Test-4-X

www.test-4-x.com/cdl

Canada • Alberta Class 1 (CDL)

Alberta

Study Guide

KNOWLEDGE POINTS	CHAPTERS	EDITION
565	97	2026-10-18

© 2026 Test4X. All rights reserved.
For personal study use. Not for resale or redistribution.

Questions or corrections: support@test-4-x.com

Disclaimer

This study guide is compiled from official government handbooks and other publicly available sources, for educational purposes only. It is intended to help you study and prepare; it does not constitute legal or professional advice.

Rules and regulations change. Always refer to the official handbook published by your licensing authority for the most current and authoritative information. The publisher assumes no liability for any decision made on the basis of this material.

This publication is independent. It is not affiliated with, endorsed by, or sponsored by any licensing or examining authority. All trademarks are the property of their respective owners.

Edition 2026-10-18 • 565 knowledge points • 97 chapters

Spotted an error, or have a question about this guide?
support@test-4-x.com

Contents

01	Introduction and Program Objectives	1
02	Commercial Driver's Licence Requirements: Class Definitions	3
03	Operating a truck-tractor and semi-trailer	5
04	Commercial Driver's Licence Requirements	6
05	Size and Weight Restrictions of Commercial Vehicles	14
06	Chapter 9: Transporting Dangerous Goods (Placards and Explosives)	15
07	Module 3: The Supply Circuit	16
08	Module 8: Foundation Brakes Operation and Adjustment - Manual Slack Adjusters	19
09	Air Brake Practical Test (DPLS0003) - Form Completion	20
10	Transporting Dangerous Goods	22
11	Air Brake Program Overview	25
12	Commercial Driver's Licence Requirements: Upgrading Your Licence	27
13	Air Brakes	28
14	Distracted Driving Law for Commercial Drivers	29
15	Knowledge Test	33
16	National Safety Code	34
17	Chapter 10: Distracted Driving Law for Commercial Drivers	37
18	Module 4: Service Brakes	40
19	Module 4: The Service Circuit	43
20	Module 8: Automatic Slack Adjusters	47
21	Tractor Protection System Test	50
22	Practical Test and Pre-Trip Inspection Details	51
23	Commercial Driver's Licence Requirements: MELT, Knowledge Test and Vision	53
24	How long does it take to stop a vehicle?	55
25	Fatigue	58
26	Practical Test Details	61

Contents (cont.)

27	Trip Inspections	62
28	How Long Does It Take to Stop a Vehicle?	70
29	Chapter 10: Fatigue	72
30	Module 1: Braking Fundamentals	74
31	Module 5: Parking and Emergency Brakes	78
32	Licensing and Endorsement Requirements	80
33	Module 5: The Park Circuit	81
34	Module 9: Safe Driving Practices	83
35	Park Control Valve Test	87
36	Commercial Driver's Licence Requirements: Air Brakes and Definitions	88
37	General braking information	90
38	Railway Crossing	91
39	Instructor Demonstration and Pre-Trip Procedures	95
40	General Braking Information	96
41	Chapter 10: Railway Crossings	98
42	Module 2: Air Brake System Fundamentals	101
43	Module 6: Trailer Air Systems	106
44	Module 10: Vehicle Inspections	110
45	Supply Circuit Test	115
46	Program Documents	116
47	Coupling and uncoupling a truck-tractor and semi-trailer	117
48	Know the Law — Railway Crossings	119
49	Coupling and Uncoupling a Truck-Tractor and Semi-Trailer	120
50	Chapter 10: Fire and Fire Extinguishers	122
51	Module 3: Supply Circuit	124
52	Module 7: System Failures	128

Contents (cont.)

53	Module 7: Emergencies (System Failures)	131
54	Air Brake Knowledge Test and Program Completion	134
55	Air System Leaks Test	136
56	Know the Law - Railway Crossings	137
57	National Safety Code: Safety Fitness and Legislation	138
58	Program Documents and Forms	139
59	Coupling mechanisms	140
60	National Safety Code: Hours of Service	142
61	Fire and Fire Extinguishers	143
62	Coupling Mechanisms - Double Trailer Combination Types	146
63	Chapter 11: Fueling a Vehicle	148
64	Practical Training and Test Procedures	149
65	Module 8: Brake Adjustment and Foundation Brakes	151
66	Module 8: Brake Adjustment	154
67	Brake Adjustment Test	157
68	Operating long combination vehicles	158
69	National Safety Code: Vehicle Inspection Program and Cargo Securement	160
70	Fueling a Vehicle	161
71	Operating Long Combination Vehicles	164
72	Driving skills and manoeuvres	165
73	Notice of Air Brake Program Completion (DPLS0005)	168
74	Chapter 11: Fuel Efficiency - Making Smart Choices	170
75	Trip Inspections: Purpose and Requirements	172
76	Driving Skills and Manoeuvres	173
77	Chapter 11: Caring for Your Vehicle	176
78	Parking	177

Contents (cont.)

79	Fuel Efficiency	179
80	Trip Inspections: Circle Check and Walk-Around	185
81	Driving Defensively and Safe Stopping	187
82	Reversing	188
83	Driving Defensively	191
84	Chapter 11: Smart Driving Practices	192
85	Trip Inspections: Coupling and Combination Components	194
86	Chapter 11: Driving Defensively and Safe Stopping	196
87	Important information for commercial drivers	197
88	Trip Inspections: Trip Air Brake Inspection Procedure	198
89	Important Information for Commercial Drivers	199
90	Information for class 2 and class 4 bus operators	201
91	Operating a school bus safely	202
92	Trip Inspections: Enroute, Inspection Stations and Post-Trip	205
93	Loading and unloading dump vehicles	206
94	Mixer truck operators	207
95	Emergency vehicles	208
96	Operating a taxi	209
97	Transporting Persons with Disabilities	210

CHAPTER 1

Introduction and Program Objectives

1.1 Skill Objectives for Practical Training

The practical training session teaches drivers to perform an effective pre-trip inspection, determine if s-cam foundation brakes are correctly adjusted, and know how to adjust an s-cam drum brake.

- ✓ Perform an effective pre-trip inspection ensuring proper air brake operation before service
- ✓ Determine correct adjustment on s-cam foundation brakes and know how to adjust an s-cam drum brake

1.2 Knowledge and Skill Objectives

Candidates must understand how a typical air brake system functions, use it safely to maximum advantage, know how the system reacts to failures, and learn operational strategies to safely stop a vehicle after an air system failure. Skill objectives include performing an effective pre-trip inspection, determining if s-cam foundation brakes are correctly adjusted, and knowing how to adjust an s-cam drum brake.

- ✓ Drivers must be able to perform an effective pre-trip inspection before putting a vehicle into service
- ✓ Drivers must determine if s-cam foundation brakes are correctly adjusted and know how to adjust an s-cam drum brake

1.3 Air Brake Program Legal Framework

The Alberta Air Brake Program is mandatory for operators of air brake equipped vehicles since November 1, 1990. Legislation is found in the Alberta Traffic Safety Act and its regulations, and in Air Brake Systems (Standard 121) of Transport Canada's Motor Vehicle Safety Act.

- ✓ The program has been mandatory since November 1, 1990
- ✓ Legislation is located in the Alberta Traffic Safety Act and Transport Canada's Air Brake Systems Standard 121

1.4 Knowledge Objectives of Air Brake Training

The classroom session aims to provide a basic understanding of how a typical air brake system functions, how to use it safely and to maximum advantage, how the system reacts to failures, and operational strategies to safely stop a vehicle after an air system failure.

- ✓ Understand how a typical air brake system functions and how to use it safely
- ✓ Know how an air brake system reacts to various failures and how to safely stop after a failure

1.5 Air Brake Program Mandatory Since 1990

The Alberta Air Brake Program provides training for the safe and efficient operation of air brake systems. Since November 1, 1990 it has been mandatory for operators of air brake equipped vehicles. Legislation is found in the Alberta Traffic Safety Act and Transport Canada's Motor Vehicle Safety Act, Air Brake Systems (Standard 121).

- ✓ Air brake training is mandatory for operators of air brake equipped vehicles since November 1, 1990
- ✓ Legislation is located in the Alberta Traffic Safety Act and Transport Canada Standard 121

1.6 Alberta Air Brake Program Purpose

The Alberta Air Brake Program provides training for drivers to ensure safe and efficient operation of air brake systems. Since November 1, 1990 it has been mandatory for operators of air brake equipped vehicles. Legislation is found in the Alberta Traffic Safety Act and Transport Canada's Motor Vehicle Safety Act (Standard 121).

- ✓ The air brake program has been mandatory since November 1, 1990 for operators of air brake equipped vehicles
- ✓ Legislation regarding air brake systems is in the Alberta Traffic Safety Act and Transport Canada's Air Brake Systems Standard 121
- ✓ The training manual itself has no legal authority

1.7 Purpose of the Alberta Air Brake Program

The Alberta Air Brake Program provides training to ensure the safe and efficient operation of air brake systems. It has been mandatory for operators of air brake equipped vehicles since November 1, 1990. The manual itself has no legal authority; the governing legislation is the Alberta Traffic Safety Act and its regulations, and Air Brake Systems (Standard 121) of Transport Canada's Motor Vehicle Safety Act.

- ✓ The air brake program has been mandatory since November 1, 1990 for operators of air brake equipped vehicles
- ✓ Legal authority comes from the Alberta Traffic Safety Act and Transport Canada Standard 121, not the manual

CHAPTER 2

Commercial Driver's Licence Requirements: Class Definitions

2.1 Class 1 Licence Privileges and Age

A Class 1 licence is the highest commercial class in Alberta. The minimum learning or licensing age is 18 years. You may not apply for a Class 1 licence as a probationary (GDL) driver. The holder may operate any motor vehicle or combination of vehicles other than a motorcycle, and Class 6 type vehicles for learning only.

- ✓ Minimum learning/licensing age for Class 1 is 18 years
- ✓ You cannot apply for Class 1 as a probationary/GDL driver
- ✓ Class 1 allows operation of any motor vehicle or combination except a motorcycle
- ✓ A Class 1 licence cannot be obtained without first qualifying for an air brake endorsement

2.2 Class 1 Road Test Vehicle Configuration

To take the Class 1 road test you must provide a tractor-trailer with a specific configuration to demonstrate ability to handle a full commercial combination unit.

- ✓ 13-speed manual transmission required
- ✓ Gross vehicle weight of at least 11,794 kg
- ✓ Full-air brake system on both tractor and trailer
- ✓ Minimum tandem axle tractor and tandem axle trailer
- ✓ Fifth wheel coupling device required
- ✓ Single trailer minimum 48 feet length, minimum 35 feet from kingpin to centre of each rear axle

2.3 Class 2 Licence Privileges

A Class 2 licence permits operating a bus plus any vehicle a Class 3, 4 or 5 holder may operate. Minimum age is 18 and no probationary applicants. The road test bus must exceed 24 passenger seating capacity. If air brake equipped, driver needs a 'Q' endorsement or air brake course certificate.

- ✓ Class 2 holder may operate a bus and Class 3, 4, 5 vehicles
- ✓ Road test bus must have seating capacity exceeding 24 passengers, excluding operator
- ✓ Air brake 'Q' endorsement required for air brake equipped vehicles
- ✓ Class 1 and 6 vehicles for learning only

2.4 Class 3 Licence Privileges

A Class 3 licence allows operation of a single motor vehicle with three or more axles, and a three-or-more-axle vehicle towing a trailer with one or more axles (if the trailer has no air brakes). Holders cannot operate vehicles seating more than 15 passengers while carrying passengers, or transport passengers for hire.

- ✓ Class 3 allows single motor vehicle with three or more axles
- ✓ May tow a trailer only if that trailer is not equipped with air brakes
- ✓ Cannot operate vehicle seating more than 15 while transporting anyone other than driver
- ✓ Cannot transport passengers for hire

2.5 Class 4 Licence Privileges

A Class 4 licence permits operation of a bus with seating not more than 24 (excluding operator), an ambulance, or a taxi, plus Class 5 vehicles. Minimum age is 18 with no probationary applicants.

- ✓ Class 4 allows a bus with seating capacity not more than 24, excluding operator
- ✓ Class 4 permits driving an ambulance or taxi
- ✓ Class 4 road test requires a Class 5 vehicle or bus seating not exceeding 24 passengers
- ✓ Air brake 'Q' endorsement required if the vehicle is air brake equipped

CHAPTER 3

Operating a truck-tractor and semi-trailer

3.1 Commercial vehicle size restrictions

Commercial vehicles must comply with maximum dimension limits set by the Commercial Vehicle Dimension and Weight Regulation (AR 315/2002). Exceeding these limits requires a special permit with specific conditions.

- ✓ Maximum width is 2.6 metres; clearance lights required if wider than 2.05 metres (amber front, red rear)
- ✓ Maximum height is 4.15 metres from the ground surface
- ✓ Maximum length is 12.5 metres for a straight truck
- ✓ Maximum wheelbase length is 6.2 metres for a truck-tractor
- ✓ Maximum overall length is 23 metres for a tractor semi-trailer or truck and towed trailer combination
- ✓ Maximum overall length is 25 metres for TAC combinations (A, B and C trains)

3.2 Oversized and overweight permits

Specialized, oversized or overweight equipment requires a special permit that specifies operating conditions to prevent road damage and ensure safety.

- ✓ Permit states the routes you may travel on
- ✓ Permit states the days and hours of travel
- ✓ Permit states the type of equipment that must be used
- ✓ No vehicle may operate if weight on a tire, axle, axle group or gross vehicle weight exceeds regulation limits

3.3 Special permits for oversized/overweight loads

Specialized, oversized or overweight equipment requires a special permit that will state specific conditions to prevent road damage and ensure safety.

- ✓ A special permit is required for specialized, oversized or overweight equipment
- ✓ Permit conditions state routes, days and hours of travel, and the type of equipment that must be used
- ✓ No vehicle may operate on a highway if weight exceeds what is allowed under the regulation

CHAPTER 4

Commercial Driver's Licence Requirements

4.1 Class 1 Licence Privileges and Age

A Class 1 driver's licence permits operation of any motor vehicle or combination of vehicles other than a motorcycle. It also allows learning of Class 6 type vehicles. The minimum learning or licensing age is 18 years, and you may not apply as a probationary (GDL) driver.

- ✓ Minimum learning or licensing age for Class 1 is 18 years
- ✓ Class 1 allows operation of any motor vehicle or combination except motorcycles
- ✓ Cannot apply for Class 1 as a probationary/GDL driver
- ✓ Class 1 holders may operate Class 6 vehicles for learning only

4.2 Class 1 Road Test Vehicle Configuration

To take the Class 1 road test you must provide a tractor-trailer with a specific configuration including a 13-speed manual transmission, a minimum gross vehicle weight, a full-air brake system, tandem axles, and a fifth wheel coupling device.

- ✓ Must have a 13-speed manual transmission
- ✓ Tractor-trailer must have a gross vehicle weight of at least 11,794 kg
- ✓ Full-air brake system required on both tractor and trailer
- ✓ Minimum tandem axle tractor and tandem axle trailer required
- ✓ Fifth wheel coupling device required
- ✓ Single trailer minimum 48 feet long with minimum 35 feet from kingpin to centre of each rear axle

4.3 Mandatory Entry-Level Training (MELT)

Effective March 1, 2019, anyone wanting a Class 1 or Class 2 licence must complete the Mandatory Entry-Level Training (MELT) program. Successful MELT completion is a prerequisite to taking the Class 1 or Class 2 knowledge test.

- ✓ MELT is mandatory for Class 1 and Class 2 licences
- ✓ MELT completion is required before taking the Class 1 or 2 knowledge test
- ✓ Most Class 1 and Class 2 knowledge test questions come from MELT curriculums

4.4 Knowledge Test Requirements

To upgrade a licence you must pass a knowledge test based on this guide and the Cars and Light Trucks guide. The test is 30 multiple choice questions requiring at least 25 correct to pass, and stops after six wrong answers.

- ✓ Knowledge test is 30 multiple choice questions
- ✓ Must score a minimum of 25 correct out of 30 to pass
- ✓ Test stops and fails after six questions answered incorrectly
- ✓ Class 1 applicants may be asked questions from any chapter in the guide

4.5 Road Test Pre-Trip Inspection Requirement

Applicants for Class 1, 2 or 3 must perform a pre-trip inspection during the road test, communicating and demonstrating each item. Class 1 also requires demonstrating couple/uncouple procedures and an air brake inspection.

- ✓ Class 1, 2 and 3 road tests require a pre-trip inspection
- ✓ You must point to and describe each item being inspected
- ✓ Class 1 requires demonstrating uncouple/couple procedures
- ✓ Air brake inspection required for air-brake equipped units
- ✓ You may not refer to any notes during the pre-trip
- ✓ If the pre-trip is failed, the road test will not proceed

4.6 Air Brake Endorsement for Class 1

A Class 1 licence cannot be obtained without first qualifying for an air brake endorsement. No driver (other than a learner) may operate a vehicle with full air brakes unless they hold a Class 1 licence or a Q endorsement.

- ✓ A Class 1 licence cannot be obtained without an air brake endorsement
- ✓ Only learners may drive air brake vehicles without a Q endorsement or Class 1
- ✓ Class 1 licence itself satisfies the air brake endorsement requirement

4.7 Air Brake System Definitions

The guide defines three braking types: full air brakes (air to all foundation brakes) require a Q endorsement or Class 1; air-over-hydraulic (combination) also require the endorsement; and air-actuated hydraulic (air assisted, all hydraulic foundation brakes) do NOT require the Q endorsement.

- ✓ Full air brakes send air pressure to all foundation brakes and require Q or Class 1
- ✓ Air over hydraulic braking system requires a Q endorsement or Class 1
- ✓ Air actuated hydraulic braking system does NOT require a Q endorsement
- ✓ Farm single-motor-vehicle drivers do not need a Q endorsement

4.8 Class 1 Licence Requirements and Configuration

A Class 1 licence permits operation of any motor vehicle or combination other than a motorcycle, plus Class 6 vehicles for learning only. The minimum learning/licensing age is 18. You cannot apply as a probationary driver. Specific vehicle configuration must be provided for the road test.

- ✓ Minimum learning/licensing age for Class 1 is 18 years
- ✓ Cannot apply for Class 1 as a probationary (GDL) driver
- ✓ Road test tractor-trailer requires 13-speed manual transmission, GVW of at least 11,794 kg, full-air brakes on tractor and trailer, tandem axles, fifth wheel, and a trailer minimum 48 feet with 35 feet from kingpin to rear axle centre
- ✓ A Class 1 licence cannot be obtained without first qualifying for an air brake endorsement

4.9 Class 2 Licence Requirements

A Class 2 licence allows operating a bus and any vehicle a Class 3, 4 or 5 holder may operate, plus Class 1 and 6 vehicles for learning only. Minimum age is 18, no probationary applicants.

- ✓ Must provide a bus with seating capacity exceeding 24 passengers (excluding operator) for the road test
- ✓ Air brake 'Q' endorsement required to operate air brake equipped vehicles
- ✓ Minimum learning/licensing age is 18 years and no probationary applicants

4.10 Class 3 Licence Requirements

A Class 3 licence permits single motor vehicles with three or more axles and towing trailers (with one or more axles if not air-brake equipped), plus Class 5 vehicles. Restrictions apply to passenger transport.

- ✓ Cannot operate a vehicle with seating capacity over 15 while transporting persons other than the driver
- ✓ Cannot transport passengers for hire
- ✓ Must provide a single motor vehicle with three or more axles for the road test (no three-axle recreational vehicles)
- ✓ Drivers of single-motor vehicles registered as farm vehicles do not require an air brake 'Q' endorsement

4.11 Class 4 Licence Requirements

A Class 4 licence permits a bus with seating capacity not more than 24 (excluding operator), an ambulance or taxi, and Class 5 vehicles, plus Classes 1, 2, 3 and 6 for learning only.

- ✓ Must provide a Class 5 vehicle or bus with capacity not exceeding 24 passengers (excluding operator) for road test
- ✓ Allows operation of an ambulance or taxi
- ✓ Minimum learning/licensing age is 18 years and no probationary applicants

4.12 Knowledge Test Structure

To upgrade, you must pass a knowledge test for the licence class sought. It is based on this guide and the Cars and Light Trucks guide. Class 1 applicants may be asked questions from other chapters since they can operate other vehicle types.

- ✓ The test has 30 multiple choice questions
- ✓ You must score a minimum of 25 correct out of 30 to pass
- ✓ When six questions are answered incorrectly, the test is stopped and a fail recorded

4.13 Road Test Pre-Trip Requirements

Class 1, 2 or 3 applicants must conduct a pre-trip inspection in addition to the road test, communicating and demonstrating what they inspect. Notes may not be used.

- ✓ Must communicate and demonstrate a pre-trip inspection, couple/uncouple (Class 1), and air brake inspection where applicable
- ✓ You may not refer to any notes during the pre-trip
- ✓ If the vehicle fails the pre-trip or you do not complete it, the road test will not proceed
- ✓ A road test will not be done in a vehicle required to display dangerous goods placards

4.14 Braking System Definitions and Endorsements

Three braking system types exist: full air brakes (air to all foundation brakes), air over hydraulic (combination), and air actuated hydraulic (air assisted but hydraulic foundation brakes). Each has different endorsement requirements.

- ✓ Full air brakes and air over hydraulic systems require an air brake 'Q' endorsement or Class 1 licence
- ✓ Air actuated hydraulic braking systems do NOT require a 'Q' endorsement
- ✓ No driver (other than a learner) may operate a vehicle with air-to-all-foundation air brakes without a Class 1 licence or 'Q' endorsement

4.15 Class 2 Licence and Buses

A Class 2 licence permits operation of a bus and any vehicle a Class 3, 4 or 5 holder may operate. For the road test you must provide a bus seating more than 24 passengers excluding the operator. An air brake Q endorsement is required for air brake equipped vehicles.

- ✓ Class 2 permits operating a bus and any Class 3, 4 or 5 vehicle
- ✓ Road test bus must seat more than 24 passengers excluding operator
- ✓ Air brake Q endorsement or course completion certificate required if vehicle has air brakes
- ✓ Minimum age is 18, cannot apply as probationary driver

4.16 Class 3 Licence Restrictions

A Class 3 licence permits single vehicles with three or more axles, and towing trailers without air brakes. A Class 3 holder cannot operate vehicles seating more than 15 while transporting passengers, nor transport passengers for hire.

- ✓ Class 3 allows a single motor vehicle with three or more axles
- ✓ May tow a trailer with one or more axles only if trailer has no air brakes
- ✓ Cannot carry more than 15 passengers when transporting people
- ✓ Cannot transport passengers for hire
- ✓ Road test requires a single vehicle with three or more axles (no 3-axle RVs)

4.17 Class 4 Licence Privileges

A Class 4 licence permits operation of small buses (24 or fewer passengers), ambulances, taxis, and any Class 5 vehicle. Road test requires a Class 5 vehicle or bus seating 24 or fewer excluding operator.

- ✓ Class 4 permits buses seating not more than 24 excluding operator
- ✓ Class 4 permits ambulances and taxis
- ✓ Road test requires Class 5 vehicle or bus seating 24 or fewer
- ✓ Minimum age 18, cannot apply as probationary driver

4.18 Medical and Vision Requirements

A medical report is required to upgrade to Class 1, 2 or 4. Reports must be renewed at set age intervals. A vision assessment is also required before upgrading; failing minimum standards requires an optometrist/ophthalmologist referral.

- ✓ Medical report required to upgrade to Class 1, 2 or 4
- ✓ Medical required every 5 years until age 45, every 2 years from 45-65, every year after 65
- ✓ Vision assessment required before upgrading
- ✓ You must report any disease or disability affecting safe driving to a Registry Agent
- ✓ Bring corrective glasses or contact lenses to the vision assessment

4.19 GDL and Wrong-Class Driving Rules

An applicant holding a Graduated Driver Licence (GDL) cannot take a road test for a classification higher than Class 5. Driving with the wrong licence class is illegal, and it is also an offence for a vehicle owner to allow this.

- ✓ GDL holders may not take a road test above Class 5
- ✓ Driving with the wrong licence class is against the law
- ✓ Vehicle owners must not allow driving by someone without the proper class
- ✓ 10-day waiting period applies to certain out-of-province re-class applicants

4.20 Key Vehicle Definitions

A bus is a commercial vehicle designed to carry 11 or more persons including the driver. A semi-trailer has axles only at the rear and connects by kingpin and fifth wheel. A truck tractor may couple to a semi-trailer via a fifth wheel.

- ✓ A bus is designed to carry 11 or more persons including the driver
- ✓ A semi-trailer has axles only at or near the rear end
- ✓ A semi-trailer connects to a truck tractor via kingpin and fifth wheel
- ✓ A truck tractor couples to a semi-trailer via a fifth wheel

4.21 Q and S Endorsements

A Q endorsement is placed on any licence class when a driver completes an approved Alberta air brake course. An S endorsement is for school bus drivers (Class 1, 2 or 4) who complete the School Bus Driver Improvement Program.

- ✓ Q endorsement is earned by completing an approved Alberta air brake course
- ✓ S endorsement requires completing the School Bus Driver Improvement Program
- ✓ S endorsement available only to Class 1, 2 or 4 licence holders

4.22 Learning Requirements for Commercial Classes

To learn to drive a commercial class vehicle you must hold at least a Class 5 or Class 5 GDL licence. You cannot apply for commercial classes while in the GDL program. Learning drivers must be accompanied by a qualified instructor.

- ✓ Must have at least a Class 5 or Class 5 GDL licence to learn a commercial vehicle
- ✓ GDL holders may not take a road test for a class higher than Class 5
- ✓ Instructor must be at least 18 and hold the appropriate class; road test taker must be 18 non-GDL
- ✓ No air brake endorsement needed while learning on an air brake equipped vehicle

4.23 Cross-Jurisdiction Waiting Period

New applicants from other Canadian jurisdictions must wait to re-class to commercial classes so Alberta can confirm licence information.

- ✓ A 10-day waiting period applies to non-GDL Class 5, 5-6 and 6 new applicants from other Canadian jurisdictions re-classing to Classes 1 to 4
- ✓ Driving with the wrong licence class is illegal, and allowing an improperly licensed driver to operate is also an offence

4.24 Air Brake Endorsement and Farm Vehicles

An air brake 'Q' endorsement is not required for a single motor vehicle registered as a farm vehicle, but is required for a farm vehicle combination requiring a Class 1 licence.

- ✓ No air brake endorsement needed for a single motor vehicle registered as a farm vehicle
- ✓ Air brake endorsement required for a farm vehicle combination requiring a Class 1 licence
- ✓ Must show proof of air brake qualifications when applying for a Class 1 licence even if the vehicle is a farm vehicle

4.25 Endorsements and Vehicle Definitions

A 'Q' endorsement is added when a driver completes an approved Alberta air brake course. An 'S' endorsement is for school bus drivers who complete the School Bus Driver Improvement Program. A bus is designed for 11 or more persons including the driver.

- ✓ A 'Q' endorsement requires successful completion of an approved Alberta air brake course
- ✓ Class 1, 2 or 4 holders may apply for an 'S' school bus endorsement after the School Bus Driver Improvement Program
- ✓ A 'bus' is a commercial vehicle designed to carry 11 or more persons including the driver
- ✓ A semi-trailer connects to the truck tractor via a kingpin and fifth wheel

4.26 Dangerous Goods Placard Road Test Rule

A road test will not be conducted in any vehicle that is required to display dangerous goods placards.

- ✓ No road test may be done in a vehicle displaying required dangerous goods placards

CHAPTER 5

Size and Weight Restrictions of Commercial Vehicles

5.1 Maximum Commercial Vehicle Dimensions

Commercial vehicles must not exceed specific dimensions for width, height, length and wheelbase. Vehicles wider than 2.05 metres require clearance lights (amber front, red rear). Exceeding these limits requires a special permit.

- ✓ Maximum width is 2.6 metres
- ✓ If wider than 2.05 metres, clearance lights required: amber in front, red in rear
- ✓ Maximum height is 4.15 metres from the ground surface (including load)
- ✓ Maximum length for a straight truck is 12.5 metres
- ✓ Maximum wheelbase for a truck-tractor is 6.2 metres

5.2 Maximum Combination Lengths

Overall length limits apply to tractor semi-trailer combinations and TAC vehicle combinations (A, B and C trains). No vehicle may operate if weight on a tire, axle or gross vehicle weight exceeds the Commercial Vehicle Dimension and Weight Regulation (AR 315/2002).

- ✓ Maximum 23 metres overall length for a tractor semi-trailer or truck and towed trailer combination
- ✓ Maximum 25 metres overall length for TAC combinations of A, B and C trains
- ✓ Maximum box length is 16.2 metres (53 ft.)
- ✓ Weight exceeding the regulation is not allowed on a highway

5.3 Special Permits for Oversized Equipment

Specialized, oversized or overweight equipment requires a special permit that states specific conditions the driver must follow.

- ✓ Permit conditions state routes, days and hours of travel
- ✓ Permit specifies the type of equipment that must be used
- ✓ Permit includes anything needed to prevent road damage and ensure safety

CHAPTER 6

Chapter 9: Transporting Dangerous Goods (Placards and Explosives)

6.1 Documentation for Class 1 Explosives Transport

Every vehicle carrying Class 1 material (Explosives) must carry a document signed by the vehicle's owner or lessee that names the authorized driver(s) permitted to operate or accompany the vehicle.

- ✓ A signed document from the owner or lessee is mandatory for Class 1 Explosives vehicles
- ✓ The document must indicate the name(s) of authorized driver(s) to operate or accompany the vehicle

6.2 Lost or Damaged Placards Must Be Replaced

If the dangerous goods placards and panels are lost, damaged, or defaced during the trip, the carrier is responsible for replacing them immediately to maintain proper identification of the load.

- ✓ Carrier must replace lost, damaged, or defaced placards during the trip
- ✓ Placards and panels must remain visible and intact throughout transport

6.3 Dangerous Goods Contact Information

For complete information on transporting dangerous goods, drivers can contact the Dangerous Goods, Vehicle and Rail Safety Branch in Edmonton at 780-422-9600, or toll free anywhere in Alberta at 1-800-272-9600 with 24-hour service.

- ✓ Edmonton contact for dangerous goods: 780-422-9600
- ✓ Toll free Alberta-wide 24-hour service: 1-800-272-9600

CHAPTER 7

Module 3: The Supply Circuit

7.1 Draining Tanks and Contamination Control

Supply tanks have lanyard pulls; service tanks have lanyards or manual drain valves. Regular draining prevents contamination accumulation. Tanks do not drain properly until air pressure is depleted and contamination settles and drips from the tank.

- ✓ Pull the supply tank lanyard often during the day, pre-trips, en-route inspections, and fuelling
- ✓ Drain tanks completely at the end of the shift if moisture is accumulating
- ✓ Tanks do not drain properly until air pressure is depleted and contamination settles

7.2 Air Compressor Inspection Procedures

The air compressor generates air pressure for the brake system. On engine blocks not originally designed for air systems, the OEM adds a belt-driven compressor with mounting brackets. During the daily trip inspection, drivers must check the compressor for loose fasteners, cracked hubs, loose spindle nuts, and proper belt tension.

- ✓ Shake the top of the compressor to check for loose fasteners and brackets
- ✓ Move pulleys side to side to check for cracked hubs or loose spindle nuts
- ✓ Pull the belt to check for appropriate tension at the middle of the longest run

7.3 Supply Tank Terminology and Function

The first tank receiving air pressure is called the supply, wet, or purge tank interchangeably. 'Supply' is the formal term; 'wet tank' is common because it captures the bulk of contamination. Most air dryers manage their own purge air rather than relying on the supply tank, except the AD-IS system.

- ✓ Supply is the formal term for the first tank receiving air pressure
- ✓ The wet tank captures the bulk of contamination
- ✓ Other than the AD-IS system, most dryers manage their own purge air

7.4 Draining the Supply Tank

The supply tank lanyard should be pulled often during the day, during pre-trips, en-route inspections, and fuelling. This ensures contamination is not accumulating. If moisture accumulates, drain tanks completely at the end of the shift. Tanks do not drain properly until air pressure is depleted and contamination settles.

- ✓ Pull the supply tank lanyard often throughout the day and during inspections
- ✓ Drain tanks completely at the end of the shift if moisture is accumulating
- ✓ Tanks do not drain properly until after air pressure is depleted and contamination settles

7.5 Safety Valves in the Supply Circuit

Safety valves protect the system from over-pressurization. They may be external, or thread in so the top is flush with the bung. Most air brake vehicles have safety valves in both the air dryer and supply tank; some have one only in the air dryer.

- ✓ Most air brake vehicles have safety valves in both the air dryer and supply tank
- ✓ Some air brake vehicles have a safety valve only in the air dryer

7.6 Air Dryers and Desiccant Systems

Older air dryers were after-cooler types recognized by cooling fins, collecting contamination in a sump. Modern dryers use desiccant that adsorbs moisture, which is blown off during purging (back-flushing). Most dryers manage their own purge air; some use a separate tank or supply tank air.

- ✓ Older after-cooler air dryers are recognized by cooling fins on the sides
- ✓ Modern dryers use desiccant that adsorbs moisture and is purged by back-flushing

7.7 AD-IS Integrated Air Dryer System

The AD-IS (Air Dryer Integrated Solution) integrates the air dryer, purge reservoir, and charging valve components into one module. It collects and removes contaminants in solid, liquid, and vapour form before they enter the brake system, eliminating the need for daily manual tank draining.

- ✓ AD-IS eliminates the necessity for daily manual draining of air tanks
- ✓ Drain lanyards should still be pulled regularly to confirm the dryer is working properly

7.8 Air Brake Antifreeze Precautions

Air brake antifreeze is methyl-alcohol with a lubricant to prevent rubber components from drying out. Pure alcohol damages the air dryer desiccant, so it must not be added ahead of the dryer. Some trailers have desiccant dryers that alcohol would damage, indicated by a warning decal.

- ✓ Pure alcohol damages air dryer desiccant, so avoid adding alcohol ahead of that component
- ✓ Alcohol added into the compressor pressure line goes directly into and damages the dryer

7.9 Identifying the Supply Tank

The supply tank can be identified by looking for the safety valve. The OEM often labels the tank. Air enters from the air dryer, and red/green lines go to respective service tanks. A 1/4 inch (6 mm) line runs to the governor, and the drain lanyard is visible underneath.

- ✓ Identify the supply tank by looking for the safety valve
- ✓ The air dryer feeds air into the supply tank, which then feeds the service tanks

7.10 Safety Valves Location and Function

Safety valves protect the system from over-pressurization. They may be mounted externally or thread in flush with the bung. Most air brake vehicles have safety valves in both the air dryer and supply tank; some only in the air dryer.

- ✓ Most air brake equipped vehicles have safety valves in both the air dryer and supply tank
- ✓ Some vehicles have a safety valve only in the air dryer
- ✓ Safety valves can be mounted externally or threaded in flush with the tank bung

7.11 Identifying the Supply Tank on Vehicles

The supply tank can be identified by locating the safety valve. Air comes in from the air dryer (black line), red and green lines go to service tanks, and a 1/4 inch (6mm) line goes to the governor. The drain lanyard is visible underneath.

- ✓ Identify the supply tank by looking for the safety valve
- ✓ The 1/4 inch (6mm) line from the supply tank goes to the governor
- ✓ The air dryer heating element keeps the purge valve from freezing open

CHAPTER 8

Module 8: Foundation Brakes Operation and Adjustment - Manual Slack Adjusters

8.1 Adjusting Manual Slack Adjusters Correctly

There is no fixed direction for turning the wrench when adjusting a manual slack adjuster; it may turn right or left depending on how the slack adjuster is installed. What matters is that the s-cam shaft rotates in the direction of brake application, pressing the linings toward the drum. There is no fixed relationship between the s-cam shaft rotation and the direction of wrench rotation.

- ✓ Turn the adjuster cap screw so the s-cam shaft rolls in the direction of brake application, pressing linings toward the drum
- ✓ There is no relationship between s-cam shaft rotation and wrench rotation direction
- ✓ The wrench may need to be turned right or left depending on how the slack adjuster is installed

8.2 Confirming Correct Wrench Direction via Push Rod

When adjusting a manual slack adjuster, the push rod's behaviour confirms whether adjustment is correct. If the push rod starts pulling out of the brake chamber, the wrench is being turned incorrectly. If the push rod moves into the brake chamber, the brake was previously adjusted incorrectly.

- ✓ If the push rod pulls out of the brake chamber, the wrench is being turned the wrong way
- ✓ If the push rod moves into the brake chamber, the brake was previously mis-adjusted

8.3 Backing Off Manual Slack Adjusters

After tightening a manual slack adjuster, back off approximately one-third of a turn as a general guide. The exact amount varies depending on the person and how securely the brake was previously tightened.

