Addressees:

ABC Customer Care and Parts Source
Coach Owners and Operators

Inspection Advisory Bulletin WP449- Rev. A
dd.: 16/04/2013
C2045 – Chassis

To reinforce the chassis in the drive axle area

APPLICATION:

This procedure is typical to C2045 units. Details may differ depending on the type and make of transmission installed and the year of build.

DESCRIPTION:

1. This procedure has been released to assist ABC Customer Care and Parts Source in successfully inspecting and converting coaches showing small cracks in the drive axle area. It contains guidelines to reinforce several tube joints (see Figures 1 through 3) in order to ensure the structural integrity of the chassis.
   Replacement instructions for the sloped transmission cross member have also been included (see page 2, and figure 10 on page 13).

2. If the periodic inspection of the rear underframe structure as per maintenance manual instructions reveals any small cracks in the afore-mentioned area, please refer to the following instructions and parts list outlining corrective action and repairs.

3. The parts information on page 13 (figure 10) of this procedure should be copied and inserted in the relevant section of the coach Owner's/Operator's Spare Parts Manual.

PARTS AND PRODUCTS:

Retrofit parts

- **Order one reinforcing kit VH 11053288 for one coach to modify.**
  - **The kit 11053288 is suited for C units and contains the following parts:**

VH reference	Description	Qty	Refer to
VH 11043238	Gusset, luggage compartment bulkhead post	6	Figure 4 and figure 5
VH 11043239	Angle, to complement VH 11043238	4	Figure 5
VH 11044727	Gusset, front tube tying lower cross member to chassis rail, LH	1	Figure 7
VH 11044753	Gusset, front tube tying lower cross member to chassis rail, RH	1	Figure 7
VH 11043241	Gusset, rear tube tying leg assembly to chassis cross member and to side frame.	6	Figure 4A and 8

- **The following items can be ordered separately:**
  1. if the inspection shows damaged or broken cross members (figure 10 page 13)

     NOTE: For this repair you may require
     either
     cross member VH 11046326 (length: 29-27/32 inch between mounting flanges)
     or,
     cross member VH 11044968 (length: 30-33/64 inch between mounting flanges).

     State cross member length or part number when ordering.

     Note: Cross member 8 and 7/13 (see figure 10, page 13) should always be installed to reinforce the anchor point of the suspension arms of the tag axle.

  2. if, due to the missing angles VH 11044727 and 11044753 in figure 7 page 11, you have seen damaged or broken longitudinal members M1 and/or M2 figure 9 page 12, you have to install the saddle brackets 11359279 and 11359280 figure 11, 12 and 13.
     Note: these saddle brackets don't have to be installed if there is no damage seen at these longitudinal members.

VH reference	Description	Qty	Refer to
See note on top	Cross member, transmission lower, reinforced	1	Figure 10
VH 10846850	Spacer for VH 11046326/VH 11044968, 3/64-inch (1 mm)	#	
VH 10846852	Spacer for VH 11046326/VH 11044968, 5/64-inch (2 mm)	#	
VH 660226501	Bolt, M12 x 1.75 x 30 mm, grade 8.8	6	
VH 660207406	Nut, self-locking, M12 x 1.75 mm, grade 8.8	6	
VH 11359279	Saddle bracket to complement VH 11359383 RHS figure 11	1	Figure 12
VH 11359280	Saddle bracket to complement VH 11359383 LHS figure 11	1	Figure 13

- Parts may be purchased through regular channels.
- Parts and products disposition: discard according to applicable environmental regulations.

PROCEDURE:

1. General:

- This job should be executed by an experienced welder.

- For more information refer to:

  the Maintenance Manual,
  the Spare Parts Manual,
  the Operating Manual.

2. Special tools, equipment or services:

- This job requires the use of MIG welding equipment, a 3”cutter, and an angle grinder.

3. Preparations:

- Park the coach on a level-surfaced service pit with the front wheels straight.
  If portable post lifts are going to be used, lower the suspension first.
- Apply the parking brake and shut down the engine.
- Switch off all systems and turn off the battery master switch.
- Put a “DO NOT OPERATE” tag on the instrument panel.
- Read the entire procedure before beginning to work.

CAUTION: Observe safe shop practices at all times.

4. Shop practice and safety rules:

Welding data:

Table 1: Welding data for stainless steel 304L to stainless steel, or mild steel to stainless steel
Welding data according to AWS A 5.9 ER 309 L SI • Welding wire section: 1.0 mm (0.039 inch) • Welding wire feed speed: 2.9-8.4 m/min (115-330 inch/min) • Current: 80-190 Amps • Welding gas: 98% Argon + 2% CO_2 (option: 98% Argon + 2% O_2)

Table 2: Welding data for mild steel to mild steel
Welding data according to AWS A 5.18 ER 70S-6 • Welding wire section: 1.0 mm (0.039 inch) • Welding wire feed speed: 2.9-8.4 m/min (115-330 inch/min) • Current: 80-190 Amps • Welding gas: 75% Argon + 25% CO_2 (option: 80% Argon + 20% CO_2)

NOTE: **Welding gas with a high Helium content introduces a lot of heat in the weld leading to a harder and more britle weld.**

Welding safety rules:

The following information pertaining to welding should be read before beginning any such procedure. The prohibitions and requirements contained herein must be followed during such procedure.

- Welding must be done only by a qualified and experienced person.
- It is the responsibility of the welder to make sure that his/her personal safety equipment and the welding equipment he/she is using are in a condition that will not endanger his/her health and safety or the health and safety of others.

