



PROGRAM OUTLINE

Transport Trailer Technician

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TRANSPORT TRAILER TECHNICIAN PROGRAM OUTLINE

**APPROVED BY INDUSTRY
SEPTEMBER 2013**

**BASED ON
NOA 2013**

**Developed by
SkilledTradesBC
Province of British Columbia**

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Section 1

INTRODUCTION

Transport Trailer Technician

Foreword

Transport Trailer Technicians inspect, diagnose, maintain and repair transport trailers connected to or moved by a power unit. Trailers include flat decks, dry freight vans, refrigerated vans, tankers, converters, boosters, jeeps, pole trailers, steering dollies, dump trailers and any other commercial pull-type units. Transport Trailer Technicians inspect, service and repair parts and components of systems such as suspension and brake systems, mechanical and electrical components, flooring, hydraulic systems, axles, wheel assemblies and coupling units. Mechanics may specialize in sheet metal work, frame repair or replacement, and heating and refrigeration unit repairs.

Transport Trailer Technicians are employed at trailer manufacturers, sales and repair facilities, as well as at construction or industrial sites and fleet repair shops. They may work in a shop or out of a mobile service vehicle.

Due to the size and complexity of the equipment, safety is of prime importance. The student must be conscious of the impact on people, equipment, work area and environment when performing their work.

Some important attributes of the Transport Trailer Technician student are:

- Reliability
- Analytical skills
- Ability to read and understand service manuals
- Mathematical aptitude

They also demonstrate the ability to:

- Communicate effectively
- Work with little or no supervision
- Contribute to a team approach
- Plan and work sequentially
- Adapt to changing technology
- Problem solve

Key attributes for people entering this trade are mechanical aptitude, manual dexterity, hand-eye coordination, stamina and agility. Communication skills and patience are also important. Other assets are good vision, hearing and sense of smell to diagnose problems. This occupation may require a valid driver's license with air endorsement and/or a forklift operator's certificate.

SAFETY ADVISORY

Be advised that references to the WorkSafeBC safety regulations contained within these materials do not/may not reflect the most recent Occupational Health and Safety Regulation (the current Standards and Regulation in BC can be obtained on the following website: <http://www.worksafebc.com>). Please note that it is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulation pertaining to his/her work.

Acknowledgements

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- D. Vallely, Coast Mountain Bus Company (Director)
- J. Saunders (Finning - Retired)
- J. Yardley, Canadian Forces (Mechanic)
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- B. Holcik- Finning (Instructor)
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Facilitators:

- G. Shorland (Facilitator and Director Program Standards)
- R. Robertson (CEO transCDA)

The SkilledTradesBC would like to acknowledge the dedication and hard work of all the industry representatives appointed to identify the training requirements of the Transport Trailer Technician occupation.

How to Use this Document

This Program Outline has been developed for the use of individuals from several different audiences. The table below describes how each section can be used by each intended audience.

Section	Training Providers	Apprentices
Program Credentialing Model	Communicate program length and structure, and all pathways to completion	Understand the length and structure of the program, and pathway to completion
OAC	Communicate the competencies that industry has defined as representing the scope of the occupation	View the competencies they will achieve as a result of program completion
Training Topics and Suggested Time Allocation	Shows proportionate representation of general areas of competency (GACs) at each program level, the suggested proportion of time spent on each GAC, and percentage of time spent on theory versus practical application	Understand the scope of competencies covered in the technical training, the suggested proportion of time spent on each GAC, and the percentage of that time spent on theory versus practical application
Program Content	Defines the objectives, learning tasks, high level content that must be covered for each competency, as well as defining observable, measureable achievement criteria for objectives with a practical component	Provides detailed information on program content and performance expectations for demonstrating competency
Training Provider Standards	Defines the facility requirements, tools and equipment, reference materials (if any) and instructor requirements for the program	Provides information on the training facility, tools and equipment provided by the school and the student, reference materials they may be expected to acquire, and minimum qualification levels of program instructors

Section 2

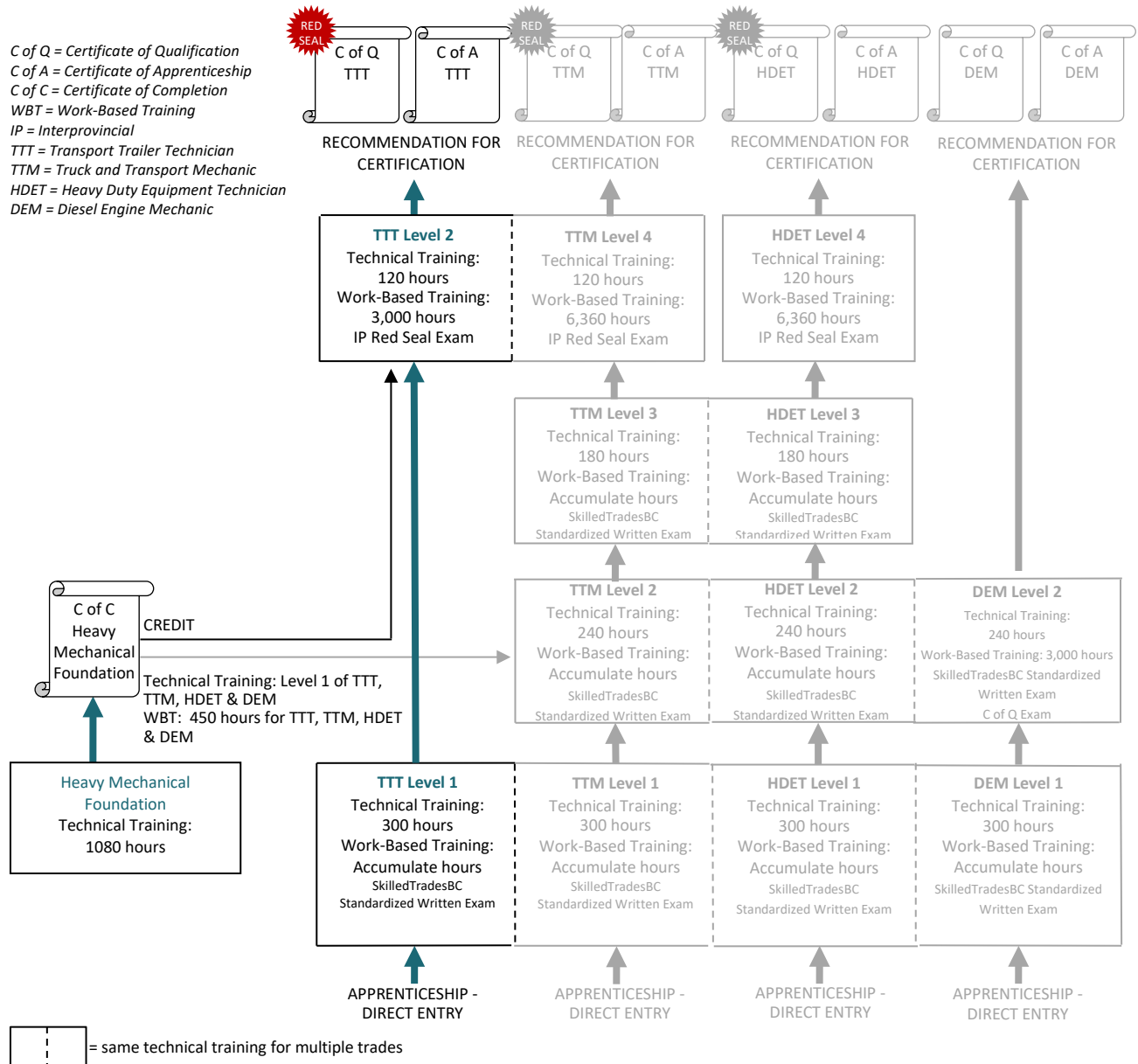
PROGRAM OVERVIEW

Transport Trailer Technician

Program Credentialing Model

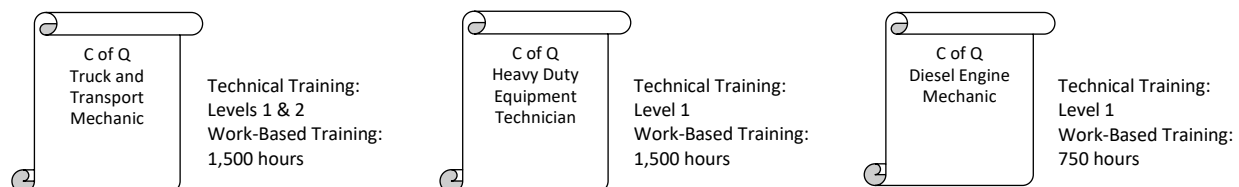
Apprenticeship Pathway

This graphic provides an overview of the Transport Trailer Technician apprenticeship pathway.



CROSS-PROGRAM CREDITS

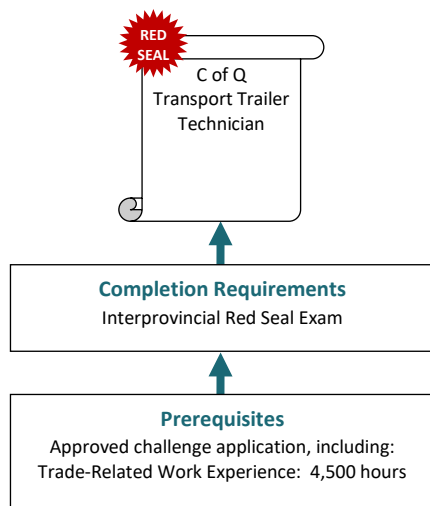
Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program



Challenge Pathway

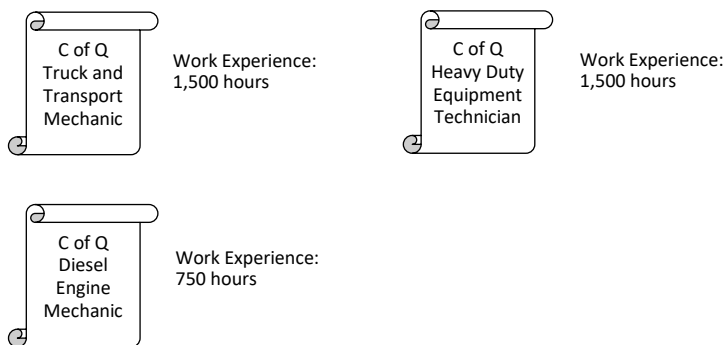
This graphic provides an overview of the Transport Trailer Technician challenge pathway.

