

GCRTA: Chassis Rework



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Property name and Top bus number: GCRTA 76000, 87000, 125000, 128000



Issue: Structural issues were reported by the customer.

Reason: Structural upgrades to enhance durability.

Solution: Reinforcing the effected area per this work instruction.

GCRTA: Chassis Rework



Effected buses: 70 buses chosen by GCRTA will be inspected and welded as required. The inspection and crack repair is detailed in this work instruction. 248 buses will be reinforced per this work instruction

Estimate repair hours/bus: 1-3 hours on the 70 buses, 10 hours on the 248 buses

Necessary parts:

U-channel, outer for 3 rd crossmember,	Part #: V01-6103-011A,	1/bus,
U-channel, inner for 3 rd crossmember,	Part #: V01-6103-111A,	1/bus,
Two angle pieces for the center of 3 rd cm,	Part #: V02-6103-001,	1/bus,
L-profile, Mud flap holder, 3 rd cm,	Part #: 511-6144-063,	1/bus,
Gusset, upper part, left (street side),	Part #: 529-6143-003,	1/bus,
Gusset, upper part, right (curb side),	Part #: 529-6143-003T,	1/bus,
Gusset, lower part, left (street side),	Part #: 529-6143-004,	1/bus,
Gusset, lower part, right (curb side),	Part #: 529-6143-004T,	1/bus,
Welding wire, ER 309LSi, dia. 0.035"	Part #: NPN,	as required,
Industrial primer,	Part #: NPN,	1 can / 10 buses,
Sikaflex 221, White, sealer,	Part #: 416.00.7311.909,	1 tube/5 buses,
Rubberized undercoating:	Part #: NPN,	1 can / 10 buses,
Penetrate test kit (cleaner-, penetrate- and developer sprays):	NPN	as required

See some pictures below about the possible usable products.



Necessary tools:

Usual hand tools (wrenches, screwdrivers, hammer, chisel, etc.) putty knife, Sika applicator gun, angle grinder, GTAW Welding machine, 1/8" and 18 mm diameter drill bits, drill, wire wheel, 40G abrasive disc, de-burr bits

Work instruction number: L3/FSV-195
L4/QUA-003

Revision: Initial

Date: 09/19/2013
Revision: Initial

SAFETY PRECAUTIONS MUST BE FOLLOWED ACCORDING TO ACCEPTED INDUSTRY STANDARDS AND LOCAL/PROPERTY REQUIREMENTS.

Stop welding 45 minutes before planning to leave the bus.

1. General Information:

- Read and understand this work instruction before start repairing buses.
- Study the repaired environment before start repairing.
- Ensure that all tools, protective equipment and parts are available.
- Departing from this work instruction without preliminary discussion is not allowed.
- Number of repaired buses, mileage and date of repairing must be recorded and reported weekly to Kalman Takacs.

2. General Preparation

- Turn off the main electric switch.
- Tag and disconnect the battery cables.
- Disconnect the ECU of engine, transmission, ABS. Disconnect the destination signs. Turn off and disconnect the PA system.
- Lift the bus and place jack stands underneath the official jack pads.
- Protect repaired area from damage, grinding spark and welding splatter.



Cover the hydraulic lifts with fire proof blankets

- Remove coating material and primer from welded surfaces by using grinding tools and wire wheels. Primary condition of good quality weld is a perfectly clean metal surface.
- Remove dust and degrease cleaned areas with acetone.

3. General Welding instruction:

3.1 Weld just a clean surface! Grind surfaces with grinding disk suitable for stainless steel material.

3.2 To prevent gas defects of the weld joints welding should be performed only in closed production area protected from currents of air.

