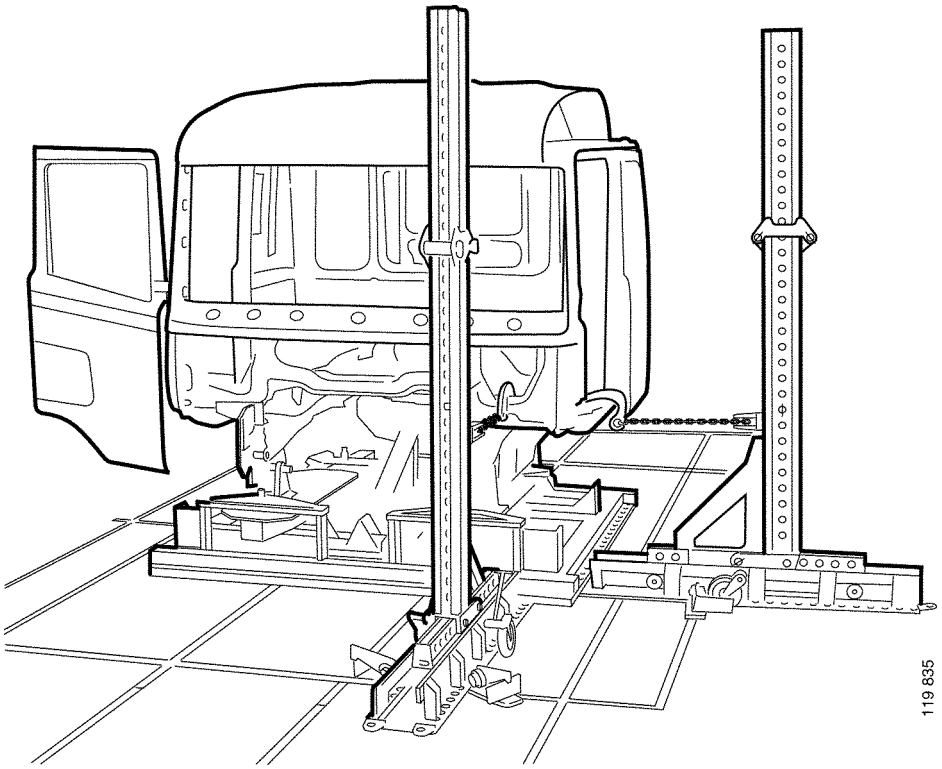
SCANIA

18:01-22

Issue 1 **en**

Repairing damage to cab



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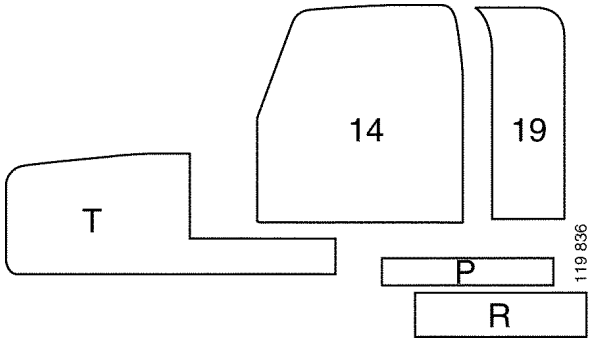
Contents

Repairing damage to cab

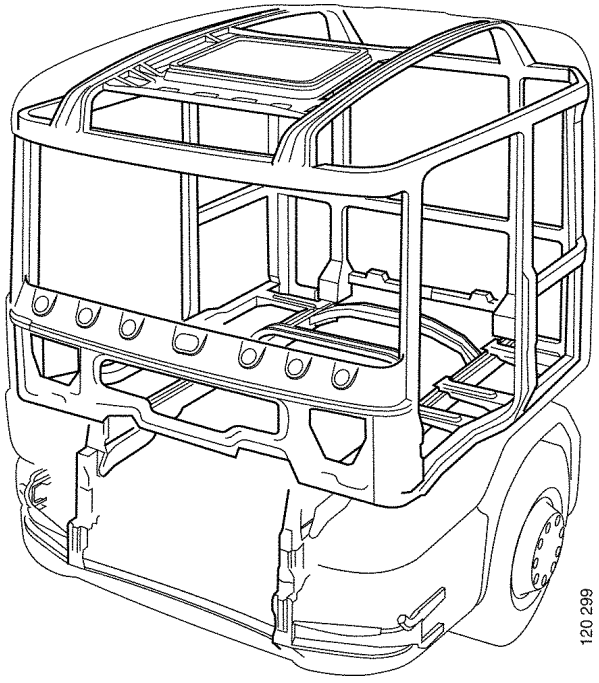
General

The cabs for PRT trucks are designated CP, CR and CT. These designations can be combined with cab length in decimetres, for example CT14 and CT19. The cabs are all very similar in structure. Many of the basic elements are common to the different versions.