C of Q = Certificate of Qualification



CREDIT FOR PRIOR LEARNING

Individuals who hold the credentials listed below are entitled to receive partial credit toward the completion requirements of this program



Occupational Analysis Chart

TRANSPORT TRAILER TECHNICIAN

Occupation Description: The Transport Trailer Technician program covers the scope of four occupations:

Transport Trailer Technician: Transport Trailer Technician means a person who maintains, rebuilds, overhauls, reconditions does diagnostic troubleshooting of motorized commercial truck, bus, and road transport equipment.

Occupational Skills A	Use Safe Work Practices A1 1	Use Hand Tools, Power Tools, and Shop Equipment A4 1	Use Fasteners and Fittings A5 1	Lift and Support Loads A6 1	Operate Equipment A7 1	Use Shop Resources and Record Keeping Practices A8 1
	Service Winch Wire Rope A9 1	Identify Lubricants A10 1	Service Bearings and Seals A11 1	Use Electronic Media A13 1	Use Cutting and Welding Equipment A14 1	Describe Diagnostic Procedures A16 1
Brakes B	Service and Repair Hydraulic Brakes B1 1	Service and Repair Hydraulic Power Brakes B2 1	Service and Repair Air Brakes B3 1	Diagnose and Repair Advanced Brake Systems B4 2		
Hydraulics C	Describe Hydraulic Systems C1 1	Service Hydraulic Components C2 1	Diagnose and Repair Advanced Hydraulic Systems C3 2			
Electrical D	Describe Electricity D1 1	Use Electrical Testing Instruments D2 1	Service and Diagnose Batteries D3 1	Service Charging Systems D4 1	Service Starting Systems D6 1	Service Electrical Circuits D8 1

	Service, Diagnose and Repair Hybrid Systems				
		D12			
	2				

Frames, Steering and Suspension	Service and Diagnose Tires, Wheels, and Hubs				
	E1				
	1				

Service Steering Systems					
E2					
	1				

Diagnose and Repair Truck Hydraulic Assisted Steering Systems					
E3					
	2				

Service, Diagnose and Repair Suspension Systems					
E4					
	1				

Diagnose and Repair Frames					
E6					
	1				

Align Vehicle					
E7					
	2				

Trailer	Service Landing Gear and Trailer Accessories				
	F1				
	1				

Service and Repair Coupling Systems					
F2					
	1				

Service, Diagnose and Repair Trailer Body Components					
F3					
	1				

Service, Diagnose and Repair Heating and Refrigeration Systems					
F4					
	1				

Heating, Ventilation and Air Conditioning	Describe Heating and Air Conditioning Fundamentals				
	G1				
	1				

Diagnose and Repair Heating and Air Conditioning Systems					
G2					
	1				

Structural Components and Accessories	Identify Protective Structures				
	J1				
	1				

Service Cab Structures					
J2					
	1				

Repair Advanced Cab and Body Structures					
J3					
	2				

Training Topics and Suggested Time Allocation

Transport Trailer Technician – Level 1

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
Line A	OCCUPATIONAL SKILLS	18%	55%	45%	100%
A1	Use Safe Work Practices		✓	✓	
A4	Use Hand Tools, Power Tools, and Shop Equipment		✓	✓	
A5	Use Fasteners and Fittings		✓	✓	
A6	Lift and Support Loads		✓	✓	
A7	Operate Equipment		✓	✓	
A8	Use Shop Resources and Record Keeping Practices		✓	✓	
A9	Service Winch Wire Rope		✓	✓	
A10	Identify Lubricants		✓	✓	
A11	Service Bearings and Seals		✓	✓	
A13	Use Electronic Media		✓	✓	
A14	Use Cutting and Welding Equipment		✓	✓	
A16	Describe Diagnostic Procedures		✓		
Line B	BRAKES	17%	30%	70%	100%
B1	Service and Repair Hydraulic Brakes		✓	✓	
B2	Service and Repair Hydraulic Power Brakes		✓	✓	
B3	Service and Repair Air Brakes		✓	✓	
Line C	HYDRAULICS	13%	40%	60%	100%
C1	Describe Hydraulic Systems		✓		
C2	Service Hydraulic Components		✓	✓	
Line D	ELECTRICAL	17%	55%	45%	100%
D1	Describe Electricity		✓		
D2	Use Electrical Testing Instruments		✓	✓	
D3	Service and Diagnose Batteries		✓	✓	
D4	Service Charging Systems		✓	✓	
D6	Service Starting Systems		✓	✓	
D8	Service Electrical Circuits		✓	✓	
Line E	FRAMES, STEERING AND SUSPENSION	14%	30%	70%	100%
E1	Service and Diagnose Tires, Wheels, and Hubs		✓	✓	
E2	Service Steering Systems		✓	✓	
E4	Service, Diagnose and Repair Suspension Systems		✓	✓	
E6	Diagnose and Repair Frames		✓	✓	

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
Line F	TRAILER	10%	35%	65%	100%
F1	Service Landing Gear and Trailer Accessories		✓	✓	
F2	Service and Repair Coupling Systems		✓	✓	
F3	Service, Diagnose and Repair Trailer Body Components		✓	✓	
F4	Service, Diagnose and Repair Heating and Refrigeration Systems		✓	✓	
Line G	HEATING, VENTILATION AND AIR CONDITIONING	8%	50%	50%	100%
G1	Describe Heating and Air Conditioning Fundamentals		✓		
G2	Diagnose and Repair Heating and Air Conditioning Systems		✓	✓	
Line J	STRUCTURAL COMPONENTS AND ACCESSORIES	3%	90%	10%	100%
J1	Identify Protective Structures		✓		
J2	Service Cab Structures		✓	✓	
Total Percentage for Transport Trailer Technician Level 1		100%			

Training Topics and Suggested Time Allocation

Transport Trailer Technician – Level 2

		% of Time Allocated to:			
		% of Time	Theory	Practical	Total
Line B	BRAKES	30%	50%	50%	100%
B4	Diagnose and Repair Advanced Brake Systems		✓	✓	
Line C	HYDRAULICS	30%	40%	60%	100%
C3	Diagnose and Repair Advanced Hydraulic Systems		✓	✓	
Line D	ELECTRICAL	5%	60%	40%	100%
D12	Service, Diagnose and Repair Hybrid Systems		✓	✓	
Line E	FRAMES, STEERING AND SUSPENSION	25%	40%	60%	100%
E3	Diagnose and Repair Truck Hydraulic Assisted Steering Systems		✓	✓	
E7	Align Vehicle		✓	✓	
Line J	STRUCTURAL COMPONENTS AND ACCESSORIES	10%	80%	20%	100%
J3	Repair Advanced Cab and Body Structures		✓	✓	
Total Percentage for Transport Trailer Technician Level 2		100%			

Section 3

PROGRAM CONTENT

Transport Trailer Technician

Level 1

Transport Trailer Technician

Line (GAC): A OCCUPATIONAL SKILLS

Competency: A1 Use Safe Work Practices

Objectives

To be competent in this area, the individual must be able to:

- Apply personal safety measures.
- Identify and use shop emergency equipment.
- Prevent, identify and extinguish various classes of fires.

LEARNING TASKS

1. Apply personal safety precautions and procedures

CONTENT

- Personal apparel
- Clothing
- Hair and beards
- Jewellery
- Personal Protective Equipment (PPE)
 - Head
 - Hands
 - Lungs
 - Eyes
 - Ears
 - Feet
- Safety meetings
- Housekeeping
- Maintaining PPE
- Equipment and machine lock-out
- Ventilation systems
- Clear head
- Professionalism
- Respect for others' safety
- Constant awareness of surroundings
- Lifting
- WorkSafeBC requirements
- Electrical isolation (Night switch)
- Tag
- Key storage
- Emergency shutoffs
- Fire control systems
- Eye wash facilities
- Emergency exits
- First aid facilities

2. Lock out heavy duty equipment prior to service

3. Locate shop emergency equipment and procedures

LEARNING TASKS
CONTENT

- | | |
|--|---|
| <p>4. Describe the conditions necessary to support a fire</p> <p>5. Describe the classes of fires according to the materials being burned</p> <p>6. Apply preventative fire safety precautions when working near, handling or storing flammable liquids or gases, combustible materials and electrical apparatus</p> <p>7. Describe the considerations and steps to be taken prior to fighting a fire</p> <p>8. Describe the procedure for using a fire extinguisher</p> <p>9. Describe fire suppression systems</p> | <ul style="list-style-type: none"> • Emergency contact/phone numbers • Outside meeting place • Disaster meeting place • Air • Fuel • Heat • Class A • Class B • Class C • Class D • Symbols and colours • Fuels • Diesel • Gasoline • Propane • Natural gas • Ventilation • Purging • Lubricants • Oily rags • Combustible metals • Aerosols • Warning others and the Fire Department • Evacuation of others • Fire contained and not spreading • Personal method of egress • Training • P.A.S.S. <ul style="list-style-type: none"> ○ Pull ○ Aim ○ Squeeze ○ Sweep • Types • Construction • Operation • Disarming |
|--|---|

Line (GAC):	A	OCCUPATIONAL SKILLS
Competency:	A4	Use Hand Tools, Power Tools, and Shop Equipment

Objectives

To be competent in this area, the individual must be able to:

- Select, use and maintain tools and shop equipment.
- Select, use and maintain safety equipment.