3.3 Welding parameters according to attached WPS sheets.

3.4 Weld joints should be 100% visually inspected (VT), penetration (PT) if necessary.

3.5 Protect repaired area from damage during welding.

Make sure that no cracks are present at the area where reinforcement parts will be installed. If crack was found, then follow the steps below:

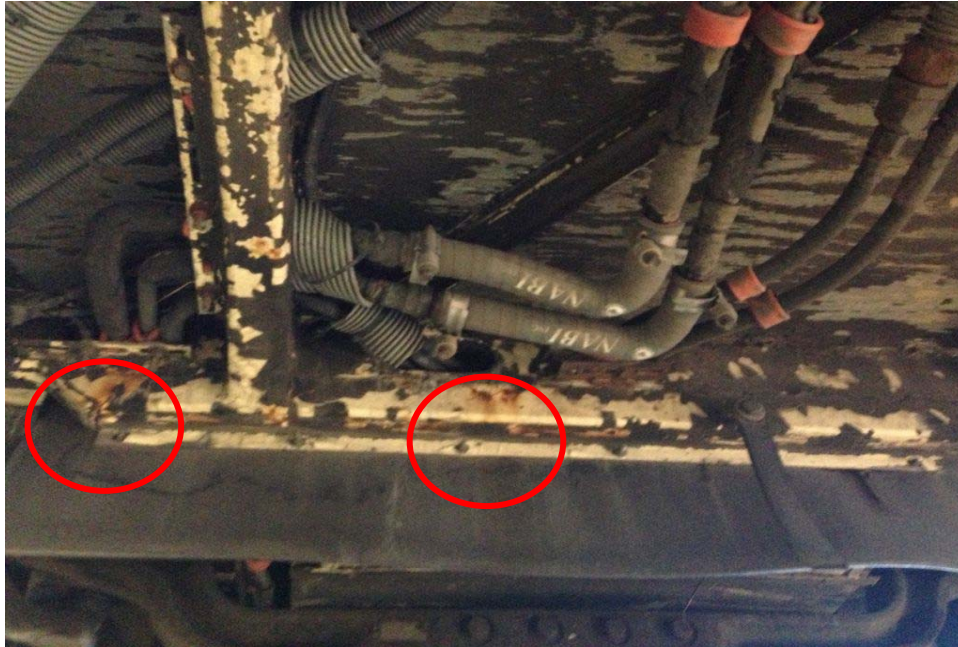
- Find the end of the crack (it is recommended to use magnifier, or PT),
- Drill a 1/8" size hole at the end of the crack,
- Bevel the crack profile 2x30° for single "V" butt (groove) weld,
- Clean the surface at the welding area (mechanical cleaning).
- Degrease surface at the welding area by using acetone or denatured alcohol.
- Weld the cracked and bevelled line with continuous weld per **WPS CL-R51**.
- Grind the weld surface until the same height as the parent metal.
- Check the welds by Visual Test and/or Penetrate Test.

Note: inspect for crack(s) at the following areas on every bus:

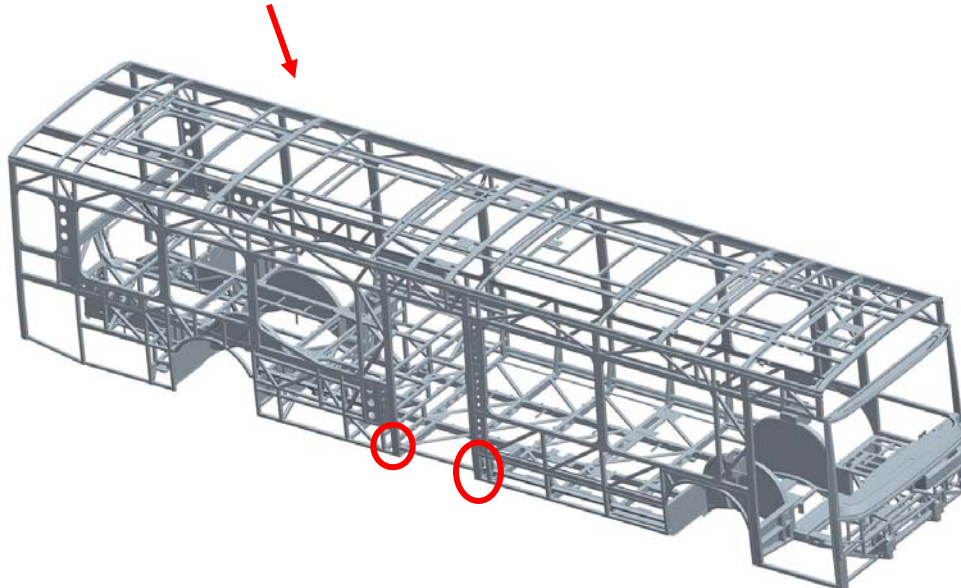
- Front radius rod brackets area (left and right sides).



