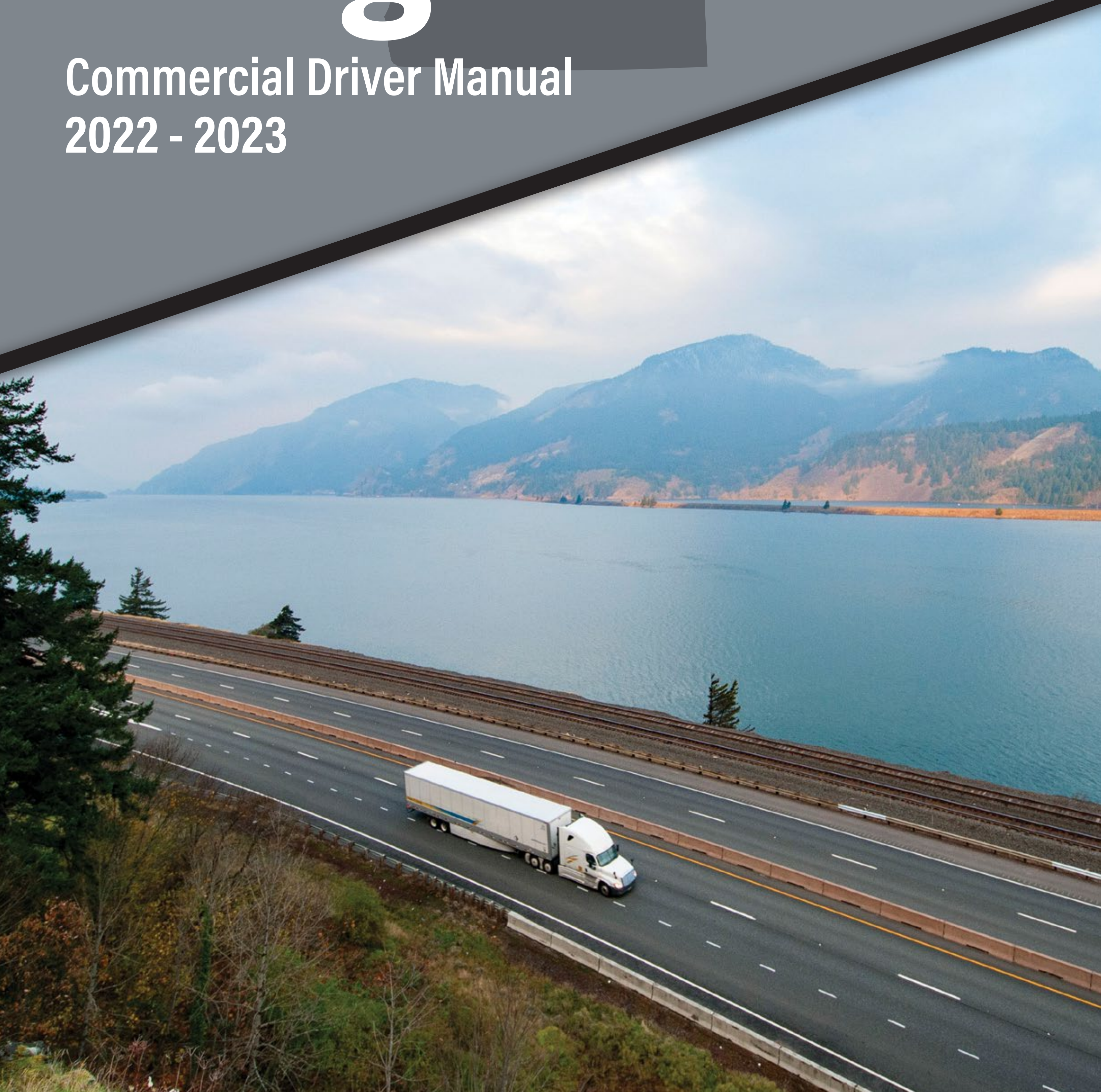
DRIVER AND MOTOR VEHICLE SERVICES

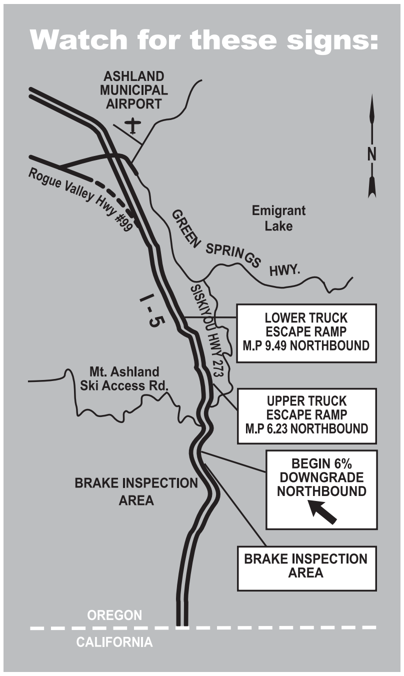
Oregon

Commercial Driver Manual
2022 - 2023



Tune radio to AM 1610 for updated weather information and road conditions

Watch for these signs:



RESPECT THE PASS!

The Siskiyou Pass, commonly called "The Siskiyous," is one of the most hazardous stretches of road along Interstate 5.

Truckers Beware

The summit is at an elevation of 4,310 feet. You'll lose about 2,300 feet of elevation in six miles at a 6 percent downgrade while maneuvering your truck through sharp curves and some of the most hazardou visibility (fog) and road surface conditions in Oregon.

More than 13,000 vehicles travel this stretch of highway daily. Approximately half of the vehicles involved in accidents on this stretch of highway were commercial trucks with trailers.

Extreme Caution Urged

Escape ramps are located Northbound at Mileposts 6.3 and 9.5

When in doubt about snow and ice conditions, chain-up your truck. It is better to be over prepared than to chain-up after you jackknife.

Why Do I Have to Chain-Up Here?

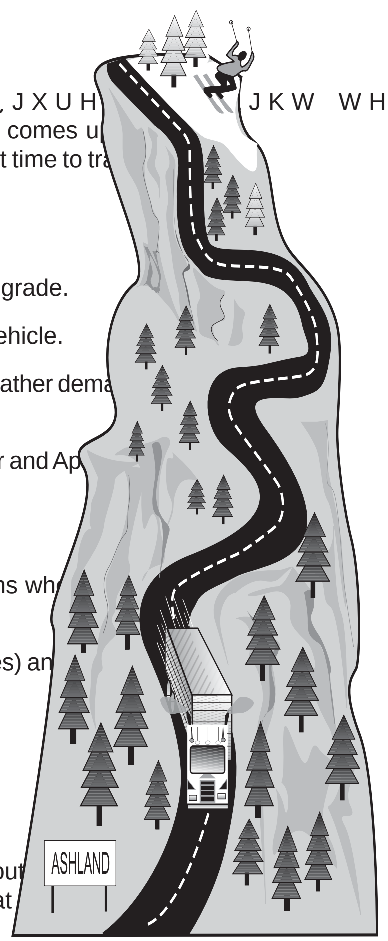
Chain-up areas are set up prior to inspection sites so that chains can be installed with ample shoulde space. Sometimes this needs to be done some distance from the snow line itself. Highway personnel a there to help you get over the pass safely.

Be cooperative. Work with them.

If you are not fully chained-up prior to the inspection site you will be turned around! When required, chains need to be installed prior to the inspection site. Inspection sites are at Milepost 1, Northbound and Milepost 11, Southbound.

When is it the Best Time to Go Over the Pass?

0RWKHU 1DWXUH LV KDUG WR ¿JXUH JKW WHPSHU freezing is common. Early in the morning when the sun comes u when fresh snow is the slickest. Midday is usually the best time to tra over the pass.



Reminders For a Safe Descent

- Remember to check brakes before entering the downgrade.
- Be aware of the safe recommended speed for your vehicle.
- Posted speeds are maximums in good weather. Bad weather dema slower speeds.
- Fog, snow, and black ice are common between October and Ap Be prepared!
- Descend the summit in the proper gear.
- Oregon law requires that you carry and use tire chains wh conditions warrant and/or signs posted.
- Be sure you have emergency warning devices (triangles) an use them if you are stopped.
- Be sure all your lights are working.
- Don't drive if you are fatigued!

DOT Registration Information

Motor carriers can obtain information and services about trucking regulations and appropriate Oregon permits at the Ashland Port of Entry located at I-5 Northbound, Milepost 18.

For Oregon road conditions, call 511 (toll free within Oregon) for weather conditions on the hill or 1-800-977-6368 (toll free within Oregon), or 1-503-588-2941 (outside Oregon)

Published by the Oregon Department of Transportation. Funds for this publication provided by the Motor Carrier Safety Assistance Program

DMV
DRIVER & MOTOR VEHICLE SERVICES

This material is based upon work supported by the Federal Motor Carrier Safety Administration
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recommendations expressed in this publication are those of the Author(s) and do not necessarily
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7KH PDQXDO KDV EHHQ PRGL¿HG IRU VSHFL¿F XVH LQ 2UHJRQ
WKH PDWHULDO LV FXUUHQW DQG UHÀHFWV DSSOLFDEOH ODZ DV
authority and should not be referenced in a court of law.

Graphics/Layout
ODOTDesign

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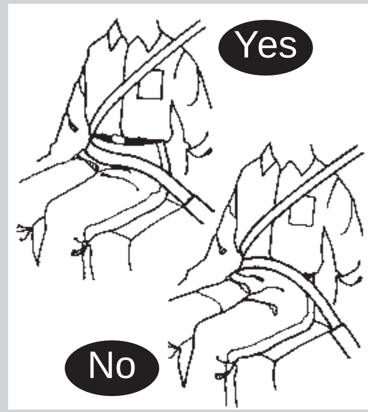
XVLQJ WKH PDQXDO SOHDVH UHF\FOH RU UHWXUQ LW WR D OF

The Correct Way to Wear a Safety Belt

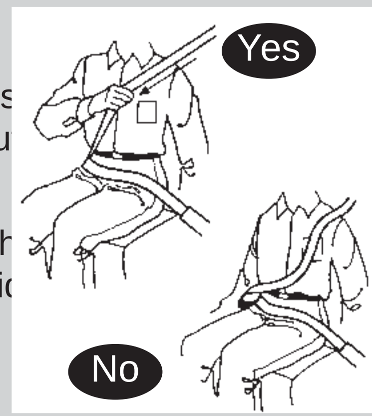
WEAR IT LOW



The lap portion of the safety belt should be two to four inches below the waist, snug across your hip and pelvic bones — NOT across your stomach.

In a crash, a belt worn too high places you at high risk of potentially fatal internal injuries.

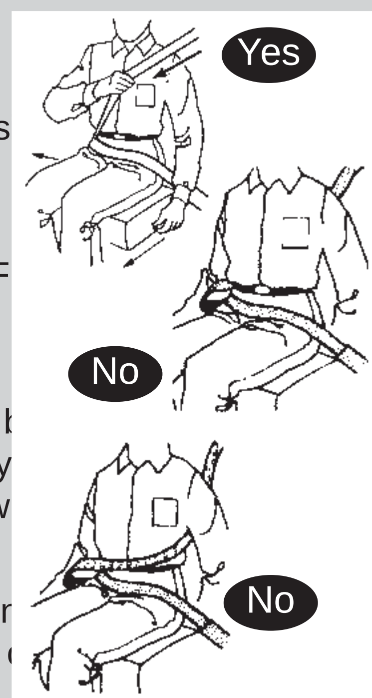
WEAR IT SNUG



The shoulder portion should rest smoothly over your collarbone and across your chest and shoulders. Pull the belt ou and let it retract to remove slack.

Safety belts will stretch slightly in a crash If not snug before the crash, you may slid under and out or up and over the belt.

WEAR IT RIGHT



If the belt rubs against your neck, try changing the seat position or the way you s

Some vehicles have shoulder belt adjusters which you slide up or down to S U R Y L G H D F R U U H F W F ¿W % H O W extenders may also be purchased.

Some cars feature a shoulder belt that automatically comes across your chest, b you must fasten the lap portion manually to achieve proper use and compliance w Oregon law.

Safety belts should be worn over the fron of the shoulder, never behind your back o under your arm.

Table Of Contents

Section 1

Introduction

This Section Covers

- Commercial Driver License Types
- Special Endorsements and Permits
- Obtaining Your Commercial Driver License
- Commercial Driver License Tests

‡'ULYHU 'LVTXDOL¿FDWLRQV DQG 3HQDOWLHV

- Other CDL Rules

There is a federal requirement that each state have minimum standards for the licensing of commercial drivers. This manual provides driver license testing information for drivers who want a commercial driver license (CDL) or commercial learner permit (CLP). The manual does NOT provide information on all the federal and state requirements needed before you can operate a FRPPHUFLDO PRWRU YHKLFOH &09 7KH)HGHUDO 0RWRU &DUULHU 6DIHW\ Administration (www.fmcsa.dot.gov) publishes rules for operation RI FRPPHUFLDO PRWRU YHKLFOHV DQG SU ... SDQLHV ... ULQWHG FRSLHV RI WKHVH UXOHV IRU D IHH ,Q DG ... KH 2UHJ ... FOH &R (www.oregon.gov/ODOT/DMV/pages/form/vehiclecodebk.aspx) LQFOXGHV VWDWXWHV WKDW DUH VSHFL¿F WR 2UHJRQ &09 RSHUDWRUV DQ... operations.

You must have a CDL if you operate:

- Any single vehicle with a gross vehicle weight rating or actual gross vehicle weight, whichever is greater, of 26,001 pounds or more;
- A trailer, or multiple trailers, with a total gross vehicle weight rating or actual gross vehicle weight of more than 10,000 pounds when the gross combination weight rating or actual gross combination weight, whichever is greater, of all vehicles combined is 26,001 pounds or more;
- A vehicle that transports 16 or more passengers (including the driver); or
- Any size vehicle that is used in the transportation of any material that requires hazardous materials placards or any amount of a material listed as a select agent or toxin in 42 CFR, Part 73.

There are exceptions for:

- Personal-use recreational vehicles;

‡(PHUJHQF\ ¿UH YHKLFOHV (ORS 801.050) E\ ¿UH ... or

‡(PHUJHQF\ YHKLFOHV XVHG E\ TXDOL¿HG HPHUJHQF\ VHUYLFH volunteers (ORS 401.358)

To get a CDL, you must pass knowledge tests, obtain and hold a Commercial Learner Permit (CLP) for at least 14 days and pass a skills test. This manual is not a substitute for a truck driver training class or program. Formal training is the most reliable way to learn the many special skills required for safely driving a large commercial vehicle and becoming a professional driver in the trucking industry.

Figure 1.1 helps you determine if you need a CDL.

Do You Need a CDL?

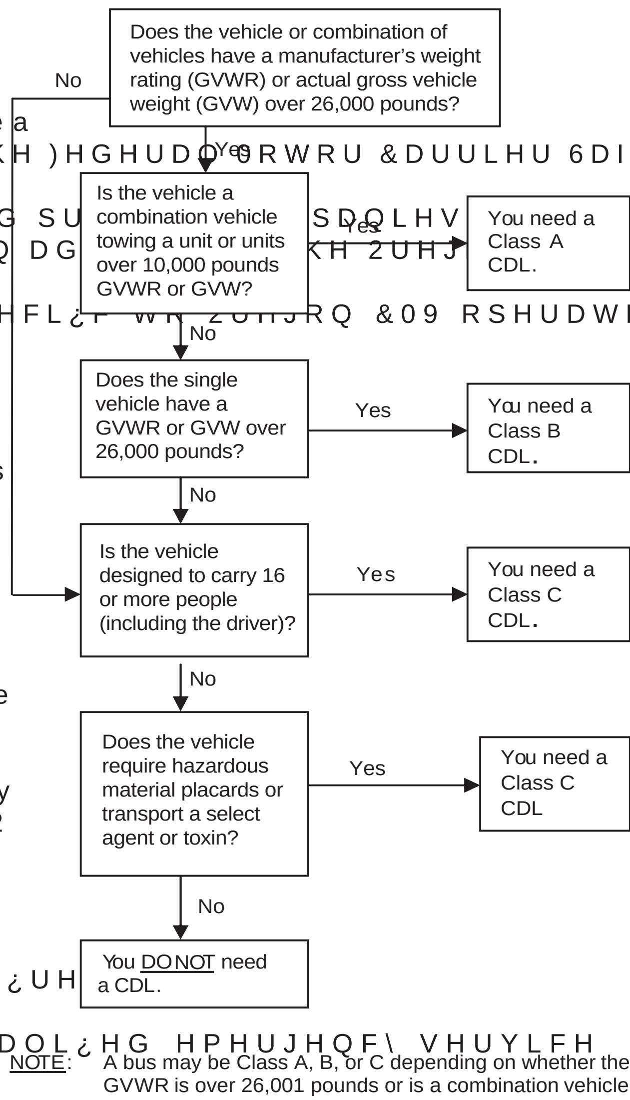


Figure 1.1

1.1 – Commercial Driver License Types

2UHJRQ LVVXHV WKUHH FODVVHV RI OLFHQVHV DQG ¿YH HQGRUVHPHQW W\SH WR GULYHUV RI &09¶V (DFK FODVV RI OLFHQVH JUDQWV GULYLQJ SULYLOHJH for that class and all lower classes. However, no license class grants driving privileges which require an endorsement. For example, a Class B CDL does not permit you to operate a tank vehicle unless you also have a tank endorsement.

± /LFHQVH FODVVL¿FDWLRQV

Remember, along with the license class, you must also obtain the SURSHU HQGRUVHPHQWV WR EH HOLJLEOH WR RSHUDWH VSHFL¿F W\SHV R commercial vehicles. For example, a Class A CDL does not allow you to pull double and triple trailers unless you have a double and triple trailer endorsement (see section 1.2).

- A Class A CDL authorizes a person to operate any vehicle or combination of vehicles except that the person may not operate any vehicle for which an endorsement is required unless the person obtains the endorsement.
- A Class B CDL authorizes a person to operate any single vehicle regardless of weight. You may tow a trailer if the WUDLOHU¶V *9:5 RU *9: ZKLFKHYHU LV JUHDWHU GRHV QRW exceed 10,000 pounds. If the trailer you are towing has a *9:5 RU *9: ZKLFKHYHU LV JUHDWHU RI PRUH WKDQ pounds, and the GCWR or GCW, whichever is greater, of all vehicles combined is more than 26,000 pounds, you will need a Class A CDL. The person may not operate any vehicle for which an endorsement is required unless the person obtains the endorsement.
- A Class C CDL authorizes a person to operate.
  - — Any vehicle that is designed to transport 16 or more persons, including the driver, if the gross vehicle weight rating or gross vehicle weight, whichever is greater, of the vehicle is less than 26,001 pounds and the person has the proper endorsement to operate a vehicle described in this paragraph;
  - — Any vehicle that is used in the transportation of hazardous materials if the gross vehicle weight rating or gross vehicle weight, whichever is greater, of the vehicle is less than 26,001 pounds and the person has the proper endorsement.

A CDL authorizes a person to operate any vehicle that may be operated by the holder of a Class C non-commercial license.

1.2 – Obtaining Your Commercial Driving Privilege

1.2.1 – Commercial Driver License

To obtain an Oregon CDL you must:

‡+DYH RU PHHW WKH TXDOL¿FDWLRQV IRU DQ 2UHJRQ GULYHU /LFHQVH (non-commercial Class C).

- Be at least 18 years of age, you must be at least 21 years old to drive commercial vehicles in interstate commerce. (Note: “Interstate commerce” includes vehicle operation within 2UHJRQ LI WKH WUDGH WUDvF RU WUDQVSRUWDWLRQ RULJLQDWHV RU terminates outside Oregon.);
- Present proof of your full legal name, legal presence in the United States, identity, date of birth and residence address; Please visit www.oregondmv.com for a list of acceptable documents;
- Provide your Social Security Number on the application;
- Have at least one year driving experience in a non-commercial Class C vehicle;
- Complete requirements for any CDL endorsements you may need (Note: Beginning February7, 2022, you will need to complete Entry Level Driver Training before taking a hazardous PDWHULDOV HQGRUVHPHQW NQRZOHG
- Pass a vision screening;

‡6XEPLW D FRS\ RI D YDOLG 0HGLFDO when required, a State medical waiver or federal exemption RU 6NLOO 3HUIRUPDQFH (YDOXDWLRQ

- Get and hold a valid Oregon commercial learner permit for at least 14 days before you take the Commercial Skills Test;
- Beginning February 7, 2022, complete entry level driver training before taking a CDL Skills test for a Class A or B CDL, RU D SDVVHQJHU RU VFKRRO EXV HQG
- Pass the CDL Skills Test;
- Pay the applicable fees;

‡1RW EH VXVSHQGHG RU RWKHUZLVH commercial driver license in any state; and

- Certify the type of driving you expect to do while holding a CDL.

Beginning on February 7, 2022, you will need to complete entry level driver training before taking a skills test if you are applying to:

‡ 2EWDLQ D &ODVV $ RU &ODVV % &'/ I

- Upgrade an existing Class B CDL to a Class A CDL; or
- Obtain a passenger (P) or school bus (S), endorsement for the ¿UVW WLPH

You will also need to complete entry level driver training before talking a hazardous materials endorsement knowledge test for the ¿UVW WLPH

You will not need to take ELDT if you are issued a CLP before February 7, 2022, and obtain your CDL before your CLP expires. You will not be required to take ELDT if you are applying for a Class A or B CDL and have a military skills test waiver.

You must take entry level driver training from a training provider listed on the Training Provider Registry. Only training providers that are registered with FMCSA through the Training Provider Registry can provide entry level driver training.

Most drivers will want to certify a driving type of non-excepted interstate. If there is any chance that you may operate a vehicle in non-excepted interstate commerce and you qualify, you should certify that driving type. Otherwise, your CDL and/or CLP may be needlessly restricted to use in Oregon only.

Your options in Oregon are:

- Non-excepted interstate. You operate or expect to operate in interstate commerce that is not excepted by federal regulations. You meet and will continue to meet all federal requirements, LQFOXGLQJ PHGLFDO TXDOL¿FDWLRQ interstate commerce while holding a CDL or CLP. You may DOVR RSHUDWH D &09 LQ H[FHSWHG WUDQVSRUWDWLRQ RULJLQDWHV RU intrastate commerce.

- Excepted interstate –You operate or expect to operate in interstate commerce, but engage exclusively in transportation or operations that are excepted under 49 CFR 390.3 (f), 391.2, 391.68, or 398. You will not be required to maintain federal medical standards but you will have to meet Oregon CDL medical standards. Operations that are excepted interstate include:
  - — Transportation performed by the federal government, a state, or political subdivision.
  - — Occasional transport of personal property not for compensation or for a commercial enterprise.
  - — Transportation of human corpses or sick and injured persons.
  - — Emergency delivery of propane winter heating fuel and pipeline response.
  - — Farm custom operations (custom harvesters).
  - — Operation of a vehicle by a beekeeper engaged in seasonal transportation of bees.
  - — Non-articulated farm vehicle operation within 150 miles of the farm.
- Non-excepted intrastate –You operate a Class A, B, or C &09 RQO\ LQ LQWUDVWDWH FRPPHUFH <RX ZLOO QRW EH UHTXLUHG WR maintain federal medical standards but you will have to meet Oregon CDL medical standards.

A person who has a CDL issued by another state must obtain an Oregon CDL within 30 days of being domiciled in Oregon.

If you are convicted of giving a false statement on your application, VXFK DV D IDOVH VRFLDO VHFXULW\ QXPEHU D IDOVH RU ¿FWLWLRXV QDPH or document, or giving a false address or age, you may face a PD[LPXP ¿QH RI   D RQH \HDU MDLO VHQWHQFH RU ERWK '09 will also suspend your driving privileges for one year if you are FRQYLFWHG RI RQH RI WKHVH RuHQVHV RU LI '09 RWKHUZLVH GHWHUPLQHV \RX FRPPLWWHG RQH RI WKHVH RuHQVHV

1.2.2 – Commercial Learner Permits

You must get and hold a CLP for at least 14 days prior to taking a CDL skills test. Your CLP is valid for one year. The CLP must be LQ WKH FODVV DQG ZLWK WKH SURSHU HQGRUVHPHQW IRU WKH W\SH RI &09 you will be driving.

The CLP must be in your immediate possession. You must be accompanied, in the seat next to you, by a person who is least 21 years of age and has the appropriate class CDL and proper endorsement(s) that grant the driving privileges required to operate the vehicle.

You may not operate any vehicle transporting hazardous materials, towing double or triple trailers, or operate passenger vehicles while transporting passengers. Any tank vehicle you operate must be empty.

To obtain an Oregon CLP you must:

- Be at least 18 years old, you must be at least 21 years old to operate in interstate commerce;
- Have at least one year of driving experience;
- Have a valid, unexpired Oregon driver license or CDL;
- Present proof of your full legal name, legal presence in the United States, identity, date of birth and residence address; Please visit www.oregondmv.com for a list of acceptable documents;
- Provide a valid social security number;
- Pass a CDL general knowledge test;
- Pass a combination vehicle knowledge test (for a Class A CLP);
- Pass a passenger knowledge test for a CLP with a passenger endorsement;
- Pass a school bus knowledge test for a CLP with a school bus endorsement;
- Pass a tank vehicle knowledge test for a CLP with a tank endorsement;
- Pass an airbrake knowledge test to operate, with a CLP, vehicles with airbrakes;

‡1RW EH VXVSHQGHG RU RWKHUZLVH commercial driver license in any state;

- Certify the type of driving you expect to do while holding a CLP;

‡6XEPLW D FRS\ RI D YDOLG 0HGLFDO when required, a State medical waiver or federal exemption RU 6NLOO 3HUIRUPDQFH (YDOXDWLRQ

- Pay the required fee.

1.3 – Endorsements and Restrictions

$ SHUVRQ ZKR RSHUDWHV D &09 PXVW K &'/ RU &/3 WR EH HOLJLEOH WR GULYH vehicles. To add an endorsement or remove a restriction you must pass the appropriate knowledge test. You must also pass a skills test in D UHSUHVHQWDWLYH &09 WR DGG D SDVV or remove a CDL restriction.

1.3.1 – CDL and CLP Endorsements

- (N) Tank endorsement – required to operate a commercial motor vehicle (over 26,000 pounds) designed to transport any liquid or gaseous material within a tank or tanks having an individual rated capacity of 119 gallons and an aggregate rated capacity of 1,000 gallons or more that is either permanently or temporarily attached to the vehicle or chassis.

A commercial motor vehicle transporting an empty storage container tank that has a rated capacity of 1,000 gallons or [illegible] considered a tank vehicle.

- (P) Passenger endorsement –Required to operate a Class A RU &ODVV % &09 GHVLJQHG WR WUD RU D &ODVV & &09 GHVLJQHG WR WU including the driver. A passenger endorsement does not authorize operation of a school bus.
- (S) School bus endorsement – Required to operate a vehicle that is marked with or displays the words “school bus” and is used to transport students to or from school and may be used to transport students to or from authorized school activities. A school bus manufacturer, dealer or mechanic is not required to have the endorsement while operating a school bus that is not transporting students. A driver must also hold a valid passenger endorsement.

1.3.2 – CDL-Only Endorsements

- (H) Hazardous materials endorsement – required to operate any vehicle carrying hazardous materials that require placards or transporting any amount of material listed in the Federal Department of Health and Human Services regulations as a select agent or toxin.

‡ 7 'RXEOH DQG 7ULSOH 7UDLOHU ± 5 towing more than one trailer.

- (X) Tank and Hazardous Materials.

1.3.3 – CDL Restrictions

‡ / $LU EUDNH UHVWULFWLRQ ± $ SHUVRQ PD\ QRW RSHUDWH D &09 with air brakes, including air-over-hydraulic brakes. To remove the air brake restriction on a CDL, you must pass both an air brake knowledge test and a skills test in a vehicle equipped with air brakes.

‡ =)XOO DLU EUDNH UHVWULFWLRQ ± $ SHUVRQ PD\ QRW RSHUDWH D &09 with brakes that operate solely on compressed air but may operate D &09 ZLWK DLU RYHU K\GUDXOLF EUDNHV 7R UHPRYH D IXOO DLU EUDNH UHVWULFWLRQ RQ D &'/ \RX PXVW SDVV D VNLOOV WHVW LQ D &09 equipped with brakes that operate solely on compressed air.

- (E) Manual transmission restriction – A person may not operate a &09 WKDW KDV D PDQXDO WUDQVPLVVLRQ 7R UHPRYH WKH UHVWULFWLRQ \RX PXVW SDVV D VNLOOV WHVW LQ D &09 ZLWK D PDQXDO WUDQVPLVVLRQ
- (M) or (N) Passenger endorsement restrictions – A CDL holder with a passenger endorsement may not operate a passenger vehicle that is in a higher class than the class of passenger vehicle the person used for testing.
- (O) Tractor-trailer restriction – A person may not operate a &ODVV $ FRPELQDWLRQ YHKLFOH WKDW LV FRQQHFWHG E\ D ¿IWK ZKHHO coupling. To remove the restriction, you must pass a skills test LQ D &ODVV $ FRPELQDWLRQ YHKLFOH WKDW LV FRQQHFWHG E\ D ¿IWK wheel coupling.

‡ 9 0HGLFDO YDULDQFH UHVWULFWLRQ ± $ SHUVRQ ZKR RQO\ TXDOL¿HV &09 PHGLFDO TXDOL¿FDWLRQV RQO\ XQGHU WKH FRQGLWLRQV RI D federal exemption and/or skills performance evaluation (SPE) PD\ QRW RSHUDWH D &09 ZLWKRXW KDYLQJ WKH H[HPSWLRQ OHWWHU and/or SPE in his or her possession.

- (K) Intrastate restriction – A person who does not meet all UHTXLUHPHQWV IRU RSHUDWLQJ D &09 LQ QRQ H[FHSWHG LQWHUVWDWH FRPPHUFH PD\ QRW RSHUDWH D &09 LQ QRQ H[FHSWHG LQWHUVWDWH commerce. Such persons who have a CDL or CLP may operate a vehicle in intrastate commerce only. See driving types in Section 1.3 for additional information

A person issued an original CDL may obtain or add an endorsement at a later date. If you add an endorsement RU UHPRYH D UHVWULFWLRQ DW D ODWHU GDWH '09 ZLOO FKDUJH D replacement fee, as well as any testing fee(s), unless you are also renewing your CDL.

1.3.4 – CLP Restrictions

‡ / $LU EUDNH $ &/3 KROGHU PD\ QRW RSHUDWH D &09 ZLWK air brakes, including air-over-hydraulic brakes. To remove an air brake restriction from a CLP you must pass an air brake knowledge test.

- (N) Tank – A CLP holder with a tank endorsement may not RSHUDWH D &09 WDQN YHKLFOH XQOHVV WKH WDQN YHKLFOH LV HPSW\ and, when applicable, purged of hazardous materials residue.
- (M) or (N) Passenger endorsement restrictions– CLP holder may not operate a passenger vehicle that is in a higher class than the class of CLP issued.

- (P) Passenger - May not operate any class or type of passenger vehicle that is carrying passengers (other than government auditors and inspectors, examiners, the trainer and other trainees). UHG WR RSHUDWH D &09

‡ 9 0HGLFDO YDULDQFH UHVWULFWLR &09 PHGLFDO TXDOL¿FDWLRQV RQO\ federal exemption and/or skills performance evaluation (SPE) PD\ QRW RSHUDWH D &09 ZLWKRXW K and/or SPE in his or her possession.

- (K) Intrastate restriction – A person who does not meet all UHTXLUHPHQWV IRU RSHUDWLQJ D &0 FRPPHUFH PD\ QRW RSHUDWH D &09 L commerce. Such persons who have a CDL or CLP may operate a vehicle in intrastate commerce only. See driving types in Section 1.3 for additional information.

1.3.5 – Farm Endorsement

A farm endorsement may be added to a CDL or non-commercial license.

A farm endorsement allows you to drive a farm vehicle that is controlled or operated by a farmer.

More information about the Farm Endorsement and farm operations can be found in the Guide to Farm Trucking in Oregon https://www.oregon.gov/odot/Forms/Motcarr/9942.pdf

1.3.6 – Hazardous Materials Endorsement Requirements

Federal Transportation Security Administration (TSA) rules require every person who applies for a HAZMAT endorsement to undergo a VHFXULW\ EDFNJURXQG FKHFN WKDW LQ for FBI review. Oregon is using an agent under contract with TSA WR FROOHFW ¿QJHUSULQWV DQG LQLWL You will be required to pay a fee to the agent for this security background check. For information on requirements for the criminal EDFNJURXQG FKHFN ORFDWLRQV DQG K sites, or to complete the application and submit fees, visit the TSA website at https://www.tsa.gov/for-industry/hazmat-endorsement or call (855) 347-8371.

Persons who are wanted or under indictment, have been found not guilty by reason of insanity, have a felony conviction within the previous 7 years, or were released from incarceration during the previous 5 years for a felony conviction of certain crimes may be FRQVLGHUHG D VHFXULW\ WKUHDW E\ 7 a hazardous materials endorsement. Also, an individual is not TXDOL¿HG IRU D KD]DUGRXV PDWHULDO KDV D PHQWDO GHIHFW DV GH¿QHG LQ U.S. Citizenship.

'09 ZLOO QRW LVVXH D &'/ ZLWK D KD]DU until a TSA background check has been received and entered into the applicant's Oregon driver record. If TSA determines that you SUHVHQW D VHFXULW\ WKUHDW '09 ZLOO materials endorsement.

'09 ZLOO QRW LVVXH D &/ ZLWK D KD]DU to a person that is not a U.S. citizen or permanent legal resident.

Beginning February 7, 2022, you will need to complete entry level driver training before taking the HAZMAT endorsement knowledge WHVW IRU WKH ¿UVW WLPH

1.4 – Commercial Tests

1.4.1 – Knowledge Tests

<RX PD\ JR WR DQ\ IXOO VHUYLFH '09 RvEH WR WDNH \RXU NQRZOHGJH WHVWV 0DQ\ RvFHV GR QRW FRQGXFW NQRZOHGJH WHVWV DIWHU S P /RRN IRU VLJQV LQ WKH OREE\ RU DVN WKH RvFH VWDu *R HDUO\ HQRXJK WR JLYH \RXUVHOI SOHQW\ RI WLPH WR WDNH WKH WHVWV EHIRUH WKH RvFH FOR

You will have to take one or more knowledge tests, depending on what class of CDL or CLP and what endorsements you need. All tests DUH RuHUHG LQ (QJOLVK RQO\ &RPP

- The general knowledge test, taken by all applicants.
- The combination vehicles test required if you want to operate Class A combination vehicles.
- The passenger endorsement test, if you want to operate a Class $ RU % &09 GHVLJQHG WR WUDQVSRUW SHUVRQV LQ FRPPHUFH RU a Class C vehicle designed to transport 16 or more persons, including the driver.
- The school bus test, required in addition to the passenger endorsement knowledge test, if you want to operate a school bus.

‡ 7KH DLU EUDNHV WHVW UHTXLUHG LI \RX ZDQW WR RSHUDWH D &09 with air brakes, including air over hydraulic brakes. (A CDL LV QRW UHTXLUHG WR RSHUDWH D QRQ &09 ZLWK DLU EUDNHV

- The hazardous materials test, required if you want to transport hazardous materials or waste in amounts that require placarding or any quantity of a material listed as a select agent or toxin in 42 CFR, Part 73. Beginning February 7, 2022, you will need to complete entry level driver training before taking the hazardous PDWHULDOV NQRZOHGJH WHVW IRU WKH ¿UVW WLPH <RX PXVW DOVR SDVV the hazardous materials knowledge test every time you renew your CDL with a hazmat endorsement.

‡ 7KH WDQN YHKLFOH WHVW UHTXLUHG LI \RXU &09 LV GHVLJQHG WR transport a liquid or gas in a cargo tank or tanks rated at more than 119 gallons with an aggregate capacity of 1,000 gallons or more.

‡ 7KH GRXEOHV DQG WULSOHV YHKLFOH WHVW UHTXLUHG LI \RXU &09 combination includes double or triple trailers. (Contact your employer about additional requirements for operation of a triple trailer combination.)

Most other sections in this manual have titles to coincide with the GLuHUHQW HQGRUVHPHQWV 5HDG WKH VHFWLRQ V \RX QHHG WR REWDLQ the desired endorsement(s). Endorsement knowledge tests cover not only the material from individual endorsement sections, but also from other sections. Figure 1.2 details which sections of this manual you should study for each particular class of license and for each endorsement.

'09 PD\ ZDLYH DOO FRPPHUFLDO NQRZOHGJH WHVWV (;&(37 WKH hazardous materials knowledge test if you surrender a current valid, or expired for less than one year, CDL from another jurisdiction for an Oregon CDL with the same class and endorsements.

A CLP issued by another state may not be used to waive CDL knowledge tests.

All knowledge tests are closed book. Only testers are allowed in the testing area. During the knowledge test there is no talking, cellphone use, operation of any electronic devices, writing or note taking, or cheating of any kind. If you do not follow the testing rules and guidelines or it is determined that you are cheating, your test will be stopped immediately. You will not be allowed to test again for 90 days.

NOTE: knowledge test results are valid for six months from the date the test is passed. Drivers applying for a CLP must complete all application requirements within those six months to be issued a CLP or they will be required to take and pass the knowledge test(s) again. The hazardous materials and double/triples endorsements cannot be applied to a CLP. Drivers applying for a CDL must complete all application requirements to be issued a CDL with those endorsements within the six month timeframe or they will be required to take and pass the knowledge test(s) again.

1.4.2 – Skills Test

You must hold a CLP for at least 14 days before you may take a CDL skills test. The CLP must be in the same class or higher and have the appropriate endorsements for the vehicle in which you will be taking the skills test.

Beginning on February 7, 2022, you will need to complete entry level driver training before taking a skills test if you are applying to:

‡ 2EWDLQ D &ODVV $ RU &ODVV % &'/ I

- Upgrade an existing Class B CDL to a Class A CDL; or
- Obtain a passenger (P) or school bus (S), endorsement for the ¿UVW WLPH

You will not need to take ELDT if you are issued a CLP before February 7, 2022, and obtain your CDL before your CLP expires. You will not be required to take ELDT if you are applying for a Class A or B CDL and have a military skills test waiver.

