# RED SEAL

THE INTERPROVINCIAL STANDARDS RED SEAL PROGRAM


## National Occupational Analysis

2013

# Transport Trailer Technician

Human Resources and Skills Development Canada
Ressources humaines et Développement des compétences Canada
Canada

**Occupational Analyses Series**

# Transport Trailer Technician

**2013**

| | |
|---|---|
| Trades and Apprenticeship Division | Division des métiers et de l'apprentissage |
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# FOREWORD

***The Canadian Council of Directors of Apprenticeship (CCDA) recognizes this National Occupational Analysis (NOA) as the national standard for the occupation of Transport Trailer Technician.***

## Background

The first National Conference on Apprenticeship in Trades and Industries, held in Ottawa in 1952, recommended that the federal government be requested to cooperate with provincial and territorial apprenticeship committees and officials in preparing analyses of a number of skilled occupations. To this end, Human Resources and Skills Development Canada (HRSDC) sponsors a program, under the guidance of the CCDA, to develop a series of NOAs.

The NOAs have the following objectives:

- to describe and group the tasks performed by skilled workers;
- to identify which tasks are performed in every province and territory;
- to develop instruments for use in the preparation of Interprovincial Red Seal Examinations and curricula for training leading to the certification of skilled workers;
- to facilitate the mobility of apprentices and skilled workers in Canada; and,
- to supply employers, employees, associations, industries, training institutions and governments with analyses of occupations.

# ACKNOWLEDGEMENTS

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# STRUCTURE OF ANALYSIS

To facilitate understanding of the nature of the occupation, the work performed is divided into the following categories:

| | |
|---|---|
| **Blocks** | largest division within the analysis that is comprised of a distinct set of trade activities |
| **Tasks** | distinct actions that describe the activities within a block |
| **Sub-Tasks** | distinct actions that describe the activities within a task |
| **Key Competencies** | activities that a person should be able to do in order to be called 'competent' in the trade |

The analysis also provides the following information:

| | |
|---|---|
| **Trends** | changes identified that impact or will impact the trade including work practices, technological advances, and new materials and equipment |
| **Related Components** | list of products, items, materials and other elements relevant to the block |
| **Tools and Equipment** | categories of tools and equipment used to perform all tasks in the block; these tools and equipment are listed in Appendix A |
| **Context** | information to clarify the intent and meaning of tasks |
| **Required Knowledge** | elements of knowledge that an individual must acquire to adequately perform a task |

The appendices located at the end of the analysis are described as follows:

| | |
|---|---|
| **Appendix A — Tools and Equipment** | non-exhaustive list of tools and equipment used in this trade |
| **Appendix B — Glossary** | definitions or explanations of selected technical terms used in the analysis |
| **Appendix C — Acronyms** | list of acronyms used in the analysis with their full name |
| **Appendix D — Block and Task Weighting** | block and task percentages submitted by each jurisdiction, and the national averages of these percentages; these national averages determine the number of questions for each block and task in the Interprovincial exam |
| **Appendix E — Pie Chart** | graph which depicts the national percentages of exam questions assigned to blocks |
| **Appendix F — Task Profile Chart** | chart which outlines graphically the blocks, tasks and sub-tasks of this analysis |

# DEVELOPMENT AND VALIDATION OF ANALYSIS

### Development of Analysis

A draft analysis is developed by a committee of industry experts in the field led by a team of facilitators from HRSDC. This draft analysis breaks down all the tasks performed in the occupation and describes the knowledge and abilities required for a tradesperson to demonstrate competence in the trade.

### Draft Review

The NOA development team then forwards a copy of the analysis and its translation to provincial and territorial authorities for a review of its content and structure. Their recommendations are assessed and incorporated into the analysis.

### Validation and Weighting

The analysis is sent to all provinces and territories for validation and weighting. Participating jurisdiction consult with industry to validate and weight the document, examining the blocks, tasks and sub-tasks of the analysis as follows:

| | |
|---|---|
| **BLOCKS** | Each jurisdiction assigns a percentage of questions to each block for an examination that would cover the entire trade. |
| **TASKS** | Each jurisdiction assigns a percentage of exam questions to each task within a block. |
| **SUB-TASKS** | Each jurisdiction indicates, with a YES or NO, whether or not each sub-task is performed by skilled workers within the occupation in its jurisdiction. |

The results of this exercise are submitted to the NOA development team who then analyzes the data and incorporates it into the document. The NOA provides the individual jurisdictional validation results as well as the national averages of all responses. The national averages for block and task weighting guide the Interprovincial Red Seal Examination plan for the trade.

This method for the validation of the NOA also identifies common core sub-tasks across Canada for the occupation. If at least 70% of the responding jurisdictions perform a sub-task, it shall be considered common core. Interprovincial Red Seal Examinations are based on the common core sub-tasks identified through this validation process.

## Definitions for Validation and Weighting

| | |
|---|---|
| **YES** | sub-task performed by qualified workers in the occupation in a specific jurisdiction |
| **NO** | sub-task not performed by qualified workers in the occupation in a specific jurisdiction |
| **NV** | analysis Not Validated by a province/territory |
| **ND** | trade Not Designated in a province/territory |
| **NOT COMMON CORE (NCC)** | sub-task, task or block performed by less than 70% of responding jurisdictions; these will not be tested by the Interprovincial Red Seal Examination for the trade |
| **NATIONAL AVERAGE %** | average percentage of questions assigned to each block and task in Interprovincial Red Seal Examination for the trade |

## Provincial/Territorial Abbreviations

| | |
|---|---|
| **NL** | Newfoundland and Labrador |
| **NS** | Nova Scotia |
| **PE** | Prince Edward Island |
| **NB** | New Brunswick |
| **QC** | Quebec |
| **ON** | Ontario |
| **MB** | Manitoba |
| **SK** | Saskatchewan |
| **AB** | Alberta |
| **BC** | British Columbia |
| **NT** | Northwest Territories |
| **YT** | Yukon Territory |
| **NU** | Nunavut |

# ANALYSIS

Safe working procedures and conditions, accident prevention, and the preservation of health are of primary importance to industry in Canada. These responsibilities are shared and require the joint efforts of government, employers and employees. It is imperative that all parties become aware of circumstances that may lead to injury or harm. Safe learning experiences and work environments can be created by controlling the variables and behaviours that may contribute to accidents or injury.

It is generally recognized that safety-conscious attitudes and work practices contribute to a healthy, safe and accident-free work environment.

It is imperative to apply and be familiar with the Occupational Health and Safety Acts (OH&S) and Workplace Hazardous Materials Information System (WHMIS) regulations. As well, it is essential to determine workplace hazards and take measures to protect oneself, co-workers, the public and the environment.

Safety education is an integral part of training in all jurisdictions. As safety is an imperative part of all trades, it is assumed and therefore it is not included as a qualifier of any activities. However, the technical safety tasks and sub-tasks specific to the trade are included in this analysis.

# SCOPE OF THE TRANSPORT TRAILER TECHNICIAN

"Transport Trailer Technician" is this trade's official Red Seal occupational title approved by the CCDA. This analysis covers tasks performed by transport trailer technicians whose occupational title has been identified by some provinces and territories of Canada under the following names:

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Commercial Trailer Mechanic | | | | | | | | | | ✓ | | | |
| Commercial Trailer Technician | | | | ✓ | | | | | | | | | |
| Transport Trailer Technician | ✓ | ✓ | ✓ | | | | ✓ | | | | | ✓ | |
| Truck-Trailer Service Technician | | | | | | ✓ | | | | | | | |

Transport trailer technicians inspect, diagnose, maintain, rebuild, assemble 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. Transport trailer technicians also torque wheels by installing wheels and placing rims on hubs and perform tanker work which includes taking appropriate safety precautions. Technicians may specialize in sheet metal work, frame repair or replacement.

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.

To meet government standards and regulations, transport trailer technicians may have to attain specialty certifications in order to perform work-related tasks. A propane license, refrigeration certificate, tanker inspection certificate, specialized pressure vessel welding license, wheel and tire certification, wheel and rim torquing certification, and government inspector certificate are examples of additional certification that may be required by certain jurisdictions.

Technicians must practice safe operating procedures and be conscious of the impact on people, equipment, work area and environment when performing their work. Due to the size and complexity of the equipment, safety is of prime importance. There is an inherent risk of injury when working with heavy equipment, power tools and welding equipment. There are also risks associated with working around loud noises, grease, oil, gasoline and various exhaust fumes. Hazardous cargo or residue contained within trailers can pose a risk to technicians.

The work requires considerable standing, climbing, crouching, kneeling and heavy lifting. Good vision, hearing and sense of smell, as well as the ability to think logically, allow transport trailer technicians to identify and isolate problems. Technicians must also be able to diagnose complex problems and interpret technical manuals and schematics. Building and fabrication skills are also an asset.

This analysis recognizes similarities or overlaps with the work of truck and transport mechanics, refrigeration and air conditioning mechanics, welders, motor vehicle body repairers, partspersons and heavy duty equipment technicians.

With experience, transport trailer technicians act as mentors and trainers to apprentices in the trade. They may also advance to supervisory, service management and training position.

In order to maximize load capacities, lighter, longer and stronger trailers are always entering the market. As a result, repair procedures are changing due to the use of new materials such as aluminum and composites. There are also new products that are available for trailers to improve safety and longevity such as anti roll-over systems and wheel nut indicators. There is a trend in using super singles instead of dual wheels.

Computer skills have become required to work in the trade. Computers are used in trailers for a variety of functions, and computerized diagnostic equipment is more common.

There are opportunities for specialization such as in electronic braking control systems, body repairs and fabrication.

With a growing concern around safety, there is an increase in the use of personal protective equipment (PPE). The use of fall arrest equipment has become mandatory. To prevent contamination, the use of rubber gloves in the shop is more common. Continuous air monitoring when working in confined spaces has become a standard.

There has been greater emphasis on environmentally friendly and less hazardous products, with better recycling, disposal and handling procedures. To improve fuel economy, the use of side skirts is becoming more prevalent.

Essential skills are needed for work, learning and life. They provide the foundation for learning all other skills and enable people to evolve with their jobs and adapt to workplace change.

Through extensive research, the Government of Canada and other national and international agencies have identified and validated nine essential skills. These skills are used in nearly every occupation and throughout daily life in different ways.

A series of CCDA-endorsed tools have been developed to support apprentices in their training and to be better prepared for a career in the trades. The tools can be used independently or with the assistance of a tradesperson, trainer, employer, teacher or mentor to:

- understand how essential skills are used in the trades;
- learn about individual essential skills strengths and areas for improvement; and
- improve essential skills and increase success in an apprenticeship program.

The tools are available online or for order at: www.hrsdc.gc.ca/essentialskills.

The essential skills profile for the Transport Trailer Technicians trade indicates that the most important essential skills are **document use, numeracy** and **problem solving**.

The application of these skills may be described throughout this document within the competency statements which support each subtask of the trade. The following are summaries of the requirements in each of the essential skills, taken from the essential skills profile. A link to the complete essential skills profile can be found at www.red-seal.ca.

