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National Occupational Analysis

Motor Vehicle Body Repairer (Metal and Paint)

2014

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National Occupational Analysis

Motor Vehicle Body Repairer (Metal and Paint)

2014

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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 Motor Vehicle Body Repairer (Metal and Paint).

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, Employment and Social Development Canada (ESDC) 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.

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This analysis was prepared by the Labour Market Integration Directorate of ESDC. The coordinating, facilitating and processing of this analysis were undertaken by employees of the NOA development team of the Trades and Apprenticeship Division. The host jurisdiction of British Columbia also participated in the development of this NOA.

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STRUCTURE OF ANALYSIS

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

Blocks	the 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	a 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	the 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	a 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	a list of acronyms used in the analysis with their full name
Appendix D — Block and Task Weighting	the 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	a graph which depicts the national percentages of exam questions assigned to blocks
Appendix F — Task Profile Chart	a 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 ESDC. 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 jurisdictions 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 (OH&S) Acts 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 MOTOR VEHICLE BODY REPAIRER (METAL AND PAINT)

"Motor Vehicle Body Repairer (Metal and Paint)" is this trade's official Red Seal occupational title approved by the CCDA. This analysis covers tasks performed by a motor vehicle body repairer 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
Auto Body and Collision Damage Repairer						✓							
Automotive Collision Repair Technician										✓			
Motor Vehicle Body Repairer							✓	✓					✓
Motor Vehicle Body Repairer (Metal and Paint)	✓	✓	✓	✓					✓			✓	
Motor Vehicle Body Repairer - Autobody Refinisher/Repairer											✓		

Motor vehicle body repairers (metal and paint) repair and restore damaged motor vehicles. They assess body damage and make repair estimates. Their repair work may range from correcting minor structural damage and cosmetic scratches and dents to fixing extensive structural damage to motor vehicles. Some parts may need to be removed for access or during repairs. Vehicle parts that are damaged beyond repair are replaced. The alignment and replacement of suspension and steering components may also be a part of this trade. Restoring interior components of vehicles falls within the scope of the trade. They work with electronic components and passenger restraint systems such as seat belts and air bags.

In this sector, most motor vehicle body repairers work in private enterprises or are self-employed. They may be employed by body shops, auto and truck dealerships, custom shops, and trucking and bus companies. In larger shops or dealerships, there may be a division of responsibilities among the team of repair professionals. Some may work exclusively on collision specialization such as damage repair, frame straightening, painting, suspension, detailing, or auto glass installation. Generally in smaller shops, motor vehicle body repairers tend to be responsible for a wider range of these duties. While they may work as part of the repair team, which includes other motor vehicle body repairers, automotive painters, automotive service technicians, and others in the automotive sector, journeypersons tend to carry out their duties alone.

Motor vehicle body repairers require proficiency with a variety of tools and equipment, some of which are technologically advanced. Hand and power tools are used in the repair and replacement of motor vehicle parts. Welding, cutting and soldering equipment are also used. Motor vehicle body repairers work with a number of materials such as metal, glass, plastic and composites. Surface repairs may require the application of body fillers. In addition, they may prepare surfaces for refinishing and apply a variety of appropriate refinishing products. They must have refinishing application and detailing skills.

Working environments vary in this trade. Typically, motor vehicle body repairers work indoors in an environment that may be noisy and dusty. However, many shops are well ventilated to reduce health risks from dust and fumes. Health and safety are important issues as these workers are frequently in contact with chemicals (e.g. paints, solvents and fillers) and physical hazards (e.g. frame equipment and sharp metal). Ongoing safety training and safe work practices are important.

Key attributes for people entering this trade are good communication skills, mechanical aptitude, problem solving skills, an eye for detail, computer literacy and a commitment to ongoing training. The work often requires considerable standing, kneeling, lifting, climbing, pulling and reaching.

With experience, motor vehicle body repairers may move into supervisory positions, start their own business, or become auto damage appraisers. Some of the skills of this trade may be transferred to other occupations such as sheet metal worker, glazier or automotive service technician.

Dismantling and repair procedure information is becoming more readily available to the technician as a result of online resources and legislation. This is critical as vehicle design construction has become more proprietary and complex. Relevant and up-to-date documentation ensures that vehicles are being repaired correctly, in a timely manner and according to the manufacturers' specifications.

Shops are streamlining their operations for easier maintenance, better production and cost efficiency. Lean production is becoming prevalent and effecting the work process from start to finish by eliminating waste and work duplication.

Hybrid and alternate fuel vehicles have become and will continue to be more prevalent in the marketplace. This new technology requires motor vehicle body repairers to upgrade their skills. The high voltage produced by hybrid/electric vehicles requires increased safety measures. Curing and baking procedures of those vehicles are altered for component longevity and safety of technicians.

New vehicle construction material such as magnesium, aluminium and boron steel are being used; this requires special training and equipment to perform repairs. Specialized inverter resistance welders are the latest trend in welding some of these new materials.

There is an increase in the use of aluminium, carbon-fibre, plastic and composite type materials, largely because of weight reduction and the resulting fuel economy. Fibre-reinforced plastics and carbon fibre materials are becoming structural components because they are lighter and stronger. Aluminium parts and components and all equipment used to repair them must be quarantined to avoid cross contamination with ferrous metals.

Due to heightened consumer awareness and demand, and trends in legislation in this area, both electronic stability control (ESC) and crash avoidance technology is on the verge of becoming standard equipment. Increased coordination with manufacturers and dealerships may be required due to proprietary technology being used, including the need for proper manufacturers' reset for electronics.

Vehicle manufacturers are producing more special effect and custom paint finishes. These finishes are harder to replicate, refinish and repair.

Due to climate change and ozone depletion concerns, new eco-friendly refrigerant, HFO-1234yf, will become the new standard for automakers.

The recycling of automotive parts, paint materials and paper products is increasing.

ESSENTIAL SKILLS SUMMARY

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.

Tools are available online or for order at: http://www.hrsdc.gc.ca/eng/jobs/les/tools/index.shtml.

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
Motor vehicle body repairers read labels, technical service bulletins and manuals to learn about installation and repair procedures. They read estimates, work orders and memos about damages and details of customers' requests. Motor vehicle body repairers read safety related information and a variety of Acts, and bylaws about regulations for reporting and repairing vehicles deemed to be irreparable. They also read trade publications to learn about new technologies, products and materials.

Document Use
Motor vehicle body repairers observe hazard symbols on product labels. They locate and interpret data on forms, works orders and tables to identify product identifications numbers, parts and colours. Motor vehicle body repairers read tables to determine product specifications such as dimensions of doors, hatches and seat belt restraint systems. They also identify devices and circuits in schematics and technical drawings to identify connectors, switches, and the position and orientation of vehicle parts and assemblies.

Writing
Motor vehicle body repairers write notes and supplements on work orders and forms to describe what work was carried out. They may write reports describing workplace accidents.

Numeracy
Motor vehicle body repairers take a variety of measurements, and analyze and compare them to manufacturers' specifications. They may estimate times and materials for projects.

Oral Communication
Motor vehicle body repairers communicate with colleagues and customers about the scope of work and work completed. They may explain procedures to apprentices. Motor vehicle body repairers may exchange technical information with co-workers and technicians when seeking advice on procedures for carrying out tasks.

Thinking Skills
Motor vehicle body repairers use problem solving skills to determine severity of damage prior to beginning repairs and to identify hidden damages when dismantling vehicles. They judge the quality of repairs by considering shape, length, depths of bodylines, fit of doors and parts. Motor vehicle body repairers decide order and priority of tasks taking into consideration availability of equipment and priority of unfinished work.

Digital Technology
Motor vehicle body repairers may use mobile devices to complete numeracy-related tasks. They may use digital cameras to visually inspect hard to access vehicle components for damages. Motor vehicle body repairers may use specialized autobody service databases to access job assignments, retrieve and review past service information, and complete estimates and work orders. They may use the internet to access training courses or forums to provide advice and learn how to complete unusual repairs.

Working with Others
Motor vehicle body repairers spend most of their time working independently but they may be required to coordinate activities with workers from other departments to ensure vehicle availability when repairing damaged vehicles. They may also work directly with colleagues when moving vehicles and lifting large and heavy parts into place.

Continuous Learning
Motor vehicle body repairers are continuously learning to keep up with the changes in the industry. They attend on-site or classroom training provided by industry associations or manufacturers and suppliers.

Trends

There is an increased awareness of safe work practices and their enforcement by governments. There is stricter control in the release of volatile organic compounds (VOCs). The use of personal protective equipment (PPE) is increasingly being enforced as standard practice.

Due to the number of electronic controls in vehicles, more specialized diagnostic tools are increasing in use.

There is an increase in the use of the silicon bronze fusion (low temperature brazing), and resistance spot welding and weld bonding processes because they closely replicate the integrity of the OEM's process. There is a trend for repair facilities to acquire the equipment and knowledge of these processes in order to become accredited.

The use of cordless power tools is becoming more prevalent because they are more convenient and easier to use.

Related Components

All components apply.

Tools and Equipment

See Appendix A.

Task 1 Performs safety-related functions.

Context

Motor vehicle body repairers are responsible for using PPE and maintaining a safe work environment to protect self, others and the environment.

Required Knowledge

K 1	WHMIS, material safety data sheet (MSDS) and OH&S, and where to find the documentation
K 2	PPE and their use
K 3	workers' rights and responsibilities
K 4	on the job hazards
K 5	location of safety equipment such as eye wash stations, firefighting equipment and first aid kits

K 6	emergency procedures
K 7	safe disposal and recycling procedures including jurisdictional regulations
K 8	workplace safety and health regulations
K 9	first aid
K10	safe practices for using tools and equipment such as oxyacetylene and compressors

---

Sub-task

A-1.01 Uses PPE and safety equipment.

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

Key Competencies

A-1.01.01	select PPE required for task such as hearing protection, fresh air supplied respirators, safety gloves, welding jackets, eye protection and non-static coveralls
A-1.01.02	select and use safety equipment such as welding curtains and blankets, smoke and dust extractors, eye wash stations and fire extinguishers
A-1.01.03	wear PPE according to task and OH&S regulations
A-1.01.04	inspect and/or maintain PPE and safety equipment to verify proper operation prior to use
A-1.01.05	store PPE and safety equipment such as respirators, coveralls and other non-disposable items in designated locations and packaging
A-1.01.06	safely dispose of expired, damaged or used PPE and safety equipment

Sub-task

A-1.02 Maintains safe work environment.

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

Key Competencies

A-1.02.01	perform housekeeping activities such as maintaining a clean and organized work station and shop to avoid tripping and slipping
A-1.02.02	recognize and eliminate fire hazards such as contaminated rags and build-up of vapours
A-1.02.03	recognize and eliminate hazardous conditions such as fumes, lack of grounding and static electricity
A-1.02.04	handle and dispose of hazardous materials such as waste thinners, paints and oils according to jurisdictional regulations and safety and environmental considerations
A-1.02.05	locate, access and interpret regulation documentation such as WHMIS, MSDS, OH&S information and company policies
A-1.02.06	recognize and eliminate personal injury hazards such as sparks, static electricity protruding objects and wet floors, while welding
A-1.02.07	locate and use fire extinguishers, first aid kits, eye wash stations and defibrillators
A-1.02.08	tag and lock-out damaged tools, equipment and vehicles
A-1.02.09	maintain a clear path to emergency exits and designated emergency meeting area

Task 2 Uses and maintains tools and equipment.