LEARNING TASKS

1. Use protective equipment associated with the use of tools and shop equipment
2. Apply lock-out procedures to shop equipment
3. Select, use and maintain hand tools

CONTENT

- Personal Protective Equipment (PPE)
 - Head
 - Hands
 - Lungs
 - Eyes
 - Ears
 - Feet
 - Clothing
- Screening
- Guarding
- Ventilation
- Clean up
- WorkSafeBC lock-out procedures
- Electrical isolation
- Tags
- Locks
- Hand tool safety
 - Safety practices
 - Work with a safe attitude
 - Tool selection
 - Organize work area
 - Correct usage of hand tools
 - Maintain hand tools
 - Safe tool handling
 - Safe tool storage
- Hazards
- Wrenches
- Screwdrivers
- Cutting tools
- Hammers
- Chisels/punches
- Pry bars
- Pliers

LEARNING TASKS

4. Select, use and maintain measuring instruments

5. Select, use and maintain power tools

6. Select, use and maintain drill bits

7. Select, use and maintain shop equipment

CONTENT

- Clamping tools
- Abrasives
- Pullers
- Torque wrenches and multipliers
- Layout tools
- Precision measuring
- Imperial
- Metric
- Micrometer
- Veriner
- Dial indicator
- Feeler/thickness gauges
- Bore gauges
- Pneumatic
- Electric
- Hydraulic
- Types
- Sharpening
- Cutting speeds
- Presses
- Parts cleaning equipment
 - Hot tank
 - Cold solution
 - Hot agitator
 - Solvent tank
 - Pressure washer
 - Steam cleaner
 - Chemical cleaners
- Drill press
- Glass beader
- Sand blaster
- Grinders
- Compressor
- Cut-off saws

Line (GAC): **A OCCUPATIONAL SKILLS**

Competency: **A5 Use Fasteners and Fittings**

Objectives

To be competent in this area, the individual must be able to:

- Select and use imperial and metric fasteners.
- Select and use pipe, tubing, hose and fittings.

LEARNING TASKS

1. Select and use imperial and metric fasteners
2. Cut and repair internal and external threads
3. Select use and repair tubing, pipe and fittings

CONTENT

- Thread systems
- Fastener types
 - Installation
- Washers
 - Types
 - Applications
- Locking devices
 - Types
 - Applications
- Taps
- Dies
- Thread repair
- Tubing
 - Types
 - Sizing
 - Applications
- Pipe
 - Types
 - Sizing
- Threads
 - Applications
- Fitting
 - Types
 - Sizing
 - Applications
- Assembly procedures
- Sealants
- Cutting, bending and flaring

LEARNING TASKS

4. Select and use hose and hose fittings

CONTENT

- Hose
 - Types
 - Sizing
 - Applications
- Assembly
- Hose fittings
 - Types

Line (GAC): A OCCUPATIONAL SKILLS

Competency: A6 Lift and Support Loads

Objectives

To be competent in this area, the individual must be able to:

- Apply the WorkSafeBC Safety Regulations to lifting and blocking applications.
- Select, use and maintain lifting and blocking equipment.
- Lift and move loads.

LEARNING TASKS

1. Apply the Occupational Health and Safety Regulations
2. Determine load weight
3. Select, use and maintain jacks
4. Select, use and maintain stands and blocking
5. Select, use and maintain wire ropes, chains and lifting straps
6. Use fibre rope knots, bends and hitches
7. Use visual and sound signals
8. Select, use and maintain hoisting equipment

CONTENT

- Refer to Regulations
 - Personal Protective Equipment (PPE)
 - Clothing
 - Housekeeping
 - Safe lifting and carrying
 - Safe handling with cranes
- Manufacturer's specification
- Estimation
- Types
- Capacities
- Manufacturer's procedures
- Types
- Capacities
- Bridging
- Types
- Capacities
- Inspection
- Rating tags
- Rigging and lifting attachments
- Types
- Uses
- Care and maintenance
- WorkSafeBC Safety Regulations
 - Hand
 - Sound
- Types
- Capacities
- Operation

LEARNING TASKS

9. Lift, hoist and move loads

CONTENT

- Determine safe working load
- Lifting and rigging procedures
- Regulations and specifications

Line (GAC): A OCCUPATIONAL SKILLS

Competency: A7 Operate Equipment

Objectives

To be competent in this area, the individual must be able to:

- Perform pre-start and walk around inspections.
- Start, move, secure and stop equipment.
- Obtain forklift operation training.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| 1. Describe pre-start and walk around inspections | <ul style="list-style-type: none"> • Checklist • Operator's manuals |
| 2. Describe starting aids | <ul style="list-style-type: none"> • Glow plug systems • Intake preheater systems • Starting fluids • Block/circulating heaters • Battery warmers |
| 3. Describe start up procedures | <ul style="list-style-type: none"> • Controls • Cranking • Monitoring • Jump starting |
| 4. Describe emergency shut down procedures | <ul style="list-style-type: none"> • Cut-off <ul style="list-style-type: none"> ○ Fuel ○ Air |
| 5. Start, operate and shut down selected equipment | <ul style="list-style-type: none"> • Pre-start and walk around • Use of starting aids • Moving • Securing and shutting down |
| 6. Lock-out heavy duty equipment prior to service | <ul style="list-style-type: none"> • WorkSafeBC requirements • Electrical isolation (Night switch) • Tag • Key in pocket |
| 7. Operate a forklift | <ul style="list-style-type: none"> • Safe operation • Forklift training (certification optional) <ul style="list-style-type: none"> ○ Occupational Health and Safety Regulations ○ Maintenance and records |

Line (GAC): **A OCCUPATIONAL SKILLS**
Competency: **A8 Use Shop Resources and Record Keeping Practices**

Objectives

To be competent in this area, the individual must be able to:

- Communicate using forms and reports.
- Use computers and written media to locate service and maintenance information.

LEARNING TASKS

1. Use record keeping forms

2. Describe the requirements for report writing

3. Use manuals

CONTENT

- Business forms
 - Work order
 - Parts requisition
 - Purchase order
- Record keeping forms
 - Time sheets and daily time card
 - Equipment log
 - Maintenance log
 - Personal log
 - Maintenance schedule
 - Warranty
- Types of reports
 - Service
 - Structure
 - Inclusions or attachments
 - Shift end
 - Maintenance log
 - Accident
 - Safety
 - Digital media
- Technical
 - Service
 - Repair
- Parts
- Systems
- Operators
- Service bulletins/updates
- Digital media

Line (GAC): A OCCUPATIONAL SKILLS

Competency: A9 Service Winch Wire Rope

Objectives

To be competent in this area, the individual must be able to:

- Describe wire rope and its applications.
- Inspect and service wire rope used on winches.

LEARNING TASKS

1. Describe wire rope

2. Inspect wire rope

3. Service wire rope

CONTENT

- Types
 - Regular lay
 - Lang lay
- Construction
- Application
- Safe working load
- Frequency
- Wear
- Damage
- Inspection
- Remove
- Repair/replace
- Lubrication
- Scheduled maintenance

Line (GAC): A OCCUPATIONAL SKILLS

Competency: A10 Identify Lubricants

Objectives

To be competent in this area, the individual must be able to:

- Identify and select lubricants.

LEARNING TASKS

1. Describe the theory of lubrication
2. Describe the properties of lubricants
3. Describe the use of lubricants

CONTENT

- Friction
- Purpose
- Viscosity
- Viscosity Index
- Additives
- Types
 - Oils
 - Greases
 - Dry lubricants
 - Synthetics
 - Brake fluids
 - Environmentally Friendly Liquids (EFL)
- Ratings
 - American Petroleum Institute (API)
 - Society of Automotive Engineers (SAE)
 - International Standardization Organization (ISO)
 - Military Standards
 - International Lubricant Standardization Approval Committee (ILSAC)
- Applications
- Oils
- Greases
- Dry lubricants
- Synthetics
- Brake fluids
 - Dot 3
 - Dot 4
 - Dot 5
- Manufacturer's specifications
- Minimum requirements
- Warranty issues

LEARNING TASKS

4. Handle lubricants

5. Perform fluid analysis

CONTENT

- Storage
- Disposal
- Personal protection
- Procedures
- Safety
- Reports
 - Contamination
 - Condition
 - Recommendations

Line (GAC): A OCCUPATIONAL SKILLS

Competency: A11 Service Bearings and Seals

Objectives

To be competent in this area, the individual must be able to:

- Select and service bearings and seals.

LEARNING TASKS

1. Describe bearings

CONTENT

- Purpose
- Types
 - Friction
 - Antifriction
- Terminology
- Applications
- Loads
 - Axial
 - Radial

2. Select and service bearings

- Removal
- Clean
- Inspection
- Lubrication
- Storage
- Installation
- Adjustments

3. Describe seals

- Types
 - Static
 - Dynamic
- Applications

4. Select and service seals

- Removal
- Inspection
- Installation

Line (GAC): A OCCUPATIONAL SKILLS

Competency: A13 Use Electronic Media

Objectives

To be competent in this area, the individual must be able to:

- Use computers to create documents and conduct research.
- Use electronic imaging equipment.

LEARNING TASKS

1. Use computers

CONTENT

- Hardware
- Keyboarding
- Software
- Operating system
 - Windows
 - Managing files
 - Printing
- Applications
 - Word processing
 - Internet access
 - E-mail
 - On-line resources
 - Data bases
- Digital camera
- Digital video

2. Use electronic media

Line (GAC): **A OCCUPATIONAL SKILLS**
Competency: **A14 Use Cutting and Welding Equipment**

Objectives

To be competent in this area, the individual must be able to:

- Identify metals.
- Describe different welding procedures.
- Cut, weld and braze using oxy-acetylene.
- Perform shielded metal arc weld.
- Weld using wire feed processes.
- Solder tubing and sheet metal.