***Reading***
Transport trailer technicians read instructions on work orders, application or installation instructions, manufacturers' service bulletins and manuals for troubleshooting and diagnostic information of products and materials. They read information sheets to learn about new products and materials.

***Document Use***
Transport trailer technicians reference drawings and interpret troubleshooting diagrams and charts to obtain information. They may complete check lists and documentation for inspection certificates.

***Writing***
Transport trailer technicians write notes on work orders, maintenance sheets and inspection forms. They may write to inform or request information from supervisors, colleagues or different departments. They may fill out maintenance and inspection reports.

*Numeracy*
Transport trailer technicians measure width, length and distance of components to determine placement of components and ensure proper tension. They measure material to be cut. They calculate areas to be refitted with panels. They take measurements to ensure that axles are adjusted or that tire treads meet specifications.

*Oral Communication*
Transport trailer technicians communicate with colleagues, manufacturers and supervisors to discuss and review job and safety requirements. They may speak with customers or drivers to determine their concerns with a trailer. They may advise customers of general trailer conditions and future repair requirements.

*Thinking Skills*
Transport trailer technicians use problem solving skills to diagnose the source of the trailer breakdowns and to estimate time required to complete a job. Decision-making skills are required for determining the type of equipment, parts, materials and procedures best suited for the job.

Transport trailer technicians require job task planning skills to determine task sequencing or prioritization of tasks. They organize their tools and the parts required at the beginning of each job. Transport trailer technicians find information by accessing WHMIS and other safety information. They consult repair manuals or inspection manuals for information about requirements and procedures.

*Digital Technology*
Transport trailer technicians may use mobile devices to complete numeracy-related tasks. They may communicate by email with coworkers, supervisors, suppliers and manufacturers. They may use the Internet to access online manuals, training courses, seminars and articles by suppliers or manufacturers.

*Working with Others*
Transport trailer technicians spend most of their time working independently but work with others depending on the job requirements.

*Continuous Learning*
Transport trailer technicians are continuously learning to keep up with the changes in the industry. They may attend manufacturers' or suppliers' seminars.

| | |
|---|---|
| **Trends** | Because of the new electronic and computerized equipment on transport trailers, diagnostic equipment has evolved. Electronic manuals and service bulletins are becoming more common. |
| **Related Components** | All components apply. |
| **Tools and Equipment** | See Appendix A. |

## Task 1 Performs safety-related functions.

**Context** Transport trailer technicians must adhere to safety procedures and regulations to ensure a safe work environment.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of PPE such as respiratory, hearing, eye and body protection |
| K 2 | types of safety equipment such as caging devices, shop ventilation, fire extinguishers, eye wash stations and first aid kits |
| K 3 | PPE and safety equipment operations and limitations |
| K 4 | workplace health and safety acts and regulations |
| K 5 | WHMIS and Material Safety Data Sheets (MSDS) |
| K 6 | emergency phone numbers |
| K 7 | company policies and procedures such as evacuation routes, location of safety equipment and safety training |
| K 8 | disposal and recycling procedures |
| K 9 | potential hazards such as ceiling heights, overhead wires and uneven surfaces |

**Sub-task**

**A-1.01 Uses personal protective equipment (PPE) and safety equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-1.01.01 | store and maintain PPE and safety equipment according to workplace safety policies |
| A-1.01.02 | repair or replace worn, damaged or defective PPE and safety equipment according to workplace safety policies |
| A-1.01.03 | select PPE according to work conditions and requirements such as wearing rubber gloves when handling hazardous or carcinogenic materials, and wearing eye and hearing protection when grinding metals |

**Sub-task**

**A-1.02 Maintains safe work environment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-1.02.01 | perform visual inspection of vehicles and surrounding work area to identify potential hazards such as fluids and gases under high pressure in hydraulic, pneumatic and refrigeration systems |
| A-1.02.02 | perform general housekeeping duties such as sweeping, discarding defective components and keeping area clear of obstacles |
| A-1.02.03 | utilize ventilation equipment to exhaust and contain fumes, smoke and dust |
| A-1.02.04 | handle and store hazardous materials according to MSDS and workplace policies |

## Task 2 Uses and maintains tools and equipment.

**Context** Transport trailer technicians must use and maintain tools and equipment to perform all tasks in their trade in a safe and efficient manner.

**Required Knowledge**

| | |
|---|---|
| K 1 | types, uses and maintenance of hand tools such as wrenches, chisels and ratchets |
| K 2 | types, uses and maintenance of specialty tools such as pullers, presses and tamper-proof tools |
| K 3 | types, uses and maintenance of electric tools such as drills, grinders and electric saws |
| K 4 | types, uses and maintenance of pneumatic tools such as impact guns, die grinders and air drills |
| K 5 | types, uses and maintenance of measuring devices such as tape measures, micrometers, calipers and dial indicators |
| K 6 | types, uses and maintenance of testing devices such as pressure gauges, multimeters and flow meters |
| K 7 | types, uses and maintenance of diagnostic tools and equipment such as computers and handheld diagnostic tools |
| K 8 | imperial and metric systems of measurement |
| K 9 | types of hoisting and lifting equipment such as floor jacks, chain hoists, overhead cranes and bumper jacks |
| K 10 | applications of hoisting and lifting equipment |
| K 11 | types of staging equipment such as axle stands and blocking |
| K 12 | types of access equipment such as ladders, scaffolds and steps |
| K 13 | load limitations of hoisting, staging and lifting equipment |
| K 14 | types of welding equipment such as oxy-acetylene welding (OAW) and gas metal arc welding (GMAW) |
| K 15 | welding materials such as covered and coiled wire electrodes, and shielding gases |
| K 16 | basic welding procedures |
| K 17 | jurisdictional regulations for welding procedures |
| K 18 | types of gas cutting equipment such as oxy-acetylene torches, propane torches and plasma cutters |

| | |
|---|---|
| K 19 | gas cutting principles and considerations |
| K 20 | basic gas cutting procedures |
| K 21 | recording and reporting of damaged and defective shop tools |

---

**Sub-task**

**A-2.01 Maintains hand, electric and pneumatic tools.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-2.01.01 | inspect hand, electric and pneumatic tools for wear, damage and defects |
| A-2.01.02 | clean and lubricate hand, electric and pneumatic tools such as adjustable wrenches, electric angle drills and impact guns |
| A-2.01.03 | sharpen drill bits using specialized equipment such as drill bit sharpeners |
| A-2.01.04 | store hand, electric and pneumatic tools |

---

**Sub-task**

**A-2.02 Maintains measuring, testing and diagnostic equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-2.02.01 | inspect measuring, testing and diagnostic equipment for wear, damage or defects |
| A-2.02.02 | recalibrate measuring, testing and diagnostic equipment at required intervals according to manufacturers' specifications |
| A-2.02.03 | clean and store measuring, testing and diagnostic equipment to prevent contamination and damage to the equipment |
| A-2.02.04 | change battery within electronic equipment when required |

**Sub-task**

**A-2.03 Uses hoisting, lifting, staging and access equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-2.03.01 | inspect hoisting and lifting equipment for wear, damage, leaks and defects |
| A-2.03.02 | repair or replace worn, damaged and defective components on hoisting, lifting and staging equipment |
| A-2.03.03 | store hoisting, lifting, staging and access equipment |
| A-2.03.04 | position and connect hoisting and lifting equipment |
| A-2.03.05 | operate hoisting and lifting equipment |
| A-2.03.06 | secure access equipment to prevent movement |
| A-2.03.07 | place staging equipment depending on job at hand |

**Sub-task**

**A-2.04 Uses welding equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-2.04.01 | inspect welding equipment for wear, damage, defects and potential hazards |
| A-2.04.02 | store and secure welding equipment |
| A-2.04.03 | maintain welding equipment such as cleaning welding tips, replacing electrode holders and securing ground clamps |
| A-2.04.04 | transport welding equipment according to standards such as federal, provincial and territorial regulations |
| A-2.04.05 | select and regulate gases according to material requirements |
| A-2.04.06 | set up welding equipment using wire speed, heat and gas controls depending on material being welded and job conditions |

| | |
|---|---|
| A-2.04.07 | prepare parent material to accept weld |
| A-2.04.08 | assess flow and penetration during welding by performing sensory inspection |
| A-2.04.09 | shut down welding equipment |

**Sub-task**

**A-2.05 Uses gas cutting equipment.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-2.05.01 | inspect gas cutting equipment for wear, damage, defects and potential hazards |
| A-2.05.02 | store and secure gas cutting equipment |
| A-2.05.03 | maintain gas cutting equipment such as replacing or cleaning cutting tips, cleaning torch bodies and securing hoses |
| A-2.05.04 | transport gas cutting equipment according to standards such as federal, provincial and territorial regulations |
| A-2.05.05 | select and regulate gases according to material requirements |
| A-2.05.06 | set up gas cutting equipment using heat and gas controls depending on material being cut and job conditions |
| A-2.05.07 | shut down gas cutting equipment |

## Task 3 Performs common work practices and procedures.

**Context** Transport trailer technicians perform the activities in this task across their trade in performing repairs and maintenance.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of fluids such as oil, methyl hydrate and fuel, and their properties |
| K 2 | types of lubricants such as synthetic, semi-synthetic and non-synthetic, and their properties |
| K 3 | handling, storage, disposal and recycling of fluids and cleaning materials |
| K 4 | types of cleaning agents and their effects on different types of surfaces |

| | |
|---|---|
| K 5 | ventilation requirements |
| K 6 | types and grades of fasteners, and their torque specifications |
| K 7 | types and properties of sealants, adhesives and gaskets |
| K 8 | handling, storage and disposal of sealants, adhesives and gaskets |
| K 9 | types of hoses, tubing and fittings such as plastic and rubber |
| K 10 | regulations regarding hoses, tubing and fittings |
| K 11 | sizes and specifications of hoses, tubing and fittings |
| K 12 | compatibility of hoses, tubing and fittings |

---

**Sub-task**

**A-3.01 Maintains fluids and lubricants.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-3.01.01 | identify safe handling procedures and equipment for fluids and lubricants according to WHMIS |
| A-3.01.02 | perform sensory inspections of fluids and lubricants for odour, visible contaminants and feel |
| A-3.01.03 | store and dispose of fluids and lubricants according to regulations and manufacturers' recommendations |
| A-3.01.04 | service filtration systems according to manufacturers' scheduled maintenance |
| A-3.01.05 | verify fluid levels such as hub oil, hydraulic oil and coolants, and top up to specification |
| A-3.01.06 | identify and select types and grades of fluids and lubricants appropriate for the application |

**Sub-task**

**A-3.02 Lubricates parts and components.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-3.02.01 | select lubricant required for specific application |
| A-3.02.02 | inspect components prior to lubricating |
| A-3.02.03 | use lubricating equipment such as grease guns, pumps and suction guns |