Context The proper use and maintenance of tools and equipment is important for safety and efficiency.

Required Knowledge

K 1	types of hand tools such as removal and installation, bumping and straightening, sanding and material application tools
K 2	types of power tools such as pneumatic and electric
K 3	operating procedures for tools and equipment

K 4	types of straightening equipment such as floor-mounted and portable benches
K 5	vehicle construction
K 6	types of lifting equipment such as hoists, jack stands, floor jacks and door jacks
K 7	applications and limitations of lifting equipment
K 8	certification requirements of lifting equipment and operators
K 9	types of measuring equipment such as trams, centering gauges and lasers
K 10	limitations of measuring and pulling equipment
K 11	air pressures
K 12	types of refinishing tools and equipment
K 13	types of paint systems
K 14	maintenance schedules for equipment such as hoists and spray booths

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Sub-task

A-2.01 Maintains hand and power tools.

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

Key Competencies

A-2.01.01	clean tools to ensure proper operation and to prevent transfer of contaminants to vehicle
A-2.01.02	lubricate hand and power tools such as orbital sanders, drills, ratchets and pliers, as required
A-2.01.03	check tools for damage, excess wear and proper operation, and remove defective and worn hand and power tools from service
A-2.01.04	drain compressed air system of water to prevent premature failure of tools and contamination of work surface
A-2.01.05	organize and store tools in designated area

Sub-task

A-2.02 Maintains frame and unibody repair and measuring equipment.

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

Key Competencies

A-2.02.01	check frame and unibody repair equipment components such as chains, clamps, hooks, fixtures and anchor points for damage, wear and missing parts
A-2.02.02	check level of hydraulic fluids in frame and unibody repair equipment to ensure full extension and capability
A-2.02.03	check air pressure in frame and unibody repair equipment to avoid premature damage to equipment
A-2.02.04	clean frame and unibody repair equipment to ensure smooth operation
A-2.02.05	lubricate frame and unibody repair equipment as required
A-2.02.06	calibrate measuring equipment such as tram gauges, centering gauges and laser equipment to ensure accurate measurements
A-2.02.07	check measuring equipment for wear and damage, and remove from service if necessary
A-2.02.08	update measuring equipment software to current specifications on electronic measuring systems
A-2.02.09	clean and store measuring equipment to prevent damage while not in use

Sub-task

A-2.03 Uses lifting equipment.

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

Key Competencies

A-2.03.01	identify lifting points of vehicle to avoid damage to hoist or vehicle
A-2.03.02	select lifting equipment according to vehicle and required repair
A-2.03.03	operate equipment within operating limitations
A-2.03.04	check equipment to ensure that certification and servicing are kept current
A-2.03.05	check safety backups such as hoist locks, safety tabs and height limiter switches

A-2.03.06	check components such as pads, levers, cables and arm locks for proper operation
A-2.03.07	operate door jacks to avoid damage to door and vehicle, and injury to repairer

Sub-task

A-2.04 Maintains refinishing tools and equipment.

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

Key Competencies

A-2.04.01	clean and maintain spray booths according to manufacturers' specifications
A-2.04.02	clean spray guns after every application
A-2.04.03	lubricate spray gun components with paint-compatible lubricant
A-2.04.04	maintain air dryers and filters to remove contamination and moisture
A-2.04.05	calibrate refinishing material mixing scales
A-2.04.06	maintain mixing equipment and paint mixing room
A-2.04.07	maintain spray gun cleaners and recycling equipment
A-2.04.08	troubleshoot spray gun equipment to check for, and correct, malfunctions

Task 3 Uses and maintains welding equipment.

Context The ability to weld competently is an important skill for motor vehicle and body repairers as it used in many aspects of the trade.

Required Knowledge

K 1	types of welding processes such as oxy-fuel, gas metal arc welding (GMAW [MIG]), resistance spot and plastic and related equipment
K 2	types of welding components and consumables such as gauges, tips, coolant, nozzles, regulators, welding wire, shielding gases and hoses
K 3	operating procedures
K 4	applications and limitations
K 5	safe work practices

Sub-task

A-3.01 Uses welding equipment.

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

Key Competencies

A-3.01.01	determine base material to be welded by performing tests such as ferrous metal test to aid in selection of welding equipment required
A-3.01.02	protect vehicle with welding blankets, disconnecting battery, and ensuring any electronic components are isolated
A-3.01.03	select grounding position as close as possible to repair area
A-3.01.04	ensure a dry working environment
A-3.01.05	prepare and clean work piece by methods such as grinding, media blasting, using a pre-cleaner and drilling or punching and applying corrosion resistant materials
A-3.01.06	secure, clamp and brace work piece
A-3.01.07	set temperature to ensure proper penetration by performing test welds on similar material
A-3.01.08	control heat while welding to prevent warping using heat-sink materials
A-3.01.09	ensure appropriate angle, speed of travel and distance from work piece to attain penetration while welding
A-3.01.10	install replacement panel with same number and types of welds as originally found in the vehicle, according to manufacturers' specifications
A-3.01.11	return vehicle integrity by using appropriate splicing procedures

Sub-task

A-3.02 Maintains welding equipment.

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

Key Competencies

A-3.02.01	check equipment for calibration, damage, wear and missing parts
A-3.02.02	ensure tanks are secured to prevent tanks from rupturing
A-3.02.03	avoid contamination of oxy-fuel equipment
A-3.02.04	check tension on drive rollers to ensure that wire is fed correctly

A-3.02.05 check wire liner for wear and contamination

A-3.02.06 clean out the interior of a MIG welder machine

Trends

With the evolution of vehicle construction, removal of trims and mouldings are becoming more difficult. Therefore, they are often replaced after removal.

Transparent stone chip guard decals are becoming more common and require special consideration at the estimating stage.

Related Components

All components apply.

Tools and Equipment

See Appendix A.

Task 4 Organizes work and uses documentation.

Context

Upon the receipt of vehicle, motor vehicle body repairers prepare estimates and supplements to establish their repair plans and procedures. In order for the work to be more efficient, they organize parts, materials and work areas.

Required Knowledge

K 1	vehicle construction
K 2	industry terminology
K 3	repair procedures
K 4	parts and materials
K 5	WHMIS and MSDS, and their locations
K 6	OH&S
K 7	PPE
K 8	workers' rights and responsibilities
K 9	location of safety equipment such as eye wash station, fire fighting equipment and first aid kits

K 10	emergency procedures
K 11	safe disposal and recycling procedures
K 12	jurisdictional disposal and recycling regulations
K 13	estimating programs

Sub-task

B-4.01 Prepares estimates and supplements.

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

Key Competencies

B-4.01.01	record information such as mileage, customer information, vehicle identification number (VIN), make and model, production date and colour codes
B-4.01.02	visually assess damage to vehicle to document repair required
B-4.01.03	photograph vehicle as required
B-4.01.04	complete written estimate of damage by listing parts, materials and labour required for repair
B-4.01.05	dismantle vehicle to access and assess hidden damage after obtaining permission
B-4.01.06	record any previous damage on vehicle

Sub-task

B-4.02 Prepares repair procedures/plans.

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

Key Competencies

B-4.02.01	review work order and estimate to identify repairs required
B-4.02.02	verify ordered parts are available
B-4.02.03	match ordered parts to vehicle parts required
B-4.02.04	determine sequence of repair procedure
B-4.02.05	summarize tasks to be completed

Sub-task

B-4.03 Organizes parts, materials and work area.

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

Key Competencies

B-4.03.01	verify that necessary parts and materials are available for task such as fasteners and retainers
B-4.03.02	notify supervisor of missing, damaged and incorrect parts
B-4.03.03	store parts to ensure they are not lost or damaged
B-4.03.04	inspect and prepare parts prior to installation
B-4.03.05	store computers and electric components in sealed packaging to protect from dust, moisture and static electricity
B-4.03.06	label parts and components to ensure traceability

Task 5 Applies corrosion protection and sound deadening materials.

Context Motor vehicle body repairers apply corrosion protection to impede corrosion infiltration and ensure structural soundness of vehicle. They also apply sound deadening materials to minimize noise and panel vibration.

Required Knowledge

K 1	vehicle construction and material types
K 2	types of corrosion protection materials
K 3	where and when to apply various inhibiters
K 4	application procedures
K 5	vehicle electrical systems and components
K 6	corrosion inhibitors such as undercoating, epoxies, weld-through primers and etch primers
K 7	types of foams and sealers
K 8	types of sound deadeners
K 9	tools and techniques to replicate original equipment manufacturer (OEM) appearance

Sub-task

B-5.01 Applies corrosion inhibitors and undercoats.

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

Key Competencies

B-5.01.01	identify areas subject to corrosion such as limited access panels, rocker panels, frame rails and repair zone
B-5.01.02	spray inhibitors inside panels to provide additional corrosion protection
B-5.01.03	protect surrounding areas and components from unwanted inhibitors
B-5.01.04	remove excess inhibitors from surrounding area after application
B-5.01.05	check vehicle OEM specifications on usage and location of replacement product
B-5.01.06	prepare surface before applying weld-through primer between adjoining surfaces
B-5.01.07	apply primer before panels are welded together

Sub-task

B-5.02 Applies seam sealers and sound deadeners.

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

Key Competencies

B-5.02.01	identify and replace original seam sealers and sound deadening materials such as sprayable and brushable seam sealers, sound deadening pads and foams
B-5.02.02	protect surrounding areas and components from excess material
B-5.02.03	remove any residual material from surrounding area after application
B-5.02.04	apply seam sealers using methods such as spraying, brushing and using self-leveling products
B-5.02.05	prepare surface prior to application by priming or scuffing, according to product specifications
B-5.02.06	apply and replicate appearance of specialty sound deadeners
B-5.02.07	apply sound deadening and structural foam according to manufacturers' specifications

Sub-task

B-5.03 Applies corrosion protection for electrical components.

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

Key Competencies

B-5.03.01	recognize where protection is required such as on grounding and reconnections
B-5.03.02	apply heat shrink tubing to repairs to protect electrical connection and ensure moisture-free environment
B-5.03.03	apply dielectric grease to electrical components according to vehicle manufacturers' specifications
B-5.03.04	ensure that rubber seals for connections are not missing or damaged

Task 6 Removes and installs trim and weatherstrips.

Context Motor vehicle body repairers remove trim and weatherstrips to facilitate repairs and refinish on panels. They install trim and weatherstrips on vehicles to obtain proper fit and finish.

Required Knowledge

K 1	vehicle construction
K 2	types and composition of trim
K 3	purpose and limitations of trim
K 4	fastening systems such as clips, adhesives and screws
K 5	repair materials and equipment
K 6	types of trim such as belt mouldings, body side mouldings and drip rail mouldings
K 7	purpose and limitations of weatherstrips
K 8	installation method of double-sided tape

Sub-task

B-6.01 Removes trim and weatherstrips.

