Non-Structural Analysis and Damage 4

Course Information

Developers: Automotive Collision and Repair State Curriculum Committee


Development Date: 01/29/2014

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Credit Hours: 5

Description:

Through a variety of classroom and shop/lab learning and assessment activities, students in this course will: remove trim and hardware; install trim and hardware; repair movable glass; protect adjacent body panels; repair outer body panel; replace outer body panels; adjust outer body panels; replace mechanical and electrical components; demonstrate safety protocol appropriate for the auto repair setting, perform welding skills on non-structural damage repairs; and perform plastic and adhesive repairs.

Exit Learning Outcomes

External Standards

A By meeting any institution-required NATEF Tasks from the criteria outlined below. NATEF Guidelines of: 95% of HP-I items must be taught in the curriculum; 90% of HP-G items must be taught in the curriculum

B 2.A Preparation

C 2.B Outer Body Panel Repairs, Replacements, and Adjustments

D 2.C Metal Finishing and Body Filling

E 2.D Moveable Glass and Hardware

F 2.E Metal Welding and Cutting

G 2.F Plastics and Adhesives

H 4.A Safety Precautions
Competencies

Remove trim and hardware

Properties
Domain: Psychomotor  Level:

Linked External Standards
2.A Preparation
DAM01: Vehicle Identification, Estimating Systems, And Terminology
DAM02: Frontal Impact Analysis
DAM03: Mechanical Systems Analysis
DAM04: Restraints, Interior, Glass, Side And Rear Impact Analysis
EXT01: Bolted-On Part Replacement
EXT02: Welded And Adhesively Bonded Panel Replacement
TRM01: Trim And Hardware

You will demonstrate your competence:
- in the classroom or classroom shop setting

Your performance will be successful when:
- 2.A.1 Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. HP-I
- 2.A.2 Inspect, remove, store, and replace exterior trim and moldings. HP-I
- 2.A.3 Inspect, remove, store, and replace interior trim and components. HP-I
- 2.A.4 Inspect, remove, store, and replace non-structural body panels and components that may interfere with or be damaged during repair. HP-I
- 2.A.5 Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair. HP-G
- 2.A.6 Protect panels, glass, and parts adjacent to the repair area. HP-I

Install trim and hardware

Properties
Domain: Psychomotor  Level:

Linked External Standards
2.A Preparation
DAM01: Vehicle Identification, Estimating Systems, And Terminology
DAM02: Frontal Impact Analysis
DAM04: Restraints, Interior, Glass, Side And Rear Impact Analysis
EXT01: Bolted-On Part Replacement
DAM03: Mechanical Systems Analysis
DAM06: Steering And Suspension Damage Analysis
TRM01: Trim And Hardware

You will demonstrate your competence:
- in the classroom or classroom shop setting
Your performance will be successful when:
- 2.A.1 Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. HP-I
- 2.A.2 Inspect, remove, store, and replace exterior trim and moldings. HP-I
- 2.A.3 Inspect, remove, store, and replace interior trim and components. HP-I
- 2.A.4 Inspect, remove, store, and replace non-structural body panels and components that may interfere with or be damaged during repair. HP-I
- 2.A.5 Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair. HP-G
- 2.A.6 Protect panels, glass, and parts adjacent to the repair area. HP-I

**Repair movable glass**

**Properties**
- Domain: Psychomotor
- Level:

**Linked External Standards**
- 2.A Preparation
- 2.E Metal Welding and Cutting
- 2.D Moveable Glass and Hardware
- DAM01: Vehicle Identification, Estimating Systems, And Terminology
- DAM02: Frontal Impact Analysis
- DAM04: Restraints, Interior, Glass, Side And Rear Impact Analysis
- EDSO1: Non-Structural Supplement Diagnose electrical concerns Complete headlamp and fog/driving lamp assemblies and repairs Demonstrate self-grounding procedures for handling electronic components Determine diagnosis, inspection and service needs for brake system hydraulic components Examine components of heating and air conditioning systems Determine the inspection, service and repair needs for collision damaged cooling system components Distinguish between the under car components and systems Determine the diagnosis, inspection and service requirements of active and passive restraint systems
- EXTO1: Bolted-On Part Replacement
- EXTO2: Welded And Adhesively Bonded Panel Replacement
- FCR01: Fundamentals Of Collision Repair
- STS01: Cosmetic Straightening Steel
- TRM01: Trim And Hardware
- WCS01: Steel GMA (MIG) Welding