- Front and rear shock absorber upper brackets area (left and right sides).
- Entire 3rd crossmember: need to check both the forward and backward surfaces of the crossmember



- Exit door lower corners.

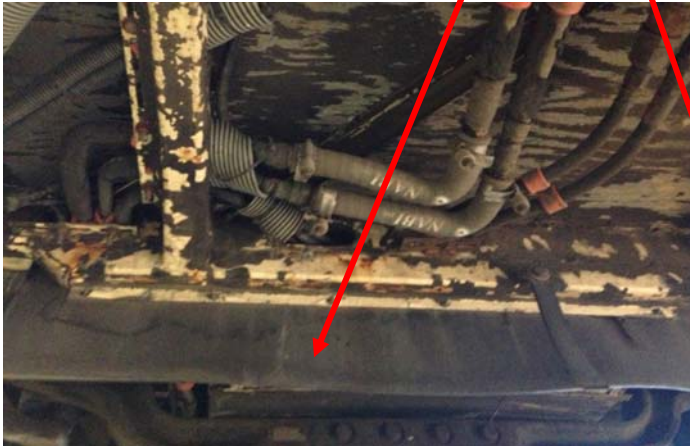


- Rear radius rod brackets area (left and right sides). See bottom left picture on the page 11.

4. Install Reinforcement Parts

4.1. 3rd crossmember rework

1. Remove mud flap on the center and street (left) side of the 3rd crossmember.



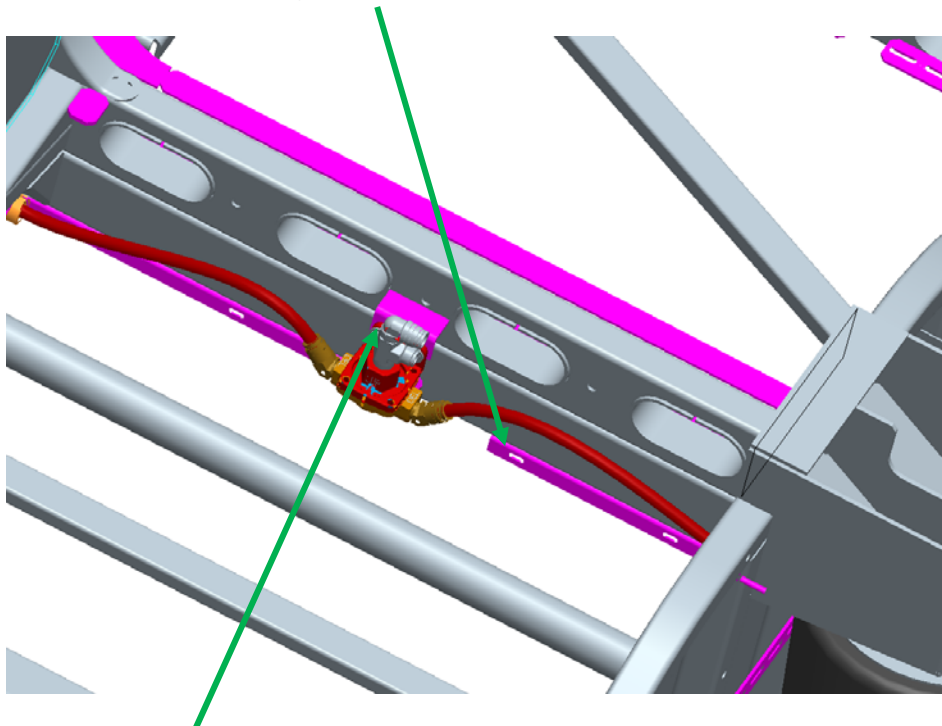
2. Remove QR valve from the front of the crossmember (see picture on the next page).
3. Cut the hose support bracket off. Do not damage this bracket because it has to be welded back later.



- Cut the closeout plate off from the left (street side) end of the lower tube of the rossmember.

