possible, avoid backing.
2. *Look, think and plan ahead* to select the safest possible parking location and backing path.

GET THE BIG PICTURE®

1. Sweep the entire backing area with your eyes.
2. Deal with potential hazards before backing.
3. If you have *any* doubt about blind areas, a walk-around inspection is recommended.
4. If possible, obtain backing guidance from a trusted person on the outside.
5. Don't take anything for granted. When backing, you have the opportunity and obligation to gather *detail* about the backing site.

KEEP YOUR EYES MOVING.®

1. Don't give too much attention to too little information. Avoid staring at one object. Problems may be developing elsewhere.
2. Maximize the full range of your central *and* peripheral vision by scanning the whole area.
3. Don't forget the front and sides.
4. Move your vehicle slowly.

LEAVE YOURSELF AN OUT.®

1. Choose the site with the fewest hazards.
2. Cut no closer to other vehicles than you must.
3. Keep your space cushion as large as possible.

MAKE SURE THEY SEE YOU.®

1. If you think someone may enter your path, establish immediate eye contact by using the warning devices available to you.
2. Don't take anything for granted. Eye contact is not a guarantee.
3. Be sure your warnings are heeded before moving.

PRACTICE MEANS EVERYTHING

We have just outlined the most important techniques for the Smith System of safe driving. They have been tested and proven by hundreds of thousands of drivers since 1952. We hope you will be the next person to test them.

The only way to test this system is to practice it. Practice it consistently—every moment, every mile, everywhere. This will fine tune your knowledge of the

system until the details of each technique become a natural part of your everyday driving skills.

Driving safely year after year is more a matter of skill than luck. Skill comes from knowledge, logic, and practice. Practice forms habits. Make the Smith System a habit, and realize your fullest potential for safety and success in the increasingly complex, challenging traffic world.

*Remember your life-saving,
accident-preventing goals:*

- Space for your vehicle
- Improved visibility for you
- Time to make decisions

To achieve these goals,

1. AIM HIGH IN STEERING®
2. GET THE BIG PICTURE®
3. KEEP YOUR EYES MOVING®
4. LEAVE YOURSELF AN OUT®
5. MAKE SURE THEY SEE YOU®

*And don't forget,
fasten your seat belt!*