Basic Automotive Collision Repair

Exam Information

Exam number
500

Items
43

Points
45

Prerequisites
None

Recommended course length
One semester

National Career Cluster
Transportation, Distribution, & Logistics

Performance standards
Included (Optional)

Certificate available
Yes

Description

This course is the first in a sequence of courses that prepares individuals in repair and refinishing of uni-bodies and fenders of automobiles. This course is an introduction in non-structural repairs and various methods of refinishing and safety training. This course is based on the Automotive Service Excellence (ASE) automotive collision task list and the I-CAR training program. Industry work ethic standards and productivity are an integral part of the classroom and laboratory activities of this program as determined in the Professional Development Program (PDP).

Exam Blueprint

Standard	Percentage of exam
1. Safety	20%
2. Tools & Equipment	9%
3. Construction & Parts	11%
4. Damage Analysis & Estimating	11%
5. Metal Finishing & Body Filling	4%
6. Mig Welding	4%
7. Plastic Repair	9%
8. Automotive Finishes	9%
9. Surface Preparation	19%
10. Refinishing Application	4%
11. Detailing & Services	0%
12. CTSOS & Workplace Skills	

Standard 1

Students will be able to understand and demonstrate personal protective equipment, safe operating procedures, and emergency practices.

Objective 1 Successfully complete a safety program before entering a shop space.

Objective 2 Locate and understand basic and hazardous information from a Safety Data Sheet (SDS) for products used in the collision repair industry.

1. Proper product labeling

Objective 3 Identify, select, inspect, and properly use appropriate personal protective equipment (PPE).

1. Eye protection
2. Hand protection
3. Body protection
4. Respiratory protection
5. Hearing protection

Performance Skills

1. Pass a safety test with 100% accuracy.
2. Locate, name, and demonstrate all safety equipment and procedures.
3. Demonstrate correct use of PPE.
4. Recognize and report potential safety hazards.
5. Identify proper material labeling.

Standard 1 Performance Evaluation included below (Optional)

Standard 2

Students will distinguish safe practices and uses of hand tools, power tools, and shop equipment.

Objective 1 Understand and demonstrate safe practices with hand tools, power tools, and shop equipment.

Objective 2 Identify and demonstrate safe, proper use of hand tools.

1. Wrenches
2. Ratchets, sockets, and extensions

3. Screwdrivers
4. Hammers, and mallets
5. Pliers
6. Cutters
7. Punches and chisels
8. Pry bar sets
9. Putty knives
10. Rivet guns
11. Scrapers
12. Tin snips
13. Tire pressure gauges
14. Removing and releasing tools
15. Tape measures
16. Blow gun

Objective 3 Identify and demonstrate safe, proper use of power tools.

1. Drills
2. Impacts (electric and pneumatic)
3. Vacuum system
4. Heat gun
5. Die grinder
6. Angle grinder
7. Battery charger
8. Power sanders
9. Spray guns
10. Cut off wheels

Objective 4 Distinguish between and demonstrate safe, proper use of body working tools as opposed to traditional tools.

1. Assorted files (metal and plastic finishing)
2. Hand sanding pads
3. Mixing boards
4. Sanding blocks (short and long)
5. Sanding boards (short and long)
6. Body hammers
7. Dolly
8. Fillers, spreaders, and applicators

Objective 5 Identify and understand safe, proper use of shop equipment.

1. Air compressor
2. Masking equipment
3. Spray booth
4. Mixing room

5. Paint shaker
6. Welders (oxygen, acetylene)
7. Frame pulling/straightening equipment

Performance Skills

1. Locate personal protective equipment (PPE) needed for using tools and equipment.
2. Demonstrate safe and proper use of hand tools.
3. Demonstrate safe and proper use of power tools.
4. Demonstrate safe and proper use of body working tools.

Standard 2 Performance Evaluation included below (Optional)

Standard 3

Students will be able to understand vehicle construction and parts identification.

Objective 1 Recognize types of vehicle construction (space frame, unibody, body-over-frame).

Objective 2 Recognize the different damage characteristics of space frame, unibody, and body-over-frame vehicles.

Objective 3 Identify impact energy absorbing components.

1. Impact absorbers
2. Automotive impact absorbing foams
3. Crush zones
4. Seats
5. Floors
6. Steering wheel and column
7. Instrument panel
8. Airbags

Objective 4 Relate parts designed for collision energy transfer.