You must take entry level driver training from a training provider listed on the Training Provider Registry. Only training providers that are registered with FMCSA through the Training Provider Registry can provide entry level driver training.

What Sections Should You Study?

		License Type			Endorsement				
		Class A	Class B	Class C	Hazardous Materials	Double/ Triple	Tank Vehicles	Passenger	School Bus
Sections to Study	1	X	X	X					
	2	X	X	X		X	X	X	
	3	X	X	X					
	4							X	
	5*	X	X	X		X			
	6	X				X	X		
	7					X			
	8						X		
	9				X		X		
	10								X
	11	X	X	X				X	X
	12	X	X	X				X	X
	13	X	X	X				X	X

*Study section 5 if you plan to operate vehicles equipped with air brakes.

Figure 1.2

There are currently three types of general skills that will be tested: pre-trip vehicle inspection, basic vehicle control and on-road drive test. You must take these tests in the type of vehicle for which \RX ZLVK WR EH OLFHQVHG '09 ZLOO QRW FRQGXFW D VNLOOV WHVW LQ a vehicle with hazardous materials on board, with double/triple trailers, towing a trailer that has no brakes or uses surge brakes, or is transporting any commercial load. A tractor, without trailer, may not be used for any class of test. Appropriate seating must be available for driver and examiner. The vehicle must be equipped with operable seat belts for driver and examiner unless it is a bus without passenger seat belts.

Pre-trip Vehicle Inspection Test. You will be tested to see if you know whether your vehicle is safe to drive. You will be asked to do a pre-trip inspection of your vehicle and explain to the examiner KRZ \RX ZRXOG LQVSHFW YDULRXV FRPSRQHQWV IRU VDIHW\ '09 FDQQRW permit use of a vehicle that has components marked or labeled in any way. An exception exists for those components that have been marked or labeled by the manufacturer. Section 11 of this manual explains the details of the testing process.

Basic Control Skills Test. You will be tested on your skill to control the vehicle. You will be asked to move your vehicle forward, EDFNZDUG DQG WXUQ LW ZLWKLQ D GH¿QHG DUHD 7KHVH DUHDV PD\ EH PDUNHG ZLWK WUDvF ODQHV FRQHV EDUULHUV RU VRPHWKLQJ VLPLODU 7K examiner will tell you how each control test is to be done. Section 12 of this manual provides additional details.

On-road Drive Test. You will be tested on your skill to safely GULYH \RXU YHKLFOH LQ D YDULHW\ RI WUDvF VLWXDWLRQV 7KH VLWXDWLR may include left and right turns, intersections, railroad crossings, curves, up and down grades, single or multi-lane roads, streets, or highways. Section 13 of this manual explains more about this test.

If you are applying for a CDL with a passenger endorsement, the vehicle used on the skills test must qualify as a passenger vehicle. The skills test for a school bus endorsement must be taken in a school bus. If you are applying for a CDL without the air brake restriction, the vehicle used on the skills test must have full air brakes.

If you are a new resident applying for a CDL and you have a valid out-of-state CDL, or one that is expired for less than one year, '09 PD\ ZDLYH WKH VNLOOV WHVW IRU WKH FODVV RI &'/ \RX KHOG LQ the previous state.

Skills Test Appointments

If you need to take the skills tests, you may make an appointment ZLWK '09 E\ FDOOLQJ ,W¶V D JRRG LGHD WR SKRQH D minimum of three weeks in advance of the date you want to take your test(s).

You may also take your skills test through a CDL Third Party Tester. CDL Third Party Testers can often schedule tests more quickly and DW WLPHV RU RQ GD\V QRW DYDLODEOH DW '09 7HVWLQJ FRVWV PD\ EH greater when using a Third Party Tester, however.

&RQWDFW '09 RU YLVLW WKH '09 ZHE VLWH DW www.oregondmv.com for the nearest CDL third party tester.

You must have a CLP for at least 14 days and completed entry level driver training (if applicable) before taking the CDL skills test.

Other Information

If you fail any portion of the CDL Skills Test, you may retake the failed segment and any other required segments as early as the next day. Testing is subject to examiner availability and CDL Third Party Examiners are required to schedule tests at least 48 hours in advance.

All CDL skills tests in Oregon must be conducted in English only.

Oregon will accept the results of a CDL skills test administered by a state or third party examiner in another state, if the driver attended training in that state and was issued an Oregon CLP prior to taking the CDL skills test.

NOTE: CDL skills test results are valid for six months from the date the test is passed. Drivers applying for a CDL must complete all application requirements to be issued a CDL within those six months, or they will need to satisfy any prerequisites (up to and including re-taking/passing knowledge tests and obtaining a new CLP) in order to take and pass the CDL skills test again.

'09 PD\ ZDLYH &'/ VNLOOV WHVWLQJ ZK member, of the military provides evidence of a specialty (MOS, AFSC or Rating) whose principal duty is operation of a commercial motor vehicle. Additional provisions and application details are available at www.oregondmv.com under Commercial Skills Tests RU IURP '09 &XVWRPHU $VVLVWDQFH DW

1.4.3 – Fees

The cost of your original CDL or CLP will vary depending upon WKH QXPEHU RI WHVWV \RX PXVW WDNH you take. In addition, if you fail knowledge or skills test, you need to pay the test fee again each time you take the test. Test fees must be paid prior to taking the test. Please bring a separate payment for your issuance fee. For example, bring one check for your test(s) and one check for your CDL issuance. If you bring one check for ERWK WKH WHVW DQG LVVXDQFH IHH D UHIXQG WKH GLuHUHQFH

A CDL fee schedule may be found online at https://www.oregon.gov/ODOT/DMV/Pages/Fees/CDL.aspx

± 'ULYHU 4XDOL¿FDWLRQ

You may not operate a commercial motor vehicle if you are GLVTXDOL¿HG IRU DQ\ UHDVRQ 6XVSH SULYLOHJHV DUH DSSOLHG FRQVHFXWLY separate incidents.

1.5.1 – Alcohol, Leaving the Scene of an Accident, Commission of a Felony, Driving a CMV While Suspended, and Severe Forms of Human 7UDýFNLQJ

,W LV LOOHJDO WR RSHUDWH D &09 LI \ (BAC) is .04% or more. Oregon's implied consent law means that by driving a motor vehicle you have agreed that you will take a EUHDWK EORRG RU XULQH WHVW ZKHQ DUH DUUHVWHG IRU GULYLQJ XQGHU W

You will lose your commercial driving privileges for at least one \HDU IRU D ¿UVW RuHQVH RI

- Driving a CMV if your blood alcohol concentration is or higher.
- Driving any vehicle if your blood alcohol concentration is 0.08% or higher (beginning January 1, 2023).
- Driving any vehicle under the influence of alcohol cannabis psilocybin, a controlled substance, or an inhalant (intoxicants).
- Entering a diversion program for driving under the influence of intoxicants (beginning January 1, 2023).
- Leaving the scene of an accident while driving any vehicle.
- Committing a felony involving the use of any vehicle.
- Driving a CMV while suspended as a result of prior violations in a CMV

You will lose your commercial driving privileges for at least three years if the offense occurs while you are operating a CMV containing hazardous materials.

A refusal to submit to a blood, breath or urine test when asked by a police officer if you are arrested for driving under the influence of intoxicants (DUII) in any vehicle will also result in loss of your commercial driving privileges for at least years If the offense occurs while operating a CMV containing hazardous material you will lose your commercial driving privileges 5 years.

You will lose your commercial driving privileges for life for a second occurrence of any combination of offenses described above

You will lose your commercial driving privileges for life if you use a any motor vehicle to commit a felony involving controlled substances.

Beginning September 23, 2022, you will lose your commercial driving privileges for life if you use a CMV to commit a felony involving certain severe forms of human trafficking

You will be put out-of-service for 24 hours by a commercial motor vehicle inspector if you have any detectable amount of alcohol under .04%.

A person who holds commercial driving privileges is not eligible for diversion or any other action that prevents conviction for a traffic offense from appearing on his her driving record A person “holds” commercial driving privileges even if the commercial driving privileges are suspended, cancelled or revoked. A person holds commercial driving privileges even the person’s CDL has expired.

Hardship Permits - If your driving privileges are suspended for any reason, you will not be able to get a hardship permit to drive a commercial motor vehicle. If you are eligible to obtain a hardship permit to drive non-commercial vehicles, you will have to surrender your CDL.

– Serious Traffic Offenses

Serious Traffic Offenses are

- Driving any vehicle that is not a commercial motor vehicle while holding commercial driving privileges if the conviction results in the suspension, cancellation, or revocation of your driving privileges:
  - — Speeding by 15 or more miles per hour above a speed limit;
  - — Reckless driving;
  - — Failure to drive within a lane;
  - — Unsafe passing on the left;
  - — Unsafe passing on the right;
  - — Following too closely; or
  - — Violating a traffic control la… fatal accident.
- Driving a commercial motor vehicle while holding commercial driving privileges:
  - — Speeding by 15 or more miles per hour above a speed limit;
  - — Reckless driving;
  - — Failure to drive within a lane;
  - — Unsafe passing on the left;
  - — Unsafe passing on the right;
  - — Following too closely;
  - — Violating a traffic control la… fatal accident;
  - — Driving while using a mobile electronic device (text messages or phone use);
  - — Driving without a proper license classification or endorsement;
  - — Driving without driving privileges;
  - — Failing to carry or present v… commercial driving privileges.

You will lose your CDL and/or CLP:

- For at least days if you have c… offenses within a three year per…
- For at least days for three s… a three-year period.

1.5.3 – Violation of Out-of-Service Orders

You will lose your commercial driving Privileges:

- For days if you committed your… of-service order or notice and you were neither transporting hazardous materials nor operating a vehicle designed to transport 16 or more passengers including the driver.
- For one year if you committed yo… of-service order or notice and you were transporting hazardous materials or operating a vehicle designed to transport 16 or more passengers including the driver.
- For three years if you have committed a second or subsequent violation of an out-of-service order or notice in a ten-year period and you were neither transporting hazardous materials nor operating a vehicle designed to transport 16 or more passengers including the driver.
- For five years if you have committ… violation of an out-of-service order or notice in a ten-year period and you were transporting hazardous materials or operating a vehicle designed to transport 16 or more passenger including the driver.

It is a class A misdemeanor to violate an out-of-service order. In addition DMV will impose a civil p… for a first offense and for… offense if you violate an out of serv… will be imposed up to on an… allows or requires violation.

These rules improve highway safety for you and for all highway users.

1.5.4 – Railroad-highway Grade Crossing Violations

These violations include violation of a federal, state or local law RU UHJXODWLRQ SHUWDLQLQJ WR RQH RI WKH IROORZLQJ VL[RuHQVHV DW UDLOURDG KLJKZD\ JUDGH FURVVLQJ LQ D &09

- For drivers who are not required to always stop, failing to stop before reaching the crossing if the tracks are not clear.
- For drivers who are not required to always stop, failing to slow down and check that the tracks are clear of an approaching train.
- For drivers who are always required to stop, failing to stop before driving onto the crossing.
- For all drivers, failing to have sufficient space to drive completely through the crossing without stopping.
- ‡)RU DOO GULYHUV IDLOLQJ WR REH GLUHFWLRQV RI DQ HQIRUFHPHQW R
- For all drivers, failing to negotiate a crossing because of LQVXvFLHQW XQGHUFDUULDJH FOHDUDQFH

You will lose your commercial driving privileges:

- ‡)RU GD\V IRU \RXU ¿UVW YLRODWLRQ
- For 120 days for your second violation within any three-year period.
- For one year for your third violation within any three-year period.

1.5.5 – Hazardous Materials Endorsement Background &KHFN DQG 'LVTXDOL¿FDWLRQV

If you require a hazardous materials endorsement you will be required WR VXEPLW \RXU ¿QJHUSULQWV DQG EH VXEMHFW WR D EDFNJURXQG FKHFN

You will be denied or you will lose your hazardous materials endorsement if you:

- Renounce your United States citizenship.
- Are wanted or under indictment for certain felonies.
- Have a conviction in military or civilian court for certain felonies.
- Have been adjudicated as a mental defective or committed to a mental institution.
- Are considered to pose a security threat as determined by the Transportation Security Administration.
- Fail to obtain a background check from TSA, as required. '09 ZLOO VHQG \RX D QRWLFH SULRU background check. Checks are good for no more than 5 years.

1.6 – Other Commercial Motor Vehicle Rules

The Oregon Department of Transportation (ODOT), Commerce and Compliance Division (CCD) has adopted the Federal Motor Carrier Safety Regulations. Some of these regulations are summarized below. For detailed information, you should check with your QHDUHVW '27 RvFH DQG RU IDPLOLDUL]H \RXUVHOI ZLWK &)5 3DUWV 382, 383, 385, and 390-399.

± 'ULYHU 4XDOL¿FDWLRQV

7R PHHW PLQLPXP &09 GULYHU TXDOL¿F

- ‡%H DW OHDVW \HDUV ROG WR RSH least 21 years old to operate in interstate commerce. (In some cases, you may be operating a vehicle in interstate commerce even if your vehicle does not leave the state. When in doubt, check with your employer or ODOT CCD at 503-378-6963.
- Speak, read and write English well enough to understand WUDvF VLJQV DQG VLJQDOV LQ (QJOL to complete reports and records.
- Be able to operate the vehicle safely.
- Be able to properly locate, distribute and secure cargo on the vehicle.
- ‡3DVV D SK\VLFDO H[DPLQDWLRQ and, if required, a valid medical waiver or exemption.
- Have a valid CDL or CLP for the class and type of vehicle you operate.
- Pass a road test given by your employer.
- Fill out a detailed job application to include a report of all WUDvF YLRODWLRQV
- Meet controlled substance and alcohol testing requirement.

1.6.2 – Annual Report to Employer

You may be required to furnish your employer, at least once every PRQWKV D OLVW RI DOO WKH FRQYLF than parking violations) you have received throughout the previous PRQWK SHULRG 7KLV OLVW ZLOO EHF

1.6.3 – Physical Examination

To qualify for a CDL or CLP you must undergo a Department of Transportation (DOT) medical examination performed in accordance with CFR 49 §391.41 and CFR 49 §391.43.

The medical examination may only be performed by a Medical ([DPLQHU OLVWHG RQ WKH 1DWLRQDO Examiners. 49 CFR, Part 390, Subpart D describes the requirements to be listed in the National Registry. Additional information about the National Registry is available at https://www.fmcsa.dot.gov/ UHJXODWLRQV QDWLRQDO UHJLVWU\ QD examiners

The examiner will provide you with a Medical Examiner's &HUWL¿FDWH <RX PXVW VXEPLW D FRS &HUWL¿FDWH WR '09 EHIRUH RULJLQDO PXVW PDLQWDLQ D YDOLG XQH[SLUHG RQ ¿OH ZLWK '09 7KH FRS\ \RX VHQG W and legible.

Oregon CDL and CLP holders who have submitted a current medical H[DPLQHU¶V FHUWL¿FDWH WR '09 DUH WKHLU SHUVRQ WKH PHGLFDO H[DPLQHU than 15 days after the date it was issued as valid proof of medical FHUWL¿FDWLRQ 7KLV DOORZV WLPH IRU information to be entered to the driver record.

7KH PHGLFDO FHUWL¿FDWH LV YDOLG I \RX KROG D &'/ RU &/3 '09 ZLOO PRQLW FHUWL¿FDWH ,I LW H[SLUHV \RX ZLOO

D QHZ FHUWL¿FDWH WR '09 RU VXUUH
must cancel your CDL or CLP if you do neither.

6RPH SK\VLFDO FRQGLWLRQV ZLOO GLVTXDOLI\ \RX IURP GULYLQJ D &09 DV GH¿QHG LQ)0&65 $ PHGLFDO ZDLYHU PD\ EH LVVXHG IRU some otherwise disqualifying conditions, but a medical waiver issued E\ '09 LV YDOLG IRU QR PRUH WKDQ WZR \HDUV DQG DSSOLHV RQO\ WR GULYHUV RSHUDWLQJ D &09 LQ LQWUDVWDWH FRPPHUFH $Q DSSOLFDWLRQ IR D PHGLFDO ZDLYHU LV DYDLODEOH IURP '09 E\ FDOOLQJ

$ PHGLFDO ZDLYHU RU H[HPSWLRQ WR RSHUDWH D &09 LQ QRQ H[FHSWHG interstate commerce may be issued by the U.S. DOT, Federal Motor Carrier Safety Administration (FMCSA). If you believe you qualify for a federal waiver or exemption, call 503-399-5775.

,I WKH IHGHUDO PRWRU FDUULHU VDIHW\ DGPLQLVWUDWLRQ RU '09 KDV issued a medical exemption letter or skill performance evaluation FHUWL¿FDWH WKH GULYHU PXVW KDYH WKH FXUUHQW DQG YDOLG GRFXPHQW in physical possession.

1.6.4 – Hours of Service

There are rules on how many hours commercial drivers can drive. 7KHUH DUH GLuHUHQW UXOHV GHSHQGLQJ RQ ZKHWKHU \RX DUH RSHUDWLQJ a vehicle in interstate commerce or intrastate commerce only and whether the vehicle is transporting property or passengers. Consult 49 CFR, Part 395 for information about interstate hours-of-service limits and Oregon Administrative Rule 740-100-0010 (2)(g) through (j) for information about intrastate hours-of-service limits. Both of these regulations are discussed in detail https://www.oregon.gov/odot/MCT/Pages/TruckSafety.aspx

1.6.5 – Other Rules

7KHUH DUH RWKHU IHGHUDO DQG VWDWH UXOHV WKDW DuHFW GULYHUV RSHUDWLQJ &09¶V LQ DOO VWDWHV $PRQJ WKHP DUH

- You cannot have more than one license. If you break this rule, D FRXUW PD\ ¿QH \RX XS WR RU SXW \RX LQ MDLO DQG NHHS your home state license and return any others.
- You must notify your employer within 30 days of conviction IRU DQ\ WUDvF YLRODWLRQV H[FHSW SDUNLQJ 7KLV LV WUXH QR PDWWHU what type of vehicle you were driving.
- You must notify your employer & your license is suspended, UHYRNHG RU FDQFHOHG RU LI \RX D
- You must give your employer information on all driving jobs you have held for the past 10 years. You must do this when you apply for a commercial driving job.
- No one can operate a commercial motor vehicle without a CDL RU &/3 $ FRXUW PD\ ¿QH \RX RU SX this rule.
- If you have a hazardous materials endorsement you must notify and surrender your hazardous materials endorsement to the state that issued your CDL within 24 hours of any conviction or indictment in any jurisdiction, civilian or military, for, or found not guilty by reason of insanity of a disqualifying crime listed in 49 CFR 1572.103; if you are adjudicated as a mental GHIHFWLYH RU FRPPLWWHG WR D PH 49 CFR 1572.109; or if you renounce your U. S. citizenship.
- Your employer may not let you operate a commercial motor vehicle if you have more than one license or if your commercial driving privilege is suspended, cancelled or revoked. A court PD\ ¿QH WKH HPSOR\HU RU SXW KLP rule.
- All states are connected to one computerized system to share information about commercial drivers. All states check drivers' records to be sure they do not have more than one CDL.
- FMCSA rules and Oregon statutes do not permit courts to RuHU GLYHUVLRQ IRU WUDvF RuHQV GULYLQJ SULYLOHJHV DW WKH WLPH DELOLW\ WR SOHDG JXLOW\ WR D ¿U are considered to hold commercial driving privileges even if your privileges are suspended, canceled, revoked or expired.

‡<RX PD\ QRW RSHUDWH D &09 ZLWK D

- You must be properly restrained by a safety belt at all times ZKLOH RSHUDWLQJ D &09
- With some exceptions, Oregon law prohibits idling the primary HQJLQH RI D &09 IRU PRUH WKDQ ¿YH 60 minute period. See Oregon Revised Statute 825.605 for additional details.

Section 2

Driving Safely

This Section Covers

‡ 9HKLFOH ,QVSHFWLRQ
‡ %DVLF &RQWURO RI <RXU 9HKLFOH
- Shifting Gears
- Seeing
- Communicating
- Space Management
- Controlling Your Speed
- Seeing Hazards
- Distracted Driving
- Aggressive Drivers/Road Rage
- Night Driving
- Driving in Fog
- Winter Driving
- Hot Weather Driving
- Railroad-highway Crossings
- Mountain Driving
- Driving Emergencies
- Antilock Braking Systems
- Skid Control and Recovery
- Accident Procedures
- Fires
- Alcohol, Other Drugs, and Driving
- Staying Alert and Fit to Drive
- Hazardous Materials Rules

This section contains knowledge and safe driving information that all commercial drivers should know. You must pass a test on WKLV LQIRUPDWLRQ WR JHW D &'/ 7KLV VHFWLRQ GRHV QRW KDYH VSHFL¿F information on air brakes, combination vehicles, doubles, passenger vehicles, or school buses. You must read other sections of this manual to learn these subjects. This section does have basic information on hazardous materials (HAZMAT) that all drivers should know. If you need a HAZMAT endorsement, you should study Section 9.

2.1 – Vehicle Inspection

2.1.1 – Why Inspect

Safety is the most important reason you inspect your vehicle; safety for yourself and for other road users.

A vehicle defect found during an inspection could save you problems later. You could have a breakdown on the road that will cost time and dollars, or even worse, a crash caused by the defect.

Federal and state laws require that drivers inspect their vehicles. Federal and state inspectors also may inspect your vehicles. If they judge the vehicle to be unsafe, they will put it "out of service" XQWLO LW LV ¿[HG

This section does not cover the details of the CDL pre-trip vehicle inspection test. Section 11 of this manual tells you what to inspect and how to inspect it.

2.1.2 – Types of Vehicle Inspection

Pre-trip Inspection. $ SUH WULS LQVSHFWLRQ problems that could cause a crash or breakdown.

During a Trip. For safety you should:

- Watch gauges for signs of trouble.
- Use your senses to check for problems (look, listen, smell, feel).
- Check critical items when you stop:
  - — Tires, wheels and rims.
  - — Brakes.
  - ² /LJKWV DQG UHÀHFWRUV
  - — Brake and electrical connections to trailer.
  - — Trailer coupling devices.
  - — Cargo securement devices.

After-trip Inspection and Report. You should do an after-trip inspection at the end of the trip, day, or tour of duty on each vehicle \RX RSHUDWHG ,W PD\ LQFOXGH ¿OOLQ OLVWLQJ DQ\ SUREOHPV \RX ¿QG 7KH L carrier know when the vehicle needs repairs.

2.1.3 – What to Look For

Tire Problems

- Too much or too little air pressure.
- Bad wear. You need at least 4/32-inch tread depth in every major groove on front tires. You need 2/32 inch on other tires. No fabric should show through the tread or sidewall.
- Cuts or other damage.
- Tread separation.
- Dual tires that come in contact with each other or parts of the vehicle.
- Mismatched sizes.
- Radial and bias-ply tires used together.
- Cut or cracked valve stems.
- Regrooved, recapped, or retreaded tires on the front wheels of a bus. These are prohibited.

Wheel and Rim Problems

- Damaged rims.
- Rust around wheel nuts may mean the nuts are loose--check tightness. After a tire has been changed, stop a short while later and re-check tightness of nuts.
- Missing clamps, spacers, studs, or lugs means danger.

- Mismatched, bent, or cracked lock rings are dangerous.
- Wheels or rims that have had welding repairs are not safe.

Bad Brake Drums or Shoes

- Cracked drums.

‡6KRHV RU SDGV ZLWK RLO JUHDV

- Shoes worn dangerously thin, missing, or broken.

Steering System Defects

- Missing nuts, bolts, cotter keys, or other parts.
- Bent, loose, or broken parts, such as steering column, steeri gear box, or tie rods.

‡,I SRZHU VWHHULQJ HTXLSSHG F level; check for leaks.

- Steering wheel play of more than 10 degrees (approximate 2 inches movement at the rim of a 20-inch steering wheel) ca make it hard to steer.

Figure 2.1

Figure 2.1 illustrates a typical steering system.

Suspension System Defects. The suspension system holds up the vehicle and its load. It keeps the axles in place. Therefore, broke suspension parts can be extremely dangerous. Look for:

- Spring hangers that allow movement of axle from prope position. See Figure 2.2.
- Cracked or broken spring hangers.
- Missing or broken leaves in any leaf spring. (Your vehicle may be placed out-of-service if ¼ or more of the leaves i any spring assembly are broken or if any leaf is missing o separated.) See Figure 2.3.
- Broken leaves in a multi-leaf spring or leaves that have shifted so they might hit a tire or other part.
- Leaking shock absorbers.
- Torque rod or arm, u-bolts, spring hangers, or other axle positioning parts that are cracked, damaged, or missing.

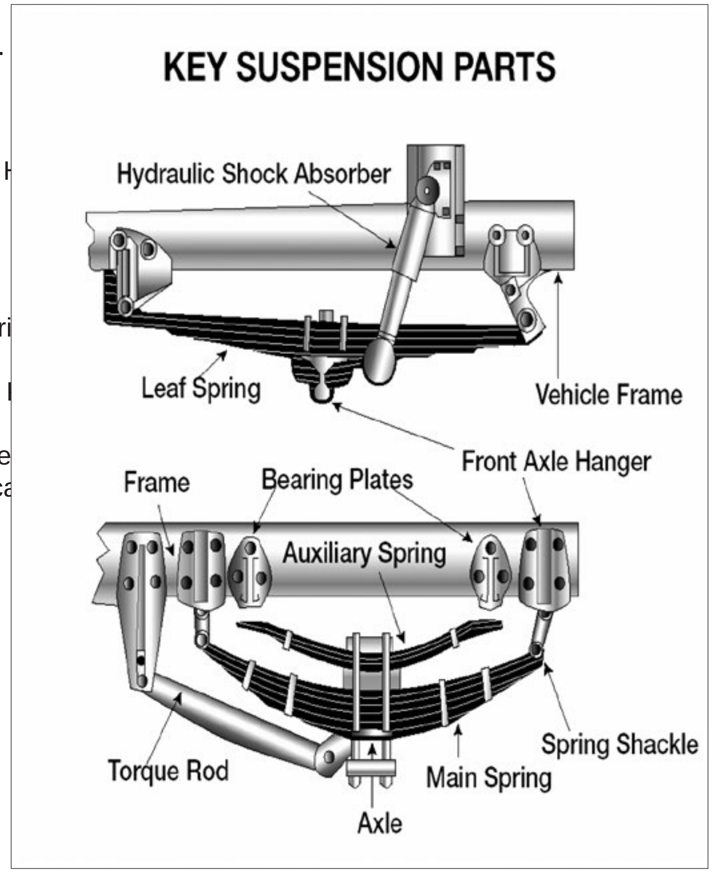


Figure 2.2

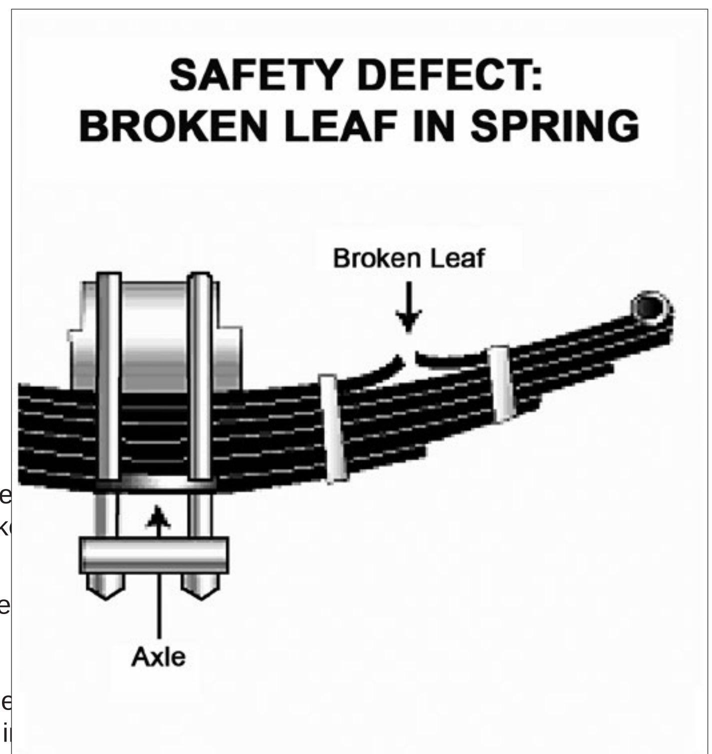


Figure 2.3

- Air suspension systems that are damaged and/or leaking. See Figure 2.4.
- Any loose, cracked, broken, or missing frame members.

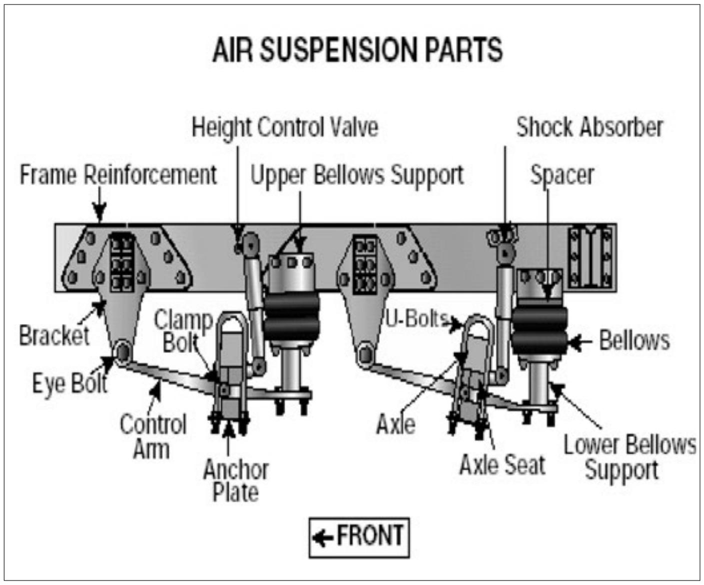


Figure 2.4

Exhaust System Defects. A broken exhaust system can let poison fumes into the cab or sleeper berth. Look for:

‡/RRVH EURNHQ RU PLVVLQJ H[KDXVW SLSHV PX[illegible]HUV WDLOSLSHV or vertical stacks.

- Loose, broken, or missing mounting brackets, clamps, bolts, or nuts.
- Exhaust system parts rubbing against fuel system parts, tires, or other moving parts of vehicle.
- Exhaust system parts that are leaking.

Emergency Equipment. 9HKLFOHV PXVW EH HTXLSSHG ZLWK HPHUJHQF\ equipment. Look for:

- Fire extinguisher(s).
- Spare electrical fuses (unless equipped with circuit breakers).
- Warning devices for parked vehicles (for example, three UHÀHFWLYH ZDUQLQJ WULDQJOHV

Cargo (Trucks). You must make sure the truck is not overloaded and the cargo is balanced and secured before each trip. If the cargo contains hazardous materials, you must inspect for proper papers and placarding.

2.1.4 – CDL Pre-trip Vehicle Inspection Test

In order to obtain a CDL, you will be required to pass a pre-trip vehicle inspection test. The test assesses your ability to determine whether your vehicle is safe to drive. You will be asked to explain to the examiner how you would inspect various components. Section 11 of this manual tells you what to inspect and how to inspect it but the following seven-step inspection method should be useful.

2.1.5 – Seven-step Inspection Method

Method of Inspection. You should do a pre-trip inspection the same way each time so you will learn all the steps and be less likely to forget something.

Approaching the Vehicle. Notice general condition. Look for damage or vehicle leaning to one side. Look under the vehicle for fresh oil, coolant, grease, or fuel leaks. Check the area around the vehicle for hazards to vehicle movement (people, other vehicles, objects, low-hanging wires, limbs, etc.).

Vehicle Inspection Guide

Step 1: Vehicle Overview

Review Last Vehicle Inspection Report. Drivers may have to make a vehicle inspection report in writing each day. The motor FDUULHU PXVW UHSDLU DQ\ LWHPV LQ certify on the report that repairs were made or were unnecessary. <RX PXVW VLJQ WKH UHSRUW RQO\ LI G to be repaired or not needed to be repaired.

Step 2: Check Engine Compartment

Check That the Parking Brakes Are On and/or Wheels Chocked. You may have to raise the hood, tilt the cab (secure loose things so they don't fall and break something), or open the engine compartment door. Check the following:

- Engine oil level.
- Coolant level in radiator; condition of hoses.

‡3RZHU VWHHULQJ ÀXLG OHYHO KRVH
‡:LQGVKLHOG ZDVKHU ÀXLG OHYHO
‡%DWWHU\ ÀXLG OHYHO FRQQHFWLRQ be located elsewhere).
‡$XWRPDWLF WUDQVPLVVLRQ ÀXLG OH running).

- Check belts for tightness and excessive wear (alternator, water pump, air compressor)--learn how much "give" the belts should have when adjusted right, and check each one.
- Leaks on the ground and in the engine compartment (fuel, FRRODQW RLO SRZHU VWHHULQJ ÀXL
- Cracked, worn electrical wiring insulation.

Lower and secure hood, cab, or engine compartment door.

Step 3: Start Engine and Inspect Inside the Cab

Get In and Start Engine

- Make sure parking brake is on.
- Put gearshift in neutral (or "park" if automatic).
- Start engine; listen for unusual noises.

Look at the Gauges

- Oil pressure. Should come up to normal within seconds after engine is started. See Figure 2.5
- Air pressure. Pressure should build from 50 to 90 psi within 3 minutes.
- Ammeter and/or voltmeter. Should be in normal range(s).
- Coolant temperature. Should begin gradual rise to normal operating range.
- Engine oil temperature. Should begin gradual rise to normal operating range.
- Warning lights and buzzers. Oil, coolant, charging circuit warning, and antilock brake system lights should go out right away.

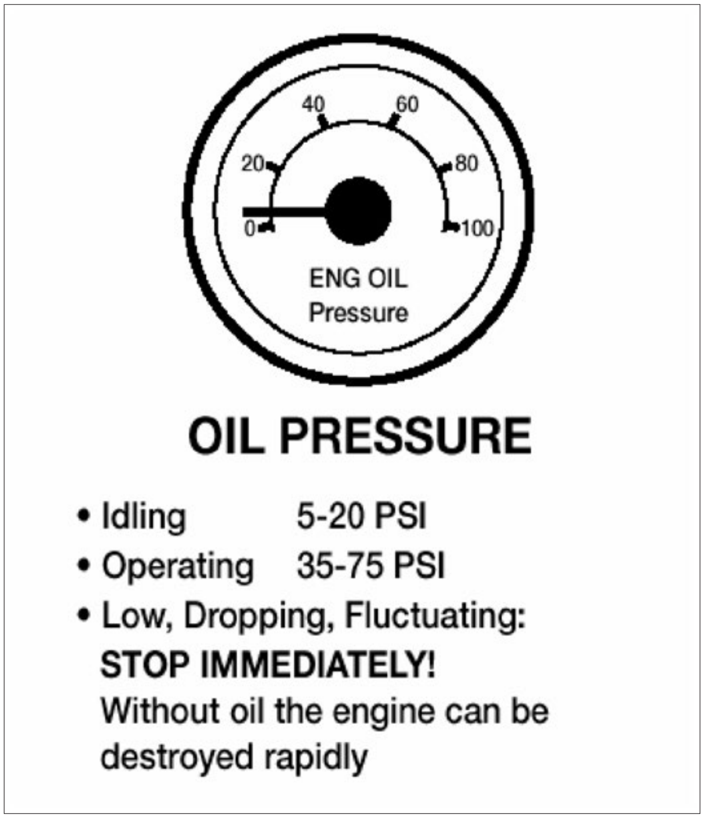


Figure 2.5

Check Condition of Controls. Check all of the following for looseness, sticking, damage, or improper setting:

- Steering wheel.
- Clutch.
- Accelerator ("gas pedal").
- Brake controls.
  - — Foot brake.
  - — Trailer brake (if vehicle has one).
  - — Parking brake.
  - — Retarder controls (if vehicle has them).
- Transmission controls.

‡,QWHUD[OH GLuHUHQWLDO ORFN LI YHKLFOH KDV RQH

- Horn(s).
- Windshield wiper/washer.
- Lights.
  - — Headlights.
  - — Dimmer switch.
  - — Turn signal.
  - ²)RXU ZD\ ÀDVKHUV
  - ² 3DUNLQJ FOHDUDQFH LGHQWL¿FDWLRQ PDUNHU VZLWFK HV

Check Mirrors and Windshield. Inspect mirrors and windshield for cracks, dirt, illegal stickers, or other obstructions to seeing clearly. Clean and adjust as necessary.

Check Emergency Equipment

- Check for safety equipment:
  - — Spare electrical fuses (unless vehicle has circuit breakers).
  - ² 7KUHH UHG UHÀHFWLYH WULDQJOHV
  - ² 3URSHUO\ FKDUJHG DQG UDWHG ¿UH H[WLQJXLVKHU
- Check for optional items such as:
  - — Chains (where winter conditions require).
  - — Tire changing equipment.
- List of emergency phone numbers.
- Accident reporting kit (packet).

Check Safety Belt. Check that the safety belt is securely mounted, adjusts, latches properly and is not ripped or frayed.

6WHS 7XUQ 2u (QJLQH DQG &KHFN /LJ

0DNH VXUH WKH SDUNLQJ EUDNH LV VH the key with you to ensure no one can start or move the vehicle while you are performing your walk-around inspection. Turn on KHDGOLJKWV ORZ EHDPV DQG IRXU ZD out of the vehicle.

Step 5: Do Walk-around Inspection

- Go to front of vehicle and check that low beams are on and ERWK RI WKH IRXU ZD\ ÀDVKHUV DUH
- Push dimmer switch and check that high beams work. (The key may need to be in the "ON" position to check high beam operation.)

‡7XUQ Ru KHDGOLJKWV DQG IRXU ZD\
‡7XUQ RQ SDUNLQJ FOHDUDQFH VLG lights.

- Turn on right turn signal, and start walk-around inspection.

General

- Walk around and inspect.