LEARNING TASKS

1. Identify regulations with respect to welding
2. Identify metals
3. Identify oxy-acetylene components
4. Use oxy-acetylene equipment
5. Cut mild steel with oxy-acetylene equipment

CONTENT

- WorkSafeBC Safety Regulations
- Metals and alloys
- Terminology
- Shapes
- Storage and handling
- Gases
- Valves and regulators
- Cylinders
- Hoses and fittings
- Cutting torches and tips
- Safety precautions
- Blow back
- Check valves
- Assembly procedures
- Operation procedures
- Lighting
- Pressures
- Adjusting
- Shut down procedures
- Leak testing
- Storage
- Set-up
- Freehand cuts
- Guided cuts
- Hole piercing

LEARNING TASKS
CONTENT

- | | |
|---|---|
| 6. Weld mild steel with oxy-acetylene equipment | <ul style="list-style-type: none"> • Principles of fusion welding • Filler metal • Flux • Welding tips • Flame • Technique • Basic joints |
| 7. Braze lap joints with oxy-acetylene equipment | <ul style="list-style-type: none"> • Brazing set-up • Brazing techniques |
| 8. Solder tubing and sheet metal | <ul style="list-style-type: none"> • Process and procedures • Solder types <ul style="list-style-type: none"> ○ 60/40 ○ 40/60 ○ Rosin core ○ Acid core |
| 9. Describe the shielded metal arc welding (SMAW) process | <ul style="list-style-type: none"> • Process • Applications • Safety requirements |
| 10. Identify shielded metal arc welding equipment | <ul style="list-style-type: none"> • AC/DC machines • Components • Electrode holder • Ground clamps • Cables • Connectors |
| 11. Identify mild steel electrodes for shielded metal arc welding | <ul style="list-style-type: none"> • Types • Operations • Classifications • Selection • Storage and handling |
| 12. Weld mild steel with shielded metal arc | <ul style="list-style-type: none"> • Procedures • Weld ground placement • Settings • Positions • Joints • Types of welds |

LEARNING TASKS

13. Weld mild steel using wire feed processes

14. Describe air-arc gouging

CONTENT

- Procedures
- Settings
- Safety
- Weld types and positions
- Wire type
- Purpose
- Procedure
- Safety

Line (GAC): **A OCCUPATIONAL SKILLS**
Competency: **A16 Describe Diagnostic Procedures**

Objectives

To be competent in this area, the individual must be able to:

- Describe the importance of following a diagnostic procedure.
- Describe diagnostic procedures used for troubleshooting.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| 1. Describe the importance of following a diagnostic process | <ul style="list-style-type: none"> • Cost of improper diagnosis • Unhappy customers • Lost business • Time management • Efficiency • Damage to components |
| 2. Describe general diagnostic procedures | <ul style="list-style-type: none"> • Understand system • Understand complaint • Communicate with operator • Operational test • Visual inspection • Form all possible conclusions • Test conclusions • System component isolation |
| 3. Describe the importance of following manufacturer's diagnostic procedures where available | <ul style="list-style-type: none"> • Time saving • Warranty requirement • Diagnostic efficiency |
| 4. Describe the importance of failure analysis | <ul style="list-style-type: none"> • Repeat failure • Extend life • Cost • Customer satisfaction |

Line (GAC):	B	BRAKES
Competency:	B1	Service and Repair Hydraulic Brakes

Objectives

To be competent in this area, the individual must be able to:

- Service hydraulic brake systems.
- Diagnose hydraulic brake systems.
- Repair hydraulic brake systems.

LEARNING TASKS

1. Describe the principles of braking
2. Describe the foundation brake
3. Review hydraulic principles

CONTENT

- Friction
- Definition
- Coefficient
- Heat
- Absorbing
- Dissipating
- Effects of speed and weight
- Brake fade
- Types
 - Disk
 - Drum
 - Multidisc
 - Others
- Components
 - Calipers
 - Wheel cylinder
 - Lines
 - Shoes/pads
- Operation
 - Self energizing and non-self energizing
 - Servo/non-servo
- Pressure, force and area

LEARNING TASKS

4. Describe the hydraulics of a brake system

5. Select brake fluids

6. Describe parking brake systems

7. Diagnose hydraulic brake systems

CONTENT

- Types
 - Disk
 - Drum
 - Multidisc
 - Others
- Components
 - Master cylinder
 - Metering valve
 - Proportioning valve
 - Switches
- Operation
- Requirements
- Types
 - DOT 3
 - DOT 4
 - DOT 5
 - Others
- Characteristics
 - Hygroscopic
 - Boiling point
 - Viscosity
- Identification
- Types
 - Integral
 - Driveline
 - Hydraulic
 - Mechanical
- Components
- Operation
- Diagnostic procedures
 - Operational checks
 - Fluid condition/level
- Inspection

LEARNING TASKS

8. Repair hydraulic brake systems

9. Service parking brake systems

10. Perform preventive maintenance

CONTENT

- Components
 - Hydraulic
 - Mechanical
- Inspection
- Remove
- Repair/replace
- Install
- Flush/bleed
- Inspection
- Remove
- Repair/replace
- Install
- Inspection
- Operational tests
- Fluid level checks
- Adjustment
- Lubrication

Achievement Criteria

Performance B1 Service and Repair Hydraulic Brakes

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with hydraulic disk and drum brakes

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC): **B BRAKES**
Competency: **B2 Service and Repair Hydraulic Power Brakes**

Objectives

To be competent in this area, the individual must be able to:

- Diagnose hydraulic assisted power brake systems.
- Repair hydraulic assisted power brake systems.
- Describe hydraulic anti-lock braking (ABS) systems.
- Diagnose and repair hydraulic anti-lock braking (ABS) systems.

LEARNING TASKS

1. Describe the power brake systems

2. Diagnose power brake systems

3. Repair power brake systems

4. Describe hydraulic anti-lock braking systems

CONTENT

- Types
 - Vacuum boosters
 - Hydro-boost
 - Hydro-max
 - Hydraulic
- Components
- Operation
- Diagnostic procedures
- Operational test
- Components
- Inspection
- Testing
- Inspection
- Remove
- Repair/replace
- Install
- Adjustments
- Verify system operation
- Types
 - Single channel
 - Two channel
 - Four channel
- Components
- Operation
- Precautions

LEARNING TASKS

5. Diagnose hydraulic anti-lock braking systems

CONTENT

- Manufacturer's diagnostic procedures
- Road test
- Diagnostic codes
- Components
- Inspection
- Testing

6. Repair hydraulic anti-lock braking systems

- Inspection
- Remove
- Repair/replace
- Install
- Adjustments
- Verify system operation
- Diagnostic codes

Achievement Criteria

Performance B2 Service and Repair Hydraulic Power Brakes

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with hydraulic disk and drum brakes

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC):	B	BRAKES
Competency:	B3	Service and Repair Air Brakes

Objectives

To be competent in this area, the individual must be able to:

- Describe the principles of braking.
- Describe the principles of pneumatics.
- Describe air brake schedules and components.
- Service air brake systems.
- Repair a wheel brake assembly.
- Describe and perform a pre-trip inspection.

LEARNING TASKS

1. Describe the principles of braking
2. Describe the principles of pneumatics
3. Describe a basic air brake system

CONTENT

- Friction
- Definition
- Coefficient
- Heat
- Absorbing
- Dissipating
- Effects of speed and weight
- Brake fade
- Water cooling
- Characteristics of air
- Relationship between force, pressure and area
- Effects of heat on air
- Time lag
- Pneumatic balance
- Sub systems
- Supply
- Delivery
- Foundation brakes
 - Drum
 - Disc
- Components
 - Compressor
 - Governor
 - Treadle
 - Relay
 - Brake chamber
- Operation

LEARNING TASKS

CONTENT

- | | |
|--|---|
| 4. Describe the basics of air brake schedules | <ul style="list-style-type: none"> • 121 • S • SX • Operation and routine maintenance |
| 5. Repair foundation brake assembly | <ul style="list-style-type: none"> • Inspection • Disassembly • Replacement • Measurement • Assembly • Adjustment |
| 6. Service and inspect air brakes | <ul style="list-style-type: none"> • Tractor and trailer • Components <ul style="list-style-type: none"> ○ Foundation brakes ○ Reservoirs ○ Lines ○ Disc/Drum • Adjustment • Scheduled maintenance |
| 7. Describe tractor trailer pre-trip brake inspection | <ul style="list-style-type: none"> • As per motor vehicle standards |
| 8. Perform a tractor trailer pre-trip brake inspection | <ul style="list-style-type: none"> • As per motor vehicle standards |

Achievement Criteria

Performance B3 Service and Repair Air Brakes

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with hydraulic disk and drum brakes

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC):	C	HYDRAULICS
Competency:	C1	Describe Hydraulic Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe the principles of hydraulics.
- Describe the basic components of a hydraulic system.
- Describe the types of hydraulic systems.

LEARNING TASKS

1. Describe the principles of hydraulics
2. Describe the basic operation of a hydraulic system
3. Describe types of hydraulic systems

CONTENT

- Terminology
- Advantages/disadvantages
- Fluid characteristics
- Pascal's Law
- Calculations
- Bernoulli's Principle
- Components
- Reservoir
 - Vented
 - Pressurized
- Pump
 - Positive displacement
 - Gear
 - Vane
 - Piston
 - Ratings
- Control valves
 - Pressure
 - Directional
 - Volume
- Actuators
 - Cylinder
 - Motor
- Connecting lines
- Hydraulic fluids
- Open-centre
- Closed-centre
- Vented
- Pressurized

LEARNING TASKS

4. Interpret basic hydraulic diagrams

CONTENT

- Types
 - Pictorial
 - Schematic
- Basic symbols

Line (GAC): **C HYDRAULICS**
Competency: **C2 Service Hydraulic Components**

Objectives

To be competent in this area, the individual must be able to:

- Describe selected hydraulic components.
- Select hydraulic fluids for applications.
- Select and assemble hydraulic hoses and fittings.
- Demonstrate safe work procedures for hydraulic systems service.
- Perform scheduled maintenance on hydraulic systems.

LEARNING TASKS

1. Describe hydraulic components

2. Select hydraulic fluids

3. Select hydraulic hoses and fittings

4. Assemble hydraulic hoses and fittings

CONTENT

- Seals
- Hoses/lines
- Fittings
- Filters
- Requirements
- Society of Automotive Engineers (SAE) viscosity ratings
- International Standardization Organization (ISO) viscosity ratings
- American Petroleum Institute (API) service ratings
- Manufacturer's specifications
- Synthetic/Non-synthetic (mineral)
- Component/System compatibility
- Hose construction
- Working pressure
- Ratings
- Compatability
- Hose application
- Fitting types
 - National Pipe Thread (NPT)
 - Joint Industry Conference (JIC)
 - O-ring Boss (ORB)
 - O-ring Face (ORFS)
 - Split flange
 - Society of Automotive Engineers (SAE)
 - Reusable/Permanent
- Permanent
- Reusable

LEARNING TASKS

5. Demonstrate safe work procedures
6. Perform scheduled maintenance

CONTENT

- Safety blocking equipment and attachments
- Relieve pressure
- Reservoir venting
- Actuator neutralization
- Temperature hazards
- Visual inspection
- Leaks
- Hose rubs
- External damage
- Fluid level check
- Filter change, fluid change, fluid analysis
- Strainers
- Flushing system

Achievement Criteria

Performance	C2 Service Hydraulic Components
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with mobile hydraulic systems
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts</i></p>

Line (GAC): D ELECTRICAL

Competency: D1 Describe Electricity

Objectives

To be competent in this area, the individual must be able to:

- Define electrical terminology.
- Explain basic circuit concepts.
- Perform circuit calculations.
- Describe magnetic theory.
- Identify common electrical and electronic components.
- Interpret wiring diagrams and symbols.