1. A-pillar
2. B-pillar
3. Roof rails
4. Rocker panel or sill
5. Crossmembers
6. Floor plan reinforcements

Objective 5 Identify steel types; determine repairability.

1. Mild steel
2. High-strength steel (HSS)
3. Ultra-high-strength steel (UHSS)
4. Laminated steel

Objective 6 Identify aluminum/magnesium components; determine repairability.

Objective 7 Associate plastic/composite and carbon fiber components; determine repairability.

Objective 8 Identify vehicle glass components; determine repairability.

Objective 9 Identify add-on accessories.

Standard 3 Performance Evaluation included below (Optional)

Standard 4

Students will observe a damaged vehicle and determine the repair needed as related to a detailed damage report.

Objective 1 Describe the function and importance of damage reports and general business aspects in the collision repair industry.

Objective 2 Use a vehicle identification number and an information source to fully identify a vehicle.

Objective 3 Explain and identify different types of vehicle damage.

1. Accidents
2. Theft recovery
3. Flood damage
4. Hail damage
5. Vandalism
6. Total loss

Objective 4 Identify and describe a general plan for repairs on a damaged area.

Objective 5 Explain the importance of planning, describe a sequence for damage analysis, and identify common industry parts names and repair terms.

Objective 6 Recognize damage to various mechanical systems of the vehicle.

1. HVAC
2. Cooling systems
3. Suspension
4. Latch mechanisms
5. Exhaust
6. Panel alignment
7. Unrelated/related prior damage

Objective 7 Understand flat rate, hourly rate and pricing of materials as it applies to collision repair.

Performance Skills

1. Apply appropriate estimating and parts terminology.
2. Determine and record customer and vehicle information.

3. Identify mechanical systems, determine precautions, inspections, and replacement items as required.
4. Identify and locate a vehicle identification number (VIN).
5. Determine and identify different types of vehicle damage.
6. Understand flat rate, hourly rate, and pricing of materials as it applies to collision repair.
7. Read and understand a damage report.
8. Identify and correct misaligned parts.

Standard 4 Performance Evaluation included below (Optional)

Standard 5

Students will be able to understand and demonstrate metal straightening and the use of body fillers.

Objective 1 Categorize body filler defects.

1. Pinholing
2. Ghosting
3. Staining
4. Over catalyzing

Objective 2 Investigate the cause and condition of filler defects.

Objective 3 Identify different types of body fillers.

Objective 4 Illustrate the steps for preparing a panel for body filler

1. Abrade/remove coatings
2. Featheredge
3. Refine scratches
4. Clean surface

Objective 5 Illustrate the steps for properly repairing a surface of irregularities and straightening contours.

Objective 6 Illustrate cold and heat shrinking for proper contour.

Objective 7 Compare various metal finishing and body filling techniques.

1. Glue-Pulling Dent Repair (GPDR)
2. Heat/Cold Shrink
3. Hammer & Dolly
4. Filler Shaping

Performance Skills

1. Prepare a panel for body filler.
2. Properly locate and repair surface irregularities and straighten contours.
3. Demonstrate hammer and dolly techniques.
4. Heat and cold shrink stretched panel areas to proper contour.
5. Properly shape body filler to contour; finish, and sand.
6. Properly repair a damaged panel using a Glue-Pulling Dent Repair (GPDR) technique.

7. Mix and apply body filler.

Standard 5 Performance Evaluation included below (Optional)

Standard 6

Students will be able to understand and demonstrate MIG welding.

Objective 1 Explain and demonstrate all applicable personal and shop safety steps, along with vehicle protection measures, to be followed when welding and cutting.

Objective 2 Describe metal joining methods and identify where each method is suitable in automotive sheet metal repair.

Objective 3 Properly set up a MIG welder for welding automotive sheet metal.

Objective 4 Run a test weld and tune the welder for the welds being made.

Objective 5 Clean, assemble, and complete a butt joint with backing in a flat position; visually inspect the weld.

Objective 6 Clean, assemble, and complete a fillet weld lap joint in a flat position; visually inspect the weld.

Objective 7 Clean, assemble, and complete a plug weld in a flat position; visually inspect the weld.