**Sub-task**

**A-3.03 Cleans parts and components.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-3.03.01 | select cleaning agent required for specific application |
| A-3.03.02 | use cleaning equipment such as parts washers and pressure washers |
| A-3.03.03 | apply cleaning procedures according to the parts manufacturers' standards and instructions |

**Sub-task**

**A-3.04 Uses fasteners, sealants, adhesives and gaskets.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-3.04.01 | remove broken fasteners and replace with fastener specified by manufacturer and standard repair practices |
| A-3.04.02 | install fasteners using tools and equipment such as rivet guns, glue guns, torque wrenches, crimpers and air hammers |
| A-3.04.03 | apply sealants and adhesives using tools such as caulking guns and trowels |
| A-3.04.04 | tighten fasteners according to manufacturers' torque specifications and standard repair practices |
| A-3.04.05 | repair threads using tools such as taps, dies and chasers |

**Sub-task**

**A-3.05 Replaces hoses, tubing and fittings.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| A-3.05.01 | drain fluid and relieve pressure from air and fluid systems before disconnecting hoses, tubing and fittings according to service needs |
| A-3.05.02 | route and secure hoses, tubing and fittings using clamps, springs, separators and ties |
| A-3.05.03 | fit ferrules, nuts and inserts according to design |
| A-3.05.04 | remove and install hoses, tubing and fittings |
| A-3.05.05 | create flares using specialized flaring tools |

| | |
|---|---|
| **Trends** | New technologies provide lighter, stronger suspension systems such as composite spring suspensions.<br>Multi-functional air springs are now available, acting as both a suspension system during normal operation, and as a lifting device for loading and unloading. This provides easier access to loading docks.<br>Some technologies, such as on-board scales, are being developed to improve load distribution.<br>Stability control systems improve stability of vehicle. |
| **Related Components (including, but not limited to)** | **Air suspension systems**: air springs, valves, suspension beams, suspension hangers, suspension bushings, shock absorbers, u-bolts, air lines, fasteners.<br>**Spring suspension systems**: leafs, fasteners, hangers, equalizers, radius rods (torque rods), bushings.<br>**Rubber block suspension systems**: trunnion bushings, radius rods, rubber blocks, walking beams. |
| **Tools and Equipment** | See Appendix A. |

## Task 4 Diagnoses suspension systems.

**Context** Transport trailer technicians inspect and diagnose suspension systems according to manufacturers' standards.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of suspension systems such as air, spring and rubber block |
| K 2 | manufacturers' specifications |
| K 3 | air suspension components such as air valves, air springs and height control valves |
| K 4 | air supply and operating pressure |
| K 5 | spring suspension components such as equalizers, hangers and radius rods (torque rods) |

| | |
|---|---|
| K 6 | rubber block suspension components such as radius rods, wishbones and trunnion bushings |
| K 7 | diagnostic tools and equipment such as feeler gauges, dial indicators and pry bars |
| K 8 | diagnostic procedures |

---

**Sub-task**

**B-4.01 Diagnoses air suspension systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| B-4.01.01 | test operation of valves by supplying air at system operating pressure |
| B-4.01.02 | inspect operation of air bags and components |
| B-4.01.03 | identify problems of air supply and flow of the supply pressure protection valve |
| B-4.01.04 | verify air pressure by using gauges |
| B-4.01.05 | perform sensory inspections by listening and feeling for air leaks and visually recognizing wear, damages and defects of components |
| B-4.01.06 | check for excessive movements of components |
| B-4.01.07 | interpret test results to determine next steps such as repairing and replacing air suspension system components |

**Sub-task**

**B-4.02 Diagnoses spring suspension systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| B-4.02.01 | perform visual inspections of worn, damaged or defective spring suspension system components such as leaves, spring saddles and bushings |
| B-4.02.02 | check u-bolts for defects or looseness by using hammers |
| B-4.02.03 | check for excessive movements of components |
| B-4.02.04 | interpret diagnostic results to determine next steps such as repairing and replacing spring suspension system components |

**Sub-task**

**B-4.03 Diagnoses rubber block suspension systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| B-4.03.01 | perform visual inspections of components for wear, damages and defects |
| B-4.03.02 | determine conditions of components by using tools and equipment such as pry bars, flashlights and jacks |
| B-4.03.03 | interpret diagnostic results to determine next steps such as repairing and replacing rubber block suspension system components |

## Task 5 Services suspension systems.

**Context** Transport trailer technicians maintain suspension systems to prevent system failure. They also repair or replace suspension systems on the road and in the shop to enable the trailer to operate.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of suspension systems |
| K 2 | manufacturers' maintenance procedures and schedules |
| K 3 | location of manufacturers' specifications |
| K 4 | components of air suspension systems such as suspension beams, air springs and control valves |
| K 5 | components that can be repaired, replaced or adjusted |
| K 6 | spring suspension components such as equalizers, hangers and radius rods (torque rods) |
| K 7 | rubber block suspension components such as radius rods, wishbones and trunnion bushings |
| K 8 | operation of suspension systems |
| K 9 | valve operation and location |
| K 10 | repair procedures of suspension systems |
| K 11 | installation procedures of suspension system components |

**Sub-task**

### B-5.01 Maintains suspension systems.

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| B-5.01.01 | perform preventative maintenance checks such as checking height control valve operation and air lines securement |
| B-5.01.02 | measure alignment by using tools and equipment such as laser, pogo stick, measuring tape and alignment bar |
| B-5.01.03 | adjust alignment of axles according to manufacturers' specifications |
| B-5.01.04 | adjust ride height according to manufacturers' specifications |

**Sub-task**

**B-5.02 Repairs air suspension systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| B-5.02.01 | stabilize the vehicle by decompressing air systems and using wheel chocks, jacks and stands to prevent collapse or movement of trailer |
| B-5.02.02 | remove worn, damaged or defective components such as air springs and suspension beams |
| B-5.02.03 | repair components to manufacturers' specifications by using tools and equipment such as wrenches, welders and cutting torches |
| B-5.02.04 | reinstall or replace components to manufacturers' specifications |
| B-5.02.05 | adjust components for alignment of axles |
| B-5.02.06 | torque fasteners to manufacturers' specifications and complete repair by verifying assembly of components |

**Sub-task**

**B-5.03 Repairs spring suspension systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| B-5.03.01 | stabilize the vehicle by using wheel chocks, jacks and stands to prevent collapse or movement of trailer |
| B-5.03.02 | remove components |
| B-5.03.03 | repair components to manufacturers' specifications by using torque wrenches, cutting torches and impact guns |
| B-5.03.04 | reinstall or replace components to manufacturers' specifications |
| B-5.03.05 | adjust components for alignment according to manufacturers' specifications |
| B-5.03.06 | torque fasteners to manufacturers' specifications and complete repair by verifying assembly of components |

**Sub-task**

**B-5.04 Repairs rubber block suspension systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| B-5.04.01 | stabilize the vehicle by using wheel chocks, jacks and stands to prevent collapse or movement of trailer |
| B-5.04.02 | remove components |
| B-5.04.03 | repair components to manufacturers' specifications |
| B-5.04.04 | reinstall or replace components to manufacturers' specifications |
| B-5.04.05 | adjust components for alignment according to manufacturers' specifications |
| B-5.04.06 | torque fasteners to manufacturers' specifications and complete repair by verifying assembly of components |

| | |
|---|---|
| **Trends** | There is an increased use of disc brake systems.<br>Electronic braking control systems are being refined to improve the braking efficiencies of trailers and enhance safety. They have become more complex with the amalgamation of antilock brake systems (ABS) and roll stability systems. |
| **Related Components (including, but not limited to)** | **Disc brake systems**: rotors, calipers, pads, valves, brake chambers, air lines, hardware.<br>**Drum brake systems**: shoes, hardware, drums, brake chambers, air lines.<br>**Air brake systems**: camshafts, bushings, slack adjusters, valves, brake chambers.<br>**Hydraulic brake systems**: master cylinders, wheel cylinders, steel brake lines, fittings, valves.<br>**Electric brake systems**: magnets, adjusters, wiring, controllers.<br>**Electronic braking control systems**: valves, sensors, wiring, cables, modulator, electronic control unit (ECU). |
| **Tools and Equipment** | See Appendix A. |

## Task 6 Diagnoses brake systems.

**Context** Transport trailer technicians diagnose brake systems as a critical task for the safe operation of the units. Accurate diagnostics are required for correct repair.

**Required Knowledge**

| | |
|---|---|
| K 1 | manufacturers' specifications |
| K 2 | component functions |
| K 3 | types of brake shoe materials and linings and their functions |
| K 4 | brake timing |
| K 5 | types and operation of disc brake systems such as hydraulic and air |
| K 6 | types and operation of drum brake systems such as air, hydraulic and electric |

| | |
|---|---|
| K 7 | types and sizes of drum brake components |
| K 8 | types and operation of air brake systems |
| K 9 | types and operation of hydraulic brake systems such as surge, air-actuated and vacuum-actuated |
| K 10 | types and operation of electric brake systems |
| K 11 | types and operation of electronic braking control systems such as ABS and roll stability systems |
| K 12 | diagnostic tools and equipment such as vernier calipers, dial indicators and drum gauges |
| K 13 | diagnostic procedures |

---

**Sub-task**

**C-6.01 Diagnoses disc brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-6.01.01 | inspect disc brake system components using tools and equipment such as vernier calipers, dial indicators, wrenches and flashlights |
| C-6.01.02 | perform sensory inspections to identify conditions such as worn and cracked pads and rotors, worn slider pin bushings, and leaking and chafing air lines and fittings |
| C-6.01.03 | inspect brake chamber to ensure that there are no leaks, to identify damage and to locate broken springs |
| C-6.01.04 | measure stroke of arm on brake using brake stroke gauge or tape measure to determine if the travel is within specifications |
| C-6.01.05 | perform functional check on disc brake characteristics such as running clearance, adjuster function and caliper travel |
| C-6.01.06 | interpret diagnostic results to determine next steps such as repairing and replacing disc brake system components |

**Sub-task**

**C-6.02 Diagnoses drum brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-6.02.01 | inspect drum brake system components using tools and equipment such as drum gauge, shoe gauge, dial indicator with magnetic base and flashlight |
| C-6.02.02 | perform sensory inspections to identify conditions such as excessive wear and cracks on shoes and drums, worn slack adjusters, broken or missing retainer hardware, leaking and chafing air lines and fittings, protruding shoes, and seized or worn cams and bushings |
| C-6.02.03 | inspect brake chamber to ensure that there are no leaks, to identify damage, to verify mounting and to locate broken springs |
| C-6.02.04 | perform cam rotation test to check component performance |
| C-6.02.05 | measure camshaft to bushing gap to verify that it is according to recommended specifications |
| C-6.02.06 | interpret diagnostic results to determine next steps such as repairing and replacing drum brake system components |

**Sub-task**

**C-6.03 Diagnoses air brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-6.03.01 | inspect air brake system components using tools and equipment such as air gauge, brake application tool (gauge, gladhand, hose and valve) and spray bottle with soapy water |
| C-6.03.02 | perform sensory inspections to identify conditions such as air leaks, chafed, kinked and cracked air lines and valves, loose valves and fittings, and malfunctioning valves |