The design and structure of the cabs meet the high safety requirements for driver and passenger. To maintain this level of safety, repairs to the cab structure must be carried out by a professional.

The cab is constructed around panel sections that form a basic frame. The body panels are spot welded to the basic frame.



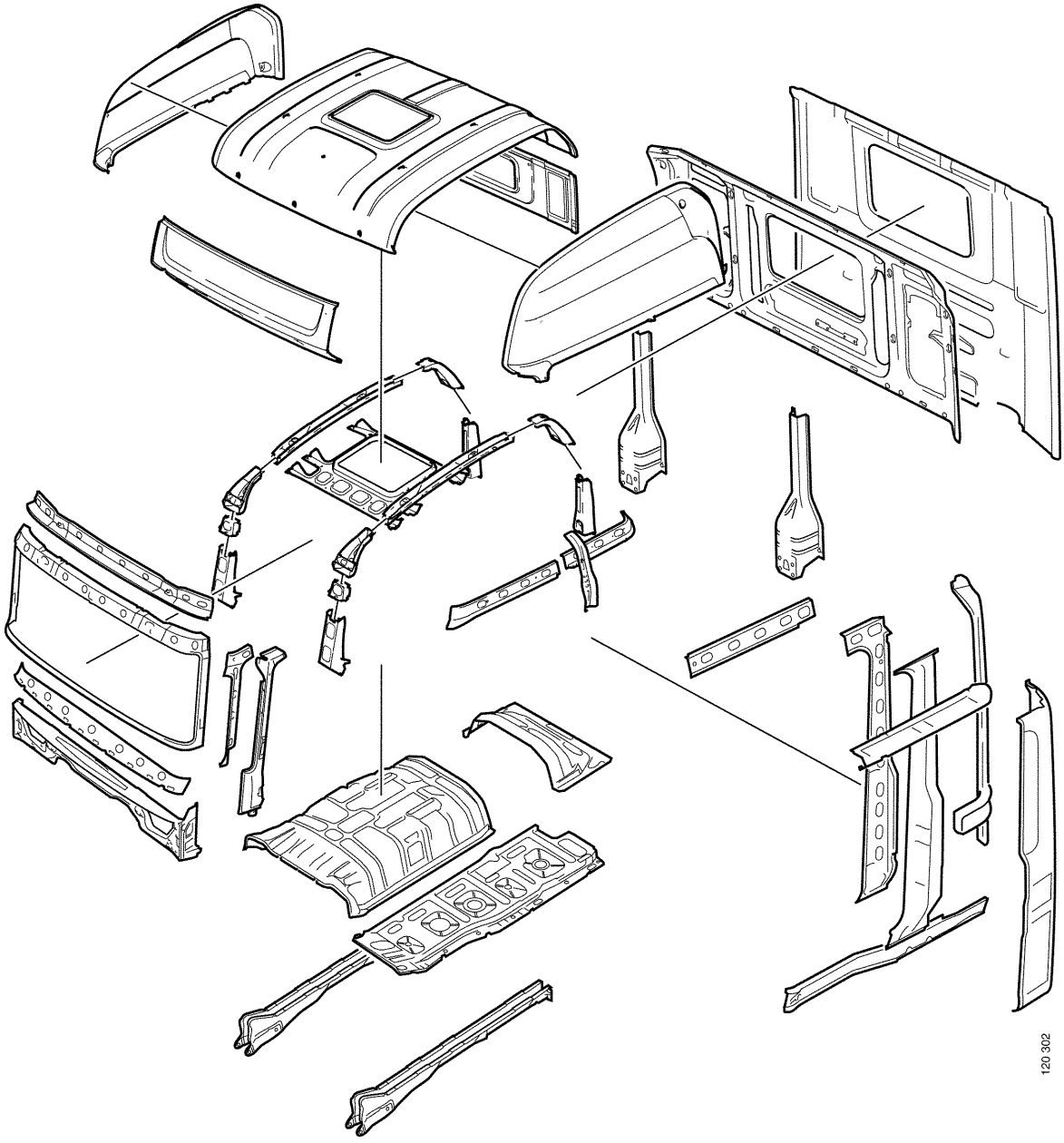
This type of cab structure distributes the forces that arise in a collision. Consequently, damage and distortion can occur in places other than where there is visible damage. This design solution means that the methods used to align these cabs may differ from those used on older Scania cabs.

Repairing a damaged cab correctly will require a well-equipped workshop and, above all, a good deal of professional skill.

The cab structure components can be adjusted or replaced, fully or partially. Weld beads and spot welds must be carried out in the prescribed manner.