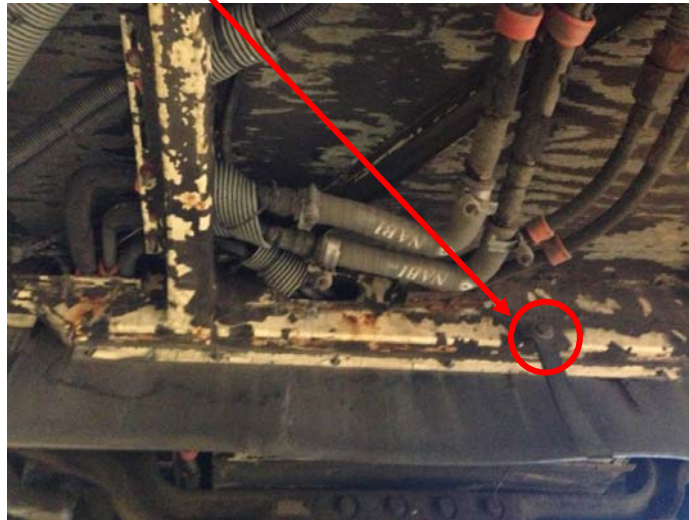


- Cut the mud flap brackets (angle pieces) off from the crossmember. Do not cut the structure!



- Cut the QR valve bracket off from the crossmember. Do not damage this bracket because it has to be welded back later.

- Cut the static strap bracket off from the crossmember. Do not damage this bracket because it has to be welded back later.

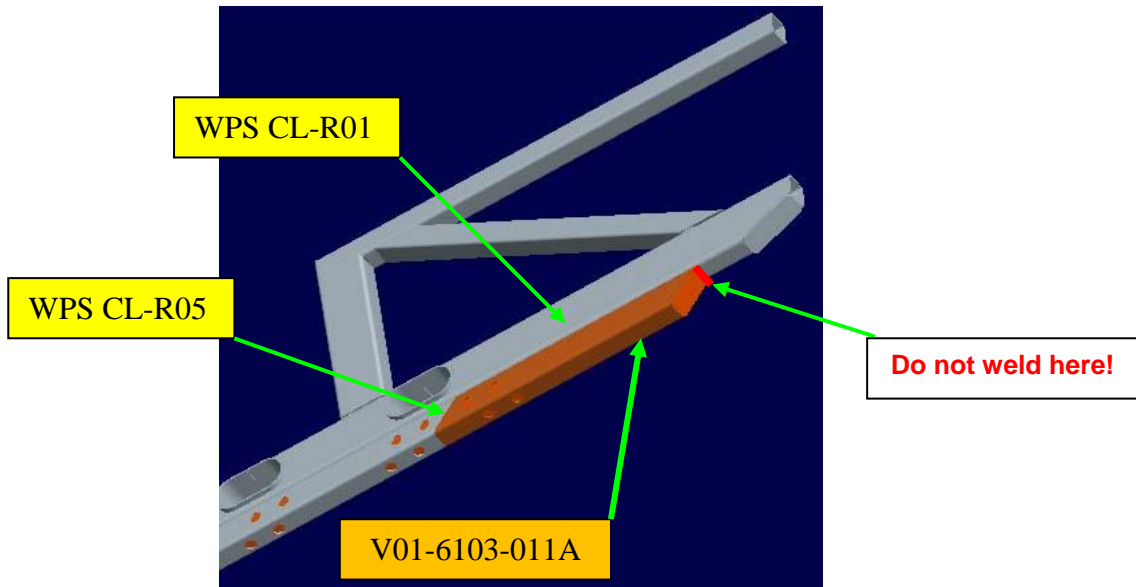
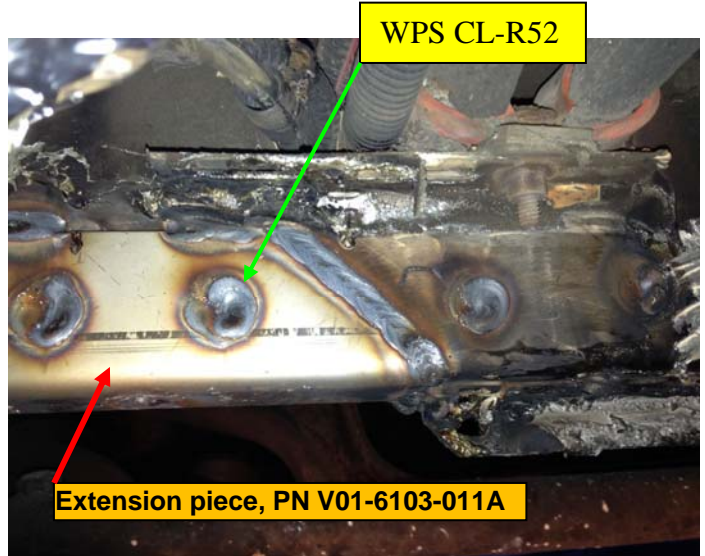