C-6.03.03 inspect brake chamber to ensure that there are no leaks, to identify damage, and to locate broken springs

C-6.03.04 interpret diagnostic results to determine next steps such as repairing and replacing air brake system components

---

**Sub-task**

**C-6.04 Diagnoses hydraulic brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

C-6.04.01 disassemble hydraulic brake system in order to access and inspect system components

C-6.04.02 inspect hydraulic brake system components using tools and equipment such as flashlight and drum gauge

C-6.04.03 perform sensory inspections to identify conditions such as hydraulic fluid leaks, kinked and rusted lines, worn shoes and mounting hardware, and seized adjusters

C-6.04.04 check brake fluid levels

C-6.04.05 inspect safety breakaway system by checking that the lever moves freely

C-6.04.06 interpret diagnostic results to determine next steps such as repairing and replacing hydraulic brake system components

---

**Sub-task**

**C-6.05 Diagnoses electric brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

C-6.05.01 inspect electric brake system components using tools and equipment such as screwdriver, power source, flashlight and multimeter

C-6.05.02 disassemble electric brake system in order to access and inspect system components

| | |
|---|---|
| C-6.05.03 | perform sensory inspections to identify conditions such as broken wires, and wear on shoes, drums and magnet |
| C-6.05.04 | check power source for safety breakaway system and check that the switch is functional |
| C-6.05.05 | interpret diagnostic results to determine next steps such as repairing and replacing electric brake system components |

---

**Sub-task**

**C-6.06 Diagnoses electronic braking control systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-6.06.01 | inspect electronic braking control system components using tools and equipment such as multimeter, wire brush, computer and flashlight |
| C-6.06.02 | interpret computer diagnostic information by downloading and saving results |
| C-6.06.03 | check wiring and connections for continuity, wear and damage |
| C-6.06.04 | test wheel sensors using multimeter and verify against manufacturers' specifications |
| C-6.06.05 | inspect wheel sensor and exciter ring for excessive gap and corrosion |
| C-6.06.06 | verify warning light operation (ABS light) |
| C-6.06.07 | interpret diagnostic results to determine next steps such as repairing and replacing electronic braking control system components |

## Task 7 Services brake systems.

**Context** Transport trailer technicians service brake systems as a critical task for the safe operation of units. Servicing includes both regular preventative maintenance as well as repairs to braking system faults and failures.

**Required Knowledge**

| | |
|---|---|
| K 1 | manufacturers' specifications such as adjustment procedures, wear limitations and failure criteria |
| K 2 | operation of brake systems |
| K 3 | maintenance procedures such as lubrication, verification of wear and adjustment |
| K 4 | system contamination |
| K 5 | maintenance intervals |
| K 6 | removal and installation procedures for brake system accessories and components such as brake stroke indicators and auto-greasers |
| K 7 | disc brake system components such as rotors, calipers, pads and hardware |
| K 8 | drum brake system components such as brake drums, brake shoes, camshafts, slack adjusters and hardware |
| K 9 | air brake system components such as valves, fittings, tubing, brake chambers and hoses |
| K 10 | hydraulic brake system components such as valves, sensors, master cylinder, wheel cylinders, brake bleeders, tubing, lines and fittings |
| K 11 | electric brake system components such as controllers and magnets |
| K 12 | electronic braking control system components such as sensors, modules and valves |
| K 13 | brake system components that can be repaired, replaced or adjusted |
| K 14 | component functions |
| K 15 | component replacement procedures |

**Sub-task**

**C-7.01 Maintains brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-7.01.01 | perform preventative maintenance checks such as power and free stroke, and wear |
| C-7.01.02 | lubricate components such as cams and adjusters according to recommended maintenance schedule |
| C-7.01.03 | adjust brakes to specifications required by jurisdictional regulations |
| C-7.01.04 | clean air system by flushing contaminants from system with air |
| C-7.01.05 | inspect electronic control systems |
| C-7.01.06 | apply dielectric grease to electronic braking connections |

**Sub-task**

**C-7.02 Repairs disc brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-7.02.01 | replace worn, damaged and defective mechanical components such as disc pads, calipers, rotors and fasteners |
| C-7.02.02 | replace worn, damaged and defective air system related components such as brake chambers, air lines, valves and fasteners |
| C-7.02.03 | complete repair by verifying operation of brakes |

**Sub-task**

**C-7.03 Repairs drum brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-7.03.01 | remove wheel end and hub assemblies to access brake system |
| C-7.03.02 | replace or reinstall drum brake components such as brake drums, brake shoes, camshafts, cam bushings, slack adjusters and hardware |
| C-7.03.03 | shim and adjust components such as cams and slack adjusters |
| C-7.03.04 | complete repair by verifying operation of brakes |

**Sub-task**

**C-7.04 Repairs air brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-7.04.01 | replace air brake components such as valves, sensors, lines, tanks, gladhands and brake chambers |
| C-7.04.02 | repair brake chambers by replacing components such as clamps, fittings and diaphragms |
| C-7.04.03 | complete repair by verifying operation of air system |

**Sub-task**

**C-7.05 Repairs hydraulic brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-7.05.01 | remove wheel end and hub assemblies to access brake system |
| C-7.05.02 | replace or reinstall hydraulic brake components such as valves and sensors |
| C-7.05.03 | recondition hydraulic brake components such as wheel and master cylinders |
| C-7.05.04 | bleed system to remove air from system |
| C-7.05.05 | complete repair by verifying operation of brakes and visually inspecting for leaks |

**Sub-task**

**C-7.06 Repairs electric brake systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-7.06.01 | remove worn and damaged components |
| C-7.06.02 | replace or reinstall electric brake components such as battery, magnets and shoes |
| C-7.06.03 | repack wheel bearings and adjust bearings to manufacturers' free play specifications |
| C-7.06.04 | repair and replace damaged and corroded wiring |
| C-7.06.05 | charge battery |
| C-7.06.06 | complete repair by verifying operation of electric brake system |

**Sub-task**

**C-7.07 Repairs electronic braking control systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| C-7.07.01 | confirm voltage supplied to the system |
| C-7.07.02 | replace components such as sensors, cables, valves, connectors and ECU |
| C-7.07.03 | adjust sensors to manufacturers' specifications |
| C-7.07.04 | clean tone ring to allow for generation of electrical impulses as required for the function of the electronic control system |
| C-7.07.05 | clear fault codes in the ECU and complete repair by verifying operation of electronic braking control system |

# BLOCK D AXLES AND WHEEL END ASSEMBLIES

| | |
|---|---|
| **Trends** | Automatic inflation systems have become more common, especially in fleets.<br>Nitrogen-inflated tires are increasing in popularity. Nitrogen maintains a constant inflation pressure regardless of ambient temperature.<br>More self-steering axles are being used on trailers. There is also an increasing use of super single tires. |
| **Related Components (including, but not limited to)** | **Axles and hubs:** bearings, races, seals, gaskets, hub caps, nuts, axle assembly, studs, wheel clamps, valves, wheel spacers.<br>**Steering and lift axles:** kingpins, tie rod ends, tie rods, locking pins, steering stops, shock absorbers, torsion bags, torsion bars, regulators.<br>**Tires and rims:** tires, tubes, stud-piloted rims, spoke wheels, hub-piloted rims, fasteners, valve stems, balancing systems, split rims, lock rings, tubeless rims, spacers, studs, wheel guards, wheel clamps, nuts. |
| **Tools and Equipment** | See Appendix A. |

## Task 8 Diagnoses axles and wheel end assemblies.

**Context** Transport trailer technicians diagnose axles and wheel end assemblies when inspecting and performing preventative maintenance of the trailer.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of axles |
| K 2 | axle components such as spiders and brake chamber supports |
| K 3 | manufacturers' specifications such as welding practices, torque specifications and load capacities |
| K 4 | axle connection points |
| K 5 | bearing and spindle wear tolerances |
| K 6 | types of hubs such as spoke, stud-piloted and hub-piloted |
| K 7 | hub components such as hub caps, studs and nuts |

| | |
|---|---|
| K 8 | cup and cone bearings, and seals |
| K 9 | bearing preload and end play |
| K 10 | types and models of self-steering and lift axles |
| K 11 | self-steering and lift axle components such as air springs, switches and valves |
| K 12 | component functions |
| K 13 | types and sizes of tires and rims |
| K 14 | tire wear limits and inflation pressures |
| K 15 | normal and irregular tire wear |
| K 16 | tire and rim components such as multi-piece rims and valve stems |
| K 17 | automatic inflation systems |
| K 18 | diagnostic tools and equipment such as dial indicators and micrometer |
| K 19 | diagnostic procedures |

---

**Sub-task**

**D-8.01 Diagnoses fixed, self-steering and lift axles.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| D-8.01.01 | perform visual inspections to identify cracks and movements in attachments such as trailing arm, blocks, shock brackets and saddles |
| D-8.01.02 | identify axle problems such as worn, damaged or defective components |
| D-8.01.03 | inspect spindle for excessive wear and cracks |
| D-8.01.04 | interpret diagnostic results to determine next steps such as repairing and replacing fixed, self-steering and lift axle components |

**Sub-task**

**D-8.02 Diagnoses hubs.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| D-8.02.01 | check and feel for end play and measure using dial indicator |
| D-8.02.02 | perform visual inspections of cups and bearings to identify marks and excessive wear |
| D-8.02.03 | identify hub problems such as spinning race, failed wheel seal and cracked hubs |
| D-8.02.04 | interpret diagnostic results to determine next steps such as repairing and replacing hub components |

**Sub-task**

**D-8.03 Diagnoses tires and rims.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| D-8.03.01 | perform visual inspections to identify worn and mismatched tires, damaged treads and side walls |
| D-8.03.02 | measure tread depth using tread gauges |
| D-8.03.03 | measure air pressure using pressure gauges |
| D-8.03.04 | identify rim irregularities such as dents, cracks, corrosion and wear |
| D-8.03.05 | inspect lock ring of multi-piece rims for irregularities |
| D-8.03.06 | interpret diagnostic results to determine next steps such as repairing and replacing tires and rim components |

## Task 9 Services axles and wheel end assemblies.

**Context** Transport trailer technicians maintain, repair and replace axles and wheel end assemblies to ensure proper and safe operation of trailers, in compliance with jurisdictional requirements.