- ✓ Back off approximately one-third of a turn after tightening
- ✓ The amount to back off varies with how tightly the brake was previously secured

CHAPTER 9

Air Brake Practical Test (DPLS0003) - Form Completion

9.1 Scoring and Pass/Fail Criteria

During the test, the instructor marks each task the student did NOT correctly perform using the corresponding check box. At the end of the test, the percentages beside each incorrectly performed task are added together (e.g. 5% + 5% + 10% = 20%). A total score equal to or more than 25% results in a fail.

- ✓ Only tasks performed INCORRECTLY are marked with a check
- ✓ A total score of 25% or more results in a failed test
- ✓ Percentages of all incorrect tasks are summed to determine the total score

9.2 Retest Procedures

If the student fails the test, the same form must be used for the retest. Steps 2 through 8 (dating, checking boxes, scoring, and signatures) must be repeated. Importantly, a retest cannot be done on the same day as the original test.

- ✓ The same form must be used for any retest
- ✓ A retest cannot be done on the same day as the original test
- ✓ Steps 2 to 8 must be repeated on another day for the retest

9.3 Student and Instructor Identification Requirements

Before starting the air brake practical test, the student's first and last name and operator's licence number must be completed. The date of the test must be written in year/month/day format. The instructor's first and last name and their licence/certificate number must be recorded, which may be done before or after the test.

- ✓ Student first and last name plus operator's licence number must be completed prior to starting the test
- ✓ Date must be written in yyyy-mm-dd format before the test begins
- ✓ Instructor name and licence/certificate number can be recorded before or after the test

9.4 Signatures and Verification

At the end of the test, the instructor must sign their name to verify the test's results. The student must also sign to verify the test results. Both signatures are required to complete the form.

- ✓ Instructor must sign at the end of the test to verify results
- ✓ Student must sign to verify the test results
- ✓ Signatures are completed at the end of the test

9.5 Time Limit and Document Handling

The air brake practical test has a time limit of 15 minutes. If completing the document electronically, use the Save and Print buttons to save and print the form for record keeping.

- ✓ The practical test has a 15 minute time limit
- ✓ Electronic forms should be saved and printed for record keeping

CHAPTER 10

Transporting Dangerous Goods

10.1 Class 1 Explosives Vehicle Documentation

Every vehicle used to carry Class 1 material (Explosives) must carry a document signed by the owner or the person leasing the vehicle. This document identifies the driver(s) authorized to operate or accompany the vehicle.

- ✓ A signed document from the owner or lessee is required for Class 1 explosives vehicles
- ✓ The document must name the driver(s) authorized to operate or accompany the vehicle

10.2 Replacing Lost or Damaged Placards

If dangerous goods placards and panels are lost, damaged, or defaced during the trip, the carrier is responsible for replacing them.

- ✓ The carrier must replace placards and panels that are lost, damaged, or defaced during a trip
- ✓ Placards and panels must be maintained in proper condition throughout transport

10.3 Class 1 Explosives Documentation Requirement

Every vehicle used to carry Class 1 material (Explosives) must carry a signed document indicating who is authorized to operate or accompany the vehicle.

- ✓ The document must be signed by the owner or the person leasing the vehicle
- ✓ It must indicate the name of the driver(s) authorized to operate or accompany the vehicle
- ✓ This applies to every vehicle carrying Class 1 Explosives

10.4 Dangerous Goods Contact Information

For complete information on transporting dangerous goods, drivers can contact the Dangerous Goods, Vehicle and Rail Safety Branch in Edmonton.

- ✓ Edmonton contact: 780-422-9600
- ✓ Toll free from anywhere in Alberta: 1-800-272-9600 with 24-hour service

10.5 Dangerous goods training requirements

No one may handle, offer for transport or transport dangerous goods unless trained or working in direct contact with someone trained. Carriers must ensure proper training and issue a signed Dangerous Goods Training Certificate.

- ✓ No one may handle, offer for transport or transport dangerous goods unless trained or working in direct contact with a trained person
- ✓ The employer must be satisfied with the training and sign the certificate of training
- ✓ A driver must produce the certificate of training if asked by a dangerous goods inspector

10.6 Nine hazard classes of dangerous goods

There are nine hazard classes of dangerous goods, some with divisions: explosives, gases, flammable liquids, flammable solids, oxidizers/organic peroxides, toxic/infectious substances, radioactive materials, corrosives, and miscellaneous.

- ✓ Class 1 is explosives, Class 2 is gases, Class 3 is flammable liquids with a closed-cup flash point below 60.5°C
- ✓ Class 4 is flammable solids/spontaneous combustion/water-reactive, Class 5 is oxidizers and organic peroxides, Class 6 is toxic and infectious substances
- ✓ Class 7 is radioactive materials, Class 8 is corrosive materials, Class 9 is miscellaneous products or substances
- ✓ Class 2 divisions are 2.1 flammable, 2.2 non-flammable non-toxic, and 2.3 toxic compressed gas

10.7 Reporting dangerous occurrences

When a dangerous incident such as a leak, collision or release occurs, the person in charge of the goods must immediately notify several parties.

- ✓ Immediately notify the local police, the vehicle owner, the employer, and the owner of the dangerous goods consignment
- ✓ Notify the Alberta Government Co-ordination and Information Centre (CIC) at 1-800-272-9600

10.8 Dangerous goods documents

Drivers must carry the shipping document, waste manifest or other required document, positioned within reach in the cab. Special rules apply to parked trailers and multiple deliveries.

- ✓ When in the cab, documents must be within reach or in a pocket on the driver's door; when not in the cab, on the seat or in the door pocket
- ✓ For a parked detached trailer, the person in charge of the parking area keeps a copy, or a copy in a waterproof container is attached to the trailer
- ✓ For multiple deliveries by tank truck, tank trailer or gas cylinders, the change in quantity must be shown on the shipping document after each delivery

10.9 Dangerous goods safety marks and placards

Safety marks are supplied by the consignor, but the driver must ensure the vehicle has all proper safety marks before loading. Marks must stay on until no hazard exists.

- ✓ Safety marks, placards or orange panels must be on each side and each end of a trailer or transport unit before loading
- ✓ Placards may be moved to the front of the lead vehicle so safety marks are visible
- ✓ Safety marks must remain until no hazard exists, meaning goods are unloaded and the container cleaned and purged of all residues

CHAPTER 11

Air Brake Program Overview

11.1 Knowledge Test Requirements

The air brake knowledge test is conducted by a Registry Agent, comprises thirty multiple choice questions randomly chosen from a question bank. The pass mark is 83%, allowing a maximum of five incorrect answers.

- ✓ Knowledge test has 30 multiple choice questions with a pass mark of 83%
- ✓ A maximum of five incorrect answers is permitted to pass

11.2 Practical Test Scoring

The Practical Test form records student performance on the air brake pre-trip inspection and brake adjustment on a tractor-trailer. Each task is weighted 5%, 10% or 15%. Errors totalling 25% or more result in a test failure, as 80% is required to pass.

- ✓ Each task on the practical test has a weight of 5%, 10% or 15%
- ✓ Errors totalling 25% or more result in a test failure
- ✓ 80% is required to pass the practical test
- ✓ Students who fail must retake the test on another day

11.3 Knowledge Test Details

The knowledge test is comprised of thirty multiple choice questions randomly chosen from a question bank. The pass mark is 83%, allowing a maximum of five incorrect answers. It is conducted by a Registry Agent for a cost, and students are encouraged to write shortly after completing the course.

- ✓ The knowledge test has 30 multiple choice questions with a pass mark of 83%
- ✓ A maximum of five incorrect answers is allowed to pass the knowledge test

11.4 Practical Test Structure

Practical tests are conducted after completing practical training sessions. Each student's practical test is fifteen minutes in length with no other students present, conducted one instructor to one student. Retests are allowed on another day.

- ✓ Practical test is 15 minutes with no other students present
- ✓ Testing must be one instructor to one student; retest allowed on another day

11.5 Course Structure and Testing

The air brake course has three portions: a classroom session, practical training sessions, and practical tests. The classroom session is a prerequisite to practical training. A completed classroom session, practical training session, and practical test lead to program completion, followed by a knowledge test at a Registry Agent.

- ✓ The classroom session is a prerequisite to offering practical training sessions
- ✓ A student's practical test is fifteen minutes in length with no other students present
- ✓ Students who fail are allowed a retest on another day

11.6 Class Size and Session Limits

A maximum of 18 students are permitted per classroom session. A maximum of three students are permitted per air brake equipped vehicle and instructor in each practical training session. Students may retest on another day if unsuccessful.

- ✓ Maximum of 18 students per classroom session
- ✓ Maximum of three students per practical training session per vehicle and instructor

CHAPTER 12

Commercial Driver's Licence Requirements: Upgrading Your Licence

12.1 Medical Report Requirements

A medical report is required to upgrade to Class 1, 2 or 4. Medical forms must be completed by a doctor or nurse practitioner. Reports are needed at first application and at set intervals based on age. Drivers are legally responsible to report any disease or disability affecting safe driving.

- ✓ Medical report required to upgrade to Class 1, 2 or 4
- ✓ Medical report renewed every 5 years until age 45
- ✓ Every 2 years from age 45 to 65
- ✓ Every year after age 65
- ✓ Driver must report any disease or disability interfering with safe operation

12.2 General Upgrading Requirements Classes 1-4

To learn to drive a commercial class vehicle you must hold at least a Class 5 or Class 5 GDL licence. You may not apply for commercial classes while in the GDL program. You do not need an air brake endorsement while learning to operate an air brake equipped vehicle.

- ✓ Must hold at least a Class 5 or Class 5 GDL licence to learn commercial classes
- ✓ Cannot apply for commercial classes while in the Graduated Driver Licensing program
- ✓ No air brake endorsement needed when learning on an air brake equipped vehicle
- ✓ A 10-day waiting period applies to non-GDL Class 5/5-6/6 applicants from other Canadian jurisdictions re-classing to Classes 1-4

12.3 Wrong Licence Class Offence

Driving with the wrong licence class is against the law. It is also an offence for a vehicle owner to allow their vehicle to be driven by someone without the proper class of licence.

- ✓ Driving with the wrong licence class is illegal
- ✓ A vehicle owner commits an offence by allowing an improperly licensed driver to operate their vehicle
- ✓ A fee is charged for each knowledge test, road test and re-classification

CHAPTER 13

Air Brakes

13.1 Air brake Q endorsement requirement

To operate any vehicle with air brakes you must complete the Alberta Air Brake Program at a licensed driving school or entity and obtain the air brake 'Q' endorsement on your licence.

- ✓ The 'Q' endorsement is required to operate any vehicle with air brakes
- ✓ You must complete the Alberta Air Brake Program to obtain the endorsement
- ✓ Detailed air brake information is found in the Alberta Air Brake Manual

13.2 Air Brake Q Endorsement Requirement

Detailed air brake information is in the Alberta Air Brake Manual, given when completing the Alberta Air Brake Program at a licensed driving school or entity. Completing the program is required for the Q endorsement.

- ✓ You must complete the Alberta Air Brake Program to obtain the air brake Q endorsement
- ✓ The Q endorsement is required to operate any vehicle with air brakes

CHAPTER 14

Distracted Driving Law for Commercial Drivers

14.1 Cellular Phones and Electronic Distractions

Do not use a cellular phone or other electronic devices while driving. This includes making/receiving calls and sending/receiving texts, and applies even to hands-free phones. If you must communicate, stop in a safe and legal place first.

- ✓ Do not use a cellular phone to make/receive calls or send/receive texts while driving
- ✓ The prohibition applies to hands-free cellular telephones as well
- ✓ Stop in a safe and legal place to make or receive calls or texts
- ✓ The Traffic Safety Act includes fines for hand-held cell phone use, texting, emailing, using laptops, video games, cameras, and programming portable audio players

14.2 Fineable Distracted Driving Activities

The Traffic Safety Act includes fines for specific distractions: using hand-held cell phones; texting/emailing; using electronic devices (laptops, video games, cameras, video entertainment displays); programming portable audio players; entering GPS information; reading printed materials; writing, printing or sketching; and personal grooming.

- ✓ Fineable activities include entering information on GPS units, reading printed materials, writing, printing or sketching
- ✓ Personal grooming while driving is a fineable distraction

14.3 Cellular Phones and Prohibited Distractions

Do not use a cellular phone or other electronic devices while driving. This includes making/receiving calls and sending/receiving texts, and applies even to hands-free phones because the distraction takes attention from driving. If you must use a phone, stop in a safe and legal place.

- ✓ Do not make/receive calls or send/receive texts while driving, including with hands-free devices
- ✓ Stop in a safe and legal place if you need to use a phone
- ✓ Fineable distractions include hand-held cell phones, texting/emailing, using laptops, video games, cameras, video displays, programming audio players, entering GPS info, reading printed materials, writing, sketching, and personal grooming

14.4 Vehicles Covered by Distracted Driving Law

The distracted driving law applies to all vehicles as defined in the Traffic Safety Act, including cars, motorcycles, motor homes, truck tractors, farm vehicles and bicycles.

- ✓ The law applies to all vehicles defined in the Traffic Safety Act
- ✓ Covered vehicles include cars, motorcycles, motor homes, truck tractors, farm vehicles and bicycles

14.5 Emergency Vehicle Exemptions

Under the Traffic Safety Act, emergency vehicles include police service vehicles, fire response units, ambulances and gas disconnection units responding to a call. Their drivers may use hand-held communication or electronic devices only when acting within the scope of their employment.

- ✓ Emergency vehicles include police, fire response units, ambulances and gas disconnection units responding to a call
- ✓ Emergency vehicle drivers may use hand-held devices only when acting within the scope of their employment

14.6 Permitted Activities and Display Screens

Certain activities are not restricted: using two-way/CB radios when escorting oversized vehicles, contacting one's employer, or during search/rescue and emergency management. Permitted display screens include affixed and pre-programmed (or voice-activated) GPS, vehicle system gauges, passenger transport dispatch systems, and logistical transportation tracking systems.

- ✓ Two-way/CB radios are permitted for escorting oversized vehicles, contacting an employer, or search/rescue and emergency situations
- ✓ GPS navigation is permitted only if affixed to the vehicle and programmed before driving, or voice-activated — you cannot hold the unit or manually enter information while driving
- ✓ Permitted screens include vehicle system gauges, passenger dispatch systems, and logistical transportation tracking systems

14.7 Dispatch Computers and Mobile Data Devices

Drivers using dispatch systems for passenger transport or logistical tracking devices for commercial purposes can have mobile data computers installed and activated, but should not type information into these devices while driving.

- ✓ Mobile data computers may be installed and activated in vehicles for commercial dispatch/tracking use
- ✓ Drivers should not type information into these devices while driving

14.8 CB Radios and Mike Phones Exemption

CB radios and 'Mike phones' are exempt for commercial purposes and search/rescue services. Hand-held use is allowed to communicate with the driver's employer or during emergency management situations, including reporting extreme weather or roadway hazards like collisions.

- ✓ Hand-held CB radios or Mike phones are allowed to communicate with an employer or during emergency management
- ✓ Communicating extreme weather or roadway hazards (such as a collision) can fall under the emergency scenario category
- ✓ Enforcement officers evaluate specific situations to determine compliance

14.9 Activities Allowed for Commercial Drivers

Some activities are not restricted under the distracted driving law, including using two-way or hand-held radios (such as CB radios) when escorting oversized vehicles, contacting an employer, or participating in search, rescue and emergency management.

- ✓ Two-way and hand-held CB radios are allowed when escorting oversized vehicles or contacting an employer
- ✓ Radio use is allowed during search, rescue and emergency management situations

14.10 Permitted Display Screens

Certain display screens are permitted while driving: a GPS navigation system affixed to the vehicle and programmed before driving (or voice activated); a gauge/instrument/device providing vehicle system or location info; a passenger transport dispatch system; and a logistical transportation tracking system.

- ✓ A GPS must be affixed and pre-programmed or voice activated; you cannot hold it or enter info while driving
- ✓ Permitted screens include vehicle-info gauges, passenger dispatch systems, and commercial logistical tracking systems

14.11 Dispatch Computers in Taxis and Delivery Trucks

Drivers who use dispatch systems for transporting passengers or logistical tracking devices for commercial purposes may still have mobile data computers installed and activated. However, drivers should keep focus on the road and must not type information into these devices while driving.

- ✓ Mobile data computers may be installed and activated in commercial vehicles
- ✓ Drivers must not type information into these devices while driving

14.12 Tour Bus Driver Compliance

Tour bus drivers must comply with the distracted driving law and must not drive distracted. Hands-free units and innovative technology solutions are available to provide passenger information while remaining compliant.

- ✓ Tour bus drivers must be in compliance with the law and must not drive distracted
- ✓ Hands-free units and technology solutions must be used to provide passenger information

14.13 Emergency Vehicles Exempt from the Law

Under the Traffic Safety Act, emergency vehicles include police service vehicles, fire response units, ambulances and gas disconnection units responding to a call. Drivers of these vehicles may use hand-held communication or electronic devices only when acting within the scope of their employment.

- ✓ Emergency vehicles include police, fire, ambulance and gas disconnection units responding to a call
- ✓ Emergency vehicle drivers may use hand-held devices only within the scope of their employment

CHAPTER 15

Knowledge Test

15.1 Air Brake Knowledge Test Format

The air brake knowledge test is conducted by a Registry Agent in the same format as other knowledge tests. It comprises thirty multiple choice questions randomly chosen from a question bank. The pass mark is 83%, allowing a maximum of five incorrect answers. There is a cost for each test attempt.

- ✓ The knowledge test has 30 multiple choice questions with a pass mark of 83%
- ✓ A maximum of five incorrect answers is allowed to pass
- ✓ After passing, the Registry Agent can apply the endorsement or licence upgrade

CHAPTER 16

National Safety Code

16.1 Cargo Securement Requirements

Cargo must be secured per National Safety Code Standard 10. Commercial trucks over 4,500 kg must ensure cargo cannot leak, spill, blow off, fall, or shift enough to affect vehicle stability. Improper securement results in fines and penalties.

- ✓ Cargo securement follows NSC Standard 10
- ✓ Applies to commercial trucks registered over 4,500 kg
- ✓ Cargo must not leak, spill, blow off, fall from or be dislodged
- ✓ Cargo must not shift enough to affect stability or ability to move
- ✓ Driver, carrier or shipper may face fines for improper securement

16.2 Safety Fitness Certificate Requirements

Carriers may need a Safety Fitness Certificate (SFC). Federal law requires an SFC for vehicles over 4,500 kg operating outside Alberta; provincial law requires one for vehicles registered at 11,794 kg or greater operating solely within Alberta.

- ✓ Federal SFC required for trucks/trailers over 4,500 kg operating outside Alberta
- ✓ Provincial SFC required for vehicles registered 11,794 kg or greater within Alberta
- ✓ SFC required for commercial passenger vehicles seating 11 or more including the driver
- ✓ Farmers are exempt from provincial SFC but NOT from federal regulations
- ✓ Only one piece of legislation applies to a carrier at any given time

16.3 Driver Responsibilities Under NSC

Each driver must be trained, medically fit, not fatigued or impaired, qualified for the vehicle, carry required documents, and report violations, convictions and collisions to the carrier.

- ✓ Driver must be medically fit and not fatigued or impaired by alcohol or drugs
- ✓ Driver must carry valid licence, registration, insurance and required documents
- ✓ Driver must report violations, convictions and collisions to the carrier
- ✓ Driver must not operate a vehicle with a defect that jeopardizes safety

16.4 Provincial Hours of Service

Under Alberta legislation, work shifts generally begin and end with eight consecutive off-duty hours. A driver cannot drive after 13 hours driving or after 15 hours on-duty. Daily logs must be maintained and kept for six months.

- ✓ Cannot drive after having driven 13 hours
- ✓ Cannot drive after being on-duty for 15 hours
- ✓ Work shifts start/end with 8 consecutive off-duty hours
- ✓ Daily logs delivered to employer within 20 days, kept for at least six months
- ✓ Log exemption if within 160 km radius, same start/end point, under 15 hours, and records kept

16.5 Federal Hours of Service

Federal rules are more restrictive with daily, work shift and cycle limits. A driver cannot drive after 13 hours driving or 14 hours on-duty, must take 10 hours off-duty daily (8 consecutive), and must follow either Cycle 1 or Cycle 2.

- ✓ Cannot drive after 13 hours driving or 14 hours on-duty in a day
- ✓ Must take 10 hours off-duty daily with 8 consecutive
- ✓ Cannot drive after 16 hours elapsed since last 8 consecutive off-duty hours
- ✓ Cycle 1: 70 hours on-duty in 7 days; Cycle 2: 120 hours in 14 days
- ✓ Cycle 1 reset requires 36 consecutive hours off; Cycle 2 requires 72
- ✓ Must take at least 24 consecutive hours off in the preceding 14 days

16.6 Vehicle Inspection Program (VIP)

Alberta's mandatory VIP for Commercial Vehicles sets standards for owner maintenance. Buses over 11 passengers must be inspected every six months; trucks and trailers at 11,794 kg or more must be inspected every 12 months.

- ✓ Buses carrying more than 11 passengers must be inspected every six months
- ✓ Trucks and trailers of 11,794 kg or more must be inspected every 12 months
- ✓ Municipal transit buses and farm trucks are exempt within Alberta
- ✓ Passing vehicles receive a Commercial Vehicle Inspection Certificate and decal

16.7 Preventive Maintenance Plans

Alberta carriers must maintain a written maintenance and inspection program covering all applicable vehicles including leased vehicles. Drivers have specific responsibilities.

- ✓ Drivers must carry out inspections required by owner and legislation (trip inspections)
- ✓ Drivers must not operate any vehicle with a defect that jeopardizes safety
- ✓ Drivers must notify the carrier of any defects found during inspection
- ✓ The program must cover all applicable vehicles registered to the carrier, including leased vehicles

16.8 Carrier Safety Plans

In Alberta a carrier must establish, maintain and follow a written safety program covering matters such as speed, seat belts, drug/alcohol use, load security and record keeping. Drivers must know and follow their company's safety plan.

- ✓ Carriers must have a written safety program
- ✓ Safety plan must cover speed limits, seat belt use, drug/alcohol use, load security and fuelling
- ✓ All drivers must know and follow the company's safety plan
- ✓ Failure to comply may result in charges, penalties or cancellation of the SFC

CHAPTER 17

Chapter 10: Distracted Driving Law for Commercial Drivers

17.1 Cellular Phones and Electronic Device Prohibition

Drivers must not use a cellular phone or other electronic devices while driving. Making/receiving calls or sending/receiving texts is a dangerous distraction. This prohibition also applies to hands-free phones. If you must communicate, stop in a safe and legal place first.

- ✓ Do not use hand-held cell phones to make/receive calls or texts while driving
- ✓ The distraction warning applies even to hands-free cellular telephones
- ✓ Stop in a safe and legal place before making or receiving a call or text

17.2 Fined Distraction Activities Under the Traffic Safety Act

The Traffic Safety Act imposes fines for specific distractions: using a hand-held cell phone; texting or emailing; using electronic devices such as laptops, video games, cameras, and video entertainment displays; programming portable audio players; entering information on GPS units; reading printed materials; writing, printing or sketching; and personal grooming.

- ✓ Fined activities include texting, emailing, and using laptops/video games/cameras
- ✓ Reading printed materials, writing/sketching, and personal grooming are prohibited while driving
- ✓ Manually entering information on GPS units while driving is prohibited

17.3 Distracted Driving Law Applies to All Vehicles

The distracted driving law applies to all vehicles defined in the Traffic Safety Act, including cars, motorcycles, motor homes, truck tractors, farm vehicles, and bicycles. No vehicle type is exempt from the general prohibition.

- ✓ The law applies to all vehicles including trucks, farm vehicles, and bicycles
- ✓ Vehicle types are defined under the Traffic Safety Act

17.4 Permitted Activities for Commercial Drivers

Not specifically restricted: using two-way/hand-held CB radios when escorting oversized vehicles, contacting one's employer, or participating in search, rescue, and emergency management situations. This preserves established commercial and emergency communication practices.

- ✓ CB and two-way radios permitted for escorting oversized vehicles and contacting employers
- ✓ Radios permitted during search, rescue, and emergency management situations

17.5 Permitted Display Screens

Permitted display screens include: a GPS navigation system affixed to the vehicle and programmed before driving (or voice-activated); a gauge/instrument/device showing vehicle systems or location; a dispatch system for transporting passengers; and a logistical transportation tracking system for commercial purposes.

- ✓ GPS must be affixed and pre-programmed before driving, or be voice-activated
- ✓ You cannot hold the GPS unit or manually enter information while driving
- ✓ Vehicle system gauges, passenger dispatch systems, and logistical tracking systems are permitted

17.6 Dispatch Computers and Mobile Data Devices

Drivers who use dispatch systems for transporting passengers or logistical tracking devices for commercial purposes can have mobile data computers installed and activated. However, drivers must keep focus on the road and should not type information into these devices while driving.

- ✓ Mobile data computers may be installed and activated for commercial/passenger dispatch use
- ✓ Drivers must not type information into these devices while driving

17.7 Emergency Vehicle Exemptions

Under the Traffic Safety Act, emergency vehicles (police service vehicles, fire response units, ambulances, and gas disconnection units responding to a call) may use hand-held communication or electronic devices, but only when acting within the scope of their employment.

- ✓ Emergency vehicles include police, fire, ambulances, and gas disconnection units responding to a call
- ✓ Emergency vehicle drivers may use devices only within the scope of their employment

17.8 CB Radios and Mike Phones Exemption

The legislation is not intended to interfere with well-established commercial operations or search and rescue. Hand-held CB radios or 'Mike phones' are allowed when communicating with the employer or during emergency management situations, including reporting extreme weather or roadway hazards like a collision.

- ✓ CB radios / Mike phones allowed for employer communication and emergency management
- ✓ Reporting extreme weather or roadway hazards (collisions) can fall under the emergency category
- ✓ Enforcement officers evaluate specific situations to determine compliance

17.9 Tour Bus Driver Compliance

Tour bus drivers must comply with the distracted driving law and must not drive distracted. Hands-free units and innovative technology solutions are available to provide information to passengers while remaining compliant.

- ✓ Tour bus drivers must not drive distracted
- ✓ Hands-free units must be used to remain compliant while informing passengers

CHAPTER 18

Module 4: Service Brakes

18.1 Independent Service Brake Circuits

Every axle group has its own independent service brake circuit, and they all work essentially the same way. Some trailer OEMs fit a circuit per axle; others use one circuit for the complete axle group. The circuit consists of a tank, control valve, and chambers, with quick release and relay variations added.

- ✓ Every axle group has an independent service brake circuit
- ✓ All service brake circuits work the same way regardless of axle group

18.2 Air Tank Testing and Capacity Requirements

The air tank stores air pressure sized to brake chamber air volume requirements. Tanks are hydrostatically tested to at least five times the compressor cut-out pressure or 500 PSI (3,448 kPa), whichever is greater. Tank capacity must provide a minimum number of full service applications.

- ✓ Tanks are hydrostatically tested to at least 5x compressor cut-out pressure or 500 PSI (3,448 kPa), whichever is greater
- ✓ Tank volume must provide minimum 12 full service applications for power units and 8 for trailers

18.3 Check Valves Protect Service Tanks

Check valves protect the service tanks from air supply failure. Every service tank on every axle group has one. AD-IS systems use pressure protection valves built into the AD-IS module.

- ✓ Every service tank on every axle group is equipped with a check valve
- ✓ Check valves protect service tanks from air supply failure

18.4 Low Air Pressure Warning Alarm

The low air alarm activates if air pressure drops below 60 PSI (414 kPa), though sending units tend to activate around 70 PSI (483 kPa). The CVSA out-of-service standard is a minimum of 55 PSI (310 kPa) or half the governor cut-out pressure, whichever is less. If either warning device works, the vehicle is not placed out-of-service.

- ✓ The low air alarm is set to activate below 60 PSI (414 kPa)
- ✓ CVSA out-of-service standard is minimum 55 PSI (310 kPa) or half governor cut-out pressure, whichever is less

18.5 Brake Chamber Force Conversion

Brake chambers convert air pressure into mechanical force, marking the end of the air system and start of mechanical linkages. Two factors affect the conversion: brake chamber size and applied air pressure. Air pressure is force over surface area; 10 PSI over 20 square inches produces 200 pounds of force on the push plate.

- ✓ Brake chambers convert air pressure into mechanical force
- ✓ Force output depends on brake chamber size and applied air pressure

18.6 Brake Chamber Sizing by Axle

Brake chambers are sized by the OEM, but air pressure is controlled by the driver. Type 20 (20 square inches / 129 sq cm) is typical for steering axles. Type 30 (30 square inches / 194 sq cm) is typical for load bearing axles.

- ✓ Type 20 chambers (20 sq in) are typical for steering axles
- ✓ Type 30 chambers (30 sq in) are typical for load bearing axles

18.7 Control Valve Operation

Control valves manage air pressure flow from the tank to the chambers using an inlet valve and an exhaust valve. When released, inlet is closed and exhaust open. When applied, exhaust closes and inlet opens. In hold/balance, both are closed, capturing application air.

- ✓ When applied, the exhaust valve closes and the inlet valve opens to send air to chambers
- ✓ In the hold/balance position, both inlet and exhaust valves are closed
- ✓ When released, the inlet is closed and the exhaust is open

18.8 Relay Valves and Air Lag

Relays reduce air lag by placing a control valve directly in the axle group area for faster air delivery. Relays can be mounted in the service tank (trailers) or on the frame (drive axles). The driver sends a control signal to the top of the relay. Large air volumes use 5/8 to 3/4 inch hoses; signals use smaller lines.

- ✓ Relays reduce air lag by delivering air directly from a nearby tank to the chambers
- ✓ Air pressure control signals must always be maintained even with electronic brake management
- ✓ Brake signals move through 3/8 inch (10 mm) lines, governor signals through 1/4 inch lines

18.9 Pressure Gauges and Trailer Tank Supply

Pressure gauges measure air pressure in the two tractor service tanks (primary and secondary). Trailer service tanks receive air pressure from the tractor service tank with the highest pressure.

- ✓ Gauges measure pressure in the primary and secondary tractor service tanks
- ✓ Trailer service tanks receive air from the tractor tank with the highest pressure

18.10 Long Stroke Brake Chambers

Long stroke chambers have more total stroke before the push plate bottoms out. A standard Type 30 has 2½ inches (64 mm) total stroke, while a long stroke has 3 inches (77 mm). Long stroke chambers have square inlet ports and are not interchangeable with regular chambers.

- ✓ Long stroke chambers are identified by square inlet ports
- ✓ Long stroke chambers are not interchangeable with regular chambers

18.11 Quick Release Valves

Quick release valves speed the exhaust of air from the brake chambers. Air exhausts through the quick release valve, but may also exhaust through the ABS modulators if equipped.

- ✓ Air exhausts through the quick release valve during brake release
- ✓ Air may also exhaust through ABS modulators if equipped

18.12 Relay Crack Pressures and Timing

Crack pressure is the control air pressure needed at the top of the relay before it opens. Different crack pressures regulate brake timing along the vehicle's length. Relays closer to the cab have higher crack pressures, allowing time for control air to reach rear brakes. Service line booster relays have zero crack pressure.

- ✓ Crack pressure is the control air needed to open the relay and deliver tank air to chambers
- ✓ Relays closer to the cab have higher crack pressures to time brake application
- ✓ Service line booster relays have zero crack pressure to avoid reducing the signal

CHAPTER 19

Module 4: The Service Circuit

19.1 Air Tank Capacity Requirements

The air tank stores air pressure for the service circuit, sized to the brake chamber air volume required. Tanks are hydrostatically tested and must provide a minimum number of full brake applications.

- ✓ Tanks are hydrostatically tested to handle at least five times cut-out pressure or 500 PSI (3,448 kPa), whichever is greater
- ✓ Tank capacity must provide minimum 12 full service applications for power units
- ✓ Tank capacity must provide minimum 8 full service applications for trailers

19.2 Pressure Gauges and Low Air Alarm

Pressure gauges measure air in the two tractor service tanks (primary and secondary). Trailer tanks receive air from the tractor tank with highest pressure. The low air alarm activates below 60 PSI.

- ✓ The low air alarm is set to activate if air pressure drops below 60 PSI (414 kPa)
- ✓ Sending units tend to activate the alarm around 70 PSI (483 kPa)
- ✓ Trailer service tanks receive air from the tractor service tank with the highest pressure

19.3 CVSA Out-of-Service Standards

The Commercial Vehicle Safety Alliance (CVSA) standardizes commercial vehicle inspections so defects are applied equally throughout North America. The out-of-service standard for low air is defined by minimum pressure thresholds.

- ✓ CVSA out-of-service standard is minimum 55 PSI (310 kPa) or half of governor cut-out pressure, whichever is less
- ✓ If either the audible or visual warning device works, the vehicle is not placed out-of-service
- ✓ CVSA standardizes inspections so defects are applied equally throughout North America

19.4 Brake Chambers Convert Air to Force

Brake chambers convert air pressure into mechanical force, marking the end of the air system and beginning of mechanical linkages. Two factors affect conversion: brake chamber size and applied air pressure. Force equals pressure multiplied by surface area.

- ✓ Two factors affecting conversion are brake chamber size and applied air pressure
- ✓ 10 PSI (69 kPa) applies 10 pounds of force onto a single square inch
- ✓ Force = air pressure multiplied by diaphragm surface area

19.5 Brake Chamber Sizes

Brake chambers are sized by the OEM but air pressure is controlled by the driver. Steering axles typically use Type 20 (20 sq in / 129 sq cm diaphragm); load bearing axles typically use Type 30 (30 sq in / 194 sq cm).

- ✓ Type 20 = 20 square inches diaphragm, typical for steering axles
- ✓ Type 30 = 30 square inches diaphragm, typical for load bearing axles
- ✓ Brake chambers are sized by OEM; air pressure is controlled by the driver

19.6 Control Valves Operation

Control valves manage air flow from tank to chambers using two internal valves: an inlet (air from tank to chambers) and an exhaust (air from chambers to atmosphere). They work the same regardless of activation method.

- ✓ When released: inlet is closed and exhaust is open, leaving chambers open
- ✓ When applied: exhaust closes and inlet opens, applying service brakes
- ✓ In hold/balance position: both inlet and exhaust are closed, capturing application air

19.7 Relay Valves Reduce Air Lag

Relay valves are installed in the axle group area to provide fast air delivery, reducing the lag that would occur if air had to travel from cab-mounted valves. They can be tank-mounted (trailers) or frame-mounted (drive axles).

- ✓ Relays are mounted in the service tank (typical of trailers) or on the frame (typical of drive axles)
- ✓ The driver sends a control signal to the top of the relay to trigger application
- ✓ All vehicles must maintain air pressure control signals even with electronic braking systems

19.8 Independent Service Brake Circuits

Every axle group has its own independent service brake circuit and they all work essentially the same way. Some trailer OEMs fit a circuit per axle while others outfit one circuit for the complete axle group.

- ✓ Every axle group has an independent service brake circuit
- ✓ All service brake circuits work essentially the same way
- ✓ A tridem axle group might have three separate service brake circuits

19.9 Check Valves Protect Service Tanks

Check valves protect the service tanks from air supply failure. Every service tank on every axle group is equipped with one. AD-IS systems use pressure protection valves built into the module.

- ✓ Every service tank on every axle group is equipped with a check valve
- ✓ Check valves protect service tanks from air supply failure
- ✓ AD-IS systems use pressure protection valves built into the module

19.10 Long Stroke Brake Chambers

Long stroke chambers have more total stroke before the push plate bottoms out. They have square inlet ports and are not interchangeable with regular chambers.

- ✓ Standard Type 30 has total stroke of 2½ inches (64mm); long stroke has 3 inches (77mm)
- ✓ Long stroke chambers have square inlet ports
- ✓ Long stroke chambers are not interchangeable with regular chambers

19.11 Application Air Flow and Pressure Drop

When brakes apply, air flows from tank to chambers and the gauge drops, but no air volume is lost from the system. When held applied, both valves stay closed maintaining chamber pressure.

- ✓ When the control valve is first applied, air pressure in tank and gauge drops but no air volume is lost
- ✓ When held applied, both inlet and exhaust valves close to maintain chamber pressure
- ✓ When released, inlet closes and exhaust opens, releasing chamber air to atmosphere

19.12 Quick Release Valves

Quick release valves allow air to exhaust quickly from the chambers rather than travelling all the way back to the control valve. Air may also exhaust through ABS modulators if equipped.

- ✓ Air exhausts through the quick release valve for faster release
- ✓ Air may also exhaust through the ABS modulators if equipped
- ✓ Quick release valves reduce release time in the service system

19.13 Crack Pressure and Brake Timing

Crack pressure is the control air pressure that must reach the top of a relay before it opens. Different crack pressures regulate service brake timing down the vehicle length so brakes apply in coordination.

- ✓ Crack pressure is control air that must be delivered before the relay starts to open
- ✓ Relays closer to the cab have higher crack pressures to allow control air time to reach the rear
- ✓ Service line booster relays have zero crack pressure to avoid reducing the signal

19.14 Straight Truck and Super-B Service Systems

In a straight truck the primary circuit (green) serves the drive axle(s) and secondary (red) serves the steering axle. In a Super-B, four axle groups have independent service circuits including tank-mounted relays for trailers.