‡&OHDQ DOO OLJKWV UHÀHFWRUV D

Left Front Side

- Driver's door glass should be clean.
- Door latches or locks should work properly.
- Left front wheel.
  - — Condition of wheel and rim--missing, bent, broken studs, clamps, lugs, or any signs of misalignment.
  - ² &RQGLWLRQ RI WLUHV SURSHUO\ OK, no serious cuts, bulges, or tread wear.
  - — Use wrench to test rust-streaked lug nuts, indicating looseness.
  - — Hub oil level OK, no leaks.
- Left front suspension.
  - — Condition of spring, spring hangers, shackles, u-bolts.
  - — Shock absorber condition.
- Left front brake.
  - — Condition of brake drum or disc.
  - — Condition of hoses.

Front

- Condition of front axle.
- Condition of steering system.
  - — No loose, worn, bent, damaged or missing parts.
  - — Must grab steering mechanism to test for looseness.
- Condition of windshield.
  - — Check for damage and clean if dirty.
  - — Check windshield wiper arms for proper spring tension.
  - — Check wiper blades for damage, "stiff" rubber, and securement.

‡/LJKWV DQG UHÀHFWRUV

— Parking, clearance, and identification lights clean, operating, and proper color (amber at front).
² 5HÀHFWRUV FOHDQ DQG SURSHU FRORU DPEHU DW IURQW
— Right front turn signal light clean, operating, and proper color (amber on signals facing forward).

Right Side

- Right front: check all items as done on left front.
- Primary and secondary safety cab locks engaged (if cab-over-engine design).
- Right fuel tank(s).
  - — Securely mounted, not damaged, or leaking.
  - — Fuel crossover line secure.
  - — Tank(s) contain enough fuel.
  - — Cap(s) on and secure.
- Condition of visible parts.
  - — Rear of engine--not leaking.
  - — Transmission--not leaking.
  - — Exhaust system--secure, not leaking, not touching wires, fuel, or air lines.
  - — Frame and cross members--no bends or cracks.
  - — Air lines and electrical wiring--secured against snagging, rubbing, wearing.
  - — Spare tire carrier or rack not damaged (if so equipped).
  - — Spare tire and/or wheel securely mounted in rack.
  - — Spare tire and wheel adequate (proper size, properly LQÀDWHG
- Cargo securement (trucks and trailers).
  - — Cargo properly blocked, braced, tied, chained, etc.
  - — Headerboard secure (if equipped).
  - — Side boards and stakes are strong enough, free of damage, and properly set in place (if so equipped).
  - — Canvas or tarp (if required) properly secured to prevent tearing, billowing, or blocking of mirrors.
  - ² ,I RYHUVL]H DOO UHTXLUHG VLJQV safely and properly mounted and all required permits in driver's possession.
  - — Curbside cargo compartment doors in good condition, securely closed, latched/locked and required security seals in place.

Right Rear

- Condition of wheels and rims--no missing, bent, or broken spacers, studs, clamps, or lugs.
- ‡ &RQGLWLRQ RI WLUHV SURSHUO\ LQÀDWHG YDOYH VWHPV DQG FDSV OK, no serious cuts, bulges, tread wear, tires not rubbing each other, and nothing stuck between them.
- Tires same type, e.g., not mixed radial and bias types.
- Tires evenly matched (same sizes).
- Wheel bearing/seals not leaking.
- Suspension.
  - — Condition of spring(s), spring hangers, shackles, and u-bolts.
  - — Axle secure.
  - — Powered axle(s) not leaking lube (gear oil).
  - — Condition of torque rods, radius arms, and bushings.
  - — Condition of shock absorber(s).
  - — If retractable axle equipped, check condition of lift mechanism. If air powered, check for leaks.
  - — Condition of air ride components.
- Brakes.
  - — Brake adjustment (improper adjustment is one of the most common reasons for being placed out-of-service).
  - — Condition of brake drum(s) or discs.
  - — Condition of hoses--look for any wear due to rubbing.

‡ /LJKWV DQG UHÀHFWRUV
- — Side-marker lights clean, operating, and proper color (red at rear, others amber).
- ² 6LGH PDUNHU UHÀHFWRUV FOHDQ others amber).

Rear

‡ /LJKWV DQG UHÀHFWRUV
- ² 5HDU FOHDUDQFH DQG LGHQWL¿FD and proper color (red at rear).
- ² 5HÀHFWRUV FOHDQ DQG SURSHU F
- — Tail lights clean, operating, and proper color (red at rear).
- — Right rear turn signal operating, and proper color (red or amber at rear).

- License plate(s) present, clean, and secured.
- Splash guards present, not damaged, properly fastened, not dragging on ground, or rubbing tires.
- Cargo secure (trucks and trailers).
- Cargo properly blocked, braced, tied, chained, etc.
- Tail boards up and properly secured.
- End gates free of damage, properly secured in stake sockets.
- Canvas or tarp (if required) properly secured to prevent tearing, billowing, or blocking of either the rearview mirrors or rear lights.
- If over-length, or over-width, make sure all signs and/or ÀDJV ODPSV DQG UHÀHFWRUV DGGLWLRQDO OLJKWV ÀDJV DUH VDI all required permits are in driver's possession.
- Rear doors securely closed, latched/locked.

Left Side

- Check all items as done on right side, plus:
  - — Battery(ies) (if not mounted in engine compartment).
  - — Battery box(es) securely mounted to vehicle.
  - — Box has secure cover.
  - — Battery(ies) secured against movement.
  - — Battery(ies) not broken or leaking.
  - — Fluid in battery(ies) at proper level (except maintenance-free type).
  - — Cell caps present and securely tightened (except maintenance-free type).
  - ² 9HQWV LQ FHOO FDSV IUHH RI maintenance-free type).

Step 6: Check Signal Lights

*HW ,Q DQG 7XUQ 2u /LJKWV

‡ 7XUQ Ru DOO OLJKWV
- Turn on stop lights (apply trailer hand brake or have a helper put on the brake pedal).
- Turn on left turn signal lights.

Get Out and Check Lights

- Left front turn signal light clean, operating and proper color (amber on signals facing the front).
- Left rear turn signal light and both stop lights clean, operating, and proper color (red or amber).

Get In Vehicle

‡7XUQ Ru OLJKWV QRW QHHGHG IRU GULYLQJ
- Check for all required papers, trip manifests, permits, etc.
- Secure all loose articles in cab (they might interfere with operation of the controls or hit you in a crash).
- Start the engine.

Step 7: Start the Engine and Check

Test for Hydraulic Leaks. If the vehicle has hydraulic brakes, pump WKH EUDNH SHGDO WKUHH WLPHV 7KHQ DSSO\ ¿UP SUHVVXUH WR WKH SHGD DQG KROG IRU ¿YH VHFRQGV 7KH SHGDO VKRXOG QRW PRYH ,I LW GRHV WKHUH PD\ EH D OHDN RU RWKHU SUREOHP *HW LW ¿[HG EHIRUH GULYLQJ If the vehicle has air brakes, do the checks described in Sections 5 and 6 of this manual.

Brake System

Test Parking Brake

- Fasten seat belt.
- Allow vehicle to move forward slowly.
- Apply parking brake.

‡,I LW GRHVQ¶W VWRS YHKLFOH LW LV IDXOW\ JHW LW ¿[HG

Test Service Brake Stopping Action

‡*R DERXW ¿YH PLOHV SHU KRXU
‡3XVK EUDNH SHGDO ¿UPO\
- “Pulling” to one side or the other can mean brake trouble.
- Any unusual brake pedal “feel” or delayed stopping action can mean trouble.

,I \RX ¿QG DQ\WKLQJ XQVDIH GXULQJ WKH SUH WULS LQVSHFWLRQ JHW LW ¿[HG)HGHUDO DQG VWDWH ODZV IRUELG RSHUDWLQJ DQ XQVDIH YHKLFOH

2.1.6 – Inspection During a Trip

Check Vehicle Operation Regularly

You should check:

- Instruments.
- Air pressure gauge (if you have air brakes).
- Temperature gauges.
- Pressure gauges.
- Ammeter/voltmeter.
- Mirrors.
- Tires.
- Cargo, cargo covers.

If you see, hear, smell, or feel anything that might mean trouble, check it out.

Safety Inspection. Drivers of trucks and truck tractors, when transporting cargo, must inspect the securement of the cargo within WKH ¿UVW PLOHV RI D WULS DQG HYHU\ PLOHV RU KRXUV ZKLFKHYHU FRPHV ¿UVW WKHUHDIWHU

2.1.7 – After-trip Inspection and Report

You may have to make a written report each day on the condition RI WKH YHKLFOH V \RX GURYH 5HSRU possibly leading to mechanical breakdown.

The vehicle inspection report tells the motor carrier about problems WKDW PD\ QHHG ¿[LQJ .HHS D FRS\ RI one day. That way, the next driver can learn about any problems you have found.

SUBSECTION 2.1

TEST YOUR KNOWLEDGE

1. What is the most important reason for doing a vehicle inspection?
2. What things should you check during a trip?
3. Name some key steering system parts.
4. Name some suspension system defects.
5. What three kinds of emergency equipment must you have?
6. What is the minimum tread depth for front tires? For other tires?
7. Name some things you should check on the front of your vehicle during the walk-around inspection.
8. What should wheel bearing seals be checked for?

+RZ PDQ\ UHÀHFWLYH WULDQJ

10. How do you test hydraulic brakes for leaks?
11. Why put the starter switch key in your pocket during the pre-trip inspection?

These questions may be on your test. If you can’t answer them all, re-read subsection 2.1.

2.2 – Basic Control of Your Vehicle

To drive a vehicle safely, you must be able to control its speed and direction. Safe operation of a commercial vehicle requires skill in:

- Accelerating.
- Steering.
- Stopping.
- Backing safely.

Fasten your seatbelt when on the road. Apply the parking brake when you leave your vehicle.

2.2.1 – Accelerating

Oregon law requires many commercial motor vehicles to be equipped with forward crossview mirrors or that drivers visually inspect the intended path of the vehicle before reentering the vehicle. Ensure your path is free of persons and objects before moving the vehicle.

Don’t roll back when you start. You may hit someone behind you. If you have a manual transmission vehicle, partly engage the clutch EHIRUH \RX WDNH \RXU ULJKW IRRW Ru brake whenever necessary to keep from rolling back. Release the parking brake only when you have applied enough engine power to keep from rolling back. On a tractor-trailer equipped with a trailer brake hand valve, the hand valve can be applied to keep from rolling back.

Speed up smoothly and gradually so the vehicle does not jerk. Rough acceleration can cause mechanical damage. When pulling a trailer, rough acceleration can damage the coupling.

Speed up very gradually when traction is poor, as in rain or snow. If you use too much power, the drive wheels may spin. You could ORVH FRQWURO ,I WKH GULYH ZKHHOV EHJLQ WR VSLQ WDNH \RXU IRRW R the accelerator.

2.2.2 – Steering

+ROG WKH VWHHULQJ ZKHHO ¿UPO\ ZLWK ERWK KDQGV <RXU KDQGV VKRXOG be on opposite sides of the wheel. If you hit a curb or a pothole (chuckhole), the wheel could pull away from your hands unless \RX KDYH D ¿UP KROG

2.2.3 – Stopping

Push the brake pedal down gradually. The amount of brake pressure you need to stop the vehicle will depend on the speed of the vehicle and how quickly you need to stop. Control the pressure so the vehicle comes to a smooth, safe stop. If you have a manual transmission, push the clutch in when the engine is close to idle.

2.2.4 – Backing Safely

Because you cannot see everything behind your vehicle, backing is always dangerous. Avoid backing whenever you can. When you park, try to park so you will be able to pull forward when you leave. When you have to back, here are a few simple safety rules:

‡ 7XUQ \RXU ZD\ ÀDVKHUV RQ
- Honk your horn.
- Start in the proper position.
- Look at your path.
- Use mirrors on both sides.
- Back slowly.
- Back and turn toward the driver's side whenever possible.
- Use a helper whenever possible.
- These rules are discussed in turn below.

Start in the Proper Position. Put the vehicle in the best position to allow you to back safely. This position will depend on the type of backing to be done.

Look at Your Path. Look at your line of travel before you begin. Get out and walk around the vehicle. Check your clearance to the sides and overhead, in and near the path your vehicle will take.

Use Mirrors on Both Sides. Check the outside mirrors on both sides frequently. Get out of the vehicle and check your position and path if you are unsure.

Back Slowly. Always back as slowly as possible. Use the lowest reverse gear. That way you can more easily correct any steering errors. You also can stop quickly if necessary.

Back and Turn Toward the Driver's Side. Back to the driver's side so you can see better. Backing toward the right side is very dangerous because you can't see as well. If you back and turn toward the driver's side, you can watch the rear of your vehicle by looking out the side window. Use driver-side backing--even if it means going around the block to put your vehicle in this position. The added safety is worth it.

Use a Helper. Use a helper when you can. There are blind spots you can't see. That's why a helper is important. The helper should stand near the back of your vehicle where you can see the helper. Before you begin backing, work out a set of hand signals that you both understand. Agree on a signal for "stop."

2.3 – Shifting Gears

Correct shifting of gears is important. If you can't get your vehicle into the right gear while driving, you will have less control.

2.3.1 – Manual Transmissions

Basic Method for Shifting Up. Most heavy vehicles with manual transmissions require double clutching to change gears. This is the basic method:

- Release accelerator, push in clutch and shift to neutral at the same time.
- Release clutch.
- Let engine and gears slow down to the rpm required for the next gear (this takes practice).
- Push in clutch and shift to the higher gear at the same time.
- Release clutch and press accelerator at the same time.

Shifting gears using double clutching requires practice. If you remain WRR ORQJ LQ QHXWUDO \RX PD\ KDYH G the next gear. If so, don't try to force it. Return to neutral, release clutch, increase engine speed to match road speed, and try again.

Knowing When to Shift Up. There are two ways of knowing when to shift:

Use Engine Speed (rpm). Study the driver's manual for your vehicle and learn the operating rpm range. Watch your tachometer, and shift up when your engine reaches the top of the range. (Some newer vehicles use "progressive" shifting: the rpm at which you shift becomes higher as you move up in the gears. Find out what's right for the vehicle you will operate.)

Use Road Speed (mph). Learn what speeds each gear is good for. Then, by using the speedometer, you'll know when to shift up.

With either method, you may learn to use engine sounds to know when to shift.

Basic Procedures for Shifting Down

- Release accelerator, push in clutch, and shift to neutral at the same time.
- Release clutch.
- Press accelerator, increase engine and gear speed to the rpm required in the lower gear.
- Push in clutch and shift to lower gear at the same time.
- Release clutch and press accelerator at the same time.
- Downshifting, like upshifting, requires knowing when to shift. Use either the tachometer or the speedometer and downshift at the right rpm or road speed.

Special conditions where you should downshift are:

Before Starting Down a Hill. Slow down and shift down to a speed that you can control without using the brakes hard. Otherwise the brakes can overheat and lose their braking power.

Downshift before starting down the hill. Make sure you are in a low enough gear, usually lower than the gear required to climb the same hill.

Before Entering a Curve. Slow down to a safe speed, and downshift to the right gear before entering the curve. This lets you use some power through the curve to help the vehicle be more stable while turning. It also allows you speed up as soon as you are out of the curve.

2.3.2 – Multi-speed Rear Axles and Auxiliary Transmissions

Multi-speed rear axles and auxiliary transmissions are used on many vehicles to provide extra gears. You usually control them by a selector knob or switch on the gearshift lever of the main WUDQVPLVVLRQ 7KHUH DUH PDQ\ GLuHUHQW VKLIW SDWWHUQV /HDUQ WK right way to shift gears in the vehicle you will drive.

2.3.3 – Automatic Transmissions

Some vehicles have automatic transmissions. You can select a low range to get greater engine braking when going down grades. The lower ranges prevent the transmission from shifting up beyond the selected gear (unless the governor rpm is exceeded). It is very LPSRUWDQW WR XVH WKLV EUDNLQJ HuHFW ZKHQ JRLQJ GRZQ JUDGHV

2.3.4 – Retarders

Some vehicles have “retarders.” Retarders help slow a vehicle, reducing the need for using your brakes. They reduce brake wear and give you another way to slow down. There are four basic types of retarders (exhaust, engine, hydraulic, and electric). All retarders FDQ EH WXUQHG RQ RU Ru E\ WKH GULYHU 2Q VRPH YHKLFOHV WKH UHWDUGL power can be adjusted. When turned “on,” retarders apply their braking power (to the drive wheels only) whenever you let up on the accelerator pedal all the way.

Because these devices can be noisy, be sure you know where their use is not permitted by law.

Caution. When your drive wheels have poor traction, the retarder may cause them to skid. Therefore, you should turn the retarder Ru ZKHQHYHU WKH URDG LV ZHW LF\ RU VQRZ FRYHUHG

SUBSECTIONS 2.2 AND 2.3

TEST YOUR KNOWLEDGE

1. Why should you back toward the driver’s side?
2. If stopped on a hill, how can you start moving without rolling back?
3. When backing, why is it important to use a helper?
4. What’s the most important hand signal that you and the helper should agree on?
5. What are the two special conditions where you should downshift?
6. When should you downshift automatic transmissions?
7. Retarders keep you from skidding when the road is slippery. True or False?
8. What are the two ways to know when to shift?

These questions may be on the test. If you can’t answer them all, re-read subsections 2.2 and 2.3.

2.4 – Seeing

To be a safe driver you need to know what’s going on all around your vehicle. Not looking properly is a major cause of accidents.

2.4.1 – Seeing Ahead

All drivers look ahead; but many don’t look far enough ahead.

Importance of Looking Far Enough Ahead. Because stopping or FKDQJLQJ ODQHV FDQ WDNH D ORW RI is doing on all sides of you is very important. You need to look well ahead to make sure you have room to make these moves safely.

How Far Ahead to Look. Most good drivers look at least 12 to 15 seconds ahead. That means looking ahead the distance you will travel in 12 to 15 seconds. At lower speeds, that’s about one block. At highway speeds it’s about a quarter of a mile. If you’re not looking that far ahead, you may have to stop too quickly or make quick lane changes. Looking 12 to 15 seconds ahead doesn’t mean not paying attention to things that are closer. Good drivers shift their attention back and forth, near and far. Figure 2.6 illustrates how far to look ahead.

/RRN IRU 7UDIILF Look for vehicles coming onto the highway, into your lane, or turning. Watch for brake lights from slowing vehicles. By seeing these things far enough ahead, you can change your speed, RU FKDQJH ODQHV LI QHFHVVDU\ WR D has been green for a long time it will probably change before you get there. Start slowing down and be ready to stop.

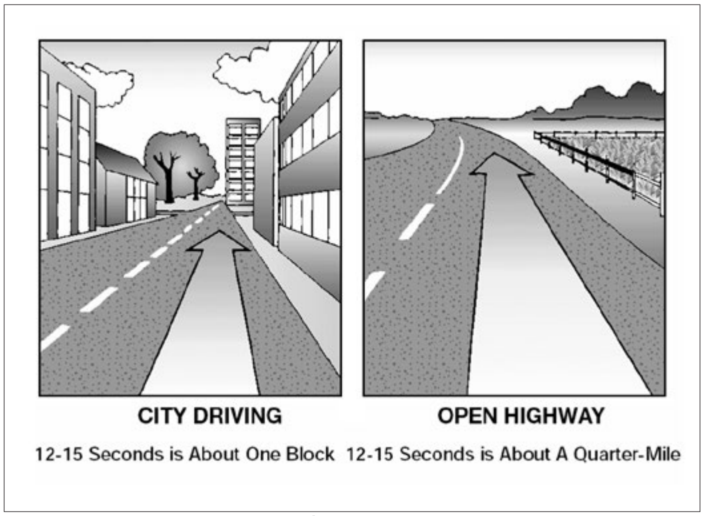


Figure 2.6

2.4.2 – Seeing to the Sides and Rear

It's important to know what's going on behind and to the sides. Check your mirrors regularly. Check more often in special situations.

Mirror Adjustment. Mirror adjustment should be checked prior to the start of any trip and can only be checked accurately when the trailer(s) are straight. You should check and adjust each mirror to show some part of the vehicle. This will give you a reference point for judging the position of the other images.

Regular Checks. You need to make regular checks of your mirrors WR EH DZDUH RI WUDvF DQG WR FKH

7UDvF Check your mirrors for vehicles on either side and in back of you. In an emergency, you may need to know whether you can make a quick lane change. Use your mirrors to spot overtaking vehicles. There are "blind spots" that your mirrors cannot show you. Check your mirrors regularly to know where other vehicles are around you, and to see if they move into your blind spots.

Check Your Vehicle. Use the mirrors to keep an eye on your tires. ,W¶V RQH ZD\ WR VSRW D WLUH ¿UH \RX can use the mirrors to check it. Look for loose straps, ropes, FKDLQV :DWFK IRU D ÀDSSLQJ RU ED

Special Situations. Special situations require more than regular mirror checks. These are lane changes, turns, merges, and tight maneuvers.

Lane Changes. You need to check your mirrors to make sure no one is alongside you or about to pass you. Check your mirrors:

- Before you change lanes to make sure there is enough room.
- After you have signaled to check that no one has moved into your blind spot.
- Right after you start the lane change, to double-check that your path is clear.
- After you complete the lane change.

Turns. In turns, check your mirrors to make sure the rear of your vehicle will not hit anything.

Merges. When merging, use your mirrors to make sure the gap in WUDvF LV ODUJH HQRXJK IRU \RX WR HQWHU VDIHO\

Tight Maneuvers. Any time you are driving in close quarters, check your mirrors often. Make sure you have enough clearance.

How to Use Mirrors. Use mirrors correctly by checking them quickly and understanding what you see.

- When you use your mirrors while driving on the road, check quickly. Look back and forth between the mirrors and the road ahead. Don't focus on the mirrors for too long. Otherwise, you will travel quite a distance without knowing what's happening ahead.

‡0DQ\ ODUJH YHKLFOHV KDYH FXUYHG ³EXJH\H´ PLUURUV WKDW VKRZ D ZLG is often helpful. But everything appears smaller in a convex mirror than it would if you were looking at it directly. Things also seem farther away than they really are. It's important to UHDOL]H WKLV DQG WR DOORZ IRU L vision using a convex mirror.

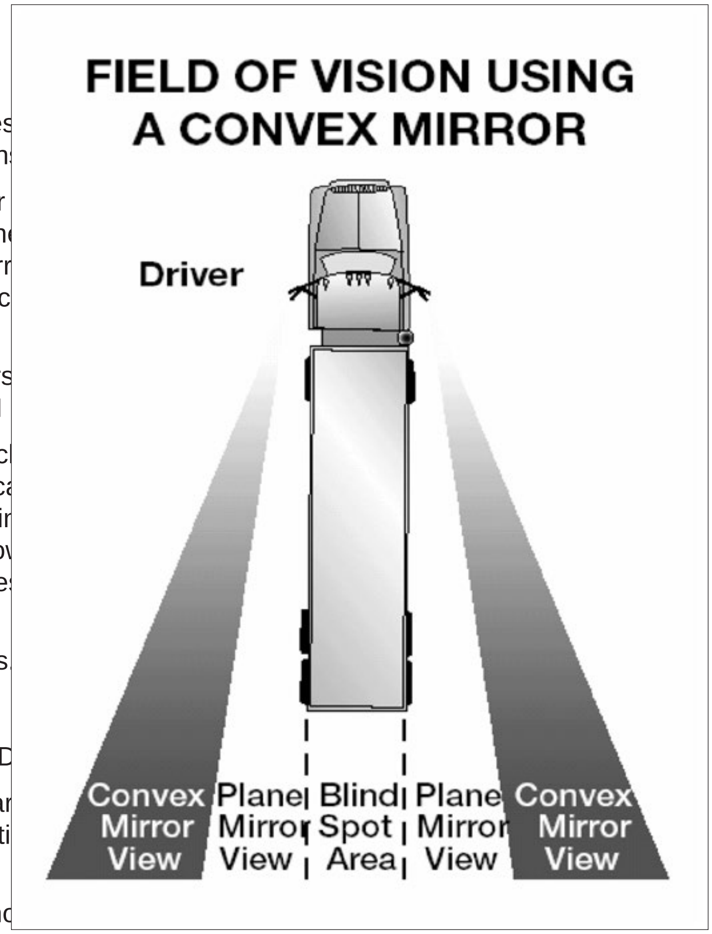


Figure 2.7

2.5 – Communicating

2.5.1 – Signal Your Intentions

Other drivers can't know what you are going to do until you tell them.

Signaling what you intend to do is important for safety. Here are some general rules for signaling.

Turns. There are three good rules for using turn signals:

- Signal early. Signal well before you turn. It is the best way to keep others from trying to pass you.

- Signal continuously. You need both hands on the wheel to turn safely. Don't cancel the signal until you have completed the turn.
- Cancel your signal. 'RQ¶W IRUJHW WR WXUQ Ru \RXU WXUQ VLJQDO after you've turned (if you don't have self-canceling signals).

Lane Changes. Put your turn signal on before changing lanes. Change lanes slowly and smoothly. That way a driver you didn't see may have a chance to honk his/her horn, or avoid your vehic

Slowing Down. Warn drivers behind you when you see you'll need WR VORZ GRZQ $ IHZ OLJKW WDSV RQ ÀDVK the brake lights – should warn following drivers. Use the four-way HPHUJHQF\ ÀDVKHUV IRU WLPHV ZKH U are stopped. Warn other drivers in any of the following situations

- Trouble Ahead. The size of your vehicle may make it hard for drivers behind you to see hazards ahead. If you see a haz that will require slowing down, warn the drivers behind by ÀDVKLQJ \RXU EUDNH OLJKWV
- Tight Turns. Most car drivers don't know how slowly you have to go to make a tight turn in a large vehicle. Give driver behind you warning by braking early and slowing gradually.
- Stopping on the Road. Truck and bus drivers sometimes stop in the roadway to unload cargo or passengers, or to stop a UDLOURDG FURVVLQJ :DUQ IROOR brake lights. Don't stop suddenly.
- Driving Slowly. Drivers often do not realize how fast they are catching up to a slow vehicle until they are very close. you must drive slowly, alert following drivers by turning on \RXU HPHUJHQF\ ÀDVKHUV LI LW LV H RI ÀDVKHUV GLuHU IURP RQH VWD RI the states where you will drive.)

'RQ¶W 'LUHFW 7UDIF Some drivers try to help out others by signaling when it is safe to pass. You should not do this. You cou cause an accident. You could be blamed and it could cost you ma thousands of dollars.

2.5.2 – Communicating Your Presence

Other drivers may not notice your vehicle even when it's in plai sight. To help prevent accidents, let them know you're there.

When Passing. Whenever you are about to pass a vehicle, pedestria or bicyclist, assume they don't see you. They could suddenly mo LQ IURQW RI \RX :KHQ LW LV OHJDO JKW your lights from low to high beam and back. And, drive carefully enough to avoid a crash even if they don't see or hear you.

When It's Hard to See. At dawn, dusk, in rain, or snow, you need to make yourself easier to see. If you are having trouble seeing ot vehicles, other drivers will have trouble seeing you. Turn on you OLJKWV 8VH WKH KHDGOLJKWV QRW FOHD lights. Use the low beams; high beams can bother people in t daytime as well as at night.

When Parked at the Side of the Road. :KHQ \RX SXOO DQG VWRS EH VXUH WR WXUQ RQ WK KLV is important at night. Don't trust the tail lights to give warning. Drivers have crashed into the rear of a parked vehicle because they thought it was moving normally.

If you must stop on a road or the shoulder of any road, you must put out your emergency warning devices within ten minutes. Place your warning devices at the following locations:

If you must stop on or by a one-way or divided highway, place warning devices 10 feet, 100 feet, and 200 feet toward the DSSURDFKLQJ WUDvF 6HH)LJXUH

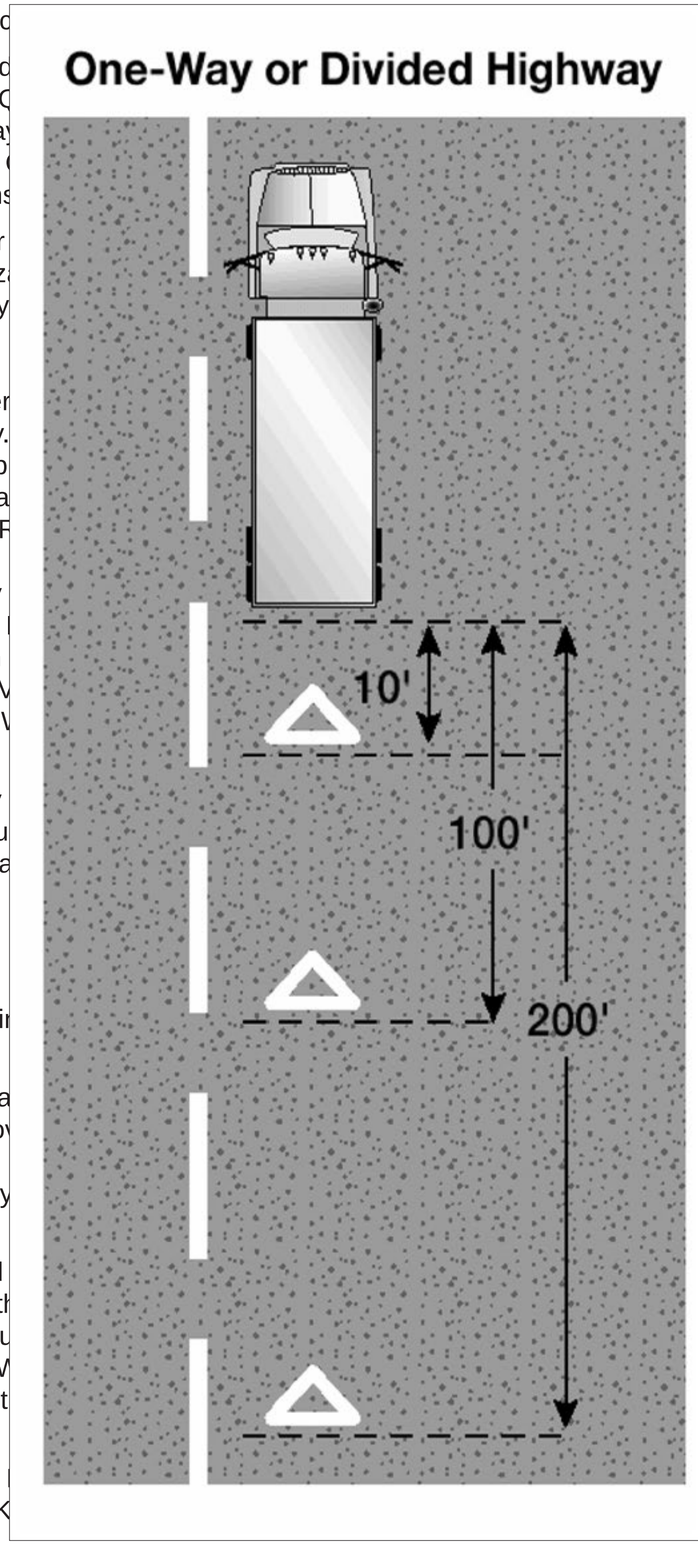


Figure 2.8

,I \RX VWRS RQ D WZR ODQH URDG F[...] or on an undivided highway, place warning devices within 10 feet of the front or rear corners to mark the location of the vehicle and 100 feet behind and ahead of the vehicle, on the shoulder or in t[he] lane you stopped in. See Figure 2.9.

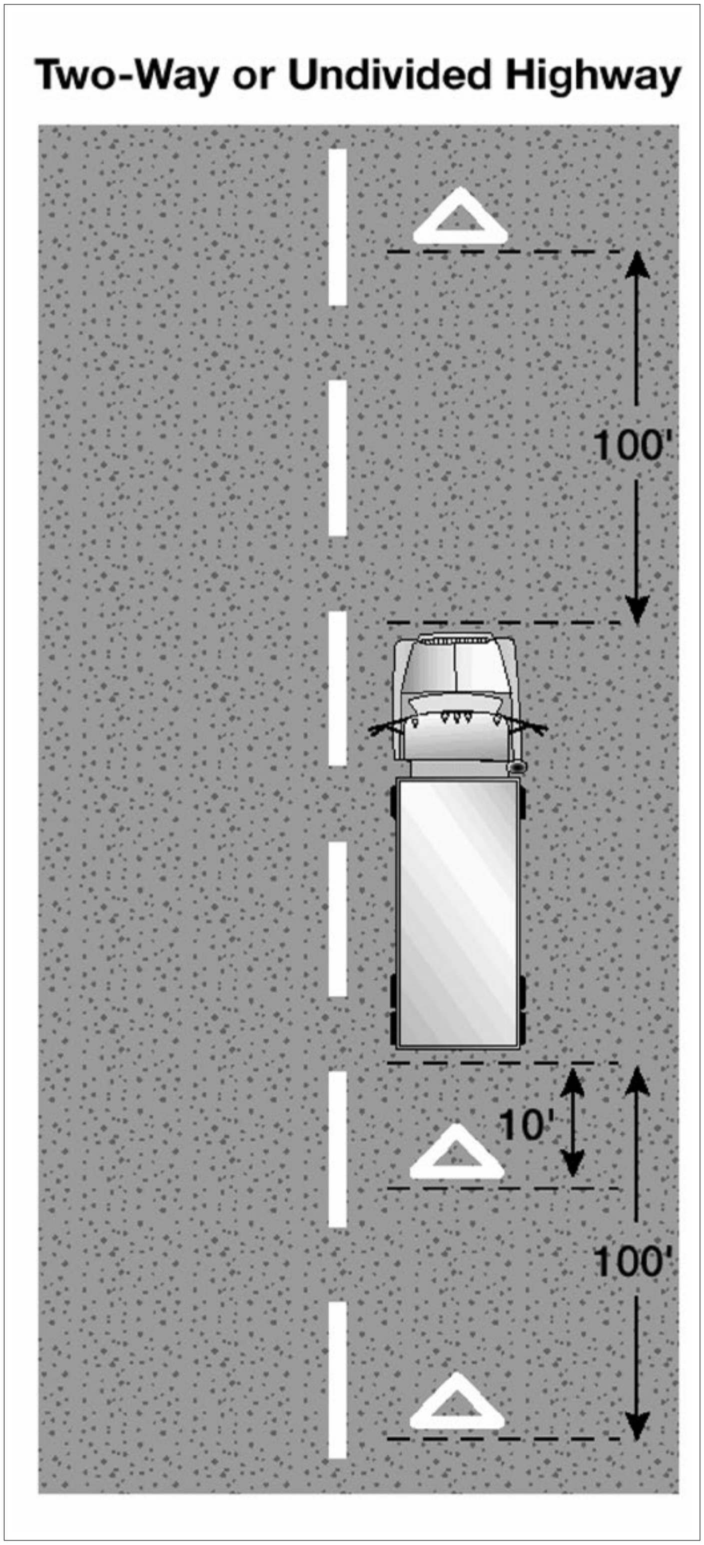


Figure 2.9

If you stop on a hill or curve, or other obstruction where drivers can't see your vehicle within 500 feet, move the rear-most triangle further out, within 500 feet behind the vehicle, so warning is provided. See Figure 2.10.

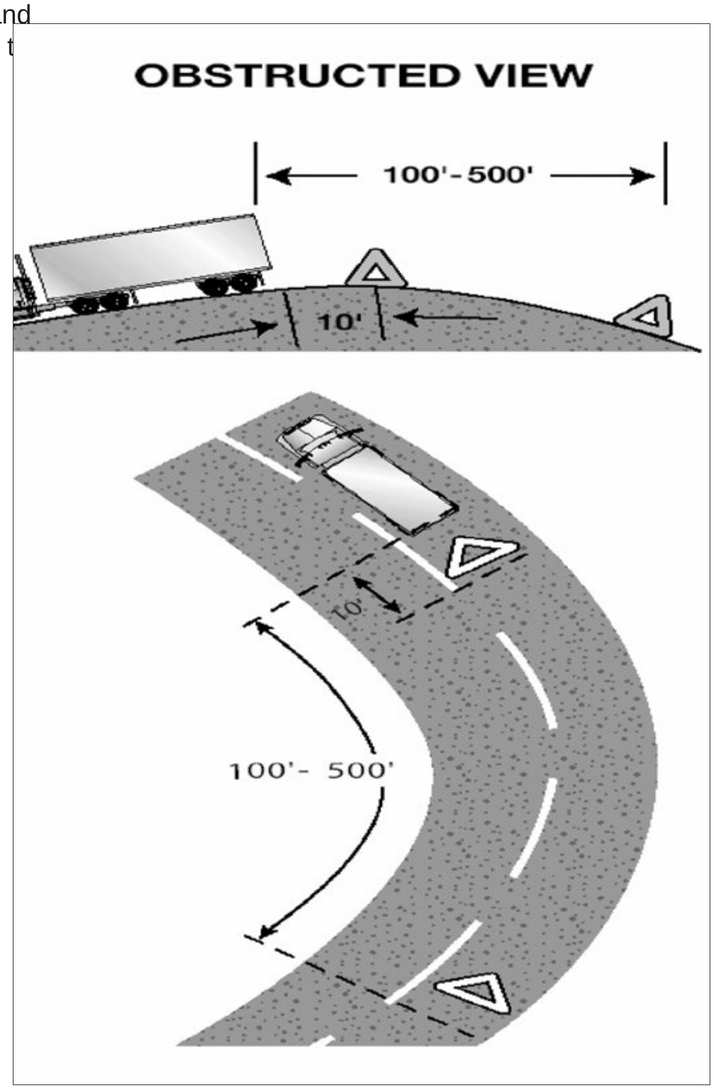


Figure 2.10

When putting out the triangles, hold them between yourself and the RQFRPLQJ WUDvF IRU \RXU RZQ VDIHW\

Use Your Horn When Needed. Your horn can let others know you're there. It can help to avoid a crash. However, it can startle others and could be dangerous when used unnecessarily.

2.6 – Controlling Speed

Driving too fast is a major cause of fatal crashes. You must adjust your speed depending on driving conditions. These include traction, FXUYHV YLVLELOLW\ WUDvF DQG KLOO

2.6.1 – Stopping Distance

Perception Distance + Reaction Distance + Braking Distance = Total Stopping Distance

Perception Distance. This is the distance your vehicle travels, in ideal conditions, from the time your eyes see a hazard until your brain recognizes it. Keep in mind certain mental and physical FRQGLWLRQV FDQ DuHFW \RXU SHUFHS greatly depending on visibility and the hazard itself. The average perception time for an alert driver is 1¾ seconds. At 55 mph this accounts for 142 feet traveled.