Performance Skills

1. Understand and demonstrate MIG welding.
2. Explain and demonstrate all applicable personal and shop safety steps, along with vehicle protection measures, to be followed when welding and cutting.
3. Perform a proper set up of a MIG welder for welding automotive sheet metal.
4. Perform a test weld and tune the welder for the welds being made.
5. Clean, assemble, and complete a butt joint with a backing, a fillet weld lap joint, and a plug weld in a flat position; visually inspect the weld.
6. Properly shut down equipment (cord management, gas valves, storage).

Standard 6 Performance Evaluation included below (Optional)

Standard 7

Students will categorize plastics and determine the method for repairability.

Objective 1 Properly use PPE when grinding or sanding plastic.

Objective 2 Compare thermoplastic and thermoset plastics.

Objective 3 Understand and locate International Organization for Standardization codes (ISO).

Objective 4 Perform a single-sided cosmetic repair.

Objective 5 Perform a double-sided cosmetic repair.

Performance Skills

1. Distinguish between the two different types of plastics.
2. Properly and safely perform a single-sided cosmetic repair.
3. Properly and safely perform a double-sided cosmetic repair.

Standard 7 Performance Evaluation included below (Optional)

Standard 8

Students will identify and distinguish between different types of automotive finishes and their applications.

Objective 1 Identify and distinguish between the different types of automotive finishes.

1. Primers
2. Base coats (solvent/waterborne)
3. Clear coats

Objective 2 Select the proper finish for repairs based on environmental conditions.

Objective 3 Read and understand how to mix a product from the product data sheet (PDS).

Objective 4 Locate vehicle Original Equipment Manufacturer (OEM) paint codes.

Standard 8 Performance Evaluation included below (Optional)

Standard 9

Students will understand the principles needed to prepare a surface for refinishing.

Objective 1 Select, and properly use PPE when preparing the surface of a vehicle for refinishing.

Objective 2 Properly clean the entire vehicle to remove contaminants.

Objective 3 Remove paint finish as needed.

1. Surface prep for primer
2. Surface prep for blend (solid/metallic/tri-coat)

Objective 4 Mask/protect areas that will not be refinished

1. Recess/back masking
2. Foam door type/aperture
3. Plastic

4. Paper

Objective 5 Understand the removal and installation of pinstripes, decals, and emblems.

Performance Skills

1. Successfully prepare a vehicle surface for refinishing.
2. Successfully prevent overspray on a vehicle.
3. Demonstrate proper use of PPE.

Standard 9 Performance Evaluation included below (Optional)

Standard 10

Students will understand the procedures necessary in the application of a finish.

Objective 1 Select, and properly use PPE when applying refinishing materials to a vehicle surface.

Objective 2 Understand corrosion protection.

1. OEM E-Coat
2. Direct to Metal (DTM) Primer
3. Seam Sealer
4. Chip-Coating
5. Undercoating
6. Bed Lining
7. Powder Coating

Objective 3 Demonstrate proper gun setup for undercoat and top coat applications.

1. Needle nozzle sets
2. Spray technique (distance, speed)
3. Gun types
4. Air pressure
5. Compressed air line filtration

Objective 4 Investigate paint defects and corrections.

1. Solvent popping
2. Orange peel
3. Dry spray
4. Blistering
5. Wrinkling
6. Tiger/zebra striping
7. Runs
8. Fish eye

Performance Skills

1. Successfully and properly set up a spray gun.
2. Demonstrate proper spray techniques.
3. Demonstrate proper use of PPE.

Standard 10 Performance Evaluation included below (Optional)

Standard 11

Students will understand and demonstrate detailing principles of a vehicle.

Objective 1 Students will understand and demonstrate detailing principles of a vehicle.

Objective 2 Correct finishing defects.

1. Cut
2. Buff
3. Polish
4. De-nib
5. Claybar (overspray removal)

Objective 3 Show knowledge of interior detailing.

1. Vacuum
2. Glass care
3. Upholstery care
4. Stain & odor removal

Objective 4 Show knowledge of exterior detailing.

1. Freshly refinished panel care.
2. Exterior washing.
3. Tire care

Objective 5 Show knowledge of customer care materials.

1. Air fresheners
2. Paper floor mat
3. Plastic seat cover

Objective 6 Discuss aftermarket detailing services.

1. Window tinting
2. Paint protection film (PPF).
3. Hydro dipping
4. Ceramic coating
5. Vinyl wraps

Performance Skills

1. Understand the importance of thoroughly cleaning the vehicle before and after repairs; select and use proper cleaning products and tools to clean the vehicle exterior, including the engine compartment, tires and wheels.
2. Understand the importance of customer satisfaction.