- Adequate ground contact and barriers must be positioned as required to protect components (wiring, air-lines, hydraulic lines, fuel lines etc.) from damage due to heat, contact by weld spatter, arcing or other potentially damaging events associated with welding.
- The following precautions must be taken to protect the vehicle's electronic equipment:

  → FIRST disconnect the wires from the GND (ground) terminal of the battery equalizer.
  → Disconnect the batteries (disconnect ground cable first, reconnect ground cable last).
  → Disconnect the engine, transmission and brake system ECU's.
  → Disconnect the HVAC and combustion heater ECU's.
  → Disconnect the MUX nodes.
  → On shell units, also disconnect the suspension ECU if the vehicle is equipped with an electronic control unit.
  → For any other electronic equipment (radio, video, ICE…) refer to the OEM prescriptions.
  → Keep the ground clamp as close as possible to the work and make sure the clamp makes perfect contact with the drive axle housing.
  → Make certain the welder is properly grounded.

- Never look at the arc unless wearing a suitable helmet or face shield.
- Wear protective clothing and gloves.
- Do not permit bystanders, unless they are wearing protective gear.
- Never weld while standing in water or on damp ground.
- Have adequate ventilation.
- Do not adjust machine settings while the machine is under load.
- Keep cables tight in the sockets.
- Do not touch hot metal.
- Do not allow the welding rod/wire to touch anything but the work.
- Make sure there is nothing flammable near the working area.
- Always have a fire extinguisher of the correct type available.

Grinding safety rules:

Grinders can be dangerous. When improperly used, they are responsible for many serious and lasting injuries to the eyes, hands, face and body. Therefore you must always observe the following safety rules:

- Always wear eye protection (safety goggles, face shield). Wear leather gloves.
- Adequate barriers must be positioned as required to protect components (glass, wiring, air-lines, hydraulic lines, fuel lines, drive shaft etc.) from damage by grinding sparks.
- Before doing any grinding on the coach, thoroughly clean the affected area.
- Keep abrasive discs tight, clean and true.
- Allow grinder to reach full rpm before using.
- Do not put aside the grinder until the wheel has completely stopped revolving.
- Never strike a grinding wheel while revolving. It may shatter and explode.
- Do not grind in the presence of explosive vapors (gasoline, paint thinner, batteries…)
- Before installing a new grinding disc, disconnect the electric mains or air supply line.
- When installing a new disc make certain:

  → It is designed for the rpm of the grinder.
  → It has the correct size.
  → It is properly fixed.

- Never remove the grinding disc guard.

5. To check chassis tube joints for cracks, and to repair possible damage:

1) Underneath the coach, in the drive axle area, on both sides of the vehicle, locate the chassis tube joints of which typical examples have been provided in Figures 1, 2, and 3.

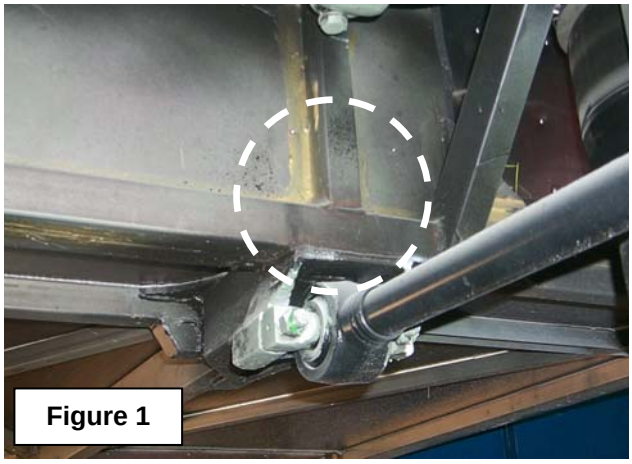


Figure 1

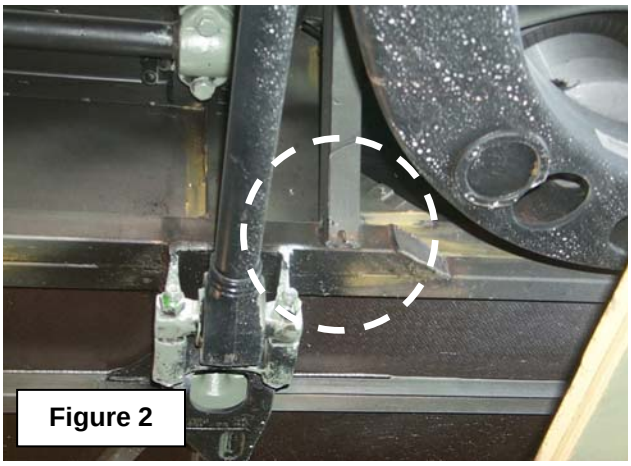


Figure 2

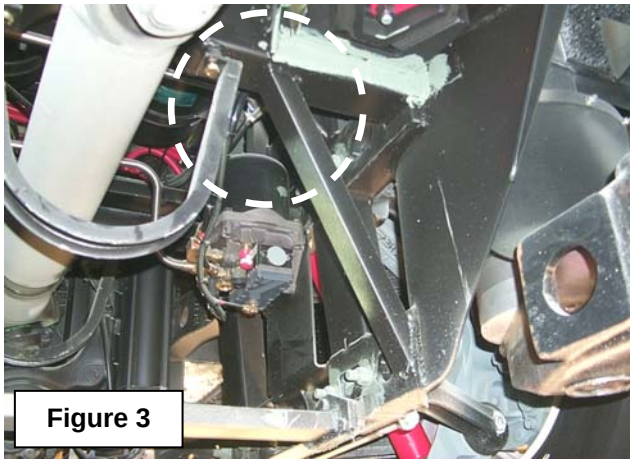


Figure 3

2) Refer to the grinding safety rules.
Using an angle grinder remove all undercoating and paint from and around the joints as shown in Figure 4.
Make sure that enough bare metal is exposed to allow detection of possible cracks.
At the same time provide a proper surface for welding on the reinforcing parts.