- ✓ Primary (green) circuit serves the drive axle(s); secondary (red) serves the steering axle
- ✓ Service circuits are connected with control lines
- ✓ Trailers use tank-mounted relay valves in the service circuit

19.15 Air Line Diameters

Large air volumes flow through larger hoses while control signals flow through smaller diameter lines for faster delivery. Different line sizes are used for different functions.

- ✓ Tank-to-relay volume lines are typically 5/8 to 3/4 inch (16 to 19 mm)
- ✓ Brake signals move through 3/8 inch (10 mm) lines; governor signals through 1/4 inch (7 mm)
- ✓ Transmission signals move through 1/8 inch (4 mm) lines

CHAPTER 20

Module 8: Automatic Slack Adjusters

20.1 Correct Adjustment Confirmation on Automatic Adjusters

On all automatic slack adjusters, the brake is being tightened correctly if the wrench turns the s-cam shaft in the same direction as brake application - the same indicators used for manual slack adjusters. Adjusting automatic slack adjusters is not a normal procedure; it is only to get the vehicle safely to a repair facility. Using it as regular maintenance will damage the automatic adjusters.

- ✓ On all automatic slack adjusters, correct tightening turns the s-cam shaft in the direction of brake application
- ✓ Adjusting automatic slack adjusters is an emergency measure only; regular use damages them

20.2 Automatic Slack Adjusters Cannot Be Retrofitted

Vehicles manufactured with automatic slack adjusters cannot be retrofitted with manual slack adjusters. There are various manufacturers of automatic slack adjusters, and each may offer more than one model.

- ✓ Vehicles built with automatic slack adjusters cannot be changed to manual slack adjusters
- ✓ Different manufacturers each may have several models of automatic slack adjuster

20.3 Arvin Meritor Automatic Slack Adjusters

Arvin Meritor slack adjusters are recognized by the square adjusting head on the end of the self-adjusting mechanism. It is the only automatic slack adjuster that uses brake application stroke for adjustments (others measure lining-to-drum clearance), taking up excess slack on the return stroke. Emergency adjustment uses a 5/16 inch open end wrench, tightening to the LEFT (counterclockwise) - the only one that tightens left. The pawl (round button on side) must be lifted to back off the brake.

- ✓ Recognized by the square adjusting head on the self-adjusting mechanism
- ✓ Uses application stroke for adjustment; takes up excess slack on the return stroke
- ✓ Emergency adjustment: 5/16 inch wrench, tighten counterclockwise (left) - the only one to tighten left
- ✓ Lift the pawl (round button) to back off the brake

20.4 Activating Automatic Slack Adjusters (Six Pack)

Automatic slack adjusters are activated by full brake applications, sometimes called a 'six pack' (six full applications), though only the first few applications have adjusting value. Normal service applications and spring park brake applications (about half of a full service application) do not properly trigger automatic adjustment. To activate properly: keep air pressure in the normal range (above 100 PSI / 690 kPa), press the foot valve firmly to the floor, and account for brake lag with one-second intervals between applications and releases. Do not excessively fan or pump the pedal.

- ✓ Keep air pressure above 100 PSI (690 kPa) when activating automatic adjusters
- ✓ Press the foot valve firmly to the floor with one-second intervals to account for brake lag
- ✓ Spring park brake applications (~half a full service application) do NOT properly trigger automatic adjustment
- ✓ Only the first few of the 'six pack' applications have adjusting value; do not excessively fan or pump

20.5 Disc Brake Inspection

Disc brake rotors can be hard to see, with cracks hidden behind brake pads, backing plates, or callipers. However, some part of the rotor is generally visible, so inspecting rotors often means any cracks will eventually become visible. Rotors should be checked during inspections and throughout the work shift.

- ✓ Inspect disc rotors frequently since cracks may hide behind pads, backing plates, or callipers
- ✓ Some part of a rotor is generally visible; regular checks reveal developing cracks

20.6 Bendix, Crewson, Haldex and Gunite Slack Adjusters

Bendix adjusters have the Bendix name on the side, measure lining-to-drum clearance, and gather excess slack on the application stroke. Crewson adjusters have a decal and triangular pointer from the two clevis pins, measure shoe-to-drum clearance, and gather excess slack on the return stroke. Haldex is the only automatic adjuster with a single clevis pin (like a manual), using an anchor bracket attached to axle components; it takes up slack on the release stroke. Gunite adjusters are recognized by two tabs cast on the s-cam shaft end of the housing, gathering slack on the application stroke. All four use a 7/16 inch wrench turned clockwise to tighten for emergency adjustment.

- ✓ Bendix, Crewson, Haldex and Gunite all use a 7/16 inch wrench turned clockwise to tighten
- ✓ Haldex is the only automatic slack adjuster with a single clevis pin, similar to a manual adjuster
- ✓ All of these measure lining/shoe-to-drum clearance (unlike Arvin Meritor)
- ✓ Gunite is recognized by two tabs cast on the s-cam shaft end of the housing

20.7 Forming Good Full-Application Habits

Making a single full brake application whenever the vehicle is stopped with drums cool and park brakes released is a good habit. The air loss from a full application is not significant enough to reduce air pressure from normal levels. This habit is comparable to regularly scanning mirrors and engine gauges.

- ✓ Make a single full service application when stopped with drums cool and park brakes released
- ✓ A single full application does not significantly reduce normal air pressure

CHAPTER 21

Tractor Protection System Test

21.1 Tractor Protection System Setup and Checks

To test the tractor protection system, leave the engine off with the key in the run position and confirm the wheels are chocked. Push the trailer air supply valve (red button); the park control valve (yellow button) should be pulled. Disconnect both air lines to the trailer. Confirm the low air pressure warning comes on by 60 PSI (414 kPa). Confirm the trailer air supply valve (red button) pops out at 40-60 PSI (276-414 kPa) or higher. Apply and hold the foot or hand valve; no air should leak from the open trailer service line.

- ✓ Engine must be off with key in run position and wheels chocked
- ✓ Low air pressure warning must come on by 60 PSI (414 kPa)
- ✓ Trailer air supply valve (red button) must pop out at 40-60 PSI (276-414 kPa) or higher
- ✓ No air should leak from the open trailer service line when foot or hand valve is applied

CHAPTER 22

Practical Test and Pre-Trip Inspection Details

22.1 Air Line Coupling and Uncoupling Safety

When uncoupling air lines, hold a hand over the supply coupler to protect from air pressure release and debris. When coupling, inspect glad hand couplers before connecting, connect them properly, and confirm correct connection. Ensure air lines are suspended and won't catch as the trailer turns.

- ✓ Hold a hand over the supply coupler when uncoupling to protect from air pressure release and debris
- ✓ Inspect glad hand couplers before connecting and confirm they are properly connected

22.2 Automatic Slack Adjuster Adjustment

To activate automatic slack adjuster adjustment, restart the engine to maintain air pressure and apply two full service brake applications in the normal operating range, allowing one second intervals to account for brake lag. Confirm proper brake adjustment by pulling the slack adjusters of both brakes on one axle.

- ✓ Apply two full service brake applications with one-second intervals to trigger automatic slack adjuster adjustment
- ✓ Confirm correct adjustment by pulling the slack adjusters of both brakes on one axle (rear trailer axle is easiest)

22.3 Practical Test Scoring

Each task on the Practical Test form has a weight of 5%, 10% or 15%. Errors totalling 25% or more result in test failure, as 80% is required to pass. Only the brake adjustment of one axle needs to be checked. The 15-minute time limit applies, and failure to complete requires a retest on another day.

- ✓ 80% is required to pass; errors totalling 25% or more result in failure
- ✓ Each task is weighted 5%, 10% or 15%; only one axle's brake adjustment is checked

22.4 Hands-on Brake Adjustment Practice

Students must observe and practise adjusting s-cam drum brakes, adjusting the brakes twice each. They must understand s-cam shaft rotation, how to turn the adjusting bolt correctly, how to recognize proper stroke when backed off, and that the spring loaded lock sleeve is in place.

- ✓ Each student must adjust the brakes twice and observe other students
- ✓ Understand s-cam shaft rotation, adjusting bolt operation, proper stroke, and spring loaded lock sleeve placement

CHAPTER 23

Commercial Driver's Licence Requirements: MELT, Knowledge Test and Vision

23.1 Mandatory Entry-Level Training (MELT)

Effective March 1, 2019, anyone seeking a Class 1 or Class 2 licence must complete a Mandatory Entry-Level Training (MELT) program. Successful completion is a prerequisite before taking the Class 1 or Class 2 knowledge test.

- ✓ MELT is mandatory for Class 1 and Class 2 licences since March 1, 2019
- ✓ MELT completion is a prerequisite to writing the Class 1 or Class 2 knowledge test
- ✓ Most Class 1 and Class 2 knowledge test questions come from the MELT curriculum

23.2 Knowledge Test Format and Passing Score

The knowledge test is based on this guide and the Cars and Light Trucks guide. It has 30 multiple choice questions covering safe driving, laws and road signs. Class 1 applicants may be asked questions from any chapter since they can drive multiple vehicle types.

- ✓ Test is 30 multiple choice questions
- ✓ Minimum 25 correct out of 30 needed to pass
- ✓ Test stops and a fail is recorded after six incorrect answers
- ✓ Class 1 applicants may be asked questions from any chapter of the guide

23.3 Vision and Road Test Requirements

A vision assessment is required before upgrading. If minimum vision standards are not met, a Vision Referral form must be completed by an optometrist or ophthalmologist. Class 1, 2 and 3 applicants must complete a pre-trip inspection in addition to the road test, communicating and demonstrating each item to the examiner.

- ✓ Vision assessment required before upgrading; bring corrective lenses
- ✓ Class 1, 2 and 3 applicants must perform a pre-trip inspection before the road test
- ✓ Must demonstrate couple/uncouple procedures for Class 1 vehicles
- ✓ Must inspect the air brake system on air brake equipped units
- ✓ You may not refer to notes during the pre-trip inspection
- ✓ If the pre-trip is not successfully completed, the road test will not proceed

23.4 GDL Road Test Restriction and Placard Rule

An applicant holding a Graduated Driver Licence may not take a road test for a classification higher than Class 5. A road test will not be conducted in a vehicle required to display dangerous goods placards.

- ✓ GDL holders cannot take a road test higher than Class 5
- ✓ Road tests are not done in vehicles required to display dangerous goods placards
- ✓ Each pre-trip inspection and road test has a set time limit

CHAPTER 24

How long does it take to stop a vehicle?

24.1 Factors affecting stopping distance

The distance a commercial vehicle needs to stop is affected by brake condition, traction, weight and speed.

- ✓ Brake condition: all brakes must share the task equally or others generate more friction and take longer
- ✓ Traction depends on road condition, tire contact, tire condition/inflation and gross vehicle weight
- ✓ There is the most traction just before all wheels lock up and less when wheels are skidding
- ✓ When weight is doubled, force needed doubles and it takes about twice as long to stop
- ✓ Doubling speed requires four times the braking force
- ✓ Doubling both speed and weight increases force required by eight times

24.2 Perception, reaction, lag and braking time

Total stopping distance is measured from when a driver realizes the need to apply brakes until full stop, and is affected by four time components each with a corresponding distance.

- ✓ Average perception time is about three-quarters of a second
- ✓ Normal driver reaction time is about three-quarters of a second
- ✓ Reaction time slows if the driver is tired or has been drinking alcohol or using drugs
- ✓ Lag time (air brake response) takes about 4/10 of a second
- ✓ Total stopping distance = perception distance + reaction distance + lag time distance + braking distance

24.3 Four factors affecting stopping distance

The distance a commercial vehicle needs to stop is affected by brake condition, traction, weight (GVW) and speed. Poorly maintained brakes force remaining brakes to work harder, lengthening stopping distance.

- ✓ Four factors affecting stopping: brake condition, traction, weight and speed
- ✓ There is the most traction just before the wheels lock up and less traction when wheels skid
- ✓ When weight is doubled, force needed doubles and stopping takes about twice as long
- ✓ Doubling speed requires four times the braking force; doubling both speed and weight requires eight times the force

24.4 Total stopping distance components

Total stopping distance is measured from when a driver realizes the need to brake until the vehicle fully stops. It is the sum of perception distance, reaction distance, lag time distance and braking distance.

- ✓ Perception time averages about three-quarters of a second
- ✓ Driver reaction time is about three-quarters of a second and is slower if tired or impaired by alcohol/drugs
- ✓ Air brake lag time is about 4/10 of a second because compressed air takes time to flow and apply brakes
- ✓ Total stopping distance = perception + reaction + lag time + braking distance

24.5 General braking techniques

Apply the brakes using even pressure and ease off as the vehicle slows. Do not pump air brakes because this causes loss of air pressure, especially dangerous on long downhill grades.

- ✓ Apply even pressure, ease off as vehicle slows, release just before stopping to avoid jerk, then reapply to hold
- ✓ Do not pump air brakes as this results in a loss of air pressure
- ✓ Downshift before the top of a hill and use engine compression to control speed on steep grades
- ✓ Test brakes before going down a hill and do not proceed if there is abnormal air pressure loss

24.6 Low air pressure and hand valve cautions

Stop safely if a low air pressure warning occurs and restore pressure before continuing. Excessive use of the trailer hand valve causes unbalanced braking that can cause jackknifing.

- ✓ If there is a low air pressure warning, stop as soon as possible in a safe place and increase pressure before continuing
- ✓ Overuse of the trailer hand valve on steep hills can cause trailer brakes to fail and unbalanced braking that leads to jackknifing
- ✓ Improperly adjusted brakes make some brakes work harder and can cause a skid
- ✓ A driver must not pull any trailer over 2,300 kg not equipped with driver-controlled brakes

24.7 Three actions to stop a vehicle

To stop a moving vehicle a driver must See a hazard, Think and decide to stop, and Do by placing foot on the brake pedal until the vehicle stops. Heavy commercial vehicles take more time and distance to stop than smaller vehicles.

- ✓ The three actions are See, Think, and Do
- ✓ Heavy commercial vehicles need more braking force to overcome weight and forward motion

24.8 Effect of grade on stopping

The slope or grade of the road affects stopping distance because of gravity.

- ✓ A vehicle travelling downhill needs a longer stopping distance than on a level surface
- ✓ A vehicle travelling uphill stops in a shorter distance than on a level surface

24.9 Three actions needed to stop

To stop a moving vehicle a driver must See a hazard, Think and decide to stop, then Do by placing foot on the brake pedal until the vehicle stops. Heavy commercial vehicles take more time and distance to stop than smaller vehicles.

- ✓ Three actions to stop: See a hazard, Think to decide to stop, Do by applying brakes
- ✓ Heavy commercial vehicles need more braking force to overcome weight and forward motion

24.10 Traction factors

Traction is the friction between the tire and the road surface. More traction means less time and distance to stop.

- ✓ Traction depends on road condition, tire contact with the road, tire condition/inflation pressure, and gross vehicle weight
- ✓ There is the most traction just before all wheels lock up and less when skidding

24.11 Braking time factors and grade effects

Braking time depends on brake application force, condition of linings and drums, tire traction, and vehicle weight and speed. Road slope also affects stopping distance.

- ✓ Braking time depends on brake force applied, condition of linings and drums, tire traction, and vehicle weight and speed
- ✓ A vehicle travelling downhill needs a longer stopping distance due to gravity
- ✓ A vehicle travelling uphill stops in a shorter distance due to the grade

CHAPTER 25

Fatigue

25.1 Dangers of Drowsy Driving

Driving while exhausted makes you a road hazard. Drowsy driving is as dangerous as impaired driving because it slows reaction time, decreases awareness and impairs judgment like alcohol or drugs.

- ✓ Drowsy driving is as dangerous as impaired driving
- ✓ Fatigue slows reaction time, decreases awareness and impairs judgment
- ✓ Lack of sleep is one of the most common causes of drowsy driving

25.2 Warning Signs of Driver Fatigue

Recognize fatigue warning signs: yawning; inability to keep eyes focused and head up; wandering, disconnected thoughts; driving the past few kilometres without remembering them; drifting between lanes, tailgating or missing traffic signs; and noticing a vehicle in the rear view mirror that seemed to appear out of nowhere.

- ✓ Warning signs include yawning, drifting between lanes, tailgating and missing traffic signs
- ✓ Driving without remembering the past few kilometres is a key fatigue sign
- ✓ Missing time or being surprised by nearby vehicles indicates dangerous fatigue

25.3 How to Reduce Driver Fatigue

Short-term measures (radio, open window, coffee, gum, eating) only help briefly. To prevent fatigue: know your biological clock and avoid down times; stop if sleepy; get plenty of sleep before long trips; avoid working all day then driving all night; schedule breaks; take a mid-afternoon nap; and travel with an awake passenger.

- ✓ Schedule a break every two hours or every 160 km to stretch and get fresh air
- ✓ Take a mid-afternoon break with a 20-40 minute nap
- ✓ Get plenty of sleep before a long trip and stop if you become sleepy
- ✓ Avoid working all day and driving all night — stay overnight rather than driving straight through

25.4 How to Reduce and Prevent Driver Fatigue

Short-term measures like radio, fresh air, coffee, gum or eating only help briefly. To prevent fatigue: be aware of your biological clock and avoid driving during down times, stop when sleepy, get plenty of sleep before a long trip, avoid working all day then driving all night, schedule breaks, take a mid-afternoon nap, and travel with an alert passenger.

- ✓ Schedule a break every two hours or every 160 km
- ✓ Take a mid-afternoon 20-40 minute nap
- ✓ Get plenty of sleep before a long trip and stop if you become sleepy
- ✓ Avoid working all day and then driving all night; stay overnight instead

25.5 Contributing Factors and At-Risk Groups

Contributing factors to fatigue include driving alone, driving long distances without breaks, driving through the night or at times the driver normally sleeps, taking sleep-inducing medication, and drinking alcohol. Those most at risk are shift workers, commercial drivers, people with untreated sleep disorders, teenagers and young adults.

- ✓ Driving alone, long distances without rest, and driving at night increase fatigue risk
- ✓ Sleep-inducing medication and alcohol contribute to driver fatigue
- ✓ Shift workers, commercial drivers, people with untreated sleep disorders, teenagers and young adults are most at risk

25.6 Timing of Fatigue-Related Collisions

Most fatigue-related collisions happen between 1-4 p.m. and early morning between 2-6 a.m. They typically occur at higher speeds and can result in running off the road or head-on collisions with vehicles or stationary objects.

- ✓ Most fatigue collisions occur between 1-4 p.m. and 2-6 a.m.
- ✓ Fatigue-related collisions typically occur at higher speeds
- ✓ These collisions often involve running off the road or head-on impacts

25.7 Causes and At-Risk Groups for Fatigue

Lack of sleep is the most common cause of drowsy driving. Other contributing factors include driving alone, driving long distances without rest breaks, and driving through the night. Medication and alcohol increase fatigue. Those most at risk include shift workers, commercial drivers, people with untreated sleep disorders, teenagers and young adults.

- ✓ Lack of sleep is the most common cause of drowsy driving
- ✓ Driving alone, long distances without breaks, and night driving contribute to fatigue
- ✓ Shift workers, commercial drivers, people with sleep disorders, teens and young adults are most at risk

CHAPTER 26

Practical Test Details

26.1 Practical Test Scoring and Passing

During the practical test students perform an air brake pre-trip inspection and a brake adjustment on a tractor-trailer unit. Each task is weighted 5%, 10% or 15%. Errors totalling 25% or more result in a test failure, as 80% is required to pass. The test has a fifteen minute time limit and only the brake adjustment of one axle needs to be checked.

- ✓ Each task is weighted 5%, 10% or 15%
- ✓ Errors totalling 25% or more result in failure; 80% is required to pass
- ✓ The practical test time limit is fifteen minutes; exceeding it discontinues the test
- ✓ Only the brake adjustment of one axle needs to be checked during the practical test

26.2 Practical Test Conditions

Each student must be tested privately without other students present, at a ratio of one instructor to one student. Students must complete the operations on the Air Brake Practical Test form without assistance and without using the form as a checklist. Students who fail must retake the test on another day.

- ✓ The practical test must be conducted one instructor to one student with no other students present
- ✓ Students cannot use the practical test form during the test
- ✓ Unsuccessful students must retake the test on another day

CHAPTER 27

Trip Inspections

27.1 Purpose and Validity of Trip Inspections

A daily vehicle inspection identifies problems and defects before highway operation. It is part of the carrier's written maintenance program. A completed trip inspection and report are valid for a maximum of 24 hours.

- ✓ Trip inspections identify defects before highway operation
- ✓ An inspection and report are valid for a maximum of 24 hours
- ✓ Drivers may not drive unless an inspection was done within the previous 24 hours
- ✓ Driver must carry the schedule and report in the vehicle

27.2 Recording and Reporting Defects

Drivers must record defects immediately after inspection or upon discovery. Minor and major defects must be reported to the carrier immediately. A driver may continue with a minor defect but must never operate a vehicle with a major defect.

- ✓ Record defects immediately after inspection or upon discovery
- ✓ Report minor and major defects to the carrier immediately
- ✓ May continue to drive with a listed minor defect if recorded and reported
- ✓ No person shall drive a vehicle with a major defect present

27.3 Tire and Wheel Inspection Standards

Steering axle tires must have tread depth not less than 3.2 mm; other axle tires not less than 1.6 mm. Tires must be properly inflated with no bulges, cuts or uneven wear. Wheel rims must have no cracks, and fasteners must be secure.

- ✓ Steering axle tire tread depth not less than 3.2 mm
- ✓ Drive and trailer axle tire tread depth not less than 1.6 mm
- ✓ Tires must have no bulges, sidewall separation, cuts or uneven wear
- ✓ Dual tires must not touch and nothing trapped between them
- ✓ Wheel fasteners must be secure, not missing, broken or loose

27.4 Air Brake Component Inspection

For air brake vehicles, check that the air compressor is securely mounted; inspect lines, fittings, hoses and couplers; check brake chambers for condition and security; check slack adjuster angle and push rod travel; and ensure air lines have no leaks or damage.

- ✓ Air compressor must be securely mounted
- ✓ Check slack adjuster angle, push rod travel and mechanical wear
- ✓ Brake chambers must be secure with no cracks, corrosion or holes
- ✓ Air lines must have no leaks, kinks, cuts, abrasions or cracks
- ✓ Use a pry bar or pull manually to check slack adjuster travel

27.5 Fifth Wheel and Coupling Inspection

During inspection the fifth wheel coupler bolt must be secure, the slider locked, the plate flush to the apron with no daylight, locking jaws closed around the kingpin, and the kingpin enclosed and undamaged.

- ✓ Fifth wheel coupler bolt secure and slider locked
- ✓ Plate flush to the apron with no daylight visible between them
- ✓ Fifth wheel locking jaws closed and kingpin enclosed
- ✓ Kingpin and pintle hitch eyehook not worn, damaged, cracked or broken

27.6 Trip Air Brake Inspection Steps

The trip air brake inspection includes a visual check, tractor protection system test, park control valve test, supply circuit test, air system leak test, and service brake response test, each with specific pressure thresholds.

- ✓ Trailer air supply valve should pop out at 40-60 PSI (276-414 kPa) or higher
- ✓ Low air pressure warning should come on by 60 PSI (414 kPa)
- ✓ Park control valve should pop out at 20-45 PSI (138-311 kPa)
- ✓ Governor cut-out at 120-135 PSI (828-931 kPa)
- ✓ Cut-in must be 20-25 PSI less than cut-out pressure
- ✓ Compressor build-up: 50 to 90 PSI within 3 minutes

27.7 Air System Leak Test

With engine off after building pressure, apply and firmly hold a full service brake application for 2 minutes. Maximum allowable loss is 4 PSI (28 kPa) for power units plus an additional 2 PSI (14 kPa) per trailer after the system stabilizes.

- ✓ Hold full service brake application for 2 minutes with engine off
- ✓ Maximum 4 PSI (28 kPa) loss for power units
- ✓ Add 2 PSI (14 kPa) allowable loss per trailer
- ✓ Measure loss after the system stabilizes

27.8 Purpose and Validity of Daily Inspections

Daily vehicle inspections identify problems and defects before highway operation. The process is part of a carrier's legal maintenance program and serves as communication between drivers, carrier and maintenance.

- ✓ An inspection and report are valid for a maximum of 24 hours
- ✓ The driver must carry the schedule and report in the vehicle and produce them on demand of a peace officer
- ✓ Reports are completed immediately following an inspection
- ✓ Inspection prevents operation of a vehicle with conditions likely to cause or worsen a collision

27.9 Vehicles Requiring Trip Inspections

The weight thresholds for required trip inspection reports differ between provincially and federally regulated carriers.

- ✓ Provincial carriers: trucks registered 11,794 kg and greater, and passenger vehicles seating 11+ including driver
- ✓ Federal carriers: trucks registered 4,500 kg and greater, and passenger vehicles seating 11+ including driver
- ✓ A trip inspection is required as part of the road test for Class 1, 2 and 3 licences

27.10 Under-Hood and Air Brake Component Checks

During the walk-around, inspect under the hood components common to all vehicles plus air brake components on equipped vehicles.

- ✓ Check radiator, fan, belts, fluid levels, air filter and battery for defects and secure mounting
- ✓ On air brake vehicles check air compressor mounting, brake chambers, slack adjuster angle and push rod travel
- ✓ Check that air lines have no leaks, kinks, cuts, abrasions or cracks
- ✓ Check steering, hoses, shock absorbers and suspension for wear or damage

27.11 Coupling and Fifth Wheel Inspection

For combination vehicles, inspect the fifth wheel, kingpin, coupling hardware and safety devices.

- ✓ Fifth wheel coupler bolt must be secure, slider locked, plate flush to the apron with no daylight visible
- ✓ Fifth wheel locking jaws must be closed and kingpin enclosed
- ✓ Kingpin, pintle hitch eyehook, hitches, chains and cables must not be worn, cracked or broken and must be securely attached

27.12 Trip Air Brake Inspection Procedure

A step-by-step air brake test is a guide for verifying the air brake system on tractor-trailers. Specific pressure thresholds must be memorized for the exam.

- ✓ Tractor protection: trailer air supply valve should pop out at 40-60 PSI (276-414 kPa); low air warning by 60 PSI (414 kPa)
- ✓ Park control valve should pop out at 20-45 PSI (138-311 kPa)
- ✓ Governor cut-out at 120-135 PSI (828-931 kPa); cut-in is 20-25 PSI (138-172 kPa) less than cut-out
- ✓ Air leak test: max 4 PSI (28 kPa) loss for power units plus 2 PSI (14 kPa) per trailer over 2 minutes with full brake applied

27.13 Vehicles Requiring Inspection

Provincially regulated carriers must complete trip inspection reports on trucks at 11,794 kg and greater and passenger vehicles seating 11 or more. Federally regulated carriers must do so on trucks at 4,500 kg and greater.

- ✓ Provincial: trucks 11,794 kg and greater require trip inspection reports
- ✓ Federal: trucks 4,500 kg and greater require trip inspection reports
- ✓ Passenger vehicles seating 11 or more including driver require reports

27.14 Trip Inspection Schedules

A truck, tractor and towed trailer are inspected using Schedule 1; a converter dolly is inspected as part of the trailer it carries. Carriers must supply drivers with the schedule, which must be produced on demand by an officer.

- ✓ Truck, tractor and towed trailer use Schedule 1
- ✓ A converter dolly is inspected as part of the trailer it carries
- ✓ Carriers must supply drivers with a copy of the inspection schedule
- ✓ Driver must produce the schedule and report on demand of a peace officer

27.15 Preparation Before Inspection

Before beginning an inspection, park on level terrain away from traffic, set the parking/spring brake, place a manual transmission in low gear, shut off the engine, and chock the wheels with blocks at least 15 by 15 centimetres.

- ✓ Park on level terrain safely away from traffic
- ✓ Set parking/spring brake and place manual transmission in low gear
- ✓ Shut off the engine before inspecting
- ✓ Chock the wheels; minimum square block size is 15 by 15 centimetres

27.16 Circle Check Procedure

Perform a walk-around (circle check) before starting any trip. It may be done in any order but must make a complete circle around the vehicle and cover every regulated item, with defects recorded and reported.

- ✓ Do a walk-around check before starting any trip
- ✓ Always make a complete circle around the vehicle
- ✓ Every regulated inspection item must be inspected
- ✓ Record and report any discovered defect

27.17 Interior and Engine Start-Up Checks

Inside the vehicle check seat and mirrors, seat belt, brake and clutch pedals, steering play, gauges, wipers, defroster, heater, horn and engine operation. Truck-tractors also verify air pressure build-up time and test service brakes.

- ✓ Adjust seat, mirrors and seat belt properly
- ✓ Steering must have no excessive play or slack
- ✓ All gauges and warning lights must work
- ✓ Test service brakes by driving forward slowly and stopping
- ✓ Air pressure build-up time must be adequate for air brake units

27.18 Enroute Check Stop Inspections

Rest and check stops provide a break and allow checking the vehicle after time on the road. Ensure the vehicle is completely off the road, avoid stopping at the bottom of a hill, and check lights, air leaks, wheels, load and brakes.

- ✓ Make sure the vehicle is completely off the road
- ✓ Do not stop at the bottom of a hill or on an uphill slope
- ✓ Choose stops that don't require backing to enter or exit
- ✓ Check lights, air leaks, wheels, load security and brake adjustment
- ✓ Schedule stops according to NSC requirements and company policy

27.19 Reporting to a Vehicle Inspection Station

All commercial vehicles or combinations over 4,500 kg must report to inspection stations when highway lights are flashing. Loaded vehicles drive across the scale; empty vehicles use the adjacent lane. Follow the light board instructions.

- ✓ All commercial vehicles over 4,500 kg must report when station lights are flashing
- ✓ Loaded vehicles drive slowly across the scale lane; empty vehicles use the adjacent lane
- ✓ Follow STOP, BACK UP and PARK light board instructions
- ✓ If PARK is activated, bring all vehicle and driver documents to the scale building

27.20 Inspection Responsibility and Schedules

Drivers must complete and sign a report and cannot drive unless an inspection was conducted within the previous 24 hours. Other persons may conduct inspections. Schedule 1 is used for trucks, tractors and trailers.

- ✓ A driver cannot drive a truck or tow a trailer unless an inspection was done within the previous 24 hours
- ✓ A truck, tractor and towed trailer are inspected using Schedule 1; a converter dolly is inspected as part of the trailer
- ✓ A person other than the driver who inspects and signs is legally responsible for that inspection
- ✓ The driver must monitor vehicle condition for defects while en route

27.21 School Bus and Ambulance Specific Checks

Buses and ambulances have unique inspection items beyond common items, including warning lights and safety equipment.

- ✓ School bus: check alternating amber/red flashing lights, pedestrian safety crossing arm, stop arm, crossover mirror and retro-reflective tape
- ✓ School bus rear: check white flashing strobe light and rear door emergency buzzer/seal
- ✓ Ambulance: check emergency lights and patient compartment medical equipment, fire extinguisher and warning device
- ✓ Bus interior: check fire extinguisher, first aid kit, emergency exits, wheelchair restraints and securely fastened passenger seats

27.22 In-Cab Inspection and Engine Start Up

Inside the vehicle, check seat, mirrors, controls, gauges, and operation of key systems before driving.

- ✓ Check seat belt, brake and clutch pedal feel, steering play, gauges/warning lights and fuel level
- ✓ Check windshield wipers/washer, defroster, heater, horn and backing alarm
- ✓ Truck-tractor: check air pressure build-up time, air pressure drop when brakes applied, and test service brakes at slow speed
- ✓ Listen for unusual engine and clutch noises

27.23 Post-Trip Inspection

A post-trip inspection at the end of a shift lets you arrange repairs before the next trip and report problems found during the trip. School buses require additional checks for lost articles, sleeping children, floor cleaning and emergency equipment.

- ✓ Do a post-trip inspection at the end of a shift
- ✓ Report any problems discovered during the trip
- ✓ School buses: inspect for lost articles and sleeping children
- ✓ School buses: check emergency equipment, tires and fluid leaks

CHAPTER 28

How Long Does It Take to Stop a Vehicle?

28.1 Four Factors Affecting Stopping Distance

The distance a commercial vehicle needs to stop is affected by brake condition, traction, weight (GVW) and speed. Poorly aligned or maintained brakes force remaining brakes to generate more friction, lengthening stopping distance.

- ✓ All brakes must share the braking task equally
- ✓ Poorly maintained or misaligned brakes increase stopping distance
- ✓ Stopping is affected by brake condition, traction, weight and speed

28.2 Weight, Speed and Braking Force Relationship

A heavy vehicle, though it may have better traction, needs more time and distance to stop. Doubling weight doubles the force needed. Doubling speed requires four times the braking force. Doubling both weight and speed requires eight times the braking force.

- ✓ Doubling weight doubles the force required and roughly doubles stopping time
- ✓ Doubling speed requires four times the braking force
- ✓ Doubling both weight and speed increases required force by eight times

28.3 Total Stopping Distance Components

Total stopping distance is the sum of perception distance, reaction distance, lag time distance and braking distance. It is measured from when the driver realizes the need to brake until the vehicle fully stops.

- ✓ Total stopping distance = perception + reaction + lag time + braking distance
- ✓ Average perception time is about three-quarters of a second
- ✓ Normal driver reaction time is about three-quarters of a second
- ✓ Air brake lag time is about 4/10 of a second

28.4 Perception, Reaction, Lag and Braking Time

Perception time increases if not paying attention or unwell. Reaction time is slower if the driver is tired or has consumed alcohol or drugs. Lag time is the delay for compressed air to flow and apply the brakes. Braking time depends on brake force, lining/drum condition, traction and vehicle weight and speed.

- ✓ Perception time increases if the driver is inattentive or unwell
- ✓ Reaction time slows if the driver is tired or impaired by alcohol/drugs
- ✓ Air brakes do not respond immediately due to lag time (~4/10 second)
- ✓ Braking time depends on brake force, lining/drum condition, traction, weight and speed

28.5 Three Actions Required to Stop

To stop a moving vehicle, a driver must See a hazard, Think and decide to stop, and Do by placing foot on the brake pedal until the vehicle stops. Heavy commercial vehicles take more time and distance to stop than smaller vehicles.

- ✓ Stopping requires three actions: See, Think, Do
- ✓ Heavy commercial vehicles need more braking force to overcome weight and forward motion

28.6 Traction and Its Effect on Stopping

Traction is the friction between the road surface and the tire contact area. More traction means less time and distance to stop. There is the most traction just before all wheels lock up, and less traction when wheels are skidding.

- ✓ Traction depends on road condition, tire contact, tire condition/inflation, and GVW
- ✓ The most traction exists just before all wheels lock up
- ✓ There is less traction when the wheels are skidding

28.7 Effect of Grade on Stopping

The slope or grade of a road affects stopping distance. A vehicle travelling downhill needs a longer stopping distance due to gravity. A vehicle travelling uphill stops in a shorter distance.

- ✓ Downhill travel increases stopping distance due to gravity
- ✓ Uphill travel decreases stopping distance

CHAPTER 29

Chapter 10: Fatigue

29.1 Dangers of Drowsy Driving

Driving while exhausted makes you a road hazard. Drowsy driving is as dangerous as impaired driving because it slows reaction time, decreases awareness, and can impair judgment like alcohol or drugs.

- ✓ Drowsy driving is as dangerous as impaired driving
- ✓ Fatigue slows reaction time, decreases awareness, and impairs judgment

29.2 Warning Signs of Driver Fatigue

Recognize fatigue warning signs: yawning; inability to keep eyes focused or head up; wandering, disconnected thoughts; driving the past few kilometres without remembering them; drifting between lanes, tailgating, or missing traffic signs; and noticing a vehicle in your mirror that seemed to appear out of nowhere.

- ✓ Warning signs include yawning, drifting between lanes, and missing traffic signs
- ✓ Not remembering the past few kilometres driven indicates dangerous fatigue

29.3 How to Reduce and Prevent Driver Fatigue

Short-term aids (radio, open window, coffee, gum, eating) only help briefly. Prevention: know your biological clock and avoid driving during down time; stop when sleepy; sleep well before a long trip; avoid working all day then driving all night; schedule a break every two hours or 160 km; take a 20-40 minute mid-afternoon nap; and travel with an awake, alert passenger.

- ✓ Schedule a break every two hours or every 160 km
- ✓ Take a 20-40 minute nap for a mid-afternoon break
- ✓ Stop driving if you become sleepy and avoid driving during your body's down time
- ✓ Stay overnight rather than working all day and driving all night

29.4 Causes and At-Risk Groups for Fatigue

Lack of sleep is the most common cause of drowsy driving. Contributing factors include driving alone, long distances without breaks, driving overnight, medication that increases sleepiness, and alcohol. Most at risk: shift workers, commercial drivers, people with untreated sleep disorders, teenagers, and young adults.