**You will demonstrate your competence:**
- in the classroom or classroom shop setting

**Your performance will be successful when:**
- 2.A.1 Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. HP-I
- 2.A.4 Inspect, remove, store, and replace non-structural body panels and components that may interfere with or be damaged during repair. HP-I
- 2.A.6 Protect panels, glass, and parts adjacent to the repair area. HP-I
2.E.9 Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations. HP-I
2.D.1 Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls. HP-I
2.D.2 Diagnose and repair water leaks, dust leaks, and wind noises; inspect, repair, and replace weather-stripping. HP-G
2.D.3 Inspect, repair or replace, and adjust removable, manually or power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs. HP-G
2.D.4 Inspect, remove, reinstall, and align convertible top and related mechanisms. HP-G

Protect adjacent body panels

Properties
Domain: Cognitive  Level: Application

Linked External Standards
2.A Preparation
2.B Outer Body Panel Repairs, Replacements, and Adjustments
2.E Metal Welding and Cutting
ADH01: Adhesive Bonding
CPS01: Corrosion Protection
DAM02: Frontal Impact Analysis
DAM05: Aluminum Panels And Structures Damage Analysis
EDSO1: Non-Structural Supplement Diagnose electrical concerns Complete headlamp and fog/driving lamp assemblies and repairs Demonstrate self-grounding procedures for handling electronic components Determine diagnosis, inspection and service needs for brake system hydraulic components Examine components of heating and air conditioning systems Determine the inspection, service and repair needs for collision damaged cooling system components Distinguish between the under car components and systems Determine the diagnosis, inspection and service requirements of active and passive restraint systems
FCR01: Fundamentals Of Collision Repair
FOM01: Automotive Foams
PRA01: Replacing Aluminum Exterior Panels
STA01: Cosmetic Straightening Aluminum
STS01: Cosmetic Straightening Steel
WNW01: Wind Noise And Water Leaks

You will demonstrate your competence:
- in the classroom or classroom shop setting

Your performance will be successful when:
- 2.A.1 Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. HP-I
- 2.A.2 Inspect, remove, store, and replace exterior trim and moldings. HP-I
- 2.A.3 Inspect, remove, store, and replace interior trim and components. HP-I
- 2.A.4 Inspect, remove, store, and replace non-structural body panels and components that
o 2.B.1 Determine the extent of direct and indirect damage and direction of impact; develop and document a repair plan. HP-I

o 2.E.9 Protect adjacent panels, glass, vehicle interior, etc. from welding and cutting operations. HP-I

**Repair outer body panel**

**Properties**

Domain: Psychomotor

**Linked External Standards**

2.B Outer Body Panel Repairs, Replacements, and Adjustments
2.C Metal Finishing and Body Filling
ADH01: Adhesive Bonding
CPS01: Corrosion Protection
DAM02: Frontal Impact Analysis
DAM04: Restraints, Interior, Glass, Side And Rear Impact Analysis
DAM05: Aluminum Panels And Structures Damage Analysis
EDSO1: Non-Structural Supplement Diagnose electrical concerns Complete headlamp and fog/driving lamp assemblies and repairs Demonstrate self-grounding procedures for handling electronic components Determine diagnosis, inspection and service needs for brake system hydraulic components Examine components of heating and air conditioning systems Determine the inspection, service and repair needs for collision damaged cooling system components Distinguish between the under car components and systems Determine the diagnosis, inspection and service requirements of active and passive restraint systems
EXT01: Bolted-On Part Replacement
EXT02: Welded And Adhesively Bonded Panel Replacement
FOM01: Automotive Foams
PRA01: Replacing Aluminum Exterior Panels
STA01: Cosmetic Straightening Aluminum
STS01: Cosmetic Straightening Steel

**You will demonstrate your competence:**

o in the classroom or classroom shop setting

**Your performance will be successful when:**

o 2.C.1 Remove paint from the damaged area of a body panel. HP-I

o 2.C.2 Locate and reduce surface irregularities on a damaged body panel. HP-I

o 2.C.3 Demonstrate hammer and dolly techniques. HP-I

o 2.C.4 Heat shrink stretched panel areas to proper contour. HP-I

o 2.C.5 Cold shrink stretched panel areas to proper contour. HP-I

o 2.C.6 Mix body filler. HP-I

o 2.C.7 Apply body filler; shape during curing. HP-I

o 2.C.8 Rough sand cured body filler to contour; finish sand. HP-I
Replace outer body panels