LEARNING TASKS

1. Define electrical terminology
2. Explain basic circuit concepts and perform calculations

CONTENT

- Electrical quantities and their units and prefixes
- Voltage
- Current
- Resistance
- Power/Watts
- Circuit terminology
- Open circuit
- Closed circuit
- Short circuit
- Continuity
- Ground circuit
- Ground fault
- Series circuit
- Parallel circuit
- Series parallel circuit
- Sources of electricity
- Atomic theory
- Current flow
- Electrons
- Protons
- Neutron
- Conductors
- Insulators
- Semiconductors
- Basic circuit
- Source

LEARNING TASKS

CONTENT

- | | |
|---|---|
| <p>3. Describe magnetic theory</p> <p>4. Identify common electrical components</p> <p>5. Describe the basic function of common electronic components</p> <p>6. Interpret basic electrical wiring diagrams</p> | <ul style="list-style-type: none"> • Load • Complete path • Electrical relationships • Ohm's Law • Watt's Law • Series circuits • Parallel circuits • Series parallel circuits • Properties of magnetic lines of force • Terminology • Relationship to electric current • Electromagnetic induction <ul style="list-style-type: none"> ○ Types ○ Requirements ○ Factors affecting magnitude • Lamps • Switches • Relays • Solenoids • Resistors <ul style="list-style-type: none"> ○ Fixed ○ Variable • Capacitors • Motors • Alternators • Fuses • Diodes • Transistors • Types • Wiring schematic and diagrams • Symbols • Conventions • Abbreviations |
|---|---|

Line (GAC): **D ELECTRICAL**
Competency: **D2 Use Electrical Testing Instruments**

Objectives

To be competent in this area, the individual must be able to:

- Use electrical measuring devices.

LEARNING TASKS

1. Describe how to use electrical measuring devices.

CONTENT

- Analog vs. digital
- Voltmeters
- Ammeters
- Ohmmeters
- Multimeters (VOM)
- Amp clamp
- VAT's (Volt amp testers)
- Continuity testers
- Test lights
- Safety precautions
- Voltage drops
- Shorts
- Grounds
- Opens
- Resistance
- Amperage draw

2. Diagnose electrical circuits

Line (GAC):	D	ELECTRICAL
Competency:	D3	Service and Diagnose Batteries

Objectives

To be competent in this area, the individual must be able to:

- Describe battery design and operation.
- Select, test and maintain batteries.
- Diagnose causes of battery failure.
- Remove and replace batteries.
- Use booster batteries.

LEARNING TASKS

1. Describe safety considerations when working with batteries
2. Describe the design and construction of the various types of batteries
3. Describe the chemical action that takes place in a battery during charging and discharging

CONTENT

- Personal protection
 - Face shield
 - Apron
- Hydrogen gassing
- Acid
- Frozen batteries
- Short circuit (arcing)
- Environmental considerations
- Types
 - Conventional
 - Low maintenance
 - Maintenance free
 - Deep-cycle
 - Gel
 - AGM
- Plates
 - Grid material
 - Active material
- Plate straps
- Separators
- Electrolyte/Gel
- Case
- Terminals
- Charging cycle
- Discharging cycle

LEARNING TASKS

4. Select batteries

5. Service batteries

6. Diagnose batteries

7. Use booster batteries

CONTENT

- Battery rating methods
 - Cold cranking amperes (CCA)
 - Cranking amperes (CA)
 - Reserve capacity
 - Amp hour
- Physical dimensions
- Safety precautions
- Inspection
- Cleaning
- Terminal servicing
- Charging
- Replacement
- Scheduled maintenance
- Storage and handling
- Specific gravity
- Open circuit voltage test
- Load test
- 3 minute fast charge test
- Battery impedance test
- Safety
- Voltage
 - 6/12/24
- Polarity

Achievement Criteria

Performance D3 Service and Diagnose Batteries

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with maintenance and maintenance free batteries

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC): **D ELECTRICAL**
Competency: **D4 Service Charging Systems**

Objectives

To be competent in this area, the individual must be able to:

- Describe the purpose of charging circuits.
- Perform routine maintenance on charging circuits.

LEARNING TASKS

1. Describe charging circuits

2. Maintain charging circuits

CONTENT

- Purpose
- Operation
- Connections

- Inspection
- Visual
- Audible
- Output voltage/amperage test
- Belt condition and tension
- Alternator removal and replacement

Achievement Criteria

Performance D4 Service Charging Systems

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with functional charging circuit

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC):	D	ELECTRICAL
Competency:	D6	Service Starting Systems

Objectives

To be competent in this area, the individual must be able to:

- Identify starting circuit components.
- Describe the design and operation of starting circuits.
- Perform maintenance on starting circuits.

LEARNING TASKS

1. Identify components of starting circuits
2. Describe the design and operation of starting circuits
3. Inspect starting circuits

CONTENT

- Battery
- Starter motor assembly
- Solenoids and relays
- Ignition switch
- Neutral safety switch/clutch pedal switch
- Cables and terminals
- System voltage
 - 12 volt
 - 24 volt
- Battery configuration
 - Series
 - Parallel
 - Series parallel
- Isolation switches
- Starter motor assembly
- Solenoids and relays
- Magnetic switch
- Thermal switch
- Ignition switch
- Neutral safety switch/clutch pedal switch
- Cables and terminals
- Inspection
 - Visual
 - Audible
- Routine maintenance
- Component removal and replacement

Achievement Criteria

Performance	D6 Service Starting Systems
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with functional starter circuit
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of context</i></p>

Line (GAC): **D ELECTRICAL**
Competency: **D8 Service Electrical Circuits**

Objectives

To be competent in this area, the individual must be able to:

- Service electrical circuits.
- Describe trailer wiring.

LEARNING TASKS

1. Replace electrical components

2. Select and install conductors and terminals/connectors

3. Describe sources of circuit faults

4. Describe trailer wiring circuits

CONTENT

- Lamps
- Starters
- Alternators
- Batteries
- Switches
- Motors
- Fuses
- Wire gauge
- Terminals/connectors
 - Crimped
 - Soldered
- Blown fuses
- Fusible link
- Circuit breaker
- Connection
- Wiring
- Connectors
- Junction box
- Wiring harness
- Circuit identification

Achievement Criteria

Performance	D8 Service Electrical Circuits
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with electrical and electronic components
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts</i></p>

Line (GAC):	E	FRAMES, STEERING AND SUSPENSION
Competency:	E1	Service and Diagnose Tires, Wheels and Hubs

Objectives

To be competent in this area, the individual must be able to:

- Describe and service tires and rims.
- Describe and service wheels and hubs.
- Describe traction devices.

LEARNING TASKS

1. Describe tires and rims

2. Diagnose tires and rims

3. Service tires and rims

4. Describe wheel hubs

CONTENT

- Types of tires
 - Radial
 - Bias
- Rating
 - Load range
 - Size
 - Ply
- Types of rims
 - Dayton
 - Hub pilot
 - Stud pilot
- Inspection
- Tire wear
- Wheel run out
- Air pressure
- Tread depth
- Safety precautions
- Inspection
- Repair/replace
- Matching
- Mounting
 - Runout
- Balancing
 - Static
 - Dynamic
- Scheduled maintenance
- Types
 - Conventional
 - Planetary
 - Unitized
- Components

LEARNING TASKS

CONTENT

5. Diagnose wheel hubs

- Bearings
- Seals

- Lubrication

- Inspection

- Testing

6. Service wheel hubs

- Inspection

- Replacement

- Repair

- Adjustment

- Bearing end play

- Rolling torque

- Lubrication

- Scheduled maintenance

7. Describe traction devices

- Types

- Chains

- Sanders

- Calcium

Achievement Criteria

Performance E1 Service and Diagnose Tires, Wheels and Hubs

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with tires and wheel assemblies

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC): E FRAMES, STEERING AND SUSPENSION

Competency: E2 Service Steering Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe steering systems.
- Service steering systems.

LEARNING TASKS

1. Describe basic steering systems fundamentals

CONTENT

- Types
 - Truck power assist
 - Track steering
 - Wheeled equipment steering
- Track system components
 - Kingpins
 - Tie-rod ends
 - Drag link
 - Tie rod
 - Spindle
 - Steering arms
- Track system components
- Wheeled system components
- Inspection
- Remove/replace
- Install
- Lubrication
- Scheduled maintenance
- Adjustment
 - Drag link
 - Tie rod ends
 - Axle stops
 - Steering gear
 - Toe

2. Service steering systems

Achievement Criteria

Performance	E2 Service Steering Systems
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with various steering systems
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts</i></p>

Line (GAC): **E FRAMES, STEERING AND SUSPENSION**
Competency: **E4 Service, Diagnose and Repair Suspension Systems**

Objectives

To be competent in this area, the individual must be able to:

- Describe suspension systems.
- Diagnose and repair suspension systems.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| 1. Describe wheeled equipment suspension systems | <ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ○ Hydro pneumatic ○ Rigid • Components • Operation |
| 2. Diagnose wheeled equipment suspension systems | <ul style="list-style-type: none"> • Inspection • Measuring |
| 3. Repair wheeled equipment suspension systems | <ul style="list-style-type: none"> • Inspection • Remove • Repair/replace • Install • Adjustments • Lubrication • Scheduled maintenance |
| 4. Diagnose and repair auto-lube systems | <ul style="list-style-type: none"> • Inspection • Remove • Repair/replace • Install • Adjustments • Scheduled maintenance |
| 5. Describe truck and trailer steering axle suspension systems | <ul style="list-style-type: none"> • Types <ul style="list-style-type: none"> ○ Single ○ Tandem • Components <ul style="list-style-type: none"> ○ Air bag ○ Shock absorbers ○ Spring construction ○ Hangers and attachments • Operation |
| 6. Repair truck and trailer steering axle suspension systems | <ul style="list-style-type: none"> • Inspection • Replacement |

LEARNING TASKS

CONTENT

7. Describe truck and trailer rear axle suspension systems

- Repair
- Adjustments
- Lubrication
- Arrangements
 - Single axle
 - Tandem axle
 - Tri axle
 - Lift axle
 - Tag axle
- Types
 - Walking beams
 - Leaf springs
 - Air bag
 - Rubber block
- Components
 - Torque rods
 - Transverse rods
 - Frame attachments
 - Springs
 - Pins and Bushings
- Operation
- Inspection
- Replacement
- Repair
- Lubrication
- Adjustments

8. Repair truck and trailer rear axle suspension systems

Achievement Criteria

Performance E4 Service and Diagnose Suspension Systems

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with various suspension systems

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC): **E FRAMES, STEERING AND SUSPENSION**
Competency: **E6 Diagnose and Repair Frames**

Objectives

To be competent in this area, the individual must be able to:

- Describe types of frames.
- Diagnose and repair frames.