Reaction Distance. The distance you will continue to travel, in ideal conditions; before you physically hit the brakes, in response to a hazard seen ahead. The average driver has a reaction time of ¾ second to 1 second. At 55 mph this accounts for 61 feet traveled.

Braking Distance. The distance your vehicle will travel, in ideal conditions; while you are braking. At 55 mph on dry pavement with good brakes, it can take about 216 feet.

Total Stopping Distance. The total minimum distance your vehicle has traveled, in ideal conditions; with everything considered, including perception distance, reaction distance and braking distance, until you can bring your vehicle to a complete stop. At 55 mph, your vehicle will travel a minimum of 419 feet.

7KH (uHFW RI 6SHHG RQ 6WRSSLQJ 'LVWDQFH. The faster you drive, the greater the impact or striking power of your vehicle. When you double your speed from 20 to 40 mph the impact is 4 times greater. The braking distance is also 4 times longer. Triple the speed from 20 to 60 mph and the impact and braking distance is 9 times greater. At 60 mph, your stopping distance is greater than the length of a IRRWEDOO ¿HOG ,QFUHDVH WKH VSHHG WR PSK DQG WKH LPSDFW DQG braking distance are 16 times greater than at 20 mph. High speeds greatly increase the severity of crashes and stopping distances. By slowing down, you can reduce braking distance.

Stopping Distance Chart				
Miles Per Hour	Perception Distance	Driver Reaction Distance	Vehicle Braking Distance	Total Stopping Distance
15 mph	39 ft.	16 ft.	17 ft.	72 ft.
30 mph	78 ft.	33 ft.	64 ft.	175 ft.
45 mph	117 ft.	50 ft.	152 ft.	319 ft.
50 mph	129 ft.	55 ft.	177 ft.	361 ft.
55 mph	142 ft.	61 ft.	216 ft.	419 ft.

Figure 2.11

7KH (uHFW RI 9HKLFOH :HLJKW RQ 6WRSSLQJ 'LVWDQFH. 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 an empty vehicle has less traction.

2.6.2 – Matching Speed to the Road Surface

You can't steer or brake a vehicle unless you have traction. Traction is friction between the tires and the road. There are some road conditions that reduce traction and call for lower speeds.

Slippery Surfaces. It will take longer to stop, and it will be harder to turn without skidding, when the road is slippery. Wet roads can double stopping distance. You must drive slower to be able to stop in the same distance as on a dry road. Reduce speed by about one-third (e.g., slow from 55 to about 35 mph) on a wet road. On packed snow, reduce speed by a half, or more. If the surface is icy, reduce speed to a crawl and stop driving as soon as you can safely do so.

Identifying Slippery Surfaces. Sometimes it's hard to know if the road is slippery. Here are some signs of slippery roads:

- Shaded Areas. Shady parts of the road will remain icy and slippery long after open areas have melted.
- Bridges. When the temperature drops, bridges will freeze before the road will. Be especially careful when the temperature is close to 32 degrees Fahrenheit.
- Melting Ice. Slight melting will make ice wet. Wet ice is much more slippery than ice that is not wet.
- Black Ice. Black ice is a thin layer that is clear enough that you can see the road underneath it. It makes the road look wet. Any time the temperature is below freezing and the road looks wet, watch out for black ice.
- Vehicle Icing. An easy way to check for ice is to open the window and feel the front of the mirror, mirror support, or antenna. If there's ice on these, the road surface is probably starting to ice up.
- Just After Rain Begins. Right after it starts to rain, the water mixes with oil left on the road by vehicles. This makes the road very slippery. If the rain continues, it will wash the oil away.
- Hydroplaning. In some weather, water or slush collects on the road. When this happens, your vehicle can hydroplane. It's like water skiing--the tires lose their contact with the road and have little or no traction. You may not be able to steer or brake. You can regain control by releasing the accelerator and pushing in the clutch. This will slow your vehicle and let the wheels turn freely. If the vehicle is hydroplaning, do not use the brakes to slow down. If the drive wheels start to skid, push in the clutch to let them turn freely.

It does not take a lot of water to cause hydroplaning. Hydroplaning can occur at speeds as low as 30 mph if there is a lot of water. Hydroplaning is more likely if tire pressure is low, or the tread is worn. (The grooves in a tire carry away the water; if they aren't deep, they don't work well.)

Road surfaces where water can collect can create conditions WKDW FDXVH D YHKLFOH WR K\GURSOD tire splashes, and raindrops on the road. These are indications of standing water.

2.6.3 – Speed and Curves

Drivers must adjust their speed for curves in the road. If you take a curve too fast, two things can happen. The tires can lose their WUDFWLRQ DQG FRQWLQXH VWUDLJKW the tires may keep their traction and the vehicle rolls over. Tests have shown that trucks with a high center of gravity can roll over at the posted speed limit for a curve.

Slow to a safe speed before you enter a curve. Braking in a curve is dangerous because it is easier to lock the wheels and cause a skid. Slow down as needed. Don't ever exceed the posted speed limit for the curve. Be in a gear that will let you accelerate slightly in the curve. This will help you keep control.

2.6.4 – Speed and Distance Ahead

You should always be able to stop within the distance you can see ahead. Fog, rain, or other conditions may require that you slow down to be able to stop in the distance you can see. At night, you can't see as far with low beams as you can with high beams. When you must use low beams, slow down.

± 6SHHG DQG 7UDýF)ORZ

:KHQ \RX¶UH GULYLQJ LQ KHDY\ WUDvF WKH VDIHVW VSHHG LV WKH VSHHG of other vehicles as long as the speed is legal and not excessive for FRQGLWLRQV 9HKLFOHV JRLQJ WKH VDPH GLUHFWLRQ DW WKH VDPH VSHHG are not likely to run into one another. In many states, speed limits are lower for trucks and buses than for cars. It can vary as much as 15 mph. Use extra caution when you change lanes or pass on these roadways. Keep a safe following distance.

The main reason drivers exceed speed limits is to save time. But, DQ\RQH WU\LQJ WR GULYH IDVWHU WKDQ WKH VSHHG RI WUDvF ZLOO QRW E able to save much time. The risks involved are not worth it. If you JR IDVWHU WKDQ WKH VSHHG RI RWKHU WUDvF \RX¶OO KDYH WR NHHS SDVV other vehicles. This increases the chance of a crash, and it is more WLULQJ)DWLJXH LQFUHDVHV WKH FKDQFH RI D FUDVK *RLQJ ZLWK WKH ÀRZ RI WUDvF LV VDIHU DQG HDVLHU

2.6.6 – Speed on Downgrades

Your vehicle's speed will increase on downgrades because of gravity. Your most important objective is to select and maintain a speed that is not too fast for the:

- Total weight of the vehicle and cargo.
- Length of the grade.
- Steepness of the grade.
- Road conditions.
- Weather.

If a speed limit is posted, or there is a sign indicating "Maximum Safe Speed," never exceed the speed shown. Also, look for and heed warning signs indicating the length and steepness of the grade. <RX PXVW XVH WKH EUDNLQJ HuHFW RI WKH HQJLQH DV WKH SULQFLSDO ZD\ RI FRQWUROOLQJ \RXU VSHHG RQ GRZQJUDGHV 7KH EUDNLQJ HuHFW RI the engine is greatest when it is near the governed rpms and the transmission is in the lower gears. Save your brakes so you will be DEOH WR VORZ RU VWRS DV UHTXLUHG E\ URDGZD\ DQG WUDvF FRQGLWLRQV 6K your transmission to a low gear before starting down the grade and use the proper braking techniques. Please read carefully the section on going down long, steep downgrades safely in "Mountain Driving."

2.6.7 – Roadway Work Zones

6SHHGLQJ WUDvF LV WKH QXPEHU RQH FDXVH RI LQMXU\ DQG GHDWK LQ roadway work zones. Observe the posted speed limits at all times when approaching and driving through a work zone. Watch your speedometer, and don't allow your speed to creep up as you drive through long sections of road construction. Decrease your speed for adverse weather or road conditions. Decrease your speed even further when a worker is close to the roadway.

SUBSECTIONS 2.4, 2.5, AND 2.6

TEST YOUR KNOWLEDGE

1. How far ahead does the manual say you should look?
2. What are two main things to look for ahead?
3. What's your most important way to see the sides and rear of your vehicle?
4. What does "communicating" mean in safe driving?
5. :KHUH VKRXOG \RXU UHÀHFWRUV EH on a divided highway?
6. What three things add up to total stopping distance?
7. If you go twice as fast, will your stopping distance increase by two or four times?
8. Empty trucks have the best braking. True or False?
9. What is hydroplaning?
10. What is "black ice"?

These questions may be on the test. If you can't answer them all, re-read subsections 2.4, 2.5, and 2.6.

2.7 – Managing Space

To be a safe driver, you need space all around your vehicle. When things go wrong, space gives you time to think and to take action.

To have space available when something goes wrong, you need to manage space. While this is true for all drivers, it is very important for large vehicles. They take up more space and they require more space for stopping and turning.

2.7.1 – Space Ahead

Of all the space around your vehicle, it is the area ahead of the vehicle--the space you're driving into --that is most important.

The Need for Space Ahead. You need space ahead in case you must suddenly stop. According to accident reports, the vehicle that trucks and buses most often run into is the one in front of them. The most frequent cause is following too closely. Remember, if the vehicle ahead of you is smaller than yours, it can probably stop faster than you can. You may crash if you are following too closely.

How Much Space? How much space should you keep in front of you? One good rule says you need at least one second for each 10 feet of vehicle length at speeds below 40 mph. At greater speeds, you must add 1 second for safety. For example, if you are driving a 40-foot vehicle, you should leave 4 seconds between you and the vehicle ahead. In a 60-foot rig, you'll need 6 seconds. Over 40 mph, you'd need 5 seconds for a 40-foot vehicle and 7 seconds for a 60-foot vehicle. See Figure 2.12.

To know how much space you have, wait until the vehicle ahead passes a shadow on the road, a pavement marking, or some other FOHDU ODQGPDUN 7KHQ FRXQW Ru WKH and-one, one thousand-and-two" and so on, until you reach the same spot. Compare your count with the rule of one second for every ten feet of length.

If you are driving a 40-foot truck and only counted up to 2 seconds, you're too close. Drop back a little and count again until you have

4 seconds of following distance (or 5 seconds, if you're going over 40 mph). After a little practice, you will know how far back you should be. Remember to add 1 second for speeds above 40 mph. Also remember that when the road is slippery, you need much more space to stop.

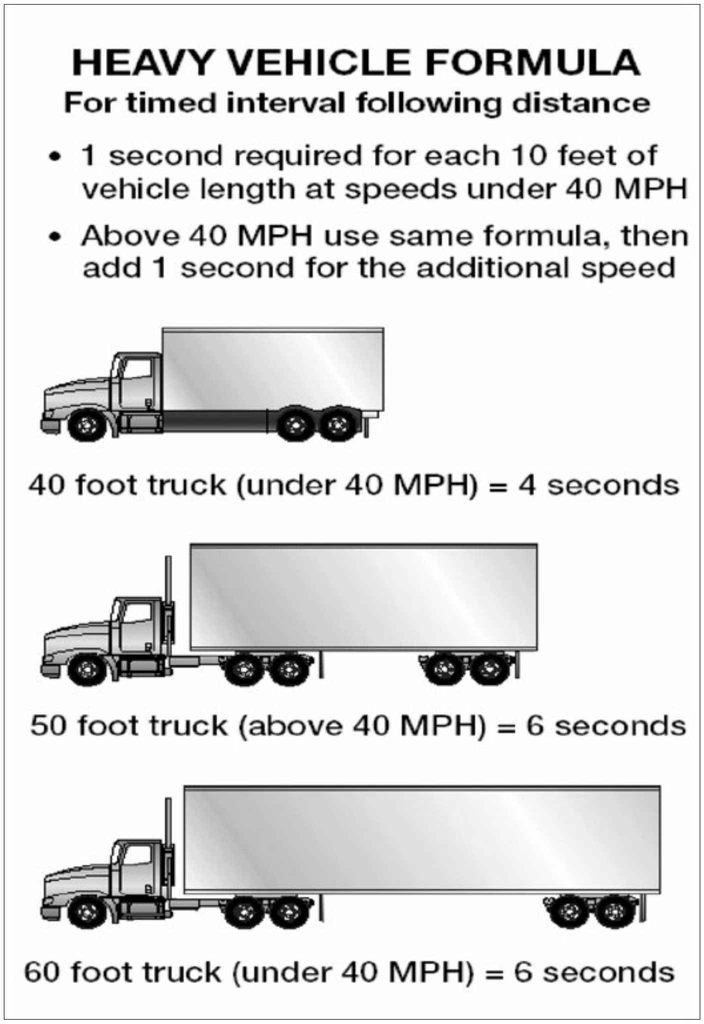


Figure 2.12

2.7.2 – Space Behind

You can't stop others from following you too closely. But there are things you can do to make it safer.

Stay to the Right. Heavy vehicles are often tailgated when they FDQ¶W NHHS XS ZLWK WKH VSHHG RI WUDvF 7KLV RIWHQ KDSSHQV ZKHQ you're going uphill. If a heavy load is slowing you down, stay in the right lane if you can. Going uphill, you should not pass another slow vehicle unless you can get around quickly and safely.

Dealing with Tailgaters Safely. In a large vehicle, it's often hard to see whether a vehicle is close behind you. You may be tailgated:

- When you are traveling slowly. Drivers trapped behind slow vehicles often follow closely.
- In bad weather. Many car drivers follow large vehicles closely during bad weather, especially when it is hard to see the road ahead.

,I \RX ¿QG \RXUVHOI EHLQJ WDLOJDWHG
do to reduce the chances of a crash.

- Avoid quick changes. If you have to slow down or turn, signal early, and reduce speed very gradually.
- Increase your following distance. Opening up room in front of you will help you to avoid having to make sudden speed or direction changes. It also makes it easier for the tailgater to get around you.
- Don't speed up. It's safer to be tailgated at a low speed than a high speed.
- Avoid tricks. 'RQ¶W WXUQ RQ \RXU WDLOOI lights. Follow the suggestions above.

2.7.3 – Space to the Sides

Commercial vehicles are often wide and take up most of a lane. Safe drivers will manage what little space they have. You can do this by keeping your vehicle centered in your lane, and avoid driving alongside others.

Staying Centered in a Lane. You need to keep your vehicle centered in the lane to keep safe clearance on either side. If your vehicle is wide, you have little room to spare.

Traveling Next to Others. There are two dangers in traveling alongside other vehicles:

- Another driver may change lanes suddenly and turn into you.
- You may be trapped when you need to change lanes.

)LQG DQ RSHQ VSRW ZKHUH \RX DUHQ¶ When WUDvF LV KHDY\ LW PD\ EH KDUG WR ¿ travel near other vehicles, try to keep as much space as possible between you and them. Also, drop back or pull forward so that you are sure the other driver can see you.

Strong Winds. 6WURQJ ZLQGV PDNH LW GLvFX The problem is usually worse for lighter vehicles. This problem can be especially bad coming out of tunnels. Don't drive alongside others if you can avoid it.

2.7.4 – Space Overhead

Hitting overhead objects is a danger. Make sure you always have overhead clearance.

- Don't assume that the heights posted at bridges and overpasses are correct. Re-paving or packed snow may have reduced the clearances since the heights were posted.
- The weight of a cargo van changes its height. An empty van is higher than a loaded one. That you got under a bridge when you were loaded does not mean that you can do it when you are empty.
- If you doubt you have safe space to pass under an object, go slowly. If you aren't sure you can make it, take another route. Warnings are often posted on low bridges or underpasses, but sometimes they are not.
- Some roads can cause a vehicle to tilt. There can be a problem clearing objects along the edge of the road, such as signs, trees, or bridge supports. Where this is a problem, drive a little closer to the center of the road.
- Before you back into an area, get out and check for overhanging objects such as trees, branches, or electric wires. It's easy to miss seeing them while you are backing. (Also check for other hazards at the same time.)

2.7.5 – Space Below

Many drivers forget about the space under their vehicles. That space can be very small when a vehicle is heavily loaded. This is often a problem on dirt roads and in unpaved yards. Don't take a chance on getting hung up. Drainage channels across roads can cause ends of some vehicles to drag. Cross such depressions careful

Railroad tracks can also cause problems, particularly when pulli trailers with a low underneath clearance. Don't take a chance getting hung up halfway across.

2.7.6 – Space for Turns

The space around a truck or bus is important in turns. Because ZLGH WXUQV DQG Ru WUDFNLQJ OD KLFO or objects during turns.

Right Turns.

Here are some rules to help prevent right-turn crashes:

- Turn slowly to give yourself and others more time to avoi problems.
- If you are driving a truck or bus that cannot make the right tur without swinging into another lane, turn wide as you complet the turn. Keep the rear of your vehicle close to the curb. Th will stop other drivers from passing you on the right.
- Don't turn wide to the left as you start the turn. A following driver may think you are turning left and try to pass you on the right. You may crash into the other vehicle as you complete your turn.
- If you must cross into the oncoming lane to make a turn, watch out for vehicles coming toward you. Give them room to go by or to stop. However, don't back up for them, because you might hit someone behind you. See Figure 2.13.

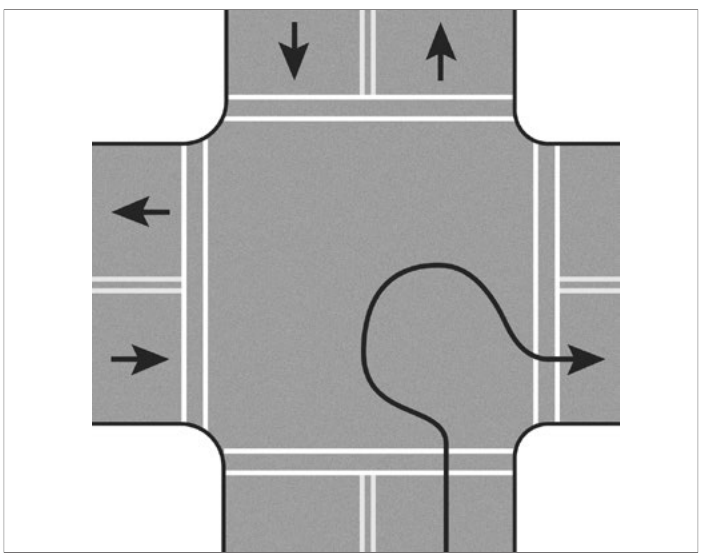


Figure 2.13

Left Turns. On a left turn, make sure you have reached the center of the intersection before you start the left turn. If you turn too soon, the left side of your vehicle may hit another vehicle because RI Ru WUDFNLQJ

If there are two turning lanes, always take the right turn lane. Don't start in the inside lane because you may have to swing right to make the turn. Drivers on your left can be more readily seen. See Figure 2.14.

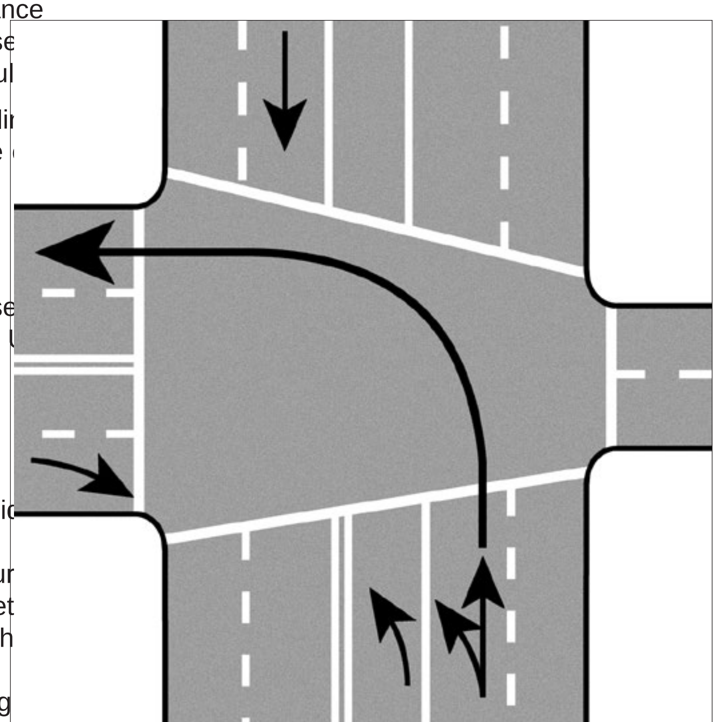


Figure 2.14

± 6SDFH 1HHGHG WR &URVV RU

Be aware of the size and weight of your vehicle when you cross RU HQWHU WUDvF +HUH DUH VRPH LPS

- Because of slow acceleration and the space large vehicles UHTXLUH \RX PD\ QHHG D PXFK ODU you would in a car.
- Acceleration varies with the load. Allow more room if your vehicle is heavily loaded.
- Before you start across a road, make sure you can get all the ZD\ DFURVV EHIRUH WUDvF UHDFKHV

2.8 – Seeing Hazards

2.8.1 – Importance of Seeing Hazards

What Is a Hazard? A hazard is any road condition or other road user (driver, bicyclist, pedestrian) that is a possible danger. For example, a car in front of you is headed toward the freeway exit, but his brake lights come on and he begins braking hard. This could PHDQ WKDW WKH GULYHU LV XQFHUWD might suddenly return to the highway. This car is a hazard. If the driver of the car cuts in front of you, it is no longer just a hazard; it is an emergency.

Seeing Hazards Lets You Be Prepared. You will have more time to act if you see hazards before they become emergencies. In the example above, you might make a lane change or slow down to prevent a crash if the car suddenly cuts in front of you. Seeing this hazard gives you time to check your mirrors and signal a lane change. Being prepared reduces the danger. A driver who did not see the hazard until the slow car pulled back on the highway in front of him would have to do something very suddenly. Sudden braking or a quick lane change is much more likely to lead to a crash.

Learning to See Hazards. There are often clues that will help you see hazards. The more you drive, the better you can learn to see hazards. This section will talk about hazards that you should be aware of.

2.8.2 – Hazardous Roads

Slow down and be very careful if you see any of the following road hazards.

Work Zones. When people are working on the road, it is a hazard. There may be narrower lanes, sharp turns, or uneven surfaces. Other drivers are often distracted and drive unsafely. Workers and construction vehicles may get in the way. Drive slowly and FDUHIXOO\ QHDU ZRUN]RQHV 8VH \RXU IRXU ZD\ ÀDVKHUV RU EUDNH lights to warn drivers behind you.

'URS 2u. 6RPHWLPHV WKH SDYHPHQW GURSV Ru VKDUSO\ QHDU WKH HGJH of the road. Driving too near the edge can tilt your vehicle toward the side of the road. This can cause the top of your vehicle to hit roadside objects (signs, tree limbs). Also, it can be hard to steer DV \RX FURVV WKH GURS Ru JRLQJ R

Foreign Objects. Things that have fallen on the road can be hazards. They can be a danger to your tires and wheel rims. They can damage electrical and brake lines. They can be caught between dual tires and cause severe damage. Some obstacles that appear to be harmless can be very dangerous. For example, cardboard boxes may be empty, but they may also contain some solid or heavy material capable of causing damage. The same is true of paper and cloth sacks. It is important to remain alert for objects of all sorts, so you can see them early enough to avoid them without making sudden, unsafe moves.

2u 5DPSV 2Q 5DPSV. Freeway and turnpike exits can be SDUWLFXODUO\ GDQJHURXV IRU FRPPHUFLDO YHKLFOHV 2u UDPSV DQG RQ ramps often have speed limit signs posted. Remember, these speeds may be safe for automobiles, but may not be safe for larger vehicles or heavily loaded vehicles. Exits that go downhill and turn at the same time can be especially dangerous. The downgrade makes it GLvFXOW WR UHGXFH VSHHG %UDNLQJ DQG WXUQLQJ DW WKH VDPH WLPH FD be a dangerous practice. Make sure you are going slowly enough EHIRUH \RX JHW RQ WKH FXUYHG SDUW RI DQ Ru UDPS RU RQ UDPS

2.8.3 – Drivers Who Are Hazards

In order to protect yourself and others, you must know when other drivers may do something hazardous. Some clues to this type of hazard are discussed below.

Blocked Vision. People who can't see others are a very dangerous KD]DUG %H DOHUW IRU GULYHUV ZKRVH YLVLRQ LV EORFNHG 9DQV ORDGH station wagons, and cars with the rear window blocked are examples. Rental trucks should be watched carefully. Their drivers are often not used to the limited vision they have to the sides and rear of the truck. In winter, vehicles with frosted, ice-covered, or snow-covered windows are hazards.

9HKLFOHV PD\ EH SDUWO\ KLGGHQ E\ E you only can see the rear or front end of a vehicle but not the driver, then he or she can't see you. Be alert because he/she may back out or enter into your lane. Always be prepared to stop.

Delivery Trucks Can Present a Hazard. Packages or vehicle doors often block the driver's vision. Drivers of step vans, postal vehicles, and local delivery vehicles often are in a hurry and may suddenly VWHS RXW RI WKHLU YHKLFOH RU GULY

Parked Vehicles Can Be Hazards, especially when people start to get out of them. Or, they may suddenly start up and drive into your way. Watch for movement inside the vehicle or movement of the vehicle itself that shows people are inside. Watch for brake lights or backup lights, exhaust, and other clues that a driver is about to move.

Be careful of a stopped bus. Passengers may cross in front of or behind the bus, and they often can't see you.

Pedestrians and Bicyclists Can Also Be Hazards. Walkers, joggers, and bicyclists may be on the road with their back to the WUDvF VR WKH\ FDQ¶W VHH \RX 6RPHW with headsets, so they can't hear you either. This can be dangerous. On rainy days, pedestrians may not see you because of hats or umbrellas. They may be hurrying to get out of the rain and may QRW SD\ DWWHQWLRQ WR WKH WUDvF

Distractions. People who are distracted are hazards. Watch for where they are looking. If they are looking elsewhere, they can't see you. But be alert even when they are looking at you. They may believe that they have the right of way.

Children. &KLOGUHQ WHQG WR DFW TXLFN &KLOGUHQ SOD\LQJ ZLWK RQH DQRWKH a serious hazard.

Talkers. Drivers or pedestrians talking to one another may not be SD\LQJ FORVH DWWHQWLRQ WR WKH WU

Workers. People working on or near the roadway are a hazard clue. The work creates a distraction for other drivers and the workers themselves may not see you.

Ice Cream Trucks. Someone selling ice cream is a hazard clue. Children may be nearby and may not see you.

Disabled Vehicles. 'ULYHUV FKDQJLQJ D WLUH RIWHQ GR QRW SD\ DWWHQWLRQ WR WK them. They are often careless. Jacked up wheels or raised hoods are hazard clues.

Crashes. Crashes are particularly hazardous. People involved in WKH FUDVK PD\ QRW ORRN IRU WUDvF 3 FUDVK 3HRSOH RIWHQ UXQ DFURVV WK may slow or stop suddenly.

Shoppers. People in and around shopping areas are often not ZDWFKLQJ WUDvF EHFDXVH WKH\ DUH into store windows.

Confused Drivers. Confused drivers often change direction suddenly or stop without warning. Confusion is common near freeway or turnpike interchanges and major intersections. Tourists unfamiliar with the area can be very hazardous. Clues to tourists include car-top luggage and out-of-state license plates. Unexpected actions (stopping in the middle of a block, changing lanes for no apparent reason, backup lights suddenly going on) are clues to confusion. Hesitation is another clue, including driving very slowly, using brakes often, or stopping in the middle of an intersection. You may also see drivers who are looking at street signs, maps, and house numbers. These drivers may not be paying attention to you.

Slow Drivers. Motorists who fail to maintain normal speed are hazards. Seeing slow moving vehicles early can prevent a crash. Some vehicles, by their nature, are slow and seeing them is a hazard clue (mopeds, farm machinery, construction machinery, tractors, etc.). Some of these will have the “slow moving vehicle” symbol to warn you. This is a red triangle with an orange center. Watch for it.

Drivers Signaling a Turn May Be a Hazard. Drivers signaling a turn may slow more than expected or stop. If they are making a tight turn into an alley or driveway, they may go very slowly. If pedestrians or other vehicles block them, they may have to stop on
WKH URDGZD\ 9HKLFOHV WXUQLQJ OHIW PD\ KDYH WR VWRS IRU RQFRPLQJ
vehicles.

Drivers in a Hurry. Drivers may feel your commercial vehicle is preventing them from getting where they want to go on time. Such
GULYHUV PD\ SDVV \RX ZLWKRXW D VDIH JDS LQ WKH RQFRPLQJ WUDvF
cutting too close in front of you. Drivers entering the road may pull in front of you in order to avoid being stuck behind you, causing you to brake. Be aware of this and watch for drivers who are in a hurry.

Impaired Drivers. Drivers who are sleepy, have had too much to drink, are on drugs, or who are ill are hazards. Some clues to these drivers are:

- Weaving across the road or drifting from one side to another.
- Leaving the road (dropping right wheels onto the shoulder, or bumping across a curb in a turn).
- Stopping at the wrong time (stopping at a green light, or waiting for too long at a stop).
- Open window in cold weather.
- Speeding up or slowing down suddenly, driving too fast or too slow.

Be alert for drunk drivers or sleepy drivers, especially late at night.

Driver Body Movement as a Clue. Drivers look in the direction they are going to turn. You may sometimes get a clue from a driver's head and body movements that a driver may be going to make a turn, even though the turn signals aren't on. Drivers making over-the-shoulder checks may be going to change lanes. These clues are most easily seen in motorcyclists and bicyclists. Watch other road users and try to tell whether they might do something hazardous.

&RQÀLFWV <RX DUH LQ FRQÀLFW ZKHQ \RX KDYH WR FKDQJH VSHHG DQG RU
GLUHFWLRQ WR DYRLG KLWWLQJ VRPHRQH &RQÀLFWV RFFXU DW LQWHUVHFWLRQV
where vehicles meet, at merges (such as turnpike on ramps) and where there are needed lane changes (such as the end of a lane,
IRUFLQJ D PRYH WR DQRWKHU ODQH RI WUDvF 2WKHU VLWXDWLRQV LQFOX
VORZ PRYLQJ RU VWDOOHG WUDvF LQ D WUDvF ODQH DQG DFFLGHQW VFHQH
:DWFK IRU RWKHU GULYHUV ZKR DUH LQ FRQÀLFW EHFDXVH WKH\ DUH D KD]DU
WR \RX :KHQ WKH\ UHDFW WR WKLV FRQÀLFW WKH\ PD\ GR VRPHWKLQJ
WKDW ZLOO SXW WKHP LQ FRQÀLFW ZLWK \RX

2.8.4 – Always Have a Plan

You should always be looking for hazards. Continue to learn to see hazards on the road. However, don't forget why you are looking for the hazards--they may turn into emergencies. You look for the hazards in order to have time to plan a way out of any emergency.

When you see a hazard, think about the emergencies that could
GHYHORS DQG ¿JXUH RXW ZKDW \RX ZR
take action based on your plans. In this way, you will be a prepared, defensive driver who will improve your own safety as well as the safety of all road users.

SUBSECTIONS 2.7 AND 2.8

TEST YOUR KNOWLEDGE

1. +RZ GR \RX ¿QG RXW KRZ PDQ\ VHF
distance space you have?
2. If you are driving a 30-foot vehicle at 55 mph, how many seconds of following distance should you allow?
3. You should decrease your following distance if somebody is following you too closely. True or False?
4. If you swing wide to the left before turning right, another driver may try to pass you on the right. True or False?
5. What is a hazard?
6. Why make emergency plans when you see a hazard?

These questions may be on the test. If you can't answer them all, re-read subsections 2.7 and 2.8.

2.9 – Distracted Driving

Whenever you are driving a vehicle and your attention is not on the road, you're putting yourself, your passengers, other vehicles, and pedestrians in danger. Distracted driving can result when you perform any activity that may shift your full attention from the
GULYLQJ WDVN 7DNLQJ \RXU H\HV Ru W
wheel presents obvious driving risks. Mental activities that take your mind away from driving are just as dangerous. Your eyes can gaze at objects in the driving scene but fail to see them because your attention is distracted elsewhere.

Activities that can distract your attention include: talking to passengers; adjusting the radio, CD player or climate controls; eating, drinking or smoking; reading maps or other literature; picking up something that fell; reading billboards and other road advertisements; watching other people and vehicles including aggressive drivers; talking on a CB radio; using telematic devices (such as navigation systems, pagers, etc.); daydreaming or being occupied with other mental distractions.

2.9.1 – Don't Drive Distracted

If drivers react a half-second slower because of distractions, crashes double. Some tips to follow so you won't become distracted:

- Review and be totally familiar with all safety and usage features on any in-vehicle electronics before you drive.
- Pre-program radio stations.
- Pre-load your favorite CDs.
- Clear the vehicle of any unnecessary objects.
- Review maps and plan your route before you begin driving.

- Adjust all mirrors for best all-round visibility before you start your trip.
- Don't attempt to read or write while you drive.
- Avoid smoking, eating and drinking while you drive.
- Don't engage in complex or emotionally intense conversations with other occupants.

2.9.2 – Watch Out for Other Distracted Drivers

You need to be able to recognize other drivers who are engaged in any form of driving distraction. Not recognizing other distracted drivers can prevent you from perceiving or reacting correctly in time to prevent a crash. Watch for:

‡ 9HKLFOHV WKDW PD\ GULIW RYHU ... their own lane.
‡ 9HKLFOHV WUDYHOLQJ DW LQFRQVLVWHQW VSHHGV
- Drivers who are preoccupied with maps, food, cigarettes, cell phones, or other objects.
- Drivers who appear to be involved in conversations with their passengers.

Give a distracted driver plenty of room and maintain your safe following distance.

Be very careful when passing a driver who seems to be distracted. The other driver may not be aware of your presence, and they may drift in front of you.

2.10 – Aggressive Drivers/Road Rage

2.10.1 – What Is It?

Aggressive driving and road rage is not a new problem. However, LQ WRGD\¶V ZRUOG ZKHUH KHDY\ DQG VORZ PRYLQJ WUDvF DQG WLJKW schedules are the norm, more and more drivers are taking out their anger and frustration in their vehicles.

Crowded roads leave little room for error, leading to suspicion and hostility among drivers and encouraging them to take personally the mistakes of other drivers.

Aggressive driving is the act of operating a motor vehicle in a VHO¿VK EROG RU SXVK\ PDQQHU ZLWK... DUG IRU WKH ULJKWV RU safety of others. An aggressive driver may change lanes abruptly and without warning, for instance.

Road rage is operating a motor vehicle with the intent of doing harm to others or physically assaulting a driver or their vehicle.

2.10.2 – Don't Be an Aggressive Driver

How you feel before you even start your vehicle has a lot to do ZLWK KRZ VWUHVV ZLOO DuHFW \RX ZKLOH GULYLQJ...

- Reduce your stress before and while you drive. Listen to "easy listening" music.
- Give the drive your full attention. Don't allow yourself to become distracted by talking on your cell phone, eating, etc.
- Be realistic about your travel time. Expect delays because of WUDvF FRQVWUXFWLRQ RU EDG ZHDWKHU DQG PDNH DOORZDQFHV
- If you're going to be later than you expected – deal with it. Take a deep breath and accept the delay.

‡ *LYH RWKHU GULYHUV WKH EHQH¿W why he or she is driving that way. Whatever their reason, it has nothing to do with you.
- Slow down and keep your following distance reasonable.

‡ 'RQ¶W GULYH VORZO\ LQ WKH OHIW O
- Avoid gestures. Keep your hands on the wheel. Avoid making any gestures that might anger another driver, even seemingly harmless expressions of irritation like shaking your head.
- Be a cautious and courteous driver. If another driver seems eager to get in front of you, say, "Be my guest." This response ZLOO VRRQ EHFRPH D KDELW DQG \R other drivers' actions.

2.10.3 – What You Should Do When Confronted by an Aggressive Driver

- First and foremost, make every attempt to get out of their way.
- Put your pride in the back seat. Do not challenge them by speeding up or attempting to hold-your-own in your travel lane.
- Avoid eye contact.
- Ignore gestures and refuse to react to them.
- Report aggressive drivers to the appropriate authorities by providing a vehicle description, license number, location and, if possible, direction of travel.
- If an aggressive driver is involved in a crash farther down the road, stop a safe distance from the crash scene, wait for the police to arrive, and report the driving behavior that you witnessed.

SUBSECTIONS 2.9 AND 2.10

TEST YOUR KNOWLEDGE

1. What are some tips to follow so you won't become a distracted driver?
2. What can keep you from being distracted while you drive?
3. How do you recognize a distracted driver?
4. :KDW LV WKH GLuHUHQFH EHWZHHQ ... road rage?
5. What should you do when confronted with an aggressive driver?
6. What are some things you can do to reduce your stress before and while you drive?

These questions may be on the test. If you can't answer them all, re-read subsections 2.9 and 2.10.

2.11 – Driving at Night

2.11.1 – It's More Dangerous

You are at greater risk when you drive at night. Drivers can't see hazards as quickly as in daylight, so they have less time to respond. Drivers caught by surprise are less able to avoid a crash.

The problems of night driving involve the driver, the roadway, and the vehicle.

2.11.2 – Driver Factors

Vision. People can't see as sharply at night or in dim light. Also, their eyes need time to adjust to seeing in dim light. Most people have noticed this when walking into a dark movie theater.

Glare. Drivers can be blinded for a short time by bright light. It takes time to recover from this blindness. Older drivers are especially bothered by glare. Most people have been temporarily blinded by FDPHUD ÀDVK XQLWV RU E\ WKH KLJK EHDPV RI DQ RQFRPLQJ YHKLFOH ,W can take several seconds to recover from glare. Even two seconds of glare blindness can be dangerous. A vehicle going 55 mph will WUDYHO PRUH WKDQ KDOI WKH GLVWDQFH RI D IRRWEDOO ¿HOG GXULQJ WKDW Don't look directly at bright lights when driving. Look at the right side of the road. Watch the sidelines or fog lines when someone coming toward you has very bright lights on.