Properties
Domain: Psychomotor  Level:

Linked External Standards
2.B Outer Body Panel Repairs, Replacements, and Adjustments
DAM01: Vehicle Identification, Estimating Systems, And Terminology
DAM03: Mechanical Systems Analysis
DAM04: Restraints, Interior, Glass, Side And Rear Impact Analysis
DAM06: Steering And Suspension Damage Analysis
EXT01: Bolted-On Part Replacement
GLA01: Movable Glass
PWR01: Power Accessories
WNW01: Wind Noise And Water Leaks

You will demonstrate your competence:
- in the classroom or classroom shop setting

Your performance will be successful when:
- 2.B.2 Inspect, remove and replace bolted, bonded, and welded steel panel or panel assemblies. HP-I
- 2.B.1 Determine the extent of direct and indirect damage and direction of impact; develop and document a repair plan. HP-I
- 2.B.4 Inspect, remove, replace, and align hood, hood hinges, and hood latch. HP-I
- 2.B.5 Inspect, remove, replace, and align deck lid, lid hinges, and lid latch. HP-I
- 2.B.6 Inspect, remove, replace, and align doors, tailgates, hatches, lift gates, latches, hinges, and related hardware. HP-I
- 2.B.7 Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware. HP-I
2.B.8 Inspect, remove, replace and align front fenders, headers, and other panels. HP-I
2.B.11 Restore corrosion protection. HP-I
2.B.12 Replace door skins. HP-G
2.B.13 Restore sound deadeners and foam materials. HP-I
2.B.14 Perform panel bonding. HP-G
2.B.15 Diagnose and repair water leaks, dust leaks, and wind noise. HP-G

Adjust outer body panels

Properties
Domain: Psychomotor  Level:

Linked External Standards
2.B Outer Body Panel Repairs, Replacements, and Adjustments
DAM01: Vehicle Identification, Estimating Systems, And Terminology
DAM03: Mechanical Systems Analysis
DAM04: Restraints, Interior, Glass, Side And Rear Impact Analysis
DAM06: Steering And Suspension Damage Analysis
EXT01: Bolted-On Part Replacement
GLA01: Movable Glass
PWR01: Power Accessories
WNW01: Wind Noise And Water Leaks

You will demonstrate your competence:
- in the classroom or classroom shop setting

Your performance will be successful when:
- 2.B.2 Inspect, remove and replace bolted, bonded, and welded steel panel or panel assemblies. HP-I
- 2.B.1 Determine the extent of direct and indirect damage and direction of impact; develop and document a repair plan. HP-I
- 2.B.4 Inspect, remove, replace, and align hood, hood hinges, and hood latch. HP-I
- 2.B.5 Inspect, remove, replace, and align deck lid, lid hinges, and lid latch. HP-I
- 2.B.6 Inspect, remove, replace, and align doors, tailgates, hatches, lift gates, latches, hinges, and related hardware. HP-I
- 2.B.7 Inspect, remove, replace, and align bumper bars, covers, reinforcement, guards, isolators, and mounting hardware. HP-I
- 2.B.8 Inspect, remove, replace and align front fenders, headers, and other panels. HP-I
- 2.B.11 Restore corrosion protection. HP-I
- 2.B.12 Replace door skins. HP-G
- 2.B.13 Restore sound deadeners and foam materials. HP-I
- 2.B.14 Perform panel bonding. HP-G
- 2.B.15 Diagnose and repair water leaks, dust leaks, and wind noise. HP-G

Replace mechanical and electrical components

Properties
Domain: Psychomotor

Linked External Standards

2.A Preparation
2.D Moveable Glass and Hardware
2.E Metal Welding and Cutting

DAM01: Vehicle Identification, Estimating Systems, And Terminology
DAM03: Mechanical Systems Analysis
DAM04: Restraints, Interior, Glass, Side And Rear Impact Analysis
DAM06: Steering And Suspension Damage Analysis
EXT01: Bolted-On Part Replacement
GLA01: Movable Glass
PWR01: Power Accessories
WNW01: Wind Noise And Water Leaks

You will demonstrate your competence:
- in the classroom or classroom shop setting