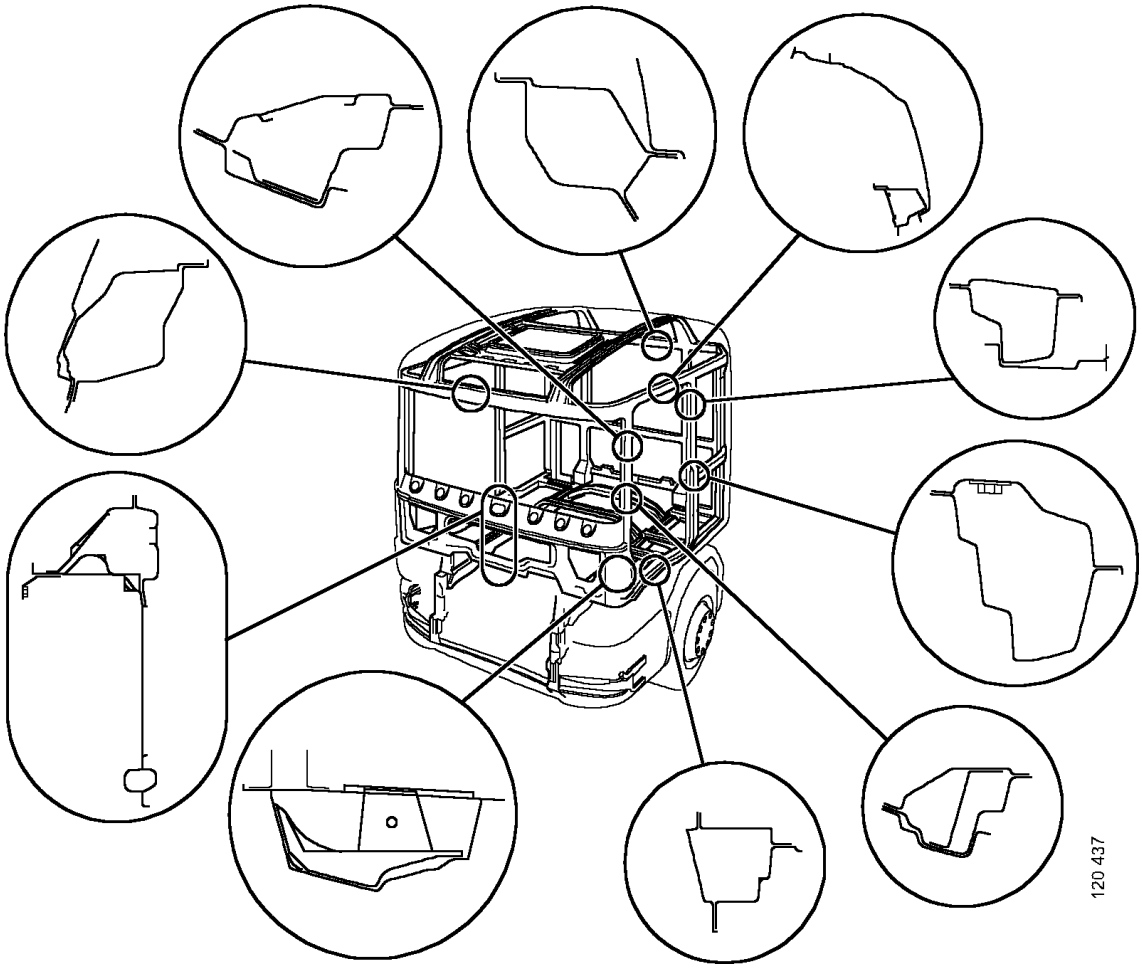
Basic construction

The cab consists of a number of panels and sections joined together with spot welds.



Principle drawing of the cab design

Sectional drawings



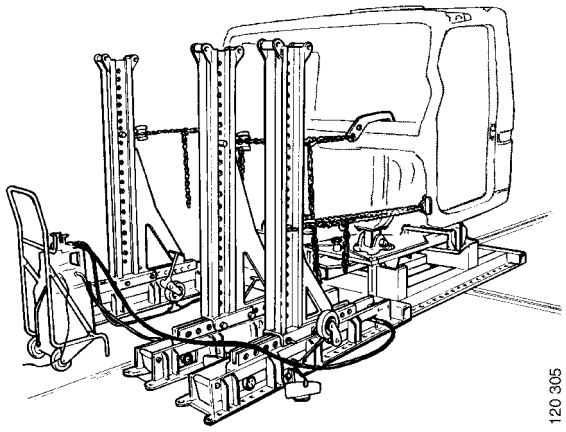
This example shows selected sections of cab members