Fatigue and Lack of Alertness. Fatigue (being tired) and lack of alertness are bigger problems at night. The body's need for sleep is beyond a person's control. Most people are less alert at night, especially after midnight. This is particularly true if you have been driving for a long time. Drivers may not see hazards as soon, or react as quickly, so the chance of a crash is greater. If you are sleepy, WKH RQO\ VDIH FXUH LV WR JHW Ru WKH URDG DQG JHW VRPH VOHHS ,I \RX don't, you risk your life and the lives of others.

2.11.3 – Roadway Factors

Poor Lighting. In the daytime there is usually enough light to see well. This is not true at night. Some areas may have bright street lights, but many areas will have poor lighting. On most roads you will probably have to depend entirely on your headlights.

Less light means you will not be able to see hazards as well as in daytime. Road users who do not have lights are hard to see. There are many accidents at night involving pedestrians, joggers, bicyclists, and animals.

(YHQ ZKHQ WKHUH DUH OLJKWV WKH URDG VFHQH FDQ EH FRQIXVLQJ 7UDI¿F signals and hazards can be hard to see against a background of signs, shop windows, and other lights.

Drive slower when lighting is poor or confusing.

Drive slowly enough to be sure you can stop in the distance you can see ahead.

Drunk Drivers. 'UXQN GULYHUV DQG GULYHUV XQGHU WKH LQÀXHQFH RI drugs are a hazard to themselves and to you. Be especially alert around the closing times for bars and taverns. Watch for drivers who have trouble staying in their lane or maintaining speed, who stop ZLWKRXW UHDVRQ RU VKRZ RWKHU VLJQV RI EHLQJ XQGHU WKH LQÀXHQFH of alcohol or drugs.

2.11.4 – Vehicle Factors

Headlights. At night your headlights will usually be the main source of light for you to see by and for others to see you. You can't see nearly as much with your headlights as you see in the daytime. With low beams you can see ahead about 250 feet and with high beams about 350-500 feet. You must adjust your speed to keep your stopping distance within your sight distance. This means going slowly enough to be able to stop within the range of your headlights. Otherwise, by the time you see a hazard, you will not have time to stop.

Night driving can be more dangerous if you have problems with your headlights. Dirty headlights may give only half the light they should. This cuts down your ability to see, and makes it harder for others to see you. Make sure your lights are clean and working. Headlights can be out of adjustment. If they don't point in the right direction, they won't give you a good view and they can blind other GULYHUV +DYH D TXDOL¿HG SHUVRQ PDN

Other Lights. In order for you to be seen easily, the following must be clean and working properly:

‡ 5HÀHFWRUV

- Marker lights.
- Clearance lights.
- Taillights.

‡ ,GHQWL¿FDWLRQ OLJKWV

Turn Signals and Brake Lights. At night your turn signals and brake lights are even more important for telling other drivers what you intend to do. Make sure you have clean, working turn signals and stop lights.

Windshield and Mirrors. It is more important at night than in the daytime to have a clean windshield and clean mirrors. Bright lights at night can cause dirt on your windshield or mirrors to create a glare of its own, blocking your view. Most people have experienced driving toward the sun just as it has risen or is about to set, and found that they can barely see through a windshield that seemed to look OK in the middle of the day. Clean your windshield on the inside and outside for safe driving at night.

2.11.5 – Night Driving Procedures

Pre-trip Procedures. Make sure you are rested and alert. If you are drowsy, sleep before you drive! Even a nap can save your life or the lives of others. If you wear eyeglasses, make sure they are clean and unscratched. Don't wear sunglasses at night. Do a complete pre-trip inspection of your vehicle. Pay attention to checking all OLJKWV DQG UHÀHFWRUV DQG FOHDQLQ

Avoid Blinding Others. Glare from your headlights can cause problems for drivers coming toward you. They can also bother drivers going in the same direction you are, when your lights shine in their rearview mirrors. Dim your lights before they cause glare for other drivers. That means you should dim your lights within 500 feet of an oncoming vehicle. Oregon law requires you to dim your lights within 350 feet of a vehicle you are following.

Avoid Glare from Oncoming Vehicles. Do not look directly at lights of oncoming vehicles. Look slightly to the right at a right lane or edge marking, if available. If other drivers don't put their low beams on, don't try to "get back at them" by putting your own high beams on. This increases glare for oncoming drivers and increases the chance of a crash.

Use High Beams When You Can. Some drivers make the mistake of always using low beams. This seriously cuts down on their ability to see ahead. Use high beams when it is safe and legal to do so. Use them when you are not within 500 feet of an approaching vehicle. Also, don't let the inside of your cab get too bright. This makes it KDUGHU WR VHH RXWVLGH .HHS WKH LQWHULRU OLJKW Ru DQG DGMXVW \R instrument lights as low as you can to still be able to read the gauges.

If You Get Sleepy, Stop Driving at the Nearest Safe Place. People often don't realize how close they are to falling asleep even when their eyelids are falling shut. If you can safely do so, look at yourself in a mirror. If you look sleepy, or you just feel sleepy, stop driving! You are in a very dangerous condition. The only safe cure is to sleep.

2.12 – Driving in Fog

Fog can occur at any time. Fog on highways can be extremely dangerous. Fog is often unexpected, and visibility can deteriorate rapidly. You should watch for foggy conditions and be ready to reduce your speed. Do not assume that the fog will thin out after you enter it.

The best advice for driving in fog is don't. It is preferable that you SXOO Ru WKH URDG LQWR D UHVW DU If you must drive, be sure to consider the following:

- Obey all fog-related warning signs.
- Slow down before you enter fog.
- Use low-beam headlights and fog lights for best visibility even in daytime, and be alert for other drivers who may have forgotten to turn on their lights.
- Turn on your 4-way flashers. This will give vehicles approaching you from behind a quicker opportunity to notice your vehicle.
- Watch for vehicles on the side of the roadway. Seeing taillights or headlights in front of you may not be a true indication of where the road is ahead of you. The vehicle may not be on the road at all.

‡8VH URDGVLGH KLJKZD\ UHÀHFWRUV DV JXLGHV WR GHWHUPLQH KRZ the road may curve ahead of you.

‡/LVWHQ IRU WUDvF \RX FDQQRW VHH

- Avoid passing other vehicles.
- Don't stop along the side of the road, unless absolutely necessary.

2.13 – Driving in Winter

2.13.1 – Vehicle Checks

Make sure your vehicle is ready before driving in winter weather. You should make a regular pre-trip inspection, paying extra attention to the following items.

Coolant Level and Antifreeze Amount. Make sure the cooling system is full and there is enough antifreeze in the system to protect against freezing. This can be checked with a special coolant tester.

Defrosting and Heating Equipment. Make sure the defrosters work. They are needed for safe driving. Make sure the heater is working, and that you know how to operate it. If you use other heaters and expect to need them (e.g., mirror heaters, battery box heaters, fuel tank heaters), check their operation.

Wipers and Washers. Make sure the windshield wiper blades are in good condition. Make sure the wiper blades press against the window hard enough to wipe the windshield clean, otherwise WKH\ PD\ QRW VZHHS Ru VQRZ SURSHU ZDVKHU ZRUNV DQG WKHUH LV ZDVKLQJ Use windshield washer antifreeze to prevent freezing of the washer liquid. If you can't see well enough while driving (for example, if \RXU ZLSHUV IDLO VWRS VDIHO\ DQG

Tires. Make sure you have enough tread on your tires. The drive tires must provide traction to push the rig over wet pavement and through snow. The steering tires must have traction to steer the vehicle. Enough tread is especially important in winter conditions. You must have at least 4/32 inch tread depth in every major groove on front tires and at least 2/32 inch on other tires. More would be better. Use a gauge to determine if you have enough tread for safe driving.

Tire Chains. <RX PD\ ¿QG \RXUVHOI LQ FRQGL drive without chains, even to get to a place of safety. Carry the right number of chains and extra cross-links. Make sure they will ¿W \RXU GULYH WLUHV &KHFN WKH FK broken cross-links, and bent or broken side chains. Learn how to put the chains on before you need to do it in snow and ice. You should familiarize yourself with Oregon chain laws and requirements. Information is available from the Safety section on ODOT's Web page (https://www.tripcheck.com/Pages/chain-laws.asp).

/LJKWV DQG 5HÀHFWRUV 0DNH VXUH WKH OLJKWV DQ /LJKWV DQG UHÀHFWRUV DUH HVSHFLDO Check from time to time during bad weather to make sure they are clean and working properly.

Windows and Mirrors. Remove any ice, snow, etc., from the windshield, windows, and mirrors before starting. Use a windshield scraper, snow brush, and windshield defroster as necessary.

Hand Holds, Steps, and Deck Plates. Remove all ice and snow from hand holds, steps, and deck plates. This will reduce the danger of slipping.

Radiator Shutters and Winterfront. Remove ice from the radiator shutters. Make sure the winterfront is not closed too tightly. If the shutters freeze shut or the winterfront is closed too much, the engine may overheat and stop.

Exhaust System. Exhaust system leaks are especially dangerous when cab ventilation may be poor (windows rolled up, etc.). Loose connections could permit poisonous carbon monoxide to leak into your vehicle. Carbon monoxide gas will cause you to be sleepy. In large enough amounts it can kill you. Check the exhaust system for loose parts and for sounds and signs of leaks.

2.13.2 – Driving

Slippery Surfaces. Drive slowly and smoothly on slippery roads. ,I LW LV YHU\ VOLSSHU\ \RX VKRXOGQ safe place.

Start Gently and Slowly. :KHQ ¿UVW VWDUWLQJ J road. Don't hurry.

Check for Ice. Check for ice on the road, especially bridges and overpasses. A lack of spray from other vehicles indicates ice has formed on the road. Also, check your mirrors and wiper blades for ice. If they have ice, the road most likely will be icy as well.

Adjust Turning and Braking to Conditions. Make turns as gently as possible. Don't brake any harder than necessary, and don't use the engine brake or speed retarder. (They can cause the driving wheels to skid on slippery surfaces.)

Adjust Speed to Conditions. Don't pass slower vehicles unless necessary. Go slowly and watch far enough ahead to keep a steady speed. Avoid having to slow down and speed up. Take curves at slower speeds and don't brake while in curves. Be aware that as the temperature rises to the point where ice begins to melt, the road becomes even more slippery. Slow down more.

Adjust Space to Conditions. Don't drive alongside other vehicles. .HHS D ORQJHU IROORZLQJ GLVWDQFH .KHQ \RX VHH D WUDI¿F MDP DKHDG slow down or stop to wait for it to clear. Try hard to anticipate stops early and slow down gradually. Watch for snowplows, as well as salt and sand trucks, and give them plenty of room.

Wet Brakes. When driving in heavy rain or deep standing water, your brakes will get wet. Water in the brakes can cause the brakes to be weak, to apply unevenly, or to grab. This can cause lack of braking power, wheel lockups, pulling to one side or the other, and jackknife if you pull a trailer.

$YRLG GULYLQJ WKURXJK GHHS SXGGOHV RU ÀRZLQJ ZDWHU LI SRVVLEOH If you can't, you should:

- Slow down and place transmission in a low gear.
- Gently put on the brakes. This presses linings against brake drums or discs and keeps mud, silt, sand, and water from getting in.
- Increase engine rpm and cross the water while keeping light pressure on the brakes.
- When out of the water, maintain light pressure on the brakes for a short distance to heat them up and dry them out.
- Make a test stop when safe to do so. Check behind to make sure no one is following, then apply the brakes to be sure they work well. If not, dry them out further as described above. (CAUTION: Do not apply too much brake pressure and accelerator at the same time, or you can overheat brake drums and linings.)

2.14 – Driving in Very Hot Weather

2.14.1 – Vehicle Checks

Do a normal pre-trip inspection, but pay special attention to the following items.

Tires. Check the tire mounting and air pressure. Inspect the tires every two hours or every 100 miles when driving in very hot weather. Air pressure increases with temperature. Do not let air out or the SUHVVXUH ZLOO EH WRR ORZ ZKHQ WKH WLUHV FRRO Ru ,I D WLUH LV WRR WR WRXFK UHPDLQ VWRSSHG XQWLO WKH WLUH FRROV Ru 2WKHUZLVH WKH PD\ EORZ RXW RU FDWFK ¿UH

Engine Oil. The engine oil helps keep the engine cool, as well as lubricating it. Make sure there is enough engine oil. If you have an oil temperature gauge, make sure the temperature is within the proper range while you are driving.

Engine Coolant. Before starting out, make sure the engine cooling system has enough water and antifreeze according to the engine manufacturer's directions. (Antifreeze helps the engine under hot conditions as well as cold conditions.) When driving, check the water temperature or coolant temperature gauge from time to time. Make sure that it remains in the normal range. If the gauge goes above the highest safe temperature, there may be something wrong WKDW FRXOG OHDG WR HQJLQH IDLOXU VRRQ DV VDIHO\ SRVVLEOH DQG WU\ WR

6RPH YHKLFOHV KDYH VLJKW JODVVHV containers, or coolant recovery containers. These permit you to check the coolant level while the engine is hot. If the container is not part of the pressurized system, the cap can be safely removed and coolant added even when the engine is at operating temperature.

Never remove the radiator cap or any part of the pressurized system until the system has cooled. Steam and boiling water can spray under pressure and cause severe burns. If you can touch the radiator cap with your bare hand, it is probably cool enough to open.

If coolant has to be added to a system without a recovery tank or RYHUÀRZ WDQN IROORZ WKHVH VWHSV

‡ 6KXW HQJLQH Ru
- Wait until engine has cooled.
- Protect hands (use gloves or a thick cloth).
‡ 7XUQ UDGLDWRU FDS VORZO\ WR WK pressure seal.
- Step back while pressure is released from cooling system.
- When all pressure has been released, press down on the cap and turn it further to remove it.
‡ 9LVXDOO\ FKHFN OHYHO RI FRRODQW D
- Replace cap and turn all the way to the closed position.

Engine Belts. Learn how to check v-belt tightness on your vehicle by pressing on the belts. Loose belts will not turn the water pump and/or fan properly. This will result in overheating. Also, check belts for cracking or other signs of wear.

Hoses. Make sure coolant hoses are in good condition. A broken KRVH ZKLOH GULYLQJ FDQ OHDG WR HQ

2.14.2 – Driving

Watch for Bleeding Tar. Tar in the road pavement frequently rises to the surface in very hot weather. Spots where tar "bleeds" to the surface are very slippery.

Go Slowly Enough to Prevent Overheating. High speeds create more heat for tires and the engine. In desert conditions, the heat may build up to the point where it is dangerous. The heat will increase FKDQFHV RI WLUH IDLOXUH RU HYHQ ¿U

SUBSECTIONS 2.11, 2.12, 2.13, AND 2.14

TEST YOUR KNOWLEDGE

1. You should use low beams whenever you can. True or False?
2. What should you do before you drive if you are drowsy?
 :KDW HuHFWV FDQ ZHW EUDNHV F these problems?
4. You should let air out of hot tires so the pressure goes back to normal. True or False?
5. You can safely remove the radiator cap as long as the engine isn't overheated. True or False?

These questions may be on the test. If you can't answer all of them, re-read subsections 2.11, 2.12, 2.13, and 2.14.

2.15 – Railroad-highway Crossings

Railroad-highway grade crossings are a special kind of intersecti where the roadway crosses train tracks. These crossings are alw dangerous. Every such crossing must be approached with th expectation that a train is coming.

2.15.1 – Types of Crossings

Passive Crossings. This type of crossing does not have any type RI WUDvF FRQWURO GHYLFH 7KH GHFLVLRQ WR VWRS RU SURFHHG UHVWV entirely in your hands. Passive crossings require you to recogni the crossing, search for any train using the tracks and decide WKHUH LV VXvFLHQW FOHDU VSDFH VLQJV have yellow circular advance warning signs, pavement marking and crossbucks to assist you in recognizing a crossing.

Active Crossings. 7KLV W\SH RI FURVVLQJ KD LQVWDOOHG DW WKH FURVVLQJ WR U QJ 7 DFWLYH GHYLFHV LQFOXGH ÀDVKLQJ HOOV ÀDVKLQJ UHG OLJKWV ZLWK EHOOV D

2.15.2 – Warning Signs and Devices

Advance Warning Signs. The round, black-on-yellow warning sign is placed ahead of a public railroad-highway crossing. Th advance warning sign tells you to slow down, look and listen fo the train, and be prepared to stop at the tracks if a train is comin See Figure 2.15.

Figure 2.15

Pavement Markings. Pavement markings mean the same as the advance warning sign. They consist of an "X" with the letters ""RR" and a no-passing marking on two-lane roads. See Figure 2.16.

Figure 2.16

There is also a no passing zone sign on two-lane roads. There may be a white stop line painted on the pavement before the railroad tracks. The front of a school bus must remain behind this line while stopped at the crossing.

Crossbuck Signs. This sign marks the grade crossing. It requires you to yield the right-of-way to the train. If there is no white line painted on the pavement, you must stop the bus before the crossbuck sign. When the road crosses over more than one set of tracks, a sign below the crossbuck indicates the number of tracks. See Figure 2.17

Figure 2.17

Flashing Red Light Signals. At many highway-rail grade crossings, WKH FURVVEXFN VLJQ KDV ÀDVKLQJ UHG OLJKWV DQG EHOOV :KHQ WKH OLJK EHJLQ WR ÀDVK VWRS $ WUDLQ LV DSSURDFKLQJ <RX DUH UHTXLUHG WR \LH the right-of-way to the train. If there is more than one track, make sure all tracks are clear before crossing. See Figure 2.18.

Gates. 0DQ\ UDLOURDG KLJKZD\ FURVVLQJV KDYH JDWHV ZLWK ÀDVKLQJ UHG OLJKWV DQG EHOOV 6WRS ZKHQ WKH OLJKWV EHJLQ WR ÀDVK DQG EHIR the gate lowers across the road lane. Remain stopped until the JDWHV JR XS DQG WKH OLJKWV KDYH VWRSSHG ÀDVKLQJ 3URFHHG ZKHQ LW is safe. See Figure 2.18.

2.15.3 – Driving Procedures

Never Race a Train to a Crossing. Never attempt to race a train WR D FURVVLQJ ,W LV H[WUHPHO\ GLvFXOW WR MXGJH WKH VSHHG RI DQ approaching train.

Reduce Speed. Speed must be reduced in accordance with your ability to see approaching trains in any direction, and speed must be held to a point which will permit you to stop short of the tracks in case a stop is necessary.

Don't Expect to Hear a Train. Because of noise inside your vehicle, you cannot expect to hear the train horn until the train is dangerously close to the crossing.

Don't Rely on Signals. You should not rely solely upon the presence RI ZDUQLQJ VLJQDOV JDWHV RU ÀDJPHQ WR ZDUQ RI WKH DSSURDFK RI trains. Be especially alert at crossings that do not have gates or ÀDVKLQJ UHG OLJKW VLJQDOV

Double Tracks Require a Double Check. Remember that a train on one track may hide a train on the other track. Look both ways before crossing. After one train has cleared a crossing, be sure no other trains are near before starting across the tracks.

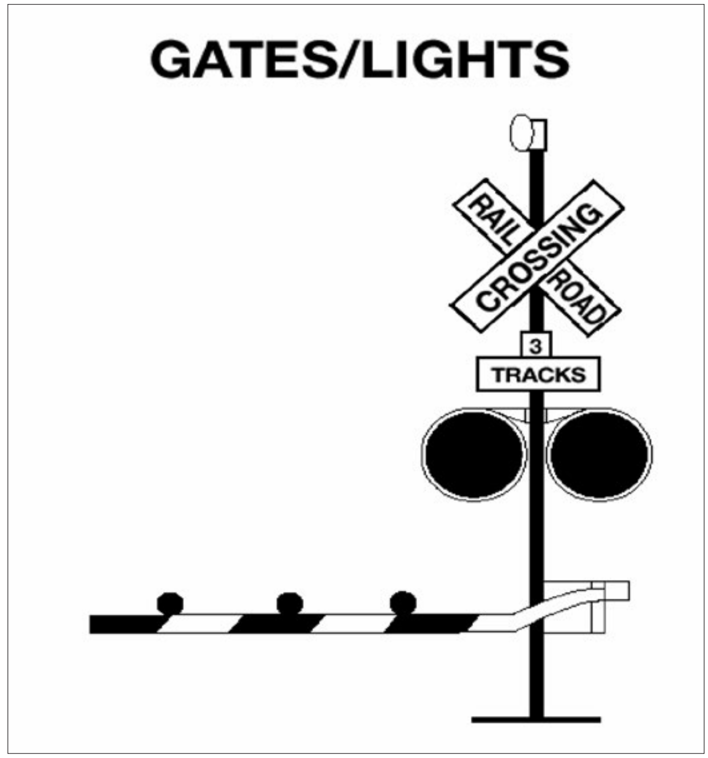


Figure 2.18

Yard Areas and Grade Crossings in Cities and Towns. Yard areas and grade crossings in cities and towns are just as dangerous as rural grade crossings. Approach them with as much caution.

2.15.4 – Stopping Safely at Railroad- highway Crossings

A full stop is required at grade crossings whenever:

- The nature of the cargo makes a stop mandatory under state or federal regulations.
- Such a stop is otherwise required by law (In Oregon, refer to ORS 811.455 through 811.475).

When stopping be sure to:

‡&KHFN IRU WUDvF EHKLQG \RX ZKLOH pullout lane, if available.
‡7XUQ RQ \RXU IRXU ZD\ HPHUJHQF\ À

2.15.5 – Crossing the Tracks

Railroad crossings with steep approaches can cause your unit to hang up on the tracks.

1HYHU SHUPLW WUDvF FRQGLWLRQV WR have to stop on the tracks. Be sure you can get all the way across the tracks before you start across. It takes a typical tractor-trailer unit at least 14 seconds to clear a single track and more than 15 seconds to clear a double track.

Do not shift gears while crossing railroad tracks.

2.15.6 – Special Situations

Be Aware! These trailers can get stuck on raised crossings:

- Low slung units (lowboy, car carrier, moving van, possum-belly livestock trailer).
- Single-axle tractor pulling a long trailer with its landing gear set to accommodate a tandem-axle tractor.

If for any reason you get stuck on the tracks, get out of the vehicle and away from the tracks. Check signposts or signal housing at WKH FURVVLQJ IRU HPHUJHQF\ QRWLFDWLRQ LQIRUPDWLRQ &DOO RU other emergency number. Give the location of the crossing using DOO LGHQWL¿DEOH ODQGPDUNV HVSHFLDOO\ WKH '27 QXPEHU LI SRVWHG

2.16 – Mountain Driving

In mountain driving, gravity plays a major role. On any upgrade, gravity slows you down. The steeper the grade, the longer the grade, and/or the heavier the load--the more you will have to use lower gears to climb hills or mountains. In coming down long, steep downgrades, gravity causes the speed of your vehicle to increase. You must select an appropriate safe speed, then use a low gear, and proper braking techniques. You should plan ahead and obtain information about any long, steep grades along your planned route of travel. If possible, talk to other drivers who are familiar with the JUDGHV WR ¿QG RXW ZKDW VSHHGV DUH VDIH

You must go slowly enough so your brakes can hold you back without getting too hot. If the brakes become too hot, they may start to “fade.” This means you have to apply them harder and harder to get the same stopping power. If you continue to use the brakes hard, they can keep fading until you cannot slow down or stop at all.

2.16.1 – Select a “Safe” Speed

Your most important consideration is to select a speed that is not too fast for the:

- Total weight of the vehicle and cargo.
- Length of the grade.
- Steepness of the grade.
- Road conditions.
- Weather.

If a speed limit is posted, or there is a sign indicating “Maximum Safe Speed,” never exceed the speed shown. Also, look for and heed warning signs indicating the length and steepness of the grade.

<RX PXVW XVH WKH EUDNLQJ HuHFW RI WKH HQJLQH DV WKH SULQFLSDO ZD\ RI FRQWUROOLQJ \RXU VSHHG 7KH EUDNLQJ HuHFW RI WKH HQJLQH LV JUHDWHVW when it is near the governed rpms and the transmission is in the lower gears. Save your brakes so you will be able to slow or stop DV UHTXLUHG E\ URDG DQG WUDvF FRQGLWLRQV

2.16.2 – Select the Right Gear Before Starting Down the Grade

Shift the transmission to a low gear before starting down the grade. Do not try to downshift after your speed has already built up. You will not be able to shift into a lower gear. You may not even be DEOH WR JHW EDFN LQWR DQ\ JHDU DQG DOO HQJLQH EUDNLQJ HuHFW ZLOO EH lost. Forcing an automatic transmission into a lower gear at high speed could damage the transmission and also lead to loss of all HQJLQH EUDNLQJ HuHFW

With older trucks, a rule for choosing gears is to use the same gear going down a hill that you would need to climb the hill. However, new trucks have low friction parts and streamlined shapes for fuel economy. They may also have more powerful engines. This means they can go up hills in higher gears and have less friction and air drag to hold them back going down hills. For that reason, drivers of modern trucks may have to use lower gears going down a hill than would be required to go up the hill. You should know what is right for your vehicle.

2.16.3 – Brake Fading or Failure

Brakes are designed so brake shoes or pads rub against the brake drum or disks to slow the vehicle. Braking creates heat, but brakes are designed to take a lot of heat. However, brakes can fade or fail from excessive heat caused by using them too much and not relying RQ WKH HQJLQH EUDNLQJ HuHFW

%UDNH IDGH LV DOVR DuHFWHG E\ DG vehicle, every brake must do its share of the work. Brakes out of adjustment will stop doing their share before those that are in adjustment. The other brakes can then overheat and fade, and there will not be enough braking available to control the vehicle. Brakes can get out of adjustment quickly, especially when they are used a lot; also, brake linings wear faster when they are hot. Therefore, brake adjustment must be checked frequently.

2.16.4 – Proper Braking Technique

Remember, the use of brakes on a long and/or steep downgrade is only D VXSSOHPHQW WR WKH EUDNLQJ HuHFW in the proper low gear, the following is the proper braking technique:

- ‡ $SSO\ WKH EUDNHV MXVW KDUG HQRX
- ‡ :KHQ \RXU VSHHG KDV EHHQ UHGXF mph below your “safe” speed, release the brakes. (This brake application should last for about three seconds.)
- When your speed has increased to your “safe” speed, repeat steps 1 and 2.

For example, if your “safe” speed is 40 mph, you would not apply the brakes until your speed reaches 40 mph. You now apply the brakes hard enough to gradually reduce your speed to 35 mph and then release the brakes. Repeat this as often as necessary until you have reached the end of the downgrade.

Escape ramps have been built on many steep mountain downgrades. Escape ramps are made to stop runaway vehicles safely without injuring drivers and passengers. Escape ramps use a long bed of loose, soft material to slow a runaway vehicle, sometimes in combination with an upgrade.

Know escape ramp locations on your route. Signs show drivers where ramp are located. Escape ramps save lives, equipment and cargo.

SUBSECTIONS 2.15 AND 2.16

TEST YOUR KNOWLEDGE

1. What factors determine your selection of a "safe" speed when going down a long, steep downgrade?
2. Why should you be in the proper gear before starting down a hill?
3. Describe the proper braking technique when going down a long, steep downgrade.
4. What type of vehicles can get stuck on a railroad-highway crossing?
5. How long does it take for a typical tractor-trailer unit to clear a double track?

These questions may be on the test. If you can't answer them all, re-read subsections 2.15 and 2.16.

2.17 – Driving Emergencies

7UDvF HPHUJHQFLHV RFFXU ZKHQ WZR YHKLFOHV DUH DERXW WR FROOLGH 9HKLFOH HPHUJHQFLHV RFFXU ZKHQ WLUHV EUDNHV RU RWKHU FULWLFDO S fail. Following the safety practices in this manual can help prevent emergencies. But if an emergency does happen, your chances of avoiding a crash depend upon how well you take action. Actions you can take are discussed below.

2.17.1 – Steering to Avoid a Crash

Stopping is not always the safest thing to do in an emergency. When you don't have enough room to stop, you may have to steer away from what's ahead. Remember, you can almost always turn to miss an obstacle more quickly than you can stop. (However, top-heavy YHKLFOHV DQG WUDFWRUV ZLWK PXOWLSOH WUDLOHUV PD\ ÀLS RYHU

Keep Both Hands on the Steering Wheel. In order to turn quickly, \RX PXVW KDYH D ¿UP JULS RQ WKH VWHHULQJ ZKHHO ZLWK ERWK KDQGV 7KH best way to have both hands on the wheel, if there is an emergency, is to keep them there all the time.

How to Turn Quickly and Safely. A quick turn can be made safely, if it's done the right way. Here are some points that safe drivers use:

- Do not apply the brake while you are turning. It's very easy to lock your wheels while turning. If that happens, you may skid out of control.
- Do not turn any more than needed to clear whatever is in your way. The more sharply you turn, the greater the chances of a skid or rollover.
- Be prepared to "countersteer," that is, to turn the wheel back in the other direction, once you've passed whatever was in your path. Unless you are prepared to countersteer, you won't be able to do it quickly enough. You should think of emergency steering and countersteering as two parts of one driving action.

Where to Steer. If an oncoming driver has drifted into your lane, a move to your right is best. If that driver realizes what has happened, the natural response will be to return to his or her own lane.

If something is blocking your path, the best direction to steer will depend on the situation.

- If you have been using your mirrors, you'll know which lane is empty and can be safely used.
- If the shoulder is clear, going right may be best. No one is likely to be driving on the shoulder but someone may be passing you on the left. You will know if you have been using your mirrors.
- If you are blocked on both sides, a move to the right may be EHVW $W OHDVW \RX ZRQ¶W IRUFH D lane and a possible head-on collision.

Leaving the Road. In some emergencies, you may have to drive Ru WKH URDG ,W PD\ EH OHVV ULVN\ WK vehicle.

Most shoulders are strong enough to support the weight of a large YHKLFOH DQG WKHUHIRUH RuHU DQ D some guidelines, if you do leave the road.

- Avoid Braking. If possible, avoid using the brakes until your speed has dropped to about 20 mph. Then brake very gently to avoid skidding on a loose surface.
- Keep One Set of Wheels on the Pavement, if Possible. This helps to maintain control.
- Stay on the Shoulder. If the shoulder is clear, stay on it until your vehicle has come to a stop. Signal and check your mirrors before pulling back onto the road.

Returning to the Road. If you are forced to return to the road before you can stop, use the following procedure:

- Hold the wheel tightly and turn sharply enough to get right back on the road safely. Don't try to edge gradually back on the road. If you do, your tires might grab unexpectedly and you could lose control.
- When both front tires are on the paved surface, countersteer immediately. The two turns should be made as a single "steer-countersteer" move.

2.17.2 – How to Stop Quickly and Safely

If somebody suddenly pulls out in front of you, your natural response is to hit the brakes. This is a good response if there's enough distance to stop, and you use the brakes correctly.

You should brake in a way that will keep your vehicle in a straight line and allow you to turn if it becomes necessary. You can use the "controlled braking" method or the "stab braking" method.

Controlled Braking. With this method, you apply the brakes as hard as you can without locking the wheels. Keep steering wheel movements very small while doing this. If you need to make a larger steering adjustment or if the wheels lock, release the brakes. Re-apply the brakes as soon as you can.

Stab Braking

- Apply your brakes all the way.
- Release brakes when wheels lock up.
- As soon as the wheels start rolling, apply the brakes fully again. (It can take up to one second for the wheels to start rolling after you release the brakes. If you re-apply the brakes before the wheels start rolling, the vehicle won't straighten out.)

Don't Jam on the Brakes. Emergency braking does not mean pushing down on the brake pedal as hard as you can. That will only keep the wheels locked up and cause a skid. If the wheels are skidding, you cannot control the vehicle.

2.17.3 – Brake Failure

Brakes kept in good condition rarely fail. Most hydraulic brake failures occur for one of two reasons: (Air brakes are discussed in Section 5.)

- Loss of hydraulic pressure.
- Brake fade on long hills.

Loss of Hydraulic Pressure. When the system won't build up SUHVVXUH WKH EUDNH SHGDO ZLOO IHHO VSRQJ\ RU JR WR WKH ÀRRU +HUH are some things you can do.

Downshift. Putting the vehicle into a lower gear will help to slow the vehicle.

Pump the Brakes. Sometimes pumping the brake pedal will generate enough hydraulic pressure to stop the vehicle.

Use the Parking Brake. The parking or emergency brake is separate from the hydraulic brake system. Therefore, it can be used to slow the vehicle. However, be sure to press the release button or pull the release lever at the same time you use the emergency brake so you can adjust the brake pressure and keep the wheels from locking up.

Find an Escape Route. While slowing the vehicle, look for an HVFDSH URXWH DQ RSHQ ¿HOG VLGH VWUHHW RU HVFDSH UDPS 7XUQLQJ uphill is a good way to slow and stop the vehicle. Make sure the vehicle does not start rolling backward after you stop. Put it in low gear, apply the parking brake, and, if necessary, roll back into some obstacle that will stop the vehicle.

Brake Failure on Downgrades. Going slow enough and braking properly will almost always prevent brake failure on long downgrades. Once the brakes have failed, however, you are going to have to look outside your vehicle for something to stop it.

Your best hope is an escape ramp. If there is one, there'll be signs telling you about it. Use it. Ramps are usually located a few miles from the top of the downgrade. Every year, hundreds of drivers avoid injury to themselves or damage to their vehicles by using escape ramps. Some escape ramps use soft gravel that resists the motion of the vehicle and brings it to a stop. Others turn uphill, using the hill to stop the vehicle and soft gravel to hold it in place.

Any driver who loses brakes going downhill should use an escape ramp if it's available. If you don't use it, your chances of having a serious crash may be much greater.

If no escape ramp is available, take the least hazardous escape URXWH \RX FDQ VXFK DV DQ RSHQ ¿HOG RU D VLGH URDG WKDW ÀDWWHQV R or turns uphill. Make the move as soon as you know your brakes don't work. The longer you wait, the faster the vehicle will go, and the harder it will be to stop.

2.17.4 – Tire Failure

Recognize Tire Failure. Quickly knowing you have a tire failure will let you have more time to react. Having just a few extra seconds to remember what it is you're supposed to do can help you. The major signs of tire failure are:

- Sound. The loud "bang" of a blowout is an easily recognized sign. Because it can take a few seconds for your vehicle to react, you might think it was some other vehicle. But any time you hear a tire blow, you'd be safest to assume it is yours.

‡9LEUDWLRQ ,I WKH YHKLFOH WKXPSV\
D VLJQ WKDW RQH RI WKH WLUHV KD
may be the only sign you get.

- Feel. If the steering feels "heavy," it is probably a sign that one of the front tires has failed. Sometimes, failure of a rear WLUH ZLOO FDXVH WKH YHKLFOH WR However, dual rear tires usually prevent this.

Respond to Tire Failure. When a tire fails, your vehicle is in danger. You must immediately:

- Hold the Steering Wheel Firmly. If a front tire fails, it can twist the steering wheel out of your hand. The only way to SUHYHQW WKLV LV WR NHHS D ¿UP J both hands at all times.

‡6WD\ 2uWKH %UDNH ,W¶V QDWXUDO W
However, braking when a tire has failed could cause loss of FRQWURO 8QOHVV \RX¶UH DERXW W the brake until the vehicle has slowed down. Then brake very JHQWO\ SXOO Ru WKH URDG DQG VW

- Check the Tires. After you've come to a stop, get out and check all the tires. Do this even if the vehicle seems to be handling all right. If one of your dual tires goes, the only way you may know it is by getting out and looking at it.

2.18 – Antilock Braking Systems (ABS)

ABS is a computerized system that keeps your wheels from locking up during hard brake applications.

ABS is an addition to your normal brakes. It does not decrease or increase your normal braking capability. ABS only activates when wheels are about to lock up.

ABS does not necessarily shorten your stopping distance, but it does help you keep the vehicle under control during hard braking.

2.18.1 – How Antilock Braking Systems Work

Sensors detect potential wheel lock up. An electronic control unit (ECU) will then decrease brake pressure to avoid wheel lockup.

Brake pressure is adjusted to provide the maximum braking without danger of lockup.

ABS works far faster than the driver can respond to potential wheel lockup. At all other times the brake system will operate normally.

2.18.2 – Vehicles Required to Have Antilock Braking Systems

The Department of Transportation requires that ABS be on:

- Truck tractors with air brakes built on or after March 1, 1997.
- Other air brake vehicles, (trucks, buses, trailers, and converter dollies) built on or after March 1, 1998.
- Hydraulically braked trucks and buses with a gross vehicle weight rating of 10,000 pounds or more built on or after March 1, 1999.

Many commercial vehicles built before these dates have been voluntarily equipped with ABS.

2.18.3 – How to Know If Your Vehicle Is Equipped with ABS

Tractors, trucks, and buses will have yellow ABS malfunction lamps on the instrument panel.

Trailers will have yellow ABS malfunction lamps on the left side, either on the front or rear corner.

Dollies manufactured on or after March 1, 1998, are required to have a lamp on the left side.

As a system check on newer vehicles, the malfunction lamp comes on at start-up for a bulb check, and then goes out quickly. On older V\VWHPV WKH ODPS FRXOG VWD\ RQ

If the lamp stays on after the bulb check, or goes on once you are under way, you may have lost ABS control.

In the case of towed units manufactured before it was required by WKH 'HSDUWPHQW RI 7UDQVSRUWDWLRQ LW PD\ EH GLvFXOW WR WHOO LI W unit is equipped with ABS. Look under the vehicle for the ECU and wheel speed sensor wires coming from the back of the brakes.

2.18.4 – How ABS Helps You

When you brake hard on slippery surfaces in a vehicle without ABS, your wheels may lock up. When your steering wheels lock up, you lose steering control. When your other wheels lock up, you may skid, jackknife, or even spin the vehicle.

ABS helps you avoid wheel lock up and maintain control. You may or may not be able to stop faster with ABS, but you should be able to steer around an obstacle while braking, and avoid skids caused by over braking.

2.18.5 – ABS on the Tractor Only or Only on the Trailer

Having ABS on only the tractor, only the trailer, or even on only one axle, still gives you more control over the vehicle during braking. Brake normally.

When only the tractor has ABS, you should be able to maintain VWHHULQJ FRQWURO DQG WKHUH LV OHVV FKDQFH RI MDFNNQLILQJ %XW NH your eye on the trailer and let up on the brakes (if you can safely do so) if it begins to swing out.