**Required Knowledge**

| | |
|---|---|
| K 1 | torque specifications and sequences |
| K 2 | manufacturers' maintenance procedures and schedules |
| K 3 | types of axles |
| K 4 | axle components such as spiders and brake chamber supports |
| K 5 | hub components such as hub fasteners, wheel bearings and seals |
| K 6 | components that can be repaired, replaced or adjusted |
| K 7 | repair, replacement and adjustment procedures and techniques |
| K 8 | types and models of self-steering and lift axles |
| K 9 | self-steering and lift axle components such as air springs, switches and valves |
| K 10 | component functions |
| K 11 | inflation pressures and procedures |
| K 12 | types of tires and rims |
| K 13 | mounting components such as nuts, wedges and studs |
| K 14 | tire damage that can be repaired |
| K 15 | repair techniques such as plugging and patching |

**Sub-task**

**D-9.01 Maintains axles and wheel end assemblies.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| D-9.01.01 | perform preventative maintenance inspections such as checking fluid levels, inflation pressures and end play |
| D-9.01.02 | adjust inflation pressures using pressure gauges |

| | |
|---|---|
| D-9.01.03 | maintain lubricant levels |
| D-9.01.04 | torque wheel nuts to manufacturers' specifications |
| D-9.01.05 | adjust and measure end play using procedures such as setting the axle nut pretorque according to manufacturers' specifications |

---

**Sub-task**

**D-9.02 Repairs fixed axles and hubs.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| D-9.02.01 | remove wheel end assembly to access axle |
| D-9.02.02 | inspect bearings and spindles for excessive wear |
| D-9.02.03 | replace cup and cone bearings or hub assembly using tools such as punches, hammers, sockets, and seal pullers and drivers |
| D-9.02.04 | remove debris by cleaning hub and bearings |
| D-9.02.05 | replace or reinstall axles and hubs |
| D-9.02.06 | align axles to the kingpin according to manufacturers' specifications |
| D-9.02.07 | complete repair by verifying operation of axles and hubs |

---

**Sub-task**

**D-9.03 Repairs self-steering and lift axles.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| D-9.03.01 | remove self-steering and lift axles and components |
| D-9.03.02 | replace worn, damaged components such as kingpins, tie-rod ends and shock stabilizers using tools and equipment such as torches, welders and wrenches |
| D-9.03.03 | adjust and align self-steering and lift axles to the kingpin according to manufacturers' specifications |
| D-9.03.04 | complete repair by verifying operation of self-steering and lift axles |

**Sub-task**

**D-9.04 Replaces tires and rims.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| D-9.04.01 | remove tires and rims from the hub assembly using impact guns |
| D-9.04.02 | dismount and mount tires on rims |
| D-9.04.03 | inflate tires in tire cage according to safety procedures and manufacturers' specifications |
| D-9.04.04 | install tires and rim assemblies on hubs |
| D-9.04.05 | tighten and torque wheel nuts to manufacturers' specifications |

**Sub-task**

**D-9.05 Repairs tires.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| D-9.05.01 | remove tires and rims from the hub assembly using impact guns |
| D-9.05.02 | dismount tires from rims using tools and equipment such as tire bars and tire machine |
| D-9.05.03 | identify internal and external damages to recommend next steps such as repair or x-ray |
| D-9.05.04 | plug and patch tire according to size and location of damage |
| D-9.05.05 | mount tires using tools and equipment such as tire bars and tire machine |
| D-9.05.06 | inflate tires according to safety procedures and manufacturers' specifications to verify repair |

# BLOCK E TRAILER CHASSIS, BODIES AND COUPLING UNITS

**Trends**

Lightweight metals and composite materials are becoming more common for frames and other structural members such as cross members and floors. These allow trailers to be lighter and stronger, and maximize cargo capabilities. There is also an increase in combination vehicles.

To improve trailer performance on the road and increase fuel efficiency, the shapes of the trailers are being modified aerodynamically by the addition of side skirts. Technicians must keep up-to-date with new techniques for repairs and the introduction of new components.

**Related Components (including, but not limited to)**

**Trailer chassis:** cross members, sub-frames, slide rails, slider locks, slide stops, bumpers, fasteners, side rails, adhesives, isolating membranes.

**Trailer bodies**: panels, posts, floors, top rails, roof bows, roofs, doors, door frames, locking devices, hatches, vents, valves, scuff liners, ladders, walkways.

**Coupling units**: plates, fifth-wheels, kingpins, slide plates, compensators, slide mechanisms, pintle-hooks, safety chains/cables, draw bar eyes, draw bars, turntables, locking pins, corner castings.

**Landing gear**: wing plates, braces, cross shafts, crank handles, legs, fasteners, sand shoes, gears.

**Tools and Equipment**

See Appendix A.

## Task 10 Diagnoses trailer chassis and trailer bodies.

**Context** Trailer chassis attach the trailer body to the suspension. Trailer bodies contain, secure and protect cargo. Structural problems affect how the weight of the load is distributed to the suspension systems, which in turn can create safety concerns.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of frames such as I-beam, ladder and unibody |
| K 2 | types of sub-frames such as movable and stationary |
| K 3 | types of slider locking mechanisms such as air-release and manual-release |
| K 4 | trailer chassis components such as frame rails, cross members and gussets |
| K 5 | manufacturers' specifications |
| K 6 | types of trailer bodies |
| K 7 | components of trailer bodies such as posts and panels, fiberglass reinforced panels (FRPs), and aluminum and structural side panels |
| K 8 | material properties and characteristics |
| K 9 | diagnostic tools and equipment such as smoke bombs and hammer |
| K 10 | diagnostic procedures |

**Sub-task**

**E-10.01 Diagnoses trailer chassis.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-10.01.01 | perform visual inspections to detect defects in frames and components such as cracks, corrosion and damaged or worn components |
| E-10.01.02 | actuate locking systems on movable and fixed chassis to verify their operation |
| E-10.01.03 | interpret diagnostic results to determine next steps such as repairing and replacing trailer chassis components |

**Sub-task**

**E-10.02 Diagnoses trailer bodies.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-10.02.01 | perform visual inspections of trailer bodies to detect structural damage such as bent side rails, bent roof bows and corroded cross members |
| E-10.02.02 | inspect fasteners such as rivets, welds and rail bolts |
| E-10.02.03 | inspect integrity of previous repairs and patches |
| E-10.02.04 | check alignment of doors and gates |
| E-10.02.05 | interpret diagnostic results to determine next steps such as repairing and replacing trailer body components |

## Task 11 Services trailer chassis and trailer bodies.

**Context** Transport trailer technicians service trailer chassis and trailer bodies to ensure structural integrity and safety of equipment on the roads. Service includes repair, replacement, rebuild, adjustment and general maintenance.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of frames such as I-beam, ladder and unibody |
| K 2 | types of sub-frames such as movable and fixed |
| K 3 | types of slider locking mechanisms such as air-release, manual-release and solid pin |
| K 4 | trailer chassis components such as side rails, cross members, gussets and bumpers |
| K 5 | manufacturers' specifications such as wear limits |
| K 6 | components of trailer bodies such as posts and panels, FRPs, and composite, aluminum and structural side panels |
| K 7 | trailer material properties and characteristics |
| K 8 | components that can be repaired, replaced or adjusted |
| K 9 | types of trailer bodies such as tankers, unibody, containers and vans |

| | |
|---|---|
| K 10 | jurisdictional requirements and certification for working on different types of trailers such as pressure vessels and tank trailers |
| K 11 | hazards of repairing trailers such as trailer content (flammable, corrosive, explosive, toxic) and material being worked on |
| K 12 | removal and installation procedures of optional components and accessories |

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**Sub-task**

**E-11.01 Repairs trailer chassis.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-11.01.01 | repair or replace worn, damaged or defective components such as sub frames, cross members and slider rails according to manufacturers' specifications |
| E-11.01.02 | complete repair by verifying integrity of trailer chassis using procedures such as looking for square |

---

**Sub-task**

**E-11.02 Repairs trailer bodies.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-11.02.01 | repair or replace worn, damaged or defective components such as roof skin, side panels and flooring |
| E-11.02.02 | repair, remove and replace doors according to manufacturers' specifications |
| E-11.02.03 | adjust or align components such as upper rails, corner castings and panels |
| E-11.02.04 | complete repair by verifying integrity of trailer body using procedures such as looking for square |

## Task 12 Diagnoses coupling units and landing gear.

**Context** Transport trailer technicians must ensure that coupling units secure the chassis to the power unit or to another chassis and that the landing gear supports the weight of the trailer when it is disconnected from the towing unit.

**Required Knowledge**

| | |
|---|---|
| K 1 | types and operation of coupling units |
| K 2 | manufacturers' specifications |
| K 3 | components of coupling units such as fifth-wheels, slide tracks, safety chains and pintle hooks |
| K 4 | types and operation of landing gear |
| K 5 | components of landing gear such as crank handles, sand shoes and cross shafts |
| K 6 | structures associated with landing gear such as wing plates, supporting structures and braces |
| K 7 | diagnostic and measuring tools such as fifth-wheel adjustment tools, kingpin gauges and straightedge |
| K 8 | diagnostic procedures |

**Sub-task**

### E-12.01 Diagnoses coupling units.

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-12.01.01 | perform visual inspection of coupling units to identify defects such as cracks on coupler or pick-up plate |
| E-12.01.02 | verify out-of-adjustment or worn components using measuring tools such as straightedge, kingpin gauge and fifth-wheel adjustment tool |
| E-12.01.03 | interpret diagnostic results to determine next steps such as repairing and replacing coupling units |

**Sub-task**

**E-12.02 Diagnoses landing gear.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-12.02.01 | perform visual inspection of landing gear to identify damage or defects such as cracked mounting brackets, worn cross shaft and defective crank handle |
| E-12.02.02 | operate landing gear to detect signs of failure such as worn bearings, worn gears and uneven leg length |
| E-12.02.03 | interpret diagnostic results to determine next steps such as repairing and replacing landing gear components |

## Task 13 Services coupling units and landing gear.

**Context** Transport trailer technicians service coupling units and landing gear to ensure public safety and prevent equipment damage. Service includes repair, replacement, rebuild, adjustment and general maintenance.

