

Uniform Procedures For Collision Repair

SP51S—Pillars, C And D

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v.2.3



1. Description

This procedure describes the repair and complete or partial replacement of a steel C- or D-pillar assembly. Inspection and evaluation requirements are also included.



2. Purpose

The purpose of this procedure is to provide industry-accepted requirements for performing high-quality repair of C- or D-pillar assemblies. This procedure is intended for use by professionals who are qualified through training and experience.



3. Referenced Documents

The following documents are considered part of this procedure by reference.

3.1 Procedures

- CP01S Corrosion Protection
- ME01 Three-Dimensional Measuring
- PS01 Personnel Safety
- RF01S Surface Preparation
- RF41 Finish Application
- ST01S Stress-Relieving Heat Limitations
- ST11 Structural Straightening
- ST21S Metal Repair
- WE01S GMA (MIG) Plug Weld
- WE11S GMA (MIG) Fillet Weld
- WE21S GMA (MIG) Butt Joint With Backing
- WE51S Squeeze-Type Resistance Spot Weld

3.2 Other Information

- Vehicle-specific dimension specifications
- Vehicle-specific repair information



4. Equipment And Material Requirements

4.1 Straightening And Measuring Equipment

Use straightening equipment as described in **ST11**.

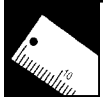
Use measuring equipment as described in **ME01**.

4.2 Welding Equipment

Use GMA (MIG) welding equipment as described in **WE01S**, **WE11S**, or **WE21S**.

Use **squeeze-type resistance spot welding (STRSW)** equipment as described in **WE51S**.

Note: Some vehicle makers recommend against the use of STRSW for replacing **spot welds**.



5. Damage Analysis

5.1 General Damage

Inspect a C- or D-pillar for these types of damage:

- visible damage
- corrosion**
- improper previous repairs
- dimensional misalignment
- damaged finish

Determine how much of the pillar can be straightened, and the portion that must be replaced. Verify the availability of replacement parts. Refer to the vehicle maker's **body repair manual** for recommended joint locations.



6. Personnel Safety

6.1 General Safety

General safety information is in **PS01**.

6.2 Straightening Safety

Straightening safety information is in **ST11**.

6.3 Welding Safety

Welding safety information is in **WE01S**, **WE11S**, **WE21S**, or **WE51S**.



7. Environmental Safety

Does not apply.



8. Vehicle Protection

8.1 Stress-Relieving

If heat is used for stress-relieving, use temperature-measuring methods as described in **ST01S**.

Note: Some vehicle makers recommend against the use of heat for stress-relieving.

8.2 Electronic Parts

To protect computers and other sensitive parts from damage:

- Follow the vehicle maker's recommendations for recording and resetting **electronic memories**.
- Ensure that the ignition is in the LOCK position, and the key is removed.
- Disconnect and isolate the negative battery cable, and disarm the **passive restraint system**. Follow the vehicle maker's recommendations.
- Carefully remove computer modules from the weld area when welding or heating within 300 mm (12"), or a greater distance when recommended by the vehicle maker.

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8. Vehicle Protection (cont'd)

- Protect computer modules, connectors, and wiring from dirt, heat, static electricity, and moisture.
- Loosen or remove any wiring harnesses or electrical parts that could be damaged during the repair process.

Remove the battery if it is in an area to be welded or heated.

8.3 Adjacent Areas

Protect glass, upholstery, and other cosmetic areas from welding, grinding, or cutting sparks. Remove interior trim and adjacent parts that cannot be protected.

8.4 Sectioning Guidelines

Do not section in or near these areas:

- holes larger than 3 mm (1/8")
- compound shapes** or structures
- areas where proper welding cannot be performed
- hinge or striker mounting locations
- seat belt mounting anchor bolts/plates

Note: Do not section inner reinforcements unless recommended by the vehicle maker.



9. Repair Procedure

9.1 Straightening

To straighten a C- or D-pillar assembly:

1. Make sure the vehicle is properly anchored to the straightening system.
2. Make upperbody measurements to determine the location of the C- or D-pillar assembly.
3. Make door opening and other upperbody measurements to determine the location of the surrounding structure.

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9. Repair Procedure (cont'd)

- ❑ 4. Use **multiple pulls** and stress-relieving to return the C- or D-pillar and surrounding structure to proper dimensions. Follow the repair and **tolerance** recommendations of the vehicle maker. If no recommendations are given, use a tolerance of ± 3 mm ($\frac{1}{8}$ "). Use a **three-dimensional measuring system** and adjacent panels to verify that the part is properly aligned.
- ❑ 5. If heat is used for relieving stress, follow the vehicle maker's temperature and time recommendations. If the part cannot be identified as **mild steel**, treat it like **high-strength steel (HSS)**.
Note: Some vehicle makers recommend against the use of heat for stress-relieving.
- ❑ 6. Plan to replace any areas that are **kinked**, have stress cracks, or develop cracks during straightening. If complete replacement is required, see **9.2** and **9.3**. For sectioning, see **9.4** and **9.5**.
- ❑ 7. Apply corrosion-resistant primer to all interior and exterior surfaces and other areas damaged by the collision, repairs, or anchoring.
- ❑ 8. Apply **seam sealers**, as necessary, to seal the joints and restore the appearance. Reprime if required by the product maker.
- ❑ 9. Replace **foam fillers**, if necessary. Follow the vehicle maker's recommendations.
- ❑ 10. Apply **anti-corrosion compounds** to all enclosed areas.
- ❑ 11. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance. Refinish **cosmetic surfaces** after all body repairs are complete.
- ❑ 12. Continue vehicle reassembly.