When only the trailer has ABS, the trailer is less likely to swing out, but if you lose steering control or start a tractor jackknife, let up on the brakes (if you can safely do so) until you regain control.

2.18.6 – Braking with ABS

When you drive a vehicle with ABS, you should brake as you always have. In other words:

- Use only the braking force necessary to stop safely and stay in control.
- Brake the same way, regardless of whether you have ABS on the bus, tractor, the trailer, or both.
- As you slow down, monitor your tractor and trailer and back Ru WKH EUDNHV LI LW LV VDIH WR GR VR WR VWD\ LQ FRQWURO

There is only one exception to this procedure. If you drive a straight truck or combination with working ABS on all axles, in an emergency stop, you can fully apply the brakes.

2.18.7 – Braking If ABS Is Not Working

Without ABS you still have normal brake functions. Drive and brake as you always have.

9HKLFOHV ZLWK $%6 KDYH \HOORZ PDO something isn't working.

As a system check on newer vehicles, the malfunction lamp comes on at start-up for a bulb check and then goes out quickly. On older V\VWHPV WKH ODPS FRXOG VWD\ RQ XQ

If the lamp stays on after the bulb check, or goes on once you are under way, you may have lost ABS control on one or more wheels.

Remember, if your ABS malfunctions, you still have regular brakes. Drive normally, but get the system serviced soon.

2.18.8 – Safety Reminders

- ABS won't allow you to drive faster, follow more closely, or drive less carefully.
- ABS won't prevent power or turning skids–ABS should prevent brake-induced skids or jackknifes, but not those caused by spinning the drive wheels or going too fast in a turn.
- ABS won't necessarily shorten stopping distance. ABS will help maintain vehicle control, but not always shorten stopping distance.
- ABS won't increase or decrease ultimate stopping power–ABS is an "add-on" to your normal brakes, not a replacement for them.
- ABS won't change the way you normally brake. Under normal brake conditions, your vehicle will stop as it always stopped. ABS only comes into play when a wheel would normally have locked up because of over braking.
- ABS won't compensate for bad brakes or poor brake maintenance.
- Remember: The best vehicle safety feature is still a safe driver.
- Remember: Drive so you never need to use your ABS.
- Remember: If you need it, ABS could help to prevent a serious crash.

2.19 – Skid Control and Recovery

A skid happens whenever the tires lose their grip on the road. This is caused in one of four ways:

Over-braking. Braking too hard and locking up the wheels. Skids also can occur when using the speed retarder when the road is slippery.

Over-steering. Turning the wheels more sharply than the vehicle can turn.

Over-acceleration. Supplying too much power to the drive wheels, causing them to spin.

Driving Too Fast. Most serious skids result from driving too fast for road conditions. Drivers who adjust their driving to conditions don't over-accelerate and don't have to over-brake or over-steer from too much speed.

2.19.1 – Drive-wheel Skids

By far the most common skid is one in which the rear wheels lose traction through excessive braking or acceleration. Skids caused E\ DFFHOHUDWLRQ XVXDOO\ KDSSHQ RQ the accelerator can easily stop them. (If it is very slippery, push the clutch in. Otherwise, the engine can keep the wheels from rolling freely and regaining traction.)

Rear wheel braking skids occur when the rear drive wheels lock. Because locked wheels have less traction than rolling wheels, the rear wheels usually slide sideways in an attempt to "catch up" with the front wheels. In a bus or straight truck, the vehicle will slide sideways in a "spin out." With vehicles towing trailers, a drive-wheel skid can let the trailer push the towing vehicle sideways, causing a sudden jackknife. See Figure 2.19.

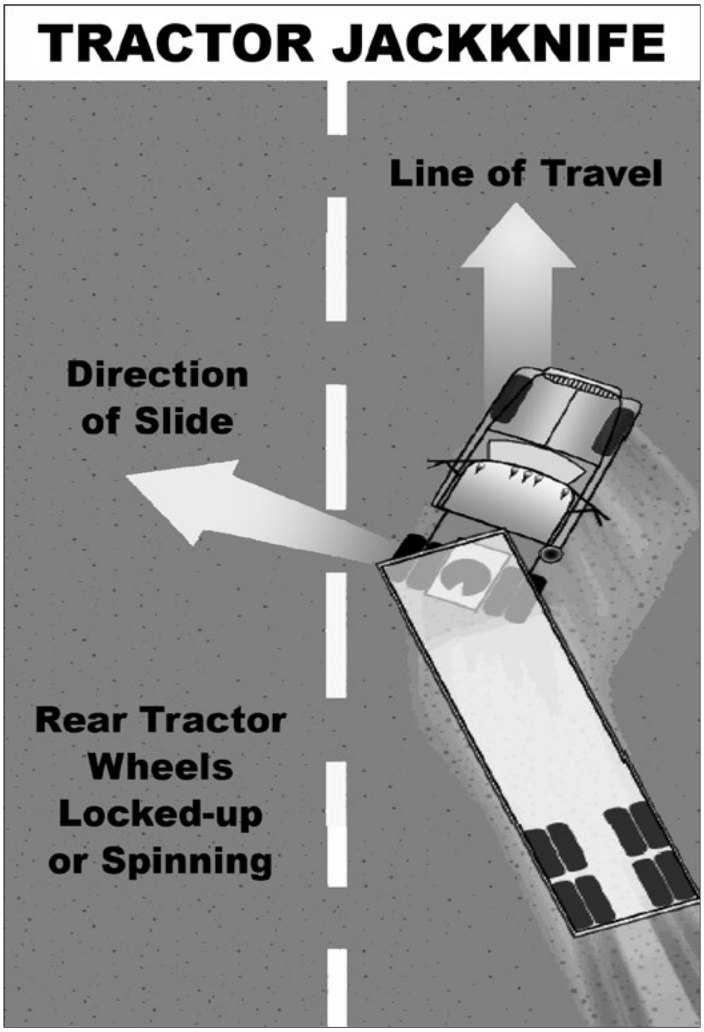


Figure 2.19

2.19.2 – Correcting a Drive-wheel Braking Skid

Do the following to correct a drive-wheel braking skid.

Stop Braking. This will let the rear wheels roll and keep them from sliding any more.

Turn the Wheel Quickly. Turn the wheel in the direction of the skid.

Countersteer.As a vehicle turns back on course, it has a tendency to keep on turning. Unless you turn the steering wheel quickly the RWKHU ZD\ \RX PD\ ¿QG \RXUVHOI VNLGGLQJ LQ WKH RSSRVLWH GLUHFWLRQ

/HDUQLQJ WR VWD\ Ru WKH EUDNH WXUQ WKH VWHHULQJ ZKHHO TXLFNO\ SX in the clutch, and countersteer in a skid takes a lot of practice. The best place to get this practice is on a large driving range or "skid pad."

2.19.3 – Front-wheel Skids

Driving too fast for conditions causes most front-wheel skids. Other causes include lack of tread on the front tires and cargo loaded so not enough weight is on the front axle. In a front-wheel skid, the front end tends to go in a straight line regardless of how much you turn the steering wheel. On a very slippery surface, you may not be able to steer around a curve or turn.

When a front-wheel skid occurs, the only way to stop the skid is to let the vehicle slow down. Stop turning and/or braking so hard. Slow down as quickly as possible without skidding.

SUBSECTIONS 2.17, 2.18, AND 2.19

TEST YOUR KNOWLEDGE

1. Stopping is not always the safest thing to do in an emergency. True or False?
2. What are some advantages of going right instead of left around an obstacle?
3. What is an "escape ramp?"
4. If a tire blows out, you should put the brakes on hard to stop quickly. True or False?
5. How do you know if your vehicle has antilock brakes?
6. What is the proper braking technique when driving a vehicle with antilock brakes?
7. How do antilock brakes help you?

These questions may be on the test. If you can't answer them all, re-read subsections 2.17, 2.18, and 2.19.

2.20 – Crash Procedures

When you're in a crash and not seriously hurt, you need to act to prevent further damage or injury. The basic steps to be taken at any crash are to:

- Protect the area.
- Notify authorities.
- Care for the injured.

2.20.1 – Protect the Area

7KH ¿UVW WKLQJ WR GR DW D FUDVK VI happening in the same spot. To protect the crash area:

- If your vehicle is involved in the crash, try to get it to the side of the road. This will help prevent another crash and allow WUDvF WR PRYH
- If you're stopping to help, park away from the crash. The area immediately around the accident will be needed for emergency vehicles.

‡ 3XW RQ \RXU ÀDVKHUV
‡ 6HW RXW UHÀHFWLYH WULDQJOHV W other drivers can see them in time to avoid the crash scene.

2.20.2 – Notify Authorities

If you have a cell phone or CB, call for assistance before you get out of your vehicle. If not, wait until after the crash scene has been properly protected, then phone or send someone to phone the police. Try to determine where you are so you can give the exact location.

2.20.3 – Care for the Injured

,I D TXDOL¿HG SHUVRQ LV DW WKH FUDVK DQG KHOSLQJ WKH LQMXUHG VWD\ of the way unless asked to assist. Otherwise, do the best you can to help any injured parties. Here are some simple steps to follow in giving assistance:

- ‡'RQ¶W PRYH D VHYHUHO\ LQMXUHG SHUVRQ XQOHVV WKH GDQJHU RI ¿UH RU SDVVLQJ WUD¿F PDNHV LW QHFHVVDU\
- Stop heavy bleeding by applying direct pressure to the wound.
- Keep the injured person warm.

2.21 – Fires

7UXFN ¿UHV FDQ FDXVH GDPDJH DQG LQMXU\ /HDUQ WKH FDXVHV RI ¿UHV DQG KRZ WR SUHYHQW WKHP .QRZ ZK

2.21.1 – Causes of Fire

7KH IROORZLQJ DUH VRPH FDXVHV RI YHKLFOH ¿UHV

- ‡$IWHU $FFLGHQWV 6SLOOHG IXHO LPSURSHU XVH RI ÀDUHV
- ‡7LUHV 8QGHU LQÀDWHG WLUHV DQG GXDOV WKDW WRXFK
- Electrical System. Short circuits due to damaged insulation, loose connections.
- Fuel. Driver smoking, improper fueling, loose fuel connections.
- Cargo. Flammable cargo, improperly sealed or loaded cargo, poor ventilation.

2.21.2 – Fire Prevention

Pay attention to the following:

- Pre-trip Inspection. Make a complete inspection of the electrical, fuel, and exhaust systems, tires, and cargo. Be su WR FKHFN WKDW WKH ¿UH H[WLQJ
- En Route Inspection. Check the tires, wheels, and truck bod for signs of heat whenever you stop during a trip.
- Follow Safe Procedures. Follow correct safety procedures fo IXHOLQJ WKH YHKLFOH XVLQJ EU DFWLYLWLHV WKDW FDQ FDXVH D ¿
- Monitoring. Check the instruments and gauges often for sign of overheating and use the mirrors to look for signs of smok from tires or the vehicle.
- ‡&DXWLRQ 8VH QRUPDO FDXWLRQ L

2.21.3 – Fire Fighting

.QRZLQJ KRZ WR ¿JKW ¿UHV LV LPSR Z ZKDW WR GR KDYH PDGH ¿UHV ZRUVH U works. Study the instructions printed on the extinguisher befor \RX QHHG LW +HUH DUH VRPH SURFH H

3XOO 2uWKH 5RDG 7KH ¿UVW VWHS LV WR JH and stop. In doing so:

- Park in an open area, away from buildings, trees, brush, oth YHKLFOHV RU DQ\WKLQJ WKDW PLJKW FDWFK ¿UH
- Don't pull into a service station!
- Notify emergency services of your problem and your location.

Keep the Fire from Spreading. %HIRUH WU\LQJ WR S make sure that it doesn't spread any further.

- ‡:LWK DQ HQJLQH ¿UH WXUQ Ru WKH Don't open the hood if you can avoid it. Shoot foam through louvers, radiator, or from the vehicle's underside.
- ‡)RU D FDUJR ¿UH LQ D YDQ RU ER[W especially if your cargo contains hazardous materials. Opening WKH YDQ GRRUV ZLOO VXSSO\ WKH ¿ it to burn very fast.

Extinguish the Fire. Here are some rules to follow in putting out D ¿UH

- ‡:KHQ XVLQJ WKH H[WLQJXLVKHU VWD possible.
- ‡$LP DW WKH VRXUFH RU EDVH RI WKH

Use the Right Fire Extinguisher.

- ‡DW ¿UVW ... GHWDLO WKH W\ E\ FODVV RI ¿UH
- ‡7KH % & W\SH ¿UH H[WLQJXLVKHU LV G ¿UHV DQG EXUQLQJ OLTXLGV
- The A:B:C type is designed to work on burning wood, paper, and cloth as well.
- Water can be used on wood, paper, or cloth, but don't use water RQ DQ HOHFWULFDO ¿UH FDQ FDXVH VSUHDG WKH ÀDPHV
- A burning tire must be cooled. Lots of water may be required.
- If you're not sure what to use, especially on a hazardous PDWHULDOV ¿UH ZDLW IRU ¿UH¿JKW
- Position yourself upwind. Let the wind carry the extinguisher WR WKH ¿UH
- Continue until whatever was burning has been cooled. Absence RI VPRNH RU ÀDPH GRHV QRW PHDQ

Class/Type of Fires	
Class	**Type**
A	Wood, Paper, Ordinary Combustibles **Extinguish by Cooling and Quenching Using Water or Dry Chemicals**
B	Gasoline, Oil, Grease, Other Greasy Liquids **Extinguish by Smothering, Cooling or Heat Shielding using carbon Dioxide or Dry Chemicals**
C	Electrical Equipment Fires **Extinguish with Nonconducting Agents such as Carbon Dioxide or Dry Chemicals. DO NOT USE WATER.**
D	Fires in Combustible Metals **Extinguish by Using Specialized Extinguishing Powders**

Figure 2.20

Class of Fire/Type of Extinguisher	
Class of Fire	**Fire Extinguisher Type**
B or C	Regular Dry Chemical
A, B, C, or D	Multi Purpose Dry Chemical
D	Purple K Dry Chemical
B or C	KCL Dry Chemical
D	Dry Powder Special Compound
B or C	Carbon Dioxide (Dry)
B or C	Halogenated Agent (Gas)
A	Water
A	Water With Anti-Freeze
A or B	Water, Loaded Steam Style
B, On Some A	Foam

Figure 2.21

SUBSECTIONS 2.20 AND 2.21

TEST YOUR KNOWLEDGE

1. What are some things to do at an accident scene to prevent another accident?
   1DPH WZR FDXVHV RI WLUH ¿UHV
   :KDW NLQGV RI ¿UHV LV D % & H[
4. When using your extinguisher, should you get as close DV SRVVLEOH WR WKH ¿UH"
   1DPH VRPH FDXVHV RI YHKLFOH

These questions may be on the test. If you can't answer them all, re-read subsections 2.20 and 2.21.

Effects Of Increasing Blood Alcohol Content		
Blood Alcohol Content is the amount of alcohol in your blood recorded in milligrams of alcohol per 100 millimeters of blood or milligrams. Your BAC depends on the amount of blood (which increases with weight) and the amount of alcohol you consume over time (how fast you drink). The faster you drink, the higher your BAC, as the liver can only handle about one drink per hour—the rest builds up in your blood.		
BAC	**Effects on Body**	**Effects on Driving Condition**
.02	Mellow feeling, slight body warmth.	Less inhibited.
.05	Noticeable relaxation.	Less alert, less self-focused, coordination impairment begins.
.08	Definite impairment in coordination & judgment.	Drunk driving limit, impaired coordination & judgment.
.10*	Noisy, possible embarrassing behavior, mood swings.	Reduction in reaction time.
.15	Impaired balance & movement, clearly drunk.	Unable to drive.
.30	Many lose consciousness.	
.40	Most lose consciousness, some die.	
.50	Breathing stops, many die.	
BAC of .10 means that 1/10 of 1 % (or 1/1000) of your total blood content is alcohol.		

Figure 2.22

2.22 – Alcohol, Other Drugs, and Driving

2.22.1 – Alcohol and Driving

Drinking alcohol and then driving is very dangerous and a serious SUREOHP 3HRSOH ZKR GULQN DOFRKRO resulting in over 20,000 deaths every year. Alcohol impairs muscle coordination, reaction time, depth perception, and night vision. ,W DOVR DuHFWV WKH SDUWV RI WKH EUDLQ WKDW FRQWURO MXGJPHQW D inhibition. For some people, one drink is all it takes to show signs of impairment.

How Alcohol Works. Alcohol goes directly into the blood stream and is carried to the brain. After passing through the brain, a small percentage is removed in urine, perspiration, and by breathing, while the rest is carried to the liver. The liver can only process one-third an ounce of alcohol per hour, which is considerably less WKDQ WKH DOFRKRO LQ D VWDQGDUG GULQN 7KLV LV D ¿[HG UDWH VR RQ WLPH QRW EODFN FRuHH RU D FROG VKRZHU ZLOO VREHU \RX XS ,I \RX have drinks faster than your body can get rid of them, you will have PRUH DOFRKRO LQ \RXU ERG\ DQG \RXU GULYLQJ ZLOO EH PRUH DuHFWHG The Blood Alcohol Concentration (BAC) commonly measures the amount of alcohol in your body. See Figure 2.22.

All of the following drinks contain the same amount of alcohol:

- A 12-ounce glass of 5% beer.
- A 5-ounce glass of 12% wine.
- A 1 1/2-ounce shot of 80 proof liquor.

What Determines Blood Alcohol Concentration? BAC is determined by the amount of alcohol you drink (more alcohol means higher BAC), how fast you drink (faster drinking means higher BAC), and your weight (a small person doesn't have to drink as much to reach the same BAC).

Alcohol and the Brain. $OFRKRO DuHFWV PRUH DQG %$& EXLOGV XS 7KH ¿UVW SDUW RI WKH and self-control. One of the bad things about this is it can keep drinkers from knowing they are getting drunk. And, of course, good judgment and self-control are absolutely necessary for safe driving.

As BAC continues to build up, muscle control, vision, and coordination DUH DuHFWHG PRUH DQG PRUH (uHFWV

- Straddling lanes.
- Quick, jerky starts.
- Not signaling, failure to use lights.
- Running stop signs and red lights.
- Improper passing.

See Figure 2.23.

What is a Drink?

It is the alcohol in drinks that affects human performance. It doesn't make any difference whether that alcohol comes from "a couple of beers," or from two glasses of wine, or two shots of hard liquor.

Approximate Blood Alcohol Content

Drinks	100	120	140	160	180	200	220	240	Effects
	Body Weight in Pounds								
0	.00	.00	.00	.00	.00	.00	.00	.00	Only Safe Driving Limit
1	.04	.03	.03	.02	.02	.02	.02	.02	Impairment Begins
2	.08	.06	.05	.05	.04	.04	.03	.03	Driving Skills Significantly Affected Criminal Penalties
3	.11	.09	.08	.07	.06	.06	.05	.05	
4	.15	.12	.11	.09	.08	.08	.07	.06	
5	.19	.16	.13	.12	.11	.09	.09	.08	
6	.23	.19	.16	.14	.13	.11	.10	.09	
7	.26	.22	.19	.16	.15	.13	.12	.11	Legally Intoxicated Criminal Penalties
8	.30	.25	.21	.19	.17	.15	.14	.13	
9	.34	.28	.24	.21	.19	.17	.15	.14	
10	.38	.31	.27	.23	.21	.19	.17	.16	

Subtract .01% for each 40 minutes of drinking. One drink is 1.5 oz of 80 proof liquor, 12 oz of beer, or 5 oz. of table wine.

Figure 2.23

7KHVH HuHFWV PHDQ LQFUHDVHG FKDQ losing your driver license. Accident statistics show that the chance of a crash is much greater for drivers who have been drinking than for drivers who have not.

+RZ $OFRKRO $uHFWV 'ULYLQJ GULYHUV DUH DuH DOFRKRO $OFRKRO DuHFWV MXGJPHQW time. It causes serious driving errors, such as:

- Increased reaction time to hazards.
- Driving too fast or too slow.
- Driving in the wrong lane.
- Running over the curb.
- Weaving.

2.22.2 – Other Drugs

Besides alcohol, other legal and illegal drugs are being used more often. Laws prohibit possession or use of many drugs while on GXW\ 7KH\ SURKLELW EHLQJ XQGHU WK substance," amphetamines (including "pep pills," "uppers," and "bennies"), narcotics, or any other substance, which can make the driver unsafe. This could include a variety of prescription and over-the-counter drugs (cold medicines), which may make the driver GURZV\ RU RWKHUZLVH DuHFW VDIH GUL and use of a drug given to a driver by a doctor is permitted if the GRFWRU LQIRUPV WKH GULYHU WKDW LW

Pay attention to warning labels for legitimate drugs and medicines, DQG WR GRFWRU¶V RUGHUV UHJDUGLQJ illegal drugs.

Don't use any drug that hides fatigue--the only cure for fatigue is UHVW $OFRKRO FDQ PDNH WKH HuHFWV safest rule is don't mix drugs with driving at all.

8VH RI GUXJV FDQ OHDG WR WUDvF DFF DQG SURSHUW\ GDPDJH)XUWKHUPRUH jail sentences. It can also mean the end of a person's driving career.

2.23 – Staying Alert and Fit to Drive

Driving a vehicle for long hours is tiring. Even the best of drivers will become less alert. However, there are things that good drivers do to help stay alert and safe.

2.23.1 – Be Ready to Drive

Get Enough SleepSleep is not like money. You can't save it up ahead of time and you can't borrow it. But, just as with money, you can go into debt with it. If you don't sleep enough, you "owe" PRUH VOHHS WR \RXUVHOI 7KLV GHEW You can't overcome it with willpower, and it won't go away by itself. The average person needs seven or eight hours of sleep every 24 hours. Leaving on a long trip when you're already tired is dangerous. If you have a long trip scheduled, make sure that you get enough sleep before you go.

Schedule Trips Safely.Try to arrange your schedule so you are not in "sleep debt" before a long trip. Your body gets used to sleeping during certain hours. If you are driving during those hours, you will be less alert. If possible, try to schedule trips for the hours you are normally awake. Many heavy motor vehicle accidents occur between midnight and 6 a.m. Tired drivers can easily fall asleep at these times, especially if they don't regularly GULYH DW WKRVH KRXUV 7U\LQJ WR SXVK RQ DQG ¿QLVK D ORQJ WULS D these times can be very dangerous.

Exercise Regularly.Resistance to fatigue and improved sleep are DPRQJ WKH EHQH¿WV RI UHJXODU H[HUFLVH 7U\ WR LQFRUSRUDWH H[HUFLVH LQWR \RXU GDLO\ OLIH ,QVWHDG RI VLWWLQJ DQG ZDWFKLQJ 79 LQ \RXU sleeper, walk or jog a few laps around the parking lot. A little bit of daily exercise will give you energy throughout the day.

Eat Healthy. ,W LV RIWHQ KDUG IRU GULYHUV WR ¿QG KHDOWK\ IRRG %XW ZLWK D OLWWOH H[WUD HuRUW \RX F WR ¿QG UHVWDXUDQWV ZLWK KHDOWK fast-food restaurants, pick low-fat items. Another simple way to reduce your caloric intake is to eliminate fattening snacks. Instead, try fruit or vegetables.

Avoid Medication. Many medicines can make you sleepy. Those that do, have a label warning against operating vehicles or machinery. The most common medicine of this type is an ordinary cold pill. ,I \RX KDYH WR GULYH ZLWK D FROG WKH FROG WKDQ IURP WKH HuHFWV RI WKH PHGLFLQH

Visit Your Doctor. Regular checkups literally can be lifesavers. Illnesses such as diabetes, heart disease, and skin and colon cancer can be detected easily and treated if found in time.

You should consult your physician or a local sleep disorder center LI \RX VXuHU IURP IUHTXHQW GD\W sleeping at night, take frequent naps, fall asleep at strange times, snore loudly, gasp and choke in your sleep, and/or wake up feeling as though you have not had enough sleep.

2.23.2 – While You Are Driving

Keep Cool.A hot, poorly ventilated vehicle can make you sleepy. Keep the window or vent cracked open or use the air conditioner, if you have one.

Take Breaks.Short breaks can keep you alert. But the time to take them is before you feel really drowsy or tired. Stop often. Walk around and inspect your vehicle. It may help to do some physical exercises.

Be sure to take a mid-afternoon break and plan to sleep between midnight and 6 a.m.

Recognize the Danger Signals of Drowsy Driving.Sleep is not voluntary. If you're drowsy, you can fall asleep and never even know it. If you are drowsy, you are likely to have "micro sleeps"–brief QDSV WKDW ODVW DURXQG IRXU RU ¿YH VHFRQGV $W PLOHV DQ KRXU that's more than 100 yards, and plenty of time for a crash. Even if you are not aware of being drowsy, if you have a sleep debt you are still at risk. Here are a few ways to tell if you're about to fall asleep. If you experience any of these danger signs, take them as a warning that you could fall asleep without meaning to.

- Your eyes close or go out of focus by themselves.
- You have trouble keeping your head up.
- You can't stop yawning.
- You have wandering, disconnected thoughts.
- You don't remember driving the last few miles.
- ‡ <RX GULIW EHWZHHQ ODQHV WDLOJDWH RU PLVV WUDI¿F VLJQV
- You keep jerking the truck back into the lane.
- ‡ <RX KDYH GULIWHG Ru WKH URDG DQ

If you have even one of these symptoms, you may be in danger RI IDOOLQJ DVOHHS 3XOO Ru WKH URD

2.23.3 – When You Do Become Sleepy

When you are sleepy, trying to "push on" is far more dangerous than most drivers think. It is a major cause of fatal accidents. Here are some important rules to follow.

Stop to Sleep. When your body needs sleep, sleep is the only thing that will work. If you have to make a stop anyway, make it whenever \RX IHHO WKH ¿UVW VLJQV RI VOHHSLQ planned. By getting up a little earlier the next day, you can keep on schedule without the danger of driving while you are not alert.

Take a Nap. ,I \RX FDQ¶W VWRS IRU WKH QL safe place, such as a rest area or truck stop, and take a nap. A nap as short as a half-hour will do more to overcome fatigue than a

Avoid Drugs. There are no drugs that can overcome being tired. While they may keep you awake for a while, they won't make you alert. And eventually, you'll be even more tired than if you hadn't taken them at all. Sleep is the only thing that can overcome fatigue.

Do Not. 'R QRW UHO\ RQ FRuHH RU DQRWKH you awake. Do not count on the radio, an open window, or other tricks to keep you awake.

2.23.4 – Illness

Once in a while, you may become so ill that you cannot operate a motor vehicle safely. If this happens to you, you must not drive. However, in case of an emergency, you may drive to the nearest place where you can safely stop.

2.24 – Hazardous Materials Rules For All Commercial Drivers

All drivers should know something about hazardous materials. You must be able to recognize hazardous cargo, and you must know whether or not you can haul it without having a hazardous materials endorsement on your CDL license.

2.24.1 – What Are Hazardous Materials?

Hazardous materials are products that pose a risk to health, safety, and property during transportation. See Figure 2.24.

2.24.2 – Why Are There Rules?

You must follow the many rules about transporting hazardous materials. The intent of the rules is to:

- Contain the product.
- Communicate the risk.
- Ensure safe drivers and equipment.

To Contain the Product.Many hazardous products can injure or kill on contact. To protect drivers and others from contact, the rules

Hazard Class Definitions		
Class	**Class Name**	**Example**
1	Explosives	Ammunition, Dynamite, Fireworks
2	Gases	Propane, Oxygen, Helium
3	Flammable	Gasoline Fuel, Acetone
4	Flammable Solids	Matches, Fuses
5	Oxidizers	Ammonium Nitrate, Hydrogen Peroxide
6	Poisons	Pesticides, Arsenic
7	Radioactive	Uranium, Plutonium
8	Corrosives	Hydrochloric Acid, Battery Acid
9	Miscellaneous Hazardous Materials	Formaldehyde, Asbestos
None	ORM-D (Other Regulated Material-Domestic)	Hair Spray or Charcoal
None	Combustible Liquids	Fuel Oils, Lighter Fluid

Figure 2.24

tell shippers how to package safely. Similar rules tell drivers how t load, transport, and unload bulk tanks. These are containment rul

To Communicate the Risk.The shipper uses a shipping paper anc diamond shaped hazard labels to warn dockworkers and drive of the risk.

After an accident or hazardous material spill or leak, you may b injured and unable to communicate the hazards of the materia \RX DUH WUDQVSRUWLQJ)LUH¿JKWH UHGX the amount of damage or injury at the scene if they know wha hazardous materials are being transported. Your life, and the liv of others, may depend on quickly locating the hazardous materia shipping papers. For that reason, you must identify shipping pape related to hazardous materials or keep them on top of other shippi papers. You must also keep shipping papers:

- In a pouch on the driver's door, or
- In clear view within reach while driving, or
- On the driver's seat when out of the vehicle.

2.24.3 – Lists of Regulated Products

Placards are used to warn others of hazardous materials. Placards are signs put on the outside of a vehicle that identify the hazard class of the cargo. A placarded vehicle must have at least four identical placards. They are put on the front, rear, and both sides. Placards must be readable from all four directions. They must be at least 10 3/4 inches square, turned upright on a point, in a diamond shape. &DUJR WDQNV DQG RWKHU EXON SDFNI number of their contents on placards or orange panels.

,GHQWL¿FDWLRQ 1XPEHUV GLJLW FRGH XV WR LGHQWLI\ KD]DUGRXV PDWHULDOV used to identify more than one chemical on shipping papers. The LGHQWL¿FDWLRQ QXPEHU ZLOO EH SUHI The US DOT Emergency Response Guidebook (ERG) lists the FKHPLFDOV DQG WKH LGHQWL¿FDWLRQ

Not all vehicles carrying hazardous materials need to have placards. The rules about placards are given in Section 9 of this manual. You can drive a vehicle that carries hazardous materials if it does not require placards. If it requires placards, you cannot drive it unless your driver license has the hazardous materials endorsement. See Figure 2.25.

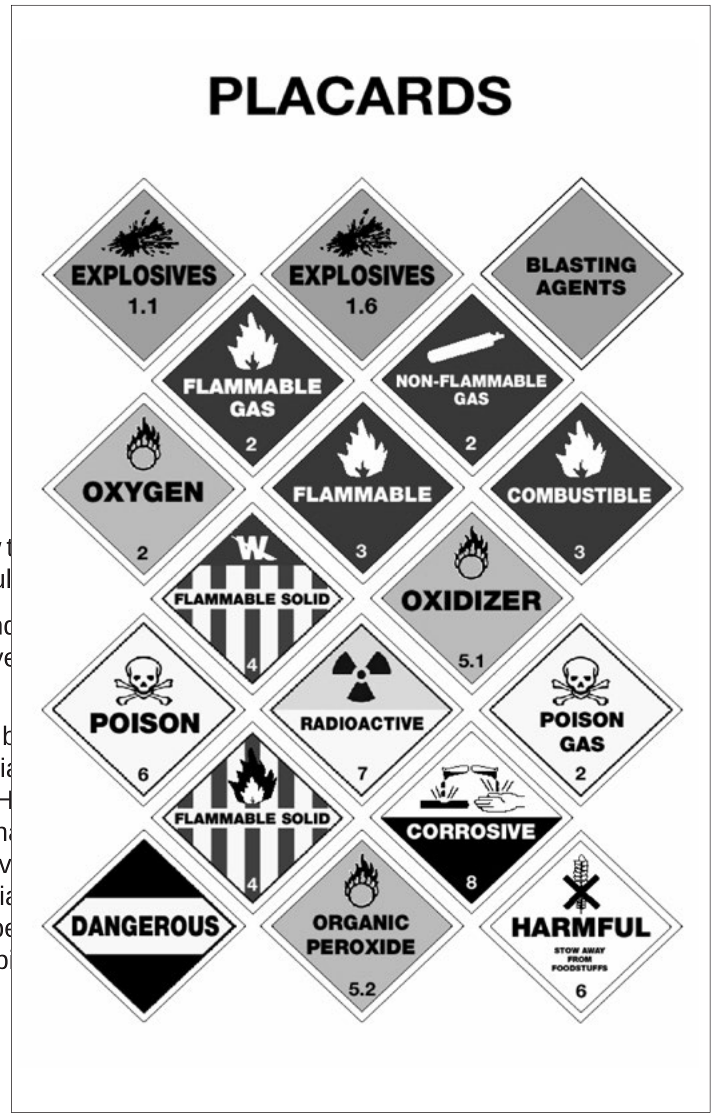


Figure 2.25

The rules require all drivers of placarded vehicles to learn how to safely load and transport hazardous products. They must have a commercial driver license with the hazardous materials endorsement.

To get the required endorsement, you must pass a written test on material found in Section 9 of this manual. A tank endorsement may also be required when the vehicle transports hazardous liquids or gases. See Section 8 of this manual.

Drivers who need the hazardous materials endorsement must learn the placard rules. If you do not know if your vehicle needs placards, ask your employer. Never drive a vehicle needing placards unless you have the hazardous materials endorsement. To do so is a crime. When stopped, you will be cited and you will not be allowed to drive your truck further. It will cost you time and money. A failure to placard when needed may risk your life and others if you have an accident. Emergency help will not know of your hazardous cargo.

Hazardous materials drivers must also know which products they can load together, and which they cannot. These rules are also in Section 9. Before loading a truck with more than one type of product, you must know if it is safe to load them together. If you do not know, ask your employer and consult the regulations.

SUBSECTIONS 2.22, 2.23, AND 2.24

TEST YOUR KNOWLEDGE

1. Common medicines for colds can make you sleepy. True or False?
2. What should you do if you become sleepy while driving?
   &RuHH DQG D OLWWOH IUHVK DLU Z
   up. True or False?
4. What is a hazardous materials placard?
5. Why are placards used?
6. What is “sleep debt”?
7. What are the danger signals of drowsy driving?

These questions may be on the test. If you can’t answer them all, re-read subsections 2.22, 2.23, and 2.24.

Section 3

Transporting Cargo Safely

This Section Covers

- Inspecting Cargo
- Cargo Weight and Balance
- Securing Cargo
- Cargo Needing Special Attention

This section tells you about hauling cargo safely. You must understand basic cargo safety rules to get a CDL.

If you load cargo wrong or do not secure it, it can be a danger to RWKHUV DQG \RXUVHOI /RRVH FDUJR WKDW IDOOV Rц D YHKLFOH FDQ FDXV WUDvF SUREOHPV DQG RWKHUV FRXOG EH KXUW RU NLOOHG /RRVH FDUJR FRX hurt or kill you during a quick stop or crash. Your vehicle could EH GDPDJHG E\ DQ RYHUORDG 6WHHULQJ FRXOG EH DuHFWHG E\ KRZ D YHKLFOH LV ORDGHG PDNLQJ LW PRUH GLvFXOW WR FRQWURO WKH YHKLFOH

Whether or not you load and secure the cargo yourself, you are responsible for:

- Inspecting your cargo.
- Recognizing overloads and poorly balanced weight.
- Knowing your cargo is properly secured and does not obscure your view ahead or to the sides.
- Knowing your cargo does not restrict your access to emergency equipment.

If you intend to carry hazardous material that requires placards on your vehicle, you will also need to have a hazardous materials endorsement. Section 9 of this manual has the information you need to pass the hazardous materials test.

3.1 – Inspecting Cargo

As part of your pre-trip inspection, make sure the truck is not overloaded and the cargo is balanced and secured properly.

After Starting. Inspect the cargo and its securing devices again ZLWKLQ WKH ¿UVW PLOHV DIWHU EHJLQQLQJ D WULS 0DNH DQ\ DGMXVWPHQWV needed.

Re-check. Re-check the cargo and securing devices as often as necessary during a trip to keep the load secure. A good habit is to inspect again:

- After you have driven for 3 hours or 150 miles.
- After every break you take during driving.

Federal, state, and local regulations for commercial vehicle weight, securing cargo, covering loads, and where you can drive large vehicles vary from place to place. Know the rules where you will be driving.

3.2 – Weight and Balance

You are responsible for not being overloaded. The following are VRPH GH¿QLWLRQV RI ZHLJKW \RX VKRX

± 'H¿QLWLRQV <RX 6KRXOG .QR

Gross Vehicle Weight (GVW). The total weight of a single vehicle plus its load.

Gross Combination Weight (GCW). The total weight of a powered unit, plus trailer(s), plus the cargo.

Gross Vehicle Weight Rating (GVWR). 7KH PD[LPXP *9 VSHFL¿HG E\ WKH PDQXIDFWXUHU IRU D

Gross Combination Weight Rating (GCWR). The maximum *&: VSHFL¿HG E\ WKH PDQXIDFWXUHU IR vehicles plus its load.

Axle Weight. The weight transmitted to the ground by one axle or one set of axles.

Tire Load. 7KH PD[LPXP VDIH ZHLJKW D WLUH pressure. This rating is stated on the side of each tire.

Suspension Systems. Suspension systems have a manufacturer's weight capacity rating.

Coupling Device Capacity. Coupling devices are rated for the maximum weight they can pull and/or carry.

3.2.2 – Legal Weight Limits

You must keep weights within legal limits. States have maximums IRU *9:V *&:V DQG D[OH ZHLJKWV 2IWH are set by a bridge formula. A bridge formula permits less maximum axle weight for axles that are closer together. This is to prevent overloading bridges and roadways.

2YHUORDGLQJ FDQ KDYH EDG HuHFWV RQ control. Overloaded trucks have to go very slowly on upgrades. Worse, they may gain too much speed on downgrades. Stopping distance increases. Brakes can fail when forced to work too hard.

During bad weather or in mountains, it may not be safe to operate at legal maximum weights. Take this into account before driving.

3.2.3 – Don't Be Top-heavy

The height of the vehicle's center of gravity is very important for safe handling. A high center of gravity (cargo piled up high or heavy cargo on top) means you are more likely to tip over. It is most dangerous in curves, or if you have to swerve to avoid a hazard. It is very important to distribute the cargo so it is as low as possible. Put the heaviest parts of the cargo under the lightest parts.