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

Key Competencies

B-6.01.01	recognize material composition to avoid damage during removal process
B-6.01.02	select and use tools and equipment such as Teflon blades, utility knives, clip removers and heat guns
B-6.01.03	remove retainers and identify reusable parts
B-6.01.04	remove adhesive residue prior to repairs and refinish
B-6.01.05	remove adhesive tapes using eraser wheels, plastic scrapers, and chemicals
B-6.01.06	remove weatherstrip and clean residue

Sub-task

B-6.02 Installs trim and weatherstrips.

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

Key Competencies

B-6.02.01	clean panel and ensure proper substrate temperature to ensure adhesion
B-6.02.02	select and use tools, equipment and primers
B-6.02.03	install mechanical fasteners such as retainers, screws and clips
B-6.02.04	apply adhesion promoters and/or adhesives such as double-sided tape, sprays and emblem adhesive to trim
B-6.02.05	align and install trim and emblems to ensure correct placement
B-6.02.06	align and install weatherstrip to ensure proper seal

Task 7 Performs inspection.

Context Motor vehicle body repairers perform quality control checks throughout the repair process. They perform final operational checks prior to delivery of vehicle to the customer.

Required Knowledge

K 1	vehicle construction and components
K 2	panel alignment and fit
K 3	components' operation
K 4	road test procedures
K 5	types of defects such as wind noise, water leaks and rattles
K 6	electrical component reset

Sub-task

B-7.01 Performs quality control checks.

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

Key Competencies

B-7.01.01	check vehicle for conditions such as vehicle cleanliness colour match and any paint imperfections
B-7.01.02	perform visual inspection to ensure that vehicle is returned to pre-damage condition
B-7.01.03	check panel gaps, panel alignment and functionality of latches, catches and locks
B-7.01.04	check alignment of trims, headlights, grilles and bumpers

Sub-task

B-7.02 Performs final operational checks.

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

Key Competencies

B-7.02.01	check all affected fluid levels to ensure that there are no visible leaks
B-7.02.02	check operation of all components that were repaired and replaced
B-7.02.03	perform system check
B-7.02.04	perform road test to ensure that vehicle is returned to pre-damage condition
B-7.02.05	complete final delivery check list
B-7.02.06	reset clocks and radio codes
B-7.02.07	verify that dash warning lights have been cleared

BLOCK C FRAME AND STRUCTURAL COMPONENTS

Trends

There are new materials being introduced such as carbon fibre, alloys and laminates that make vehicles more rigid and lighter, which increases the vehicle's fuel efficiency and performance.

New body and frame construction methods such as adhesive bonding and laser welding of structural components continue to evolve and are resulting in new repair procedures and considerations.

Related Components, (including, but not limited to)

Structural components: quarter panels, roof skins, inner bracing, frames, sub-frames, frame rails, rocker panels, end panels, radiator supports, pillars, sill panels, engine cradles, openings, passenger compartment, luggage compartment, structural glass (windshield, fixed side glass, back glass, panoramic sun roofs).

Non-structural components: doors, interior and exterior trim, fascias, glass hardware, wipers, antennas, electric defrost, mirrors, sensors, non-structural glass (sun roofs, side glass).

Tools and Equipment

See Appendix A.

Task 8 Prepares for repair and replacement of structural components.

Context

The frame and structural components, on which all other components of the vehicle are installed, provide vehicles with strength and structural integrity. In order to repair or replace these components to exacting tolerances and specifications, some parts may need to be removed for access and the vehicle must be anchored securely.

Required Knowledge

K 1	vehicle types such as unibody or frame
K 2	anchoring techniques and equipment such as clamps, fixtures, jigs, chains, hooks, cables and straps
K 3	measuring equipment such as tram gauges, centering gauges and electronic measuring systems
K 4	measuring techniques such as cross, length, comparison check, datum line and width

K 5	structural repair devices such as frame straightening equipment and dedicated bench systems
K 6	removal procedures to access anchoring and/or measuring points
K 7	composition of structural components such as high tensile steel, aluminium, magnesium and fibre-reinforced composite
K 8	damaged frame conditions such as diamond, mash, twist, sag and sway as they relate to unibody and/or full frame vehicles
K 9	point and direction of impact
K 10	vehicle specifications for structural dimensions and repair considerations
K 11	vehicle specifications for preferred anchoring or tie down points
K 12	considerations in regards to repair procedures such as the need for cutting an opening for inner access to relieve stress

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Sub-task

C-8.01 Identifies extent of damage.

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

Key Competencies

C-8.01.01	visually inspect components to identify signs of damage such as fender gaps, cracked paint, stressed spot welds, broken seam sealer, striker misalignment and cab to body misalignment (full-frame)
C-8.01.02	identify hidden damage by using methods such as comparison measuring and cross measuring of structural components
C-8.01.03	compare measurements against specifications to determine extent of damage and to help develop a repair plan

Sub-task

C-8.02 Removes components for access.

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

Key Competencies

C-8.02.01	identify components that need to be removed such as outer body panels, suspension components and wiring harnesses
C-8.02.02	remove body, mechanical and electrical components using hand and power tools
C-8.02.03	label, organize and store removed components for reassembly

Sub-task

C-8.03 Performs vehicle setup.

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

Key Competencies

C-8.03.01	identify vehicle anchoring points for clamps and fixtures to secure vehicle prior to repair, depending on type of vehicle (unibody/full-frame) and damage condition
C-8.03.02	anchor vehicle to structural repair device to secure vehicle for realignment

Task 9 Repairs, removes and installs structural components.

Context Motor vehicle body repairers return the frame and structural components of a vehicle to original tolerances and specifications. Repairing involves straightening and stress relieving with or without the application of controlled heat. Damaged components may need to be removed using drilling, cutting and grinding procedures. Replacement components are then installed using welding, fastening and adhesive bonding techniques.

Required Knowledge

K 1	vehicle types such as unibody or frame
K 2	structural component removal procedures such as grinding, drilling, cutting and releasing of mechanical fasteners
K 3	structural repair devices such as frame straightening equipment, hydraulic pullers and dedicated bench systems
K 4	repair procedures such as pulling, stress relieving (hammer on/hammer off dolly), applying heat and using hand tools
K 5	installation procedures such as welding, using mechanical fasteners and using adhesion bonding materials
K 6	vehicle specifications for structural dimensions and repair considerations
K 7	measuring equipment such as tram gauge, centering gauge and electronic measuring systems
K 8	measuring techniques such as cross, length, datum line and width
K 9	allowable tolerances for unibody and full-frame vehicles
K 10	composition of structural components such as high tensile steel, aluminium, magnesium and fibre-reinforced composite
K 11	damaged frame conditions such as diamond, mash, twist, sag and sway as they relate to unibody and/or full frame vehicles
K 12	point and direction of impact
K 13	types of fasteners such as mechanical fasteners (rivets, bolts, self-tapping screws) and adhesives
K 14	reusable and non-reusable fasteners and components
K 15	types of welds such as spot welds and laser welds
K 16	types of welding processes such as oxy-fuel, gas metal arc welding (GMAW) and squeeze-type resistance spot welding (STRSW)
K 17	welding consumable materials such as welding wire, shielding gases and tips
K 18	techniques for removing welds such as drilling, grinding and cutting

Sub-task

C-9.01 Repairs structural components.

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

Key Competencies

C-9.01.01	identify type of construction material using methods such as grinding, magnetism and scratch testing
C-9.01.02	fasten straightening equipment such as clamps, pullers and hooks to the vehicle
C-9.01.03	apply pressure to damaged areas to realign frame and structural components
C-9.01.04	perform recommended stress relief techniques while pulling to achieve vehicle specifications
C-9.01.05	monitor repair by taking ongoing three-dimensional measurements and test fitting of related components

Sub-task

C-9.02 Removes structural components.

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

Key Competencies

C-9.02.01	identify areas for sectioning according to manufacturers' specifications
C-9.02.02	remove fasteners by using hand and power tools, and applying heat
C-9.02.03	remove spot welds in pre-determined areas by drilling or grinding
C-9.02.04	cut and remove components using hand and power tools such as cut-off wheels, plasma cutters and saws

Sub-task

C-9.03 Installs structural components.

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

Key Competencies

C-9.03.01	prepare structural components using procedures such as cleaning, grinding, and drilling holes for spot welds
C-9.03.02	perform initial fastening of components to verify alignment and fit using methods such as tack welding, bolting, screwing and clamping
C-9.03.03	monitor installation by taking ongoing measurements and test fitting related components
C-9.03.04	perform final fastening of components using methods such as welding, bolting, adhesive bonding and riveting
C-9.03.05	clean and dress welded and bonded repair areas

Task 10 Removes, installs and repairs structural glass.

Context Motor vehicle body repairers remove structural glass such as windshields, quarter glass and back glass in order to facilitate access to spot welds and repair areas on structural body panels, or for replacement of damaged glass. They also repair stone chips on laminated structural glass.

Required Knowledge

K 1	types of structural glass such as tempered and laminated
K 2	structural glass handling techniques
K 3	structural glass identification such as National Auto Glass Society (NAGS) and OEM
K 4	structural glass options such as antennas, heated glass, rain sensors and heads-up displays
K 5	structural glass removal and installation tools such as blade holders, knives (cold knives, reciprocating knives), spacer blocks, induction heaters, wire and cutters
K 6	structural glass removal and installation techniques

K 7	types of bonding materials such as urethane adhesive and butyl tape, and their application techniques
K 8	types of priming materials such as pinch weld primers and adhesion promoters, and their application techniques
K 9	types of fasteners and fastening techniques
K 10	bonding and priming material specifications such as expiry date and drying times
K 11	types of repair/replacement tools and equipment such as resin injection tools, urethane application tools and ultra-violet (UV) curing lights
K 12	repair and replacement techniques
K 13	types of trim (chrome, rubber), mouldings (encapsulated, plastic) and components (windshield cowl covers and wipers)

Sub-task

C-10.01 Removes structural glass.

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

Key Competencies

C-10.01.01	remove trim, moulding and non-structural components to access bonding material
C-10.01.02	release urethane seal using cutting tools or induction heaters to facilitate removal of structural glass without causing damage to surrounding body or paint
C-10.01.03	release butyl seal by removing mechanical fasteners and apply pressure to glass
C-10.01.04	remove glass from opening manually and/or using lifting devices such as suction cups

Sub-task

C-10.02 Installs structural glass.

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

Key Competencies

C-10.02.01	test fit glass in opening and check for defects in glass
C-10.02.02	prepare pinch weld by trimming old urethane and cleaning
C-10.02.03	prepare mating areas using pinch weld primers to promote adhesion and prevent corrosion
C-10.02.04	apply urethane to opening and replace spacer blocks to achieve required glass height
C-10.02.05	set glass in opening manually or using suction cups, and verify uniformity of gaps
C-10.02.06	secure glass in place to avoid movement until urethane is set
C-10.02.07	install non-structural components and trim to finalize installation

Sub-task

C-10.03 Repairs laminated glass.

