



SP05S

Front Strut Tower And Apron

**Uniform
Procedures For
Collision Repair
UPCR**

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v.4.0



1. Description

This procedure describes the repair and complete or partial replacement of a steel front strut tower and apron 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 front strut tower and apron 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
- WA01 Wheel Alignment, Front
- WE01S GMA (MIG) Plug Weld
- WE11S GMA (MIG) Fillet Weld
- 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** or **WE11S**.

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 strut tower and apron assembly for these types of damage:

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

Determine how much of the strut tower and apron assembly 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**, 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.
- Protect 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 surfaces from welding, grinding, or cutting sparks. Remove interior trim and adjacent parts that cannot be protected.



9. Repair Procedure

9.1 Straightening

To straighten a front strut tower and apron assembly:

1. Make sure the vehicle is properly anchored to the straightening system.
2. Make underhood measurements to determine the location of the strut tower and apron assembly.
3. Make underbody and upperbody measurements to determine the location of the surrounding structure.

(cont'd)



9. Repair Procedure (cont'd)

- ❑ 4. Use multiple pulls and stress-relieving to return the strut tower and apron assembly and the 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 ($1/8$ "). 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. Apply anti-corrosion compounds to all enclosed areas.
- ❑ 10. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance. Refinish cosmetic surfaces after body repairs are complete.
- ❑ 11. Continue vehicle reassembly.

9.2 Complete Assembly Removal

To remove a complete front strut tower and apron assembly:

- ❑ 1. Perform underhood 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 radiator support or reinforcements to replace the panel.
- ❑ 3. Identify and mark all spot weld locations.
- ❑ 4. Remove the spot welds. Do not damage the parts attached to the strut tower and apron assembly which are not to be replaced.
- ❑ 5. Remove the damaged strut tower and apron assembly. Do not discard any labels until replacements are obtained.
- ❑ 6. Remove any burrs or spot weld nuggets from the mating surfaces. Avoid removing any zinc coating.
- ❑ 7. Straighten the mating panel edges, if necessary to ensure a proper fit-up with the replacement assembly.

(cont'd)



9. Repair Procedure (cont'd)

9.3 Complete Assembly Installation

To install a complete replacement front strut tower and apron 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 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.
- 5. Test-fit the replacement strut tower and apron panel assembly, and clamp it in place.
- 6. Remove the replacement assembly 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 assembly on the vehicle and clamp it in place.
- 10. Use a three-dimensional measuring system and adjacent panels to verify that the assembly is properly aligned.
- 11. Tack weld, or securely hold, the strut tower and apron assembly in position.
- 12. Recheck the alignment using the measuring system and the 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 strut tower and apron assembly is still properly aligned.
- 16. Dress the welds, if necessary.
- 17. Apply corrosion-resistant primer to all interior and exterior surfaces and 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. Apply anti-corrosion compounds to all enclosed areas.
- 20. Refinish areas damaged by the collision, repairs, or anchoring, as required to restore the appearance. Refinish cosmetic surfaces after all body repairs are complete.
- 21. Install any labels previously removed.
- 22. Continue vehicle reassembly.

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9. Repair Procedure (cont'd)

9.4 Partial Assembly Removal

To remove the damaged portion of the front strut tower and apron assembly for partial replacement:

- 1. Perform underhood 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 radiator support or reinforcements to replace the panel.
- 3. Select the cut location based on the repair procedure.
- 4. Measure and mark the cut location.
- 5. Cut the undamaged portion of the front strut tower and apron assembly slightly longer than the final cut location. Avoid creating a large heat-affected zone.
- 6. Identify and mark the spot weld locations of the portion to be removed.
- 7. Remove the spot welds. Do not damage the parts that are attached to the strut tower and apron assembly if they are not to be replaced.
- 8. Remove the cutout portion of the assembly from the vehicle.
- 9. Trim the remaining edges of the assembly to the exact cut location.
- 10. Remove all burrs or spot weld nuggets from the mating surfaces, and repair all damage. Avoid removing any zinc coating.
- 11. Straighten the mating panel edges, if needed to ensure a proper fit-up with the replacement portion.

9.5 Partial Part Installation

To install a partial front strut tower and apron assembly:

- 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 strut tower and apron to the proper length and shape for the type of joint recommended by the vehicle maker.
- 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 outer 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 replacement strut tower and apron panel assembly and clamp it in place.

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9. Repair Procedure (cont'd)

- 7. Remove the partial strut tower and apron from the vehicle.
- 8. Apply weld-through primer to all mating weld 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.
- 9. Apply weld-bond adhesive when recommended by the vehicle maker.
- 10. Position the partial strut tower and apron on the vehicle and clamp it in place.
- 11. Use a three-dimensional measuring system and adjacent panels to verify that the assembly is properly aligned.
- 12. Tack weld, or securely hold, the assembly in position.
- 13. Recheck the alignment using the measuring system and the 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 that will be used 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 assembly is still properly aligned.
- 17. Dress the welds, if necessary.
- 18. Apply corrosion-resistant primer to all interior and exterior surfaces and other areas 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. 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.



10. Use Of Recycled (Salvage) Parts

10.1 Inspection Of Salvage Parts

Do not install a salvage strut tower and apron assembly 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 strut tower and apron assembly for installation:

- Clean the part to remove dirt, wax, grease, undercoating, corrosion, etc.
- 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 Front Strut Tower And Apron Assembly

Inspect a repaired or replaced front strut tower and apron assembly 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
- proper installation and operation of all attached mechanical parts

Correct any defects.

A suspension alignment is required after repairing or replacing a strut tower or apron.