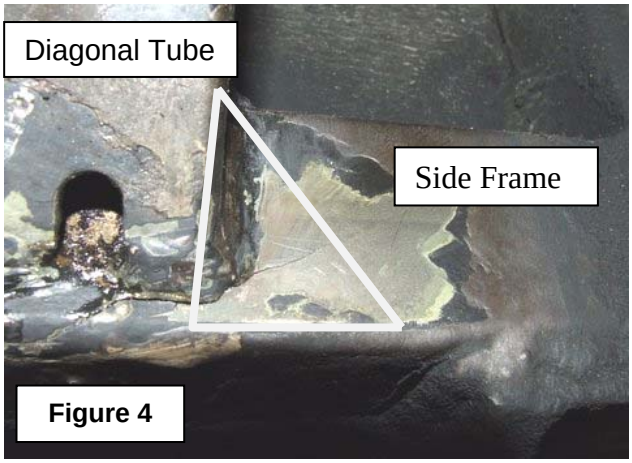


Figure 4: Diagonal tubes directly welded to side frame.
Seam weld gussets VH 11043238 to reinforce the joints of the tubes (both sides) tying the leg assemblies to the side frame member.
Always repair the cracks first of all.
(according to the information in item 3below.)

Figure 4A: additional welded cross beam introduced after April 2007.
Seam weld gussets VH 11043241 to reinforce the joints of the tubes tying the leg assemblies to the lower cross member.
Always repair the cracks first of all.(according to the information in item 3 below.)

3) If a crack is detected, drill a 5/32-inch (4 mm) diameter hole at each end of the crack to stop it from progressing any further.
With a 3-inch cutter cut through the crack along its entire length.

4) Refer to the welding data and the welding safety rules.
Seam weld the crack.
Dress the weld with a grinder.

5) Repeat steps 2 through 4 for all joints showing cracks.

6. To install reinforcing parts at the tube joints:

1) Referring to Figure 5, install gussets VH 11043238 at the bulkhead posts first.
Do not weld the gussets to the bulkhead.
Weld to the tubing only.
Tack weld the reinforcing parts in place as shown.
Seam weld the reinforcing parts by alternating between parts to avoid distortion.
Complete reinforcing by welding angles VH 11043239 to the chassis tubing and the gussets.

2) Referring to Figures 6 and 9, reinforce the lower cross member by seam welding the outer sections left and right as shown.
Welds should be approximately 3/16 inch wide.
Alternate between sections, and allow welds to cool to avoid distortion.

3) Referring to Figures 6 and 9 reinforce the cross member center section with four 1-3/4 inch long stitch welds evenly spaced.
Welds should be approximately 3/16 inch wide.
Allow to cool to avoid distortion.

4) Referring to Figure 7, install and tack weld the reinforcing parts in place as shown.
Seam weld the reinforcing parts by alternating between parts to avoid distortion.

5) Referring to Figure 8, install and tack weld the reinforcing parts in place as shown.
Seam weld the reinforcing parts by alternating between parts to avoid distortion.

6) Referring to figure 4 and 4A, install and tack weld the reinforcing parts in place as shown.

7) With all welding complete, remove welding equipment and barriers.

8) Coat the reinforcing parts and bare metal tubing with black chassis paint.
Allow to cure.

9) Finish coating the repaired joints with undercoating.

7. <u>To replace the sloped transmission cross member</u>:

1) Referring to positions 7/13, Figure 10, locate the sloped cross member underneath the transmission.

2) Take note of the cross member installation (one way orientation).

3) If fitted, undo and remove the clamp nuts securing the cooling system tubing to the center bracket.

4) Undo and remove the bolts and nuts securing the cross member to the chassis mounting pads.

5) Lower and remove the old cross member and spacers, if fitted.

6) Check that cross member length is correct for the application.
Trial fit the new reinforced cross member.

7) Without using spacers secure the new cross member with bolts and nuts to one side only in order to determine the cross member mounting flange to chassis mounting pad clearance.

8) Measure the cross member mounting flange to chassis mounting pad gap.
Determine the number of spacers required to fill the gap so as to obtain a stress-free installation of the cross member (see parts list).

9) Undo and remove the temporary fixings.
Recover the cross member.

10) Using new bolts and self-locking nuts, reinstall the cross member in the proper direction, dividing the spacers (if required) evenly left and right between the cross member mounting flanges and the chassis mounting pads.
Tighten the fasteners to a torque of 52 ft.lbf (70 Nm).
If fitted, reinstall the clamp nuts securing the cooling system tubing.
Secure hand tight.

Procedure complete.

DISCLAIMER:

The procedures contained herein are not exclusive. Van Hool cannot possibly know, evaluate, or advise the transportation industry of all conceivable ways in which a procedure may be undertaken or of the possible consequences of each such procedure. Other procedures may be as good, or better, depending upon the particular circumstances involved.
Each carrier who uses the procedures herein must first satisfy itself thoroughly that neither the safety of its employees or agents, nor the safety or usefulness of any products, will be jeopardized by any procedure selected.