**Required Knowledge**

| | |
|---|---|
| K 1 | types and operation of coupling units |
| K 2 | manufacturers' specifications |
| K 3 | components of coupling units such as fifth-wheels, slide tracks, safety chains, container locks and pintle-hooks |
| K 4 | components that can be repaired, replaced, rebuilt or adjusted |
| K 5 | types and operation of landing gear |
| K 6 | components of landing gear such as crank handles, sand shoes and cross shafts |
| K 7 | structures associated with landing gear such as wing plates, supporting structures and braces |
| K 8 | removal and installation procedures of optional components and accessories |
| K 9 | fasteners and their applications |

**Sub-task**

**E-13.01 Maintains coupling units.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-13.01.01 | perform preventative maintenance checks such as measuring kingpin, pintle-hook play and fifth-wheel play |
| E-13.01.02 | verify proper function of locking mechanisms such as safety catches, safety chains and air actuators |
| E-13.01.03 | clean, lubricate and adjust components according to manufacturers' specifications and environmental conditions |

**Sub-task**

**E-13.02 Repairs coupling units.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-13.02.01 | adjust and rebuild fifth-wheels to manufacturers' specifications |
| E-13.02.02 | replace upper coupler and kingpin |
| E-13.02.03 | replace pintle-hooks and safety chains using appropriate fasteners |
| E-13.02.04 | repair locking components and corner castings on containers and chassis |
| E-13.02.05 | complete repair by verifying operation and alignment of units |

**Sub-task**
**E-13.03 Maintains landing gear.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-13.03.01 | perform preventative maintenance checks such as lubrication and operation |
| E-13.03.02 | lubricate gear box and worm gear |
| E-13.03.03 | operate landing gear to distribute lubricants |
| E-13.03.04 | check operation of dolly leg pad |

**Sub-task**
**E-13.04 Repairs landing gear.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| E-13.04.01 | replace worn components such as cross shafts, dolly leg pads and crank handles |
| E-13.04.02 | recondition gear box on crankside leg according to manufacturers' specifications |
| E-13.04.03 | synchronize leg movement after replacing cross shafts |
| E-13.04.04 | complete repair by verifying operation of landing gear |

| | |
|---|---|
| **Trends** | Light emitting diodes (LED) lights are becoming more common in trailers. There are more air-operated electrical components in trailers for safety-related concerns. |
| **Related Components (including, but not limited to)** | Lights, junction boxes, switches, wires, harnesses, plugs, connectors, ECUs, securement systems. |
| **Tools and Equipment** | See Appendix A. |

## Task 14 Diagnoses lighting and wiring systems.

**Context** Transport trailer technicians inspect lighting and wiring systems to locate problems and recommend required repairs.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of lights such as LEDs and incandescent |
| K 2 | lighting components such as marker, signal and warning lights |
| K 3 | manufacturers' specifications |
| K 4 | regulations governing minimum requirements and colours for lighting |
| K 5 | reflectors and reflective tape |
| K 6 | current draw and resistance |
| K 7 | types and gauges of wiring |
| K 8 | types of connections such as vapour-proof and explosion-proof |
| K 9 | wiring components such as circuit breakers, switches and conduits |
| K 10 | colour coding of wires within harness |
| K 11 | types and number of harnesses required for wiring applications |
| K 12 | diagnostic tools and equipment such as multimeter, ammeter and test light |
| K 13 | diagnostic procedures |

**Sub-task**

**F-14.01 Diagnoses lights.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| F-14.01.01 | perform tests using tools and equipment such as multimeter, light tester and continuity tester |
| F-14.01.02 | perform visual inspection of lights to verify operation such as percentage of LEDs operational within the light |
| F-14.01.03 | isolate and identify problems with lights using external source of power |
| F-14.01.04 | distinguish between lighting and connection problems |
| F-14.01.05 | interpret diagnostic results to determine next steps such as repairing and replacing components |

**Sub-task**

**F-14.02 Diagnoses wiring and connections.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| F-14.02.01 | perform tests using tools and equipment such as multimeter, light tester and continuity tester |
| F-14.02.02 | perform visual inspection of wiring and connections to identify problems such as corroded pigtails and disconnected or broken wires |
| F-14.02.03 | interpret diagnostic results to determine next steps such as repairing and replacing components |

## Task 15 Services lighting and wiring systems.

**Context** Transport trailer technicians perform maintenance and repairs to lighting and wiring systems related to the operation of the unit to meet minimum regulatory requirements.

**Required Knowledge**

| | |
|---|---|
| K 1 | manufacturers' specifications |
| K 2 | maintenance procedures |
| K 3 | installation procedures for lighting and wiring system accessories and components such as interior light switches, charge systems and door locks |
| K 4 | lighting and wiring repair materials and components |
| K 5 | reflectors and reflective tape and regulations governing their locations and condition |
| K 6 | types of lights such as LED and incandescent |
| K 7 | types and gauges of wiring and connections |
| K 8 | component functions |
| K 9 | component replacement procedures |
| K 10 | types of lights that can be repaired or replaced |
| K 11 | operation of lighting systems |
| K 12 | regulations governing minimum requirements for colours and locations for lighting |
| K 13 | colour coding of wires within harness |
| K 14 | types and number of harnesses required for wiring applications |

**Sub-task**

**F-15.01 Maintains lighting and wiring systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| F-15.01.01 | perform preventative maintenance checks |
| F-15.01.02 | clean and adjust front and rear receptacles to prevent light failure |
| F-15.01.03 | ensure that wiring is secured to prevent damage and premature wear |
| F-15.01.04 | select anticorrosive products and apply to receptacles |

**Sub-task**

**F-15.02 Repairs lighting and wiring systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| F-15.02.01 | remove and test components using equipment such as multimeters and light testers |
| F-15.02.02 | repair components such as sockets, harnesses, receptacles and connections |
| F-15.02.03 | refasten loose or unsecured wiring and harnesses |
| F-15.02.04 | replace or reinstall components such as bulbs, lenses and receptacles |
| F-15.02.05 | complete repair by verifying operation of lighting and wiring systems |

| | |
|---|---|
| **Trends** | There are new fluids that function under extreme low temperatures while maintaining lubrication and flow characteristics required. |
| **Related Components (including, but not limited to)** | Valves, sensors, cylinders, hoses, controls, lift gates, fluids, couplings, pumps, tanks, filters, vent systems, accumulators, power units. |
| **Tools and Equipment** | See Appendix A. |

## Task 16 Diagnoses hydraulic systems.

**Context** Transport trailer technicians diagnose hydraulic systems as a critical task for the safe operation of the units' accessories. Accurate diagnostics are required for correct repair.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of self-contained hydraulic systems such as detachable float trailers, power lift gates and dock leveling systems |
| K 2 | hydraulic system components such as tanks, pumps, valves, sensors, cylinders, hoses and controls |
| K 3 | operation of self-contained hydraulic systems |
| K 4 | manufacturers' specifications |
| K 5 | component functions |
| K 6 | power sources such as air, electrical and engine-driven |
| K 7 | types of auxiliary-powered hydraulic systems such as dump trailers, walking floors and refuse trailers |
| K 8 | operation of auxiliary-powered hydraulic systems |
| K 9 | types of hydraulic fluids and their properties |
| K 10 | hydraulic pressures, flows and volumes |
| K 11 | diagnostic tools and equipment such as pressure gauges and flow gauges |
| K 12 | diagnostic procedures |

**Sub-task**

**G-16.01 Diagnoses self-contained hydraulic systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| G-16.01.01 | inspect hydraulic system using tools such as multimeter, flow and pressure gauges |
| G-16.01.02 | perform sensory inspections to identify conditions such as leaks, temperature, burnt oil and lack of oil |
| G-16.01.03 | identify problems with self-contained hydraulic system components such as clogged filters, collapsed hoses and faulty valves |
| G-16.01.04 | interpret diagnostic results to determine next steps such as repairing and replacing hydraulic system components |

**Sub-task**

**G-16.02 Diagnoses auxiliary-powered hydraulic systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| G-16.02.01 | inspect hydraulic system using tools such as flow and pressure gauges |
| G-16.02.02 | perform sensory inspections to identify conditions such as leaks, temperature, burnt oil and lack of oil |
| G-16.02.03 | identify problems with auxiliary-powered hydraulic system components such as leaking couplers, clogged filters, collapsed hoses, faulty valves, worn and cracked mounts, and improperly installed components |
| G-16.02.04 | interpret diagnostic results to determine next steps such as repairing and replacing hydraulic system components |

## Task 17 Services hydraulic systems.

**Context** Transport trailer technicians perform preventative maintenance on hydraulic systems to keep them operating at optimal conditions. Repairs to hydraulic systems are done to correct faulty operating conditions.

**Required Knowledge**

| | |
|---|---|
| K 1 | types of self-contained hydraulic systems such as detachable float trailers, power lift gates and dock leveling systems |
| K 2 | types of auxiliary-powered hydraulic systems such as dump trailers, walking floors and refuse trailers |
| K 3 | hydraulic system components such as tanks, pumps, valves, sensors, cylinders, hoses, controls and motors |
| K 4 | manufacturers' specifications |
| K 5 | maintenance procedures |
| K 6 | power sources such as air, electrical and engine-driven |
| K 7 | component functions |
| K 8 | component repair and replacement procedures |
| K 9 | hydraulic components that can be repaired, replaced or adjusted |
| K 10 | operation of hydraulic systems |
| K 11 | types of hydraulic fluids and their properties |
| K 12 | hydraulic pressures, flows and volumes |
| K 13 | installation procedures for hydraulic system accessories and components such as tailgates, dump boxes and stabilizers |

**Sub-task**

**G-17.01 Maintains hydraulic systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| G-17.01.01 | perform preventative maintenance checks such as hydraulic fluid levels, condition of hoses and pressure relief valves |
| G-17.01.02 | flush and service filtering systems and change oil according to manufacturers' requirements |
| G-17.01.03 | perform visual inspection during maintenance to identify problems such as wear and corrosion of cylinders and pins, and wear or cracks on mounting brackets |
| G-17.01.04 | lubricate system components such as pins and bushings |
| G-17.01.05 | operate and test systems to assess operation |

**Sub-task**

**G-17.02 Repairs hydraulic systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| G-17.02.01 | remove and replace components such as cylinders, valves and filters |
| G-17.02.02 | recondition components such as valves, cylinders, pins and bushings to manufacturers' specifications |
| G-17.02.03 | bleed system after replacing hydraulic components |
| G-17.02.04 | repair cracks in mounting and unit structure such as box frames, deck extension plates and lift rails |
| G-17.02.05 | adjust components such as pressure relief valves and flow control valves |
| G-17.02.06 | complete repair by verifying operation of hydraulic system |

**Trends**

These units are becoming more sophisticated, requiring an increased level of training to diagnose, maintain and repair. Features such as load-monitoring and integral communication controls between power units and trailers are increasingly available.

Environmental considerations have sparked the increased use of environmentally-friendly refrigerants and more stringent exhaust emission standards. The units are also becoming more efficient, requiring less run-time.

Multi-temp trailers are becoming more popular, allowing a greater variety of temperature-sensitive cargo to be transported in the same unit.

**Related Components (including, but not limited to)**

Mounting structures, controls, fuel tanks, batteries, wires, hoses, belts, shrouds, fasteners, starters, alternators.

**Tools and Equipment**

See Appendix A.

## Task 18 Diagnoses heating and refrigeration units.

**Context**

Special licenses are required to work on refrigeration and propane heating systems. However, transport trailer technicians should have a good working knowledge of these systems for safety purposes. They are expected to diagnose and service fuel, charging and starting systems.