- ✓ Lack of sleep is the most common cause of drowsy driving
- ✓ Commercial drivers and shift workers are among those most at risk of falling asleep at the wheel
- ✓ Sleepiness-increasing medication and alcohol contribute to driver fatigue

29.5 Timing of Fatigue-Related Collisions

Most fatigue-related collisions occur between 1-4 p.m. and early morning between 2-6 a.m. These collisions typically occur at higher speeds and can result in running off the road or head-on collisions with vehicles or stationary objects.

- ✓ Fatigue collisions are most common between 1-4 p.m. and 2-6 a.m.
- ✓ Fatigue collisions typically occur at higher speeds with severe outcomes

CHAPTER 30

Module 1: Braking Fundamentals

30.1 Stopping Distance and Brake Lag

All vehicles have driver perception and reaction time (about 1½ seconds) plus actual braking time and distance. Air brake vehicles additionally have air pressure lag time—the time it takes for air pressure to pass through the hoses to the brakes.

- ✓ Driver's perception and reaction time is about 1½ seconds
- ✓ Air brake vehicles have additional air pressure lag time not present in hydraulic systems
- ✓ Total stopping distance includes perception, reaction, brake lag, and actual braking distance

30.2 Brake Lag in Air Systems

Air lines to the service brakes are empty when the brakes are released. When brakes are applied, air pressure must move through the air lines, creating a delay before the service brakes apply. The longer a vehicle, the greater the brake lag. Air line layout and fittings affect air pressure flow. A body job has the least lag; a triple trailer combination has the most, with control air passing through five pairs of glad hand couplers over up to 35 metres.

- ✓ Air lines to service brakes are empty when brakes are released, causing a delay when applied
- ✓ The longer the vehicle, the greater the brake lag
- ✓ A triple trailer combination has the most brake lag with control air travelling up to 35 metres through five pairs of glad hand couplers

30.3 Hydraulic Brakes Apply Instantly

Hydraulic brake fluid is always in the lines so hydraulic brakes apply immediately. Brake fluid is held in reservoirs and lines so the system is constantly full. Brake fluid cannot be compressed and transfers pressure rather than flows, making force applied to the brake immediate.

- ✓ Hydraulic brake fluid is always in the lines so brakes apply immediately
- ✓ Brake fluid cannot be compressed and transfers pressure rather than flows
- ✓ Hydraulic brakes have no air lag because the system is constantly full

30.4 How Brakes Stop a Vehicle

Brakes convert the energy of momentum into heat, which is dissipated to the atmosphere by brake drums or disc rotors. Brake failure (fade) arises when more heat is absorbed by the drums or rotors than can be dissipated, caused by driving too fast for conditions.

- ✓ Brakes convert momentum energy into heat dissipated by drums or rotors
- ✓ Brake failure occurs when more heat is generated than can be dissipated, caused by driving too fast for conditions

30.5 Stopping Time and Brake Lag

All vehicles have driver perception and reaction time (1½ seconds) plus actual braking time and distance. Air brake vehicles additionally have air pressure lag time — the time for air pressure to pass through hoses to the brakes. Hydraulic brakes apply immediately because fluid is always in the lines.

- ✓ Driver perception and reaction time is approximately 1½ seconds
- ✓ Air brake vehicles have additional lag time as air must travel through the lines, unlike hydraulic brakes which apply immediately

30.6 Weight and Speed Effect on Braking

Required brake power increases 2 times for doubling weight, 4 times for doubling speed, and 8 times for doubling both weight and speed. Heavy vehicles take longer to stop, requiring more space and time for manoeuvres. Drivers must maintain appropriate following distances and speeds.

- ✓ Doubling speed increases braking requirements 4 times; doubling both weight and speed increases it 8 times
- ✓ Maintain appropriate following distances and speeds to allow for stopping requirements

30.7 Brake Lag in Longer Vehicles

The longer a vehicle, the greater the brake lag. Air line layout and fittings affect air pressure flow. A body job has the least lag; a triple trailer combination experiences the most lag, with control air passing through five pairs of glad hand couplers, two 90-degree bends per set, over distances up to 35 metres (114.8 feet).

- ✓ Longer vehicles experience greater brake lag due to distance and fittings
- ✓ A triple trailer combination has the most brake lag, with air travelling up to 35 metres through five coupler pairs

30.8 Travelling on Grades

Travelling up a grade slows the vehicle down, while travelling down a grade will dramatically increase stopping distance. Drivers can quickly get into trouble on steep grades.

- ✓ Travelling down a grade dramatically increases stopping distance
- ✓ Steep grades can quickly cause loss of vehicle control

30.9 Energy Conversion and Brake Fade

Brakes convert the energy of momentum into the energy of heat, which is dissipated to the atmosphere by the brake drums or disc rotors. Brake failure (fade) occurs when more heat is absorbed by the drums or rotors than can be dissipated, caused by driving too fast for conditions.

- ✓ Brakes convert momentum energy into heat that must be dissipated by drums or rotors
- ✓ Brake failure occurs when heat is absorbed faster than it can be dissipated, caused by excessive speed

30.10 Brake Lag

Air brakes experience brake lag because air must travel through the lines before brakes apply, unlike hydraulic brakes where fluid is always in the lines and applies immediately. The longer the vehicle, the greater the brake lag. Air line layout and fittings affect flow. A body job has the least lag; triple trailers have the most, with control air passing through five pairs of glad hand couplers over distances up to 35 metres.

- ✓ Hydraulic brakes apply immediately because fluid is always in the lines; air brakes have lag
- ✓ Longer vehicles have greater brake lag; triples have the most, with control air travelling up to 35 metres

30.11 Weight, Speed and Braking Requirements

Increasing vehicle mass increases braking requirements. Increasing speed also increases braking requirements. Large vehicles take longer to stop than passenger vehicles and need more space and time for manoeuvres. Doubling both weight and speed increases the complexity of the braking relationship. Steep grades can quickly get a driver into trouble.

- ✓ Increasing vehicle mass or speed increases braking requirements
- ✓ Large vehicles require more space and time to stop and manoeuvre than passenger vehicles

30.12 Brakes Convert Momentum Into Heat

Brakes convert the energy of momentum into the energy of heat, which is dissipated to the atmosphere by the brake drums or disc rotors. Brake failure arises when more heat is absorbed by the drums or rotors than can be dissipated, which is caused by driving too fast for conditions.

- ✓ Brakes convert momentum energy into heat dissipated by drums or rotors
- ✓ Brake failure occurs when heat generated exceeds heat that can be dissipated, caused by driving too fast for conditions

30.13 Stopping Distance Components and Brake Lag

All vehicles have a driver's perception and reaction time (approximately 1½ seconds) plus actual braking time and distance. Air brake vehicles additionally have air pressure lag time - the time for air pressure to pass through the hoses to the brakes. Hydraulic brakes apply immediately because fluid is always in the lines and cannot be compressed.

- ✓ Driver perception and reaction time is approximately 1½ seconds
- ✓ Air brake vehicles have additional brake lag due to air pressure traveling through the lines
- ✓ Hydraulic brakes apply immediately because fluid is incompressible and always present

30.14 Effect of Weight and Speed on Braking

Increasing vehicle mass increases braking requirements; doubling weight requires 2 times the brake power. Increasing speed increases braking requirements; doubling speed requires 4 times the brake power. Doubling both weight and speed requires 8 times the brake power. Drivers must maintain appropriate following distances and speeds for stopping requirements.

- ✓ Doubling weight requires 2 times the brake power
- ✓ Doubling speed requires 4 times the brake power
- ✓ Doubling both weight and speed requires 8 times the brake power

30.15 Brake Lag Increases With Vehicle Length

The longer a vehicle is, the greater the brake lag. Air line layout and types of fittings also affect air pressure flow. A body job has the least brake lag while triples (three trailers) have the most, with control air passing through five pairs of glad hand couplers and distances up to 35 metres.

- ✓ Longer vehicles experience greater brake lag
- ✓ Multiple trailer combinations experience the most brake lag due to more couplers and longer air line distances

CHAPTER 31

Module 5: Parking and Emergency Brakes

31.1 Spring Park Brake Mechanical Application

The park component rides on the back of the service chamber and applies the foundation brakes with mechanical spring force rather than air pressure. Air pressure from the service tanks is used to release the park brake, compressing the spring.

- ✓ Spring park brakes apply the foundation brakes with mechanical spring force, not air pressure
- ✓ Air pressure from the service tanks is used to release (hold off) the park brake

31.2 Park Control Valve Operation

The park control valve (yellow button) is the driver's park circuit control. It sits on a spring-loaded spool requiring air pressure to hold in. When air pressure drops, the spring pops the button out, typically 20-45 PSI (138-310 kPa), or as low as 10 PSI in new trucks. Some motor coaches have an isolated park tank not shown on gauges.

- ✓ The park control valve (yellow button) pops out typically between 20-45 PSI (138-310 kPa)
- ✓ A vehicle must be placed out-of-service if the park control does not default back to park when air is depleted

31.3 Caging Bolts for Park Springs

Caging bolts (release tools) pull the park spring off the application so the vehicle can be towed or repaired. They are not used to disassemble park chambers. When caging all park brakes, chock blocks must be placed on both sides of the wheels. Do not drive with park springs caged.

- ✓ Caging bolts are for maintenance and towing only, never for driving
- ✓ Place chock blocks on both sides of the wheels when caging all park brakes

31.4 Park Circuit Air Source Redundancy

Air pressure for the park circuit is delivered from the higher pressure of either the primary or secondary tank. This keeps the spring park brake released during a system failure in either service circuit, allowing a safe and controlled stop.

- ✓ Park circuit air comes from the higher pressure of the primary or secondary tank
- ✓ This redundancy keeps park brakes released during a single service circuit failure

31.5 Park Spring Expansion Pressures

When air pressure drops to 82-84 PSI (566-580 kPa), the park springs begin to expand. Brake lining starts to drag around 55-60 PSI (380-414 kPa). Park springs are applied firmly by 45-50 PSI (310-345 kPa).

- ✓ Park springs begin to expand at 82-84 PSI (566-580 kPa)
- ✓ Park springs are applied firmly by 45-50 PSI (310-345 kPa)

CHAPTER 32

Licensing and Endorsement Requirements

32.1 Air Brake Q Endorsement

Other than the Class 1 licence, the air brake 'Q' endorsement is independent of the class of licence held. A Class 5 licence endorsed for air brakes is for a single axle vehicle. The Class 1 licence includes the air brake endorsement and allows the holder to drive everything except motorcycles (Class 6), but the holder must still pass the Alberta Air Brake Program.

- ✓ The air brake 'Q' endorsement is independent of licence class except for Class 1, which includes it
- ✓ Class 1 holders must still pass the Alberta Air Brake Program

32.2 Endorsement Exemptions and Jurisdictions

Drivers of two axle single motor vehicles registered as farm vehicles do not require an air brake 'Q' endorsement. Every jurisdiction in Canada, except Nunavut, requires drivers of air brake equipped vehicles to have an air brake endorsement.

- ✓ Two axle single motor vehicles registered as farm vehicles do not require the air brake Q endorsement
- ✓ All Canadian jurisdictions except Nunavut require an air brake endorsement for air brake equipped vehicles

CHAPTER 33

Module 5: The Park Circuit

33.1 Spring Park Brake Operation

Unlike service brakes that depend on air pressure to apply, the park component rides on the back of the service chamber and uses mechanical spring force to apply the foundation brakes. Air pressure from service tanks is used to release the park brake.

- ✓ The park spring applies the foundation brake with mechanical force, not air pressure
- ✓ Air pressure from the service tanks is used to release the park brake
- ✓ A compressed park spring is extremely dangerous and can cause injury

33.2 Park Control Valve (Yellow Button)

The yellow park control valve sits on a spring-loaded spool requiring air pressure to hold in (open/released). When air drops, the spring pops the button out, applying park brakes. The valve must default to park when air is depleted.

- ✓ The button pops out typically between 20-45 PSI (138-310 kPa), as low as 10 PSI in new trucks
- ✓ Vehicle is out-of-service if the park control does not default to park when air pressure is depleted
- ✓ When yellow button is pulled, air exhausts and the park spring applies the foundation brake

33.3 Park Spring Application Pressures

As air drops, the park springs progressively apply. Understanding these thresholds is critical for emergency braking situations where park springs become the stopping mechanism.

- ✓ Park springs begin to expand at 82-84 PSI (566-580 kPa)
- ✓ Brake linings start to drag on drums at 55-60 PSI (380-414 kPa)
- ✓ Park springs are applied firmly by 45-50 PSI (310-345 kPa)

33.4 Park Circuit Air Source

Air pressure for the park circuit is delivered from the higher pressure of either the primary or secondary tank. This keeps the spring park brake released during a single circuit failure, allowing a controlled stop.

- ✓ Park circuit air comes from the higher of the primary or secondary tank pressure
- ✓ This keeps spring park brakes released if there is a failure in either service circuit
- ✓ This design allows the driver to make a safe and controlled stop during a failure

33.5 Caging Bolts and Release Tools

Caging bolts (release tools) pull the park spring off the brakes so the vehicle can be towed or repaired. They are not for taking chambers apart. Vehicles must not be driven after caging.

- ✓ Caging bolts are for maintenance and towing purposes only, not for driving
- ✓ When caging all park brakes, place chock blocks on both sides of the wheels
- ✓ Caging bolts are typically stored in pockets on the side of the spring brake chambers

CHAPTER 34

Module 9: Safe Driving Practices

34.1 Descending Mountain Grades Safely

Descending mountain grades is a challenging skill. The vehicle should be placed in the proper (lower) gear before descending, which avoids the need for corrective procedures during the descent. Large vehicles often require slower descent speeds than other traffic - drivers must drive slowly and not be pressured by other traffic. Runaway lanes exist as a safety feature for vehicles that lose braking control.

- ✓ Select the proper lower gear BEFORE beginning the descent
- ✓ Descend at slow speeds and do not let other traffic pressure you to go faster
- ✓ Large vehicles typically need slower descent speeds than other traffic
- ✓ Use extra caution on unfamiliar grades and roadways

34.2 Brake Balance in Combination Units

The biggest challenge for combination units is loss of brake balance from uneven load distribution. A heavy load at the front of a trailer gives drive axles good traction, but the brakes under an empty rear of the trailer receive the same application air pressure without load to hold them down, causing the rear to slide and swing. This problem is magnified in multiple-trailer combinations. ABS can help maintain brake balance.

- ✓ Uneven load distribution causes loss of brake balance in combination units
- ✓ An empty rear trailer axle receives the same air pressure but can slide and swing without load
- ✓ The problem is magnified in multiple-trailer combinations
- ✓ ABS helps maintain brake balance

34.3 Antilock Brake Systems (ABS)

ABS uses sensors, modulators and a computer. Axle-end sensors relay a voltage signal interpreted as wheel speed. The computer detects differences in wheel speed and directs a modulator to release air pressure in the service chamber of slower-rotating (locking) wheels. Modulators can be mounted separately near the chambers or wing-mounted to the relay/quick release valve. ABS applies to both air and hydraulic brake vehicles. The dash ABS warning light does a bulb test at ignition then stays unlit; a continuously flashing light means ABS is actively controlling the brakes, while a steady light indicates a system problem.

- ✓ ABS releases air pressure from the service chamber of a slower/locking wheel to prevent lockup
- ✓ The ABS dash light flashes on at startup (bulb test) then stays unlit in normal operation
- ✓ A steady (continuously lit) ABS warning light indicates a system fault
- ✓ ABS applies to both air and hydraulic brake systems

34.4 Bobtail Tractor Braking

A 'bobtail' is a highway tractor operating with no trailer. Highway tractors are designed to carry heavy weight, so driving a bobtail with no weight on the axles can be dangerous even in good conditions. Tractors equipped with bobtail relays cut primary service circuit applications by as much as 80 per cent when the trailer air lines are empty, to help balance braking.

- ✓ Bobtail tractors have no load on the axles, making braking dangerous even in safe conditions
- ✓ Bobtail relays cut primary service circuit applications by up to 80% when trailer air lines are empty
- ✓ Drivers must exercise extra caution when operating a bobtail

34.5 Auxiliary Engine and Driveline Retarders

Auxiliary retarders help control speed but are NOT intended for emergency braking and do not meet sudden or large braking demands. Engine retarders open the exhaust valve at the top of the compression stroke, turning the engine into an air compressor. Exhaust retarders increase exhaust back pressure via a butterfly or sliding gate valve and must be adjusted so back pressure stays within the engine's capacity (excessive back pressure floats the exhaust valves open, hitting piston tops). Hydraulic driveline retarders pump oil to create driveline resistance - watch oil temperature and turn off when too hot. Electric driveline retarders use an electromagnet, are common on transit buses/emergency/waste vehicles, and are activated by service brake application (unlike the other three).

- ✓ Auxiliary retarders provide additional control but must not be relied on for emergency braking
- ✓ Engine retarders open the exhaust valve at top of compression, turning the engine into an air compressor
- ✓ Exhaust retarders must be adjusted so back pressure stays within the engine's capacity
- ✓ Electric driveline retarders are activated by service brake applications, unlike engine, exhaust and hydraulic retarders

34.6 Winter and Icy Road Braking

Braking technique on icy roads differs depending on whether the vehicle has ABS. Drivers must exercise safety installing tire chains and drive with extra caution on icy roads and unfamiliar grades. This topic is expanded in the ABS section.

- ✓ Braking technique on ice differs between ABS and non-ABS vehicles
- ✓ Exercise caution installing tire chains and driving on icy roads

34.7 Trailer ABS Warning Light

Trailers with ABS have a warning light at the rear of the left side. If power comes only through the stop light circuit, the light comes on when the service brake is applied then goes out to indicate normal function. Most modern tractors supply steady power through the blue wire (centre pin) of the trailer cord when the ignition is on, so the light comes on at ignition then goes out for normal function. In either case, if the light stays on, there is a system fault. Look down the left side of the trailer when starting the ignition and occasionally when braking.

- ✓ The trailer ABS warning light is located at the rear of the left side of the trailer
- ✓ If the trailer ABS light stays on, there is a system fault
- ✓ Check the trailer ABS light when the ignition is turned on and occasionally while braking

34.8 Automatic Traction Control (ATC)

ATC is a variation of ABS using the same wheel-end sensors and computer, but the computer is enhanced to monitor wheel spin and locking. Unlike ABS modulators (which only release pressure), ATC valves have a separate air pressure delivery that can apply brakes to a spinning wheel, redirecting driveline power to axle ends with better traction. ATC valves act like electrically controlled relays. A separate ATC dash warning light shows when ATC is working and when it needs repair.

- ✓ ATC can apply the brake to a spinning wheel to redirect power to wheels with traction
- ✓ ATC uses the same wheel sensors as ABS but with an enhanced computer and separate ATC valves
- ✓ A separate ATC warning light indicates operation and faults

34.9 Stability Control Systems

Stability Control Systems are more advanced than Traction Control Systems, using the same wheel speed sensors and ATC valves but monitoring rollover and yaw (jackknife) with a computer capable of handling multiple programmed situations. Stability Control replaces and incorporates the functions of Traction Control, and its warning light replaces the ATC warning light. Drivers should not rely on brake management systems and should drive as if they do not have them.

- ✓ Stability Control monitors rollover and yaw (jackknife) in addition to wheel speed
- ✓ Stability Control replaces and incorporates Traction Control functions and its warning light
- ✓ Do not rely on brake management systems; drive as though the vehicle does not have them

CHAPTER 35

Park Control Valve Test

35.1 Park Control Valve Pop-Out Test

To test the park control valve, push the park control valve (yellow button) and pump the foot valve. Confirm the park control valve (yellow button) pops out at 20-45 PSI (138-311 kPa). After the test, reconnect both air lines to the trailer.

- ✓ Push park control valve (yellow button) and pump the foot valve during the test
- ✓ Park control valve must pop out at 20-45 PSI (138-311 kPa)
- ✓ Reconnect both air lines to the trailer after the test

CHAPTER 36

Commercial Driver's Licence Requirements: Air Brakes and Definitions

36.1 Air Brake System Definitions

An air brake system uses air pressure from an engine-driven compressor sent through hoses, reservoirs and control valves to all foundation brakes. Different systems require different endorsements: full air brakes and air-over-hydraulic require a 'Q' endorsement or Class 1; air-actuated hydraulic (air assisted, all hydraulic foundation brakes) does NOT require a 'Q' endorsement.

- ✓ Full air brakes (air to all foundation brakes) require a 'Q' endorsement or Class 1
- ✓ Air over hydraulic braking systems require a 'Q' endorsement or Class 1
- ✓ Air actuated hydraulic braking systems do NOT require a 'Q' endorsement
- ✓ No driver except a learner may operate full air brake vehicles without a Class 1 or 'Q' endorsement

36.2 Air Brake Equipped Farm Vehicles

You are not required to hold an air brake endorsement to operate a single motor vehicle registered as a farm vehicle. However, an air brake endorsement is required for a farm vehicle combination requiring a Class 1 licence. Proof of air brake qualification is needed when applying for Class 1 even for farm vehicles.

- ✓ No air brake endorsement needed for a single farm-registered motor vehicle
- ✓ Air brake endorsement required for a farm combination requiring a Class 1 licence
- ✓ Must show proof of air brake qualification when applying for Class 1

36.3 Q and S Endorsements

A 'Q' endorsement is placed on a licence when a driver completes an approved Alberta air brake course through an authorized organization. An 'S' endorsement allows Class 1, 2 or 4 holders to drive school buses transporting students after completing the School Bus Driver Improvement Program.

- ✓ 'Q' endorsement is earned by completing an approved Alberta air brake course
- ✓ 'S' endorsement is for school bus operation and requires the School Bus Driver Improvement course
- ✓ Class 1, 2 or 4 drivers may apply for the 'S' endorsement

36.4 Key Vehicle Definitions

A bus is a commercial vehicle designed for carrying 11 or more persons including the driver. A semi-trailer has axles only near its rear, is supported at the front by the tractor, and connects via kingpin and fifth wheel. A truck tractor is a truck coupled to a semi-trailer by a fifth wheel.

- ✓ A bus is designed to carry 11 or more persons including the driver
- ✓ A semi-trailer connects to the tractor by a kingpin and fifth wheel
- ✓ A truck tractor couples to a semi-trailer via a fifth wheel
- ✓ An axle is a shaft on which two or more wheels revolve

CHAPTER 37

General braking information

37.1 Proper brake application technique

Apply brakes with even pressure and ease off as the vehicle slows, releasing just before the stop to avoid jerk, then reapply to hold the vehicle stopped.

- ✓ Press the pedal with even pressure and ease off as the vehicle slows down
- ✓ Release the brakes just before the stop to avoid a sudden jerk or rebound
- ✓ Do not pump air brakes as this results in a loss of air pressure

37.2 Downhill braking and hazards

Avoid overusing brakes on downgrades; use engine compression and downshift before the hill. Test brakes before descending and respond to low air pressure warnings.

- ✓ Downshift before going over the top of the hill and use engine compression to control speed
- ✓ If there is a low air pressure warning, stop as soon as possible in a safe place and increase pressure
- ✓ Before going down a hill, test the brakes and do not proceed if there is abnormal pressure loss
- ✓ Do not overuse the trailer hand valve on steep hills as it causes unbalanced braking and can cause a jackknife
- ✓ A driver must not pull any trailer weighing more than 2,300 kg that is not equipped with driver-controlled brakes

CHAPTER 38

Railway Crossing

38.1 Suggested Approach to Stopping

When approaching a crossing: slow down, shift to a lower gear (manual transmission) and test brakes; check traffic behind and stop gradually; stop no closer than five metres and no further than 15 metres from the nearest rail; roll down the window to hear a train; look carefully in each direction around obstructions; and set park brakes while waiting.

- ✓ Stop no closer than five metres (about 16 feet) and no further than 15 metres (about 49 feet) from the nearest rail
- ✓ Slow down, shift to a lower gear and test brakes when approaching
- ✓ Roll down the window and reduce interior noise to better hear a train
- ✓ Put on park brakes while waiting so you do not roll onto the track

38.2 Resuming Travel Across Tracks

Before crossing, ensure there is enough room on the other side for the whole unit including overhang (a train is a metre wider than the rails on both sides). Use a gear that lets you cross without shifting, check signals again, and if lights begin to flash after starting, keep going rather than backing up. With multiple tracks there may be more than one train.

- ✓ Ensure enough room on the other side for the whole unit including overhang before crossing
- ✓ A train is a metre wider than the rails on both sides
- ✓ Use a gear that lets you cross without shifting
- ✓ If crossing lights begin to flash after starting, keep going — it is safer than backing up
- ✓ With more than one track, do not assume the train you see is the only one

38.3 Vehicle Stalled or Stuck on Tracks

If your vehicle stalls or gets stuck on a crossing, get out immediately. If a train is coming, move away from the track toward the oncoming train to reduce chances of being struck by flying debris. Contact the railway company at its posted emergency number or call 911.

- ✓ Get out of the vehicle immediately if stalled or stuck on a crossing
- ✓ If a train is coming, move toward the oncoming train, away from the track, to avoid flying debris
- ✓ Call the railway company's posted emergency number or 911

38.4 Viewing Tracks at a Crossing

Do not cross unless you can see far enough in both directions to be sure no train is approaching. Be especially careful at crossings without gates, lights or bells. Even with active warning signals not indicating a train, still look and listen. Be cautious at uncontrolled rural crossings at night where a train may appear as a dark object against a dark road.

- ✓ Do not cross unless you can see far enough in both directions to confirm no train is approaching
- ✓ Look and listen even when active warning signals do not indicate a train
- ✓ A train at night may appear as a black, dark object against a dark road background

38.5 Vehicle Size and Clearance at Crossings

Know your vehicle length, overhang and available space on the other side. When a STOP sign faces you across the tracks, check the room between the tracks and the sign to ensure you can fully clear. If space is insufficient and your vehicle would overhang the tracks, visually and audibly confirm no oncoming train before proceeding. Do not block a crossing for more than 20 seconds.

- ✓ Ensure enough space to completely clear the railway tracks on the other side before crossing
- ✓ If space is insufficient, visually and audibly confirm no oncoming train before proceeding
- ✓ Do not block the railway crossing for more than 20 seconds

38.6 Suggested Approach to Stopping at Crossings

When approaching a crossing, slow down, shift to a lower gear (manual), and test brakes. Check traffic behind you and stop gradually. Stop between five and fifteen metres from the nearest rail. Roll down the window and reduce noise to better hear a train, look carefully in each direction around obstructions, and set park brakes while waiting.

- ✓ Stop no closer than 5 metres (16 feet) and no further than 15 metres (49 feet) from the nearest rail
- ✓ Slow down, shift to a lower gear, and test brakes on approach
- ✓ Roll down window, reduce noise, and look in both directions around obstructions
- ✓ Set park brakes while waiting to avoid rolling onto the track

38.7 Resuming Travel Across the Tracks

Before crossing, ensure there is enough room on the other side for the whole unit including overhang (a train is a metre wider than the rails on both sides). Use a gear that lets you cross without shifting, check signals once more, and if lights begin flashing after starting, keep going rather than backing up. Remember multiple tracks may carry multiple trains.

- ✓ Ensure the whole unit including overhang can clear before crossing; a train is a metre wider than the rails
- ✓ Use a gear that lets you cross without shifting
- ✓ If crossing lights flash after you start, keep going—do not back up
- ✓ Do not assume the train you see is the only one with multiple tracks

38.8 Hazards of Crossings for Large Vehicles

Crossing railway tracks is especially hazardous for large vehicles because longer vehicles need more time to clear a crossing, heavier vehicles need more time and room to stop, and larger vehicles are more likely to derail a train in a collision.

- ✓ Longer vehicles need more time to clear a crossing
- ✓ Heavier vehicles need more room and time to stop before a crossing
- ✓ Larger vehicles are more likely to derail a train in a collision

38.9 Railway Crossings at Rural Roads

Pay extra attention at rural railway crossings because approach grades may be steeper, snow banks higher, brush and trees more common, there tend to be fewer automated warning systems, and the grade crossing may be rough or uneven.

- ✓ Rural crossings often have steeper approach grades and higher snow banks
- ✓ Rural crossings tend to have fewer automated warning systems
- ✓ The grade crossing surface may be rough or uneven

38.10 Hazards of Railway Crossings for Large Vehicles

Crossing railway tracks is especially hazardous for large vehicles because longer vehicles need more time to clear a crossing, heavier vehicles need more room to stop, and larger vehicles are more likely to derail a train in a collision.

- ✓ Longer vehicles need more time to clear a crossing
- ✓ Heavier vehicles need more room to stop before a crossing
- ✓ Larger vehicles are more likely to derail a train in a collision

38.11 Viewing the Tracks at a Crossing

Do not attempt to cross unless you can see far enough in both directions to be sure no train is approaching. Be especially careful at crossings without gates, lights or bells. Even with active signals showing no train, look and listen. Be cautious at uncontrolled rural crossings at night, where a train may appear as a dark object against a dark background.

- ✓ Do not cross unless you can see far enough both directions to confirm no train is approaching
- ✓ Look and listen even where active warning signals show no train
- ✓ Be extra cautious at uncontrolled rural crossings at night

38.12 Rural Railway Crossings Precautions

Pay extra attention at rural railway crossings because approach grades may be steeper, snow banks higher, brush and trees more common, there tend to be fewer automated warning systems, and the grade crossing may be rough or uneven.

- ✓ Rural crossings often have steeper grades, higher snow banks and more brush/trees
- ✓ Rural crossings tend to have fewer automated warning systems and rougher surfaces

CHAPTER 39

Instructor Demonstration and Pre-Trip Procedures

39.1 Safe Uncoupling and Coupling of Air Lines

When uncoupling air lines, hold a hand over the supply coupler to protect from air pressure release and potential debris. When coupling after the park control valve pops out, inspect the glad hand couplers before connecting, connect them properly, and confirm correct connection. Confirm air lines to the trailer are properly suspended and will not catch as the trailer turns.

- ✓ Hold a hand over the supply coupler when uncoupling to protect from air pressure release and debris
- ✓ Inspect glad hand couplers before connecting and confirm they are correctly connected
- ✓ Ensure trailer air lines are suspended and will not catch as the trailer turns

39.2 Automatic Slack Adjuster Adjustment Check

After completing the pre-trip, restart the engine to maintain air pressure and activate the automatic slack adjuster by applying two full service brake applications. Applications must be done with air pressure in the normal operating range, allowing one second intervals to account for brake lag. Confirm proper brake adjustment by pulling the slack adjusters on both brakes of one axle, commonly the rear trailer axle.

- ✓ Apply two full service brake applications to trigger automatic slack adjuster adjustment
- ✓ Applications must be within the normal operating pressure range with one second intervals for brake lag
- ✓ Confirm proper adjustment by pulling the slack adjusters on both brakes of one axle

CHAPTER 40

General Braking Information

40.1 Proper Brake Application Technique

Apply brakes with even pressure and ease off as the vehicle slows. Just before stopping, release the brakes to avoid a jerk or rebound, then reapply pressure to hold the vehicle when stopped. Never pump air brakes as this causes loss of air pressure.

- ✓ Apply brakes with even pressure, then ease off as vehicle slows
- ✓ Release brakes just before the stop to avoid a jerk, then reapply to hold
- ✓ Do not pump air brakes as this results in loss of air pressure

40.2 Downhill Braking and Engine Compression

Avoid using brakes too much going downhill. Downshift before going over the top of the hill and use engine compression to control speed on steep grades. Pumping brakes on a long downhill grade may leave insufficient air pressure.

- ✓ Downshift before going over the top of a hill
- ✓ Use engine compression to control speed on steep grades
- ✓ Pumping brakes on long downhill grades may leave insufficient air pressure

40.3 Low Air Pressure and Brake Testing

If a low air pressure warning occurs, stop as soon as possible in a safe place and increase air pressure before continuing. Before descending a hill, test the brakes by checking the gauge and applying brakes; do not proceed if there is abnormal pressure loss.

- ✓ Stop safely and increase air pressure if a low air pressure warning occurs
- ✓ Test brakes before going down a hill and check for abnormal air pressure loss
- ✓ Do not proceed if there is abnormal pressure loss

40.4 Trailer Hand Valve Cautions

Overuse of the trailer hand valve, especially on steep hills, may cause trailer brake failure and greater wear on trailer brakes than tractor brakes. Using only the hand valve is not recommended as it causes unbalanced braking that could cause a jackknife.

- ✓ Use of the trailer hand valve only is not recommended
- ✓ Overusing the trailer hand valve causes unbalanced braking and possible jackknife
- ✓ Brakes must be adjusted properly or some brakes work harder and may cause a skid

40.5 Trailer Brake Weight Requirement

A driver must not pull any trailer weighing more than 2,300 kg that is not equipped with brakes controlled by the driver.

- ✓ Do not pull a trailer over 2,300 kg without driver-controlled brakes

CHAPTER 41

Chapter 10: Railway Crossings

41.1 Suggested Approach to Stopping at Crossings

When approaching a crossing: slow down, downshift (manual transmission), and test brakes. Check for traffic behind and stop gradually. Stop no closer than five metres (16 feet) and no further than 15 metres (49 feet) from the nearest rail. Roll down the window and reduce noise to hear a train. Look carefully both directions around obstructions. Apply the park brakes while waiting.

- ✓ Stop no closer than 5 metres (16 feet) and no further than 15 metres (49 feet) from the nearest rail
- ✓ Roll down the window and reduce interior noise to better hear an approaching train
- ✓ Look around obstructions such as mirrors and windshield pillars in each direction
- ✓ Apply park brakes while stopped so you don't roll onto the track

41.2 Resuming Travel Across the Tracks

Before resuming: ensure enough room on the other side for the whole unit to clear, including overhang (a train is a metre wider than the rails on both sides). Use a gear that lets you cross without shifting. Recheck crossing signals. If lights start flashing after you begin, keep going—it's safer than backing up. With multiple tracks, expect more than one train.

- ✓ Ensure the entire unit including overhang can clear before starting across
- ✓ Use a gear that lets you cross without shifting
- ✓ If crossing lights begin to flash after you start, keep going—do not back up
- ✓ With more than one track there may be more than one train

41.3 Vehicle Stalled or Stuck on Tracks

If your vehicle stalls or gets stuck on a crossing, get out immediately. If a train is coming, move away from the track toward the oncoming train to reduce chances of being struck by flying debris if the train hits your vehicle. Contact the railway company (posted emergency number) or call 911.

- ✓ Get out of the vehicle immediately if stalled or stuck on tracks
- ✓ Move toward the oncoming train and away from the track to avoid flying debris
- ✓ Call the railway's posted emergency number or 911

41.4 Vehicle Size, Clearance and 20-Second Rule

Know your vehicle length, overhang, and available space on the far side. When a STOP sign faces you on the opposite side, ensure enough room to fully clear the tracks. If space is insufficient and you'd overhang the tracks, visually and audibly confirm no oncoming train first. Do not block the railway crossing for more than 20 seconds.

- ✓ Confirm there is enough clearance on the far side to completely clear the tracks
- ✓ If insufficient space, visually and audibly ensure no oncoming train before proceeding
- ✓ Do not block the railway crossing for more than 20 seconds

41.5 Controlled vs Uncontrolled Crossing Law

A controlled crossing has a flag person, stop sign, crossing gate, or an electric/mechanical signalling device—all vehicles must stop if signalled. Some vehicles must stop at ALL uncontrolled crossings: school buses, vehicles carrying explosives, and vehicles designated for flammable liquids or gas (loaded or empty). Obey any police officer or railway flag person, and be aware of municipal bylaws.

- ✓ All vehicles must stop at controlled crossings when signalled to do so
- ✓ School buses, explosive carriers, and flammable liquid/gas vehicles (loaded or empty) must stop at all uncontrolled crossings
- ✓ Obey directions of a police officer or identified railway flag person
- ✓ Municipal bylaws may add stopping requirements at any or all crossings

41.6 Hazards of Railway Crossings for Large Vehicles

Crossing railway tracks is especially hazardous for large vehicles because longer vehicles need more time and distance to clear a crossing, heavier vehicles need more room to stop, and larger vehicles are more likely to derail a train in a collision.

- ✓ Longer vehicles need more time to fully clear a crossing
- ✓ Heavier vehicles need more room and time to stop before a crossing
- ✓ Larger vehicles are more likely to derail a train in a collision

41.7 Viewing Tracks and Uncontrolled Crossings

Do not cross unless you can see far enough both directions to confirm no train is approaching. Be extra careful at crossings without gates, lights, or bells. Even with active warning signals showing no train, look and listen. At night on uncontrolled rural crossings, a train may appear as a dark object against a dark road.

- ✓ Never cross unless you can see far enough both ways to confirm no train is approaching
- ✓ Look and listen even when active signals indicate no train
- ✓ At night, a train on a rural crossing may look like a dark object against a dark road

41.8 Railway Crossings at Rural Roads

Pay extra attention at rural crossings because approach grades may be steeper, snow banks higher, brush and trees more common, there tend to be fewer automated warning systems, and the grade crossing may be rough or uneven.