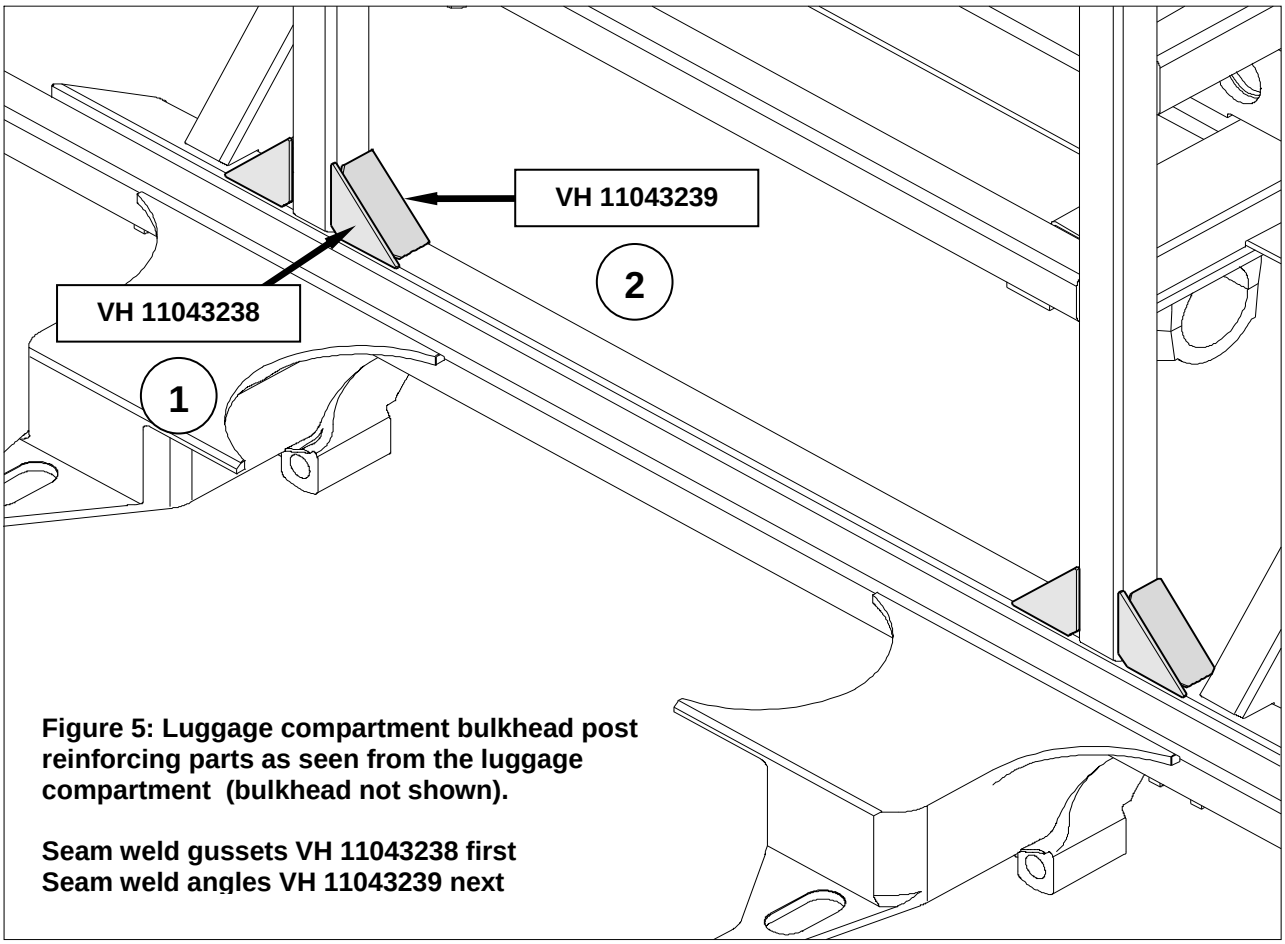


Figure 5: Luggage compartment bulkhead post reinforcing parts as seen from the luggage compartment (bulkhead not shown).