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

Key Competencies

C-10.03.01	inspect glass to determine repair process
C-10.03.02	clean glass to remove contaminants such as water repellents, dirt and broken glass
C-10.03.03	ensure glass is dry and at appropriate temperature for resin flow
C-10.03.04	clean out chipped area of laminated glass by drilling outer layer with rotary cutting tools and air pressure
C-10.03.05	mount resin injection tool onto repair area
C-10.03.06	inject resin into damaged area, with or without vacuum pressure, using tools and equipment such as pneumatic or displacement injectors
C-10.03.07	cure resin with UV light

C-10.03.08 remove excess resin with razor blade

C-10.03.09 polish glass to remove scratches and minimize the appearance of resin

BLOCK D NON-STRUCTURAL OUTER BODY PANELS AND RELATED COMPONENTS

Trends

Materials used in the construction of vehicles are constantly changing as manufacturers strive for greater strength and lighter weight. The repair materials have improved in durability, ease of use and adhesion.

There has been a resurgence of plastic welding equipment due to refined processes and new technologies such as nitrogen welding.

There are fewer repairs done on non-structural composite and rigid parts. More replacements are being performed for cost reasons.

Due to consumer demands, there is an increase in the use of glass for options such as roofs and sun roofs. Other options such as heated glass, heads-up displays and rain sensors are available.

There is a return to laminate glass for side windows by some manufacturers for safety reasons.

Related Components (including, but not limited to)

Finish panels, panel extensions, door shells, door repair panels, roof panels, fenders, hood panels, bumpers, luggage lids, quarter panels, rocker panels, screws, bolts, nuts, clips, electrical components, windshields, side glass, back glass, sun roof, interior and exterior trims, glass hardware, wipers, antennas, electric defrost, mirrors, sensors.

Tools and Equipment

See Appendix A.

Task 11 Removes, repairs and installs metal panels and components.

Context Non-structural outer body panels are cosmetic panels that contribute very little to the structural integrity of the vehicle and are generally mechanically affixed to the vehicle structure. Motor vehicle body repairers are required to repair or replace damaged panels and components to pre-damaged condition. This task covers the removal, repair and installation of metal non-structural outer body panels and components made from metals such as aluminium and mild steel.

Required Knowledge

K 1	types of metal base materials such as steel and aluminum alloys, their properties, application and handling procedures
K 2	metal panels such as doors, hoods, fenders and trunk lids
K 3	metal components such as door handles, mirrors, body side mouldings, trims, emblems, brackets and door stays
K 4	metallurgic principles such as tempering, annealing, shrinking and stretching
K 5	vehicle construction considerations such as metal type and structure
K 6	types and severity of damage such as stretches, buckles and tears
K 7	types of substrates applications such as paints, primers, undercoats and fillers
K 8	fastening methods such as bolts, clips, adhesives, spot welds and rivets
K 9	types of repair materials such as fillers, weld materials and fibre-glass, and their properties
K 10	repair procedures for various panels and materials
K 11	reshaping procedures such as heating, cold repair and pushing/pulling
K 12	special handling procedures for aluminum such as using dedicated tools, equipment and material
K 13	welding equipment and techniques for different metals
K 14	alignment sequence
K 15	application procedures
K 16	abrasives and chemical strippers
K 17	cleaning products such as soap and water, and solvent based
K 18	removal procedures

Sub-task

D-11.01 Prepares metal panels for repair.

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

Key Competencies

D-11.01.01	clean panel according to manufacturers' specifications using products such as soap and water to remove organic material, and solvent-based cleaners to remove inorganic material
D-11.01.02	inspect panel visually and by touch to identify extent of damage such as paint damage or metal damage
D-11.01.03	remove components attached or adjacent to panel to access damaged area using tools and equipment such as panel forks, wrenches, hook tools and blades
D-11.01.04	protect surrounding area and unrelated components from further damage such as sparks, grinding marks and overspray

Sub-task

D-11.02 Removes metal panels and components.

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

Key Competencies

D-11.02.01	identify fastening materials such as clips, bolts and adhesives to determine method of removal
D-11.02.02	remove and label fasteners to identify location
D-11.02.03	disconnect electrical wiring harnesses from interior components such as sensors, speakers, power windows, antennas and lights
D-11.02.04	protect surrounding area from incidental contact and damage during removal
D-11.02.05	select and use tools and equipment such as lifting equipment
D-11.02.06	seek assistance with removal of large or heavy panels.

Sub-task

D-11.03 Repairs metal panels and components.

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

Key Competencies

D-11.03.01	obtain perimeter alignment using strategies such as pulling and relieving stress and using tools and equipment such as hammers, dollies, friction jacks and pry bars
D-11.03.02	identify base metal to determine repair procedure such as quarantining and using dedicated tools and materials for aluminum to avoid contamination from steel
D-11.03.03	remove substrate such as paints and primers from damaged area using tools and equipment such as grinders and sanders
D-11.03.04	rough out damaged area using hammer-on and hammer-off dolly techniques, and tools and equipment such as panel beaters, pin guns and suction cups
D-11.03.05	normalize metal by shrinking with heat, or using tools and equipment such as shrinking hammers and dollies to restore original shape and strength
D-11.03.06	feather edge perimeter of repair area to remove deep scratches caused by grinding and to expand the repair area beyond point of initial impact
D-11.03.07	apply filler to repair area using tools and equipment such as spreaders and squeegees
D-11.03.08	remove excess filler by sanding using sanding blocks, long boards and power tools to restore original panel profile
D-11.03.09	inspect repaired base material visually and by touch to identify deficiencies such as pin holes, sand scratches and low/high spots and to determine if reapplication of repair material is required

Sub-task

D-11.04 Installs metal panels and components.

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

Key Competencies

D-11.04.01	seek assistance with repositioning of large or heavy panels
D-11.04.02	select and use lifting equipment
D-11.04.03	protect surrounding area from incidental contact and damage during installation
D-11.04.04	connect electrical wiring harnesses from interior components such as sensors, speakers, power windows, antennas and lights
D-11.04.05	align panel visually and by touch to achieve uniform spacing and positioning relative to adjacent panels
D-11.04.06	secure panel using fasteners at their original location and according to specifications
D-11.04.07	verify fit and operation

Task 12 Removes, repairs and installs plastic and composite panels and components.

Context This task covers the removal, repair and installation of non-structural outer body panels and components made from plastics and composites. Plastic and composite materials are popular because of they are often lighter, more durable and safer for vehicle occupants and pedestrians than traditional base materials.

Required Knowledge

K 1	types of plastic and composite base materials such as poly-olefins, fibre-reinforced polymers and urethane, their properties, application and handling procedures
K 2	plastic and composite panels such as doors, hoods, fenders, trunk lids and trim
K 3	plastic and composite components such as door handles, mirrors, body side mouldings, trims, emblems, brackets and door stays
K 4	types and severity of damage such as stretches, buckles, tears and shattering

K 5	types of substrates applications such as paints, primers, undercoats and fillers
K 6	fastening materials such as bolts, clips, adhesives and rivets
K 7	types of repair materials such as two part epoxies, fillers and staples, and their properties
K 8	repair procedures for various panels and base material
K 9	reshaping procedures such as heating, cold repair and pushing/pulling
K 10	plastic welding equipment and techniques for various base materials
K 11	alignment sequence
K 12	application procedures
K 13	abrasives and chemical strippers
K 14	cleaning products such as soap and water, solvent based and alcohol based
K 15	removal procedures

Sub-task

D-12.01 Prepares plastic and composite panels and components for repair.

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

Key Competencies

D-12.01.01	clean panel according to manufacturers' specifications using products such as soap and water to remove organic material, alcohol-based and solvent-based cleaners to remove inorganic material
D-12.01.02	inspect panel visually and by touch to identify the extent of damage such as paint damage or damage to base material
D-12.01.03	remove components attached or adjacent to panel to access damaged area using tools and equipment such as panel forks, wrenches, hook tools and blades
D-12.01.04	protect surrounding area and unrelated components from further damage such as grinding marks and overspray

Sub-task

D-12.02 Removes plastic and composite panels and components.

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

Key Competencies

D-12.02.01	identify fastening materials such as clips, bolts and adhesives to determine method of removal
D-12.02.02	remove and label fasteners to identify location
D-12.02.03	disconnect electrical wiring harnesses from interior components such as sensors, speakers, power windows, antennas and lights
D-12.02.04	protect surrounding area from incidental contact and damage during removal
D-12.02.05	select and use tools and equipment such as lifting equipment
D-12.02.06	seek assistance with removal of large or heavy panels

Sub-task

D-12.03 Repairs plastic and composite panels and components.

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

Key Competencies

D-12.03.01	identify base material to determine if it can be repaired or should be replaced
D-12.03.02	obtain perimeter alignment with strategies such as heating and reshaping to return the material to its original state using tools and equipment such as ovens, hot lamps and heat guns
D-12.03.03	remove substrate such as paints and primers from damaged area using tools and equipment such as grinders and sanders
D-12.03.04	reshape damaged area to remove imperfections such as hollows, cracks and deep scratches
D-12.03.05	perform structural repair by welding or bonding
D-12.03.06	feather edge perimeter of repair area to remove deep scratches caused by grinding and to expand the repair area beyond point of initial impact
D-12.03.07	apply adhesion promoters according to product manufacturers' specifications
D-12.03.08	apply filler to repair area using tools such as spreaders and squeegees depending on application

D-12.03.09	remove excess filler by sanding using sanding blocks, long boards and power tools to restore original panel profile
D-12.03.10	inspect repaired base material visually and by touch to identify deficiencies such as pin holes, sand scratches and low/high spots and to determine if reapplication of adhesion promoter and repair material is required

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Sub-task

D-12.04 Installs plastic and composite panels and components.

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

Key Competencies

D-12.04.01	seek assistance with repositioning of large or heavy panels
D-12.04.02	select and use lifting equipment
D-12.04.03	protect surrounding area from incidental contact and damage during installation
D-12.04.04	connect electrical wiring harnesses from interior components such as sensors, speakers, power windows, antennas and lights
D-12.04.05	align panel visually and by touch to achieve uniform spacing and positioning relative to adjacent panels
D-12.04.06	secure panel using fasteners at their original location and according to specifications
D-12.04.07	verify fit and operation

Task 13 Removes and installs non-structural glass.

Context Non-structural glass is usually located in doors and side panels. It may be movable or fixed. For safety and comfort, cracked, chipped or broken non-structural glass usually needs to be replaced; however, in certain circumstances laminated glass may be repaired. The repair of structural and non-structural laminated glass is the same. Tempered glass is generally not repaired. In some applications, glass needs to be removed and reinstalled to facilitate repair of surrounding components.

Required Knowledge

K 1	types of non-structural glass such as side windows and sun roofs
K 2	hardware components such as regulators, window guides, channel guides and latches
K 3	fastening methods such as lacing, rope in, bolts, rivets, plastic clips and butyl tape
K 4	removal and installation techniques
K 5	component operation
K 6	location and removal techniques of broken glass
K 7	PPE such as goggles, shields and gloves

Sub-task

D-13.01 Removes non-structural glass.