- ✓ Rural crossings often have fewer automated warning systems
- ✓ Steeper grades, higher snow banks, and rough surfaces increase rural crossing risk

CHAPTER 42

Module 2: Air Brake System Fundamentals

42.1 Driver's Responsibilities

Drivers are always responsible for the performance of their brake systems. It is the driver's responsibility to ensure brakes are working correctly. Drivers must understand how the system works, perform effective vehicle inspections, ensure brakes are correctly adjusted, use brakes properly, and know how the vehicle reacts during various circuit failures.

- ✓ Drivers are always responsible for the performance of their brake systems
- ✓ Drivers must ensure brakes are correctly adjusted and perform effective vehicle inspections
- ✓ Drivers must know how the vehicle reacts during various circuit failures

42.2 Compressed Air and Pressure Measurement

Compressed air is air pressed into a smaller space than it normally occupies; the greater the compression, the greater the resistance, which multiplies over surface area to create power to apply brakes. Pressure is measured in PSI (pounds per square inch) or kPa (kilopascals). Key conversion: 1 PSI = 6.895 kPa; 1 kPa = 0.145 PSI; 1 atmosphere = 14.5 PSI = 100 kPa = 1 bar.

- ✓ Air pressure creates the power used to apply the brakes
- ✓ 1 PSI = 6.895 kPa and 1 kPa = 0.145 PSI
- ✓ 1 atmosphere = 14.5 PSI = 100 kPa = 1 bar

42.3 Air Brake Endorsement Requirement

Every jurisdiction in Canada except Nunavut requires drivers of air brake equipped vehicles to have an air brake endorsement. Air brakes differ from hydraulic in pedal feel, vehicle reaction, more gauges and controls, and require more driver involvement to ensure safe operation.

- ✓ Every jurisdiction in Canada except Nunavut requires an air brake endorsement
- ✓ Air brakes require more driver involvement to ensure the system operates properly and safely

42.4 Licence Class and Air Brake Q Endorsement

Other than a Class 1 licence, the air brake 'Q' endorsement is independent of the class of licence held (marked as code Q on Classes 2 through 7). The Class 1 licence includes the air brake endorsement but holders must still pass the Alberta Air Brake Program. Drivers of two-axle single motor vehicles registered as farm vehicles do not require an air brake Q endorsement.

- ✓ The air brake Q endorsement is marked as code Q on Classes 2 through 7
- ✓ The Class 1 licence includes the air brake endorsement but holders must still pass the program
- ✓ Two-axle single motor vehicles registered as farm vehicles do not require the Q endorsement

42.5 Compressed Air and Its Hazards

Compressed air is air pressed into a smaller space than it normally occupies; the greater the compression the greater its resistance and power. Air pressure exhausts at points usually located under the vehicle. Injury is a concern only when doing maintenance under the vehicle. Use caution draining tanks or removing fittings, and drain the system before maintenance.

- ✓ Drain the system before doing any maintenance and use caution removing fittings or hoses
- ✓ Stand clear of discharged air; be careful disconnecting charged air lines — turn head away and cover coupler

42.6 Driver Responsibilities for Brakes

Drivers are always responsible for the performance of their brake systems. They must understand how the brake system works, perform effective vehicle inspections, ensure brakes are correctly adjusted, use brakes properly, and know how the vehicle reacts during various circuit failures.

- ✓ Drivers are always responsible for ensuring brakes work correctly and are properly adjusted
- ✓ Drivers must know how the vehicle reacts during various circuit failures

42.7 Advantages of Air Brakes

Air brakes generate greater power than hydraulic brakes, are tolerant to small leaks (systems have compressors to pump more air, whereas hydraulic leaks can lead to brake failure), allow easier coupling of multiple combinations, and are proven capable, becoming more common in RVs and smaller trucks.

- ✓ Compressed air generates greater braking power than hydraulic brakes
- ✓ Air systems tolerate small leaks because compressors replenish air, while hydraulic leaks can cause brake failure

42.8 Measuring Air Pressure

Air pressure is measured in pounds per square inch (PSI) traditionally, or kilopascals (kPa) increasingly used by OEMs. European vehicles use bars (equivalent to one atmosphere). Key conversion: 1 PSI = 6.895 kPa, 1 kPa = 0.145 PSI, 1 atmosphere = 14.5 PSI = 100 kPa = 1 bar.

- ✓ 1 PSI = 6.895 kPa and 1 kPa = 0.145 PSI
- ✓ 1 atmosphere = 14.5 PSI = 100 kPa = 1 bar

42.9 Air Brake Endorsement Requirements

Every jurisdiction in Canada, except Nunavut, requires drivers of air brake equipped vehicles to have an air brake endorsement. The 'Q' endorsement is marked as a code on Classes 2-7. The Class 1 licence includes the air brake endorsement, but the holder must still pass the Alberta Air Brake Program. Two-axle single motor vehicles registered as farm vehicles do not require the 'Q' endorsement.

- ✓ Class 1 licence includes air brake endorsement but the holder must still pass the Air Brake Program
- ✓ Air brake 'Q' endorsement appears as a code on Classes 2 through 7; farm two-axle single vehicles are exempt

42.10 Air Brake Schematic Colour Coding

The supply circuit is colour-coded blue. Service brake circuits are green (primary, drive axles) and red (secondary, steering axle). The park/emergency circuit is orange. Solid colours are filled from the compressor and stay filled; dashed colours are sections controlled by the driver. Trailer air lines are red and blue.

- ✓ Supply is blue, service is red/green, park/emergency is orange
- ✓ Solid colours stay filled from the compressor; dashed colours are driver-controlled sections

42.11 Dangers of Compressed Air

Compressed air can be hazardous. Control and quick release valves exhaust forcefully when service brakes are released or park brakes applied. Air dryers purge powerfully. When disconnecting charged air lines, turn your head away and cover the coupler with a free hand. Drain tanks before doing air system work and wear PPE.

- ✓ Turn your head away and cover the coupler with a free hand when disconnecting charged air lines
- ✓ Drain air tanks and wear PPE before performing any air system work

42.12 Air Pressure Measurement

The traditional standard is pounds per square inch (PSI); OEMs may use kilopascals (kPa), which is becoming more common. European vehicles use bars (equivalent to an atmosphere). Key conversions: 1 PSI = 6.895 kPa; 1 atmosphere = 14.5 PSI = 100 kPa = 1 bar. All vehicles with air brakes have air pressure gauges in the dash.

- ✓ 1 PSI = 6.895 kPa; 1 atmosphere = 14.5 PSI = 100 kPa = 1 bar
- ✓ All air brake equipped vehicles have air pressure gauges in the dash

42.13 Schematic Colour Coding

The supply circuit is blue. Red and green circuits operate the service brakes on the tractor. The park circuit is orange. Solid colours are filled from the compressor and stay filled; dashed colours are sections controlled by the driver during applications or release. Trailer air lines are red and blue to reflect the truck air lines. Drivers are always responsible for the performance of their brake systems.

- ✓ Supply circuit is blue, service circuits are red and green, park circuit is orange
- ✓ Solid colours stay filled from the compressor; dashed colours are driver-controlled sections

42.14 Compressed Air Hazards

Compressed air can be dangerous. Points where air pressure exhausts are usually located under the vehicle. Personal injury is not a concern unless air pressure exhausts while doing maintenance under the vehicle. Use caution when draining air pressure from tanks or removing fittings and hoses, and drain the system before doing any maintenance.

- ✓ Use caution when draining tanks or removing fittings and hoses
- ✓ Drain the air system before doing any maintenance
- ✓ Air dryers purge powerfully and can be hazardous

42.15 Driver's Responsibility for Brakes

Drivers are always responsible for the performance of their brake systems. They must understand how the brake system works, perform effective vehicle inspections, ensure brakes are correctly adjusted, use the brakes properly, and know how the vehicle reacts during various circuit failures.

- ✓ Drivers are always responsible for the performance of their brake systems
- ✓ Drivers must ensure brakes are correctly adjusted before putting the vehicle into service
- ✓ Every jurisdiction in Canada except Nunavut requires an air brake endorsement

42.16 Recognizing Air Brakes

Most air brake equipped vehicles have readily accessible air tanks and chambers, though some vehicle bodies (fire trucks, motor homes) make them hard to see. All vehicles with air brakes have air pressure gauges in the dash.

- ✓ All vehicles with air brakes have air pressure gauges in the dash
- ✓ Air tanks and chambers indicate an air brake equipped vehicle

42.17 Air Brake Endorsement and Licence Classes

Other than the Class 1 licence, the air brake Q endorsement is independent of the class of licence held and is marked as code Q on Classes 2 through 7. The Class 1 licence includes the air brake endorsement. Holders of a Class 1 licence must still pass the Alberta Air Brake Program. Drivers of two-axle single motor vehicles registered as farm vehicles do not require the Q endorsement.

- ✓ The air brake endorsement is marked as code Q on Classes 2 through 7
- ✓ The Class 1 licence includes the air brake endorsement but holders must still pass the program
- ✓ Two-axle single motor farm vehicles do not require the Q endorsement

42.18 Air Brake Circuit Colour Coding

The air brake schematic uses colour coding: the supply circuit is blue; service brake circuits use green (primary, drive axles) and red (secondary, steering axle); the park/emergency circuit is orange. Solid colours are filled from the compressor and stay filled; dashed colours are sections controlled by the driver during applications. Trailer air lines are red and blue to reflect truck air lines.

- ✓ Supply circuit is blue, park/emergency circuit is orange
- ✓ Service brakes use green for drive axles (primary) and red for steering axle (secondary)
- ✓ Solid colours stay filled from the compressor; dashed colours are driver-controlled sections

CHAPTER 43

Module 6: Trailer Air Systems

43.1 Trailer Brakes Operate Like Power Units

Service and park brakes operate the same on trailers as on power units, and relays and control lines also work the same. Air pressure is provided by the tow vehicle, so the trailer has no supply circuit.

- ✓ Trailer service and park brakes operate the same as on power units
- ✓ The trailer has no supply circuit; air is provided by the tow vehicle

43.2 Glad Hand Coupler Inspection

Glad hand couplers connect the air supply and brake signal lines to the trailer. They must be fully inspected before connecting; soft or degraded seals leak, and damaged couplers may not press together. Drivers should carry spare seals; the thick side goes into the coupler.

- ✓ Inspect glad hand couplers and seals before connecting; soft or damaged seals leak
- ✓ When replacing seals, the thick side goes into the glad hand coupler

43.3 Tractor Protection System Components

The tractor's protection system has two components: the trailer air supply valve (red button) controlling the supply line, and the tractor protection valve which uses supply line pressure to open the service line. Enforcement officers check both during CVSA Level 1 inspections; failure means out-of-service.

- ✓ The tractor protection system consists of the trailer supply valve and the tractor protection valve
- ✓ If the trailer supply valve does not work properly, the vehicle is placed out-of-service

43.4 Two-Button vs Three-Button Systems

Pulling the yellow park control valve activates all spring park brakes. In two-button systems, the red trailer supply valve pops out when yellow is pulled. Drivers often hold the red button in while pulling yellow to keep trailer brakes released and prevent linings freezing to drums.

- ✓ Pulling the yellow park control valve activates all vehicle spring park brakes
- ✓ In the two-button system, the red button pops out automatically when the yellow button is pulled
- ✓ Holding the red button while pulling yellow keeps trailer brakes released to prevent frozen linings

43.5 Service Couplers and Hand Valve

Service couplers are marked 'Service' or 'S' and traditionally connect to the passenger side. Hand valves send control air through the trailer service (blue) line to the trailer relays. Hand valves apply only the trailer service brakes and are not to be used for parking.

- ✓ Service couplers are marked 'Service' or 'S' and connect to the passenger side
- ✓ The hand valve applies only the trailer service brakes and must not be used for parking

43.6 Air Pressure Park Brake Trailers

Older air pressure park brakes supply service tank air to the service chambers, creating a very powerful emergency brake twice as strong as spring park brakes, but with increased lockup risk. The problem is they do not stay on—as air drains, brakes release. Trailers must be chocked when uncoupled.

- ✓ Air pressure park brakes release as air drains out and do not stay applied
- ✓ Air park brake trailers must be chocked when uncoupled to prevent them from moving
- ✓ Trailers must be charged with air and park/service brakes applied before coupling

43.7 Trailer Air Supply from Tow Vehicle

Service and park brakes, relays, and control lines operate the same on trailers as on power units. Air pressure is provided by the tow vehicle, so the trailer has no supply circuit of its own.

- ✓ Trailers have no supply circuit; air pressure is provided by the tow vehicle
- ✓ Service and park brakes on trailers operate the same as on power units
- ✓ Two air lines connect to the trailer: the air supply and the brake signal

43.8 Tractor Protection System

The tractor's protection system has two components: the trailer supply valve (red button) controlling the supply line, and the tractor protection valve using supply line pressure to open the service line. Enforcement checks both parts.

- ✓ The tractor protection system has two components: trailer supply valve and tractor protection valve
- ✓ If the trailer supply valve does not work properly, the vehicle is placed out-of-service
- ✓ During inspection, both lines are removed; when red button trips, the service line should not leak

43.9 Two-Button and Three-Button Systems

In two-button systems the red trailer supply valve automatically pops out when the yellow park control valve is pulled. Drivers often hold the red button in while pulling yellow to keep trailer brakes released in cold weather to prevent freezing to drums.

- ✓ In two-button systems, the red button pops out automatically when the yellow button is pulled
- ✓ Holding red in while pulling yellow keeps trailer brakes released to prevent freezing onto drums
- ✓ Pulling the yellow park control valve activates all spring park brakes on the vehicle

43.10 Foot Valve vs Hand Valve Application

Applying the foot brake activates both tractor and trailer service brakes together. The hand valve applies only the trailer service brakes.

- ✓ The foot valve activates both tractor and trailer service brakes
- ✓ The hand valve applies only the trailer service brakes
- ✓ Pressing the red trailer dash valve charges the trailer tanks and releases park brakes

43.11 Air Park Brake Dangers

Air pressure park brakes on older trailers act as a powerful emergency brake (twice as strong as spring park brakes) but do not stay on—they release as air drains out. This requires special operating procedures.

- ✓ Air pressure park brakes are twice as powerful as spring park brakes and risk brake lockup
- ✓ Air park brakes release as air pressure drains out of the system
- ✓ Trailers must be chocked when uncoupled and charged with brakes applied before coupling

43.12 Preventing Trailer Valve Contamination

Trailer air valves are expensive and must be kept clean. Dirt from bobtails migrates into trailer valves. A quick discharge of air pressure before connecting helps blow out contamination. Leave couplers open, pull the hand valve, hold the red dash valve in, then release both and connect.

- ✓ Discharge air pressure before connecting glad hand couplers to blow out contamination
- ✓ Keep trailer air valves clean to prevent expensive contamination damage

43.13 Supply (Emergency) Couplers

All supply couplers have the word 'Emergency' or a large 'E' on them and typically couple to the left (driver) side by convention. The air pressure supplying the trailer tanks comes from the higher of the two tractor service tanks.

- ✓ Supply couplers are marked 'Emergency' or 'E' and typically couple to the driver side
- ✓ Trailer supply air comes from the higher of the two tractor service tanks

43.14 Spring Park Brake Requirement on Trailers

Prior to 1976, trailers used air park brakes, still found on some converter dollies and heavy hauling equipment. As of January 1, 1976, Section 121 of the Canadian Motor Vehicle Safety Standards (CMVSS) requires spring park brakes on trailers.

- ✓ Since January 1, 1976, CMVSS Section 121 requires spring park brakes on trailers
- ✓ Air park brakes are still used on most converter dollies and some heavy hauling equipment

43.15 Service (Blue) Couplers and Hand Valve

Service couplers say Service or have a large S and traditionally connect to the passenger side. The hand valve sends control air through the trailer service (blue) line to the trailer relays and applies only the trailer service brakes.

- ✓ Service couplers are marked Service or S and traditionally connect to the passenger side
- ✓ The hand valve applies only the trailer service brakes
- ✓ The hand valve is not to be used for parking

43.16 Older Air Park Brake Trailers

Prior to 1976, trailers used air park brakes; this system remains on many converter dollies and specialized heavy-haul equipment. As of January 1, 1976, CMVSS Section 121 requires spring park brakes on trailers.

- ✓ As of January 1, 1976, CMVSS Section 121 requires spring park brakes on trailers
- ✓ Air park brakes are still used on most converter dollies and some heavy-haul equipment
- ✓ Any tractor can pull any trailer because air system communications are the same

CHAPTER 44

Module 10: Vehicle Inspections

44.1 Commercial Vehicle Safety Regulation Inspection Requirements

The Commercial Vehicle Safety Regulation of the Traffic Safety Act describes requirements for commercial vehicles. Sections 9 through 16 outline vehicle inspection requirements. Section 10 covers the vehicle trip inspection valid for 24 hours, and Section 12 provides requirements for completing trip inspection reports. Beyond regulatory minimums, industry best practice is to inspect vehicles before, during and after each trip, as each inspection has a different purpose.

- ✓ A daily vehicle Trip Inspection Report is valid for 24 hours (Section 10)
- ✓ Sections 9-16 of the Commercial Vehicle Safety Regulation cover inspection requirements
- ✓ Inspect the vehicle before, during and after each trip
- ✓ Any new equipment added must be inspected and recorded on the Trip Inspection Report before use

44.2 Major vs Minor Defects

Minor defects must be reported before the next required inspection, and the vehicle may continue to be driven. Major defects require the vehicle to be placed out-of-service immediately, even in the middle of a driver's shift. If any system failures affect braking ability, the vehicle must be placed out-of-service until proper repairs are made.

- ✓ Minor defects: report before the next required inspection; vehicle may keep operating
- ✓ Major defects: place the vehicle out-of-service immediately, even mid-shift
- ✓ Any braking-related system failure requires the vehicle to be out-of-service until repaired

44.3 Air Brake Pre-Trip and System Check Procedure

There is no mandatory order for a vehicle trip inspection, but every driver must incorporate the air brake pre-trip into their normal inspection process. The recommended practical sequence starts with air tanks full, cycles pressure down with the tractor protection system check, back up with the air supply circuit check, then tests for leaks with the system full again.

- ✓ Every driver must include the air brake pre-trip in their normal trip inspection
- ✓ There is no mandatory order for a trip inspection
- ✓ Recommended sequence: full tanks, tractor protection check, air supply circuit check, then system leak test

44.4 Tractor Protection System Check

The tractor protection system is checked in two parts: the trailer air supply valve (red button) with the service line open during a service brake application, and the park control valve (yellow button - not part of the tractor protection system but inspected together for efficiency). If the trailer supply valve trips immediately after air lines separate, return to the cab and firmly apply the foot valve to confirm the tractor protection valve closed the trailer service line. When disconnecting a live air line, place your hand between the glad hand couplers and your face to prevent debris being blown into the face, and wear proper PPE.

- ✓ The trailer air supply valve is the red button; the park control valve is the yellow button
- ✓ The park control valve is NOT part of the tractor protection system but is inspected with it
- ✓ When disconnecting a live air line, keep your hand between the couplers and your face and wear PPE
- ✓ Confirm the tractor protection valve closed the trailer service line by firmly applying the foot valve

44.5 Push Rod, Clevis Pin and Chamber Failures

Broken push rods prevent both service and park applications from delivering brake power; they are not always obvious and must be looked at directly. Clevis pin failures occur when cotter pins shear and the clevis pin works out; brakes fail when the clevis fully separates. Separated brake chambers deliver no application at the foundation brake. Loose brake chambers reduce force through chamber deflection - inspect mounting fasteners and brackets. A corroded park spring chamber is extremely dangerous because the compressed park spring can escape with tremendous force; any corrosion or damage in chambers or clamp rings must be repaired immediately by certified heavy equipment technicians.

- ✓ Push rods must be looked at directly since broken push rods are not always obvious
- ✓ A broken push rod prevents both service AND park applications
- ✓ Corroded/damaged brake chambers can violently release the park spring and must be repaired immediately by certified technicians
- ✓ Inspect chamber mounting fasteners and brackets for loose chambers

44.6 Brake Lining and Drum Failures

Brake lining failure reduces friction surface area and brake force. Extremely worn linings can cause a 'cammed over' condition where the lining becomes so thin that rollers pass the largest radius of the s-cam lobes, making brakes ineffective. CVSA standards require at least 1/4 inch (7 mm) lining thickness. Cracked drums result from repeated overheating and cooling; cracks start on the friction surface and work outward, then centrifugal force widens them until the drum separates - separated pieces become dangerous projectiles while the vehicle is moving.

- ✓ CVSA standards require at least 1/4 inch (7 mm) of lining thickness
- ✓ 'Cammed over' occurs when linings are so thin the rollers pass the largest s-cam radius, making brakes ineffective
- ✓ Cracked drums start cracking on the friction surface and can separate into dangerous projectiles

44.7 In-Service and En-Route Brake Checks

In-service brake checks examine brake systems monitored while the vehicle is in motion. The en-route inspection is ideally done every few hours to confirm the vehicle can remain in service. End-of-shift inspections are important for the success of the following shift. Brake check pullouts have white information signs (all white signs are requirements) advising what to inspect and information about the grade ahead.

- ✓ Perform en-route (in-service) inspections ideally every few hours
- ✓ All white signs are requirements
- ✓ Brake check pullouts provide inspection and grade information

44.8 Low Air Warning and Park Control Valve Checks

The low air pressure warning light is checked by pushing in the yellow park control valve and reducing air pressure until the yellow button pops out. Sometimes the yellow park control valve pops out below 20 PSI (138 kPa), even in new vehicles. Ensure the park control valve is popped out to its default position before the tanks are emptied.

- ✓ Low air warning device is checked as pressure drops until the yellow park control valve pops out
- ✓ The yellow park control valve may pop out below 20 PSI (138 kPa)
- ✓ Ensure the park control valve pops to default position before air tanks are empty

44.9 Air Supply Circuit and System Leak Checks

The air supply circuit inspection includes the air compressor, governor, and low air pressure warning device. The system leaks procedure checks the entire air brake system for pressure leaks in one operation; if leaks are found, they must be isolated by subsystem. The only air line not filled during the leak procedure is the control line from the hand valve to the double check valve (on vehicles equipped with hand valves).

- ✓ The air supply circuit check covers the compressor, governor, and low air warning device
- ✓ The system leak check covers the whole system at once; located leaks are isolated by subsystem
- ✓ The hand-valve-to-double-check-valve control line is the only line not filled during the leak test

44.10 Oil Saturation and Slack Adjuster Failures

Oil saturation is caused by leaking wheel seals. Oil leaking while moving streaks in radius lines around the inner sidewall of the inner tire; oil leaking while parked drains down the inner sidewall and puddles on the ground. Slack adjuster failures can occur when a retaining snap ring separates from the s-cam shaft end and the slack adjuster works off the splines - brakes apply normally until the moment it separates, after which there is no foundation brake application.

- ✓ Leaking wheel seals cause oil saturation, streaking radially or puddling on the ground
- ✓ A separated s-cam retaining snap ring lets the slack adjuster work off the splines
- ✓ When a slack adjuster separates, there is no foundation brake application afterward

44.11 Air Line and Hose Defects

Chaffed air lines result from lines rubbing on nearby parts; chaffing causes no performance loss until the hose ruptures, causing circuit failure. Hose bulges (from internal failure or chaffing) will rupture and cause circuit failure. Kinked plastic air lines are permanently damaged and must be replaced; a kinked rubber line can suffer internal damage leading to bulging. Fittings from different systems are not compatible and must never be mixed - use the correct fitting system for the hose. Blocking off air lines to a failed component reduces braking capacity and is never acceptable; the vehicle must be placed out-of-service.

- ✓ A kinked plastic air line is permanently damaged and must be replaced
- ✓ Never mix incompatible fitting systems; use the fitting designed for the hose
- ✓ Blocking off air lines to a failed component is never acceptable - place the vehicle out-of-service
- ✓ Chaffed or bulging hoses will eventually rupture and cause a circuit failure

44.12 Loose Air Tank Inspection

A loose air tank does not cause a failure until it separates from the circuit it supplies, which then causes an immediate circuit failure. During inspection, push on each end of the air tanks to confirm they are securely mounted.

- ✓ Push each end of an air tank to confirm it is securely mounted
- ✓ A separated air tank causes an immediate circuit failure

CHAPTER 45

Supply Circuit Test

45.1 Compressor Build-Up and Governor Tests

To test the supply circuit, start the engine and run at a fast idle around 1200 RPM. Perform the compressor build-up test; pressure must build from 50 to 90 PSI (345 to 621 kPa) within 3 minutes. Build air pressure to maximum to confirm the governor cut-out is at 120-135 PSI (828-931 kPa). Pump service brakes to reduce air pressure until the governor cuts in; confirm the cut-in is 20-25 PSI (138-172 kPa) less than the cut-out pressure.

- ✓ Engine run at fast idle around 1200 RPM for supply circuit tests
- ✓ Compressor build-up must go from 50 to 90 PSI (345 to 621 kPa) within 3 minutes
- ✓ Governor cut-out must be at 120-135 PSI (828-931 kPa)
- ✓ Governor cut-in must be 20-25 PSI (138-172 kPa) less than cut-out pressure

CHAPTER 46

Program Documents

46.1 Notice of Program Completion

The Notice of Air Brake Program Completion is issued after successful completion of the classroom session, practical training session, and practical test. It authorizes Registry Agents to provide the knowledge test. The original is presented to a Registry Agent with government issued photo ID. Tampered forms will not be accepted. It has an audit control number monitored by Alberta Transportation.

- ✓ The Completion form authorizes the Registry Agent to administer the knowledge test and requires government photo ID
- ✓ Forms that appear tampered with will not be accepted; the form has an audit control number

46.2 Student Record Retention

All student records must be retained for a minimum of two years. The completed Air Brake Student Record form(s), Air Brake Practical Test form(s), and the training school/agency copy of the Notice of Air Brake Program Completion form must be filed together in the student file. Documents must be available for inspection by Alberta Transportation.

- ✓ Student records must be retained for a minimum of two years
- ✓ Student Record, Practical Test forms, and the agency copy of the Completion form must be filed together

CHAPTER 47

Coupling and uncoupling a truck-tractor and semi-trailer

47.1 Coupling procedure steps

Coupling requires chocking the trailer, checking the fifth wheel jaws are open, inspecting components, backing to match heights, connecting air, and verifying a solid hook-up.

- ✓ Chock the semi-trailer wheel; with one chock place it to the rear, with two place one front and one rear
- ✓ Check that the fifth wheel jaws are in the unlocked (open) position
- ✓ Check the semi-trailer apron, king pin and collar for excessive wear or cracks
- ✓ Connect air lines and fill trailer air tanks if the trailer lacks spring brakes on at least one axle
- ✓ Perform a firm tug test to ensure a good hook-up and correct any noticeable slack
- ✓ Visually check that the fifth wheel jaws are properly locked around the king pin
- ✓ Raise the landing gear, hook up the electrical line, and remove wheel chocks

47.2 Uncoupling procedure steps

Uncoupling requires parking in a straight line, setting brakes, chocking wheels, lowering landing gear, disconnecting lines, unlocking the fifth wheel, and slowly pulling clear.

- ✓ Park truck-tractor and semi-trailer in a straight line and set the park brakes
- ✓ Chock the semi-trailer wheel; with one chock place it to the front
- ✓ Lower the landing gear before disconnecting
- ✓ Disconnect electrical and air lines and unlock the fifth wheel
- ✓ Move ahead slowly until the fifth wheel clears the trailer, checking ground and landing gear support the trailer

47.3 Pintle hitch coupling and uncoupling

Pintle hitch attachments have specific coupling and uncoupling steps involving safety cables, pins, and the pintle hook locking mechanism.

- ✓ Park in a straight line, set parking brakes on power unit and trailer, and chock trailer wheels
- ✓ Ensure pintle hook and eye have no cracks or excessive wear before coupling
- ✓ Snap pintle hook shut and ensure the safety latch is locked
- ✓ Properly attach safety cables/chains and fasten safety pin if applicable
- ✓ If equipped with a 'no-slack ram', charge the air system and do a tug test to ensure the ram is energized
- ✓ The most important task is to physically and visually check all connections

CHAPTER 48

Know the Law — Railway Crossings

48.1 Controlled Crossings

A controlled crossing has a flag person, stop sign, crossing gate, or an electric or mechanical signalling device. All vehicles are required to stop at controlled railway crossings if signalled to do so.

- ✓ A controlled crossing has a flag person, stop sign, crossing gate, or electric/mechanical signalling device
- ✓ All vehicles must stop at controlled crossings if signalled to do so

48.2 Uncontrolled Crossings — Mandatory Stops

Some vehicles are required by law to stop at all uncontrolled railway crossings: school buses; vehicles carrying explosives as cargo or part of cargo; and vehicles designated for carrying flammable liquids or gas, whether loaded or empty. Obey any police officer or identified railway flag person, and be aware municipalities may have additional bylaws.

- ✓ School buses must stop at all uncontrolled railway crossings
- ✓ Vehicles carrying explosives must stop at all uncontrolled crossings
- ✓ Vehicles designated for flammable liquids or gas must stop whether loaded or empty
- ✓ Obey police officers or identified railway flag persons and be aware of municipal bylaws

CHAPTER 49

Coupling and Uncoupling a Truck-Tractor and Semi-Trailer

49.1 Coupling Procedure Steps

Coupling involves chocking the wheel, checking fifth wheel jaws are unlocked, inspecting apron/king pin/collar, backing in line and stopping before contact, matching heights, connecting air lines (if no spring brakes), setting trailer brakes, backing to connect, and performing a firm tug test.

- ✓ Chock the semi-trailer wheel; one chock goes to the rear, two go front and rear
- ✓ Check fifth wheel jaws are in the unlocked (open) position before backing
- ✓ Stop before contact between the fifth wheel and trailer apron and check heights match
- ✓ Perform a firm tug test to ensure a good hook-up
- ✓ Set the semi-trailer brakes before backing to connect

49.2 Coupling Final Checks

After coupling, visually check that the fifth wheel jaws are properly locked around the trailer king pin, raise the landing gear, hook up the electrical line, and remove wheel chocks. Some older trailers may not have spring brakes.

- ✓ Visually check fifth wheel jaws are properly locked around the king pin
- ✓ Raise the landing gear and hook up the electrical line
- ✓ Remove wheel chocks after coupling is complete

49.3 Uncoupling Procedure Steps

Uncoupling involves parking straight and setting park brakes, chocking wheels, lowering landing gear, disconnecting electrical/air lines, unlocking the fifth wheel, securing lines to the tractor, moving forward slowly to clear the fifth wheel, verifying ground/landing gear support, and moving forward to fully clear.

- ✓ Park the truck-tractor and semi-trailer in a straight line and set park brakes
- ✓ Chock semi-trailer wheels before uncoupling
- ✓ Disconnect electrical and air lines and unlock the fifth wheel
- ✓ Check the ground and landing gear support the semi-trailer before fully pulling out

49.4 Most Important Coupling Task

The most important task in the coupling procedure is to physically and visually check all connections. Failure to do so may cause a serious incident.

- ✓ Physically and visually check all connections
- ✓ Failure to check connections may cause a serious incident

49.5 Pintle Hitch Coupling and Uncoupling

Pintle hitch procedures require setting parking brakes, chocking wheels, disconnecting/connecting air lines, electrical and hoses, handling safety cables/chains and safety pin, and operating the pintle hook safety latch. Ensure the pintle hook and eye have no cracks or excessive wear.

- ✓ Set parking brakes on the towing unit and trailer and chock trailer wheels
- ✓ Ensure pintle hook and eye have no cracks or signs of excessive wear
- ✓ Snap pintle hook shut and ensure the safety latch is locked
- ✓ Properly attach safety cables/chains and fasten safety pin if applicable
- ✓ If equipped with a no-slack ram, do a tug test to ensure the ram is energized

CHAPTER 50

Chapter 10: Fire and Fire Extinguishers

50.1 Bus Fire Evacuation Distance

If carrying passengers on a bus and you discover a fire or danger of fire, stop immediately in a safe location, get passengers off the bus, and move them to a safe spot at least 35 metres (115 feet) from the vehicle. Portable fire extinguishers are carried in the driver's compartment of most commercial vehicles.

- ✓ Move passengers at least 35 metres (115 feet) away from a bus fire
- ✓ Stop immediately in a safe location and evacuate passengers
- ✓ Portable extinguishers are typically kept in the driver's compartment

50.2 Fire Extinguisher Operation and Limits

Do not try to fight a fire beyond your capability or the extinguisher's. Depending on type and size, you have only eight to ten seconds of chemical discharge. Basic use: remove from bracket, pull the safety pin (breaking the seal), approach from upwind if possible, and hold upright.

- ✓ Do not fight a fire beyond your or the extinguisher's capability
- ✓ Extinguishers provide only 8 to 10 seconds of chemical discharge
- ✓ Approach the fire from upwind and hold the extinguisher upright

50.3 The PASS Method

Remember PASS: PULL the pin and point the nozzle away from you; AIM low and direct at the base of the fire; SQUEEZE the handle slowly and evenly until the fire is out or the extinguisher is empty; SWEEP side-to-side, starting at one side and working across—do not start in the middle of the fire.

- ✓ P-Pull the pin; A-Aim low at the base of the fire
- ✓ S-Squeeze the handle slowly and evenly; S-Sweep from side to side
- ✓ Aim at the base of the fire, not the flames, and do not start in the middle

50.4 Fire Prevention Tips

To prevent vehicle fires: never start a vehicle with a fuel leak (repair it and absorb spills); shut off the engine when refueling; touch the fuel nozzle to the filler pipe to ground it and prevent static sparks; don't smoke near fueling areas; check tire pressure often (soft tires build heat); and ensure brakes are fully released when moving (dragging brakes ignite hub grease).

- ✓ Never start a vehicle with a fuel leak; repair and absorb the spill first
- ✓ Ground the fuel nozzle against the filler pipe to prevent static sparks
- ✓ Soft/under-inflated tires build heat and can cause a fire
- ✓ Dragging brakes generate heat that can ignite grease in the hubs

50.5 After Extinguishing a Fire

Once the fire is out: replace the safety pin and return the extinguisher to its storage compartment. Note on the post-trip inspection that the extinguisher has been used, and have it recharged immediately or replaced.

- ✓ Note extinguisher use on the post-trip inspection
- ✓ Have a used extinguisher recharged immediately or replaced

CHAPTER 51

Module 3: Supply Circuit

51.1 Compressor Performance Standard

Compressor performance should build air pressure from 50 to 90 PSI (345 to 621 kPa) within 3 minutes with the engine running at 1200 RPM (vehicles normally reach this in a minute to a minute and a half). Reasons for slow air pressure build-up include a plugged intake, excessive system leakage, and a faulty or worn compressor.

- ✓ Compressor must build air pressure from 50 to 90 PSI (345 to 621 kPa) within 3 minutes at 1200 RPM
- ✓ Slow air pressure build-up can be caused by plugged intake, excessive system leakage, or a faulty/worn compressor

51.2 Governor Function and Settings

The governor controls the compressor as needed to maintain air pressure. It cuts out at 120–135 PSI (828–931 kPa) and cuts in approximately 20–25 PSI (138–172 kPa) less than cut-out. It is generally mounted on the top or side of the compressor head, but can be remote or incorporated in an AD-IS (Air Dryer Integrated Solution) unit.

- ✓ The governor cuts out at 120–135 PSI (828–931 kPa)
- ✓ The governor cuts in approximately 20–25 PSI (138–172 kPa) less than cut-out
- ✓ The governor controls the compressor to maintain air pressure between cut-in and cut-out

51.3 Air Compressor Function

The air compressor pressurizes air and pumps it into storage tanks. It can be a single or multiple piston pump, is often installed on the left side of the engine, and is driven directly by the internal gearing of the engine.

- ✓ The air compressor pressurizes air and pumps it into storage tanks
- ✓ The compressor is driven directly by the internal gearing of the engine
- ✓ Compressors can be single or multiple piston pumps

51.4 Supply Circuit Components

The supply circuit compresses and cleans air, maintains consistent air pressure, and protects from over-pressure. Components include the air compressor, governor, supply tank, drain valve, safety valve, and air dryer (moisture and contamination controls). It is colour-coded blue.

- ✓ Supply circuit components: air compressor, governor, supply tank, drain valve, safety valve, air dryer
- ✓ The supply circuit compresses and cleans air, maintains consistent pressure, and protects from over-pressure

51.5 Compressor Performance Standards

Air pressure must build from 50 to 90 PSI (345 to 621 kPa) within 3 minutes with the engine running at 1200 RPM — a generous allowance, as vehicles normally reach this in about a minute to a minute and a half. Slow build-up reasons include plugged intake, excessive system leakage, or a faulty/worn compressor.