Seam weld gussets VH 11043238 first
Seam weld angles VH 11043239 next

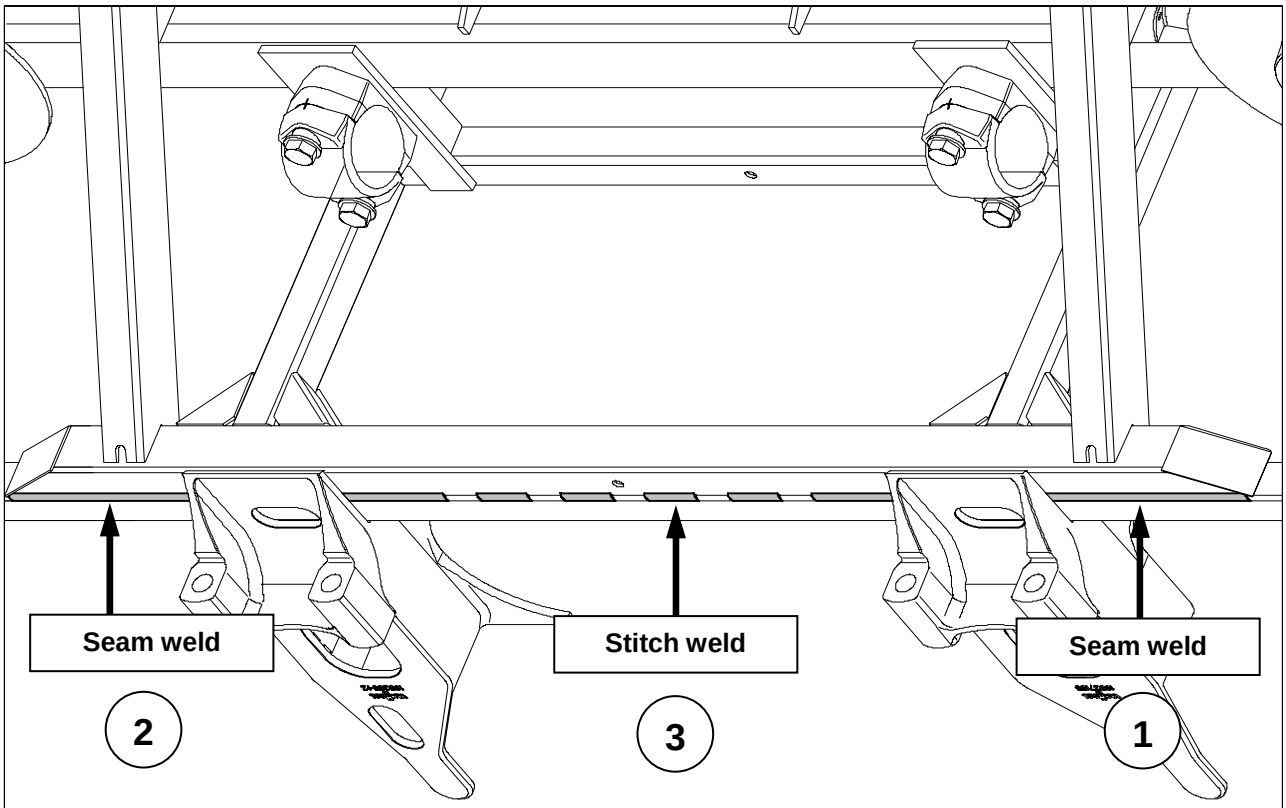


Figure 6: Seam weld lower crossmember extremities first. Stitch weld center section next.

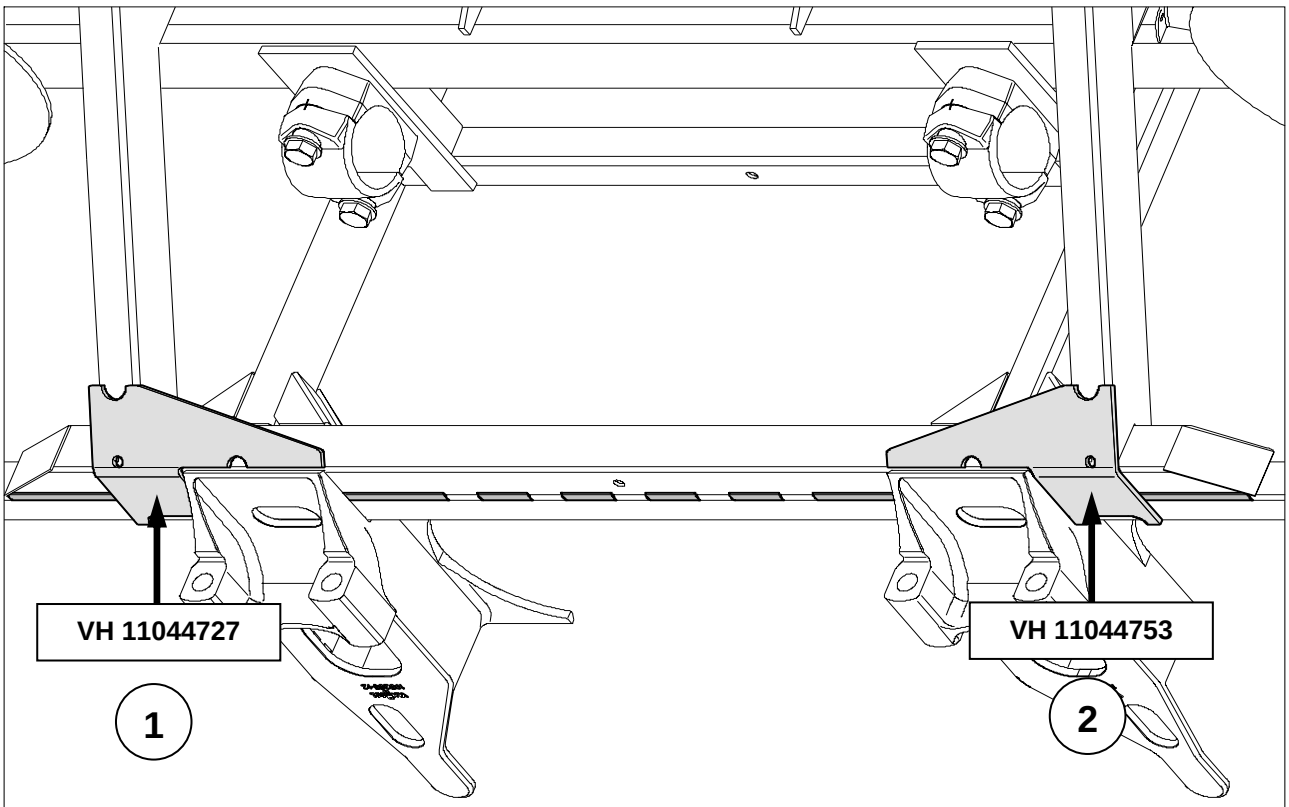


Figure 7: Install gussets VH 11044727and VH 11044753 to reinforce the joints of the tubes tying the lower crossmember to the chassis rails