Tools and equipment

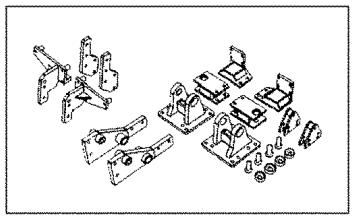
Drawing bench

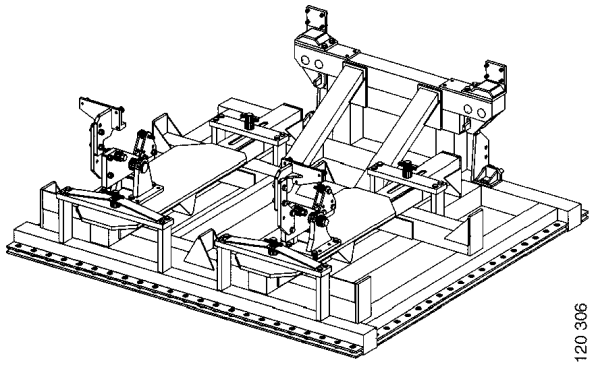
A JOSAM drawing bench has been used in the following description. It is easy to work with and brackets are available for all Scania cabs. The drawing bench is available as Scania agency tool 587650.

Other types of drawing benches can also be used in a similar way if they are supplemented with brackets for Scania cabs.



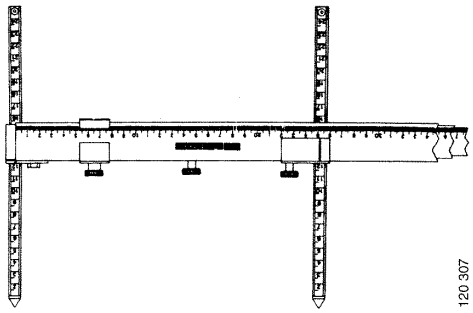
Aligning a cab in a drawing bench with three towers





Drawing bench with set of cab brackets

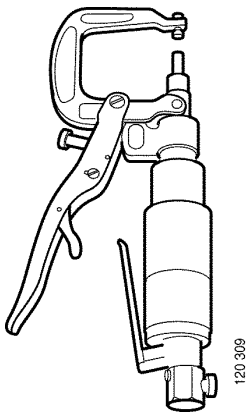
Measuring rod



The measuring rod facilitates measurement of the cab. The measuring rod is made in several sections with a wide span of measurement.

A laser instrument can be suitable to use when measuring the outside dimensions of the cab.

Spot-weld drill bit

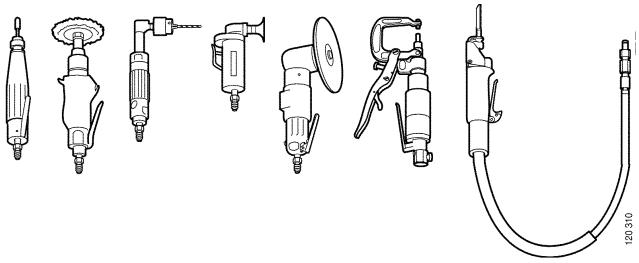


Use a spot-weld drill bit or a curved head milling cutter to separate spot-welded joints. A spot-weld drill bit removes the entire spot-weld at once.

It has a fixed centre pin and almost flat cutting blades that leave only faint drill marks in the underlying metal.

The drill will not completely remove the weld. Note: The remaining material must be ground away before a new panel is fitted and welded.

Other tools



Repairing a cab is an extensive job. To attain a satisfactory result requires access to a well-equipped workshop. The tools that are required will vary from case to case as each one will be unique.

Damage inspection

Damage analysis

Always start with a thorough analysis of the damage. Assess whether parts that can be renewed, such as doors and boarding steps, should be repaired with regard to economy and strength.

Determine the direction of the collision and try to assess how the damage has affected the different parts of the cab. A collision can involve follow-on damage to several different parts of the cab and its mountings.

In principle, the damaged part should be drawn in the opposite direction to the impact.

Make an accurate list of the damaged parts, the parts to be aligned and the parts to be replaced.

Estimate the cost of the parts, the labour cost and the downtime of the vehicle. In certain cases, it may be more economic to purchase a complete cab or cab structure.

Visual inspection

Start by looking for damage around spot welds and deformation at the following locations:

- Rear attachment.
- Rear wall.
- Front cab brackets.
- Front and front panel. Damage to the front nearly always involves damage to the floor pans.
- Joints between floor and front panel.
- Doors and door apertures. The door must not be warped and the door gaps must be even.
- The windscreen, windscreen frame and windows.