- ✓ Build air pressure from 50 to 90 PSI within 3 minutes at 1200 RPM
- ✓ Slow build-up causes: plugged intake, excessive system leakage, or a faulty/worn compressor

51.6 Governor Function

The governor controls the compressor as needed to maintain air pressure. It cuts out at 120-135 PSI (828-931 kPa) and cuts in approximately 20-25 PSI (138-172 kPa) less than cut-out. It is generally mounted on the compressor head or incorporated into an AD-IS (Air Dryer Integrated Solution).

- ✓ Governor cuts out at 120-135 PSI and cuts in about 20-25 PSI below cut-out
- ✓ The governor controls the compressor to maintain air pressure

51.7 Air Compressor Operation

The air compressor pressurizes air and pumps it into storage tanks. It is a single or multiple piston pump, often installed on the left side of the engine, and is driven directly by the internal gearing of the engine.

- ✓ The air compressor is driven directly by the engine and pumps air into storage tanks
- ✓ Compressors can be single or multiple piston pumps

51.8 Air Pressure Build-Up Standard

A vehicle should build from 50 to 90 PSI (345 to 620 kPa) within 3 minutes with the engine at 1200 RPM; this is a generous allowance and vehicles normally reach it in a minute to a minute and a half.

- ✓ Air pressure should build from 50 to 90 PSI within 3 minutes at 1200 RPM
- ✓ Vehicles normally build this pressure in about one to one and a half minutes

51.9 Air Compressor

The air compressor is directly driven from the internal gearing of the engine and can be either single or multiple piston pumps. It creates the compressed air for the system.

- ✓ The air compressor is directly driven from the engine's internal gearing
- ✓ Compressors can be single or multiple piston pumps

51.10 Governor Function and Location

The governor controls compressor loading and is generally mounted on the top or side of the compressor head but can be mounted remotely. If the vehicle has an Air Dryer Integrated Solution (AD-IS), the governor is incorporated there. It uses a control line from the supply tank.

- ✓ The governor is generally mounted on or near the compressor head or may be remote/integrated in an AD-IS
- ✓ The governor uses a control line from the supply tank to control the compressor

51.11 Compressor Performance and Buildup

Compressor performance should build air pressure from 50 to 90 PSI (345 to 621 kPa) within 3 minutes with the engine at 1200 RPM; vehicles normally reach this in a minute to a minute and a half. Reasons for slow air pressure build-up include a plugged intake, excessive system leakage, and a faulty or worn compressor.

- ✓ Air pressure must build from 50 to 90 PSI within 3 minutes at 1200 RPM
- ✓ Slow build-up may be caused by plugged intake, excessive leakage, or a faulty compressor

51.12 Governor Cut-Out and Cut-In

The governor controls the compressor as needed to maintain air pressure. It cuts out at 120-135 PSI (828-931 kPa) and cuts in approximately 20-25 PSI (138-172 kPa) less than cut-out. It is generally mounted on the top or side of the compressor head, or incorporated into an AD-IS (Air Dryer Integrated Solution) unit.

- ✓ The governor cuts out at 120-135 PSI (828-931 kPa)
- ✓ The governor cuts in approximately 20-25 PSI below cut-out pressure
- ✓ The governor controls the compressor to maintain air pressure

CHAPTER 52

Module 7: System Failures

52.1 Supply Circuit Failure

A supply circuit failure can be anything from a plugged/collapsed line to a ruptured supply tank. It is recognized by the air pressure gauges not replenishing when pressure drops below the governor cut-in level. All brakes work properly but are limited by available service tank air.

- ✓ A supply failure is recognized by gauges not replenishing below governor cut-in level
- ✓ Brakes still work but are limited by air remaining in the service tanks

52.2 Primary Circuit Failure

In a primary circuit failure, spring park brakes remain released using secondary circuit air. A service application applies steering axle and trailer brakes. An inversion valve releases controlled park brake air to apply the drive axle foundation brakes gradually. Use a steady brake application to stop.

- ✓ In a primary failure, park brakes stay released using secondary circuit air
- ✓ The inversion valve modulates park springs to brake the drive axle in a controlled manner
- ✓ Use a steady brake application when a gauge drops or the low air alarm activates

52.3 Secondary Circuit Failure

In a secondary circuit failure, park brakes remain released using primary circuit air. This is the only tractor air system failure causing a service circuit's brakes not to work during application—the steering axle brakes will not apply.

- ✓ In a secondary failure, park brakes stay released using primary circuit air
- ✓ The secondary failure is the only tractor failure where a service application won't work — steering axle brakes will not apply

52.4 Park and Emergency Circuit Failure

A park circuit failure causes both service circuits to lose air pressure. Spring park brakes are only half as strong as a full service application; lockup depends on vehicle weight, application sharpness, and traction. ABS only operates on service circuits and won't help. Apply a steady service application and expect springs to apply around 55-60 PSI.

- ✓ A park circuit failure causes both service circuits to lose air pressure
- ✓ Spring park brakes are only half as strong as a full service application
- ✓ ABS only operates on service circuits and will not assist in a park circuit failure

52.5 Trailer Service Line Failure

A trailer service line failure is very dangerous—a Super-B at 63,500 kg has braking reduced to that of a 22,500 kg straight truck, dramatically increasing braking distance. Use a steady service application, release around 70 PSI (483 kPa) to rebuild air, and continually downshift. If the trailer must stop quickly, pull the trailer air supply valve (red button).

- ✓ A trailer service line failure dramatically increases braking distance
- ✓ Release the service application around 70 PSI (483 kPa) to allow air to rebuild
- ✓ If trailer service brakes fail and a quick stop is needed, pull the trailer air supply valve

52.6 Trailer Emergency Line Failure

When the emergency line ruptures, all trailer control is lost. The tractor's protection system activates and trailer emergency brakes apply. Trailer axle lockup depends on weight, application rate, and traction. If the trailer loses traction it swings—typically to the right due to pavement crown, or outside in a turn from centrifugal force.

- ✓ An emergency line rupture triggers the tractor protection system and applies trailer emergency brakes
- ✓ A trailer losing traction typically swings right due to pavement crown
- ✓ Proper air line security during coupling and inspections is critical to prevent this failure

52.7 Reversed Air Lines

Polarized glad hand couplers in good shape cannot be reversed. Reversing lines on spring brake trailers won't release the park brakes. On older air park brake trailers, reversed lines with an empty tank means no service or park brakes, and repeated applications cause park brakes to drag.

- ✓ Park brakes will not release on spring brake trailers if lines are reversed
- ✓ Reversed lines on older air park brake trailers can cause brakes to drag as air accumulates

52.8 Verifying Trailer Charge After Coupling

After coupling, the driver monitors air gauges for expected pressure loss when pushing in the red trailer air supply valve. If gauges do not drop, the trailer tanks are already full or the lines are reversed. Charge the trailer system during pre-trip and en-route inspections to catch leaks.

- ✓ Air pressure loss when charging an empty trailer is expected and normal
- ✓ If gauges do not drop after coupling, tanks are already full or lines are reversed
- ✓ Charge the trailer system during inspections to detect air leaks early

CHAPTER 53

Module 7: Emergencies (System Failures)

53.1 Secondary Circuit Failure

When the secondary circuit fails, park brakes stay released from primary circuit air. This is the only tractor air system failure that causes a service circuit's brakes not to work during a service application—the steering axle brakes will not apply.

- ✓ Park brakes remain released from primary circuit air during secondary failure
- ✓ This is the only failure that causes a service circuit's brakes not to work in a service application
- ✓ The steering axle brakes will not apply during a secondary circuit failure

53.2 Park Circuit Failure

A park circuit failure causes both service circuits to lose air pressure. Apply a steady service application and expect spring park brakes to gradually apply as pressure drops. ABS only operates on service circuits.

- ✓ A park circuit failure causes both service circuits to lose air pressure
- ✓ Apply a steady service application; spring park brakes apply gradually near 55-60 PSI (380-414 kPa)
- ✓ ABS only operates on service circuits and will not assist a spring park brake stop

53.3 Trailer Service Line Failure

A trailer service line failure is very dangerous, drastically reducing braking capacity. If road ahead permits, use a steady service application, monitor gauges, and release near 70 PSI to rebuild air. Down shift to help rebuild pressure.

- ✓ Release the service application when air pressure reaches approximately 70 PSI (483 kPa) to rebuild
- ✓ Down shift continually to help the compressor rebuild air faster
- ✓ If trailer service brakes fail and a quick stop is needed, pull the trailer air supply (red) button

53.4 Trailer Emergency Line Failure

When the emergency line ruptures, all control of the trailer is lost. The tractor's protection system activates and trailer emergency brakes apply. If the trailer loses traction it will swing, typically to the right due to pavement crown.

- ✓ All control of the trailer is lost when the emergency line ruptures
- ✓ The tractor protection system activates and trailer emergency brakes apply
- ✓ A swinging trailer typically swings right due to the pavement crown; centrifugal force swings it outside in a turn

53.5 Supply Circuit Failure

A supply circuit failure ranges from a plugged line to a ruptured supply tank. It is recognized by air gauges not replenishing when pressure drops below governor cut-in. All brakes work but are limited by available service tank air.

- ✓ Supply circuit failure is recognized by gauges not replenishing below governor cut-in level
- ✓ All brakes work but are limited by the air pressure available in the service tanks
- ✓ Failure could be a plugged/collapsed line or a ruptured supply tank

53.6 Primary Circuit Failure

When the primary circuit fails, spring park brakes stay released from secondary circuit air. A service application still applies steering axle and trailer brakes. Many trucks have an inversion valve that modulates park spring air to apply drive axle brakes.

- ✓ Spring park brakes remain released from secondary circuit air during a primary failure
- ✓ A service application applies steering axle and trailer brakes
- ✓ The inversion valve releases controlled park spring air to apply drive axle brakes

53.7 Reversed Air Lines

Polarized glad hand couplers in good shape cannot be reversed. Spring brake trailers will not release park brakes if lines are reversed. Older air park brake trailers have problems with reversed lines including dragging brakes.

- ✓ Spring brake trailers will not release park brakes if trailer lines are reversed
- ✓ On older air park trailers with reversed lines and empty tank, there will be no service or park brakes
- ✓ If gauges do not drop when charging, tanks are already full or lines are reversed

53.8 Trailer Air Tank Failure

A trailer air tank failure is recognized by an unusually low reading on both gauges. The response is the same as a trailer service line failure. Charging the trailer during inspections reveals leaks early.

- ✓ Trailer air tank failure is recognized by unusually low readings on both air pressure gauges
- ✓ Response is the same as a trailer service line failure
- ✓ Charge the trailer during pre-trip and en-route inspections to detect leaks before service

CHAPTER 54

Air Brake Knowledge Test and Program Completion

54.1 Air Brake Knowledge Test Requirements

To take the knowledge test at a Registry Agent office, the student must present the original Notice of Air Brake Completion form received after passing the practical test - this original form authorizes the test and cannot be a copy. The knowledge test consists of 30 random multiple choice questions. A passing score is 83 per cent, allowing five incorrect answers; when the sixth incorrect answer is submitted, the test discontinues and the student must retake it another day.

- ✓ The knowledge test has 30 random multiple choice questions
- ✓ 83 per cent is required to pass, allowing a maximum of five incorrect answers
- ✓ On the sixth incorrect answer the test stops and must be retaken another day
- ✓ The original Notice of Air Brake Completion form is required to authorize the test at a Registry Agent

54.2 Practical Test Categories and Requirements

Students are practised and tested on three categories of tasks. For practice and testing, only the brakes on one axle need to be checked, but during an actual vehicle trip inspection all brakes must be inspected. During the practical test, students may be prompted for the next group of tasks but must not be coached through individual procedures.

- ✓ Only one axle's brakes need be checked for the practical test, but ALL brakes must be inspected in a real trip inspection
- ✓ The practical test covers three categories of tasks
- ✓ Examiners may prompt for the next task group but must not coach individual procedures

54.3 Course Content and Certification Requirements

The Air Brake Course requires a minimum of 6.5 hours (excluding breaks) of theory instruction using an approved Government of Alberta air brake board including trailer functions, two personally performed practice brake adjustments on a foundation brake display stand, an instructor demonstration of the air brake pre-trip and confirming/maintaining brake adjustment on a tractor-trailer, two student practice pre-trips and two practices of maintaining/confirming adjustment, and a practical test. The classroom session is a prerequisite for the practical training session, which is a prerequisite for the test.

- ✓ Minimum 6.5 hours (excluding breaks) of theory instruction is required
- ✓ Classroom session is a prerequisite for the practical training session, which is a prerequisite for the practical test
- ✓ Students must personally perform two practice brake adjustments and two practice pre-trip inspections

CHAPTER 55

Air System Leaks Test

55.1 Air System Leakage Test Procedure

To test for air system leaks, push both park control valves and rebuild air pressure. Turn off the engine. Apply and firmly hold a full service brake application for 2 minutes. The maximum allowable loss is 4 PSI (28 kPa) for power units, plus an additional 2 PSI (14 kPa) per trailer, measured after the system stabilizes.

- ✓ Apply and firmly hold a full service brake application for 2 minutes
- ✓ Maximum 4 PSI (28 kPa) loss for power units
- ✓ Add an additional 2 PSI (14 kPa) allowance per trailer
- ✓ Measure leakage after the system stabilizes and with the engine off

CHAPTER 56

Know the Law - Railway Crossings

56.1 Uncontrolled Crossings - Mandatory Stops

Some vehicles must by law stop at all uncontrolled railway crossings: school buses, vehicles carrying explosives as cargo, and vehicles designated for carrying flammable liquids or gas (whether loaded or empty). Obey police or railway flag person directions and be aware municipal bylaws may also apply.

- ✓ School buses, explosives carriers, and flammable liquid/gas vehicles must stop at all uncontrolled crossings
- ✓ Flammable liquid/gas vehicles must stop whether loaded or empty
- ✓ Obey police or railway flag person directions; municipal bylaws may also apply

56.2 Controlled Railway Crossings

A controlled crossing has a flag person, stop sign, crossing gate, or an electric/mechanical signalling device. All vehicles are required to stop at controlled railway crossings if signalled to do so.

- ✓ A controlled crossing has a flag person, stop sign, gate, or electric/mechanical signal
- ✓ All vehicles must stop at controlled crossings when signalled

CHAPTER 57

National Safety Code: Safety Fitness and Legislation

57.1 Safety Fitness Certificate Requirements

A person or company operating a commercial truck or bus is a 'motor carrier'. Both provincial and federal NSC legislation may require a Safety Fitness Certificate (SFC), but only one applies at a time. Federal law applies to carriers operating outside Alberta; provincial law applies to carriers operating solely within Alberta.

- ✓ Federal SFC required for trucks/trailers over 4,500 kg operating outside Alberta
- ✓ Provincial SFC required for trucks/trailers registered at 11,794 kg or greater within Alberta
- ✓ SFC required for commercial passenger vehicles seating 11 or more including driver
- ✓ Farmers are exempt from provincial SFC but NOT from federal regulations

57.2 Carrier Safety Plans

In Alberta a carrier must establish, maintain and follow a written safety program covering safe use and operation of vehicles. Failure may result in charges, administrative penalties, or SFC cancellation. All drivers must know and follow their company's safety plan policies.

- ✓ Carriers must maintain a written safety program
- ✓ Safety plan must address speed, seat belts, drug/alcohol use, load security and fuelling
- ✓ Drivers must report violations, convictions and collisions to the carrier
- ✓ Drivers must be medically fit and not fatigued or impaired

57.3 Preventive Maintenance Plans

Carriers must maintain a written maintenance and inspection program covering all Alberta-registered vehicles including leased vehicles. Every driver must understand the plan, carry out required inspections, report defects and never operate a vehicle with a safety-jeopardizing defect.

- ✓ Carriers must maintain a written maintenance and inspection program including leased vehicles
- ✓ Drivers must carry out legally required trip inspections
- ✓ Drivers must notify the carrier of any defects found during inspection
- ✓ Drivers must not operate a vehicle with a defect jeopardizing safety

CHAPTER 58

Program Documents and Forms

58.1 Notice of Air Brake Program Completion

The Notice of Air Brake Program Completion is issued after a student successfully completes the classroom session, practical training session and practical test. It authorizes Registry Agents to provide the air brake knowledge test and is valid for 12 months from passing the knowledge test. The original is presented to a Registry Agent with government photo ID. Forms that appear tampered with will not be accepted.

- ✓ The Notice of Program Completion authorizes the Registry Agent to provide the knowledge test
- ✓ The form is valid for 12 months from the date of passing the knowledge test
- ✓ The original must be presented with government issued photo identification
- ✓ Tampered forms will not be accepted

58.2 Retaining Student Records

All student records must be retained for a minimum of two years. The Air Brake Student Record, Practical Test forms, and the Training School/Agency copy of the Notice of Program Completion must be filed together in the student file. All documents must be available for inspection by Alberta Transportation.

- ✓ Student records must be retained a minimum of two years
- ✓ Records must be made available for inspection by Alberta Transportation personnel

CHAPTER 59

Coupling mechanisms

59.1 A train converter dolly

An A train uses an A-shaped drawbar (A-dolly) that joins a single pintle hitch on the lead trailer, providing two points of articulation.

- ✓ An A-dolly has an A-shaped drawbar joining a single pintle hitch point
- ✓ An A train provides two points of articulation, one at the pintle and one at the fifth wheel

59.2 B train converter

In a B train the converter is part of the lead trailer, with the fifth wheel assembly on the rear axle. No converter dolly is required as the second unit connects directly to the extended frame.

- ✓ In a B train the fifth wheel assembly sits on the rear axle of the lead trailer
- ✓ No converter dolly is required because the second unit connects directly to the extended frame of the lead unit

59.3 C train converter and self-steering axle

A C train uses an independent converter with two drawbars and two pintle hitches, giving only one articulation point and reducing sway. Double drawbar converters have a self-steering axle requiring correct air pressure.

- ✓ A C train has two drawbars and two pintle hitches with only one articulation point
- ✓ Check that air pressure on the self-steering axle is within manufacturer standards; low pressure causes instability and skid steering

59.4 Double trailer converter types

Adding a second trailer requires a converter mechanism, each with its own fifth wheel. Three converter types exist: A train, B train and C train.

- ✓ A train uses an A-shaped drawbar (A-dolly) joining a single pintle hitch, providing two points of articulation
- ✓ B train converter is part of the lead trailer with a fifth wheel on the rear axle; no converter dolly required
- ✓ C train uses an independent converter with two drawbars and two pintle hitches giving only one articulation point
- ✓ C train double drawbar converters have a self-steering axle for improved performance

59.5 Link-up arrangement by weight

When linking multiple trailers, always place the heaviest trailer closest to the tractor and the lightest furthest away.

- ✓ Hook the heaviest trailer directly to the tractor
- ✓ Place the lightest trailer furthest from the towing unit
- ✓ This rule applies regardless of trailer length; improper joining makes the unit unstable and the rear trailer will sway

59.6 C train self-steering axle air pressure

When driving a C train, the self-steering axle air pressure must be maintained within manufacturer standards to prevent instability.

- ✓ Check that self-steering axle air pressure is within manufacturer's standards
- ✓ If air pressure falls too low, wheels steer too much and the unit becomes unstable, leading to skid steering that can damage the converter and hitch

CHAPTER 60

National Safety Code: Hours of Service

60.1 Provincial Hours of Service Limits

Alberta hours of service legislation applies to carriers operating solely within Alberta. Work shifts generally start and end with eight consecutive hours off-duty. During a work shift a driver cannot drive after 13 hours driving or after 15 hours on-duty.

- ✓ Cannot drive after having driven 13 hours (provincial)
- ✓ Cannot drive after being on-duty 15 hours (provincial)
- ✓ Work shifts start and end with eight consecutive hours off-duty
- ✓ Daily log records must be kept for at least six months
- ✓ Daily logs and supporting documents delivered to employer within 20 days

60.2 Federal Hours of Service Limits

Federal hours of service rules are more restrictive and apply to carriers operating any vehicle outside Alberta. They have daily, work shift and cumulative cycle limits. During a day a driver cannot drive after 13 hours driving or 14 hours on-duty, and must take 10 hours off-duty (8 consecutive).

- ✓ Federal: cannot drive after 13 hours driving or 14 hours on-duty in a day
- ✓ Federal: must take 10 hours off-duty daily, 8 consecutive
- ✓ Work shift: cannot drive after 16 hours elapse since last 8 consecutive hours off-duty
- ✓ Federal rules apply to all a carrier's drivers once carrier falls under federal legislation

60.3 Federal Cycle Limits and Resets

Federal drivers must follow cycle 1 or 2 and indicate it on their daily log. Cycle 1 allows 70 hours on-duty in 7 days; cycle 2 allows 120 hours in 14 days. Cycle 2 requires 24 consecutive hours off before the 70th hour. Resets require 36 hours (cycle 1) or 72 hours (cycle 2) off-duty.

- ✓ Cycle 1: 70 hours on-duty in 7 consecutive days
- ✓ Cycle 2: 120 hours on-duty in 14 consecutive days
- ✓ Cycle 1 reset requires 36 consecutive hours off-duty
- ✓ Cycle 2 reset requires 72 consecutive hours off-duty
- ✓ No driver may drive without 24 consecutive hours off in the preceding 14 days

CHAPTER 61

Fire and Fire Extinguishers

61.1 Bus Fire — Passenger Evacuation

If carrying passengers on a bus and you discover a fire or danger of fire, stop immediately in a safe location. Get passengers off the bus and to a safe spot at least 35 metres (115 feet) from the vehicle. Portable fire extinguishers are carried in the driver's compartment in most commercial vehicles.

- ✓ Stop immediately in a safe location upon discovering a fire or danger of fire
- ✓ Move passengers to a safe spot at least 35 metres (115 feet) from the vehicle
- ✓ Portable fire extinguishers are located in the driver's compartment in most commercial vehicles

61.2 Fire Extinguisher Operation and Limits

Do not try to put out a fire beyond your capability or the extinguisher's. Depending on type and size, you only have eight to ten seconds of chemical discharge. To use: remove from bracket, pull safety pin breaking the seal, approach from upwind if possible, and hold upright. After use, replace the safety pin, return it to storage, and note on the post-trip inspection that it must be recharged immediately or replaced.

- ✓ Do not attempt to fight a fire beyond your capability or the extinguisher's
- ✓ Extinguishers provide only eight to ten seconds of chemical discharge
- ✓ Approach the fire from upwind and hold the extinguisher upright
- ✓ After use, note it on the post-trip inspection and have it recharged immediately or replaced

61.3 The PASS Method

Remember PASS to operate a fire extinguisher: Pull the pin and point the nozzle away from you; Aim low and direct at the base of the fire; Squeeze the handle slowly and evenly until the fire is out or the extinguisher is empty; Sweep from side to side starting at one side of the fire and working across — do not start in the middle.

- ✓ P = Pull the pin and point the nozzle away from you
- ✓ A = Aim low and direct the extinguisher at the base of the fire
- ✓ S = Squeeze the handle slowly and evenly until fire is out or empty
- ✓ S = Sweep from side to side, starting at one side and working across — not the middle

61.4 Bus Fire Emergency Response

If carrying passengers on a bus and you discover a fire or danger of fire, stop immediately in a safe location, get passengers off the bus and to a safe spot at least 35 metres (115 feet) from the vehicle. Portable fire extinguishers are carried in the driver's compartment of most commercial vehicles.

- ✓ Stop in a safe location and evacuate passengers at least 35 metres (115 feet) from the vehicle
- ✓ Portable fire extinguishers are located in the driver's compartment

61.5 Fire Extinguisher Operation and PASS

Do not try to fight a fire beyond your capability or the extinguisher's. Extinguishers provide only eight to ten seconds of discharge. To operate: remove from bracket, pull the safety pin, approach from upwind, hold upright. Use PASS: Pull the pin, Aim low at the base of the fire, Squeeze the handle slowly, Sweep side to side starting at one side of the fire.

- ✓ Do not fight a fire beyond your or the extinguisher's capability
- ✓ Expect only 8-10 seconds of chemical discharge
- ✓ PASS: Pull, Aim low at the base, Squeeze slowly, Sweep side-to-side
- ✓ Approach the fire from upwind and hold the extinguisher upright

61.6 Fire Prevention Tips

Fires can start from several causes. Prevent them by: never starting a vehicle with a fuel leak (repair and use absorbent material); shutting off the engine when refueling; grounding the fuel nozzle against the filler pipe to prevent static sparks; not smoking near fueling areas; checking tire pressure often since soft tires build heat; and ensuring brakes are fully released while moving since dragging brakes generate heat.

- ✓ Never start a vehicle with a fuel leak — repair it and use approved absorbent material
- ✓ Shut off the engine when refueling and do not smoke near fueling areas
- ✓ Touch the fuel nozzle against the filler pipe before filling to ground it and prevent static sparks
- ✓ Check tire pressure often as soft tires build heat and can cause fire
- ✓ Ensure brakes are fully released when moving — dragging brakes generate heat that can ignite grease in hubs

61.7 After Using a Fire Extinguisher

Once the fire is out, replace the safety pin and return the extinguisher to its storage compartment. Note on the post-trip inspection that the extinguisher was used and have it recharged immediately or replaced.

- ✓ Replace the safety pin and return the extinguisher to storage
- ✓ Note use on the post-trip inspection and have the extinguisher recharged or replaced immediately

CHAPTER 62

Coupling Mechanisms - Double Trailer Combination Types

62.1 Link-Up Arrangement by Weight

When linking two or more trailers to a towing unit, always hook the heaviest trailer directly to the tractor and place the lightest trailer furthest away. This rule applies regardless of trailer length; improper order makes the unit unstable and could cause loss of control.

- ✓ Hook the heaviest trailer directly to the tractor
- ✓ Place the lightest trailer furthest from the towing unit
- ✓ This rule applies regardless of each trailer's length
- ✓ Incorrect weight order causes instability and rear trailer sway

62.2 A Train Converter

The A train uses an A-shaped drawbar (A-dolly) that joins into a single pintle hitch point on the lead trailer. It provides two points of articulation, one at the pintle and one at the fifth wheel.

- ✓ The A train uses an A-dolly with an A-shaped drawbar
- ✓ The A train has two points of articulation (pintle and fifth wheel)
- ✓ Each converter must have its own fifth wheel attachment

62.3 B Train Converter

In a B train, the converter is part of the lead trailer with the fifth wheel assembly on the rear axle. No converter dolly is required, as the second unit connects directly to the extended frame of the lead unit.

- ✓ The B train converter is part of the lead trailer
- ✓ No separate converter dolly is required for a B train
- ✓ The second unit connects directly to the extended frame of the lead unit

62.4 C Train Converter

A C train uses an independent converter like the A train, but has two drawbars and two pintle hitches (double drawbar), giving only one articulation point so the trailer moves less side-to-side. C trains have a self-steering axle whose air pressure must stay within manufacturer standards.

- ✓ The C train uses a double drawbar with two pintle hitches and one articulation point
- ✓ C trains have a self-steering axle to improve performance
- ✓ Check that self-steering axle air pressure is within manufacturer standards
- ✓ Low air pressure on the self-steering axle can cause skid steering and instability

CHAPTER 63

Chapter 11: Fueling a Vehicle

63.1 Gasoline and Diesel Fueling Safety

When fueling with gasoline or diesel: do not add fuel while the engine is running; never overfill the tank; report any fuel spill to the attendant for immediate cleanup with approved absorbent; keep away from electrical sparks or open flame; DO NOT SMOKE and ensure no one nearby is smoking; and do not use a cell phone while fueling.

- ✓ Do not add fuel while the engine is running and never overfill the tank
- ✓ No smoking during fueling and ensure no one nearby smokes
- ✓ Do not use a cell phone while fueling
- ✓ Report spills immediately for cleanup with approved absorbent material

63.2 Propane Fueling Procedure

Only certified/trained people may refuel a propane vehicle or container. Ensure nothing that could ignite is within three metres (10 feet). Wear protective gloves and long sleeves. Switch off engine and electrical accessories. No smoking, no cell phone. Attach the filling hose, open the fixed-liquid level (bleeder) valve. When propane mist discharges from the level gauge, fueling ends. Shut the gauge, disconnect the fill-line. Total tank capacity is approximately 80 percent.

- ✓ Only certified or trained persons may refuel propane; keep ignition sources 3 metres (10 feet) away
- ✓ Switch off engine and electrical accessories before propane fueling
- ✓ Stop fueling when propane mist discharges from the fixed-liquid level gauge
- ✓ Propane tanks are filled to approximately 80 percent of total capacity

63.3 No Fueling with Engine Running or Passengers Aboard

Do not fuel a vehicle when the engine is running or a radio transmitter is on. Buses, school buses, and taxis should not be fueled while passengers are on board. Ensure sufficient fuel for the trip before picking up passengers.

- ✓ Never fuel with the engine running or a radio transmitter on
- ✓ Do not fuel buses, school buses, or taxis with passengers aboard
- ✓ Ensure sufficient fuel before picking up passengers

CHAPTER 64

Practical Training and Test Procedures

64.1 Instructor Demonstration Safety

During the practical demonstration the vehicle must be properly chocked. When uncoupling air lines, hold a hand over the supply coupler to protect from air pressure release and debris. When coupling after the park control valve pops out, inspect glad hand couplers before connecting and confirm correct connection. Confirm air lines are suspended and will not catch as the trailer turns.

- ✓ Ensure the vehicle is properly chocked before demonstrating
- ✓ Hold a hand over the supply coupler when uncoupling air lines to protect from pressure release and debris
- ✓ Inspect glad hand couplers before connecting and confirm they are correctly connected
- ✓ Confirm trailer air lines are suspended and will not catch as the trailer turns

64.2 Automatic Slack Adjuster Activation

After the pre-trip, restart the engine to maintain air pressure and activate the automatic slack adjuster adjustment by applying two full service brake applications. Applications must be done with air pressure in the normal operating range, allowing one second intervals to account for brake lag. Confirm proper brake adjustment on both brakes of one axle by pulling the slack adjusters (rear trailer axle is commonly easiest).

- ✓ Apply two full service brake applications to trigger automatic slack adjuster adjustment
- ✓ Allow one second intervals between applications to account for brake lag
- ✓ Check adjustment with air pressure in the normal operating range
- ✓ Confirm brake adjustment by pulling the slack adjusters on both brakes of one axle

64.3 Air Brake Practical Test Components

The practical test evaluates the air brake pre-trip inspection including the tractor protection system, park control valve, supply circuit build-up, air system leaks, and brake adjustment. Key checks: confirm low air pressure warning at 60 PSI (414 kPa), park control valve pops out at 20-45 PSI, and governor cut-out check. The test must be completed within fifteen minutes without assistance and without other students present.

- ✓ The low air pressure warning must come on by 60 PSI (414 kPa)
- ✓ The park control valve pops out at 20-45 PSI (138-311 kPa)
- ✓ The test must be completed within fifteen minutes without assistance and with no other students present
- ✓ Only the brake adjustment of one axle needs to be checked during the practical test

CHAPTER 65

Module 8: Brake Adjustment and Foundation Brakes

65.1 Foundation Brakes and Runaways

Foundation brakes are the mechanical components at the axle ends. If they don't work properly, the air brake system cannot stop the vehicle. Almost all runaways are caused by failures in the foundation brakes, not the air system.

- ✓ Foundation brakes are the mechanical components at the axle ends
- ✓ Almost all runaways are caused by foundation brake failures, not air system failures

65.2 Lining Thickness and Drum Inspection

The CVSA roadside inspection out-of-service criteria requires a minimum 1/4 inch (7 mm) lining thickness. Brake drums should be checked for cracks and excessive wear.

- ✓ Minimum lining thickness is 1/4 inch (7 mm) per CVSA out-of-service criteria
- ✓ Brake drums must be checked for cracks and excessive wear

65.3 Brake Power vs Stroke Relationship

Brake application force rises with a curve as push rod stroke increases. Push rod stroke increases as brake components wear. As the push plate reaches the end of the chamber, brake force drops to zero. Properly adjusted brakes use the upper half of available push rod stroke; out-of-adjustment brakes use the lower half.

- ✓ Properly adjusted brakes use the upper half of available push rod stroke
- ✓ Out-of-adjustment brakes use the lower half of push rod stroke
- ✓ Brake force drops to zero when the push plate reaches the end of the chamber

65.4 Brake Adjustment Cannot Be Felt

Brake adjustment cannot be felt when driving. Drivers may feel brakes are good only to have them fail when more is required. Drivers must always check brakes to ensure correct adjustment. Brake fade occurs from component expansion and reduced co-efficiency between lining and drum.

- ✓ Brake adjustment cannot be felt while driving; brakes must be physically checked
- ✓ Brake fade occurs from component expansion and reduced friction between lining and drum

65.5 Safe Procedures for Going Under a Vehicle

To check brakes safely, alternate spring park brakes on tow and trailer vehicles. Push yellow in and pull red out to check tractor brakes; pull yellow out and push red in to check trailer brakes. Do not leave the ignition key in the vehicle and ensure wheels are properly chocked. Leaving the transmission in gear does not replace chocking.

- ✓ Chock wheels properly before going under a vehicle; transmission in gear is not a substitute
- ✓ Remove the ignition key and alternate park brakes to check tractor versus trailer brakes

65.6 Applied Stroke Measurement Procedure

The applied stroke procedure is used by enforcement officers during CVSA Level 1 inspections. Service brakes must be fully applied—partial applications won't put enough pressure on the push rod for accurate measurement. Maximum allowed stroke values are out-of-service standards.

- ✓ Service brakes must be fully applied for accurate applied stroke measurement
- ✓ Maximum allowed stroke values are out-of-service standards

65.7 Brake Chamber Out-of-Service Stroke Limits

Mid-sized chambers have 1/2 inch reserve between total and adjusted stroke. A Type 20 has 2¼ inch total stroke, out-of-service at 1¾ inches (45 mm). A Type 30 has 2½ inch total stroke, out-of-service at 2 inches (51 mm). A Type 30LS has 3 inch total stroke, out-of-service at 2½ inches (64 mm). Brake stroke indicators are required and must be retrofitted if missing.

- ✓ Type 20 is out-of-service at 1¾ inches (45 mm) stroke; Type 30 at 2 inches (51 mm)
- ✓ Type 30LS long stroke is out-of-service at 2½ inches (64 mm)
- ✓ Brake stroke indicators are required and must be retrofitted if missing

65.8 Slack Adjusters and S-Cam Operation

The slack adjuster converts push rod force from the chamber to torque on the s-cam shafts. The cam lobes expand the brake shoe platforms, pressing the lining into the drum. Slack adjusters come in 5-7 inch centre-to-centre lengths in 1/2 inch increments; components must be replaced with proper equipment.

- ✓ The slack adjuster converts push rod force into torque on the s-cam shaft
- ✓ Brake components must be replaced with the proper matching equipment for brake balance

65.9 Slack Adjuster Free Stroke Guidelines

For manual slack adjusters, the optimum free stroke is 1/2 inch (13 mm) with a re-adjustment guideline of 3/4 inch (19 mm). Automatic slack adjusters feel loose but stay within the required applied stroke.

- ✓ Manual slack adjusters have an optimum 1/2 inch (13 mm) free stroke, re-adjust at 3/4 inch (19 mm)
- ✓ Automatic slack adjusters feel loose but remain within required applied stroke

CHAPTER 66

Module 8: Brake Adjustment

66.1 Recognizing Foundation Brake Problems

Foundation brakes are the mechanical components at axle ends. If they do not work properly the air system cannot stop the vehicle. Almost all runaways are caused by foundation brake failures, not the air system. The key skill is recognizing when adjustment is needed.

- ✓ Foundation brakes are the mechanical components at the axle ends
- ✓ Almost all runaways are caused by foundation brake failures, not the air system
- ✓ The most important outcome is recognizing when brakes need adjustment

66.2 Lining and Drum Inspection Standards

Brake linings and drums must be checked for wear and cracks. The CVSA roadside out-of-service criterion for minimum lining thickness is a specific value.

- ✓ Minimum lining thickness is 1/4 inch (7mm) per CVSA out-of-service criteria
- ✓ Brake drums should be checked for cracks and excessive wear
- ✓ These are Commercial Vehicle Safety Alliance roadside inspection standards

66.3 Brake Power vs Stroke Relationship

Brake force rises with push rod stroke up to a point, then drops to zero as the push plate reaches the end of the chamber. Push rod stroke increases as brake components wear. Properly adjusted brakes use the upper half of available stroke.

- ✓ Properly adjusted brakes use the upper half of available push rod stroke
- ✓ Brakes out of adjustment use the lower half of available push rod stroke
- ✓ Brake force drops to zero when the push plate reaches the end of the chamber

66.4 Brake Adjustment Cannot Be Felt

Brake adjustment cannot be felt while driving. Drivers may feel brakes are good only to have them fail when more is demanded. Drivers must always physically check brake adjustment. Brake fade comes partly from component expansion and reduced coefficient.

- ✓ Brake adjustment cannot be felt when driving; always physically check adjustment
- ✓ Brakes may feel good but fail when more braking is required
- ✓ Brake fade occurs from component expansion and reduced friction between lining and drum

66.5 Free Stroke and Applied Stroke Measurement

For manual slack adjusters, optimum free stroke is 1/2 inch (13mm) with a re-adjustment guideline of 3/4 inch (19mm). Automatic slack adjusters feel loose but stay within required stroke. Service brakes must be fully applied for the applied stroke procedure.