LEARNING TASKS

1. Describe rail and frame types

CONTENT

- Types of rails
 - Materials
 - Mild steel
 - High tensile steel
 - Aluminum
 - Strength
 - Resisting bending moment (RBM)
 - Section modulus
 - Yield strength
- Types of Frames
 - Channel
 - Rigid
 - Articulated
 - I beam
- Components
 - Cross members
 - Brackets
 - Mounts
 - Hardware
 - Fasteners
 - Grade
 - Type
- Components
- Inspection
- Alignment
 - Measuring
 - Projection
 - Laser
 - String

2. Diagnose frames

LEARNING TASKS

3. Repair Frames

CONTENT

- Visual inspection
- Rail replacement
- Rail sectional replacement
 - Welding procedure
 - Brace support
- Repair
 - Crack
 - Bent
 - Twisted
- Adjustments
 - Alignment

Achievement Criteria

Performance E6 Diagnose and Repair Frames

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with various frame configurations

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC): **F TRAILER**
Competency: **F1 Service Landing Gear and Trailer Accessories**

Objectives

To be competent in this area, the individual must be able to:

- Describe the construction and operation of accessories.
- Service limited accessories.

LEARNING TASKS

1. Describe the construction and operation of accessories

CONTENT

- Types
- Lift gates
 - Hydraulic
- Landing gear
 - Speeds
 - Gears
 - Cross rods
 - Support
- Ladders
- Dump box
 - Transfer box
 - High lift gate
 - Pony
 - End dump
 - Side dump
 - Clam dump
- Log bunks
 - Stakes
 - Extensions
 - Bunk
 - Bolster
 - Live
 - Fixed
- Draw bar
 - Pintle eye
 - Bushing
 - Compensator
- Load winch
 - Ratchet
 - Locks
- Components
- Operation
- Inspect

2. Service and repair lift gates, landing gears and

LEARNING TASKS

winches

CONTENT

- Operation
- Hydraulics
- Pivots
- Lubrication
- Remove
- Repair/replace
- Install
- Lubrication
- Adjust
- Scheduled maintenance

Achievement Criteria

Performance F1 Service Landing Gear and Trailer Accessories

Conditions The learner will require:

- Tools
- Test Equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment – trailer accessories, landing gear, logging bunk, lift gate

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC):	F	TRAILER
Competency:	F2	Service and Repair Coupling Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe hitches and couplers.
- Service hitches and couplers.

LEARNING TASKS

1. Describe the tractor-trailer combinations

CONTENT

- Types
 - A train
 - B train
 - C train
- Purpose and design
- Types
 - Fixed
 - Sliding
 - Oscillating
- Components
 - Top plate
 - Base plate
 - Mounting brackets
 - Jaws and lock mechanisms
 - Jaw release mechanisms
 - Slide lock mechanisms
 - Safety devices
- Inspection
 - Jaws
 - Top plate
 - Slides
 - Locks
 - Pins
 - Bushings
- Replacement
- Adjustment
 - Jaws
- Lubrication
 - Slide
 - Jaws
 - Linkages
 - Top plate
- Scheduled maintenance

2. Describe fifth wheels

- ### 3. Service and repair fifth wheel assemblies

LEARNING TASKS

4. Describe bolster plates and king pins

5. Describe pintle hooks and eyes

6. Service and repair pintle hooks and eyes

CONTENT

- Bolster plates
- King pins
 - Size
 - Mounting
- Types
- Ratings
- Buffers
- Pneumatic
- Hydraulic
- Safety chains
- Compensators
- Inspection
 - Cracks
 - Wear
 - Evidence of welding
 - Bushings
- Replacement
- Lubrication
- Scheduled maintenance

Achievement Criteria

Performance F2 Service and Repair Coupling Systems

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment - fifth wheel and pintle hitch assembly

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Line (GAC):	F	TRAILER
Competency:	F3	Service, Diagnose and Repair Trailer Body Components

Objectives

To be competent in this area, the individual must be able to:

- Describe the purpose and operation of trailer body components.
- Install and remove trailer body components.
- Diagnose and repair or replace trailer body components.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| 1. Describe the purpose and operation of trailer body components | <ul style="list-style-type: none"> • Components <ul style="list-style-type: none"> ○ Frames ○ Doors <ul style="list-style-type: none"> – Hinged – Roll up ○ Bumpers ○ Tanks ○ Valves ○ Manifold piping ○ Gauges ○ Transfer pump ○ Reflective tape |
| 2. Remove and install trailer body components | <ul style="list-style-type: none"> • Safety • Operation • Procedures • Support systems |
| 3. Diagnose trailer body components | <ul style="list-style-type: none"> • Operation • Manufacturer's specifications • Inspection and testing procedures • Diagnosis • Damage and wear identification |
| 4. Repair trailer body components | <ul style="list-style-type: none"> • Procedures • Manufacturer's specifications • Testing • Replacement • Doors <ul style="list-style-type: none"> ○ Sidewall panels ○ Cross members |

Achievement Criteria

Performance	F3 Service, Diagnose and Repair Trailer Body Components
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with a variety of trailer bodies
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts</i></p>

Competency: F4 Service, Diagnose and Repair Heating and Refrigeration Systems

To be competent in this area, the individual must be able to:

- Identify heating and refrigeration components.
- Diagnose refrigeration units.
- Repair heating and refrigeration systems.

CONTENT

1. Describe types of heating and refrigeration
 - Trailer mounted
 - Cooling unit
 - Heating unit
2. Service and repair heating and refrigeration systems
 - Maintenance
 - Inspections
 - Operational checks
 - Pressure checks
 - Temperature checks
 - Lubricants
 - Service intervals
 - Belts
3. Describe hazards associated with refrigeration units
 - Fall protection
 - Refrigerant
 - Environmental considerations
 - Ozone depletion
 - Global warming
 - Release of refrigerant

Achievement Criteria

Performance	F4 Service Diagnose and Repair Heating and Refrigeration Systems
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with refrigeration units
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts</i></p>

Line (GAC): **G HEATING, VENTILATION AND AIR CONDITIONING**
Competency: **G1 Describe Heating and Air Conditioning Fundamentals**

Objectives

To be competent in this area, the individual must be able to:

- Identify heating and air conditioning components.
- Describe the construction and operation of heating and air conditioning systems.
- Describe the impact of CFCs on the environment.
- Apply legislated procedures when dealing with systems containing CFCs.

LEARNING TASKS

CONTENT

- | | |
|--|---|
| 1. Describe principles of heating and air conditioning systems | <ul style="list-style-type: none"> • Describe the law's of thermodynamics |
| 2. Identify components of heating and air conditioning systems | <ul style="list-style-type: none"> • Heater • Valves • Controls • Ducts • Compressor • Drive systems • Evaporator • Condenser • Receiver-drier/accumulator • Orifice tubes/expansion valves • Refrigerant <ul style="list-style-type: none"> ○ Ozone depleting potential • Lubricants <ul style="list-style-type: none"> ○ Mineral ○ Synthetic • Controls • Sensors • Hoses, piping and connectors • Seats and gaskets |
| 3. Describe the design and operation of heating and air conditioning systems | <ul style="list-style-type: none"> • Heater • Refrigeration cycle • Compressor • Evaporator • Condenser • Receiver-drier/accumulator • Orifice tubes/expansion valves • Refrigerant |

LEARNING TASKS

4. Describe the impact of CFCs on the environment
5. Identify legislation/agreements dealing with the use and handling of CFCs

CONTENT

- Lubricants
- Controls
- Sensors
- Ozone depletion
- Global warming
- International
- Montreal Protocol On Substances that Deplete the Ozone Layer
- Kyoto Protocol to the United Nations Framework Convention on Climate Change
- Canadian Environmental Protection Act
- Provincial regulations
- Ozone Depleting Substances And Other Halocarbons Regulation
- Waste Management Act
- Training requirements
- Environmental awareness training course on ozone depleting substance control
- Certification
- CFC handling
- Conservation objectives

LINE (GAC): **G HEATING, VENTILATION AND AIR CONDITIONING**
Competency: **G2 Diagnose and Repair Heating and Air Conditioning Systems**

Objectives

To be competent in this area, the individual must be able to:

- Diagnose heating and air conditioning systems.
- Repair heating and air conditioning systems.
- Describe the impact of CFCs on the environment.
- Apply legislated procedures when dealing with systems containing CFCs.

LEARNING TASKS

CONTENT

- | | |
|--|--|
| 1. Diagnose heating and air conditioning systems | <ul style="list-style-type: none"> • Diagnostic procedures • Manufacturer's procedures • Performance test • Diagnostic codes • Components • Inspection • Sensory Inspection • Visual • Audible • Smell • Touch • Testing • Vacuum • Electrical • Mechanical • Pressure • Leak detection methods |
| 2. Repair heating and air conditioning systems | <ul style="list-style-type: none"> • Recovering, evacuation and recharging • Pressure/leak testing • Environmental considerations • Removing and replacing components • Verify system operations |
| 3. Describe the impact of CFCs on the environment | <ul style="list-style-type: none"> • Ozone depletion • Global warming |

LEARNING TASKS

4. Identify legislation/agreements dealing with the use and handling of CFCs

CONTENT

- International
- Montreal Protocol On Substances that Deplete the Ozone Layer
- Kyoto Protocol to the United Nations Framework Convention on Climate Change
- Canadian Environmental Protection Act
- Provincial regulations
- Ozone Depleting Substances And Other Halocarbons Regulation
- Waste Management Act
- Training requirements
- Environmental awareness training course on ozone depleting substance control
- Certification
- Conservation objectives

Achievement Criteria

Performance G2 Diagnose and Repair Heating and Air Conditioning Systems

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with air conditioning units

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

LINE (GAC): J STRUCTURAL COMPONENTS AND ACCESSORIES

Competency: J1 Identify protective structures

Objectives

To be competent in this area, the individual must be able to:

- Describe regulations related to protective structures.
- Perform service or inspection of protective structures.