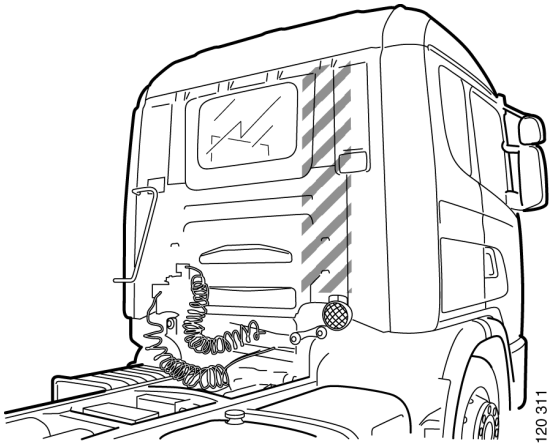
Then tilt the cab if possible, remove the floor insulation and check the following points:

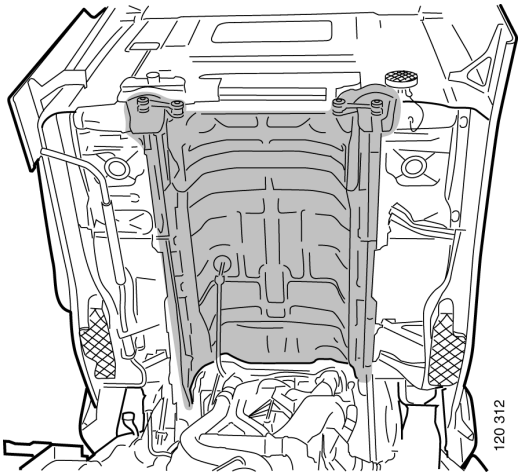
- Rear edge of cab at rear cab pillar.
- Rear cab attachments.
- Engine tunnel and floor.
- Sill at A and B-pillars.

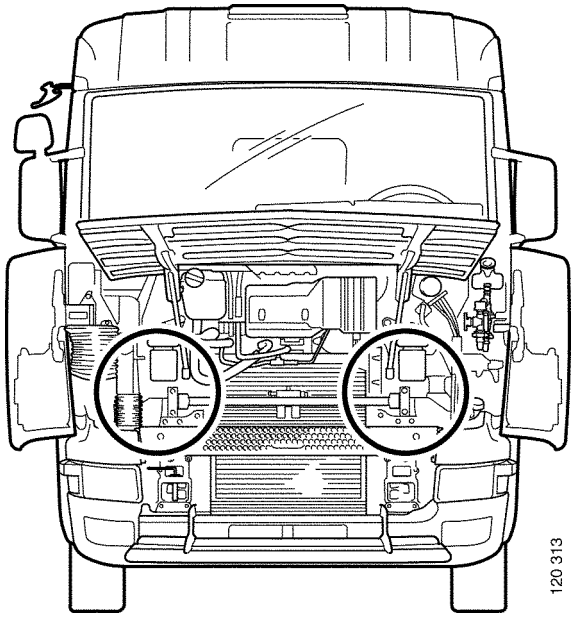
Check from inside if damage is suspected. It may be necessary to remove some parts of the interior.

If any damage or distortion is discovered, the cab must be checked thoroughly in a drawing bench to determine the location of the distortion.

Inspection points





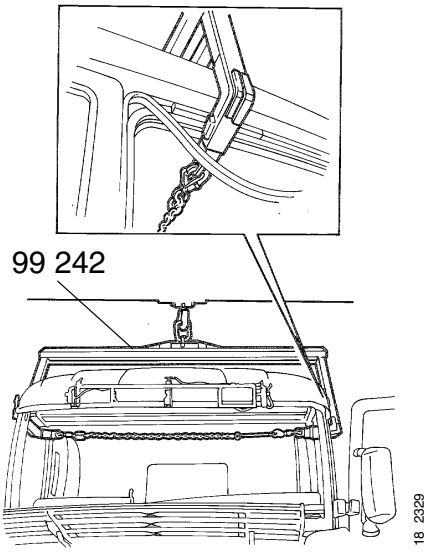


Lifting the cab

In many cases, the cab must be lifted from the chassis before it can be straightened. See 18:01-01.

Removing interior parts

All or some of the interior parts must be removed before the cab can be inspected and adjusted. See 18:01-05.



Control measurements

Measure diagonals to detect dimensional faults and distortion in the structure. Refer to 18:01-07 and 18:01-23 for a summary of check dimensions for all cab types.