- Inspect crossmember and if crack(s) were found then prepare them according to the General Welding Instruction section. Do not weld crack(s) at this time, just prepare (drill the ends, bevel, etc.). Weld cracks only after the inner U-channel and extension pieces have been installed. See step 15.
- Drill 12 ea. 18 mm diameter holes as pictures show below.



- Grind / sand the surfaces around the welding area smooth.
- Check that the new reinforcement parts fit the structure: check position, gaps, etc. and modify as required.
- Cover nearby hoses and harnesses with fireproof blankets or aluminum foil. **Ensure that fire extinguishers are handy before start welding.**

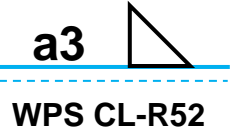
13. Plug weld the inner U-channel (PN V01-6103-111A) to the crossmember according to the **WPS CL-R52**.



14. Place the extension piece and stitch weld the upper edges of the U-channel to the 3rd crossmember according to the **WPS CL-R01**, continuous weld the joints of the extension piece and the lower tube of the crossmember according to **WPS CL-R05** and plug weld to the inner U-channel according to the **WPS CL-R52**.

15. Weld crack(s) (if any) as described at the General Welding Instruction section.

16. Install outer angle pieces (PN **V02-6103-001**) and stitch weld their upper edges to the 3rd crossmember and plug weld at the holes according to the **WPS CL-R52**.



17. Reinstall mud flap holder L-profiles (PN **511-6144-063**) with 3x1" long stitch welds per **WPS CL-R01**.

18. Reinstall QR valve bracket.

19. Reinstall static strap bracket.

20. Remove weld splatters and clean welded surfaces.

21. Check the welds by Visual Test and/or Penetrate Test.

22. Apply industrial primer. Let the primer dry. Follow instructions written on the can.



23. Apply Sikaflex 221 sealer around the stitch welded edges of the reinforcement parts.

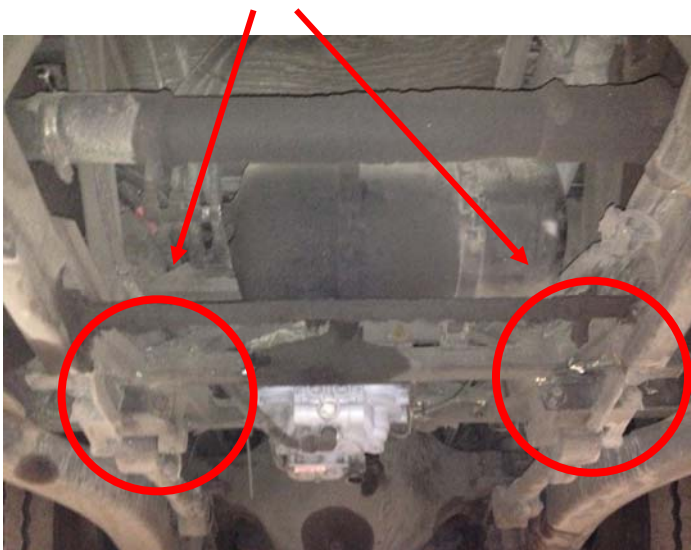
24. Apply rubberized undercoating. Follow instructions written on the can.



25. Reinstall removed parts (QR valve, mud flap, static strap).

4.2. Rear Radius Rod Bracket Area Repair

1. Locate rear radius rod brackets (left and right sides).



2. Remove clamp and pull harness/air hoses away from the work area (see below).



3. Protect nearby hoses and harnesses against sparks by using fireproof blankets or aluminum foil.
4. Clean top of the fuel tanks and cover them as well with fireproof blankets. The dirt soaked with fuel is very flammable. **Ensure that fire extinguishers are handy before start welding.**
5. Inspect rear radius rod bracket area for crack(s). Repair cracks according to the General Welding Instruction section.