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

Key Competencies

D-13.01.01	remove trim such as interior panels and reveal moldings to expose fasteners
D-13.01.02	position glass to access fasteners
D-13.01.03	identify and remove fasteners such as pressure clips, mechanical clips, rivets and bolts
D-13.01.04	extract glass from vehicle, label and store, or dispose of, according to shop procedures
D-13.01.05	inspect vehicle for damage and remove broken glass by vacuuming and cleaning all areas such as seats, seat belt retractors, window regulators, run channels, heating and cooling vents, and door panels

Sub-task

D-13.02 Installs non-structural glass.

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

Key Competencies

D-13.02.01	select and use tools, equipment, hardware, fasteners and adhesives according to manufacturers' specifications
D-13.02.02	inspect glass for defects such as scratches, chipped edges and pitting
D-13.02.03	insert glass in opening and attach with applicable hardware and fasteners
D-13.02.04	verify fit and operation of glass
D-13.02.05	install related components such as trim, door modules, vapour barriers, wiring and latches

BLOCK E MECHANICAL, ELECTRICAL AND ALTERNATE FUEL SYSTEM COMPONENTS

Trends

There is a trend towards more ESC systems, which enhance vehicle handling and safety. As technology improves, these systems have gotten more affordable and are therefore becoming standard features.

Accident avoidance sensors, parking assistance systems and self-navigating systems are becoming more common due to affordability of production and because of user demand and safety considerations.

The use of compressed air as an alternate-fuel system is at the experimental stage; however, hydrogen and flex fuel technologies are becoming more prominent while electrical hybrid technology continues to grow.

Related Components (including, but not limited to)

Suspension/steering system, drive train, exhaust system, air intake system, fuel system, heating/cooling system, braking system, electrical components and accessories.

Tools and Equipment

See Appendix A.

Task 14 Deactivates and reactivates alternate-fuel systems.

Context

The deactivation and reactivation of alternate-fuel system power sources is critical for the safety of the motor vehicle body repairer and protection of the vehicle. As well, safety must be considered when handling and storing these units and components.

Required Knowledge

K 1	types of alternate-fuel systems such as propane, biofuel, hybrid gas-electric, hybrid diesel-electric and full electric
K 2	handling and storage considerations and procedures of power supplies such as low-voltage and high-voltage batteries
K 3	colour coding of high current wiring
K 4	location and operation of master shut off switches

K 5	dangers associated with the deactivation and reactivation of electric and fuel/electric hybrids
K 6	specialized tools such as insulated hand tools and PPE such as class O electrical gloves, insulated coveralls, face shields and CSA approved footwear
K 7	PPE certification schedules
K 8	manufacturers' specifications
K 9	jurisdictional safety and environmental regulations
K 10	safe work procedures
K 11	residual power after deactivation of power supply
K 12	battery discharge times

Sub-task

E-14.01 Deactivates alternate-fuels systems.

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

Key Competencies

E-14.01.01	ensure zero energy by turning ignition off and removing keys, or by removing the ignition circuit relay or high-voltage fuse
E-14.01.02	disconnect low-voltage battery for 12V power systems
E-14.01.03	disable high-voltage system by removing service plug or locking tab, or by deactivating the master shut off switch according to manufacturers' instructions
E-14.01.04	close alternate-fuel supply valves
E-14.01.05	remove battery pack or alternate-fuel cells when performing repairs in proximity

Sub-task

E-14.02 Reactivates alternate-fuel systems.

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

Key Competencies

E-14.02.01	install battery pack when repairs have been completed
E-14.02.02	enable high-voltage system by re-installing service plug or locking tab, or by reactivating the master shut off switch according to manufacturers' instructions
E-14.02.03	open alternate-fuel supply valves
E-14.02.04	connect low-voltage battery for 12V power systems

Task 15 Removes and installs mechanical components.

Context Motor vehicle body repairers require the knowledge of the operation and purpose of mechanical components to fully remove, and install them safely and to manufacturers' specifications.

Required Knowledge

K 1	types of mechanical components such as air conditioning (A/C) condensers, radiators, fan cooling assemblies, control arms, leaf springs, drive shafts, exhaust pipes, ball joints, gas tanks and fuel lines
K 2	specialized tools and equipment such as A/C recovering/recycling machine, wheel alignment racks, fuel line and A/C line release tools and suspension spring compressors
K 3	removal and installation procedures
K 4	jurisdictional requirements for handling of refrigerants
K 5	mechanical fasteners such as bolts, rivets, retaining clips, clamps and screws
K 6	reusability of fasteners according to manufacturers' specifications
K 7	manufacturers' specifications such as torque and measurement tolerances

Sub-task

E-15.01 Removes mechanical components.

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

Key Competencies

E-15.01.01	determine removal procedure and components to be removed depending on extent of damage
E-15.01.02	recover A/C refrigerant according to jurisdictional regulations
E-15.01.03	drain coolant system using drain plugs, catch basins and hand tools
E-15.01.04	disconnect lines for systems such as power steering, brake, transmission and fuel, and clamp/plug to retain fluids
E-15.01.05	disengage electrical connections to mechanical systems such as sensors, fuel and washer pumps, and cooling fans
E-15.01.06	remove radiator hoses using clamp release tools depending on type of clamp
E-15.01.07	remove friction fit hoses on washer systems manually or using hand tools
E-15.01.08	remove mechanical fasteners from components using hand and power tools
E-15.01.09	remove mechanical components following removal procedure sequence

Sub-task

E-15.02 Installs mechanical components.

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

Key Competencies

E-15.02.01	determine installation procedure according to specifications, and lubricate components as required
E-15.02.02	preassemble mechanical components prior to installation depending on application and efficiency requirements
E-15.02.03	install mechanical components and torque to specified tolerances according to application
E-15.02.04	connect hoses and lines, and fasten clamps to components
E-15.02.05	refill fluids according to specifications to ensure proper fluid levels and avoid air locks
E-15.02.06	connect electrical connections to mechanical systems such as sensors, fuel and washer pumps, and cooling fans

E-15.02.07	recharge A/C system using A/C recovering/recycling machine according to manufacturers' specifications and jurisdictional regulations
E-15.02.08	verify system operation

Task 16 Removes, repairs and installs electrical components.

Context Motor vehicle body repairers require the knowledge of the operation and purpose of electrical components to fully remove, repair and replace them safely and to manufacturers' specifications.

Required Knowledge

K 1	electrical components such as fuses and fuse boxes, relays, sensors, fan motors, entertainment systems, power accessories and computers
K 2	colour coding for proprietary purposed wires such as supplemental restraint systems (SRS), air-bags, hybrid/electric, and related special repair considerations
K 3	considerations when handling electrical wiring and components
K 4	types of coverings such as insulated plastic coatings and wire looms
K 5	types of repair tools such as soldering irons, wire strippers, crimpers, side cutters and terminal release tools
K 6	specialized safety PPE such as high-voltage gloves
K 7	testing equipment such as digital volt ohmmeter (DVOM) and test lights
K 8	types of corrosion protection such as dielectric grease, shrink tubing and electrical tape
K 9	types of connectors such as locking tabs, screw-type fastening blocks, locking pins, loom connectors and spade-type connectors
K 10	component operation
K 11	removal procedures such as cutting, dismantling and disconnecting
K 12	electrical fault codes and diagnostic procedures
K 13	manufacturers' requirements for removal and installation of components such as computers, air bags, antilock brake systems (ABS), proximity sensors and on-board cameras
K 14	installation procedures
K 15	repair methods and materials such as solder, shrink tubes and solderless connectors
K 16	proper connections and grounding requirements

K 17	signs of corrosion
K 18	purpose and use of anti-static bags for sensitive electrical components

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Sub-task

E-16.01 Removes electrical components.

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

Key Competencies

E-16.01.01	disconnect battery and allow time for residual charge to dissipate
E-16.01.02	disconnect electrical components according to manufacturers' specifications
E-16.01.03	release clips and fasteners to remove electrical components
E-16.01.04	dispose of damaged electrical components according to jurisdictional and environmental regulations

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Sub-task

E-16.02 Repairs damaged wires and exterior coverings.

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

Key Competencies

E-16.02.01	remove components and exterior coverings manually or using hand tools to access damaged wiring connectors according to manufacturers' specifications
E-16.02.02	determine necessary repairs based on result of diagnostic testing and visual inspection, and according to manufacturers' specifications
E-16.02.03	remove corrosion from connections and apply corrosion protection according to manufacturers' specifications
E-16.02.04	perform required repairs using methods such as soldering, crimping, shrink tubing and re-attaching connectors according to manufacturers' specifications
E-16.02.05	verify operation of electrical and related components
E-16.02.06	finalize repair by routing wires to original locations

Sub-task

E-16.03 Installs electrical components.

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

Key Competencies

E-16.03.01	preassemble electrical components such as cooling fans, fuse boxes and sub-assemblies prior to final installation according to application
E-16.03.02	install clips and fasteners to secure electrical components in place
E-16.03.03	connect electrical components according to manufacturers' specifications
E-16.03.04	connect battery and verify installation by checking operation

BLOCK F RESTRAINT SYSTEM AND INTERIOR COMPONENTS

Trends

Air bags and seat belt restraints have become more of an integrated system. There is more replacement of trim, air bags and related components due to increased air bag deployment locations.

Smart airbags have been introduced to deploy according to occupancy and force of impact.

Related Components (including, but not limited to)

Interior components: seats, steering wheel, dash, instrument panel, console, headliner, door panels, visor, carpet, locks, switches, A, B and C pillar trim, stereo, sun roof, child seat anchors, luggage nets, spare tire, steering column and intermediate shaft, accessories.

Seat belt restraint systems: seat belts, trim, seats, doors, pillars, wiring, anchoring points, seat belt pretensioners.

Air bag systems: air bags, modules, clock spring, sensors, connectors, steering wheel, seats, dash, door panels, windshield, interior trim, wiring, headliner.

Tools and Equipment

See Appendix A.

Task 17 Repairs and replaces interior components.

Context

Motor vehicle body repairers replace and repair interior components such as dash pads and trim panels to bring the interior of the vehicle back to its original condition.

Required Knowledge

K 1	types of interior components such as trim panels, seats, head liners and door panels
K 2	removal and installation sequence
K 3	types of fasteners
K 4	component composition
K 5	repair products and manufacturers' procedures
K 6	interior electrical and electronic components and safe handling procedures

K 7	interior mechanical components
K 8	hard and soft synthetics

Sub-task

F-17.01 Repairs interior components.

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

Key Competencies

F-17.01.01	handle and store interior components with care during repair to avoid damage such as scratches and staining.
F-17.01.02	clean components to determine extent of damage and to facilitate repair
F-17.01.03	select and use repair tools and equipment such as plastic welding equipment, heat guns, spray guns and refinishing equipment
F-17.01.04	select and use repair materials such as epoxies and glue
F-17.01.05	re-attach mounting points for clips
F-17.01.06	perform minor repairs to fabric, leather and synthetic materials
F-17.01.07	repair hard plastic with heat, panel bonders and epoxy
F-17.01.08	install in original location with original fasteners, to ensure it remains a serviceable piece, after confirming there is no secondary damage to mounting locations
F-17.01.09	complete installation by verifying fit, finish and operation

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Sub-task

F-17.02 Replaces interior components.