Your performance will be successful when:
- 2.A.1 Review damage report and analyze damage to determine appropriate methods for overall repair; develop and document a repair plan. HP-I
- 2.A.5 Inspect, remove, store, and replace all vehicle mechanical and electrical components that may interfere with or be damaged during repair. HP-G
- 2.D.1 Inspect, adjust, repair or replace window regulators, run channels, glass, power mechanisms, and related controls. HP-I
- 2.D.2 Diagnose and repair water leaks, dust leaks, and wind noises; inspect, repair, and replace weather-stripping. HP-G
- 2.D.3 Inspect, repair or replace, and adjust removable, manually or power operated roof panel and hinges, latches, guides, handles, retainer, and controls of sunroofs. HP-G
- 2.D.4 Inspect, remove, reinstall, and align convertible top and related mechanisms. HP-G
- 2.E.10 Protect computers and other electronic control modules during welding procedures. HP-I

Demonstrate safety protocol appropriate for the auto repair setting

Properties

Domain: Cognitive  Level: Application

Linked External Standards

4.A Safety Precautions
EDS02: Refinishing Supplement
REF01: Refinishing Equipment And VOC Regulations
REF02: Surface Preparation And Masking
REF03: Color Theory, Application, Tinting, And Blending
WKR01: Hazardous Materials, Personal Safety, And Refinish Safety

You will demonstrate your competence:
Your performance will be successful when:

4.A.1 Identify and take necessary precautions with hazardous operations and materials according to federal, state, and local regulations. HP-I

4.A.2 Identify safety and personal health hazards according to OSHA guidelines. HP-I

4.A.3 Inspect spray environment to ensure compliance with federal, state and local regulations, and for safety and cleanliness hazards. HP-I

4.A.4 Select and use the NIOSH approved personal sanding respirator. Inspect condition and ensure fit and operation. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. HP-I

4.A.5 Select and use the NIOSH approved (Fresh Air Make-up System) personal painting/refinishing respirator system. Perform proper maintenance in accordance with OSHA Regulation 1910.134 and applicable state and local regulation. HP-I

4.A.6 Select and use the proper personal safety equipment for surface preparation, spray gun and related equipment operation, paint mixing, matching and application, paint defects, and detailing (gloves, suits, hoods, eye and ear protection, etc.). HP-I

Perform welding skills on non-structural damage repairs

Properties
Domain: Psychomotor

Linked External Standards

2.E Metal Welding and Cutting
ADH01: Adhesive Bonding
EXT02: Welded And Adhesively Bonded Panel Replacement
FCR01: Fundamentals Of Collision Repair
WCA01: Aluminum GMA (MIG) Welding
WCS01: Steel GMA (MIG) Welding
WCS04: Squeeze-Type Resistance Spot Welding

You will demonstrate your competence:

Your performance will be successful when:

2.E.1 Identify weldable and non-weldable materials used in collision repair. HP-I

2.E.10 Protect computers and other electronic control modules during welding procedures. HP-I

2.E.11 Clean and prepare the metal to be welded, assure good metal fit-up, apply weld-through primer if necessary, and clamp as required. HP-I

2.E.12 Determine the joint type (butt weld with backing, lap, etc.) for weld being made. HP-I

2.E.13 Determine the type of weld (continuous, butt weld with backing, plug, etc.) for each specific welding operation. HP-I

2.E.14 Perform the following welds: continuous, stitch, tack, plug, butt weld with and without backing, and fillet. HP-I
Perform plastic and adhesive repairs

Properties
Domain: Psychomotor

Linked External Standards
2.F Plastics and Adhesives
DAM02: Frontal Impact Analysis
EXT01: Bolted-On Part Replacement
EXT02: Welded And Adhesively Bonded Panel Replacement
PLA01: Plastic Welding Repair
PLA02: Plastic Adhesive Repair

You will demonstrate your competence:

Your performance will be successful when:

- 2.F.1 Identify the types of plastics; determine repairability. HP-I
- 2.F.2 Identify the types of plastic repair procedures; clean and prepare the surface of plastic parts. HP-I
- 2.F.3 Replace or repair rigid, semi-rigid, and flexible plastic panels. HP-G
- 2.F.4 Remove or repair damaged areas from rigid exterior composite panels. HP-G
- 2.F.5 Replace bonded rigid exterior composite body panels; straighten or align panel supports. HP-G