LEARNING TASKS

1. Describe structural components

2. Describe inspection procedures

3. Identify operational regulations

CONTENT

- Roll over protective structure (ROPS)
- Falling objects protective structure (FOPS)
- Operator protective structure (OPS)

- Cracks
- Dents
- Fatigue

- Components
- Safety glass
- Screens
- Service/diagnose/repair

LINE (GAC): J STRUCTURAL COMPONENTS AND ACCESSORIES
Competency: J2 Service Cab Structures
Objectives

To be competent in this area, the individual must be able to:

- Identify cab, bodies and components.
- Service cab, bodies and components.

LEARNING TASKS

1. Identify cabs, bodies and components

CONTENT

- Types
- Components
 - Cab
 - Fixed
 - Air ride
 - Doors
 - Windows
 - Seats
 - Supplemental restraint system (air bag)
 - Sleepers
 - Ventilation systems
 - Mounting
- Operation
- Inspection
- Replacement
 - Components
- Adjustment
- Lubrication

2. Service cabs, bodies and components

Achievement Criteria

Performance	J2 Service Cab Structures
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with cab structures
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts</i></p>

Level 2

Transport Trailer Technician

LINE (GAC): B BRAKES

Competency: B4 Diagnose and Repair Advanced Brake Systems

To be competent in this area, the individual must be able to:

- Describe air brake schedules and their components.
- Diagnose and repair air brake schedules and their components.
- Diagnose and repair air over hydraulic systems and their components.

LEARNING TASKS

CONTENT

- | | |
|---|--|
| 1. Review a basic air brake system | <ul style="list-style-type: none"> • Sub-systems • Supply • Delivery • Foundation brakes • Components • Operations |
| 2. Describe tractor/trailer and bus air brake schedules and their components | <ul style="list-style-type: none"> • 121 • BT-75 • T-75 • L-75 • X • SX • Valve operation/function |
| 3. Diagnose tractor and bus air brakes (schedules) and their components | <ul style="list-style-type: none"> • Inspection • Testing • Components <ul style="list-style-type: none"> ○ Vavles ○ Foundation brakes |
| 4. Repair tractor and bus air brake components | <ul style="list-style-type: none"> • Inspection • Remove • Repair/replace • Install • Adlustment • Lubrication • Verify system operations |
| 5. Describe trailer brake systems and their components | <ul style="list-style-type: none"> • Air • Electric • Electronic • Hydraulic/surge |

LEARNING TASKS
CONTENT

- | | |
|---|--|
| 6. Diagnose trailer brakes and their components | <ul style="list-style-type: none"> • Inspection • Testing • Types <ul style="list-style-type: none"> ○ Air ○ Electric ○ Electronic ○ Hydraulic/surge |
| 7. Repair trailer brake components | <ul style="list-style-type: none"> • Inspection • Remove • Repair/replace • Install • Adjustments • Lubrication • Verify system operation |
| 8. Describe air over hydraulic braking systems | <ul style="list-style-type: none"> • Components • Operation |
| 9. Diagnose air over hydraulic braking systems and their components | <ul style="list-style-type: none"> • Inspection • Testing |
| 10. Repair air over hydraulic braking components | <ul style="list-style-type: none"> • Inspection • Remove • Repair/replace • Install • Adjustments • Lubrication • Verify system operation |
| 11. Describe air anti-lock, traction control braking and vehicle stability systems | <ul style="list-style-type: none"> • Components • Operation |
| 12. Diagnose and repair air anti-lock, traction control braking and vehicle stability systems | <ul style="list-style-type: none"> • Inspection • Remove • Repair/replace • Install • Adjustments • Lubrication • Verify system operation • Diagnostic codes |

Achievement Criteria

Performance	B4 Diagnose and Repair Advanced Brake Systems
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with air brake systems
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts</i></p>

LINE (GAC): C HYDRAULICS

Competency: C3 Diagnose and Repair Advanced Hydraulic Systems

Objectives

To be competent in this area, the individual must be able to:

- Diagnose hydraulic systems.
- Repair hydraulic systems and components.
- Repair electronic hydraulic systems.

LEARNING TASKS

1. Describe hydraulic systems and components

2. Diagnose hydraulic systems

3. Repair hydraulic systems and components

CONTENT

- Pumps
 - Vane
 - Gear
 - Piston
 - Pressure compensated
 - Load sensing (HD only)
- Actuators
 - Cylinders
 - Motors
- Valves
 - Pressure
 - Flow
 - Directional
- System types
 - Closed loop
 - Open loop
- Safety precautions
- Diagnostic procedures
- Test equipment
 - Pressure gauges
 - Flow meters
 - Temperature sensors
- Cycle times
- Diagnostic codes
- Manufacturer's procedures
- Safety precautions
- Components
 - Reservoirs
 - Pumps
 - Actuators
 - Control valves

LEARNING TASKS

CONTENT

4. Repair electronic hydraulic systems

- Accumulators
- Coolers
- Connecting lines
- Fluids
- Inspection
- Remove/install
- Repair/replace
- System flushing
- Safety precautions
- Sensors
- Actuators
- Wiring and connectors
- Electronic Control Module (ECM)
- Communication Protocols
- Remove/install
- Repair/replace
- Verify systems operation

Achievement Criteria

Performance C3 Service and Repair Advanced Hydraulic Systems

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with mobile hydraulic systems

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

LINE (GAC): D ELECTRICAL

Competency: D12 Service, Diagnose and Repair Hybrid Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe hybrid systems.
- Service hybrid systems.
- Diagnose and repair hybrid systems.

LEARNING TASKS

1. Describe hybrid systems

2. Service hybrid systems

3. Diagnose hybrid systems

4. Repair hybrid systems

CONTENT

- Types
 - Electric
 - Hydraulic
 - Series
 - Parallel
- Operation
- Safety
 - High voltage
 - High pressure
- Identification
- Service procedures
- Filters
- Wiring
- Lock out procedure
- Cooling
- Codes
- Test procedures
- Communication protocols
- Components
 - Battery
 - Accumulator
 - Pumps/motors
 - Controls
- Cables
- Inverters
- Converters

Achievement Criteria

Performance	D12 Service, Diagnose and Repair Hybrid Systems
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with hybrid systems
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts</i></p>

LINE (GAC): E FRAMES, STEERING AND SUSPENSION

Competency: E3 Diagnose and Repair Truck Hydraulic Assisted Steering Systems

Objectives

To be competent in this area, the individual must be able to:

- Describe the construction and operation of power assisted steering systems.
- Diagnose power assisted steering systems.
- Repair power assisted steering systems.
- Service steering systems.
- Diagnose and repair steering systems.

LEARNING TASKS

1. Describe power assisted steering systems

CONTENT

- Types
 - Integral
 - Slave
- Components
- Operation
 - Steering gear
 - Pump
- Components
 - Steering gears
 - Valves
 - Pumps
 - Cylinders
 - Kingpins
 - Tie-rod ends
 - Drag link
 - Tie rod
 - Steering arms
 - Spindle
- Inspection
 - Visual inspection
 - Free play checks
 - Lubrication checks
- Testing
 - Pressure
 - Flow
 - Leakage

- ## 2. Diagnose power assisted steering components

LEARNING TASKS

3. Repair power assisted steering components

CONTENT

- Removal
- Repair/install
- Adjustments
- Lubrication
- Verify operation

Achievement Criteria

Performance E3 Diagnose and Repair Hydraulic Assisted Steering Systems

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with hydraulic assisted steering

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

LINE (GAC): E FRAMES, STEERING AND SUSPENSION

Competency: E7 Align Vehicle

Objectives

To be competent in this area, the individual must be able to:

- Describe steering geometry.
- Diagnose alignment problems.
- Describe types of alignment.
- Perform alignment procedures.

LEARNING TASKS

1. Describe steering geometry
2. Diagnose alignment problems
3. Describe types of alignment
4. Perform alignment

CONTENT

- Camber
- Caster
- Toe
- Toe out on turns
- King pin/Steering axis inclination
- Included angle
- Point of intersection
- Thrust line
- Inspection
- Wandering
- Pulling
- Tire wear
- Noises
- Steer axle
- Drive axle
- Trailer axle
- Pre-alignment checks
- Set-up
- Adjustments

Achievement Criteria

Performance	E7 Align Vehicle
Conditions	<p>The learner will require:</p> <ul style="list-style-type: none"> • Tools • Test equipment • Manufacturer's specifications • A work place or training environment • Equipment with various frame configurations
Criteria	<p>The learner will be competent once the performance criteria is met:</p> <ul style="list-style-type: none"> • Followed safe work practices throughout entire task including lock out procedures • Conducted in a logical manner • Conducted according to manufacturer's specifications • Conducted according to work place requirements <p><i>Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts</i></p>

LINE (GAC): **J** **STRUCTURAL COMPONENTS AND ACCESSORIES**
Competency: **J3** **Repair Advanced Cab and Body Structures**

Objectives

To be competent in this area, the individual must be able to:

- Describe truck and bus cab, bodies and components.
- Service truck and bus cab, bodies and components.