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

Key Competencies

F-17.02.01	disconnect battery if servicing SRS
F-17.02.02	identify composition of part to determine if it can be repaired or needs to be replaced
F-17.02.03	identify types and locations of fasteners
F-17.02.04	remove interior components using tools and equipment such as pullers, screwdrivers and clip removers

F-17.02.05	transfer fasteners, clips and retainers from removed component to component to be installed in the event they are not provided
F-17.02.06	install new component into its original location with OEM fasteners to ensure it remains a serviceable piece, after confirming there is no secondary damage to mounting locations
F-17.02.07	secure interior components using fasteners
F-17.02.08	connect all electrical components and reconnect battery
F-17.02.09	complete installation by verifying operation

Task 18 Services supplemental restraint systems (SRS).

Context Motor vehicle body repairers service restraint systems such as air bags and seat belts in a safe and systematic way in order to return the vehicle to its original condition.

Required Knowledge

K 1	types of seat belt restraint systems such as passive and active
K 2	types of seat belt components such as receivers, retractors, electrical harnesses and belt webbing
K 3	types of air bags such as active and passive
K 4	types of air bag components such as control modules, sensors and clock springs
K 5	mounting hardware
K 6	electrical systems and connections
K 7	discharge, diagnostic, installation and removal procedures
K 8	air bag matrix
K 9	air bag disposal and handling hazards
K 10	air bag self-diagnostic system
K 11	activation and deactivation sequence
K 12	safety practices to avoid unintentional deployment of airbags or damage to related components such as impact sensors, control modules and associated wiring
K 13	manufacturers' specifications

Sub-task

F-18.01 Services seat belt restraint systems.

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

Key Competencies

F-18.01.01	disconnect battery and allow residual charge to dissipate according to manufacturers' specifications to prevent unintentional activation
F-18.01.02	identify type of seat belt restraint systems such as passive and active
F-18.01.03	remove components in sequence according to airbag matrix
F-18.01.04	check for secondary damage to surrounding components
F-18.01.05	install components ensuring fasteners are torqued as per manufacturers' specifications and procedures
F-18.01.06	verify seat belt installation and operation
F-18.01.07	energize system after complete SRS has been serviced
F-18.01.08	allow vehicle to complete a self-diagnostic check
F-18.01.09	arrange for codes to be cleared if required

Sub-task

F-18.02 Services air bags and related components.

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

Key Competencies

F-18.02.01	disconnect battery and allow residual charge to dissipate according to manufacturers' specifications to prevent unintentional activation
F-18.02.02	identify type of air bag system such as passive and active
F-18.02.03	take precautionary measures during air bag removal, handling and storage to avoid damage and personal injury
F-18.02.04	remove components such as sensors and modules in sequence according to airbag matrix
F-18.02.05	check for secondary damage to surrounding components
F-18.02.06	determine location and alignment of components
F-18.02.07	install components ensuring fasteners are torqued as per manufacturers' specifications and procedures

F-18.02.08	verify installation, fit and alignments of air bag system and components
F-18.02.09	energize system after complete SRS has been repaired
F-18.02.10	allow vehicle to complete a self-diagnostic check
F-18.02.11	arrange for codes to be cleared and recalibration of components such as seats to be performed

Trends	The increased use of scratch resistant clear is making it harder for motor vehicle body repairers to prepare for the refinishing process. There is a trend of using UV light for curing clears and primers. This curing method is faster and uses less energy. Waterborne primers are being used to refinish unstable substrates and they also have a lesser impact on the environment. Vehicle manufacturers are increasingly using four-stage colours and special effect colours. These products have proven difficult for colour matching and application techniques.
Related Components (including, but not limited to)	Interior and exterior body panels and components.
Tools and Equipment	See Appendix A.

Task 19 Prepares surfaces.

Context Motor vehicle body repairers prepare surfaces to receive refinishing product, to ensure adhesion and to achieve pre-damage appearance.

Required Knowledge

K 1	types of contaminants such as silicone, tar, tree sap, wax, oil, grease and industrial fallout
K 2	procedures for removing contaminants
K 3	abrasive products
K 4	cleaning materials such as solvents, and soap and water
K 5	procedures for handling cleaning material
K 6	masking materials such as tape, paper, plastic sheeting, liquid mask and foam tapes
K 7	masking techniques
K 8	refinishing products

K 9	types of substrate such as metal, plastic, composite and repair materials
K 10	types of sanding tools and their limitations
K 11	guide coat usage
K 12	sandpaper grit
K 13	uses of sanding paste
K 14	sanding methods such as wet and dry
K 15	sanding techniques such as block, scratch pad, back and final sanding
K 16	sanding materials such as scratch pads, sandpaper and blend paste
K 17	appropriate drying timeframes for sanding

Sub-task

G-19.01 Decontaminates refinish area.

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

Key Competencies

G-19.01.01	select cleaning tools, products and processes according to paint manufacturers' specifications
G-19.01.02	clean refinish area with compressed air to ensure area is dust free
G-19.01.03	clean refinish area to remove water soluble contaminants such as tree sap, bird droppings, water spotting, salt and road grime
G-19.01.04	clean refinish area to remove solvent-borne contaminants such as oils, greases, road tar, waxes and silicone
G-19.01.05	dry refinish area to ensure that surface is cleaned and streak-free

Sub-task

G-19.02 Sands surfaces.

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

Key Competencies

G-19.02.01	select and use tools and equipment such as sanding blocks, air sanders, file boards and sanding pads
G-19.02.02	select abrasive grit and configuration according to stage of the repair process
G-19.02.03	protect surrounding area from damage caused by abrasives
G-19.02.04	feather repair edges for smooth transition to surrounding area
G-19.02.05	backsand refinish area for adhesion of primer
G-19.02.06	block sand primer surfacers to achieve level repair and smooth transition to surrounding area
G-19.02.07	abrade surfaces that are to receive any refinish product

Sub-task

G-19.03 Masks off surrounding area.

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

Key Competencies

G-19.03.01	select and use products such as masking tape, paper, plastic, spray mask, and wheel and car covers
G-19.03.02	outline surrounding areas using making tape
G-19.03.03	cover jambs and door openings to prevent overspray
G-19.03.04	backtape and foam tape edges to ensure softest transition possible
G-19.03.05	protect exposed surrounding areas to prevent overspray using products according to application

Task 20 Uses fillers, primers and surfacers.

Context The proper use and application of fillers, primers and surfacers is important to set the foundation for the refinishing process.

Required Knowledge

K 1	types of fillers such as polyester and glaze
K 2	types of substrates such as plastic, composites and metals
K 3	product mixing and application techniques
K 4	selection of putties to maintain characteristics of existing substrate (i.e., flexibility of bumper covers)
K 5	role of environmental conditions on working and curing times
K 6	types of primers such as etch and epoxy
K 7	types of primer surfacers such as two-part, tintable and UV cure
K 8	application techniques such as spray-on, spreadable and aerosol
K 9	types of adhesion promoters
K 10	limitations of fillers, primers and primer surfacers
K 11	flash-off times, cure times, induction times and pot life
K 12	types of additives such as flexible additives and accelerators

Sub-task

G-20.01 Mixes fillers, primers and surfacers.

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

Key Competencies

G-20.01.01	mix fillers with appropriate amount of hardener on a non-porous mixing board, according to manufacturers' recommendations
G-20.01.02	measure and stir quantities of primers and primer surfacers as per job size, according to manufacturers' recommendations
G-20.01.03	shake aerosol type repair materials such as gravel guards and etch primers
G-20.01.04	incorporate additives while mixing repair material, according to best practices and based on substrate and environmental conditions

Sub-task

G-20.02 Applies fillers, primers and surfacers.

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

Key Competencies

G-20.02.01	spread fillers firmly and evenly over imperfections using tools such as putty knives and spreaders according to industry standards
G-20.02.02	use spray gun with appropriate nozzle assembly, and adjust pattern, fluid delivery and air pressure to apply primer and primer surfacers according to manufacturers' recommendations
G-20.02.03	use aerosol or gun to spray gravel guard onto repaired area to reproduce OEM texture and finish
G-20.02.04	select and apply etch primers, epoxies and adhesion promoters according to type of substrate

Task 21 Prepares and applies refinishing materials.

Context Motor vehicle body repairers prepare surfaces, mix and apply refinishing materials to achieve pre-damage finish on interior and exterior body panels and components.

Required Knowledge

K 1	types of refinishing materials such as sealers, basecoats and topcoats
K 2	manufacturers' specifications such as mixing ratios
K 3	tinting procedures
K 4	product quality maintenance procedures
K 5	mixing hazards
K 6	types of contaminants
K 7	types of cleaning products
K 8	spraying techniques
K 9	product specifications such as drying and flash times
K 10	types of masking material
K 11	unmasking techniques and time line limitations for mask removal
K 12	paint mixing software and equipment

K 13	paint application equipment and tools such as paint guns, cups, strainers and paint booths
K 14	curing times and temperature for alternate fuel vehicles
K 15	PPE and safety equipment
K 16	disposal of refinishing materials
K 17	WHMIS, OH&S and MSDS
K 18	paint gun set up such as fan control, fluid control and pressure
K 19	use of tack cloths
K 20	blending techniques

Sub-task

G-21.01 Mixes refinishing materials.

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

Key Competencies

G-21.01.01	locate and verify paint code on service parts identification tags
G-21.01.02	determine colour variant required using sprayout cards or paint manufacturers' variant chip systems
G-21.01.03	access paint mixture information from colour manuals or paint mixing software
G-21.01.04	determine quantity of material needed for job requirements
G-21.01.05	combine tinters and additives according to paint manufacturers' specifications using scales and computers
G-21.01.06	reduce and activate sealers, and colour and clear coats following manufacturers' recommended reduction formula

Sub-task

G-21.02 Performs final wash and tack.

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

Key Competencies

G-21.02.01	blow off excess dust from refinished areas, adjacent panels and openings
G-21.02.02	select cleaning material for application according to type of substrate and paint manufacturers' specifications
G-21.02.03	clean refinished area using wipe-on and wipe-off methods ensuring area is dry and streak-free
G-21.02.04	tack surrounding masked and refinished areas to remove fine dust and dirt particles prior to paint application

Sub-task

G-21.03 Applies refinishing material to surface.

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

Key Competencies

G-21.03.01	determine refinish application method such as single stage, two-stage and three-stage, according to job requirements
G-21.03.02	select and set up spray gun according to refinishing material to be used and manufacturers' specifications
G-21.03.03	operate paint booth and determine temperature and bake time to ensure complete curing
G-21.03.04	use supplemental air movers to ensure complete curing of base coats
G-21.03.05	spray sealer according to job and paint manufacturers' specifications
G-21.03.06	spray base coat to achieve opacity, colour match and invisible blend
G-21.03.07	spray orientation coats and mid-coat to achieve desired effect, when required
G-21.03.08	spray clear coat to achieve desired mil thickness and gloss level

Sub-task

G-21.04 Removes masking.