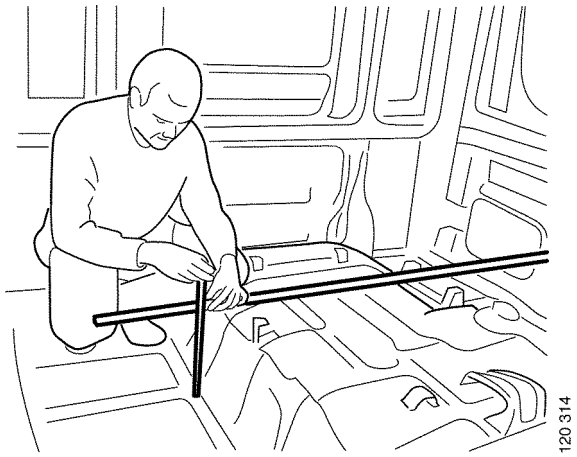
For the majority of the measurements stated, it has been assumed that the fittings have been removed.

Check that the cab floor is not deformed by measuring the distance between the drawing bench and the cab floor at a number of comparable points on both sides.

Take care when measuring the windscreen aperture. Very small deviations in the measurements may cause the windscreen to crack while the vehicle is being driven on a poorly maintained road or in the event of temperature changes.

Engine tunnel

Use a frame gauge as shown in the illustration to check the dimensions of the engine tunnel. Refer to 18:01-23 and 18:01-07 for check dimensions.

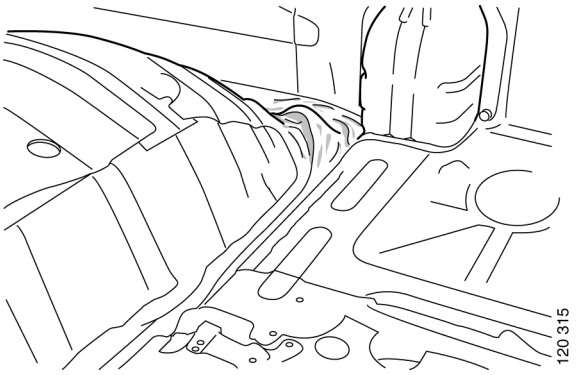


Aligning the cab

General

A damaged cab can be adjusted by either pressing out the damaged area using a hydraulic ram or by drawing. More often than not, these two methods must be combined with the cab mounted in a drawing bench in order to achieve satisfactory results.

If damage is found on the engine tunnel, the cab must be mounted in a drawing bench in order to repair the damage correctly.



Examples of a damaged engine tunnel

When drawing the cab, it must be mounted in a drawing bench or the cab suspension may be damaged.

When using the "Porto-Power" hydraulic ram for pressing out a damaged area, the pressure point and the support must both be inside the cab if it is mounted on the chassis. Otherwise, the cab may be warped and the cab brackets damaged.

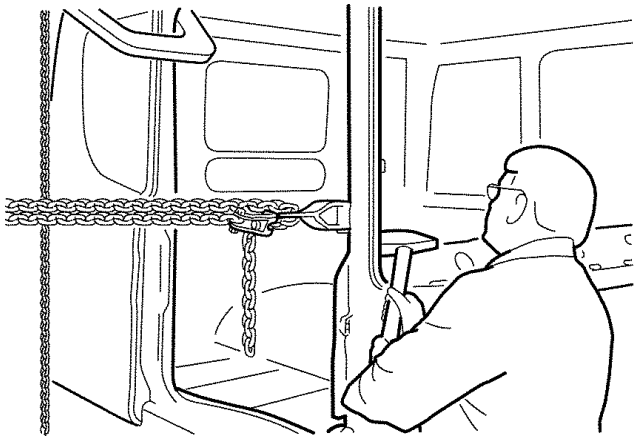
Points to consider when aligning

Adjust the damaged area as much as possible before removing any damaged parts.

When aligning the A-pillars or front: Make sure the floor pan has not come loose around the spot welds. Reinforce the joint if necessary. If the plate separates around the spot-welds, e.g. between the floor and the front panel, this section can be rectified separately and welded on again after adjusting the structure.

Draw slowly using several drawing points and observing how the different parts move during the process. Drawing points or directions must occasionally be changed several times. Drawing too much on one point may accentuate the damage.

Work deformed parts with a hammer while the cab is suspended to release any tension. Even parts that appear undamaged may be under tension and require attention.



Joined sections

Make sure the internal sections are also drawn and that they do not have any permanent deformation or cracks.

IMPORTANT! Check the welded joints, spot-welds and fastening joints on joined sections thoroughly. Incorrect welding will weaken the structure.

