

Truck and Transport Mechanic Level 4

Truck and Transport Mechanic

Unit: D1 Journeyperson Trainer

Level: Four

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

Level 1 in-school technical training offers an entry-level orientation to the challenges of apprenticeship training as it relates to the development of core tasks and skill requirements, as well as social competencies. This unit introduces senior apprentices to the responsibilities of workplace training that they will assume as supervising journeypersons. Most trades have a rich tradition of refreshing and sharing their trade skills from one generation of trade practitioner to the next. This unit orients senior apprentices to some of the practical and conceptual tools that can enable them to contribute to this trade heritage when they become certified journeypersons and, ultimately, journeyperson trainers.

The journeyperson's obligation to assist entry-level apprentices to develop skills and knowledge is complex and challenging. It involves safety considerations, employer expectations, provincial regulations, as well as the tradition of skills stewardship that links modern practice with the long history of workplace teaching and learning that defines the apprenticeable trades. The ability to offer timely and appropriate support to apprentices is itself an important area of trade learning. This unit presents material intended to help refine this ability through reflection and discussion by senior apprentices, and discussion with their in-school instructor and journeyperson trainer.

This content reflects Manitoba and Canadian standards prescribed for journeyperson-level supervisory capabilities, as well as key topics in current research on the importance of workplace training in apprenticeship systems. These detailed descriptors represent suggested focal points or guidelines for potentially worthwhile exploration, and are neither mandatory nor exhaustive.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Compare/contrast role-options and responsibilities of the supervising journeyperson.	50%
a. Implicit vs. explicit standards and content: training goals are/are not codified; assessment measures are/are not used	
b. Accountability for results: e.g. journeyperson is/is not required to prepare performance evaluation that could affect apprentice's employability or wage-rate, etc.	
c. Long-term vs. short-term supervision assignments – e.g., considerable latitude/little latitude for apprentice to learn from mistakes	
d. Formally vs. informally structured – e.g. supervision assignment is part of a prescribed cycle of assignments involving coordination among multiple journeypersons; apprentice is trained according to an individual training plan negotiated with employer	
e. Types of supervisory role options and what is implied by each:	
• Journeyperson Trainer (JT) role: often initiated by someone other than apprentice, and limited to a particular skill set, task, or production requirement	
• Mentor role: often initiated by apprentice, and relatively open-ended regarding content, duration, etc.	

- Peer role: typically involves individual upgrading or cross-training of one journeyperson by another; can include senior apprentice assisting less-experienced trade learner
- Coordinator role: often a senior-level journeyperson appointed by an organization to assume responsibilities for monitoring progression of groups of apprentices
- Other roles: may be improvised by journeyperson, such as combination or multiple roles of the above

2. Describe and demonstrate common requirements about providing journeyperson level supervision. 50%

- Apprenticeship learning adapted to journeyperson supervision assignments and a journeyperson perspective
 - Application of adult education concepts to trades teaching and learning (e.g. responsibilities and expectations of senior-level apprentices)
 - Practical significance of 'styles' of adult learning and teaching
 - Helping senior-level apprentices integrate in-school technical training and on-the-job practical training experiences
 - Providing help and guidance about new tasks and skills
 - Providing help and guidance about fixing mistakes
 - Learning and teaching "the ropes" – socialization of apprentice within a community of trade practice (e.g. how to borrow a tool, interrupt a journeyperson, and seek advice of experienced co-workers)
 - Coverage and documentation of prescribed tasks and subtasks where applicable.
 - Discuss the limits of the journeyperson trainers' own responsibilities and competence (e.g. scope, willingness to train, etc.)
 - Benefits of maintaining a personal record of achievements, ideas, and needs as a journeyperson trainer (e.g. resume, portfolio, training credentials, logbook, etc.)
- Individual reflection and guided group discussion about personal experiences of workplace learning as an apprentice
 - Identification of best and worst practices of journeyperson trainer
 - Identification of workplace and other factors that can contribute to good and bad trades teaching/learning experiences
 - Development of professional standards and work ethics about responsibility to share one's knowledge and skill with others in the workplace (e.g., use/misuse of humour, rigour, discretion, craft-pride, etc.)
 - Qualities of a good journeyperson trainer
 - Components of workplace journeyperson training
 - Processes and recommended practices re: journeyperson training
 - Troubleshooting problems re: supervision assignments
- Role of assessment in supervising, coaching, or guiding other people to learn or improve their skills (e.g. formative and summative evaluation), and how this might contribute to how the journeyperson-level supervision task is approached in future
- Compare and contrast discussion results with current knowledge and resources about workplace training methods as they apply to journeyperson-level supervision assignments
- Other (as may be specified by instructor)