**Required Knowledge**

| | |
|---|---|
| K 1 | jurisdictional regulations |
| K 2 | types of heating units |
| K 3 | fuel systems such as diesel, propane and natural gas |
| K 4 | components of heating units such as batteries, wires and fuel tanks |
| K 5 | mounting structures, fasteners and reinforcements |
| K 6 | operation of heating units |

| | |
|---|---|
| K 7 | fluid levels such as antifreeze, motor oil and fuel |
| K 8 | manufacturers' specifications |
| K 9 | hazards associated with heating units and fuel systems |
| K 10 | components of refrigeration units such as batteries, compressors and fuel tanks |
| K 11 | hazards associated with refrigeration units and fuel systems |
| K 12 | diagnostic tools and equipment such as multimeter, load tester and chargers |
| K 13 | diagnostic procedures |

---

**Sub-task**

**H-18.01 Diagnoses fuel systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| H-18.01.01 | perform sensory inspection of fuel lines to detect problems such as loose fittings, and chafed or kinked lines in order to detect leaks |
| H-18.01.02 | inspect fuel system mounting hardware for wear and damage such as loose or worn tank straps, cracked mounting brackets and broken fasteners |
| H-18.01.03 | inspect fuel tank condition such as tank expiry date and physical damage |
| H-18.01.04 | check operation of fuel delivery system components on heating units such as fuel pumps and gas regulators |
| H-18.01.05 | interpret diagnostic results to determine next steps such as repairing and replacing fuel system components |

**Sub-task**

**H-18.02 Diagnoses starting and charging systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | yes | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| H-18.02.01 | inspect starting and charging systems for worn, damaged or defective components such as corroded electric connectors and broken or loose belts |
| H-18.02.02 | test charging system for voltage and amperage output using a multimeter and/or ammeter |
| H-18.02.03 | test starting system for appropriate voltage and amperage draw using a multimeter and/or ammeter |
| H-18.02.04 | load test battery for proper cold cranking amperage (CCA) and operating condition (state of charge) |
| H-18.02.05 | interpret diagnostic results to determine next steps such as repairing and replacing starting and charging system components |

## Task 19 Services heating and refrigeration units.

**Context**

Transport trailer technicians work in a limited fashion on heating and refrigeration units due to specialized licensing and training requirements. These units regulate and monitor the temperature of trailer bodies, allowing for the transportation of perishables and temperature-sensitive cargos.

In this analysis, service includes repair, replacement, adjustment and general maintenance.

**Required Knowledge**

| | |
|---|---|
| K 1 | jurisdictional regulations and licensing requirements |
| K 2 | types of heating units |
| K 3 | fuel systems such as diesel, propane and natural gas |
| K 4 | components of heating units such as batteries, wires and fuel tanks |
| K 5 | mounting structures, fasteners and reinforcements |
| K 6 | operation of heating units |
| K 7 | fluid levels such as antifreeze, motor oil and fuel |

| | |
|---|---|
| K 8 | manufacturers' specifications |
| K 9 | types of refrigeration units |
| K 10 | power supply such as electric, diesel, propane and natural gas |
| K 11 | components of refrigeration units such as batteries, starters, alternators, compressors and fuel tanks |
| K 12 | operation of refrigeration units |
| K 13 | hazards of fuel systems associated with refrigeration and heating units |
| K 14 | hazards associated with removal and installation of refrigeration and heating units |
| K 15 | removal and installation procedures of components and accessories such as air flow chutes, bulkheads and dividers |

---

**Sub-task**

**H-19.01 Maintains fuel systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | no | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| H-19.01.01 | perform preventative maintenance checks such as checking for water in tank |
| H-19.01.02 | secure fuel lines using fasteners such as insulated clamps and separators to prevent chafing or kinking of lines |
| H-19.01.03 | replace fuel filters at regular intervals according to manufacturers' specifications |
| H-19.01.04 | drain water from tank and add stabilizer or conditioner according to seasonal requirements |

**Sub-task**

**H-19.02 Repairs fuel systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | no | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| H-19.02.01 | replace chafed or kinked fuel lines |
| H-19.02.02 | remove and reinstall fuel tanks and brackets |
| H-19.02.03 | prime fuel system after repair or replacement of components |
| H-19.02.04 | complete repair by verifying operation of fuel systems |

**Sub-task**

**H-19.03 Maintains charging and starting systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | no | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| H-19.03.01 | perform preventative maintenance checks such as battery load test and verifying |
| H-19.03.02 | adjust belt tension with belt tension gauge according to manufacturers' specifications |
| H-19.03.03 | clean electrical connections on starters, alternators and batteries using electrical contact cleaner and terminal brushes |
| H-19.03.04 | lubricate cleaned electrical connections using dielectric grease |

**Sub-task**

**H-19.04 Repairs charging and starting systems.**

| NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NV | yes | NV | NV | ND | yes | yes | ND | ND | no | ND | ND | ND |

**Key Competencies**

| | |
|---|---|
| H-19.04.01 | replace defective components such as starters, alternators, pulleys, idler pulleys, belts and batteries |
| H-19.04.02 | operate and adjust refrigeration and heating unit temperature controls depending on load requirements |
| H-19.04.03 | adjust belt tension with belt tension gauge according to manufacturers' specifications |
| H-19.04.04 | complete repair by verifying operation of charging and starting systems |

# APPENDICES

## Hand Tools

bushing installer
caulking gun
chisels
clamps
crimping tool
files
flaring tool
flashlight
grease gun
hack saw
hammer
magnet
picks
pliers
pry bars
pullers
punches
ratchets
rivet gun
scrapers
screwdrivers
seal driver
shears
side cutters
snips
sockets
spreaders
stud remover
suction gun
tire bars
torque multiplier
trouble light
trowel
tube cutters
utility knife
wire brush
wire cutters
wire strippers
wrenches

## Electric, Pneumatic and Hydraulic Tools

air cutoff tools
air drill
air grinders
air hammer
air ratchet
air rivet gun
angle grinder
blow gun
crimpers
die grinders
drills and bits
electric rivet gun
electric saws
heat guns
hole saws
nibblers
portable hydraulic power tool
portable presses
pressure washer
sanders
soldering gun
vacuum cleaner

## Lifting and Staging Tools

axle stands
blocking
brake drum dolly
chain falls
come-alongs
fork lift
hoists
jacks
ladders
mobile cranes
overhead cranes
portable stairs
scaffolds
scissor lift
wheel chocks
wheel dolly

## Diagnostic and Measuring Tools

5th wheel adjustment tool
air brake analyzer
battery load tester
brake drum gauges
brake stroke gauges
calculator
calipers
chalk line
circuit tester
computer
dial indicator
flow meter
kingpin gauge
level
light tester
micrometers
multimeter
plumb bob
portable diagnostic unit
pressure gauge
ruler
shoe gauges
spring scale
square
tape measure
tension scale
torque wrench
trailer alignment equipment
voltmeter

## Cutting and Welding Tools

arc air gouging tool
arc welder
Gas Metal Arc Welder (GMAW)
Gas Tungsten Arc Welder (GTAW)
oxyacetylene torch
plasma cutter
propane torch

## Stationary and Shop Tools

band saws
bench grinders
chop saw
drill press
hydraulic press
jigs
metal brake and brake shears
spring press
table saws
tire machine

## Personal Protective Equipment (PPE) and Safety Equipment

eye protection
eye wash station
face shields
fall arrest equipment
fire blanket
fire extinguishers
fire hoses
first aid station
gloves
hearing protection
knee pads
personal protective clothing
respirators
safety boots
safety cages
safety cones
safety signs and tape
self-contained breathing apparatus
shields and guards
showers
ventilation equipment
welder's helmet
welding curtains

# APPENDIX B GLOSSARY

| | |
|---|---|
| **access equipment** | equipment used to facilitate or gain access to an area to be repaired |
| **accessories** | components for the vehicle which enhance the operation or extend longevity |
| **air brake systems** | braking system controlled or operated by directional flow of compressed air |
| **air suspension system** | type of suspension system using air springs |
| **antifreeze** | a liquid coolant which allows for heat dissipation |
| **antilock brake system (ABS)** | electronically controlled brake control system to sense and react to wheel lockup |
| **chassis** | component that attaches the trailer body to the suspension. It includes frames, sub-frames and slider locking mechanisms. It distributes and carries the weight of the load to the suspension system. |
| **combination vehicles** | two or more trailers attached by coupling units |
| **coupling units** | device used to connect power units to one or more trailers together or to jeeps, converters and boosters. Devices can also connect chassis to containers. |
| **diagnose** | tasks involved in inspecting, testing and determining faults in trailer systems and components |
| **electric brake system** | braking system operated by a controlled voltage signal |
| **electronic control unit (ECU)** | module which monitors and controls functions of a vehicle |
| **frame** | base structure on which the rest of the trailer is built |
| **gladhand** | sealed coupling devices to join compressed air systems from one unit to another such as emergency or service systems |
| **heating and refrigeration units** | components which are used to keep a load's temperature constant through heating or cooling |
| **hydraulic brake system** | braking system controlled or operated by hydraulic fluid pressure |
| **hydraulic system** | system which uses fluid under pressure to transmit power through tubes or hoses to operate different components on a trailer |

| | |
|---|---|
| **landing gear** | components which are used to support the weight of the trailer when disconnected from the towing unit |
| **multi-temp trailer** | trailer that can maintain different temperatures in two or more compartments of the trailer |
| **power unit** | motorized towing unit |
| **rubber block suspension system** | type of suspension system using rubber blocks |
| **sensory inspection** | diagnosing or inspecting using sight, sound, smell or feel |
| **service** | activities which include repair, replacement, rebuild, reconditioning, adjustment and general maintenance of trailers and components |
| **slider** | assembly to allow movement of a sub-frame |
| **slider locking mechanism** | locking mechanism to secure the sub-frame to the chassis |
| **spread** | distance between two axles |
| **spring suspension system** | suspension system using spring packs |
| **staging equipment** | equipment that supports and stabilizes trailers to facilitate repair |
| **sub-frame (bogie)** | component to which the axles and suspension systems are attached |
| **super single** | large single tire that replaces dual tire systems |
| **suspension** | components which absorb road surface irregularities to smooth vehicle ride; it is designed to permit controlled wheel movement over irregular surfaces; basic types include spring, air and rubber block |
| **towing unit** | unit that tows the trailer; may be a power unit or a trailer |
| **wheel end assembly** | rotating parts at the end of the axles; includes hubs, bearings, seals, rims and tires |

# APPENDIX C ACRONYMS

| | |
|---|---|
| **ABS** | antilock brake system |
| **CCA** | cold cranking amperage |
| **ECU** | electronic control unit |
| **FRP** | fiberglass reinforced panel |
| **GMAW** | gas metal arc welding |
| **LED** | light emitting diode |
| **MSDS** | material safety data sheet |
| **OAW** | oxy-acetylene welding |
| **OH&S** | occupational health and safety act |
| **PPE** | personal protective equipment |
| **WHMIS** | Workplace Hazardous Materials Information System |

# APPENDIX D BLOCK AND TASK WEIGHTING

**BLOCK A COMMON OCCUPATIONAL SKILLS**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 5 | NV | NV | ND | 6 | 6 | ND | ND | 5 | ND | ND | ND | 6% |

Task 1 Performs safety-related functions.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 40 | NV | NV | ND | 25 | 47 | ND | ND | 15 | ND | ND | ND | 32% |

Task 2 Uses and maintains tools and equipment.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 30 | NV | NV | ND | 50 | 21 | ND | ND | 45 | ND | ND | ND | 36% |

Task 3 Performs common work practices and procedures.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 30 | NV | NV | ND | 25 | 32 | ND | ND | 40 | ND | ND | ND | 32% |