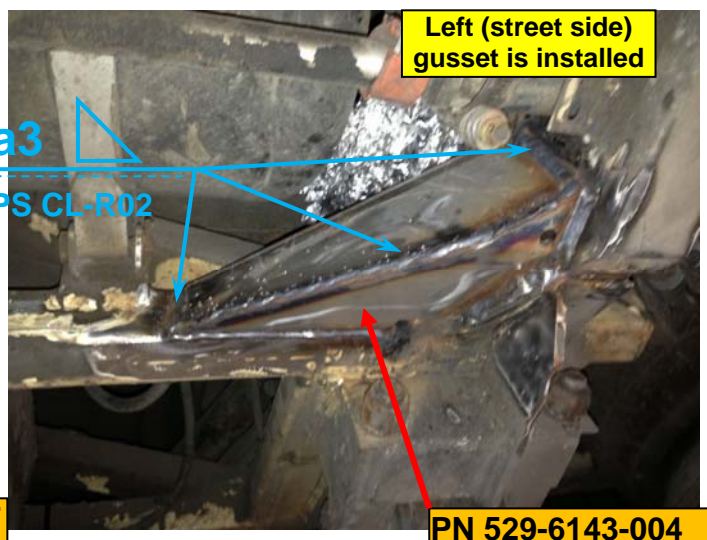
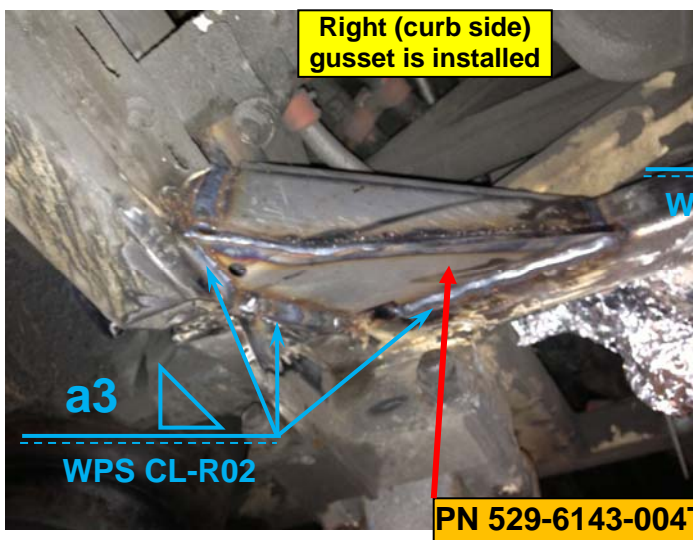


6. Remove undercoating from the structure where the gussets will be welded on.

7. Place the upper part of the gusset (PN 529-6143-003 for left side and 529-6143-003T for the right side) to the structure and check for proper gaps, position of gusset.
8. Weld upper part of the gusset per **WPS CL-R02**.



9. Place lower part of the gusset (PN 529-6143-004 for left side and 529-6143-004T for the right side) to the structure and check for proper gaps, position of gusset.
10. Weld lower part of the gusset per **WPS CL-R02**.



11. Remove weld splatters and clean welded surfaces.
12. Check the welds by Visual Test and/or Penetrate Test.

13. Apply industrial primer. Let it dry. Follow instructions written on the can.



14. Apply Sikaflex 221 sealer at the top edges of the upper gusset pieces.



Note: the Sikaflex 221 sealer must apply after the bracket is primed

15. Apply rubberized undercoating. Follow instructions written on the can.

16. Move harnesses/air hoses back to their original position and secure them with the original P-clamp. Ensure that the harnesses/hoses are not rubbing on moving components (C-frame, air bags, shock absorber and wheels).



17. Remove all tools, unused parts and blankets/aluminum foils from work area.

5. FINAL OPERATIONS

1. Present final repairing for check to delegated person.
2. Remove jack stands from underneath the bus.
3. Lower the bus, document the repairing.
4. Reconnect the ECU of engine, transmission, ABS. Reconnect the destination signs.
Reconnect the PA system.
5. Reconnect the battery cables and turn on the main electric switches.
6. Start the bus (GCRTA technician) and function test all electrical components.