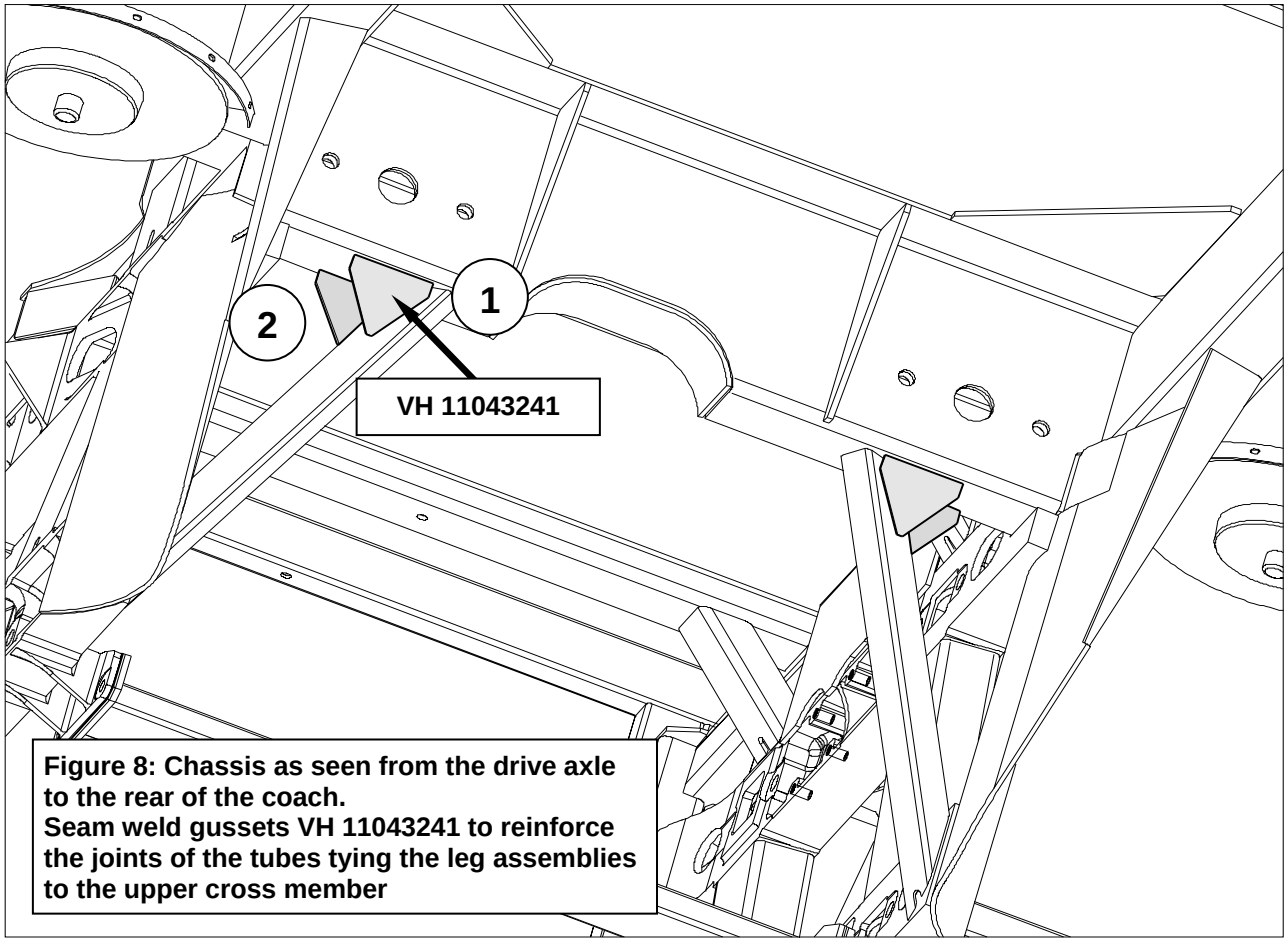


Figure 8: Chassis as seen from the drive axle to the rear of the coach.
Seam weld gussets VH 11043241 to reinforce the joints of the tubes tying the leg assemblies to the upper cross member