**BLOCK B SUSPENSION SYSTEMS**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 18 | NV | NV | ND | 19 | 18 | ND | ND | 12 | ND | ND | ND | 17% |

Task 4 Diagnoses suspension systems.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 30 | NV | NV | ND | 40 | 37 | ND | ND | 35 | ND | ND | ND | 36% |

Task 5 Services suspension systems.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 70 | NV | NV | ND | 60 | 63 | ND | ND | 65 | ND | ND | ND | 64% |

**BLOCK C BRAKE SYSTEMS**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 23 | NV | NV | ND | 23 | 24 | ND | ND | 30 | ND | ND | ND | 25% |

Task 6 Diagnoses brake systems.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 40 | NV | NV | ND | 60 | 53 | ND | ND | 70 | ND | ND | ND | 56% |

Task 7 Services brake systems.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 60 | NV | NV | ND | 40 | 47 | ND | ND | 30 | ND | ND | ND | 44% |

**BLOCK D AXLES AND WHEEL END ASSEMBLIES**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 17 | NV | NV | ND | 19 | 19 | ND | ND | 10 | ND | ND | ND | 16% |

Task 8 Diagnoses axles and wheel end assemblies.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 30 | NV | NV | ND | 40 | 50 | ND | ND | 70 | ND | ND | ND | 48% |

Task 9 Services axles and wheel end assemblies.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 70 | NV | NV | ND | 60 | 50 | ND | ND | 30 | ND | ND | ND | 52% |

**BLOCK E TRAILER CHASSIS, BODIES AND COUPLING UNITS**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 17 | NV | NV | ND | 17 | 19 | ND | ND | 30 | ND | ND | ND | 20% |

Task 10 Diagnoses trailer chassis and trailer bodies.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 20 | NV | NV | ND | 30 | 18 | ND | ND | 21 | ND | ND | ND | 22% |

Task 11 Services trailer chassis and trailer bodies.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 50 | NV | NV | ND | 30 | 35 | ND | ND | 42 | ND | ND | ND | 39% |

Task 12 Diagnoses coupling units and landing gear.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 10 | NV | NV | ND | 20 | 18 | ND | ND | 20 | ND | ND | ND | 17% |

Task 13 Services coupling units and landing gear.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 20 | NV | NV | ND | 20 | 29 | ND | ND | 17 | ND | ND | ND | 22% |

**BLOCK F LIGHTING AND WIRING SYSTEMS**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 10 | NV | NV | ND | 6 | 8 | ND | ND | 8 | ND | ND | ND | 8% |

Task 14 Diagnoses lighting and wiring systems.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 70 | NV | NV | ND | 75 | 63 | ND | ND | 80 | ND | ND | ND | 72% |

Task 15 Services lighting and wiring systems.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 30 | NV | NV | ND | 25 | 37 | ND | ND | 20 | ND | ND | ND | 28% |

**BLOCK G HYDRAULIC SYSTEMS**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 5 | NV | NV | ND | 6 | 4 | ND | ND | 5 | ND | ND | ND | 5% |

Task 16 Diagnoses hydraulic systems.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 60 | NV | NV | ND | 50 | 70 | ND | ND | 75 | ND | ND | ND | 64% |

Task 17 Services hydraulic systems.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 40 | NV | NV | ND | 50 | 30 | ND | ND | 25 | ND | ND | ND | 36% |

**BLOCK H HEATING AND REFRIGERATION UNITS**

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | National Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 5 | NV | NV | ND | 4 | 2 | ND | ND | 0 | ND | ND | ND | 3% |

Task 18 Diagnoses heating and refrigeration units.

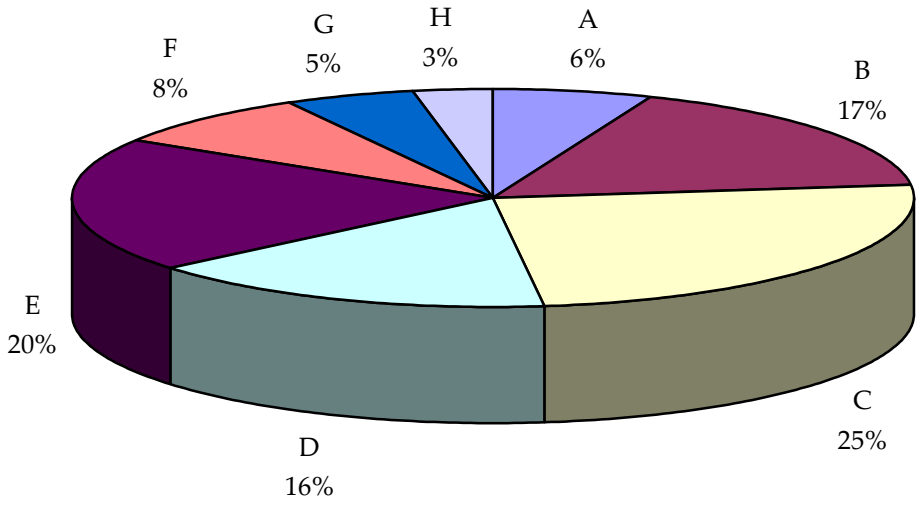
| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 50 | NV | NV | ND | 50 | 52 | ND | ND | 0 | ND | ND | ND | 51% |

Task 19 Services heating and refrigeration units.

| | NL | NS | PE | NB | QC | ON | MB | SK | AB | BC | NT | YT | NU | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % | NV | 50 | NV | NV | ND | 50 | 48 | ND | ND | 0 | ND | ND | ND | 49% |

# APPENDIX E

## PIE CHART*




**TITLES OF BLOCKS**

| | | | |
|---|---|---|---|
| BLOCK A | Common occupational skills | BLOCK E | Trailer chassis, bodies and coupling units |
| BLOCK B | Suspension systems | BLOCK F | Lighting and wiring systems |
| BLOCK C | Brake systems | BLOCK G | Hydraulic systems |
| BLOCK D | Axles and wheel end assemblies | BLOCK H | Heating and refrigeration units |

*Average percentage of the total number of questions on an interprovincial examination, assigned to assess each block of the analysis, as derived from the collective input from workers within the occupation from all areas of Canada. Interprovincial examinations typically have from 100 to 150 multiple-choice questions.

# APPENDIX F

## TASK PROFILE CHART – Transport Trailer Technician

| BLOCKS | TASKS | SUB-TASKS | | | | |
|---|---|---|---|---|---|---|
| **A - COMMON OCCUPATIONAL SKILLS** | 1. Performs safety-related functions. | 1.01 Uses personal protective equipment (PPE) and safety equipment. | 1.02 Maintains safe work environment. | | | |
| | 2. Uses and maintains tools and equipment. | 2.01 Maintains hand, electric and pneumatic tools. | 2.02 Maintains measuring, testing and diagnostic equipment. | 2.03 Uses hoisting, lifting, staging and access equipment. | 2.04 Uses welding equipment. | 2.05 Uses gas cutting equipment. |
| | 3. Performs common work practices and procedures. | 3.01 Maintains fluids and lubricants. | 3.02 Lubricates parts and components. | 3.03 Cleans parts and components. | 3.04 Uses fasteners, sealants, adhesives and gaskets. | 3.05 Installs hoses, tubing and fittings. |
| **B - SUSPENSION SYSTEMS** | 4. Diagnoses suspension systems. | 4.01 Diagnoses air suspension systems. | 4.02 Diagnoses spring suspension systems. | 4.03 Diagnoses rubber block suspension systems. | | |
| | 5. Services suspension systems. | 5.01 Maintains suspension systems. | 5.02 Repairs air suspension systems. | 5.03 Repairs spring suspension systems. | 5.04 Repairs rubber block suspension systems. | |
| **C - BRAKE SYSTEMS** | 6. Diagnoses brake systems. | 6.01 Diagnoses disc brake systems. | 6.02 Diagnoses drum brake systems. | 6.03 Diagnoses air brake systems. | 6.04 Diagnoses hydraulic brake systems. | 6.05 Diagnoses electric brake systems. |
| | | 6.06 Diagnoses electronic braking control systems. | | | | |

| BLOCKS | TASKS | SUB-TASKS | | | | |
|---|---|---|---|---|---|---|
| | 7. Services brake systems. | 7.01 Maintains brake systems. | 7.02 Repairs disc brake systems. | 7.03 Repairs drum brake systems. | 7.04 Repairs air brake systems. | 7.05 Repairs hydraulic brake systems. |
| | | 7.06 Repairs electric brake systems. | 7.07 Repairs electronic braking control systems. | | | |
| **D - AXLES AND WHEEL END ASSEMBLIES** | 8. Diagnoses axles and wheel end assemblies. | 8.01 Diagnoses fixed, self-steering and lift axles. | 8.02 Diagnoses hubs. | 8.03 Diagnoses tires and rims. | | |
| | 9. Services axles and wheel end assemblies. | 9.01 Maintains axles and wheel end assemblies. | 9.02 Repairs fixed axles and hubs. | 9.03 Repairs self-steering and lift axles. | 9.04 Replaces tires and rims. | 9.05 Repairs tires. |
| **E - TRAILER CHASSIS, BODIES AND COUPLING UNITS** | 10. Diagnoses trailer chassis and trailer bodies. | 10.01 Diagnoses trailer chassis. | 10.02 Diagnoses trailer bodies. | | | |
| | 11. Services trailer chassis and trailer bodies. | 11.01 Repairs trailer chassis. | 11.02 Repairs trailer bodies. | | | |
| | 12 Diagnoses coupling units and landing gear. | 12.01 Diagnoses coupling units. | 12.02 Diagnoses landing gear. | | | |
| | 13. Services coupling units and landing gear. | 13.01 Maintains coupling units. | 13.02 Repairs coupling units. | 13.03 Maintains landing gear. | 13.04 Repairs landing gear. | |

| BLOCKS | TASKS | SUB-TASKS | | | |
|---|---|---|---|---|---|
| **F - LIGHTING AND WIRING SYSTEMS** | 14 Diagnoses lighting and wiring systems. | 14.01 Diagnoses lights. | 14.02 Diagnoses wiring and connections. | | |
| | 15. Services lighting and wiring systems. | 15.01 Maintains lighting and wiring systems. | 15.02 Repairs lighting and wiring systems. | | |
| **G - HYDRAULIC SYSTEMS** | 16 Diagnoses hydraulic systems. | 16.01 Diagnoses self-contained hydraulic systems. | 16.02 Diagnoses auxiliary-powered hydraulic systems. | | |
| | 17. Services hydraulic systems. | 17.01 Maintains hydraulic systems. | 17.02 Repairs hydraulic systems. | | |
| **H - HEATING AND REFRIGERATION UNITS** | 18. Diagnoses heating and refrigeration units. | 18.01 Diagnoses fuel systems. | 18.02 Diagnoses starting and charging systems. | | |
| | 19. Services heating and refrigeration units. | 19.01. Maintains fuel systems. | 19.02 Repairs fuel systems. | 19.03 Maintains charging and starting systems. | 19.04 Repairs charging and starting systems. |