LEARNING TASKS

1. Describe truck cabs, bodies and components

CONTENT

- Types
- Components
- Cab
- Doors
- Windows
- Sleepers
- Ventilation systems
- Fenders
- Bumpers
- Operation

2. Repair truck cabs, bodies and components

- Inspection
- Replacement
- Adjustment
 - Hood
 - Cab
 - Doors
 - Windows
 - Cab suspension
- Lubrication
- Scheduled maintenance

LEARNING TASKS

3. Describe bus bodies and components

CONTENT

- Types
 - School
 - Transit
 - Coach
- Components
 - Body
 - Doors
 - Controls
 - Windows
- Emergency exits
- Ventilation systems
- Windshield
- Hoods
- Sanitation systems
- Operation
- Inspection
- Replace/repair
- Adjustment
- Lubrication
- Scheduled maintenance

4. Repair bus bodies and components

Achievement Criteria

Performance J3 Repair Advanced Cab and Body Structures

Conditions The learner will require:

- Tools
- Test equipment
- Manufacturer's specifications
- A work place or training environment
- Equipment with truck and trailer

Criteria The learner will be competent once the performance criteria is met:

- Followed safe work practices throughout entire task including lock out procedures
- Conducted in a logical manner
- Conducted according to manufacturer's specifications
- Conducted according to work place requirements

Throughout the term of the apprenticeship, the learner must conduct the above performance a multiple of times and in a variety of contexts

Section 4

TRAINING PROVIDER STANDARDS

Facility Requirements

Classroom Area

- Recommended 2.5 Sq. meters per student
- Projection screen, multimedia projector, whiteboard or similar
- Seating and tables suitable for lecturing
- Compliance with all safety codes

Shop Area

- Recommended 25 Sq. meters per student
- Meet all safety and fire, and environmental codes
- Good lighting
- Appropriate lifting cranes as required to move industry equipment
- Approved ventilation systems

Lab Requirements

- Recommended 10 Sq. meters per student
- Computer labs on-site

Student Facilities

- 1 locker per student
- Study areas
- Computer labs
- Food facility
- Hand wash facility
- Washroom facility

Instructor's Office Space

- Recommended 3.5 Sq. Meters

Other

- Storage space for classroom and shop props
- Parking space for heavy equipment and trucks
- Outside machine/truck wash bay

Tools and Equipment

Shop Equipment

Required Safety Equipment

- Ear protection
- Emergency backup lighting
- Eye wash station
- Face shield
- Fall arrest equipment
- Fall prevention equipment
- Fire extinguisher
- Fireproof blanket
- First aid station
- Gas mask
- Gloves
- Goggles
- Ladder
- Leather gloves
- Leggings
- Manlift
- Respirator
- Safety boots
- Safety cage
- Safety glasses
- Safety hat
- Splash suit

Student Tools (supplied by school)

Required

- 1/4, 3/8, and 1/2 inch drive socket sets
- Adjustable wrench
- Bar (pry, aligning, heel)
- Battery post and clamp cleaner, battery
- Terminal nut
- Battery terminal puller
- Brass drift
- Center punch
- Chisel
- Wire cutter, plier cutters, shears
- Digital multimeter

- Feeler gauge set
- File
- Hacksaw and blade
- Hammer: impact, rubber, sledge, air, slide, soft blow
- Hex key set, metric and imperial
- Jumper wire
- Magnetic pick-up tool (telescopic, flex)
- Metric and imperial steel rule
- Micrometer
- Pick (o-ring, seal)
- Pin punch
- Pipe wrench
- Pliers: insulated, snap ring, torque, punch
- Scraper
- Screwdriver
- Tape measure
- Test light
- Tool chest
- Universal joint
- Utility knife
- Wire brush
- Wire crimper and stripper
- Wrench set, combination (metric & imperial)
- Wrench set, flare nut (metric & imperial)

Recommended

- Air pressure gauge
- Belt tension gauge
- Boost gauge
- Borescope
- Depth micrometer
- Dial gauge
- Digital multimeter
- Electric pressure gauge
- Flowmeter
- Fuel pressure gauge
- Holding gauge
- Hydraulic pressure testing gauge/fittings
- Hydrometer
- Inside micrometer
- Level

- manifold gauge
- Mechanical pressure gauge
- Non-magnetic feeler gauge
- Oil temperature gauge
- Phototachometer
- Pressure gauge
- Pull-type scale
- Pyrometer
- Small hole gauge
- Spectroscope
- Spring scale
- Steel ruler
- Stethoscope
- Straight edge
- Tachometer
- Telescoping gauge
- Test light
- Thermometer
- Timing gauge
- Tire gauge
- Transmission gauge set
- Vacuum gauge

Student Equipment (supplied by school)***Required***

- Air compressor
- Axle stand
- Battery charger
- Battery load/starting system tester
- Bearing heater
- Bleeding equipment
- Booster cable
- Bottle/axle jack
- Cable hoist
- Chain hoist
- Component heating or cooling equipment
- Computer, portable diagnostic computer
- Crack detecting equipment
- Cutting and welding torch set
- Cylinder cart and tank
- Diagnostic equipment

- Dolly
- Engine rotator
- Floor hoist
- Forklift
- Drill: bench, hand drivers, twist, air
- Fast charger
- Fuel recovery and storage system
- Grinder: bench, hand, valve
- Honing equipment
- Hydraulic floor jack
- Hydraulic hand jack
- Hydraulic transmission jack
- Leak detection equipment
- Nitrogen charging equipment
- Parts wash station
- Press: arbor, spring, hydraulic, bushing, shop, mechanical
- Pressure washer
- Printer
- Puller: bearing, gear, heavy duty, reamer
- Retrieval and storage equipment
- Scanning tool
- Shop crane
- Sling/cable/chain
- Spreader bar
- Support stand
- Tire guard
- Transmission jack
- Welding equipment
- Refrigerant recycling cart
- Safety equipment

Recommended

- Alignment tool
- Analyzer: gas, infrared, vibration meter
- Black light
- Coolant recycling unit
- Chemical agitator
- Mobile crane
- Oil recovery and storage tank

Safety Equipment for Student (supplied by student)***Required***

- Coveralls
- Safety boots (CSA approved)
- Safety glasses (CSA approved)

Recommended

- High visibility coveralls
- Mechanics gloves

Reference Materials

Recommended Resources

- SkilledTradesBC www.skilledtradesbc.ca
- WorkSafeBC www.worksafebc.com

Foundation

- Heavy Mechanical Group Foundation Learning Resources, Queens Printer
- FOS Hydraulics (Deere) ISBN 0-86691-239-0
- or
- Vickers Mobile Hydraulics, ISBN 0-9634162-5-1
- FOS Electronic and Electrical Systems (Deere), ISBN 0-86691-240-1
- Heavy Duty Truck Systems 5th Edition (Norman/Scharff/Cosinchock), ISBN 0-7668-1340-1
- Inside Air Brake Valves and Devices (Allan C. Wright)
- Alberta Trades Training Modules, Queens Printer
- FOS Air Conditioning (Deere) ISBN 086691-221-5
- Driving Commercial Vehicles Manual MV2677 - Insurance Corporation of BC (ICBC) www.icbc.com

Level One

- Heavy Mechanical Group level 1 Learning Resources, Queens Printer
- FOS Hydraulics (Deere) ISBN 0-86691-239-0
- or
- Vickers Mobile Hydraulics, ISBN 0-9634162-5-1
- FOS Electronic and Electrical Systems (Deere), ISBN 0-86691-240-1
- Heavy Duty Truck Systems 5th Edition (Norman/Scharff/Cosinchock), ISBN 0-7668-1340-1
- Inside Air Brake Valves and Devices (Allan C. Wright)
- Alberta Trades Training Modules, Queens Printer
- FOS Air Conditioning (Deere) ISBN 086691-221-5
- Driving Commercial Vehicles Manual MV2677 - Insurance Corporation of BC (ICBC) www.icbc.com

Level Two

- Heavy Duty Truck Systems 5th Edition (Norman/Scharff/Cosinchock), ISBN 0-7668-1340-1
- Alberta trades Training Modules, Queens Printer
- FOS Hydraulics (Deere) ISBN 0-86691-239-0
- or
- Vickers Mobile Hydraulics, ISBN 0-9634162-5-1

NOTE:

This list of Reference Materials is for training providers. Apprentices should contact their preferred training provider for a list of recommended or required texts for this program.

Instructor Requirements

Occupation Qualification

The instructor must possess:

- Heavy Duty Equipment Technician – Certificate of Qualification with Interprovincial Red Seal endorsement; or
- Transport Trailer Technician – Certificate of Qualification with Interprovincial Red Seal endorsement

Work Experience

A minimum of 10 years' experience working in the industry as a journeyperson.

Instructional Experience and Education

It is preferred that the instructor also possesses one of the following:

- Grade 12 or equivalent
- Instructors Diploma

Appendices

Appendix A

Assessment Guidelines

Grading Sheet: Subject Competency and Weightings

PROGRAM: IN-SCHOOL TRAINING: SKILLEDTRADESBC PORTAL CODE:		TRANSPORT TRAILER TECHNICIAN LEVEL 1 000191	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
A	Occupational Skills	10%	10%
B	Brakes	19%	19%
C	Hydraulics	15%	15%
D	Electrical	17%	17%
E	Frames, Steering and Suspension	19%	19%
F	Trailer	10%	10%
G	Heating, Ventilation and Air Conditioning	5%	5%
J	Structural Components and Accessories	5%	5%
	Total	100%	100%
In-school theory / practical subject competency weighting		50%	50%
Final in-school percentage score		IN-SCHOOL %	

In-school Percentage Score Combined theory and practical subject competency multiplied by	80%
Standard Level Exam Percentage Score The exam score is multiplied by	20%
Final Percentage Score	FINAL%

PROGRAM: IN-SCHOOL TRAINING: SKILLEDTRADESBC PORTAL CODE:		TRANSPORT TRAILER TECHNICIAN LEVEL 2 000191	
LINE	SUBJECT COMPETENCIES	THEORY WEIGHTING	PRACTICAL WEIGHTING
B	Brakes	30%	30%
C	Hydraulics	30%	30%
D	Electrical	5%	5%
E	Frames, Steering and Suspension	25%	25%
J	Structural Components and Accessories	10%	10%
	Total	100%	100%
In-school theory / practical subject competency weighting		50%	50%

Final in-school percentage score Apprentices must achieve a minimum 70% as the final in-school percentage score to be eligible to write the Interprovincial Red Seal exam.	IN-SCHOOL %
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All apprentices who complete Levels 1-2 of the Transport Trailer Technician program with a FINAL level percentage score of 70% or greater will write the Interprovincial Red Seal examination as their final assessment.

SkilledTradesBC will enter the apprentices' Transport Trailer Technician Interprovincial Red Seal examination percentage score in SkilledTradesBC Portal.

A minimum percentage score of 70% on the examination is required for a pass.