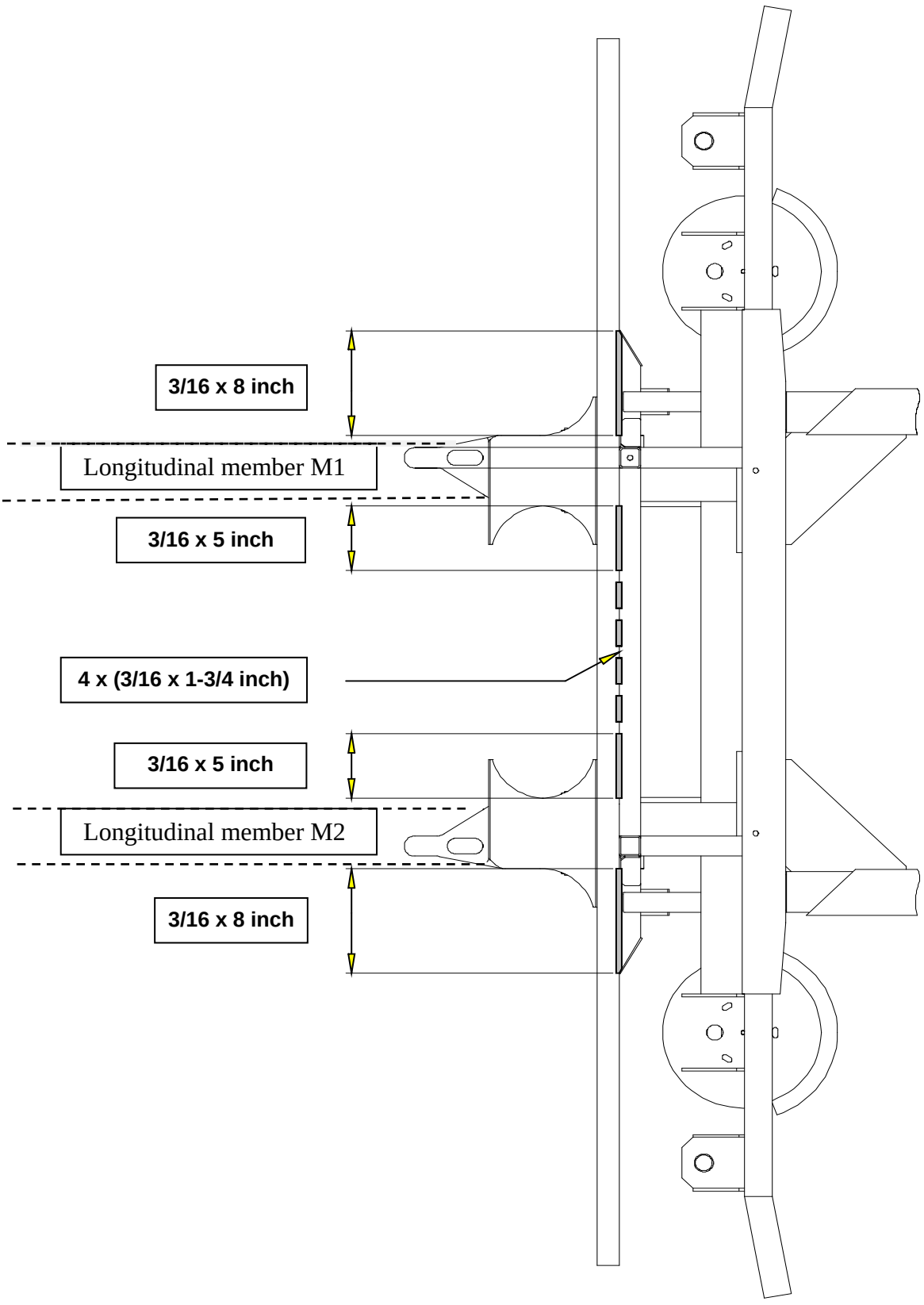
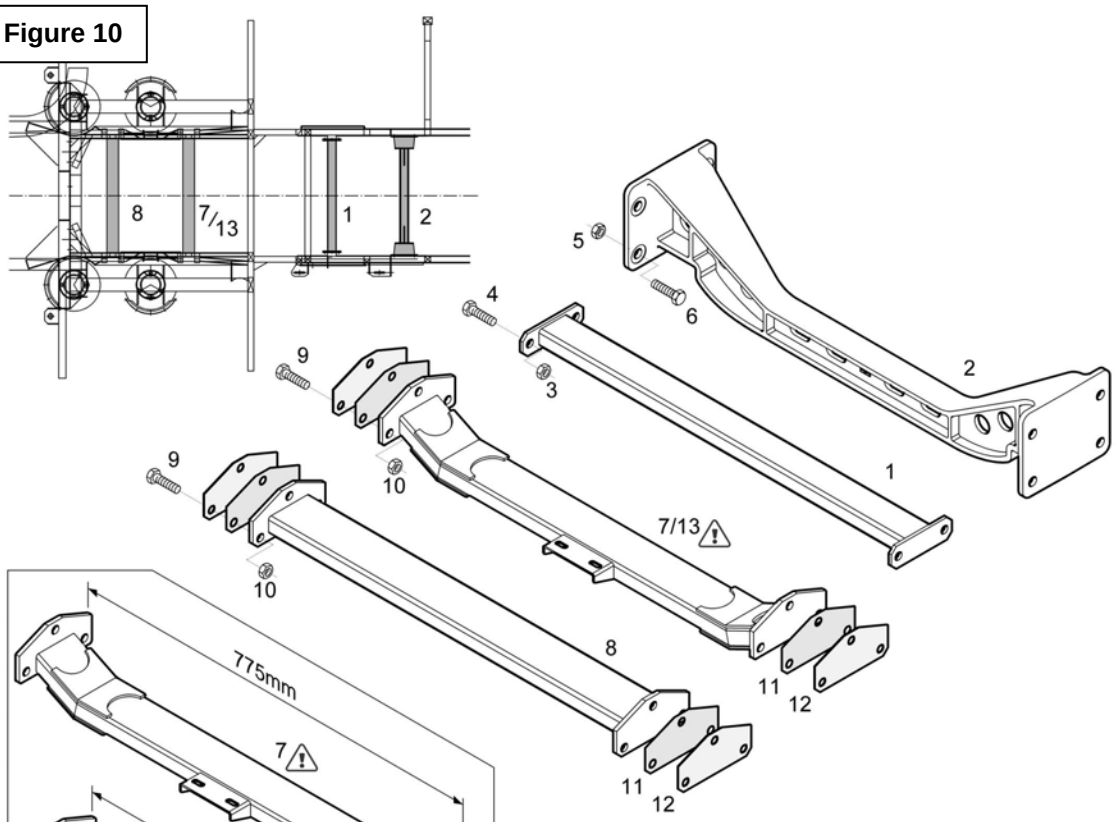