Truck and Transport Mechanic

Unit: D2 Electronics II: Vehicle/Engine Management Systems

Level: Four

Duration: 42 hours

Theory: 14 hours

Practical: 28 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about vehicle management systems when working with today's truck and transport equipment. The unit begins by covering terminology and safe work practices for vehicle management systems. The unit then covers the tools and equipment used when servicing and repairing vehicle management systems. Finally, the unit covers the procedures used to diagnose and service vehicle management systems.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with vehicle management systems.	10%
2. Identify hazards and describe safe work practices pertaining to vehicle management systems.	5%
3. Identify the following vehicle electronic system components and describe their purpose and operation. a. Component/grouping name, including: <ul style="list-style-type: none">• Sensors• Actuators• Harnesses, including multiplexing• Engine control module• Chassis control module• Emission control module	20%
4. Identify specialty tools and equipment used for vehicle management systems and describe their applications and procedures for use.	25%
5. Describe and demonstrate procedures used to diagnose and service vehicle management systems. a. Fault processes b. Programming <ul style="list-style-type: none">• Customer parameters• Manufacturer parameters	40%

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Unit: D3 Steering and Suspension Systems II

Level: Four

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about steering systems and alignment when working with today's truck and transport equipment. The unit begins by covering terminology and safe work practices for steering systems and alignment. The unit then covers the tools and equipment used when servicing and repairing steering systems, and when performing alignments. Finally, the unit covers the procedures used to inspect, diagnose and maintain steering system components, and procedures for performing steering and axle alignments.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with steering and suspension systems.	20%
2. Identify hazards and describe safe work practices pertaining to steering and suspension systems.	20%
3. Identify and describe tools and equipment used when servicing and repairing steering and suspension systems.	20%
4. Describe procedures used to inspect, diagnose and maintain steering and suspension systems. a. Steering components <ul style="list-style-type: none">• Columns• Steering linkage• Gear boxes• Hydraulic components b. Suspension components <ul style="list-style-type: none">• Leaf springs• Air suspension• Solid block	40%

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Unit: D4 Air Brake Systems

Level: Four

Duration: 35 hours

Theory: 14 hours

Practical: 21 hours

Overview:

This unit provides the apprentice further knowledge about other brake systems, with a focus on dual air brake systems, when working with today's truck and transport equipment. The unit also covers such topics as safe work practices, tools and equipment and the principles of operation of brake systems and their components, again with a focus on dual air brake systems. Finally, the unit covers the procedures to inspect, diagnose and maintain dual air brake systems and their components, and their related servicing procedures.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with dual air brake systems.	5%
2. Identify hazards and describe safe work practices pertaining to dual air brake systems.	5%
3. Identify and describe tools and equipment used to service and repair dual air brake systems.	5%
4. Describe the operation of dual air brake systems.	15%
5. Identify the following brake system components and describe their purpose and operation.	20%
a. Dual air brake system	
• Foundation brake (drum and disc)	
• Air supply	
• Air storage	
• Air delivery	
6. Describe and perform procedures used to inspect, diagnose and maintain:	30%
a. Dual air brake system	
• Foundation brake (drum and disc)	
• Air supply	
• Air delivery	
7. Describe and perform servicing procedures for braking systems:	20%
a. Dual air brake system	
• Foundation brake (drum and disc)	