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

Key Competencies

G-21.04.01	select tools and removal procedures depending on types of masking issues such as bridging and over masking
G-21.04.02	remove masking tape and paper to prevent surface damages such as peeling and marking newly refinished surface
G-21.04.03	remove spray mask by washing with soapy water

Trends

Motor vehicle body repairers spend more time detailing and cleaning vehicles due to customer expectations. More sophisticated polishing products are being developed which simplifies their use.

Related Components (including, but not limited to)

Exterior components: all exterior surfaces, glass, accessories.

Interior components: seats, carpets, dash, headliners, door panels, consoles, audio visual equipment, vents.

Tools and Equipment

See Appendix A.

Task 22 Details exterior.

Context

Motor vehicle body repairers detail vehicles after the refinishing process and prior to delivery of vehicles to customers. They install decals and striping according to shop standards. They restore paint finish by removing overspray and imperfections, touching up stone chips and polishing vehicles to meet OEM standards.

Required Knowledge

K 1	surface imperfections such as nibs, runs and overspray
K 2	paint care procedures
K 3	curing time of refinishing material
K 4	types of overspray such as paint and undercoat
K 5	topcoats and surfaces
K 6	polishing procedures
K 7	types of compounds and their limitations
K 8	PPE and safety equipment
K 9	WHMIS, OH&S and MSDS
K 10	wet sanding techniques
K 11	types of abrasives, their application techniques and limitations
K 12	types of decals, stripings and emblems

Sub-task

H-22.01 Removes overspray and imperfections.

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

Key Competencies

H-22.01.01	identify imperfections such as fish eyes, solvent popping, runs and orange peel
H-22.01.02	determine repair techniques according to type of imperfection
H-22.01.03	wet sand, denib and shave according to type of imperfection
H-22.01.04	remove overspray using tools and materials such as razor blades, polishers, body clay, rubbing compounds and chemicals from paint surface and glass

Sub-task

H-22.02 Polishes vehicle.

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

Key Competencies

H-22.02.01	evaluate paint finish to determine polishing procedures
H-22.02.02	protect surrounding areas such as plastic mouldings, tires and soft surfaces
H-22.02.03	select and use tools and equipment such as variable speed buffers, polishing cloths and pads
H-22.02.04	select and use materials such as polish, compounds and pads
H-22.02.05	apply compound and polish areas to restore lustre and to match surrounding panel
H-22.02.06	wet sand and polish headlights to restore clarity
H-22.02.07	control speed, pressure and angle of polisher to avoid damage to surface

Sub-task

H-22.03 Installs decals, striping and emblems.

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

Key Competencies

H-22.03.01	locate position of decals, striping and emblems
H-22.03.02	cut decals and striping using methods and tools such as razor blades and stripe cutters, according to job requirements
H-22.03.03	determine application methods such as soapy water, heat and self-adhesive, according to industry practices
H-22.03.04	install decals striping and emblems, according to industry standards and practices, without damaging refinished surface
H-22.03.05	remove air bubbles from applied decals by making a pinhole or by heating

Sub-task

H-22.04 Touches up stone chips.

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

Key Competencies

H-22.04.01	identify stone chip damage on vehicle
H-22.04.02	determine vehicle colour using vehicle paint codes
H-22.04.03	clean damaged area and apply touch-up paint

Task 23 Cleans vehicle.

Context Motor vehicle body repairers must clean vehicle prior to delivery for customer satisfaction.

Required Knowledge

K 1	types of cleaners such as tire cleaners, exterior soap and window cleaners, and stain removal products
K 2	types of cleaning equipment
K 3	surface composition
K 4	cleaning techniques and precautions
K 5	WHMIS, OH&S and MSDS

Sub-task

H-23.01 Cleans exterior.

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

Key Competencies

H-23.01.01	select tools and equipment such as pressure washer, hoses and brushes
H-23.01.02	select materials such as tire and glass cleaners, car wash soap and tire dressing that are silicone free, according to shop practice
H-23.01.03	follow washing sequence such as using pressure washer, pre-soak vehicle, wash and rinse
H-23.01.04	dry vehicle after wash using materials such as chamois, squeegee and air blower
H-23.01.05	clean and dry glass to ensure it is spot and streak free

Sub-task

H-23.02 Cleans interior.

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

Key Competencies

H-23.02.01	remove garbage from interior
H-23.02.02	vacuum interior to remove debris
H-23.02.03	shampoo upholstery to remove stains and other contaminants
H-23.02.04	deodorize interior
H-23.02.05	apply surface conditioners, cleaners and dressings to surfaces such as dashes, consoles and door panels
H-23.03.06	clean streaks, smoke residue and other contaminants from the interior glass with materials such as lint-free rags, glass cleaner and paper products

APPENDICES

APPENDIX A TOOLS AND EQUIPMENT

Hand Tools

Allen keys
adjustable hood props
adjustable locking pliers

air blow guns
ball joint removers
body fill spreaders
caulking guns
chisels
clamps
crimping tools
cut-out tools (windshield)
dollies
door hem flange tools
files
flange tools
hack saws
hammers
leverage type door adjusters
magnets
marking tools
measuring tapes
metal chisels
parts storage carts
plastic pry tools
picks
pliers
clip release tool
pry bars
pullers
punches
putty knives and scrapers
quick-connect joint release tools (A/C lines, fuel lines)
ratchets
razor blades and holders
resin injection tools (windshield repair tools)
rivet guns
rubber mallets
sanding blocks
screwdrivers
slide hammers
sockets, extensions and swivels
soldering tools
specialty bits
body spoons
spring compressor (door hinge)
squeegees
stands
steering wheel pulling kits
straight edges
suction cups
tie rod removal tool
tin snips
tool box
torque wrenches
trim clip removal tools
utility knives
vices
windshield removal wires
wire cutters
wiring terminal release tools
wire stripping tools
wire wheel brushes
wrenches

Power tools

A/C tools and equipment
air chisels
air compressors
air drills
air hoses
applicator guns
battery jump packs
bench grinders
computer and software
computerized diagnostic equipment
corrosion protection applicator
curing light
cut out knives (pneumatic, electric)
cut-off tools
dent pullers
die grinders
digital cameras
door jacks
drill and drill bits
frame flange tools
frame gauging equipment
free-standing circular fans
friction jacks
fuel storage unit
grinders
gun cleaners
heat guns
heating equipment
impact guns
induction heaters
metal saws
plastic repair equipment
pneumatic air chisel
pneumatic hole punches
pneumatic moulding removers
rivet guns (pneumatic)
sand blasters (spot, conventional)
sanders
seam sealer applicators
trouble lights

Welding and Cutting Equipment

cutting torches
oxy-fuel equipment
plasma cutters
plastic welders
propane torches
squeeze type resistance spot welders (STRSW)
stud/pin welders
surge protectors
tip cleaners
welders (MIG, GMAW, TIG)
welding blankets
welding carts
welding clamps
welding coveralls/aprons
welding curtains
welding gauges and hoses
welding gloves
welding jackets
welding shields
welding tips
welding wires/rods
welding/cutting glasses and helmets

Frame and Unibody Repair Equipment

chains
clamps and fixtures
come-alongs
electric winches
frame benches
hook tools
hydraulic jacking equipment
leverage bars (pogo sticks, monkey on a stick)
portable hydraulic pulling towers and related equipment
structural straightening equipment
vehicle lifts

Lifting Equipment

door lifts
engine lifts
hoists
jacks and jack stands
portable truck box racks
transmission lifts
wheel alignment racks

Measuring and Testing Equipment

body dimensional measuring equipment
centering gauges
datum diamond centering (DDC) gauges
diagnostic/testing equipment
digital volt ohmmeter (DVOM)
lasers
tape measures
test lights
thermometers
tram gauges
ultrasonic equipment

Refinishing and Detailing Equipment

agitators (shakers)
air blower nozzles
blow guns
brushes
chamois
colour identification cameras
computerized mixing systems
drying equipment (curing light)
exhaust fans
gun wash stations
hazardous materials disposal containers
masking equipment
mixing tools
paint application equipment
paint booths
paint database
paint measuring sticks
paint mixing machines
paint rollers
paint scales
paint suits
power polishers
preparation stations
pressure washers
primer application equipment
sanding equipment
shampooers
solvent recyclers
solvent resistant gloves
spray guns
spray out cards
strainers

Refinishing and Detailing Equipment (continued)

stripe/adhesive removal wheel
sun gun (ultraviolet light gun)
tack cloths
vacuum cleaners (wet and dry)
venturi fans
wash mitts
water hoses

Personal Protective Equipment (PPE) and Safety Equipment

coveralls
creepers
dust masks
eye wash stations
face shields
fire blankets
fire extinguishers
fire hoses
first aid kit
fresh air respirator
gloves (high-voltage, rubber, impact, welding, solvent-proof)
goggles
hearing protection (ear plugs, ear muffs)
knee pads
respirator (particulate and gas)
safety footwear
safety glasses
showers
storage containers for used oils and fuels

APPENDIX B GLOSSARY

abrasives	material used for cleaning or surface roughening such as sand, aluminium oxide or silicone carbide
active restraint system	is a system you need to physically enable such as seat belts, passenger side airbag
air bags	refers to inflatable restraints located in steering wheels, dashes, seats, doors, pillars, roof rails, and headliners
air bag matrix	manufacturers' specifications for components that need to be replaced or checked in the event of a deployment
detailing	all activities performed for final preparation for delivery to the customer; detailing includes but is not limited to installation of trim and accessories, cleaning and polishing
frame and structural components	provides the vehicle with strength and structural integrity
glass	a hard transparent substance that is laminated or tempered and sometimes tinted. Motor vehicle glass can be fixed as in windshields and rear windows or moveable as in side windows
glass hardware	glass hardware consists of moveable and adjustable parts and components that ensure the operation of moveable glass and consists of but is not limited to tracks, glass run channels, plastic guides, stops and regulators
interior components	interior components consist of trim, upholstery and panels within the vehicle
mechanical and electrical components	mechanical components consists of the moving parts that produce motion or a state of balance including suspension systems (steering and suspension), cooling systems, air conditioning systems, brake systems, the power train and the exhaust system. Electrical components are designed to perform a specific function (e.g. radio, defrost, cruise control) or to generate, store and distribute electricity (e.g. battery, charging system, relays)

outer body panels	portions of a motor vehicle that are attached to the frame or structural components of the vehicle by welding, bonding or by mechanical attachments
passive restraint systems	passive restraint systems include components such as dash, pads, head rest, collapsible steering columns and knee bolsters, motorized seat belts
refinishing	provides a smooth and level surface upon which paint will adhere, by sanding, filling, cleaning and priming the surface prior to, and including, the application of a final colour coat
restraint systems (also see definition for active and passive restraint systems)	restraint systems consist of passive or active safety components which provide occupants with injury protection in the event of a collision
structural components	any primary-stress-bearing portion of the body structure that affects its over-the-road performance or crash-worthiness
structural glass	a specific type of glass with a special design and installation process that adds to the structural integrity of the vehicle
unibody motor vehicle	vehicle design in which parts of the body structure serve as support for overall vehicle