Figure 9: Lower cross member reinforcing welds

Stitch welds: 4 x (3/16 x 1-3/4 inch → center section, evenly spaced)
Seam welds: 2 x (3/16 x 8 inch → left and right hand outer section)
Seam welds: 2 x (3/16 x 5 inch → left and right hand inner section)

Figure 10



13 (758mm)	7 (775mm)
VIN T2140: 40000 - 40147 40501 - 40610	VIN T2140: 40148 → 40611 →
VIN T2145 43000 - 43500 44001 - 44300 43501 - 43999 44501 - 44614	VIN T2145 44301 → 44615 → 44801 →
VIN C2045: 45001 - 45457 45501 - 45999 46501 - 46510	VIN C2045: 45458 → 46511 → 47001 →

Pos.	Q.	Ref.N°	Description	Denominación	Spec.
1	1	10672652	Crossmember	Travesaño	
2	1	10671117	Crossmember	Travesaño	
3	4	660207406	Lock nut	Tuerca de frenado	DIN 980 M12x1,75 k.=8.8
4	4	660226601	Screw	Tornillo	DIN 933 M12x1.75x35mm k.=8.8
5	8	660207206	Lock nut	Tuerca de frenado	DIN 980 M14x2,00 k.=8.8
6	8	660228014	Screw	Tornillo	DIN 933 M14x30 k.=8.8
7	1	11044968	Crossmember	Travesaño	775mm
8	1	11044954	Crossmember	Travesaño	
9	12	660226501	Screw	Tornillo	DIN 933 M12x1,75x30 k.=8.8
10	12	660207406	Lock nut	Tuerca de frenado	DIN 980 M12x1,75 k.=8.8
11	#	10846850	shim	Placa de ajusta	d.=1mm
12	#	10846852	shim	Placa de ajusta	d.=2mm
13	1	11046326	Crossmember	Travesaño	758mm

VANHOOL

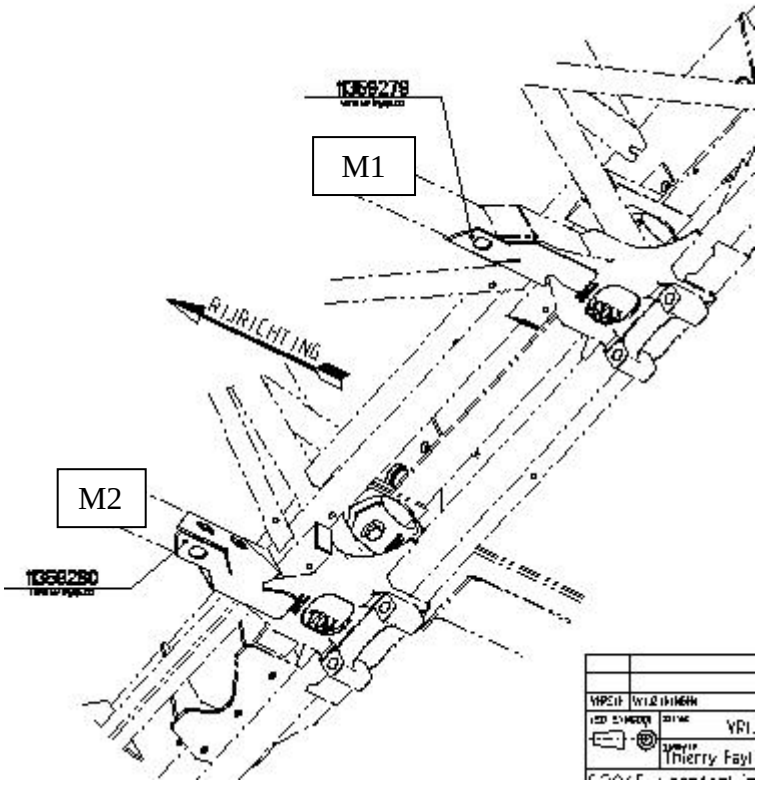
Underframe assembly - crossmembers

Conjunto de bastidor - traversaños

2007-02-16

1038.06-1002

[

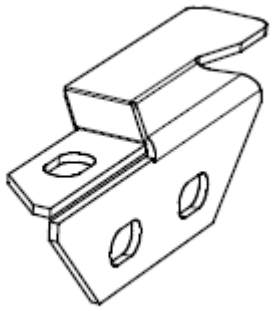


VH drawing 11359383

Both saddle brackets should be introduced after REPAIRING eventual cracks on the longitudinal members M1 and M2.

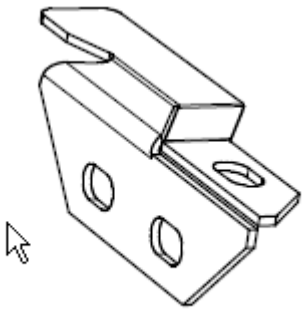
See figure 9 page 11 for position of the longitudinal members

Figure 11: position of saddle brackets



- Saddle bracket VH 11359279 at RHS, partly welded on top of the existing reinforcement.

Figure 12: Saddle bracket VH 11359279



- Saddle bracket VH 113659280 at LHS, partly welded on top of existing reinforcement

Figure 13: Saddle bracket VH 11359280