Standard 11 Performance Evaluation included below (Optional)

Standard 12

Students will be encouraged to participate in a relevant CTSO through the demonstration of automotive collision repair & refinishing workplace and career readiness skills. These standards will not appear on state skill certification exams, but should be taught throughout the duration of the course.

Objective 1 Students will display personal skills related to the essential values, personality traits, and personal characteristics for success in automotive collision repair & refinishing and life.

1. Integrity - demonstrate honesty and personal responsibility for actions in repairing and maintaining automotive collision repair and refinishing.
2. Work ethic - demonstrate tenacity, hard work, excellence, punctuality, meet deadlines; and be self-directed when completing tasks in the automotive collision repair and refinishing classroom or shop.
3. Professionalism - demonstrate maturity, self-confidence; and a positive image when working with teammates or clients on automotive collision repair or refinishing jobs/projects.
4. Responsibility - demonstrate dependability, consistency, and personal well-being when safely completing automotive collision repair or refinishing tasks.
5. Adaptability/Flexibility - Foster creativity, new ideas, and resilience when working to solve problems in automotive collision and repair or refinishing tasks.
6. Self-motivated - demonstrate a willingness to learn, independence, initiative, and a positive attitude when approaching new information

Objective 2 Students will display workplace skills related to the essential attitudes and abilities for success in the automotive collision repair and refinishing industry.

1. Communication - Demonstrates skills in listening and speaking; communicates professionally with teammates, supervisors, and customers in relation to automotive collision repair and refinishing.
2. Decision making - Analyzes key facts, data, and situations to employ reasoning skills for completing automotive collision repair and refinishing tasks.
3. Teamwork - Builds trusting relationships, works cooperatively with others and utilizes individual strengths of team members when completing automotive collision repair and refinishing tasks.
4. Environmental Awareness - Builds rapport with peers and fosters appropriate workplace relationships and interaction; respects differing opinions.
5. Planning, organizing, and management - Designs, prepares, and implements automotive collision repair and refinishing tasks within a desired timeframe; Sets priorities and responds to changing priorities.
6. Leadership - Builds positive relationships and mitigates conflict.

Objective 3 Students will display technical skills that are grounded in automotive collision repair and refinishing that deliver essential knowledge and competencies for success in the industry.

1. Computer and technology literacy - specific to the program area.
2. Job specific skills - specific to the program area.
3. Safety and health - specific to the program area.
4. Service orientation - responds to internal and external customers; demonstrates focus and presence; attends to personal matters away from the classroom.
5. Professional development - demonstrates openness to learn, grow, and change in the automotive collision repair and refinishing industry.

Automotive Collision Repair

Performance assessments may be completed and evaluated at any time during the course. The following performance skills are to be used in connection with the associated standards and exam. To pass the performance standard the student must attain a performance standard average of 8 or higher on the rating scale. Students may be encouraged to repeat the objectives until they average 8 or higher.

Student's Name: _____

Class: _____

Performance standards rating scale

0	Limited skills	2	→	4	Moderate skills	6	→	8	High skills	10

Standard 1 – Safety and Environmental Practices **Score:**

- Understand and demonstrate safety and environmental practices.

Standard 2 – Automotive Finishes **Score:**

- Understand automotive finishes.

Standard 3 – Refinishing Surfaces **Score:**

- Understand the principles needed to prepare a surface for refinishing.

Standard 4 – Metal Straightening **Score:**

- Understand and demonstrate metal straightening.

Standard 5 – Procedures Necessary to Finish **Score:**

- Understand the procedures necessary in the application of a finish.

Standard 6 – Detailing **Score:**

- Understand and demonstrate detailing.

Standard 7 – Detailed Damaged Report **Score:**

- Read and understand a detailed damage report.

Standard 8 – Body Fillers **Score:**

- Understand and demonstrate the use of body fillers.

Standard 9 – MIG Welding **Score:**

- Understand and demonstrate MIG welding.

Standard 10 – Vehicle Construction/ Parts Identifications **Score:**

- Understand vehicle construction parts identification.

Standard 11 – Professional Skills for the Workplace **Score:**

- Understanding of Automotive Collision Repair as a profession and will develop professional skills for the workplace

Performance standard average score:

Evaluator Name: _____

Evaluator Title: _____

Evaluator Signature: _____

Date: _____