- Air supply
- Air delivery

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Unit: D5 Traction-Control and ABS Systems

Level: Four

Duration: 28 hours

Theory: 7 hours

Practical: 21 hours

Overview:

This unit builds on Brake Systems I and provides the apprentice further knowledge about other brake systems, with a focus on anti-lock braking systems (ABS) and traction control systems, when working with today's truck and transport equipment. The unit also covers such topics as safe work practices, tools and equipment and the principles of operation of ABS and traction control systems. Finally, the unit covers the procedures to inspect, diagnose and maintain ABS, traction control system, and their related servicing procedures.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with anti-lock braking systems and traction control systems.	5%
2. Identify hazards and describe safe work practices pertaining to anti-lock braking systems and traction control systems.	5%
3. Identify and describe tools and equipment used to service and repair anti-lock braking systems and traction control systems.	10%
4. Describe the operation of anti-lock braking systems and traction control systems.	20%
5. Identify the following brake system components and describe their purpose and operation.	20%
a. Anti-lock braking systems	
• Tooth wheel (reluctor)	
• Wheel speed sensor	
• Electronic control unit	
• ABS warning lamp	
• Valves, solenoids, and switches	
• Wiring harnesses	
b. Traction control systems	
• Automatic traction control (ATC) indicator lamp	
• Valves, solenoids, and switches	
6. Describe and demonstrate procedures used to inspect, diagnose and maintain:	25%
a. Anti-lock braking systems	
• Tooth wheel (reluctor)	

- Wheel speed sensor
 - Electronic control unit
 - Valves, solenoids, and switches
 - Wiring harnesses
- b. Traction control systems
- Valves, solenoids, and switches

7. Describe and demonstrate servicing procedures for braking systems:

15%

- a. Anti-lock braking systems
- Tooth wheel (reluctor)
 - Wheel speed sensor
 - Electronic control unit
 - Valves, solenoids, and switches
 - Wiring harnesses
- b. Traction control systems
- Valves, solenoids, and switches

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Unit: D6 Interior Cabs, Coupling Devices and Accessories

Level: Four

Duration: 7 hours

Theory: 7 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about coupling devices when working with today's truck and transport equipment. The unit begins by covering terminology and safe work practices for coupling devices. The unit then covers the tools and equipment used when servicing and repairing coupling devices. Finally, the unit covers the procedures used to inspect, diagnose and maintain coupling devices, and procedures for servicing them.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with coupling devices.	5%
2. Identify hazards and describe safe work practices pertaining to coupling devices.	5%
3. Identify and describe tools and equipment used to service and repair coupling devices.	5%
4. Describe the operation of coupling devices.	10%
5. Identify the following coupling devices components and describe their purpose and operation.	15%
a. Fifth wheels	
b. Pintle hook couplers	
6. Describe and demonstrate procedures used to inspect, diagnose and maintain:	20%
a. Fifth wheels	
b. Pintle hook couplers	
7. Describe and demonstrate servicing procedures for coupling devices.	20%
a. Fifth wheels	
b. Pintle hook couplers	
8. Describe and demonstrate servicing procedures for interior cab components.	20%
a. Interior	
• Pedals	
• Seats	

- Restraints
- Windows and windshields

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Unit: D7 Trailer Systems and HVAC

Level: Four

Duration: 14 hours

Theory: 14 hours

Practical: 0 hours

Overview:

This unit is designed to provide the apprentice with the knowledge about trailers and trailer heating, ventilation and air conditioning (HVAC) systems when working with today's truck and transport equipment. The unit begins by covering terminology and safe work practices for trailers. The unit then covers the tools and equipment used when servicing and repairing trailers and trailer HVAC systems. Finally, the unit covers the procedures used to inspect, diagnose and maintain trailers, and procedures for servicing them.