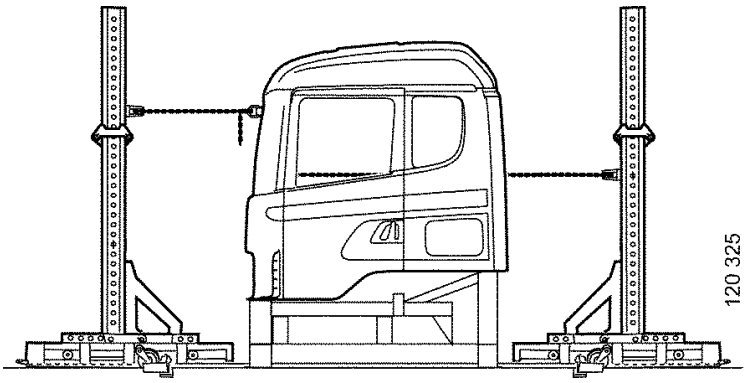
Supports for aligning

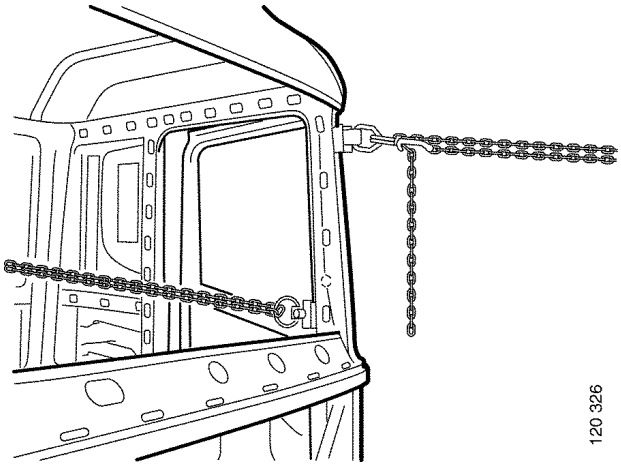
It is a good idea to use a support when aligning the cab. This will prevent unnecessary deformation and over-drawing.

Fasten the supports to the part you want to fixate in its current position, preferably to reinforcing beams or cab brackets.

If possible, the supports should be placed in a linear position to the drawing point.

Weld on temporary attachments and reinforcing plates where necessary.



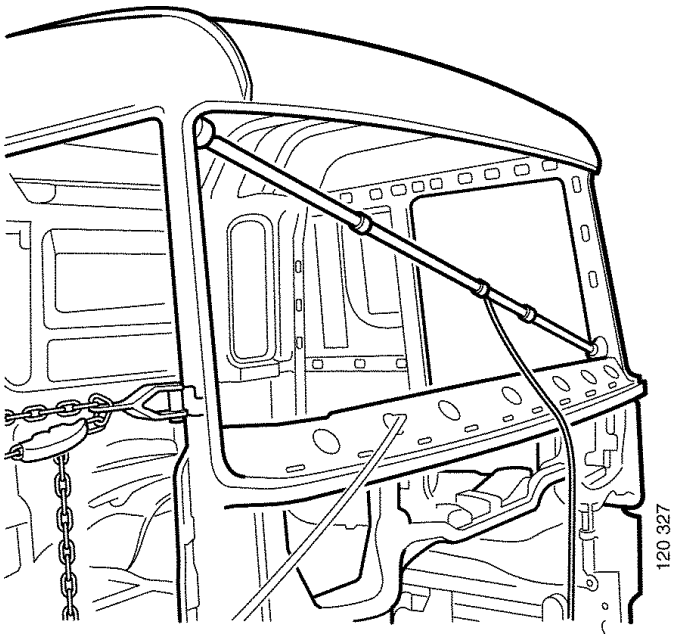


Pressing

To avoid unnecessary damage, the supporting point for the hydraulic ram must be stable, preferably in a corner or on a reinforcing beam. Spacers of rubber or wood should be applied to the pressure points to avoid unnecessary damage to beams and panels.

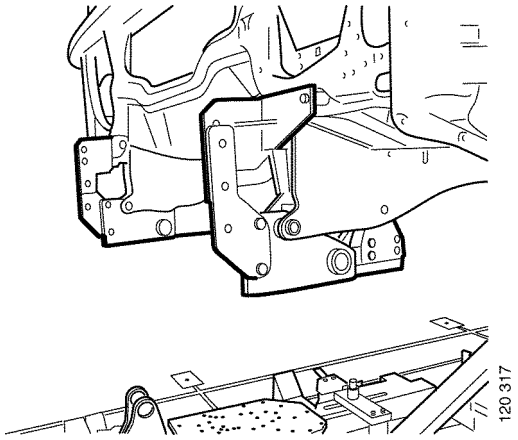
Press a little at a time and do not attempt to press out all the damage at once. The pressure point and angle may need to be changed several times. Check the dimensions of the cab often. Pressing too much may be difficult to rectify later.

If the floor must be used for support, a jack or other stable object can be placed under the floor pan. This will provide a stable supporting point and avoid deforming the plate.