- ✓ Optimum free stroke is 1/2 inch (13mm); re-adjust manual slack adjusters at 3/4 inch (19mm)
- ✓ Service brakes must be fully applied for the applied stroke measurement to work
- ✓ Automatic slack adjusters feel loose but remain within required applied stroke

66.6 Maximum Applied Stroke Out-of-Service Limits

Maximum applied stroke values are out-of-service standards used by enforcement. Mid-size Type 20 and 30 chambers have 1/2 inch reserve between total and adjusted stroke. Brake stroke indicators are required and must be retrofitted if missing.

- ✓ Type 20 total stroke 2¼ inch (57mm), out-of-service at 1¾ inch (45mm)
- ✓ Type 30 total stroke 2½ inch (64mm), out-of-service at 2 inch (51mm); Type 30LS at 2½ inch (64mm)
- ✓ Brake stroke indicators are required and must be retrofitted if missing

66.7 Slack Adjusters and S-Cam Operation

The slack adjuster converts push rod force from the chamber to torque on the s-cam shaft. The cam lobes expand the brake shoe platforms, pressing lining into the drum. Components must be replaced with proper equipment for brake balance.

- ✓ The slack adjuster converts push rod force to torque on the s-cam shaft
- ✓ Slack adjusters range 5-7 inch (125-179mm) centre-to-centre in 1/2 inch increments
- ✓ Brake components must be replaced with the proper equipment to maintain brake balance

66.8 Safe Procedures for Going Under a Vehicle

When checking brakes under a vehicle, alternate spring park brakes between tractor and trailer. Proper wheel chocking and key removal are mandatory for safety.

- ✓ Push yellow in and pull red out to check tractor brakes; reverse to check trailer brakes
- ✓ Do not leave the ignition key in the vehicle and ensure wheels are properly chocked
- ✓ Leaving the transmission in gear is not a replacement for properly chocking wheels

CHAPTER 67

Brake Adjustment Test

67.1 Automatic Slack Adjuster and Brake Adjustment Check

For brake adjustment, perform a full service brake application to maintain the adjustment of the automatic slack adjusters. This task is weighted at 15% if performed incorrectly. Confirm brake adjustment on both brakes of one axle, weighted at 10% if performed incorrectly. These are the highest-weighted tasks on the practical test.

- ✓ Full service brake application maintains adjustment of automatic slack adjusters (15% weighting)
- ✓ Confirm brake adjustment on both brakes of one axle (10% weighting)
- ✓ Brake adjustment tasks carry the heaviest scoring penalties on the test

CHAPTER 68

Operating long combination vehicles

68.1 LCV Driver's Certificate qualifications

LCVs operate under a Section 62 Traffic Safety Act permit. The carrier issues an annual LCV Driver's Certificate that must be carried by the driver, and must ensure the driver meets specific qualifications.

- ✓ The LCV Driver's Certificate is valid for 12 months and must be in the driver's possession when operating an LCV
- ✓ The driver must hold a valid Class 1 licence, have passed a recognized air brake course, and have at least 24 months or 150,000 km of articulated vehicle experience
- ✓ The driver must have passed a Professional Driver Improvement Course (PDIC) within the past 48 months and the CTA Longer Combination Vehicles Driver Training Course
- ✓ The driver's abstract must show no driving-related criminal code convictions in 36 months, no more than two moving violations in 12 months, and no more than three in 36 months

68.2 Speed limit for long combination vehicles

The maximum speed limit for drivers of long combination vehicles is 100 km/h or the posted speed limit, whichever is lower.

- ✓ Maximum speed for LCVs is 100 km/h or the posted speed limit, whichever is lower

68.3 LCV speed limits

Long combination vehicles have a maximum speed limit that is the lower of 100 km/h or the posted limit.

- ✓ Maximum speed for LCV drivers is not more than 100 km/h or the posted speed limit, whichever is lower

68.4 LCV permit and driver requirements

Long Combination Vehicles operate under a permit issued per Section 62 of the Traffic Safety Act. Carriers issue an annual LCV Driver's Certificate only if the driver meets strict qualifications.

- ✓ The LCV Driver's Certificate is valid for 12 months and must be in the driver's possession while operating an LCV
- ✓ Driver must hold a valid Class 1 licence and have passed a recognized air brake course
- ✓ Driver must have a minimum of 24 months or 150,000 kilometres of Class 1 articulated vehicle experience
- ✓ Driver must have passed a PDIC within the past 48 months and the CTA Longer Combination Vehicles Driver Training Course
- ✓ Driver's abstract must show no driving-related criminal code convictions in prior 36 months, no more

than two moving violations in prior 12 months, and no more than three in prior 36 months

CHAPTER 69

National Safety Code: Vehicle Inspection Program and Cargo Securement

69.1 Cargo Securement Requirements

All cargo must be secured per Canadian National Safety Code Standard 10, adopted in Alberta's Commercial Vehicle Safety Regulation. Commercial trucks registered over 4,500 kg must ensure cargo is contained, immobilized or secured. Improper securement can result in fines for driver, carrier or shipper.

- ✓ Cargo securement applies to commercial trucks registered over 4,500 kg
- ✓ Cargo must be contained, immobilized or secured per NSC Standard 10
- ✓ Cargo must not leak, spill, blow off, fall from or be dislodged from the vehicle
- ✓ Cargo must not shift so as to adversely affect vehicle stability or ability to move
- ✓ Driver, carrier or shipper may face fines and penalties for improper securement

69.2 Vehicle Inspection Program (VIP)

The Alberta VIP for Commercial Vehicles is a mandatory safety inspection program that sets standards for owner maintenance. Passing vehicles receive a Commercial Vehicle Inspection Certificate and decal. Municipal transit buses and farm trucks operating solely within Alberta are exempt.

- ✓ Buses carrying more than 11 passengers must be inspected every six months
- ✓ Trucks/trailers with combined GVW of 11,794 kg or more must be inspected every 12 months
- ✓ Municipal transit buses and farm trucks within Alberta are exempt from VIP
- ✓ Passing vehicles get a Commercial Vehicle Inspection Certificate and decal

CHAPTER 70

Fueling a Vehicle

70.1 Gasoline and Diesel Fueling Safety

When fueling with gasoline or diesel: do not add fuel while the engine is running; never overfill the tank; notify the attendant to clean up any spill immediately with approved absorbent material; do not fuel close to electrical sparks or open flame; do not smoke and ensure no one nearby smokes; and do not use a cell phone while fueling.

- ✓ Do not add fuel into the tank when the engine is running
- ✓ Never overfill the fuel tank
- ✓ Do not smoke or use a cell phone while fueling, and keep away from sparks and open flame
- ✓ Clean up any fuel spill immediately using approved absorbent material

70.2 Fueling Restrictions with Passengers and Radio

Do not fuel a vehicle when the engine is running or a radio transmitter is on. Vehicles such as a bus, school bus, or taxi should not be fueled when passengers are on board. Ensure there is sufficient fuel for the trip before picking up passengers.

- ✓ Do not fuel with the engine running or a radio transmitter on
- ✓ Do not fuel a bus, school bus or taxi with passengers on board
- ✓ Ensure sufficient fuel for the trip before picking up passengers

70.3 Propane Fueling Requirements

Only certified or trained people can refuel a propane vehicle or container. Ensure nothing that could ignite is within three metres (10 feet) of the dispenser or container. Wear protective gloves and clothing, switch off engine and electrical accessories, do not smoke or use a cell phone, and properly attach the filling hose.

- ✓ Only people with proper certification or training can refuel propane vehicles or containers
- ✓ Ensure nothing that could ignite is within three metres (10 feet) of the dispenser or container
- ✓ Engine and electrical accessories must be switched off during propane fueling
- ✓ Wear proper protective gloves and clothing such as long sleeve shirts

70.4 Propane Filling Procedure

Open the fixed-liquid level gauge (bleeder valve). When fuel reaches maximum, liquid propane in mist form is discharged from the level gauge — fueling should then end. Shut off the fixed level gauge and disconnect the fill line. The magnetic float gauge should indicate full; total tank capacity is approximately 80 percent.

- ✓ Open the fixed-liquid level gauge (bleeder valve) before filling
- ✓ When liquid propane mist discharges from the level gauge, fueling should end
- ✓ Shut off the fixed level gauge and disconnect the fill line
- ✓ A propane tank is filled to approximately 80 percent of its total capacity

70.5 No Fueling with Passengers or Transmitter On

Do not fuel a vehicle when the engine is running or a radio transmitter is on. Buses, school buses and taxis should not be fueled with passengers on board. Ensure sufficient fuel for the trip before picking up passengers.

- ✓ Do not fuel when the engine is running or a radio transmitter is on
- ✓ Buses, school buses and taxis should not be fueled with passengers on board
- ✓ Ensure there is sufficient fuel for the trip before picking up passengers

70.6 Fueling with Gasoline and Diesel

When fueling with gasoline or diesel, do not add fuel while the engine is running, never overfill the tank, notify the attendant to clean up any spill with approved absorbent, avoid electrical sparks or open flame, do not smoke (and ensure no one nearby smokes), and do not use a cell phone while fueling.

- ✓ Do not add fuel with the engine running and never overfill the tank
- ✓ Do not smoke or use a cell phone while fueling
- ✓ Avoid electrical sparks or open flame and clean up spills with approved absorbent material

70.7 Fueling with Propane

Only certified/trained people can refuel a propane vehicle or container. Ensure nothing that could ignite is within three metres (10 feet), wear protective gloves and clothing, switch off engine and electrical accessories, do not smoke or use a cell phone, and attach the filling hose properly. Open the fixed-liquid level gauge; fueling ends when propane mist discharges. Shut off the gauge and disconnect the fill-line. The tank fills to about 80 percent capacity.

- ✓ Only certified/trained people may refuel propane; keep ignition sources 3 metres (10 feet) away
- ✓ Switch off engine and electrical accessories and wear protective gloves/clothing
- ✓ Stop fueling when liquid propane mist discharges from the fixed-liquid level gauge
- ✓ A propane tank fills to approximately 80 percent of total capacity

CHAPTER 71

Operating Long Combination Vehicles

71.1 LCV Driver Certificate Requirements

The carrier issues an annual LCV Driver's Certificate, valid 12 months, which must be carried when operating an LCV. Before issuing it, the carrier must ensure the driver meets qualifications including licence, experience, training and a clean abstract.

- ✓ The LCV Driver's Certificate is valid for 12 months and must be carried when operating an LCV
- ✓ Driver must hold a valid Class 1 licence and have passed a recognized air brake course
- ✓ Driver must have at least 24 months or 150,000 km experience with articulated Class 1 vehicles
- ✓ Driver must have passed a PDIC within the past 48 months and the CTA LCV Driver Training Course
- ✓ Abstract must show no driving-related criminal convictions in 36 months, no more than two moving violations in 12 months, and no more than three in 36 months

71.2 LCV Speed Limit

The maximum speed limit for drivers of long combination vehicles shall not exceed 100 km/h or the posted speed limit, whichever is lower.

- ✓ Maximum LCV speed is 100 km/h or the posted speed limit, whichever is lower

71.3 LCV Permit and Provisions

Long Combination Vehicles (LCVs) operate under a permit issued per Section 62 of the Traffic Safety Act with general provisions that must be followed. Examples include Rocky Mountain Double, Triple, and Turnpike Double combinations.

- ✓ LCVs require a permit issued under Section 62 of the Traffic Safety Act
- ✓ Carriers must follow all general provisions of the permit
- ✓ Examples of LCVs include Rocky Mountain Double, Triple, and Turnpike Double

CHAPTER 72

Driving skills and manoeuvres

72.1 Four-second following distance rule

Large vehicles should use the four-second rule instead of the two-second passenger rule. Double and triple trailer units need more space because they cannot turn or stop as quickly.

- ✓ Use the four-second rule for following distance when operating a large vehicle
- ✓ Watch the vehicle ahead pass a fixed object and count; if you reach it before one-thousand-and-four you are too close
- ✓ Double your following distance when weather, road or traffic conditions are poor

72.2 Turning large vehicles

Turning a large vehicle requires accounting for off-tracking and a wider turning radius. Use hand-over-hand steering with both hands and select the proper gear before starting the turn.

- ✓ Use the hand-over-hand steering method and keep both hands on the wheel
- ✓ Select the appropriate gear before starting the turn unless the vehicle has an automatic transmission
- ✓ Account for off-tracking and the wider turning radius on every turn

72.3 Right and left turns

On right turns allow for low speed off-tracking and watch for cyclists and small vehicles pulling alongside. On narrow streets drive well into the intersection before turning. On left turns keep the arc wide enough to avoid crossing the centre line.

- ✓ On right turns allow for low speed off-tracking to avoid hitting objects, curbs or pedestrians
- ✓ On narrow streets drive well into the intersection before turning, possibly crossing the centre line
- ✓ Watch for smaller vehicles and cyclists on the right side during a right turn
- ✓ On left turns make the arc wide enough to off-track without crossing the centre line and finish to the right of the centre line

72.4 Following distance for large vehicles

Large vehicles require greater following distance than passenger vehicles. Use the four-second rule and double it in poor conditions.

- ✓ The two-second rule is the minimum for passenger vehicles at any speed
- ✓ Use the four-second rule for large vehicles by counting one-thousand-and-one etc. as the vehicle ahead passes a fixed object
- ✓ If you reach the object before counting to one-thousand-and-four you are following too closely
- ✓ Double and triple trailer units need more following distance because they cannot turn or stop quickly
- ✓ Double your following distance when weather, road or traffic conditions are poor

72.5 Off-tracking types

Off-tracking occurs when rear tires follow a different path than the steering tires. There are two types: low speed and high speed.

- ✓ Low speed off-tracking pulls rear tires inward of the steering path; longer wheelbase or tighter turns increase it
- ✓ High speed off-tracking, from centrifugal force, pulls rear tires outward during turns
- ✓ Use a moderate speed when entering curves on open highways to avoid serious high-speed off-tracking

72.6 Right turns

On right turns, allow for low speed off-tracking so rear wheels do not hit objects, curbs or pedestrians. Drive well into the intersection on narrow streets.

- ✓ Allow for low speed off-tracking on every right turn as rear wheels follow a shorter path
- ✓ On narrow streets, drive well into the intersection before turning, possibly over the centre line or into the second lane
- ✓ Watch for smaller vehicles and cyclists that may pull along the right side during the turn

72.7 Left turns

On left turns ensure the turning arc is wide enough for the vehicle to off-track on the left without crossing the centre line, and complete the turn on the right of the centre line.

- ✓ Ensure the turning arc is wide enough to off-track on the left without crossing the centre line
- ✓ Make the turn wide enough to prevent cutting the corner and hitting another vehicle
- ✓ Complete the turn by driving to the right side of the centre line of the road entered

72.8 Curves and centrifugal force

Enter curves at a speed that does not require braking. Centrifugal force pushes the vehicle outward and traction resists it; excess speed can cause loss of control.

- ✓ Enter a curve at a speed that lets you gradually accelerate while in the curve without braking
- ✓ Centrifugal force pushes the vehicle towards the outside of the curve; traction resists it
- ✓ Braking in a curve at excessive speed may cause the vehicle to skid, roll over or jackknife
- ✓ Right curves: keep the front closer to the centre of the road so trailer wheels do not drop off the pavement on the right
- ✓ Left curves: keep the front closer to the right side of the road so trailer wheels do not cut into the other lane

72.9 Turning a large vehicle

Large vehicles need special turning technique accounting for off-tracking and wider turning radius. Hand-over-hand steering is recommended.

- ✓ Use the hand-over-hand steering method with both hands on the wheel
- ✓ Select the appropriate gear before starting the turn unless the transmission is automatic
- ✓ Remember off-tracking tendencies and the wider turning radius

CHAPTER 73

Notice of Air Brake Program Completion (DPLS0005)

73.1 Student and Organization Information

The DPLS0005 form requires the student's name (last, first, second), operator's licence number and date of birth in year/month/day format. It also requires the full name and code number of the licensed driver training school or certified employee driver training agency, plus the classroom instructor's first and last name and the practical test instructor's last and first name.

- ✓ Record student name, operator's licence number and date of birth (yyyy-mm-dd)
- ✓ Record full name and code number of the driver training school or agency
- ✓ List both the classroom instructor and the practical test instructor names

73.2 Course Completion Date and Authorization

The date course completed is the date the student successfully completed the practical test, written in year/month/day format. An authorized representative of the driver training school or employee driver training agency must sign and print their first and last name, verifying the student has completed all parts of the air brake course.

- ✓ Date course completed equals the date the student passed the practical test
- ✓ An authorized representative must sign and print their name to verify course completion
- ✓ The signature confirms the student completed all parts of the air brake course

73.3 Registry Agent Section and Form Validity

The Registry Agent Section must NOT be filled out by the training school; it is completed by Registry Agents upon successful completion of the air brake knowledge test. To take the knowledge test, present the original form and government-issued photo ID to a Registry Agent. The form is valid for 12 months from the date of passing the knowledge test.

- ✓ Do not fill out the Registry Agent Section; it is completed by Registry Agents
- ✓ Present the original form and government photo ID to take the knowledge test
- ✓ The form is valid for 12 months from the date of passing the knowledge test

73.4 Duplicate Copy Handling

The DPLS0005 form comes in duplicate. Students must be given the top copy. Authorized organizations must keep the Training School/Agency copy for their records. If the student loses the original form, they should contact Driver Programs and Licensing Standards.

- ✓ Students must be given the top copy of the duplicate form
- ✓ Authorized organizations must keep the Training School/Agency copy for their records
- ✓ If the original is lost, contact Driver Programs and Licensing Standards

CHAPTER 74

Chapter 11: Fuel Efficiency - Making Smart Choices

74.1 Transportation Emissions Context

Nearly 30% of all greenhouse gas emissions in Canada are produced by the road transportation sector, with a significant portion from heavy-duty vehicles. Drivers can make many practical decisions—from vehicle specifications to driving techniques—to be more fuel-efficient.

- ✓ Nearly 30% of Canada's greenhouse gas emissions come from road transportation
- ✓ Driver behaviour and vehicle specifications both affect fuel efficiency

74.2 Preparation and Planning for Fuel Efficiency

Plan routes carefully—flat routes are more fuel efficient than mountainous, and highway driving beats inner-city driving. Maximize payload (aim for 80-90% capacity instead of 60%). Read the owner's manual and follow the manufacturer's driving recommendations.

- ✓ Flat highway routes are more fuel efficient than mountainous or inner-city routes
- ✓ Maximize payload toward 80-90% capacity for efficiency
- ✓ Follow the manufacturer's driving recommendations in the owner's manual

74.3 Fuel, Engine and Vehicle Specifications

Using the proper grade and type of fuel can improve fuel economy by up to 3%. A direct drive transmission (vs overdrive) may reduce consumption by up to 2%. Reducing aerodynamic drag by 10% can increase fuel efficiency by 5%. Use rib design tires in all positions, consider low rolling resistance/ super single tires, and lighter truck specs where appropriate.

- ✓ Proper fuel grade/type can improve fuel economy by up to 3%
- ✓ Reducing aerodynamic drag by 10% increases fuel efficiency by 5%
- ✓ Rib design tires are more fuel efficient than lug tires on drive/steering axles
- ✓ Direct drive transmission may reduce fuel consumption by up to 2%

74.4 Weather Effects on Fuel Efficiency

Weather affects fuel efficiency—snow-covered roads can increase fuel consumption by 15 to 20%, and heavy winds significantly affect economy. Minimize effects by avoiding bad weather (change trip times/routes), adjusting speed to conditions (reduce in strong head winds), maintaining safe following distance, and not parking on icy grades.

- ✓ Snow-covered roads can increase fuel consumption by 15 to 20%
- ✓ Reduce speed in strong head winds and adjust to conditions
- ✓ Do not park a tractor-trailer on an icy grade—getting stuck wastes fuel and time

74.5 Route Type Fuel Efficiency Comparison

Driving a flat, multi-lane highway improves fuel efficiency by 4 to 11% compared to a flat two-lane highway, up to 18% compared to a mountainous highway, and 25 to 35% compared to taking a suburban route.

- ✓ Flat multi-lane highway is 4-11% more efficient than a flat two-lane highway
- ✓ Flat multi-lane highway is up to 18% more efficient than a mountainous highway
- ✓ Flat multi-lane highway is 25-35% more efficient than a suburban route

CHAPTER 75

Trip Inspections: Purpose and Requirements

75.1 Purpose and Validity of Daily Inspections

Daily vehicle inspections identify problems and defects before operating on the highway, preventing collisions. The inspection uses a schedule listing components to check, and the driver completes a report. The inspection and report are valid for 24 hours and must be carried in the vehicle.

- ✓ A trip inspection and report are valid for a maximum of 24 hours
- ✓ The driver must carry the inspection schedule and report in the vehicle
- ✓ The driver must monitor vehicle condition for defects while en route
- ✓ An inspection by another person may be used if completed within 24 hours

75.2 Vehicles Requiring Trip Inspections

Provincially regulated carriers must inspect trucks registered at 11,794 kg or greater and commercial passenger vehicles seating 11 or more. Federally regulated carriers must inspect trucks registered at 4,500 kg or greater and passenger vehicles seating 11 or more.

- ✓ Provincial carriers: trucks 11,794 kg and greater require trip inspection reports
- ✓ Federal carriers: trucks 4,500 kg and greater require trip inspection reports
- ✓ Passenger vehicles seating 11 or more including driver require inspection
- ✓ A trip inspection is required as part of the Class 1, 2 and 3 road test

75.3 Recording and Reporting Defects

Drivers must record defects immediately after inspection or upon discovery en route. Minor and major defects must be reported to the carrier immediately. A driver may continue with a recorded minor defect but must NOT drive with a major defect listed on the inspection schedule.

- ✓ Defects must be recorded on the report immediately upon discovery
- ✓ Minor and major defects must be reported to the carrier immediately
- ✓ A driver may continue driving with a recorded and reported minor defect
- ✓ No person shall drive a commercial vehicle with a listed major defect
- ✓ Driver must produce the inspection schedule and report on demand of a peace officer

CHAPTER 76

Driving Skills and Manoeuvres

76.1 Four-Second Following Distance Rule

For large vehicles use the four-second rule for following distance. Watch the vehicle ahead pass a fixed object and count; if you reach the object before counting to one-thousand-and-four you are too close. Double the following distance in poor conditions.

- ✓ The two-second rule is the minimum for passenger vehicles at any speed
- ✓ Use the four-second rule for large vehicles
- ✓ Double your following distance when weather, road or traffic conditions are poor

76.2 Off-Tracking Types

Off-tracking occurs when rear tires follow a different path than steering tires. Low speed off-tracking pulls rear tires inward and is common in cities; high speed off-tracking, from centrifugal force, pulls rear tires outward on curves at higher speeds.

- ✓ Low speed off-tracking pulls rear tires inward of the steering path
- ✓ Longer wheelbase or tighter turn increases low speed off-tracking
- ✓ High speed off-tracking pulls rear tires outward due to centrifugal force
- ✓ Use moderate speed entering curves on open highways to avoid dangerous high-speed off-tracking

76.3 Right Turns

For every turn of the wheel the rear wheels follow a shorter path than the front. On narrow streets drive well into the intersection before turning, possibly crossing the centre line. Watch for smaller vehicles and cyclists that may pull along the right side.

- ✓ Allow for low speed off-tracking on every right turn
- ✓ On narrow streets, drive well into the intersection before turning
- ✓ Watch for smaller vehicles and cyclists pulling along the right side during the turn

76.4 Curves and Centrifugal Force

Enter a curve at a speed that does not require braking but allows gradual acceleration through it. Centrifugal force pushes the vehicle outward; traction resists it. Excess speed or braking in a curve can cause skid, rollover or jackknife.

- ✓ Enter curves at a speed that requires no braking, then accelerate gradually
- ✓ Centrifugal force pushes the vehicle to the outside of the curve; traction resists it
- ✓ Braking at too great a speed in a curve may cause skid, rollover or jackknife

76.5 Extra Space for Double and Triple Units

Double and triple trailer units are longer and cannot turn or stop as quickly, so allow more following distance and larger gaps before entering or crossing traffic, and be certain the sides are clear before changing lanes.

- ✓ Allow more following distance for double and triple units
- ✓ Ensure gaps are large enough before entering or crossing traffic
- ✓ Check the sides are clear before changing lanes

76.6 Turning Large Vehicles

Turning a large vehicle requires accounting for off-tracking and a wider turning radius. Use the hand-over-hand steering method with both hands and select the appropriate gear before starting the turn unless the vehicle is automatic.

- ✓ Use the hand-over-hand steering method and both hands
- ✓ Select the appropriate gear before starting the turn unless automatic
- ✓ Account for off-tracking and the wider turning radius

76.7 Left Turns

When turning left, ensure the turning arc is wide enough to allow off-tracking on the left side without crossing the centre line, and prevent cutting the corner. Complete the turn by driving to the right side of the centre line of the road entered.

- ✓ Make the turning arc wide enough to off-track on the left without crossing the centre line
- ✓ Prevent cutting the corner and hitting another vehicle
- ✓ Complete the turn to the right side of the centre line of the road entered

76.8 Right and Left Curve Positioning

On right curves keep the front of the vehicle closer to the centre of the road so trailer wheels don't roll over the curb or drop off the pavement. On left curves keep the front closer to the outside (right side) so trailer wheels don't cut into the other lane.

- ✓ On right curves keep the front closer to the centre of the road
- ✓ On left curves keep the front closer to the outside (right side of road)

CHAPTER 77

Chapter 11: Caring for Your Vehicle

77.1 Preventative Maintenance and Inspections

Preventative maintenance keeps your vehicle healthy and efficient, avoiding unexpected downtime. Beyond scheduled maintenance: keep tires inflated per manufacturer specs (1% of fuel is wasted per 10 psi of under-inflation); do a pre-trip inspection (it's the law); do a post-trip inspection; ensure correct fluid levels; monitor the air filter restriction indicator; and check gauges, tires, and cargo every three hours.

- ✓ 1% of fuel is wasted for each 10 psi of tire under-inflation
- ✓ A pre-trip inspection is legally required before you drive
- ✓ Check gauges, tires, and cargo every three hours during the trip
- ✓ Both under-filling and over-filling fluids can damage your vehicle

CHAPTER 78

Parking

78.1 Securing a parked commercial vehicle

Always set the tractor parking brake, do not use the trailer hand valve to hold a parked unit, put the transmission in the lowest gear, and block wheels with chocks. The transmission alone must not secure the vehicle.

- ✓ Set the parking brake in the tractor; do not use the trailer hand valve to hold a parked unit
- ✓ Put the transmission in the lowest forward or reverse gear and the two-speed axle in low range
- ✓ Block wheels with chocks; minimum square block size is 15 cm by 15 cm
- ✓ Always use the parking brake system and wheel blocks, not just the transmission

78.2 Parking on a hill wheel positioning

Parked wheels must be no more than 50 cm from the curb and the vehicle left in low gear/reverse (manual) or park (automatic) with the park brake engaged. Wheel direction depends on grade and curb presence.

- ✓ Parked wheels must be no more than 50 cm from the curb
- ✓ For parking downhill, with or without a curb, turn front wheels to the right
- ✓ For parking uphill with a curb, turn front wheels to the left
- ✓ For parking uphill without a curb, tractor-trailer units with one articulation point turn front wheels to the left
- ✓ With a curb, allow the vehicle to roll until the front wheels contact the curb before setting the park brake

78.3 Securing a parked vehicle

Always park in a safe place, set the tractor parking brake, put transmission in low gear, and block the wheels. Do not rely on the transmission or trailer hand valve.

- ✓ Set the parking brake in the tractor and do not use the trailer hand valve to hold a parked unit
- ✓ Put the transmission in the lowest forward or reverse gear, and a two-speed axle in low range
- ✓ Block wheels with chocks; minimum square block size is 15 centimetres by 15 centimetres
- ✓ Always use both the parking brake system and wheel blocks

78.4 Parking on a hill

When parking on a hill the wheels must be within 50 centimetres of the curb and turned in the correct direction depending on grade and curb.

- ✓ Wheels must be no more than 50 centimetres from the curb
- ✓ Downhill (with or without curb): turn front wheels to the right
- ✓ Uphill with a curb: turn front wheels to the left
- ✓ Uphill without a curb: tractor-trailer units with one articulation point turn front wheels to the left
- ✓ With a curb, let the vehicle roll until front wheels contact the curb before setting the park brake

78.5 Parking on a Hill

Parked wheels must be no more than 50 cm from the curb, with the vehicle in low gear/reverse (manual) or park (automatic) and the park brake engaged. Wheel direction rules apply to right-side parking; reverse for left-side parking.

- ✓ Parked wheels must be within 50 cm of the curb
- ✓ Parking downhill (with or without curb): turn front wheels to the right
- ✓ Parking uphill with a curb: turn front wheels to the left
- ✓ Parking uphill without a curb: single-articulation tractor-trailers turn front wheels to the left
- ✓ Where a curb exists, let wheels contact the curb before setting the park brake

78.6 Securing a Parked Vehicle

Select a safe place, set the tractor parking brake, and never use the trailer hand valve to hold a parked unit. Put the transmission in the lowest forward or reverse gear and a two-speed axle in low range. Use wheel chocks; do not rely on the transmission.

- ✓ Set the parking brake in the tractor; do not use the trailer hand valve to hold the unit
- ✓ Put the transmission in the lowest forward or reverse gear
- ✓ Block wheels with chocks at least 15 cm by 15 cm
- ✓ Do not rely on the transmission to secure the vehicle

CHAPTER 79

Fuel Efficiency

79.1 Preparation and Planning

Plan routes carefully — flat routes are more fuel efficient than mountainous, and highway driving beats inner-city driving. Maximize payload (aim for 80-90% capacity instead of 60%). Read the owner's manual and follow manufacturer's driving recommendations.

- ✓ Flat routes and highway driving are more fuel efficient than mountainous or inner-city routes
- ✓ Maximize payload — aim for 80-90% capacity rather than 60%
- ✓ Follow the manufacturer's driving recommendations in the owner's manual

79.2 Fuel, Engine and Vehicle Choices

Using proper grade and type of fuel can improve fuel economy by up to 3%. A direct drive transmission instead of overdrive may reduce consumption up to 2%. Reducing aerodynamic drag by 10% can increase efficiency by 5%. Use rib design tires in all positions, consider low rolling resistance or super single tires, choose lighter specifications, and use heaters/aerodynamic accessories.

- ✓ Proper grade/type of fuel can improve fuel economy by up to 3%
- ✓ Reducing aerodynamic drag by 10% can increase fuel efficiency by 5%
- ✓ Rib design tires are more fuel efficient than lug tires on drive and steering axles
- ✓ Lighter truck specifications improve fuel economy and increase freight capacity

79.3 Dealing with Weather

Snow-covered roads can increase fuel consumption by 15 to 20%, and heavy winds also affect economy. Minimize effects by avoiding bad weather (change trip times/routes), adjusting speed for conditions (reduce for head winds), maintaining safe following distance, and not parking a tractor-trailer on an icy grade.

- ✓ Driving on snow-covered roads can increase fuel consumption by 15 to 20%
- ✓ Reduce speed when there is a strong head wind
- ✓ Do not park a tractor-trailer on an icy grade — getting stuck wastes fuel and time

79.4 Caring for Your Vehicle

Preventative maintenance keeps your vehicle efficient. Keep tires inflated to manufacturer specs (1% of fuel is wasted for each 10 psi of under-inflation). Perform pre-trip (required by law) and post-trip inspections, keep fluids correct, monitor the air filter restriction indicator, and check gauges, tires and cargo every three hours during the trip.

- ✓ 1% of fuel is wasted for each 10 psi of tire under-inflation
- ✓ A pre-trip inspection is required by law and helps avoid breakdowns
- ✓ Check gauges, tires and cargo every three hours during the trip
- ✓ Under-filling and over-filling fluids can both damage the vehicle

79.5 Smart Starting and Warm-Up Practices

Start with zero throttle in a gear needing no throttle. Do not pump the throttle of a fuel-injected engine (fuel is pre-measured) or older mechanical engines (wastes fuel, damages cylinder walls). Use ether sparingly. Do not increase engine speed when warming up — five minutes of idling is generally adequate. Ensure oil and air pressure are in normal ranges, then warm up by driving easily.

- ✓ Start the vehicle with zero throttle in a gear that needs no throttle
- ✓ Do not pump the throttle of a fuel-injected engine — the fuel is pre-measured
- ✓ Five minutes of idling for warm-up is generally adequate
- ✓ Use ether sparingly — excessive use can harm the engine

79.6 Fuel-Efficient Driving and Shifting

Reduce average speed, change gears smoothly (professional shifting yields about 30% improvement in operating costs), always use the clutch, and practice progressive gear shifting at about 1600 rpm. Run the engine in the highest gear range to keep a low rev range, back off the accelerator over hilltops, use cruise control where appropriate, and use the retarder properly.

- ✓ Professional gear shifting can improve operating costs by about 30%
- ✓ Always use the clutch — failure can wear gear teeth in the transmission
- ✓ Practice progressive gear shifting at approximately 1600 rpm
- ✓ Run the engine in the highest gear range to keep a low rev range

79.7 Idling Costs and Reduction

Idling a truck engine burns up to four litres of fuel per hour at 900 rpm. Turn off the engine when stopped for any length of time to save fuel, reduce maintenance, prolong engine life and prevent emissions. Cutting idling by one hour a day for 260 days saves about 10,400 litres per truck.

- ✓ Idling burns up to four litres of fuel per hour at 900 rpm
- ✓ Turn off the engine when stopped for any length of time
- ✓ Reducing idling saves fuel, reduces maintenance and prolongs engine life

79.8 Speed and Fuel Consumption

Managing road speed with smart driving techniques keeps speed constant and improves efficiency. Generally, for every 10 km/h over 90 km/h you use 10% more fuel.

- ✓ For every 10 km/h over 90 km/h, you use 10% more fuel
- ✓ Keeping a constant speed increases fuel efficiency

79.9 Preparation and Planning for Fuel Savings

Plan routes carefully—flat routes are more efficient than mountainous, and highway driving beats inner-city. Maximize payload (aim for 80-90% capacity instead of 60%). Read the owner's manual and follow manufacturer driving recommendations.

- ✓ Choose flat and highway routes over mountainous or inner-city routes
- ✓ Maximize payload to 80-90% capacity
- ✓ Follow the manufacturer's driving recommendations in the owner's manual

79.10 Caring for Your Vehicle for Efficiency

Preventative maintenance keeps a vehicle efficient. Inflate tires per manufacturer specs—1% of fuel is wasted for each 10 psi of under-inflation. Do pre-trip (legally required) and post-trip inspections, keep fluid levels correct, monitor the air filter restriction indicator, and check gauges, tires and cargo every three hours during the trip.

- ✓ 1% of fuel is wasted for each 10 psi of tire under-inflation
- ✓ Pre-trip inspection is legally required; also perform post-trip inspections
- ✓ Check gauges, tires and cargo every three hours during the trip

79.11 Smart Driving Practices for Fuel Economy

Reduce average speed, change gears smoothly (professional shifting improves operating costs about 30%), always use the clutch, practice progressive shifting around 1600 rpm, run in the highest gear range for a low rev range, use the retarder properly, and back off the accelerator over hilltops using gravity and momentum. Use cruise control where appropriate.

- ✓ Professional smooth shifting can improve operating costs by about 30%
- ✓ Always use the clutch to avoid wearing gear teeth
- ✓ Practice progressive gear shifting around 1600 rpm and run in the highest gear range
- ✓ Back off the accelerator over hilltops to use gravity and momentum

79.12 Idling and Technology Benefits

Idling a truck engine burns up to four litres of fuel per hour at 900 rpm. Turn off the engine when stopped for any length of time to save fuel, reduce maintenance, prolong engine life, and reduce emissions. Modern engines let you downshift around 1200 rpm and upshift around 1600 rpm (rather than 2000 rpm), shifting less and saving money.

- ✓ Idling burns up to four litres of fuel per hour at 900 rpm
- ✓ Turn off the engine when stopped for any length of time
- ✓ Modern engines allow downshift ~1200 rpm and upshift ~1600 rpm

79.13 Road Conditions and Speed Management

Smart fuel-efficient driving is also safe driving. Adjust to light conditions (sunglasses in bright light, slow in poor light), maintain correct seat posture for comfort/alertness/visibility, and travel at the same speed as traffic within the limit. Managing road speed keeps speed constant—generally for every 10 km/h over 90 km/h you use 10% more fuel.

- ✓ For every 10 km/h over 90 km/h, fuel use increases by about 10%
- ✓ Adjust driving for light conditions and maintain correct seat posture
- ✓ Travel at the same speed as traffic within the speed limit

79.14 Fuel Efficiency as a Growing Priority

Nearly 30% of all greenhouse gas emissions in Canada come from the road transportation sector, much from heavy-duty vehicles. Drivers can make many practical decisions to be more fuel-efficient, from vehicle specifications to behind-the-wheel techniques.