9.2 Complete C- Or D-Pillar Removal

Removal of the C- or D-pillar may also include removal of the quarter panel. To remove a complete pillar assembly:

- ❑ 1. Perform upperbody measurements and adjacent panel alignment and straightening. See **9.1**.
- ❑ 2. Identify areas of overlapped panels to ensure that the replacement panel will be in the same relative position.
Note: It may be necessary to remove undamaged structural parts such as the quarter panel, rocker panel, or reinforcements to replace the pillar.
- ❑ 3. Identify and mark all spot weld locations.
- ❑ 4. Determine the cut location to separate the pillar from the quarter panel, if applicable.
- ❑ 5. Determine the cut location to separate the roof-to-pillar seam, if applicable.

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9. Repair Procedure (cont'd)

- 6. Remove the spot welds. Do not damage the parts attached to the C- or D-pillar which are not to be replaced.
- 7. Cut the panels slightly longer than the final cut locations. Avoid creating a large **heat-affected zone**.
- 8. Remove the damaged pillar. Do not discard any labels until replacements are obtained.
- 9. Remove any burrs or spot weld **nuggets** from the mating surfaces and repair any damage. Avoid removing any **zinc coating**.
- 10. Remove any foam fillers from the weld joint areas, if necessary. Follow the vehicle maker's recommendations.
- 11. Straighten the mating panel edges, if necessary to ensure a proper fit-up with the replacement pillar.

9.3 Complete C- Or D-Pillar Installation

To install a complete replacement C- or D-pillar assembly:

- 1. Perform a trial fit of the replacement parts.
- 2. Clean the mating surfaces. Avoid removing any zinc coating.
- 3. Refer to the vehicle maker's body repair manual for the recommended welding method. STRSW should be used only when recommended by the vehicle maker.
- 4. Refer to the vehicle maker's recommendation for the location, number, and size of **plug weld** holes. If no recommendations are available, punch or drill 8 mm ($\frac{5}{16}$ ") holes in the replacement panel at the same locations used originally by the vehicle maker. If using a lap joint, allow for a 6 mm ($\frac{1}{4}$ ") overlap. If STRSW is used, refer to the vehicle maker's recommendations for the electrode diameter, weld locations and spacing, etc.
- 5. Test-fit the replacement pillar and clamp it in place.
- 6. Remove the replacement pillar from the vehicle.
- 7. Apply **weld-through primer** to all weld mating surfaces that do not have zinc coating, or where the zinc coating was removed. Follow the vehicle maker's recommendations. Due to the poor adhesion property of some weld-through primers, it may have to be removed from all exposed surfaces after welding, before applying other coatings and sealants.
- 8. Apply **weld-bond adhesive** when recommended by the vehicle maker.
- 9. Position the pillar on the vehicle and clamp it in place.
- 10. Use a three-dimensional measuring system and adjacent panels to verify that the pillar is properly aligned.
- 11. **Tack weld**, or securely hold, the pillar in position.

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9. Repair Procedure (cont'd)

- 12. Recheck the alignment with the measuring system and adjacent panels.
- 13. Make test welds, before welding on the vehicle, using the same type and thickness metal that will be welded on the vehicle. Make the test welds in the same position as the welds on the vehicle, using weld-through primer if applicable. Visually inspect and destructively test the welds before welding on the vehicle.
- 14. Make the required welds.
- 15. Use the three-dimensional measuring system and adjacent panels to verify that the pillar is still properly aligned.
- 16. **Dress the welds**, if necessary.
- 17. Apply corrosion-resistant primer to all interior and exterior surfaces and all other areas damaged by the collision, repairs, or anchoring.
- 18. Apply seam sealers, as necessary, to seal the joints and restore the appearance. Reprime if required by the product maker.
- 19. Replace foam-fillers, if necessary. Follow the vehicle maker's recommendations.
- 20. Apply anti-corrosion compounds to all enclosed areas.
- 21. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance. Refinish cosmetic surfaces after all body repairs are complete.
- 22. Install any labels previously removed.
- 23. Continue vehicle reassembly.