APPENDIX C ACRONYMS

ABS	antilock brake systems
A/C	air conditioning
DVOM	digital volt ohmmeter
ESC	electronic stability control
GMAW	gas metal arc welding (MIG)
GMAW	gas metal arc welding
MSDS	material safety data sheet
NAGS	National Auto Glass Society
OEM	original equipment manufacturer
OH&S	Occupational Health & Safety
PPE	personal protective equipment
SRS	supplemental restraint systems
STRSW	squeeze type resistance spot welding
UV	ultra violet
VIN	vehicle identification number
VOC	volatile organic compound
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
%	10	13	8	6	ND	10	5	8	5	7	NV	NV	NV	8%

Task 1 Performs safety-related functions.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	40	40	62	ND	20	34	33	50	20	NV	NV	NV	38%

Task 2 Uses and maintains tools and equipment.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	30	30	19	ND	40	33	44	25	30	NV	NV	NV	32%

Task 3 Uses and maintains welding equipment.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	20	30	30	19	ND	40	33	23	25	50	NV	NV	NV	30%

BLOCK B ROUTINE TRADE TASKS.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	10	8	8	13	ND	5	5	11	5	14	NV	NV	NV	9%

Task 4 Organizes work and uses documentation.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	35	19	25	64	ND	17	30	24	20	40	NV	NV	NV	30%

Task 5 Applies corrosion protection and sound deadening materials.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	35	19	25	15	ND	33	30	24	30	30	NV	NV	NV	27%

Task 6 Removes and installs trim and weatherstrips.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	15	42	30	11	ND	33	20	29	30	20	NV	NV	NV	26%

Task 7 Performs inspection.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	15	20	20	10	ND	17	20	23	20	10	NV	NV	NV	17%

BLOCK C FRAME AND STRUCTURAL COMPONENTS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	20	22	23	18	ND	25	20	22	35	23	NV	NV	NV	22%

Task 8 Prepares for repair and replacement of structural components.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	35	40	40	40	ND	33	40	36	35	45	NV	NV	NV	38%

Task 9 Repairs, removes and installs structural components.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	35	60	40	40	ND	50	40	39	50	45	NV	NV	NV	44%

Task 10 Removes, installs and repairs structural glass.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	30	0	20	20	ND	17	20	25	15	10	NV	NV	NV	18%

BLOCK D NON-STRUCTURAL OUTER BODY PANELS AND RELATED COMPONENTS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	20	22	17	15	ND	15	15	12	10	27	NV	NV	NV	17%

Task 11 Removes, repairs and installs metal panels and components.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	55	40	40	ND	44	45	41	40	50	NV	NV	NV	44%

Task 12 Removes, repairs and installs plastic and composite panels and components.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	30	40	40	ND	39	45	40	40	40	NV	NV	NV	39%

Task 13 Removes and installs non-structural glass.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	20	15	20	20	ND	17	10	19	20	10	NV	NV	NV	17%

BLOCK E MECHANICAL, ELECTRICAL AND ALTERNATE FUEL SYSTEM COMPONENTS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	10	10	15	12	ND	15	15	9	10	10	NV	NV	NV	12%

Task 14 Deactivates and reactivates alternate-fuel systems

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	20	40	30	34	ND	17	34	27	40	20	NV	NV	NV	29%

Task 15 Removes and installs mechanical components

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	32	40	35	ND	44	33	33	30	40	NV	NV	NV	36%

Task 16 Removes, repairs and installs electrical components.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	28	30	31	ND	39	33	40	30	40	NV	NV	NV	35%

BLOCK F RESTRAINT SYSTEM AND INTERIOR COMPONENTS

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	10	10	12	6	ND	10	15	10	10	5	NV	NV	NV	10%

Task 17 Repairs and replaces interior components.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	70	50	56	ND	33	20	37	50	25	NV	NV	NV	42%

Task 18 Services supplemental restraint systems (SRS).

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	60	30	50	44	ND	67	80	63	50	75	NV	NV	NV	58%

BLOCK G REFINISHING

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	15	10	11	19	ND	15	20	22	20	10	NV	NV	NV	16%

Task 19 Prepares surfaces.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	30	40	45	40	ND	33	40	31	25	50	NV	NV	NV	37%

Task 20 Uses fillers, primers and surfacers.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	30	35	35	20	ND	22	20	29	25	30	NV	NV	NV	27%

Task 21 Prepares and applies refinishing materials.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	40	25	20	40	ND	45	40	40	50	20	NV	NV	NV	36%

BLOCK H DETAILING AND CLEANING

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	National Average
%	5	5	6	11	ND	5	5	6	5	4	NV	NV	NV	6%

Task 22 Details exterior.

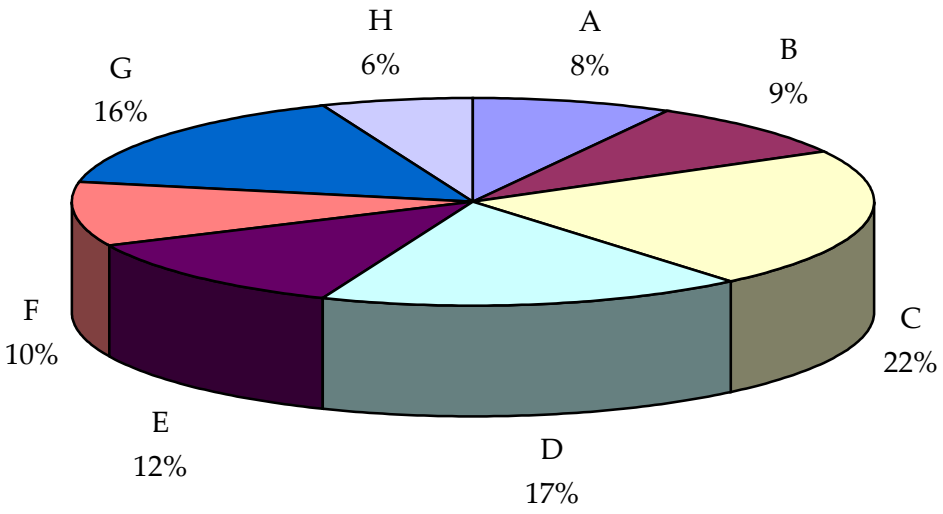
	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	50	65	55	69	ND	67	65	60	50	80	NV	NV	NV	62%

Task 23 Cleans vehicle.

	NL	NS	PE	NB	QC	ON	MB	SK	AB	BC	NT	YT	NU	
%	50	35	45	31	ND	33	35	40	50	20	NV	NV	NV	38%

APPENDIX E

PIE CHART*



TITLES OF BLOCKS

BLOCK A	Common Occupational Skills.	BLOCK E	Mechanical, electrical and alternate fuel system components
BLOCK B	Routine trade tasks.	BLOCK F	Restraint system and interior components
BLOCK C	Frame and structural components	BLOCK G	Refinishing
BLOCK D	Non-structural outer body panels and related components	BLOCK H	Detailing and cleaning

*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 — MOTOR VEHICLE BODY REPAIRER (METAL AND PAINT)

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 and power tools.	2.02 Maintains frame and unibody repair and measuring equipment.	2.03 Uses lifting equipment.	2.04 Maintains refinishing tools and equipment.
	3. Uses and maintains welding equipment.	3.01 Uses welding equipment.	3.02 Maintains welding equipment.		
B – ROUTINE TRADE TASKS	4. Organizes work and uses documentation.	4.01 Prepares estimates and supplements.	4.02 Prepares repair procedures/plans.	4.03 Organizes parts, materials and work area.	
	5. Applies corrosion protection and sound deadening materials.	5.01. Applies corrosion inhibitors and undercoats.	5.02 Applies seam sealers and sound deadeners.	5.03 Applies corrosion protection for electrical components.	
	6. Removes and installs trim and weatherstrips.	6.01 Removes trim and weatherstrips.	6.02. Installs trim and weatherstrips.		
	7. Performs inspection.	7.01 Performs quality control checks.	7.02 Performs final operational checks.		

BLOCKS	TASKS	SUB-TASKS			
C - FRAME AND STRUCTURAL COMPONENTS	8. Prepares for repair and replacement of structural components.	8.01 Identifies extent of damage.	8.02 Removes components for access.	8.03 Performs vehicle setup.	
	9. Repairs, removes and installs structural components.	9.01 Repairs structural components.	9.02 Removes structural components.	9.03 Installs structural components.	
	10. Removes, installs and repairs structural glass.	10.01 Removes structural glass.	10.02 Installs structural glass.	10.03 Repairs laminated glass.	
D - NON-STRUCTURAL OUTER BODY PANELS AND RELATED COMPONENTS	11. Removes, repairs and installs metal panels and components.	11.01 Prepares metal panels for repair.	11.02 Removes metal panels and components.	11.03 Repairs metal panels and components.	11.04 Installs metal panels and components.
	12. Removes, repairs and installs plastic and composite panels and components.	12.01 Prepares plastic and composite panels and components for repair.	12.02 Removes plastic and composite panels and components.	12.03 Repairs plastic and composite panels and components.	12.04 Installs plastic and composite panels and components.
	13. Removes and installs non-structural glass.	13.01 Removes non-structural glass.	13.02 Installs non-structural glass.		
E - MECHANICAL, ELECTRICAL AND ALTERNATE FUEL SYSTEM COMPONENTS	14. Deactivates and reactivates alternate-fuel systems.	14.01 Deactivates alternate-fuels systems.	14.02 Reactivates alternate-fuel systems.		
	15. Removes and installs mechanical components.	15.01 Removes mechanical components.	15.02 Installs mechanical components.		

BLOCKS	TASKS	SUB-TASKS			
	16. Removes, repairs and installs electrical components.	16.01 Removes electrical components.	16.02 Repairs damaged wires and exterior coverings.	16.03 Installs electrical components.	
F - RESTRAINT SYSTEM AND INTERIOR COMPONENTS	17. Repairs and replaces interior components.	17.01 Repairs interior components.	17.02 Replaces interior components.		
	18. Services supplemental restraint systems (SRS).	18.01 Services seat belt restraint systems.	18.02 Services air bags and related components.		
G - REFINISHING	19. Prepares surfaces.	19.01 Decontaminates refinish area.	19.02 Sands surfaces.	19.03 Masks off surrounding area.	
	20. Uses fillers, primers and surfacers.	20.01 Mixes fillers, primers and surfacers.	20.02 Applies fillers, primers and surfacers.		
	21. Prepares and applies refinishing materials.	21.01 Mixes refinishing materials.	21.02 Performs final wash and tack.	21.03 Applies refinishing material to surface.	21.04 Removes masking.

BLOCKS	TASKS	SUB-TASKS			
H - DETAILING AND CLEANING	22. Details exterior.	22.01 Removes overspray and imperfections.	22.02 Polishes vehicle.	22.03 Installs decals and striping and emblems.	22.04 Touches up stone chips.
	23. Cleans vehicle.	23.01 Cleans exterior.	23.02 Cleans interior.		