- ✓ Nearly 30% of Canada's greenhouse gas emissions come from road transportation
- ✓ Fuel efficiency involves both vehicle specification choices and driving techniques

79.15 Highway Selection Fuel Savings

Choosing a flat, multi-lane highway improves fuel efficiency by 4 to 11% compared to a flat two-lane highway, as much as 18% compared to a mountainous highway, and 25 to 35% compared to a suburban route.

- ✓ Flat multi-lane highway saves 4-11% versus a flat two-lane highway
- ✓ Flat multi-lane highway saves as much as 18% versus a mountainous highway
- ✓ Flat multi-lane highway saves 25-35% versus a suburban route

79.16 Taking Advantage of Engine Technology

New engine designs deliver more horsepower and torque in lower rpm ranges. You can downshift at about 1200 rpm and up-shift at about 1600 rpm rather than 2000 rpm, so you shift less, save money and generate fewer emissions.

- ✓ New engines allow downshifting at about 1200 rpm and up-shifting at about 1600 rpm
- ✓ Shifting at lower rpm rather than 2000 rpm reduces shifting, saves money and reduces emissions

79.17 Fuel, Engine, and Vehicle Choices

Using the proper grade and type of fuel can improve economy by up to 3%. A direct drive transmission may reduce consumption by up to 2%. Reducing aerodynamic drag by 10% can increase efficiency by 5%. Use rib tires, low rolling resistance/super single tires, lighter specifications, and accessories like block heaters and winter fronts.

- ✓ Proper fuel grade/type improves economy up to 3%; direct drive transmission reduces consumption up to 2%
- ✓ Reducing aerodynamic drag 10% increases fuel efficiency 5%
- ✓ Use rib design tires, low rolling resistance/super single tires, and lighter specifications

79.18 Weather Effects on Fuel Efficiency

Snow-covered roads can increase fuel consumption 15-20%, and heavy winds significantly affect economy. Minimize weather effects by avoiding bad weather via route/time changes, adjusting speed to conditions (especially in head winds), maintaining safe following distance, and not parking a tractor-trailer on an icy grade.

- ✓ Snow-covered roads can increase fuel consumption by 15-20%
- ✓ Reduce speed in strong head winds and adjust to conditions
- ✓ Do not park a tractor-trailer on an icy grade—getting stuck wastes fuel and time

79.19 Highway Choice Fuel Savings

Choosing to drive a flat, multi-lane highway improves fuel efficiency compared to alternatives: 4 to 11% versus a flat two-lane highway, as much as 18% versus a mountainous highway, and 25 to 35% versus a suburban route.

- ✓ A flat multi-lane highway saves 4-11% over a flat two-lane highway
- ✓ It saves up to 18% over a mountainous highway and 25-35% over a suburban route

CHAPTER 80

Trip Inspections: Circle Check and Walk-Around

80.1 Tire and Wheel Inspection Standards

Steering axle tires must have tread depth not less than 3.2 mm; all other tires not less than 1.6 mm. Check for proper inflation, no bulges, sidewall separation, cuts or uneven wear. Dual tires must not touch and nothing trapped between them. Rims must have no cracks, missing pieces, bends or rust streaks, and fasteners must be secure.

- ✓ Steering axle tire tread depth not less than 3.2 mm
- ✓ Drive and trailer axle tire tread depth not less than 1.6 mm
- ✓ Dual tires must not touch and nothing trapped between them
- ✓ Wheel rims must have no cracks, bends or rust streaks and fasteners must be secure
- ✓ Rust streaks may indicate loose wheel fasteners

80.2 Air Brake Component Inspection

For air brake vehicles, check the air compressor mounting, lines, fittings, hoses and couplers; brake chambers for condition and security; slack adjuster angle, push rod travel and wear; and air lines for leaks, kinks, cuts, abrasions or cracks. Slack adjusters can be checked by pulling manually or with a pry bar.

- ✓ Air compressor must be securely mounted with sound lines and fittings
- ✓ Brake chambers must be secure with no cracks, corrosion or holes
- ✓ Check slack adjuster push rod travel, mechanical condition and wear
- ✓ Air lines must have no leaks, kinks, cuts, abrasions or cracks
- ✓ Nothing must obstruct the push rod travel

80.3 Preparation Before Inspection

Before beginning a trip inspection, choose level terrain, park safely away from traffic, set the parking/spring brake, place a manual transmission in low gear, shut off the engine, and chock the wheels—especially important for air brake vehicles when brakes are released later.

- ✓ Choose level terrain and park away from traffic
- ✓ Set parking/spring brake and put manual transmission in low gear
- ✓ Shut off the engine before inspecting
- ✓ Chock the wheels; minimum square block size is 15 by 15 centimetres
- ✓ Always make a complete circle around the vehicle checking everything

80.4 Under Hood and Steering Inspection

Check the radiator for leaks, coolant level and cap; fan blades and mountings; belt tension and wear; fluid levels; air filter; and battery condition, terminals and mounting. Check steering for bent/broken/missing parts, power steering leaks, fluid level, and excessive play.

- ✓ Check radiator, fan, belts, fluid levels, air filter and battery under the hood
- ✓ Steering mechanism must have no bent, broken or missing parts and no excessive play
- ✓ Check hose connections for leaks, kinks, cuts, abrasions or cracks
- ✓ Check shock absorbers and suspension for damage where visible

CHAPTER 81

Driving Defensively and Safe Stopping

81.1 Defensive Driving Tactics

Defensive driving anticipates hazards and maintains constant speed, conserving momentum (power not used is fuel not burned). Do not let frustration push you into unsafe passes; look ahead and anticipate stops (coasting is more efficient than braking); maintain a four-second following distance; know and check your blind spots; and be aware of your physical and mental condition.

- ✓ Maintain a safe following distance of four seconds
- ✓ It is more efficient to coast to a stop than to brake
- ✓ Be aware of your blind spots and check them regularly
- ✓ Be aware of your own physical and mental condition including effects of alcohol, drugs, fatigue and illness

81.2 Safe Stopping Distance

Keep a safe following distance so you can always brake safely and efficiently. Driving at 70 km/h requires a stopping distance of about 300 feet (90 metres).

- ✓ Driving at 70 km/h requires a stopping distance of about 300 feet (90 metres)
- ✓ Keep a safe following distance to always brake safely and efficiently

CHAPTER 82

Reversing

82.1 Reversing safety precautions

Avoid unnecessary reversing by planning ahead. Sound the horn before reversing, use a guide when possible, and get out to check the area if no guide is available.

- ✓ Sound the horn before reversing and repeat at least once for every vehicle length reversed
- ✓ Use a guide who can see the vehicle's path and whom the driver can see; stop if you cannot see the guide
- ✓ The driver is still responsible for all vehicle movements even with a guide
- ✓ If reversing distance exceeds two vehicle lengths, stop and recheck the areas around the unit

82.2 Reversing manoeuvres and hand signals

Straight line reversing is the easiest and safest. 90-degree clear side (left) reversing gives a good mirror view, while blind side (right) reversing is the most difficult and dangerous and should be avoided.

- ✓ Reverse in a straight line whenever possible as it is the easiest and safest
- ✓ Clear side (left) reversing provides a clear left mirror view of the space
- ✓ Blind side (right) reversing is the most difficult and dangerous and should be avoided if possible
- ✓ Keep your foot off the throttle, use the lowest reverse gear, and cover the brake pedal

82.3 Reversing a semi-trailer technique

Reversing a semi-trailer requires steering opposite to the desired trailer direction; the tractor follows an S-shape to bring the trailer around.

- ✓ Turn the steering wheel opposite to where you want the trailer to go, or place your hand on the bottom of the wheel and move it the direction you want the trailer to go
- ✓ The tractor must follow an S-shape to bring the trailer around smoothly
- ✓ Reverse slowly using both rear view mirrors and remember the blind spot directly behind the vehicle
- ✓ Sound the horn before reversing and repeat at least once for every vehicle length reversed

82.4 Using a guide when reversing

When possible use a guide with agreed hand signals; the driver must always see the guide and remains responsible for all movements.

- ✓ The guide must see the vehicle's path and the driver must see the guide; stop if you cannot see the guide
- ✓ The driver is still responsible for all movements even with a guide
- ✓ If no guide is available, get out and visually check the area before reversing
- ✓ If reversing distance exceeds two vehicle lengths, stop, get out and recheck all areas around the unit
- ✓ Keep your foot off the throttle, use the lowest reverse gear, and cover the brake pedal

82.5 Reversing a Semi-Trailer Steering Technique

To reverse a semi-trailer, turn the steering wheel in the opposite direction to where you want the trailer to go, or place your hand at the bottom of the wheel and move it in the direction you want the trailer to go. The tractor must follow an S-shape.

- ✓ Turn the steering wheel opposite to the desired trailer direction
- ✓ Alternatively move a hand at the bottom of the wheel in the trailer's desired direction
- ✓ The tractor must follow an S-shape to bring the trailer around smoothly

82.6 Safe Reversing Practices

Reverse slowly using both rear-view mirrors, aware of the blind spot directly behind. Avoid unnecessary reversing, sound the horn before reversing and repeat every vehicle length, and use a guide who can see the path while the driver can see the guide.

- ✓ Always reverse slowly and use both rear-view mirrors
- ✓ Sound the horn before reversing and repeat at least once per vehicle length reversed
- ✓ Use a guide where possible with agreed hand signals; stop if you cannot see the guide
- ✓ The driver is still responsible for all movements even with a guide

82.7 90 degree reversing clear vs blind side

Clear side (left) reversing gives a clear left mirror view, while blind side (right) reversing is the most difficult and dangerous and should be avoided.

- ✓ Straight line reversing is the easiest and safest; reverse straight whenever possible
- ✓ For clear side reversing, turn the wheel right to move the trailer left, then straighten by turning left
- ✓ Blind side (right side) reversing mostly uses the right mirror and convex mirror and requires frequent stops to check position
- ✓ Avoid blind side reversing when possible as it is the most difficult and dangerous

82.8 Reversing Distance and Gear Control

If no guide is available, get out and check the area first. If reversing distance exceeds two vehicle lengths, stop and recheck all areas. Keep foot off throttle, select the lowest reverse gear, move slowly and cover the brake pedal.

- ✓ If no guide, get out and visually check the area before reversing
- ✓ If reversing more than two vehicle lengths, stop and recheck around the entire unit
- ✓ Select the lowest reverse gear and cover the brake pedal with your right foot

82.9 90 Degree Reversing Clear vs Blind Side

Straight line reversing is easiest and safest. Clear side (left) reversing gives a clear left mirror view. Blind side (right) reversing is the most difficult and dangerous, relies on right mirror including convex mirror, requires frequent stops to check, and should be avoided.

- ✓ Reverse in a straight line whenever possible
- ✓ Clear side (left) reversing provides a clear left mirror view
- ✓ Blind side (right) reversing is most difficult and dangerous; avoid it if possible
- ✓ Stop often and get out to check position during blind side reversing

CHAPTER 83

Driving Defensively

83.1 Defensive Driving for Safety and Fuel

Smart driving is both attitude and skill. Defensive driving lets you anticipate hazards and maintain constant speed, conserving momentum so you do not continually rebuild lost speed—power not used is fuel not burned. Do not let frustration cause unsafe passes, look ahead and anticipate stops (coasting is more efficient than braking), maintain a safe following distance, watch blind spots, and be aware of your physical/mental condition.

- ✓ Maintain a safe following distance of four seconds
- ✓ Coasting to a stop is more efficient than braking; anticipate stops
- ✓ Do not let frustration lead to unsafe passes or maneuvers
- ✓ Be aware of your physical/mental condition including alcohol, drugs, age, illness, fatigue, emotion and diet

83.2 Safe Stopping Distance

Keep a safe following distance so you can always brake safely and efficiently. Driving at 70 km/h requires a stopping distance of about 300 feet (90 metres).

- ✓ Driving at 70 km/h requires about 300 feet (90 metres) of stopping distance
- ✓ Keep a safe following distance to brake safely and efficiently

CHAPTER 84

Chapter 11: Smart Driving Practices

84.1 Proper Engine Starting and Warm-Up

Fuel efficiency starts at engine start-up. Use zero throttle in a gear needing no throttle. Do not pump the throttle on fuel-injected engines (fuel is pre-measured) or older mechanical engines (wastes fuel, damages cylinder walls). Use ether sparingly. Do not increase engine speed while warming up—five minutes of idling is generally adequate. Ensure oil and air pressure are normal at start-up.

- ✓ Start with zero throttle in a gear that needs no throttle
- ✓ Do not pump the throttle on fuel-injected or older mechanical engines
- ✓ Five minutes of idling for warm-up is generally adequate
- ✓ Use ether sparingly as excessive use can harm the engine

84.2 Efficient Driving Techniques

Warm up by driving easily, not pushing the throttle hard. Back off the accelerator over hilltops and let gravity/momentum work. Use cruise control where appropriate. Reduce average speed—for every 10 km/h over 90 km/h you use 10% more fuel. Change gears smoothly (about 30% improvement in operating costs). Always use the clutch. Practice progressive shifting at ~1600 rpm. Run the engine in the highest gear range. Use the retarder properly and turn it off when not needed.

- ✓ For every 10 km/h over 90 km/h you use 10% more fuel
- ✓ Smooth, professional gear shifting can improve operating costs by about 30%
- ✓ Always use the clutch to avoid wearing gear teeth in the transmission
- ✓ Practice progressive gear shifting at approximately 1600 rpm

84.3 Idling Costs and Fuel Waste

Idling a truck engine burns up to four litres of fuel per hour at 900 rpm. Turn off the engine when stopped for any length of time to save fuel, reduce maintenance, prolong engine life, and prevent emissions. Cutting one hour of idling per day for 260 days saves ~10,400 litres per truck.

- ✓ Idling burns up to 4 litres of fuel per hour at 900 rpm
- ✓ Turn off the engine when stopped for any length of time
- ✓ Cutting idling saves fuel, reduces maintenance, and prolongs engine life

84.4 Taking Advantage of Engine Technology

New engine designs deliver more horsepower and torque at lower rpm ranges. You can downshift at about 1200 rpm and up-shift at about 1600 rpm rather than 2000 rpm, so you shift less, save money, and generate fewer emissions.

- ✓ Downshift at about 1200 rpm and up-shift at about 1600 rpm with new engines
- ✓ Lower rpm operation means fewer shifts, cost savings, and fewer emissions

84.5 Keeping Up with Road Conditions

Smart fuel-efficient driving is also safe driving. Adjust for light (wear sunglasses in bright conditions, slow in poor light). Maintain good posture with the seat adjusted for comfort, alertness, visibility, and control access. Match traffic speed within the speed limit and give way considerately to other drivers.

- ✓ Adjust driving to visibility—reduce speed in poor light conditions
- ✓ Keep the seat adjusted for comfort, alertness, visibility, and control access
- ✓ Travel at the same speed as other traffic while staying within the speed limit

CHAPTER 85

Trip Inspections: Coupling and Combination Components

85.1 Fifth Wheel and Kingpin Inspection

For a truck-tractor combination, inspect the fifth wheel coupler bolt, slider lock, and plate for damage, cracks or weld separations. The plate must be flush to the apron with no daylight visible. Locking jaws must be closed with the kingpin enclosed, and the kingpin must not be worn, damaged or broken.

- ✓ Fifth wheel coupler bolt must be secure and slider locked
- ✓ Plate must be flush to the apron with no daylight visible between them
- ✓ Fifth wheel locking jaws must be closed with kingpin enclosed
- ✓ Kingpin and pintle hitch eyehook must not be worn, damaged, cracked or broken
- ✓ Check drive shaft condition with no obstructions

85.2 Trailer and Landing Gear Inspection

For the trailer, check the inspection decal, body for damage or missing rivets, frame and cross members. Landing gear must be raised with a secure handle and no cracks. Check air lines, clearance/marker lights, load security devices, tires, rims, sliding tandem and locking pin, brake chambers, slack adjusters and suspension.

- ✓ Landing gear must be raised with a secure handle and lowering mechanism
- ✓ Trailer air lines must be secured with no leaks, kinks, cuts, abrasions or cracks
- ✓ Sliding tandem locking pin must be locked and secure with no cross member damage
- ✓ Load security devices and anchor points must be secure and undamaged
- ✓ Multiple trailers may be added to a single report with additional lines

85.3 Suspension and Axle Assembly

Suspension must have no cracked, missing or broken springs; torsion bars or walking beams must be secure and undamaged; and U-bolts must not be loose, missing or broken. On air suspension, check for damaged, worn or inoperative air bags. Axle assembly must have no breaks, cracks, holes, broken seals or bends.

- ✓ Suspension springs, torsion bars and walking beams must be sound and secure
- ✓ U-bolts must not be loose, missing or broken
- ✓ On air suspension, check for damaged, worn or inoperative air bags
- ✓ Axle assembly must have no breaks, cracks, holes, broken seals or bends

CHAPTER 86

Chapter 11: Driving Defensively and Safe Stopping

86.1 Defensive Driving Tactics

Defensive driving anticipates hazards and maintains constant speed, conserving momentum so you don't rebuild lost speed—power not used is fuel not burned. Tactics: don't let frustration cause unsafe passes; look ahead and anticipate stops (coasting is more efficient than braking); maintain a four-second following distance; know and check blind spots; and be aware of your own physical/mental condition (alcohol, drugs, age, attitude, illness, fatigue, emotion, diet).

- ✓ Maintain a safe following distance of four seconds
- ✓ Coasting to a stop is more efficient than braking
- ✓ Do not let frustration push you into unsafe passes or maneuvers
- ✓ Be aware of your own condition including fatigue, illness, and effects of alcohol/drugs

86.2 Safe Stopping Distance

Keep a safe following distance so you can always brake safely and efficiently. Driving at 70 km/h requires a stopping distance of about 300 feet (90 metres).

- ✓ Driving at 70 km/h requires about 300 feet (90 metres) of stopping distance
- ✓ Keep a safe following distance to always brake safely and efficiently

CHAPTER 87

Important information for commercial drivers

87.1 Rules for special loads and crossings

Trucks carrying logs, dangerous goods or explosives have special rules including railway crossing stops and designated urban routes. Loads extending beyond the rear must be marked.

- ✓ Trucks carrying explosives or flammable goods must stop before every uncontrolled railway crossing
- ✓ In urban areas, drive only on routes specified for trucks and dangerous goods vehicles
- ✓ If a load extends more than 1.5 metres beyond the rear, attach a red flag at least 30 cm square during daylight or a red light at night
- ✓ Comply with federal and provincial dangerous goods laws for handling, storage and transport

87.2 Breakdown warning device placement

When a breakdown occurs, park safely on the right and deploy emergency lights and approved warning devices at distances that vary by day or night.

- ✓ Park as soon as possible in a safe position on the right side of the roadway
- ✓ Daytime breakdown outside urban limits: activate hazard lights and place a warning device about 30 metres (100 feet) in front and behind
- ✓ Nighttime or low visibility (cannot see 150 metres): place an approved warning device 75 metres (250 feet) in front and behind
- ✓ Activate emergency hazard lights during any highway breakdown

87.3 Special load and cargo rules

Certain cargo requires specific handling including logs, dangerous goods, explosives and loads extending beyond the vehicle rear.

- ✓ Overhanging logs may swing across other lanes on turns; let traffic behind pass before turning
- ✓ Trucks carrying explosives or flammable goods must stop before every uncontrolled railway crossing
- ✓ In urban areas drive only on routes specified for trucks and dangerous goods vehicles
- ✓ Loads extending more than 1.5 metres beyond the rear require a red flag (at least 30 cm square) by day and a red light at night
- ✓ Comply with federal and provincial laws when carrying dangerous goods

CHAPTER 88

Trip Inspections: Trip Air Brake Inspection Procedure

88.1 Tractor Protection and Park Control Valve Tests

With the engine off and key in run, push the trailer air supply valve and disconnect both air lines. The trailer air supply valve (red) should pop out at 40-60 PSI or higher and the low air warning should activate by 60 PSI. Pushing the park control valve (yellow) and pumping the foot valve should cause it to pop out at 20-45 PSI.

- ✓ Trailer air supply valve (red) should pop out at 40-60 PSI (276-414 kPa) or higher
- ✓ Low air pressure warning must come on by 60 PSI (414 kPa)
- ✓ Park control valve (yellow) should pop out at 20-45 PSI (138-311 kPa)
- ✓ No air should leak from the open trailer service line when holding the brake valve

88.2 Supply Circuit and Governor Test

With the engine at fast idle around 1200 RPM, the compressor should build 50 to 90 PSI within 3 minutes and the low air warning light should go out by 60 PSI. Build to system maximum to confirm governor cut-out at 120-135 PSI. Pump service brakes to confirm cut-in is 20-25 PSI less than cut-out.

- ✓ Compressor build-up: 50 to 90 PSI (345-621 kPa) within 3 minutes
- ✓ Low air warning light must go out by 60 PSI (414 kPa)
- ✓ Governor cut-out at 120-135 PSI (828-931 kPa)
- ✓ Governor cut-in must be 20-25 PSI (138-172 kPa) less than cut-out

88.3 Air System Leak and Brake Response Test

Turn off the engine and hold a full service brake application for 2 minutes. Maximum allowable loss is 4 PSI for power units plus an additional 2 PSI per trailer after the system stabilizes. Then remove chocks, release spring brakes and test brake response with both the foot valve and the trailer hand valve.

- ✓ Hold a full service brake application for 2 minutes to test for leaks
- ✓ Maximum 4 PSI (28 kPa) loss for power units plus 2 PSI (14 kPa) per trailer
- ✓ Perform brake response tests using both the foot valve and trailer hand valve
- ✓ Chock wheels and inspect components before the air brake test

CHAPTER 89

Important Information for Commercial Drivers

89.1 Breakdown Warning Device Placement

If a breakdown occurs, park safely on the right side of the roadway. Outside urban limits during daylight, activate hazard lights and place warning devices about 30 metres front and rear. In darkness or when visibility is under 150 metres, place devices 75 metres front and rear.

- ✓ Park the vehicle safely on the right side of the roadway during a breakdown
- ✓ Daytime outside urban limits: warning devices 30 metres (about 100 feet) front and rear
- ✓ Darkness or low visibility (under 150 m): warning devices 75 metres (about 250 feet) front and rear
- ✓ Always activate emergency hazard lights

89.2 Railway Crossings and Dangerous Goods

Trucks carrying explosives or flammable goods must stop before every uncontrolled railway crossing. In urban areas drivers must use only routes specified for trucks and dangerous goods vehicles and comply with federal and provincial dangerous goods laws.

- ✓ Stop before every uncontrolled railway crossing when carrying explosives or flammable goods
- ✓ In cities and towns, drive only on routes specified for trucks and dangerous goods vehicles
- ✓ Comply with federal and provincial laws for handling, storing and transporting dangerous goods

89.3 Load Overhang Marking

If a load reaches or extends more than 1.5 metres beyond the rear of the vehicle, a marking is required. In daylight a red flag not less than 30 cm square is attached to the end; at night a red light is attached to the end.

- ✓ A red flag (min. 30 cm square) is required in daylight for loads extending over 1.5 m past the rear
- ✓ A red light is required at night for loads extending over 1.5 m past the rear

89.4 Logs and Cross-Border Transport

When carrying logs, overhanging logs may swing across other lanes when turning, so let traffic behind pass before turning. When hauling goods to the US on a non-regular basis, contact each state's Department of Transportation or Highways before starting, as laws differ by state.

- ✓ Let traffic behind pass before turning when carrying overhanging logs
- ✓ Contact each US state's transportation department before an irregular cross-border trip
- ✓ Obtain all proper permits and documents before departing

CHAPTER 90

Information for class 2 and class 4 bus operators

90.1 Bus operator responsibilities

Bus operators are responsible for the safe transportation of many passengers regardless of conditions, and must know all applicable rules, regulations and company policy.

- ✓ The bus operator is responsible for safe passenger transportation regardless of weather, road or traffic conditions
- ✓ Know all rules, regulations and company policy under which you operate

CHAPTER 91

Operating a school bus safely

91.1 School bus breakdown procedures

If a school bus breaks down, stop safely off the roadway, analyze whether passengers should stay or leave, and place warning devices according to daylight or darkness conditions. Stay with the bus if you cannot get help.

- ✓ Stop the bus as far off the roadway as practical and analyze the situation before moving passengers
- ✓ In daylight outside urban limits, place approved warning devices 30 metres in front and behind the bus
- ✓ In darkness or when visibility is under 150 metres, place approved warning devices 75 metres in front and behind
- ✓ If you cannot fix the problem or call for help, stay with the bus

91.2 School bus reversing rules

Reversing is a leading cause of school bus collisions and should be avoided. It is illegal to reverse a school bus in a schoolyard or next to a school ground unless a responsible guide is outside at the rear giving direction.

- ✓ It is illegal to reverse a loaded or unloaded school bus in a schoolyard or next to a school ground without a responsible guide at the rear
- ✓ Physically check the area, use a responsible adult guide, agree on hand signals, tap the horn and reverse slowly
- ✓ Stop immediately if you lose sight of the guide; the driver is responsible for all movements

91.3 Passenger loading and unloading with flashing lights

Alternately flashing red lights and the stop arm may only be used when loading and unloading passengers. Drivers must activate them at complete stops and turn them off when not loading or unloading.

- ✓ Activate alternately flashing red lights only when loading and unloading passengers, unless a bylaw prohibits their use
- ✓ Drivers approaching a stopped school bus with flashing red lights must stop from either direction on an undivided highway and from behind on a divided highway
- ✓ On the eight-light system, activate amber lights as the bus slows down, then red lights when stopped
- ✓ Pull as far right as practical and choose a location at least one metre from waiting students

91.4 Student crossing procedures

Before loading or unloading ensure traffic has stopped, transmission is in neutral/park with the park brake applied. Students crossing in rural areas must go 10 paces in front and wait for the driver's direction.

- ✓ Before loading/unloading, place transmission in neutral (manual) or park (automatic) and apply the park brake with firm pressure on the pedal
- ✓ Instruct crossing students to go at least 10 paces in front, stop before entering the roadway, and wait for your direction
- ✓ Establish a line of sight, do not lose sight of students, and account for all of them
- ✓ Check all mirrors including the cross-over mirror before moving to ensure no students are lingering

91.5 School bus railway crossing procedures

School bus drivers must stop at railway crossings unless a traffic control signal or an officer directs them to proceed. A specific procedure applies at all uncontrolled crossings.

- ✓ Stop not less than 5 metres or more than 15 metres from the nearest track
- ✓ Alternately flashing amber or red lights must not be used when stopping at a railway crossing
- ✓ Turn off fans/radio, open the front door and driver's window, look both ways and listen for a train
- ✓ Put transmission in neutral or park, engage the parking brake, and do not shift a manual transmission until clear of the last track

91.6 School bus safe driving guidelines

The maximum speed for a loaded or unloaded school bus under ideal conditions is 90 km/h or the posted limit. Students must be seated while moving, and evacuation drills and procedures must be known.

- ✓ Maximum school bus speed under ideal conditions is 90 km/h or the posted speed limit, whichever is lower
- ✓ Use the four-second following rule and increase distance in poor conditions
- ✓ All students must be seated and all doors closed while the bus is moving; rear door use is only for emergencies
- ✓ Never refuel a bus with passengers aboard
- ✓ There are three standard evacuation methods: front exit, rear exit, and front and rear exit at the same time

91.7 School bus left and right turns

Prepare in advance by positioning in the appropriate lane, signal early, reduce speed and downshift, and check traffic and pedestrians. Do not shift gears during the turn and check mirrors for body swing.

- ✓ Turning left take the leftmost lane; turning right take the right-most lane available
- ✓ When stopped to turn left keep front wheels straight and brake pedal depressed so you are not pushed into oncoming traffic if struck
- ✓ Never shift gears during the turn
- ✓ Check mirrors for bus body swing and clearance and confirm the turn signal cancelled

91.8 Turnaround procedures

A turnaround on a two-lane highway is only done if it cannot be done on private property, and only by backing into a road on the right. Never back onto or across a highway.

- ✓ Never back onto or across a highway
- ✓ Back into a road on the right of the main roadway using mirrors and shoulder checks
- ✓ Load passengers before the turnaround and unload passengers after backing
- ✓ A U-turn on a four-lane divided highway is allowed only if the bus length is less than the median width and the bus is fully clear of traffic lanes

91.9 Strobe lamp and discipline rules

A school bus strobe lamp must be activated during adverse visibility conditions and may be used when increased visibility is desirable. A driver may not unload a student anywhere other than the normal destination.

- ✓ Activate the strobe lamp during adverse conditions such as fog, blizzard and smoke; it may be used where increased visibility is desirable
- ✓ A student cannot be unloaded at any place other than the student's normal destination; only school administration may remove a student

CHAPTER 92

Trip Inspections: Enroute, Inspection Stations and Post-Trip

92.1 Enroute Check Stop Inspections

Rest and check stops provide a break to reduce fatigue and a chance to check the vehicle after time on the road. Choose a stop completely off the road, with entry/exit that avoids backing, not at the bottom of a hill or on an uphill slope, and with an adequate acceleration lane.

- ✓ Ensure the vehicle is completely off the road at a check stop
- ✓ Do not stop at the bottom of a hill or on an uphill slope
- ✓ Check that all lights work, there are no air leaks, and wheels/tires are secure and not hot
- ✓ Verify the load is secure and dangerous goods placards are clean and secure

92.2 Reporting to Vehicle Inspection Stations

All commercial vehicles or combinations weighing over 4,500 kg must report to inspection stations when the highway lights are flashing. Loaded vehicles cross the scale lane slowly; empty vehicles use the adjacent lane. Follow the light board: STOP, BACK UP, or PARK instructions.

- ✓ All commercial vehicles/combinations over 4,500 kg must report when station lights flash
- ✓ Loaded vehicles drive slowly across the scale lane; empty in the adjacent lane
- ✓ Follow light board instructions: STOP, BACK UP or PARK
- ✓ If PARK is activated, bring all vehicle and driver documents to the scale building

92.3 Post-Trip Inspection

A post-trip inspection at the end of a shift allows service or repairs before the next trip, and the report should note any problems found during the trip. School buses require special end-of-trip inspection inside and out due to heavy wear and passenger safety.

- ✓ Post-trip inspection helps obtain service/repairs before the next trip
- ✓ For school buses, inspect for lost articles and sleeping children remaining on the bus
- ✓ Check emergency equipment condition and clean the floors
- ✓ Report minor damage, fluid leaks, and check tires for damage and air leaks

CHAPTER 93

Loading and unloading dump vehicles

93.1 During unloading dump vehicles

Keep people and vehicles out of the dumping radius, verify hoppers are empty, recognize tip-over hazards, and never enter a raised box. Lower the box and latch the tailgate after unloading.

- ✓ Other vehicles and people must not be within the dumping radius of the raised box
- ✓ Soft, uneven or poorly compacted surfaces can cause a tip-over; a load concentrated at the rear with a closed tailgate can tip the vehicle backwards
- ✓ Do not get into the raised box if the load is stuck; lower the box first
- ✓ Once unloading is complete, lower the box and ensure the tailgate is latched

93.2 Loading dump vehicles safely

Follow company loading policy and use three-point contact when exiting the vehicle. A loaded vehicle must not move until the load is evenly distributed, secured, and within legal dimensions and weights.

- ✓ Use three-point contact (two hands and one foot, or two feet and one hand) when leaving the vehicle; never jump
- ✓ Do not move a loaded vehicle until material is evenly distributed and the load is secured so it will not blow or fall off
- ✓ Secure tailgate, tailboards, doors, tarpaulins, spare tire and remove loose materials from the box and coupling devices
- ✓ Ensure total dimensions and axle weights are within legal limits and tarp the load if required by municipal law

93.3 Before unloading dump vehicles

Back slowly and to the driver's side for better visibility, use a guide when possible, check backing alarms and overhead wires, and only raise the box on level ground.

- ✓ Back the vehicle to the driver's (left) side for better visibility and use mirrors continually
- ✓ Backing alarms must be automatic without a shutoff switch as specified in the Occupational Health and Safety Code 2009
- ✓ Check for overhead wires and obstructions before dumping
- ✓ Do not raise the box to dump unless the vehicle is on level ground

CHAPTER 94

Mixer truck operators

94.1 Concrete mixer truck operation

Concrete mixers are top heavy and unstable when loaded. Special care is needed on turns, corners and ramps due to the rotating drum and characteristics of concrete.

- ✓ Concrete mixers are top heavy and unstable when loaded
- ✓ Take special care carrying low slump concrete on turns, corners and ramps
- ✓ The vehicle driver is responsible for the truck at all times

CHAPTER 95

Emergency vehicles

95.1 Legal aspects of emergency vehicle operation

A siren may only be used when responding to an emergency, emergency call or alarm. With the siren operating, an emergency vehicle may exceed limits, proceed past stop signals/signs, and contravene certain provisions when reasonable and safe.

- ✓ A siren shall only be operated when responding to an emergency, emergency call or alarm
- ✓ With the siren operating, an emergency vehicle may exceed the speed limit and proceed past a stop signal or sign without stopping when reasonable and safe
- ✓ An emergency vehicle with its siren operating has the right of way over all other vehicles
- ✓ Use of red flashing lights alone does not exempt the driver from the Traffic Safety Act; failure to meet requirements can lead to civil and criminal penalties

95.2 Defensive driving for emergency vehicles

Always use headlights with overhead lights, and use sirens plus lights during ambulance emergencies. Do not assume other drivers see you; the responsibility for safe driving rests on the emergency driver.

- ✓ Always use headlights along with emergency overhead lights
- ✓ Sirens are required by law when an ambulance operates during an emergency; red flashing lights alone are not sufficient
- ✓ Do not assume other drivers have seen you or will move; slow or stop at intersections and make eye contact
- ✓ On a four-lane highway with lights and siren, stay in the left lane if possible

CHAPTER 96

Operating a taxi

96.1 Taxi driver safety and refusal rights

Safety is the taxi driver's first concern. Drivers must provide safe transport to all customers but may refuse in specific circumstances.

- ✓ A driver may refuse to transport customers if the vehicle already carries the maximum number of passengers
- ✓ A driver may refuse a passenger who is offensive or dangerous to the driver or others
- ✓ Provide reliable service by getting passengers to their destination safely by the most direct route

96.2 Taxi permits, seat belts and reserved lanes

Taxi permit requirements vary by municipality. Taxi drivers are exempt from wearing a seat belt while carrying a passenger for hire. Reserved lanes are designated for specific vehicle types.

- ✓ Check with your municipality for taxi or limousine permit requirements
- ✓ A taxicab driver is exempt from wearing a seat belt while carrying a passenger for compensation or hire
- ✓ Reserved lane signs show which vehicles may use the lane (bus, taxi, bicycle) and the hours/days if part-time
- ✓ A white diamond on a black background indicates reserved lane vehicles travel in the same direction as traffic

96.3 Definition of for hire and Class 4 requirement

A Class 4 licence is required to operate a vehicle for hire. A vehicle is not for hire in certain incidental transportation situations with limited compensation forms.

- ✓ A Class 4 licence is required for a driver operating a vehicle for hire as defined in the Operator Licensing and Vehicle Control Regulation
- ✓ A vehicle is not for hire for incidental transport when compensation is only per-kilometre at the tax-exempt allowance rate, straight reimbursement of out-of-pocket expenses, or transporting family/household members

CHAPTER 97

Transporting Persons with Disabilities

97.1 General rules for communicating

Drivers must discover each person's preferred communication method, communicate directly with the person before the attendant, and adapt to visual and hearing impairments. Never assume a person's needs without asking.

- ✓ Communicate directly with the person with the disability before addressing an attendant
- ✓ Offer assistance but wait until the offer is accepted before helping
- ✓ When assisting a visually impaired person, identify yourself and let them take hold of your arm
- ✓ When assisting a hearing-impaired passenger, gesture or lightly touch their arm to get attention

97.2 General rules for driving with passengers with disabilities

Ensure all passengers are properly secured, drive smoothly avoiding sudden movements, and maintain comfortable temperature and noise levels.

- ✓ Make sure both seated and wheelchair passengers are properly secured in the vehicle
- ✓ Drive smoothly, avoid sudden stops, starts and swerves, and ease around corners
- ✓ Maintain comfortable temperature, air circulation and noise levels for clients

97.3 Assisting a person in a wheelchair

Ensure passenger feet do not slip from foot rests, push at a normal walking speed while watching ahead and to the sides, judge distances by the foot pedals, and apply brakes when stopped.

- ✓ Ensure the passenger's feet do not slip from the wheelchair foot rests
- ✓ Push at a normal walking speed and watch at least three metres ahead and along the sides
- ✓ Judge distances by the front of the foot pedals rather than the front of the seat
- ✓ Apply the wheelchair brakes when the wheelchair is stopped