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
1. Define terminology associated with trailers and trailer refrigeration systems.	5%
2. Identify hazards and describe safe work practices pertaining to trailers and trailer refrigeration systems.	10%
a. Confined entry	
3. Identify and describe tools and equipment used to service and repair trailers and trailer refrigeration systems.	5%
4. Describe the types of trailers and their construction.	5%
5. Explain the principles of operation of heating, ventilation and air conditioning (HVAC) systems.	15%
6. Identify the following trailers components and describe their purpose and operation.	25%
a. Landing gear	
b. King pin	
c. Bolster plate	
d. Safety chains	
e. Cables	
f. Lift axles	
g. Sliding axle	
h. Auto walking floor	
i. Trailer electrical hook ups	
j. Walls	
k. Structure (weight bearing)	

- l. Air conditioning
 - Compressor types
 - Heat exchangers
 - Hoses and fittings
 - Valves
 - Controls and pressure switches
- m. Heating system
 - Heat exchangers
 - Hoses and fittings
 - Valves
 - Control types
- n. Ventilation system
 - Climate controls (automatic and manual)
 - Air flow control
 - Ducting

7. Describe and demonstrate procedures used to test, inspect, diagnose and maintain: 25%

- a. Panel installation
- b. King pin
- c. Air conditioning systems
 - System performance
 - Refrigeration system pressure testing
- d. Heating systems
 - System performance

8. Describe and demonstrate servicing procedures for trailers. 10%

- a. Axle alignment
- b. Panel repair

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Unit: D8 Pre-Interprovincial Review

Level: Four

Duration: 35 hours

Theory: 35 hours

Practical: 0 hours

Overview:

This unit offers senior apprentices a systematic review of skills and knowledge required to pass the Inter-Provincial Examination. It promotes a purposeful personal synthesis between on-the-job learning and the content of in-school technical training. The unit includes information about the significance of Interprovincial (Red Seal) certification and the features of the Interprovincial Examination. **Note: No percentage-weightings for test purposes are prescribed for this unit's objectives. Instead, a 'Pass/Fail' grade will be recorded for the unit in its entirety.**

Objectives and Content:	<u>Percent of Unit Mark (%)</u>
<p>1. Describe the significance, format and general content of Inter-Provincial (IP) Examinations for the trade of Truck and Transport Mechanic.</p> <ul style="list-style-type: none"> a. Scope and aims of Interprovincial (Red Seal) certification; value of certifications b. Obligations of candidates for Interprovincial certification <ul style="list-style-type: none"> • Relevance of Interprovincial Examinations to current, accepted trade practices; industry-based provincial and national validation of test items • Supplemental Policy (retesting) • Confidentiality of examination content c. Multiple-choice format (four-option) item format, Red Seal standards for acceptable test items d. Government materials relevant to the Interprovincial Examinations for apprentice Truck and Transport Mechanics <ul style="list-style-type: none"> • National Occupational Analysis (NOA); prescribed scope of the skills and knowledge which comprise the trade • NOA "Pie-chart" and its relationship to content distribution of Interprovincial Examination items • Apprenticeship Manitoba Technical Training package. 	n/a
<p>2. Identify resources, strategies and other considerations for maximizing successful completion of written examinations.</p> <ul style="list-style-type: none"> a. Personal preparedness <ul style="list-style-type: none"> • Rest • Nutrition • Personal study regimen • Prior experience in test situations (e.g., Unit Tests) c. Self-assessment, consultation and personal study plan <ul style="list-style-type: none"> • Self-assessment of individual strengths/weaknesses in trade related skills and 	n/a

knowledge

- Approved textbooks
- Study groups

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| 3. Review program content regarding common occupational skills. | n/a |
| 4. Review program content regarding engine and supporting systems. | n/a |
| 5. Review program content regarding air systems and brakes. | n/a |
| 6. Review program content regarding electrical and electronic systems. | n/a |
| 7. Review program content regarding drive train. | n/a |
| 8. Review program content regarding steering, chassis/frames, suspension, wheels, hubs and tires. | n/a |
| 9. Review program content regarding cab. | n/a |
| 10. Review program content regarding trailers. | n/a |
| 11. Review program content regarding climate control. | n/a |
| 12. Review program content regarding hydraulic systems. | n/a |