3.2.4 – Balance the Weight

Poor weight balance can make vehicle handling unsafe. Too much weight on the steering axle can cause hard steering. It can damage the steering axle and tires. Under-loaded front axles (caused by shifting weight too far to the rear) can make the steering axle weight too light to steer safely. Too little weight on the driving axles can cause poor traction. The drive wheels may spin easily. During bad weather, the truck may not be able to keep going. Weight that is loaded so there is a high center of gravity causes greater chance RI UROORYHU 2Q ÀDW EHG YHKLFOH ... QFH WKH ORDG ZLOO VKLIW WR WKH VLGH ...

3.3 – Securing Cargo

3.3.1 – Blocking and Bracing

Blocking is used in the front, back, and/or sides of a piece of carg... WR NHHS LW IURP VOLGLQJ %ORFNL... LQVW cargo. It is secured to the cargo deck to prevent cargo moveme... Bracing is also used to prevent movement of cargo. Bracing goes IURP WKH XSSHU SDUW RI WKH FDUJR WR WKH ÀRRU DQG RU ZDOOV RI WKH cargo compartment.

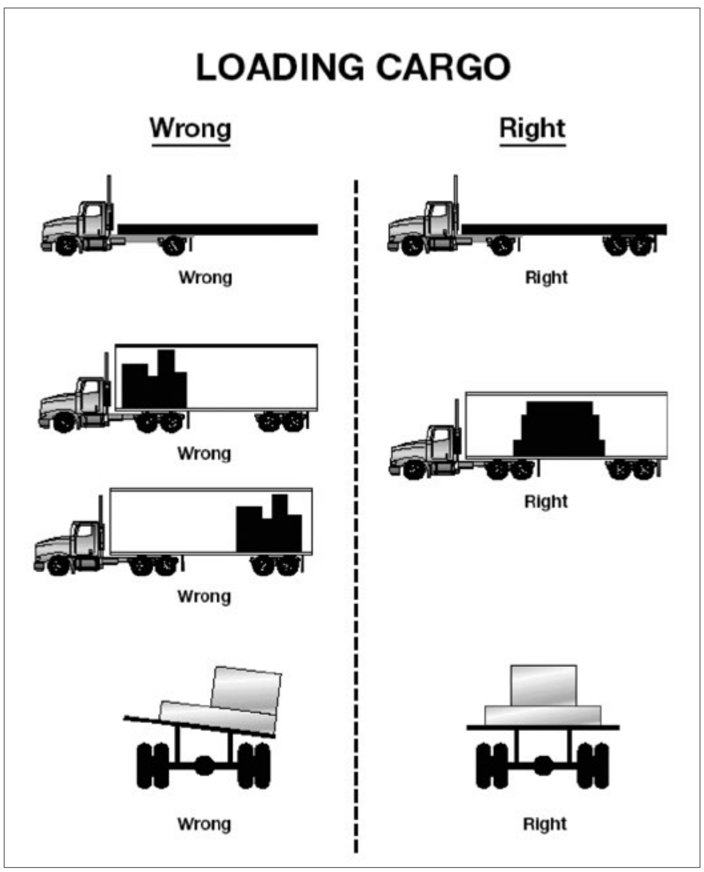


Figure 3.1

3.3.2 – Cargo Tiedown

2Q ÀDWEHG WUDLOHUV RU WUDLOHUV ZLWKRXW VLGHV FDUJR PXVW EH VHF... WR NHHS LW IURP VKLIWLQJ RU IDOOLQJ RII ... FDQ DOVR EH LPSRUWDQW WR SUHYHQW ... handling of the vehicle. Tiedowns must be of the proper type and proper strength. The working load limit of all cargo tiedowns must be at least one-half times the weight of the cargo tied down. Proper tiedown equipment must be used, including ropes, straps, chains, and tensioning devices (winches, ratchets, clinching components). Tiedowns must be attached to the vehicle correctly (hooks, bolts, UDLOV ULQJV 6HH ¿JXUH

Cargo should have at least one tiedown for each ten feet of cargo. Make sure you have enough tiedowns to meet this need. No matter

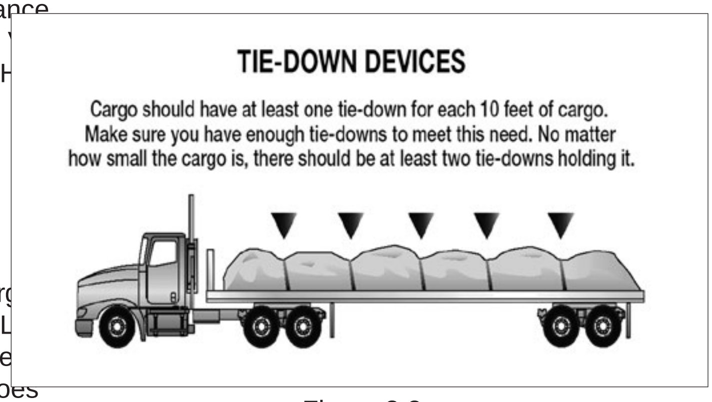


Figure 3.2

how small the cargo, it should have at least two tiedowns.

There are special requirements for securing:

- Logs.
- Dressed lumber and building products.
- Metal coils.
- Paper rolls.
- Concrete pipe.
- Intermodal containers.
- Automobiles, light trucks and vans.
- Heavy vehicles and machinery.
- Crushed vehicles.
- ‡5ROO RQ 5ROO Ru RU KRRN OLIW FRQ...
- Large boulders.

Find out what the requirements are before you carry such loads.

3.3.3 – Headerboards

Front-end headerboards (“headache racks”) protect you from your cargo in case of a crash or emergency stop. If your vehicle is equipped with a front-end structure, be sure it is in good condition. The front-end structure should block the forward movement of any cargo you carry.

3.3.4 – Covering Cargo

There are two basic reasons for covering cargo:

- To protect people from spilled cargo.
- To protect the cargo from weather.

Spill protection is a safety requirement in many states. Be familiar with the laws in the states you drive in.

You should look at your cargo covers in the mirrors from time to WLPH ZKLOH GULYLQJ $ ÀDSSLQJ FRYHU ... cargo, and possibly block your view or someone else’s.

3.3.5 – Sealed and Containerized Loads

Containerized loads generally are used when freight is carried part way by rail or ship. Delivery by truck occurs at the beginning and/or end of the journey. Some containers have their own tiedown devices or locks that attach directly to a special frame. Others have
WR EH ORDGHG RQWR ÀDWEHG WUDLO
just like any other cargo.

You cannot inspect sealed loads, but you should check that you don't exceed gross weight and axle weight limits.

3.4 – Cargo Needing Special Attention

3.4.1 – Dry Bulk

Dry bulk tanks require special care because they have a high center of gravity, and the load can shift. Be extremely cautious (slow and careful) going around curves and making sharp turns.

3.4.2 – Hanging Meat

Hanging meat (suspended beef, pork, lamb) in a refrigerated truck can be a very unstable load with a high center of gravity. Particular
FDXWLRQ LV QHHGHG RQ VKDUS FXUYHV VXFK DV Ru UDPSV DQG RQ UDPSV
Go slowly.

3.4.3 – Livestock

Livestock can move around in a trailer, causing unsafe handling. With less than a full load, use false bulkheads to keep livestock bunched together. Even when bunched, special care is necessary because livestock can lean in curves. This shifts the center of gravity and makes rollover more likely.

3.4.4 – Oversized Loads

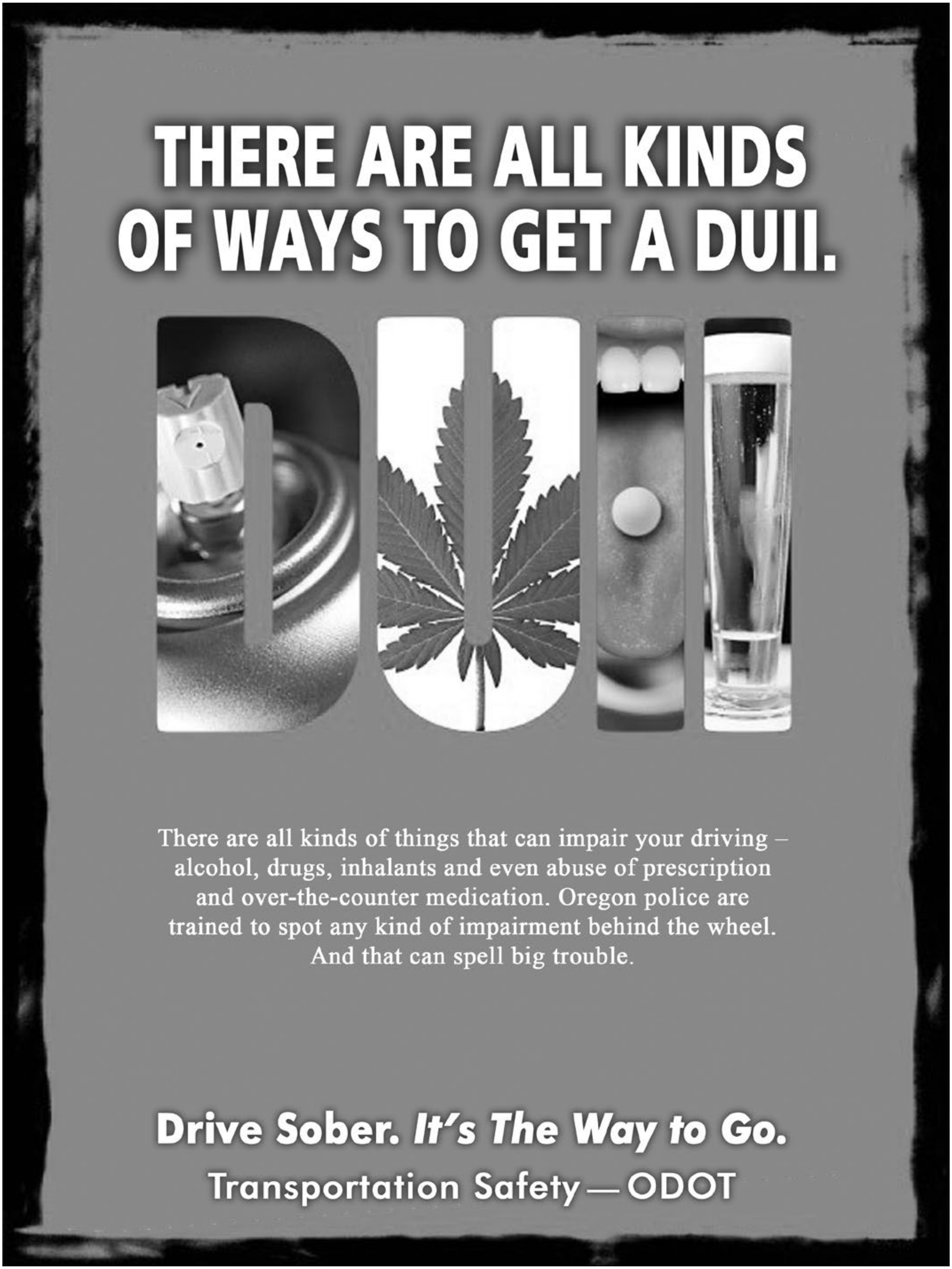
Over-length, over-width, and/or overweight loads require special transit permits. Driving is usually limited to certain times. Special
HTXLSPHQW PD\ EH QHFHVVDU\ VXFK D
OLJKWV ÀDJV HWF 6XFK ORDGV PD\ U
YHKLFOHV
loads require special driving care.

SECTION 3

TEST YOUR KNOWLEDGE

1. What four things related to cargo are drivers responsible for?
2. How often must you stop while on the road to check your cargo?
+RZ LV *URVV &RPELQDWLRQ :HLJK
from Gross Combination Weight?
4. Name two situations where legal maximum weights may not be safe.
5. What can happen if you don't have enough weight on the front axle?
:KDW LV WKH PLQLPXP QXPEHU RI W
bed load?
7. What is the minimum number of tiedowns for a 20-foot load?
8. Name the two basic reasons for covering cargo on an open bed.
9. What must you check before transporting a sealed load?

These questions may be on your test. If you can't answer them all, re-read Section 3.


THERE ARE ALL KINDS
OF WAYS TO GET A DUII.
DUII
There are all kinds of things that can impair your driving – alcohol, drugs, inhalants and even abuse of prescription and over-the-counter medication. Oregon police are trained to spot any kind of impairment behind the wheel. And that can spell big trouble.
Drive Sober. It's The Way to Go.
Transportation Safety — ODOT

Section 4

Transporting Passengers Safely

This Section Covers

‡9HKLFOH ,QVSHFWLRQ
- Loading
- On the Road

‡$IWHU WULS 9HKLFOH ,QVSHFWLRQ
- Prohibited Practices
- Use of Brake-door Interlocks

Passenger vehicle drivers must have a commercial driver license if WKH\ GULYH D &ODVV $ RU &ODVV % &09 GHVLJQHG WR WUDQVSRUW SHRSOH LQ FRPPHUFH RU D &ODVV & &09 GHVLJQHG WR WUDQVSRUW RU PRUH persons, including the driver. A passenger endorsement does not authorize operation of a school bus.

Bus drivers must have a passenger endorsement on their commercial driver license. To get the endorsement you must pass a knowledge test on Sections 2 and 4 of this manual. If your bus has air brakes, you must also pass a knowledge test on Section 5. You must also pass the skills tests required for the class of vehicle you drive. You must hold a CLP, with a passenger endorsement, for at least 14 days prior to taking the CDL skills test in a passenger vehicle. A restriction will be added to your CDL to limit operation of passenger vehicles to those at or below the class of passenger vehicle in which you tested. School bus drivers must also have a school bus endorsement. See Section 10 for requirements.

4.1 – Vehicle Inspection

Before driving your bus, you must be sure it is safe. You must review the inspection report made by the previous driver. Only if GHIHFWV UHSRUWHG HDUOLHU KDYH EHHQ to be repaired, should you sign the previous driver's report. This is \RXU FHUWL¿FDWLRQ WKDW WKH GHIHFWV UHSRUWHG HDUOLHU KDYH EHHQ

4.1.1 – Vehicle Systems

Make sure these things are in good working order before driving:

- Service brakes, including air hose couplings (if your bus has a trailer or semitrailer).
- Parking brake.
- Steering mechanism.

‡/LJKWV DQG UHÀHFWRUV
- Tires (front wheels must not have recapped or regrooved tires).
- Horn.
- Windshield wiper or wipers.
- Rear-vision mirror or mirrors.
- Coupling devices (if present).
- Wheels and rims.
- Emergency equipment.

4.1.2 – Access Doors and Panels

As you check the outside of the bus, close any open emergency exits. Also, close any open access panels (for baggage, restroom service, engine, etc.) before driving.

4.1.3 – Bus Interior

People sometimes damage unattended buses. Always check the interior of the bus before driving to ensure rider safety. Aisles and stairwells should always be clear. The following parts of your bus must be in safe working condition:

- Each handhold and railing.
- Floor covering.
- Signaling devices, including the restroom emergency buzzer, if the bus has a restroom.
- Emergency exit handles.

The seats must be safe for riders. All seats must be securely fastened to the bus.

Never drive with an open emergency exit door or window. The "Emergency Exit" sign on an emergency door must be clearly visible. If there is a red emergency door light, it must work. Turn it on at night or any other time you use your outside lights.

4.1.4 – Roof Hatches/Emergency Equipment

You may lock some emergency roof hatches in a partly open position for fresh air. Do not leave them open as a regular practice. Keep in mind the bus's higher clearance while driving with them open.

0DNH VXUH \RXU EXV KDV WKH ¿UH H[WLQJXLVKHU DQG HPHUJHQF\ UHÀHFWRUV UHTXLUHG E\ ODZ 7KH EXV fuses, unless equipped with circuit breakers.

4.1.5 – Use Your Seatbelt!

The driver's seat should have a seat belt. Always use it for safety.

4.2 – Loading and Trip Start

Do not allow riders to leave carry-on baggage in a doorway or aisle. There should be nothing in the aisle that might trip other riders. Secure baggage and freight in ways that avoid damage and:

- Allow the driver to move freely and easily.
- Allow riders to exit by any window or door in an emergency.
- Protect riders from injury if carry-ons fall or shift.

Hazard Class Definitions		
Class	**Class Name**	**Example**
1	Explosives	Ammunition, Dynamite, Fireworks
2	Gases	Propane, Oxygen, Helium
3	Flammable	Gasoline Fuel, Acetone
4	Flammable Solids	Matches, Fuses
5	Oxidizers	Ammonium Nitrate, Hydrogen Peroxide
6	Poisons	Pesticides, Arsenic
7	Radioactive	Uranium, Plutonium
8	Corrosives	Hydrochloric Acid, Battery Acid
9	Miscellaneous Hazardous Materials	Formaldehyde, Asbestos
None	ORM-D (Other Regulated Material-Domestic)	Hair Spray or Charcoal
None	Combustible Liquids	Fuel Oils, Lighter Fluid

Figure 4.1

4.2.1 – Hazardous Materials

Watch for cargo or baggage containing hazardous materials. Most hazardous materials cannot be carried on a bus.

The Federal Hazardous Materials Table shows which materials are hazardous. They pose a risk to health, safety, and property during transportation. The rules require shippers to mark containers of KD]DUGRXV PDWHULDO ZLWK WKH PDWHULDOV QDPH LGHQWL¿FDWLRQ QXPE DQG KD]DUG ODEHO 7KHUH DUH QLQH GLuHUHQW IRXU LQFK GLDPRQG VKDSH hazard labels. See Figure 4.1. Watch for the diamond-shaped labels. Do not transport any hazardous material unless you are sure the rules allow it.

4.2.2 – Forbidden Hazardous Materials

Buses may carry small-arms ammunition labeled ORM-D, emergency hospital supplies, and drugs. You can carry small amounts of some other hazardous materials if the shipper cannot send them any other way. Buses must never carry:

- Division 2.3 poison gas, liquid Class 6 poison, tear gas, irritating material.
- More than 100 pounds of solid Class 6 poisons.
- Explosives in the space occupied by people, except small arms ammunition.
- Labeled radioactive materials in the space occupied by people.
- More than 500 pounds total of allowed hazardous materials, and no more than 100 pounds of any one class.

Riders sometimes board a bus with an unlabeled hazardous material. Do not allow riders to carry on common hazards such as car batteries or gasoline.

4.2.3 – Standee Line

No rider may stand forward of the rear of the driver's seat. Buses GHVLJQHG WR DOORZ VWDQGLQJ PXVW some other means of showing riders where they cannot stand. This is called the standee line. All standing riders must stay behind it.

4.2.4 – At Your Destination

When arriving at the destination or intermediate stops announce:

- The location.
- Reason for stopping.
- Next departure time.
- Bus number.

Before coming to a complete stop, remind riders to take carry-ons ZLWK WKHP LI WKH\ JHW Ru WKH EXV than the seats, remind riders of the step-down.

Charter bus drivers should not allow riders on the bus until departure time. This will help prevent theft or vandalism of the bus.

4.3 – On the Road

4.3.1 – Passenger Supervision

Many charter and intercity carriers have passenger comfort and safety rules. Mention rules about smoking, drinking, or use of radio and tape players at the start of the trip. Explaining the rules at the start will help to avoid trouble later on.

While driving, scan the interior of your bus as well as the road ahead, to the sides, and to the rear. You may have to remind riders about rules, or to keep arms and heads inside the bus.

4.3.2 – At Stops

5LGHUV FDQ VWXPEOH ZKHQ JHWWLQJ R stops. Caution riders to watch their step when leaving the bus. Wait for them to sit down or brace themselves before starting. Starting and stopping should be as smooth as possible to avoid rider injury.

Occasionally, you may have a drunk or disruptive rider. You must ensure this rider's safety as well as that of others. Don't discharge such riders where it would be unsafe for them. It may be safer at the next scheduled stop or a well-lighted area where there are other people. Many carriers have guidelines for handling disruptive riders.

4.3.3 – Common Accidents

Bus crashes often happen at intersections. Use caution, even if a VLJQDO RU VWRS VLJQ FRQWUROV RWK EXVHV VRPHWLPHV VFUDSH Ru PLUURU pulling out from a bus stop. Remember the clearance your bus needs, and watch for poles and tree limbs at stops. Know the size of the JDS \RXU EXV QHHGV WR DFFHOHUDWH DQG PHUJH ZLWK WUDvF :DLW IRU the gap to open before leaving the stop. Never assume other drivers will brake to give you room when you signal or start to pull out.

4.3.4 – Speed on Curves

Crashes on curves that kill people and destroy buses result from excessive speed, often when rain or snow has made the road slippery. Every banked curve has a safe "design speed." In good weather, the posted speed is safe for cars but it may be too high for many buses. With good traction, the bus may roll over; with poor traction, LW PLJKW VOLGH Ru WKH FXUYH 5HGXFH VSHHG IRU FXUYHV ,I \RXU EXV leans toward the outside on a banked curve, you are driving too fast.

4.3.5 – Railroad-highway Crossings Stops

Stop at RR Crossings:

- Stop your bus at the stop line or, if a stop line is not present or visible, between 15 and 50 feet before railroad crossings.
- Listen and look in both directions for trains. You should open your forward door if it improves your ability to see or hear an approaching train.
- Before crossing after a train has passed, make sure there isn't another train coming in the other direction on other tracks.
- If your bus has a manual transmission, never change gears while crossing the tracks.

You do not have to stop, but must slow down and carefully check for other vehicles:

- At streetcar crossings.
‡ :KHUH D SROLFHPDQ RU ÀDJPDQ LV GLUHFWLQJ WUDvF
‡ ,I D WUDvF VLJQDO LV JUHHQ
- At crossings marked as "exempt" or "abandoned."

4.3.6 – Drawbridges

6WRS DW GUDZEULGJHV WKDW GR QRW KDYH D VLJQDO OLJKW RU WUDvF FRQ attendant. Stop at least 50 feet before the draw of the bridge. Look to make sure the draw is completely closed before crossing. You do not need to stop, but must slow down and make sure it's safe, when:

‡ 7KHUH LV D WUDvF OLJKW VKRZLQJ JUHHQ
‡ 7KH EULGJH KDV DQ DWWHQGDQW RU WUDvF RvFHU ZKR FRQWUROV WUDvF whenever the bridge opens.

4.4 – After-trip Vehicle Inspection

Inspect your bus at the end of each shift. If you work for an interstate carrier, you must complete a written inspection report for each bus driven. The report must specify each bus and list any defect that ZRXOG DuHFW VDIHW\ RU UHVXOW LQ D EUHDNGRZQ ,I WKHUH DUH QR GHIHF the report should say so.

Riders sometimes damage safety-related parts such as handholds, seats, emergency exits, and windows. If you report this damage at the end of a shift, mechanics can make repairs before the bus goes out again. Mass transit drivers should also make sure passenger signaling devices and brake-door interlocks work properly.

4.5 – Prohibited Practices

Avoid fueling your bus with riders on board unless absolutely necessary. Never refuel in a closed building with riders on board.

Don't talk with riders, or engage in any other distracting activity, while driving.

Do not tow or push a disabled bus with riders aboard the vehicle, XQOHVV JHWWLQJ Ru ZRXOG EH XQVDIH nearest safe spot to discharge passengers. Follow your employer's guidelines on towing or pushing disabled buses.

4.6 – Use of Brake-door Interlocks

Urban mass transit coaches may have a brake and accelerator interlock system. The interlock applies the service brakes and holds the throttle in idle position when the rear door is open. The interlock releases when you close the rear door. Do not use this safety feature in place of the parking brake.

SECTION 4

TEST YOUR KNOWLEDGE

1. Name some things to check in the interior of a bus during a pre-trip inspection.
2. What are some hazardous materials you can transport by bus?
3. What are some hazardous materials you can't transport by bus?
4. What is a standee line?
5. Does it matter where you make a disruptive SDVVHQJHU JHW Ru WKH EXV"
6. How far from a railroad crossing should you stop?
7. When must you stop before crossing a drawbridge?
8. Describe from memory the "prohibited practices" listed in the manual.
9. The rear door of a transit bus has to be open to put on the parking brake. True or False?

These questions may be on your test. If you can't answer them all, re-read Section 4.

Know the Rules
Follow the Rules

DRIVER'S DAILY LOG
(ONE CALENDAR DAY - 24 HOURS)

ORIGINAL - File each day at home terminal
DUPLICATE - Driver retains in his possession for eight days

(MONTH) (DAY) (YEAR) (TOTAL MILEAGE TODAY)

I certify these entries are true and correct: VEHICLE NUMBERS - (SHOW EACH UNIT)

(TOTAL MILES DRIVING TODAY) (DRIVER'S SIGNATURE IN FULL)

(NAME OF CARRIER OR CARRIERS) (NAME OF CO-DRIVER)

(MAIN OFFICE ADDRESS) (HOME TERMINAL ADDRESS)

MID-NIGHT 1 2 3 4 5 6 7 8 9 10 11 NOON 1 2 3 4 5 6 7 8 9 10 11 TOTAL HOURS

1: OFF DUTY

2: SLEEPER BERTH

3: DRIVING

4: ON DUTY (NOT DRIVING)

MID-NIGHT 1 2 3 4 5 6 7 8 9 10 11 NOON 1 2 3 4 5 6 7 8 9 10 11

REMARKS

Shipping document, manifest number, or name of a shipper and commodity.
Check the time and enter name of place you reported and where released from work and when and where each change of duty occurred. Explain excess hours.

FROM: (STARTING POINT OR PLACE) TO: (DESTINATION OR TURN AROUND POINT OR PLACE)

USE TIME STANDARD AT HOME TERMINAL

Help Save Lives
Stop When Tired

Oregon Department of Transportation

Section 5

Air Brakes

This Section Covers

- Air Brake System Parts
- Dual Air Brake Systems
- Inspecting Air Brakes
- Using Air Brakes

This section provides information needed to pass the Air Brake knowledge test.If you want to drive a truck or bus with air brakes, or pull a trailer with air brakes, you need to read this section. If you want to pull a trailer with air brakes, you also need to read Section &RPELQDWLRQ 9HKLFOHV <RX PD\ RSHUDWH D YHKLFOH ZLWK DLU EUDNHV without testing or studying this section, if a CDL is not otherwise required to operate the vehicle. See Figure 1.1 in Section 1.

Air brakes use compressed air to make the brakes work. Air brakes are a good and safe way of stopping large and heavy vehicles, but the brakes must be well maintained and used properly.

$LU EUDNHV DUH UHDOO\ WKUHH GLuHUHQW EUDNLQJ V\VWHPV VHUYLFH EU parking brake, and emergency brake.

- The service brake system applies and releases the brakes when you use the brake pedal during normal driving.
- The parking brake system applies and releases the parking brakes when you use the parking brake control.
- The emergency brake system uses parts of the service a parking brake systems to stop the vehicle in a brake system failu

The parts of these systems are discussed in greater detail belo

5.1 – The Parts of an Air Brake System

There are many parts to an air brake system. You should know ab the parts discussed here.

5.1.1 – Air Compressor

The air compressor pumps air into the air storage tanks (reservoi The air compressor is connected to the engine through gears o v-belt. The compressor may be air cooled or may be cooled by engine cooling system. It may have its own oil supply or be lubricated by engine oil. If the compressor has its own oil supply, check the oil level before driving.

5.1.2 – Air Compressor Governor

The governor controls when the air compressor will pump air into the air storage tanks. When air tank pressure rises to the "cut-out" level (around 125 pounds per-square-inch or "psi"), the governor stops the compressor from pumping air. When the tank pressure falls to the "cut-in" pressure (around 100 psi), the governor allows the compressor to start pumping again.

5.1.3 – Air Storage Tanks

Air storage tanks are used to hold compressed air. The number and size of air tanks varies among vehicles. The tanks will hold enough air to allow the brakes to be used several times, even if the compressor stops working.

5.1.4 – Air Tank Drains

Compressed air usually has some water and some compressor oil in it, which is bad for the air brake system. For example, the water can freeze in cold weather and cause brake failure. The water and oil tend to collect in the bottom of the air tank. Be sure that the air tanks are regularly drained. Each air tank is equipped with a drain valve in the bottom. There are two types:

- Manually operated by turning a quarter turn or by pulling a cable. You must drain the tanks yourself at the end of each day of driving. See Figure 5.1.
- Automatic--the water and oil are automatically expelled. These tanks may be equipped for manual draining as well.

Automatic air tanks are available with electric heating devices. These help prevent freezing of the automatic drain in cold weather.

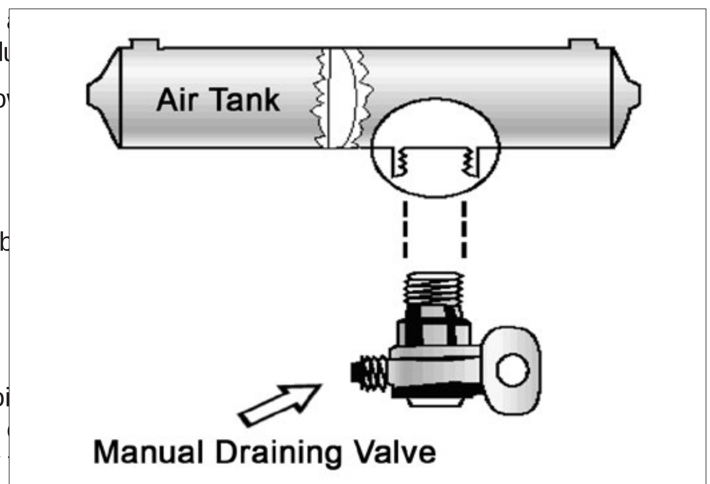


Figure 5.1

5.1.5 – Alcohol Evaporator

Some air brake systems have an alcohol evaporator to put alcohol into the air system. This helps to reduce the risk of ice in air brake valves and other parts during cold weather. Ice inside the system can make the brakes stop working.

&KHFN WKH DOFRKRO FRQWDLQHU DQG during cold weather. Daily air tank drainage is still needed to get rid of water and oil. (Unless the system has automatic drain valves.)

5.1.6 – Safety Valve

$ VDIHW\ UHOLHI YDOYH LV LQVWDOOHG LQ WKH ¿UVW WDQN WKH DLU FRPSU pumps air to. The safety valve protects the tank and the rest of the system from too much pressure. The valve is usually set to open at 150 psi. If the safety valve releases air, something is wrong. Have WKH IDXOW ¿[HG E\ D PHFKDQLF

5.1.7 – The Brake Pedal

You put on the brakes by pushing down the brake pedal. (It is also called the foot valve or treadle valve.) Pushing the pedal down harder applies more air pressure. Letting up on the brake pedal reduces the air pressure and releases the brakes. Releasing the brakes lets some compressed air go out of the system, so the air pressure in the tanks is reduced. It must be made up by the air compressor. Pressing and releasing the pedal unnecessarily can let air out faster than the compressor can replace it. If the pressure gets too low, the brakes won't work.

5.1.8 – Foundation Brakes

Foundation brakes are used at each wheel. The most common type is the s-cam drum brake. The parts of the brake are discussed below.

Brake Drums, Shoes, and LiningsBrake drums are located on each end of the vehicle's axles. The wheels are bolted to the drums. The braking mechanism is inside the drum. To stop, the brake shoes and linings are pushed against the inside of the drum. This causes friction, which slows the vehicle (and creates heat). The heat a drum can take without damage depends on how hard and how long the brakes are used. Too much heat can make the brakes stop working.

S-cam Brakes.When you press the brake pedal, air is let into each brake chamber. Air pressure forces the pushrod out of the brake chamber, moving the slack adjuster, thus twisting the brake camshaft. This turns the s-cam (so called because it is shaped like the letter "S"). The s-cam forces the brake shoes away from one another and presses them against the inside of the brake drum. When you release the brake pedal, the s-cam rotates back and a spring pulls the brake shoes away from the drum, letting the wheels roll freely again. See Figure 5.2. Most S-cam brakes are self-adjusting but some require manual adjustment.

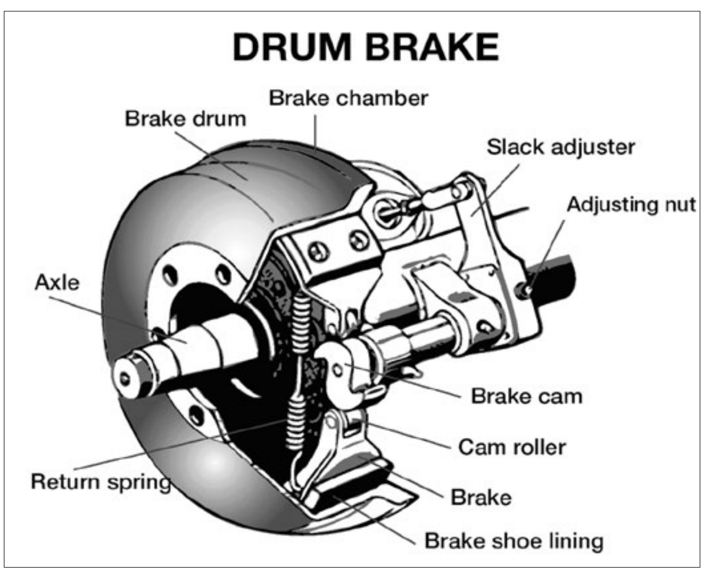


Figure 5.2

Wedge Brakes.In this type of brake, the brake chamber pushrod pushes a wedge directly between the ends of two brake shoes. This forces them apart and against the inside of the brake drum. Wedge brakes may have a single brake chamber, or two brake chambers, pushing wedges in at both ends of the brake shoes. Wedge type brakes may be self-adjusting or may require manual adjustment.

Disc Brakes. In air-operated disc brakes, air pressure acts on a brake chamber and slack adjuster, like s-cam brakes. But instead of the s-cam, a "power screw" is used. The pressure of the brake chamber on the slack adjuster turns the power screw. The power screw clamps the disc or rotor between the brake lining pads of a caliper, similar to a large c-clamp.

Wedge brakes and disc brakes are less common than s-cam brakes.

5.1.9 – Supply Pressure Gauges

All vehicles with air brakes have a pressure gauge connected to the air tank. If the vehicle has a dual air brake system, there will be a gauge for each half of the system. (Or a single gauge with two needles.) Dual systems will be discussed later. These gauges tell you how much pressure is in the air tanks.

5.1.10 – Application Pressure Gauge

This gauge shows how much air pressure you are applying to the brakes. (This gauge is not on all vehicles.) Increasing application pressure to hold the same speed means the brakes are fading. You should slow down and use a lower gear. The need for increased pressure can also be caused by brakes out of adjustment, air leaks, or mechanical problems.

5.1.11 – Low Air Pressure Warning

A low air pressure warning signal is required on vehicles with air brakes. A warning signal you can see must come on before the air pressure in the tanks falls below 60 psi. (Or one half the compressor governor cutout pressure on older vehicles.) The warning is usually a red light. A buzzer may also come on.

Another type of warning is the "wig wag." This device drops a mechanical arm into your view when the pressure in the system drops below 60 psi. An automatic wig wag will rise out of your view when the pressure in the system goes above 60 psi. The manual reset type must be placed in the "out of view" position manually. It will not stay in place until the pressure in the system is above 60 psi.

On large buses it is common for the low pressure warning devices to signal at 80-85 psi.

5.1.12 – Stop Light Switch

Drivers behind you must be warned when you put your brakes on. The air brake system does this with an electric switch that works by air pressure. The switch turns on the brake lights when the brakes are applied.

5.1.13 – Front Brake Limiting Valve

Some older vehicles (made before 1975) have a front brake limiting valve and a control in the cab. The control is usually marked "normal" and "slippery." When you put the control in the "slippery" position, the limiting valve cuts the "normal" air pressure to the front brakes by half. Limiting valves were used to reduce the chance of the front wheels skidding on slippery surfaces. However, they actually reduce the stopping power of the vehicle. Front wheel braking is good under all conditions. Tests have shown front wheel skids from braking are not likely even on ice. Make sure the control is in the "normal" position to have normal stopping power.

Many vehicles have automatic front wheel limiting valves. They reduce the air to the front brakes except when the brakes are put on very hard (60 psi or more application pressure). These valves cannot be controlled by the driver.

5.1.14 – Spring Brakes

All trucks, truck tractors, and buses must be equipped with emergency brakes and parking brakes. They must be held on by mechanical force (because air pressure can eventually leak away). Spring brakes are usually used to meet these needs. When driving, powerful springs are held back by air pressure. If the air pressure is removed, the springs put on the brakes. A parking brake control in the cab allows the driver to let the air out of the spring brakes. This lets the springs put the brakes on. A leak in the air brake system, which causes all the air to be lost, will also cause the springs to apply the brakes.

Tractor and straight truck spring brakes will come fully on when air pressure drops to a range of 20 to 45 psi (typically 20 to 30 psi). D
not wait for the brakes to come on automatically. When the low a
SUHVVXUH ZDUQLQJ OLJKW DQG EX]] ... LFOH
to a safe stop right away, while you can still control the brakes.

The braking power of spring brakes depends on the brakes bei
in adjustment. If the brakes are not adjusted properly, neither t
service brakes nor the emergency/parking brakes will work righ

5.1.15 – Parking Brake Controls

In newer vehicles with air brakes, you put on the parking brake
using a diamond-shaped, yellow, push-pull control knob. Pull th
knob out to put the parking brakes (spring brakes) on, and push
in to release them. On older vehicles, the parking brakes may
controlled by a lever. Use the parking brakes whenever you par

Caution. Do not apply excessive brake pedal pressure when th
spring brakes are on. If you do, the brakes could be damaged by
combined forces of the springs and the air pressure. Many bra
systems are designed so this will not happen. But not all syster
are set up that way, and those that are may not always work.

Modulating Control Valves. In some vehicles a control handle on
the dash board may be used to apply the spring brakes gradua
This is called a modulating valve. It is spring-loaded so you have
feel for the braking action. The more you move the control lever, th
harder the spring brakes come on. They work this way so you c
control the spring brakes if the service brakes fail. When parkin
a vehicle with a modulating control valve, move the lever as far a
it will go and hold it in place with the locking device.

Dual Parking Control Valves. When main air pressure is lost,
the spring brakes come on. Some vehicles, such as buses, hav
separate air tank which can be used to release the spring brak
This is so you can move the vehicle in an emergency. One of the valves is a push-pull type and is used to put on the spring brakes for parking. The other valve is spring loaded in the "out" position. When you push the control in, air from the separate air tank releases the spring brakes so you can move. When you release the button, the spring brakes come on again. There is only enough air in the separate tank to do this a few times. Therefore, plan carefully when moving. Otherwise, you may be stopped in a dangerous location when the separate air supply runs out. See Figure 5.3.