9.4 Partial C- Or D-Pillar Removal

To remove the damaged portion of a C- or D-pillar:

- 1. Complete upperbody measurements and adjacent panel alignment and straightening. See **9.1**.
- 2. Identify areas of overlapped panels to ensure that the replacement panel will be in the same relative position.
Note: It may be necessary to remove undamaged structural parts such as the quarter panel, rocker panel, or reinforcements to replace the pillar.
- 3. Select the cut locations on the upper and lower pillar based on the damage and construction of the pillar. Follow the vehicle maker's recommendations and the sectioning location guidelines described in **8.4**.
- 4. Measure and mark the cut locations.
- 5. Cut the undamaged portion of the pillar slightly longer than the final cut locations. Avoid creating a large heat-affected zone.
- 6. Remove any foam fillers from the weld joint areas, if necessary. Follow the vehicle maker's recommendations.

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9. Repair Procedure (cont'd)

- 7. Identify and mark the spot weld locations of the portion to be removed.
- 8. Remove the spot welds. Do not damage the parts that are attached to the pillar which are not to be replaced.
- 9. Remove the cutout portion of the pillar from the vehicle. Do not discard any labels until replacements are obtained.
- 10. Trim the remaining edges of the pillar to the exact cut locations.
- 11. Remove all burrs or spot weld nuggets from the mating surfaces, and repair all damage. Avoid removing any zinc coating.
- 12. Straighten the mating panel edges, if needed to ensure a proper fit-up with the replacement portion.

9.5 Partial C- Or D-Pillar Installation

To install a partial C- or D-pillar:

- 1. Compare the replacement part to the original part by visual inspection and measuring. Measure across the area to be sectioned using three or more reference points, such as holes, notches, weld seams, or feature lines. If no **reference points** exist on the replacement part, make reference marks on both parts.
- 2. Cut the replacement pillar to the proper length and shape for the type of joint recommended by the vehicle maker. The type of joint selected may require the use of an insert.
- 3. Clean the mating surfaces. Avoid removing any zinc coating.
- 4. Refer to the vehicle maker's body repair manual for the recommended welding method. STRSW should be used only when recommended by the vehicle maker.
- 5. Refer to the vehicle maker's recommendation for the location, number, and size of plug weld holes. If no recommendations are available, punch or drill 8 mm ($\frac{5}{16}$ ") holes in the replacement panel at the same locations used originally by the vehicle maker. If using a lap joint, allow for a minimum of 6 mm ($\frac{1}{4}$ ") overlap. If STRSW is used, refer to the vehicle maker's recommendations for the electrode diameter, weld locations and spacing, etc.
- 6. Test-fit the partial pillar and clamp it in place.
- 7. Remove the partial pillar from the vehicle.
- 8. Apply weld-through primer to all weld mating surfaces that do not have zinc coating, or where the zinc coating was removed. Follow the vehicle maker's recommendations. Due to the poor adhesion property of some weld-through primers, it may have to be removed from all exposed surfaces after welding, before applying other coatings and sealants.

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9. Repair Procedure (cont'd)

- 9. Apply weld-bond adhesive when recommended by the vehicle maker.
- 10. Position the partial pillar on the vehicle and clamp it in place.
- 11. Use a three-dimensional measuring system and adjacent panels to verify that the pillar is properly aligned.
- 12. Tack weld, or securely hold, the pillar in position.
- 13. Recheck the alignment with the measuring system and adjacent panels.
- 14. Make test welds, before welding on the vehicle, using the same type and thickness metal that will be welded on the vehicle. Make the test welds in the same position as the welds on the vehicle, using weld-through primer if applicable. Visually inspect and **destructively test** the welds before welding on the vehicle.
- 15. Make the required welds.
- 16. Use the three-dimensional measuring system and adjacent panels to verify that the pillar is still properly aligned.
- 17. Dress the welds, if necessary.
- 18. Apply corrosion-resistant primer to all interior and exterior surfaces damaged by the collision, repairs, or anchoring.
- 19. Apply seam sealers, as necessary, to seal the joints and restore the appearance. Reprime if required by the product maker.
- 20. Replace foam-fillers, if necessary. Follow the vehicle maker's recommendations.
- 21. Apply anti-corrosion compounds to all enclosed areas.
- 22. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance.
- 23. Install any labels previously removed.
- 24. Continue vehicle reassembly.



10. Use Of Recycled (Salvage) Parts

10.1 Inspection Of **Salvage Parts**

Do not install a salvage C- or D-pillar having any of these defects:

- unrepairable damage
- corrosion that has caused pitting
- improper previous repairs
- missing mounting locations

10.2 Preparation Of Salvage Parts

To prepare a salvage C- or D-pillar for installation:

- Clean the part to remove dirt, wax, grease, undercoating, corrosion, etc.
- Make any necessary repairs.
- Remove all heat-affected zones.
- Trim the part to fit.
- Make sure the part is not deformed along the weld joints.



11. Inspection And Testing

11.1 Inspection Of A Repaired Or Replaced Pillar

Inspect a repaired or replaced C- or D-pillar for these conditions:

- dimensional alignment
- weld quality
- proper finish appearance and film thickness
- proper application of corrosion protection
- proper alignment to adjacent panels
- proper installation of all labels.

Correct any defects.