5.1.16 – Antilock Braking Systems (ABS)

Truck tractors with air brakes built on or after March 1, 1997, and other air brakes vehicles, (trucks, buses, trailers, and converter dollies) built on or after March 1, 1998, are required to be equipped with antilock brakes. Many commercial vehicles built before these dates have been voluntarily equipped with ABS. Check the PHUWL¿FDWLRQ ODEHO IRU WKH GDWH vehicle is equipped with ABS. ABS is a computerized system that keeps your wheels from locking up during hard brake applications.

9HKLFOHV ZLWK $%6 KDYH \HOORZ PDO something isn't working.

Tractors, trucks, and buses will have yellow ABS malfunction lamps on the instrument panel.

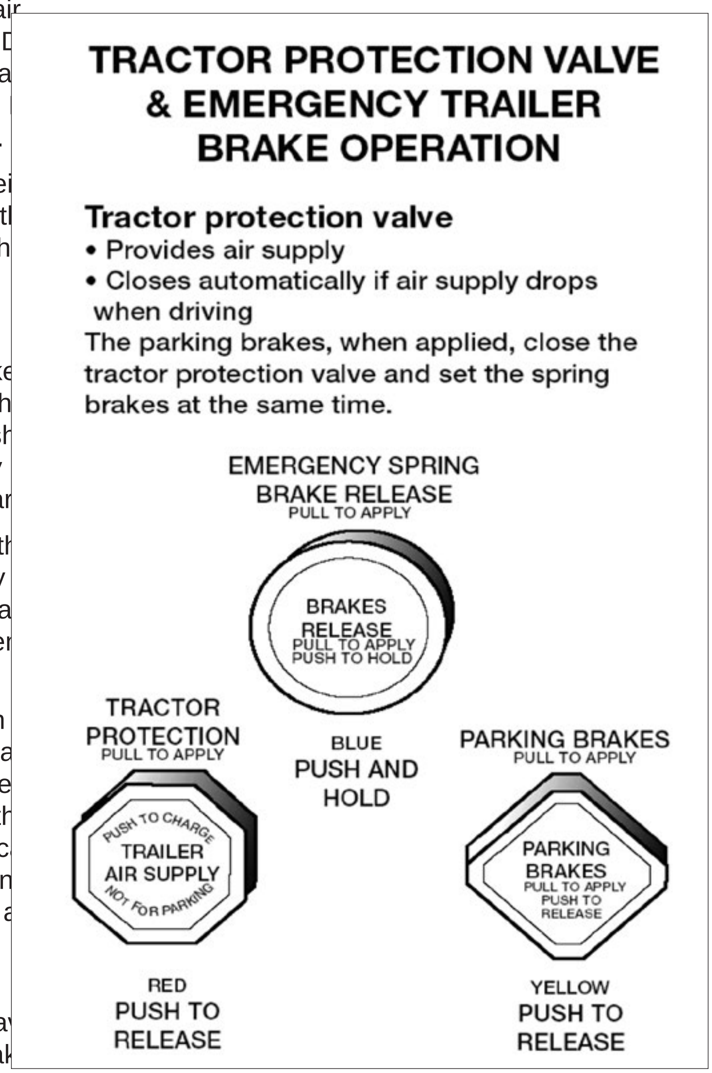


Figure 5.3

Dual Air Brake System With ABS

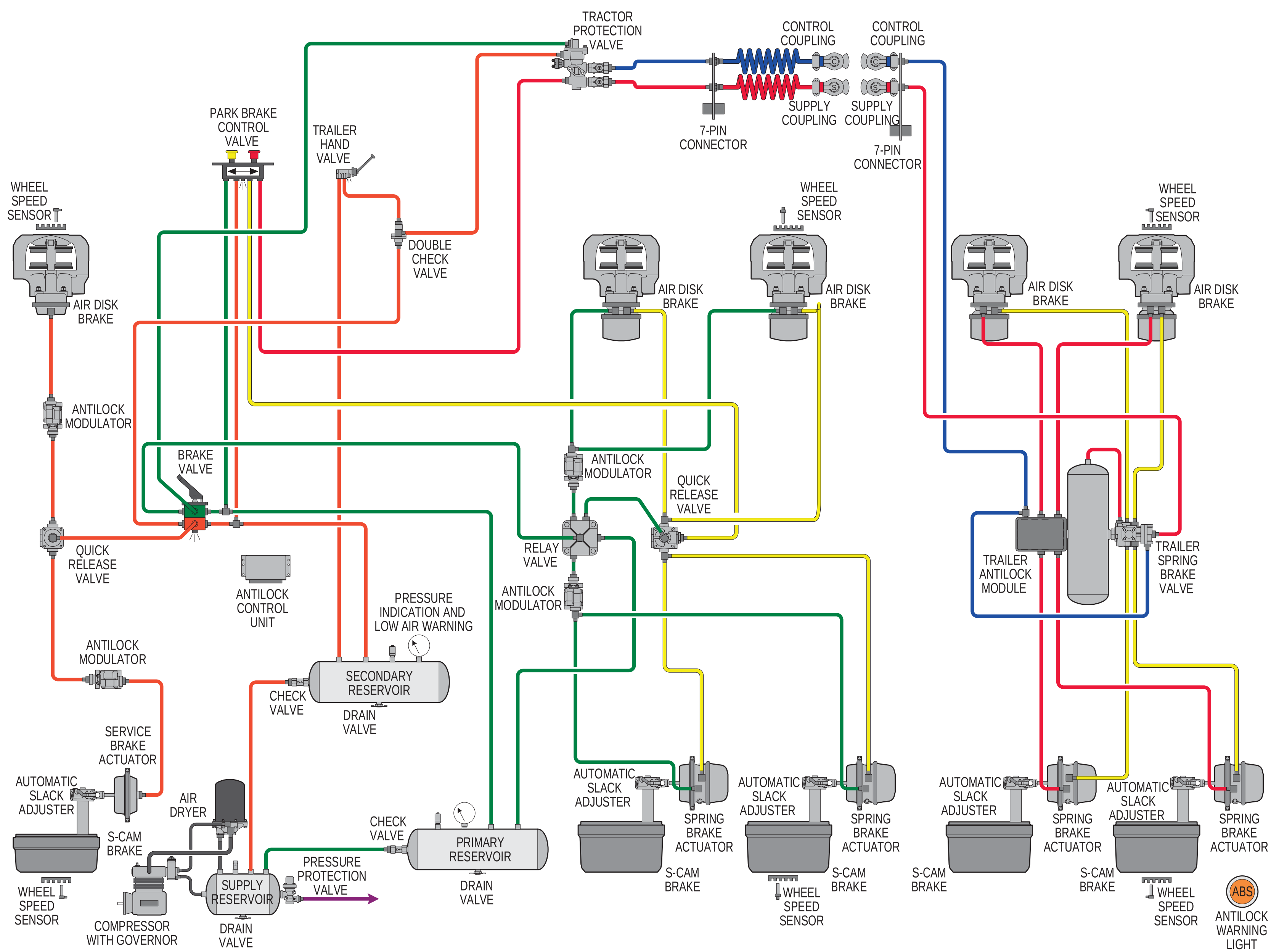


Figure 5.4

Trailers will have yellow ABS malfunction lamps on the left side, either on the front or rear corner. Dollies manufactured on or after March 1, 1998 are required to have a lamp on the left side.

On newer vehicles, the malfunction lamp comes on at start-up for a bulb check, and then goes out quickly. On older systems, the lamp FRXOG VWD\ RQ XQWLO \RX DUH GULYLQJ RYHU ¿YH PSK

If the lamp stays on after the bulb check, or goes on once you are under way, you may have lost ABS control at one or more wheels.

In the case of towed units manufactured before it was required by WKH 'HSDUWPHQW RI 7UDQVSRUWDWLRQ LW PD\ EH GLI¿FXOW WR WHOO LI W unit is equipped with ABS. Look under the vehicle for the electronic control unit (ECU) and wheel speed sensor wires coming from the back of the brakes.

ABS is an addition to your normal brakes. It does not decrease or increase your normal braking capability. ABS only activates when wheels are about to lock up.

ABS does not necessarily shorten your stopping distance, but it does help you keep the vehicle under control during hard braking.

SUBSECTION 5.1

TEST YOUR KNOWLEDGE

1. Why must air tanks be drained?
2. What is a supply pressure gauge used for?
3. All vehicles with air brakes must have a low air pressure warning signal. True or False?
4. What are spring brakes?
5. Front wheel brakes are good under all conditions. True or False?
6. How do you know if your vehicle is equipped with antilock brakes?

These questions may be on your test. If you can't answer them all, re-read subsection 5.1.

5.2 – Dual Air Brake

Most heavy-duty vehicles use dual air brake systems for safety. A dual air brake system has two separate air brake systems which use a single set of brake controls. Each system has its own air tanks, hoses, lines, etc. One system typically operates the regular brakes on the rear axle or axles. The other system operates the regular brakes on the front axle (and possibly one rear axle). Both systems VXSSO\ DLU WR WKH WUDLOHU LI WKHUH LV RQH 7KH ¿UVW V\VWHP LV FD the "primary" system. The other is called the "secondary" system. See Figure 5.4.

Before driving a vehicle with a dual air system, allow time for the air compressor to build up a minimum of 100 psi pressure in both the primary and secondary systems. Watch the primary and secondary air pressure gauges (or needles, if the system has two needles in one gauge). Pay attention to the low air pressure warning light DQG EX]]HU 7KH ZDUQLQJ OLJKW DQG EX]]HU VKRXOG VKXW R pressure in both systems rises to a value set by the manufacturer. This value must be greater than 60 psi.

The warning light (and buzzer, if equipped) should come on before the air pressure drops below 60 psi in either system. If this happens while driving, you should stop right away and safely park the vehicle. If one air system is very low on pressure, either the front or the rear brakes will not be operating fully. This means it will take you longer to stop. Bring the vehicle to a safe stop, and have WKH DLU EUDNHV V\VWHP ¿[HG

5.3 – Inspecting Air Brake Systems

You should use the basic seven-step inspection procedure described in Section 2 to inspect your vehicle. There are more things to inspect on a vehicle with air brakes than one without them. These things are GLVFXVVHG EHORZ LQ WKH RUGHU WKH

5.3.1 – During Step 2 Engine Compartment Checks

Check Air Compressor Drive Belt (if compressor is belt-driven). If the air compressor is belt-driven, check the condition and tightness of the belt. It should be in good condition.

5.3.2 – During Step 5 Walk-around Inspection

Check Slack Adjusters on S-cam Brakes. Park on level ground and chock the wheels to prevent the vehicle from moving. Release the parking brakes so you can move the slack adjusters. Use gloves and pull hard on each slack adjuster that you can reach. If a slack adjuster moves more than about one inch where the pushrod attaches WR LW LW SUREDEO\ QHHGV DGMXVWP slack can be very hard to stop. Out-of-adjustment brakes are the most common problem found in roadside inspections and a leading cause for vehicles being placed out-of-service. Be prepared and be safe. Check the slack adjusters.

All vehicles built since 1994 have automatic slack adjustors. Even though automatic slack adjustors adjust themselves during full brake applications, they must be checked.

Automatic adjusters should not be manually adjusted except by trained personnel when performing maintenance on the brakes and during installation of the slack adjusters. In a vehicle equipped with automatic adjusters, when the pushrod stroke exceeds the legal brake adjustment limit, it is an indication that a mechanical problem exists in the adjuster itself, a problem with the related foundation brake components, or that the adjuster was improperly installed.

The manual adjustment of an automatic adjuster to bring a brake pushrod stroke within legal limits is generally masking a mechanical SUREOHP DQG LV QRW ¿[LQJ LW)XUWK automatic adjusters will likely result in premature wear of the adjuster itself. It is recommended that when brakes equipped with automatic adjusters are found to be out of adjustment, the driver take the vehicle to a repair facility as soon as possible to have the problem corrected. The manual adjustment of automatic slack adjusters is dangerous because it may give the driver a false sense RI VHFXULW\ UHJDUGLQJ WKH HuHFWLY

The manual adjustment of an automatic adjuster should only be used as a temporary measure to correct the adjustment in an emergency situation as it is likely the brake will soon be back out of DGMXVWPHQW VLQFH WKLV SURFHGXUH adjustment problem.

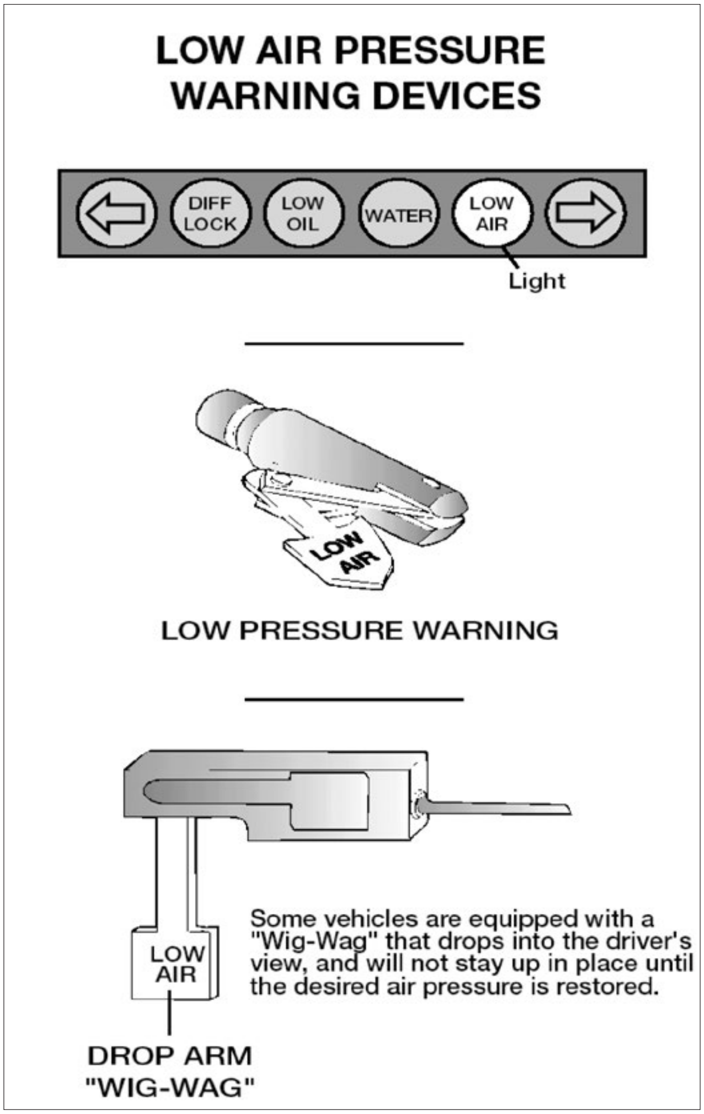


Figure 5.5

1RWH $XWRPDWLF VODFN DGMXVWHUV DUH PDGH E\ GLuHUHQW PDQXIDFWXUHU DQG GR QRW DOO RSHUDWH WKH VDPH 7KHUHIRUH WKH VSHFL¿F PDQXIDFWXUH Service Manual should be consulted prior to troubleshooting a brake adjustment problem.)

Check Brake Drums (or Discs), Linings, and Hoses. Brake drums (or discs) must not have cracks longer than one half the width of the friction area. Linings (friction material) must not be loose or soaked with oil or grease. They must not be dangerously thin. Mechanical parts must be in place, not broken or missing. Check the air hoses connected to the brake chambers to make sure they aren't cut or worn due to rubbing.

5.3.3 – Step 7 Final Air Brake Check

Note: Refer to Section 11 of this manual for the step–by-step LQIRUPDWLRQ \RX ZLOO QHHG WR NQRZ WR SHUIRUP WKH (QJLQH Ru air brake check required during the Pre-trip Vehicle Inspection portion of the CDL skills test.

Do the following checks instead of the hydraulic brake check shown in Section 2, Step 7: Check Brake System.

Test Air Leakage Rate. With a fully-charged air system (typically SVL WXUQ Ru WKH HQJLQH FKRFN \RXU ZKHHOV LI QHFHVVDU\ release all brakes, and time the air pressure drop. The loss rate should be less than two psi in one minute for single vehicles and less than three psi in one minute for combination vehicles. Then fully apply the service brake. After the initial pressure drop, if the air pressure falls more than three psi in one minute for single vehicles (more than four psi for combination vehicles), the air loss rate is WRR PXFK &KHFN IRU DLU OHDNV DQG Otherwise, you could lose your brakes while driving.

Test Low Pressure Warning Signal. 6KXW WKH HQJLQH you have enough air pressure so that the low pressure warning VLJQDO LV QRW RQ 7XUQ WKH HOHFWU the brake pedal to reduce air tank pressure. The low air pressure warning signal must come on before the pressure drops to less than 60 psi in the air tank (or tank with the lowest air pressure, in dual air systems). See Figure 5.5.

If the warning signal doesn't work, you could lose air pressure and you would not know it. This could cause sudden emergency braking in a single-circuit air system. In dual systems the stopping distance will be increased. Only limited braking can be done before the spring brakes come on.

Check Spring Brakes Come On Automatically. Continue to IDQ Ru WKH DLU SUHVVXUH E\ VWHSSLQ reduce tank pressure. The tractor protection valve and parking brake valve should close (pop out) on a tractor-trailer combination vehicle and the parking brake valve should close (pop out) on other combination and single vehicle types when the air pressure falls to WKH PDQXIDFWXUHU¶V VSHFL¿FDWLRQ

Check Rate of Air Pressure Buildup. When the engine is at operating rpms, the pressure should build from 85 to 100 psi within 45 seconds in dual air systems. (If the vehicle has larger than minimum air tanks, the buildup time can be longer and still EH VDIH &KHFN WKH PDQXIDFWXUHU¶V systems (pre-1975), typical requirements are pressure build up from 50 to 90 psi within 3 minutes with the engine at an idle speed of 600-900 rpms.

If air pressure does not build up fast enough, your pressure may drop too low during driving, requiring an emergency stop. Don't GULYH XQWLO \RX JHW WKH SUREOHP ¿

Check Air Compressor Governor Cut-in and Cut-out Pressures. The air compressor should start pumping at about 100 psi and VWRS DW DERXW SVL &KHFN PDQXI the engine at a fast idle. The air governor should cut-out the air FRPSUHVVRU DW DERXW WKH PDQXIDFW pressure shown by your gauge(s) will stop rising. With the engine LGOLQJ VWHS RQ DQG Ru WKH EUDNH 7KH FRPSUHVVRU VKRXOG FXW LQ DW D cut-in pressure. The pressure should begin to rise.

If the air governor does not work as described above, it may need WR EH ¿[HG $ JRYHUQRU WKDW GRHV Q enough air pressure for safe driving.

Test Parking Brakes. Stop the vehicle, put the parking brake on, and gently pull against it in a low gear to test that the parking brake will hold.

Test Service Brakes. Wait for normal air pressure, release the SDUNLQJ EUDNH PRYH WKH YHKLFOH IR

DQG DSSO\ WKH EUDNHV ¿UPO\ XVLQJ WKH EUDNH SHGDO 1RWH DQ\ YHKLFOH "pulling" to one side, unusual feel, or delayed stopping action.

This test may show you problems, which you otherwise wouldn't know about until you needed the brakes on the road.

SUBSECTIONS 5.2 AND 5.3

TEST YOUR KNOWLEDGE

1. What is a dual air brake system?
2. What are the slack adjusters?
3. How can you check slack adjusters?
4. How can you test the low pressure warning signal?
5. How can you check that the spring brakes come on automatically?
6. What are the maximum leakage rates?

These questions may be on your test. If you can't answer them all, re-read subsections 5.2 and 5.3.

5.4 – Using Air Brakes

5.4.1 – Normal Stops

Push the brake pedal down. Control the pressure so the vehicle comes to a smooth, safe stop. If you have a manual transmission, don't push the clutch in until the engine rpm is down close to idle. When stopped, select a starting gear.

5.4.2 – Braking with Antilock Brakes

When you brake hard on slippery surfaces in a vehicle without ABS, your wheels may lock up. When your steering wheels lock up, you lose steering control. When your other wheels lock up, you may skid, jackknife, or even spin the vehicle.

ABS helps you avoid wheel lock up. The computer senses impending lockup, reduces the braking pressure to a safe level, and you maintain control.

You may or may not be able to stop faster with ABS, but you should be able to steer around an obstacle while braking, and avoid skids caused by over braking.

Having ABS on only the tractor, only the trailer, or even on only one axle, still gives you more control over the vehicle during braking. Brake normally.

When only the tractor has ABS, you should be able to maintain VWHHULQJ FRQWURO DQG WKHUH LV OHVV FKDQFH RI MDFNNQL¿QJ %XW N your eye on the trailer and let up on the brakes (if you can safely do so) if it begins to swing out.

When only the trailer has ABS, the trailer is less likely to swing out, but if you lose steering control or start a tractor jackknife, let up on the brakes (if you can safely do so) until you gain control.

When you drive a tractor-trailer combination with ABS, you should brake as you always have. In other words:

- Use only the braking force necessary to stop safely and stay in control.
- Brake the same way, regardless of whether you have ABS on the tractor, the trailer, or both.
- As you slow down, monitor your tractor and trailer and back Ru WKH EUDNHV LI LW LV VDIH WR G

There is only one exception to this procedure, if you always drive a straight truck or combination with working ABS on all axles, in an emergency stop, you can fully apply the brakes.

Without ABS, you still have normal brake functions. Drive and brake as you always have.

Remember, if your ABS malfunctions, you still have regular brakes. Drive normally, but get the system serviced soon.

5.4.3 – Emergency Stops

If somebody suddenly pulls out in front of you, your natural response is to hit the brakes. This is a good response if there's enough distance to stop, and you use the brakes correctly.

You should brake in a way that will keep your vehicle in a straight line and allow you to turn if it becomes necessary. You can use the "controlled braking" method or the "stab braking" method.

Controlled Braking. With this method, you apply the brakes as hard as you can without locking the wheels. Keep steering wheel movements very small while doing this. If you need to make a larger steering adjustment or if the wheels lock, release the brakes. Re-apply the brakes as soon as you can.

Stab Braking

- Apply your brakes all the way.
- Release brakes when wheels lock up.
- As soon as the wheels start rolling, apply the brakes fully again. (It can take up to one second for the wheels to start rolling after you release the brakes. If you re-apply the brakes before the wheels start rolling, the vehicle won't straighten out.)

5.4.4 – Stopping Distance

Stopping distance was described in Section 2 under "Speed and Stopping Distance." With air brakes there is an added delay--the time required for the brakes to work after the brake pedal is pushed. With hydraulic brakes (used on cars and light/medium trucks), the brakes work instantly. However, with air brakes, it takes a little time RQH KDOI VHFRQG RU PRUH IRU WKH the brakes. Thus, the total stopping distance for vehicles with air EUDNH V\VWHPV LV PDGH XS RI IRXU GL

Perception Distance + Reaction Distance + Brake Lag Distance + Braking Distance = Total Stopping Distance

The air brake lag distance at 55 mph on dry pavement adds about 32 feet to the total stopping distance. So at 55 mph for an average driver under good traction and brake conditions, the total stopping distance is over 450 feet. See Figure 5.6.

5.4.5 – Brake Fading or Failure

Brakes are designed so brake shoes or pads rub against the brake drum or disks to slow the vehicle. Braking creates heat, but brakes are designed to take a lot of heat. However, brakes can fade or fail

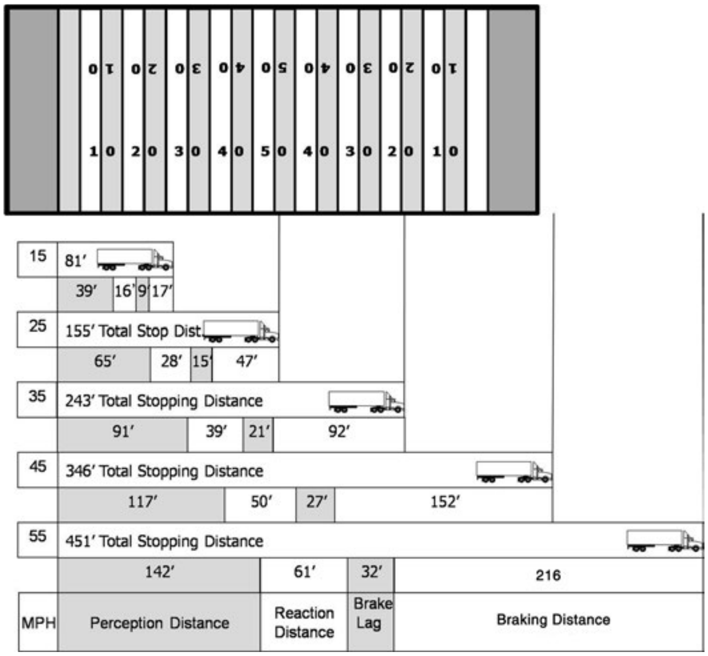


Figure 5.6

from excessive heat caused by using them too much and not relying RQ WKH HQJLQH EUDNLQJ HuHFW

Excessive use of the service brakes results in overheating and leads to brake fade. Brake fade results from excessive heat causing chemical changes in the brake lining, which reduce friction, and also causing expansion of the brake drums. As the overheated drums expand, the brake shoes and linings have to move farther to contact the drums, and the force of this contact is reduced. This means you have to apply increasing brake pedal pressure to slow the vehicle. Continued overuse may increase brake fade until the vehicle cannot be slowed down or stopped.

%UDNH IDGH LV DOVR DuHFWHG E\ DGMXVWPHQW 7R VDIHO\ FRQWURO D YHKL every brake must do its share of the work. Brakes out of adjustment will stop doing their share before those that are in adjustment. The other brakes can then overheat and fade, and there will not be enough braking available to control the vehicle(s). Brakes can get out of adjustment quickly, especially when they are hot. Therefore, check brake adjustment often.

5.4.6 – Proper Braking Technique

Remember, the use of brakes on a long and/or steep downgrade LV RQO\ D VXSSOHPHQW WR WKH EUDNLQJ HuHFW RI WKH HQJLQH 2QFH the vehicle is in the proper low gear, the following is the proper braking technique:

‡ $SSO\ WKH EUDNHV MXVW KDUG HQRXJ
‡ :KHQ \RXU VSHHG KDV EHHQ UHGXFHG PSK below your “safe” speed, release the brakes. (This application should last for about three seconds.)

- When your speed has increased to your “safe” speed, repeat steps 1 and 2.

For example, if your “safe” speed is 40 mph, you would not apply the brakes until your speed reaches 40 mph. You now apply the brakes hard enough to gradually reduce your speed to 35 mph and then release the brakes. Repeat this as often as necessary until you have reached the end of the downgrade.

5.4.7 – Low Air Pressure

If the low air pressure warning comes on, stop and safely park your vehicle as soon as possible. There might be an air leak in the system. Controlled braking is possible only while enough air remains in the air tanks. The spring brakes will come on when the air pressure drops into the range of 20 to 45 psi. A heavily loaded vehicle will take a long distance to stop because the spring brakes do not work on all axles. Lightly loaded vehicles or vehicles on slippery roads may skid out of control when the spring brakes come on. It is much safer to stop while there is enough air in the tanks to use the foot brakes.

5.4.8 – Parking Brakes

Except as noted below, use the parking brakes every time you park. Pull the parking brake control knob out to apply the parking brakes, push it in to release. The control will be a yellow, diamond-shaped knob labeled “parking brakes” on newer vehicles. On older vehicles, it may be a round blue knob or some other shape (including a lever that swings from side to side or up and down).

Don’t use the parking brakes if the brakes are very hot (from just having come down a steep grade), or if the brakes are very wet in freezing temperatures. If they are used while they are very hot, they can be damaged by the heat. If they are used in freezing temperatures when the brakes are very wet, they can freeze so the vehicle cannot move. Use wheel chocks to hold the vehicle. Let hot brakes cool before using the parking brakes. If the brakes are wet, use the brakes lightly while driving in a low gear to heat and dry them.

If your vehicle does not have automatic air tank drains, drain your air tanks at the end of each working day to remove moisture and oil. Otherwise, the brakes could fail.

Never leave your vehicle unattended without applying the parking brakes or chocking the wheels. Your vehicle might roll away and cause injury and damage.

SUBSECTION 5.4

TEST YOUR KNOWLEDGE

1. Why should you be in the proper gear before starting down a hill?
2. What factors can cause brakes to fade or fail?
3. The use of brakes on a long, steep downgrade is only D VXSSOHPHQW WR WKH EUDNLQJ H or False?
4. If you are away from your vehicle only a short time, you would not need to use the parking brake. True or False?
5. How often should you drain air tanks?
6. How do you brake when you drive a tractor-trailer combination with ABS?
7. You still have normal brake functions if your ABS is not working. True or False?

These questions may be on your test. If you can’t answer them all, re-read subsection 5.4.

Section 6

Combination Vehicles

This Section Covers

- Driving Combinations
- ‡&RPELQDWLRQ 9HKLFOH $LU %UDNHV
- Antilock Brake Systems
- Coupling and Uncoupling
- Inspecting Combinations

This section provides information needed to pass the tests for combination vehicles (tractor-trailer, doubles, triples, straight truck with trailer). The information is only to give you the minimum knowledge needed for driving common combination vehicles. You should also study Section 7 if you need to pass the test for doubles and triples.

6.1 – Driving Combination Vehicles Safely

Combination vehicles are usually heavier, longer, and require more driving skill than single commercial vehicles. This means that drivers of combination vehicles need more knowledge and skill than drivers of single vehicles. In this section, we talk about some important VDIHW\ IDFWRUV WKDW DSSO\ VSHFL¿FDOO\ WR FRPELQDWLRQ YHKLFOHV

6.1.1 – Rollover Risks

More than half of truck driver deaths in crashes are the result of truck rollovers. When more cargo is piled up in a truck, the “center of gravity” moves higher up from the road. The truck becomes easier to turn over. Fully loaded trucks are ten times more likely to roll over in a crash than empty truck.

The following two things will help you prevent rollover--keep the cargo as close to the ground as possible, and drive slowly around turns. Keeping cargo low is even more important in combination vehicles than in straight trucks. Also, keep the load centered on your rig. If the load is to one side so it makes a trailer lean, a rollover is more likely. Make sure your cargo is centered and spread out as much as possible. (Cargo distribution is covered in Section 3 of this manual.)

Rollovers happen when you turn too fast. Drive slowly around FRUQHUV RQ UDPSV DQG Ru UDPSV $YRLG TXLFN ODQH FKDQJHV especially when fully loaded.

6.1.2 – Steer Gently

7UXFNV ZLWK WUDLOHUV KDYH D GDQJ KHQ \RX PDNH D TXLFN ODQH FKDQJH can turn the trailer over. There are many accidents where only the trailer has overturned.

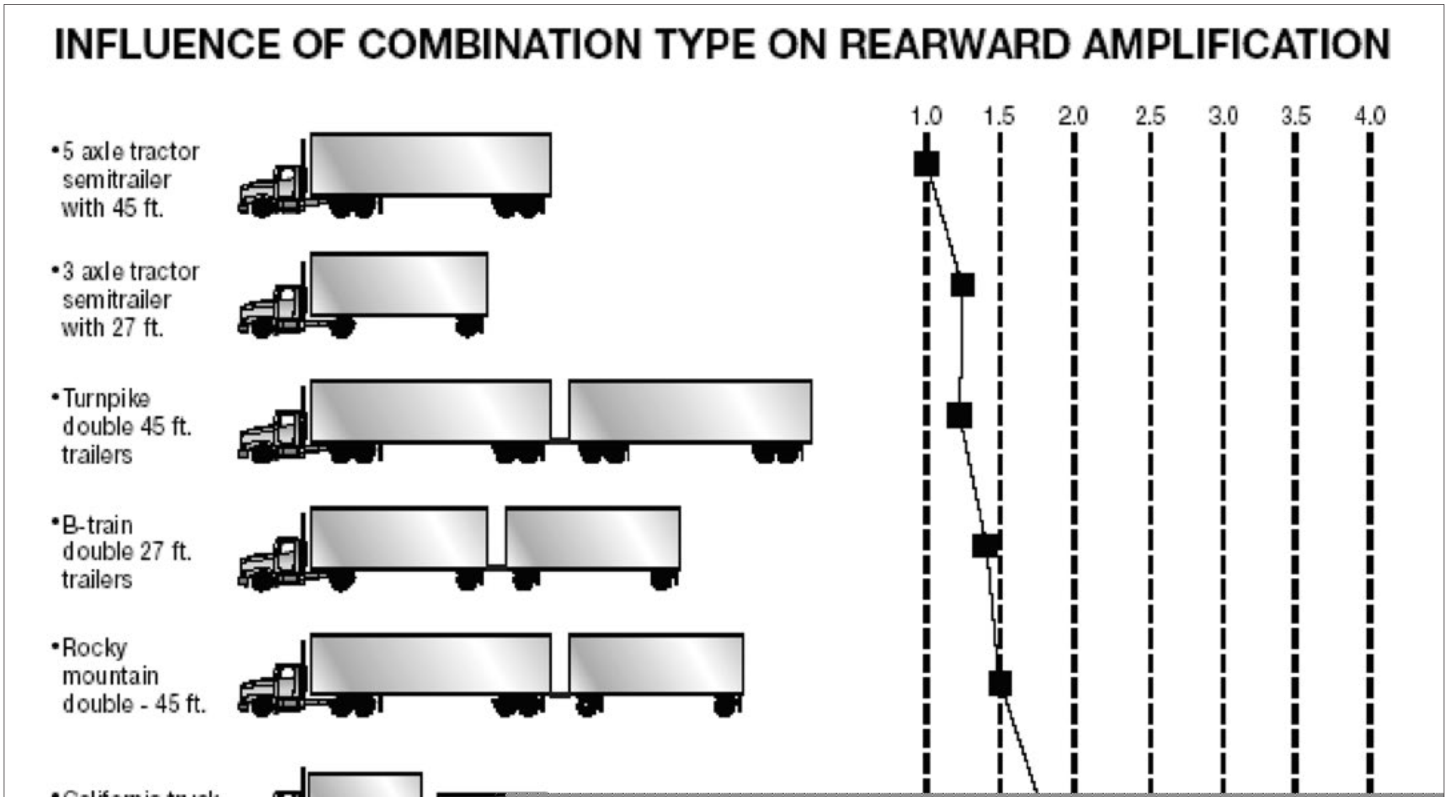
³5HDUZDUG DPSOL¿FDWLRQ´ FDXVHV WK 6.1 shows eight types of combination vehicles and the rearward DPSOL¿FDWLRQ HDFK KDV LQ D TXLFN O FUDFN WKH ZKLS HuHFW DUH VKRZQ DW DW WKH ERWWRP 5HDUZDUG DPSOL¿FD that the rear trailer is twice as likely to turn over as the tractor. <RX FDQ VHH WKDW WULSOHV KDYH D U means you can roll the last trailer of triples 3.5 times as easily as D ¿YH D[OH WUDFWRU

Steer gently and smoothly when you are pulling trailers. If you make a sudden movement with your steering wheel, your trailer could tip over. Follow far enough behind other vehicles (at least 1 second for each 10 feet of your vehicle length, plus another second if going over 40 mph). Look far enough down the road to avoid being surprised and having to make a sudden lane change. At night, drive slowly enough to see obstacles with your headlights before it is too late to change lanes or stop gently. Slow down to a safe speed before going into a turn.

6.1.3 – Brake Early

Control your speed whether fully loaded or empty. Large combination vehicles take longer to stop when they are empty than when they DUH IXOO\ ORDGHG :KHQ OLJKWO\ ORD springs and strong brakes give poor traction and make it very easy to lock up the wheels. Your trailer can swing out and strike other vehicles. Your tractor can jackknife very quickly. You also must be very careful about driving “bobtail” tractors (tractors without semitrailers). Tests have shown that bobtails can be very hard to stop smoothly. It may take them longer to stop than a tractor-semitrailer loaded to maximum gross weight.

In any combination rig, allow plenty of following distance and look far ahead, so you can brake early. Don’t be caught by surprise and have to make a sudden stop.



[redacted]

Figure 6.1

6.1.4 – Railroad-Highway Crossings

Railroad-highway crossings can also cause problems, particularly when pulling trailers with low underneath clearance.

These trailers can get stuck on raised crossings:

- Low slung units (lowboy, car carrier, moving van, possum-belly livestock trailer).
- Single-axle tractor pulling a long trailer with its landing gear set to accommodate a tandem-axle tractor.

If for any reason you get stuck on the tracks, get out of the vehicle and away from the tracks. Check signposts or signal housing at WKH FURVVLQJ IRU HPHUJHQF\ QRWL¿FDWLRQ LQIRUPDWLRQ &DOO RU other emergency number. Give the location of the crossing using DOO LGHQWL¿DEOH ODQGPDUNV HVSHFLDOO\ WKH '27 QXPEHU LI SRVWHG

6.1.5 – Prevent Trailer Skids

When the wheels of a trailer lock up, the trailer will tend to swing around. This is more likely to happen when the trailer is empty or lightly loaded. This type of jackknife is often called a "trailer jackknife." See Figure 6.2.

The procedure for stopping a trailer skid is:

Recognize the Skid. The earliest and best way to recognize that the trailer has started to skid is by seeing it in your mirrors. Any time you apply the brakes hard, check the mirrors to make sure the trailer is staying where it should be. Once the trailer swings out of \RXU ODQH LW¶V YHU\ GLvFXOW WR SU

- (From R.D. Ervin, R.L. Nisconger, C.C. MacAdam, and P.S. Fancher, ³,QÀXHQFH RI VL]H DQG ZHLJKW YDULDE properties of heavy trucks, "University of Michigan Transportation Research Institute, 1983).

Stop Using the Brake. Release the brakes to get traction back. Do not use the trailer hand brake (if you have one) to "straighten out the rig." This is the wrong thing to do since the brakes on the WUDLOHU ZKHHOV FDXVHG WKH VNLG LQ WKH ¿UVW SODFH 2QFH WKH WUDLOHU wheels grip the road again, the trailer will start to follow the tractor and straighten out.