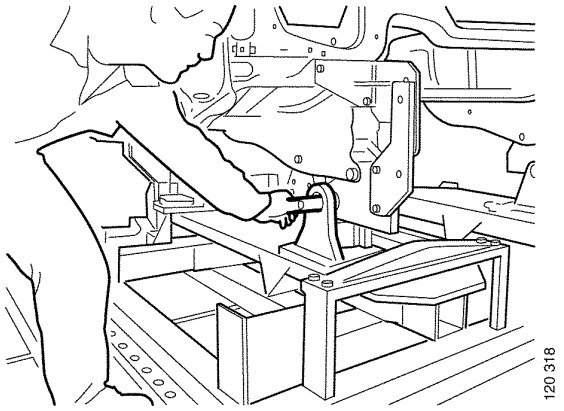


Mounting in drawing bench

Start by fitting the brackets that are to be fastened to the cab before lowering and attaching the cab in the drawing bench.



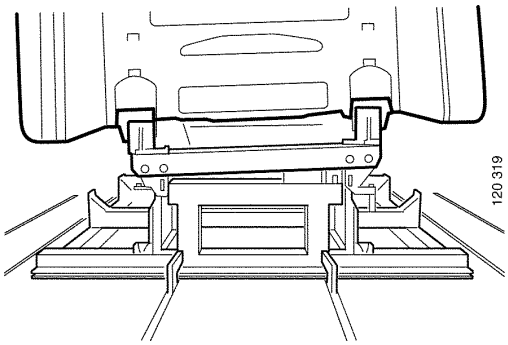
Fasten the cab to the drawing bench. The cab brackets will probably need adjusting by pressing or pulling before they will fit the bench.



Aligning the cab structure

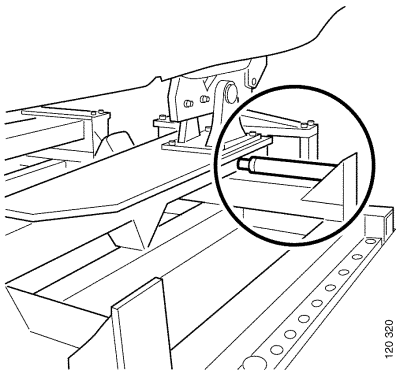
Aligning the bottom section

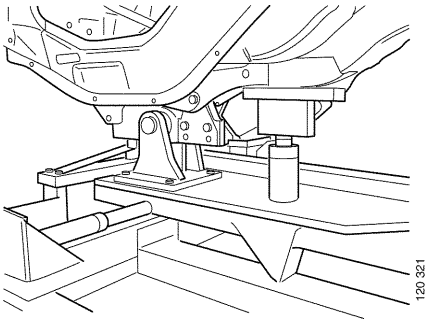
As a rule, start by checking and aligning the rear part of the cab. Press or draw the cab to obtain a straight rear edge.



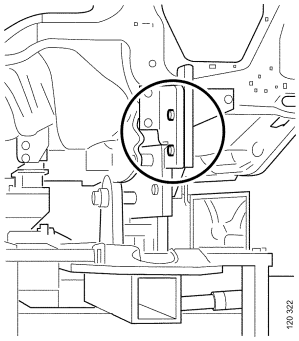
Align the centre of the front part of the cab by pressing or drawing it transversely or longitudinally.

Place pins into the centre holes of the aligning frame if necessary. The pins should be easy to insert and withdraw.

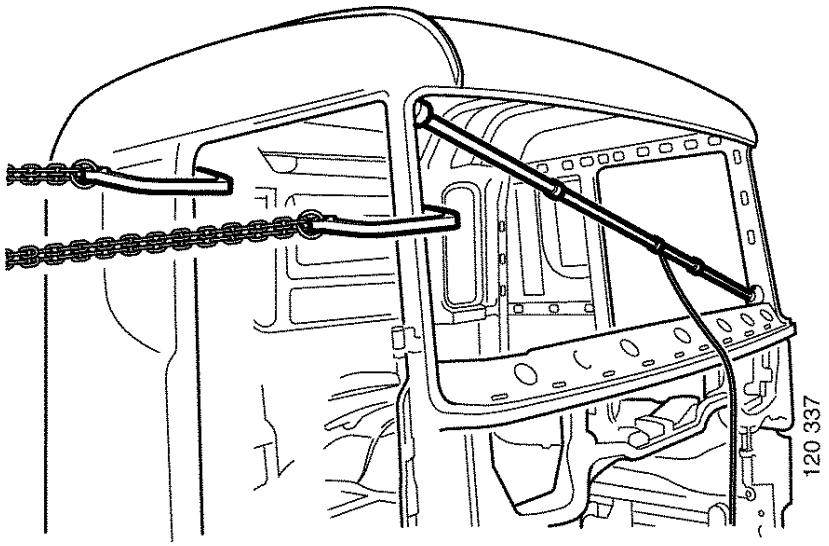




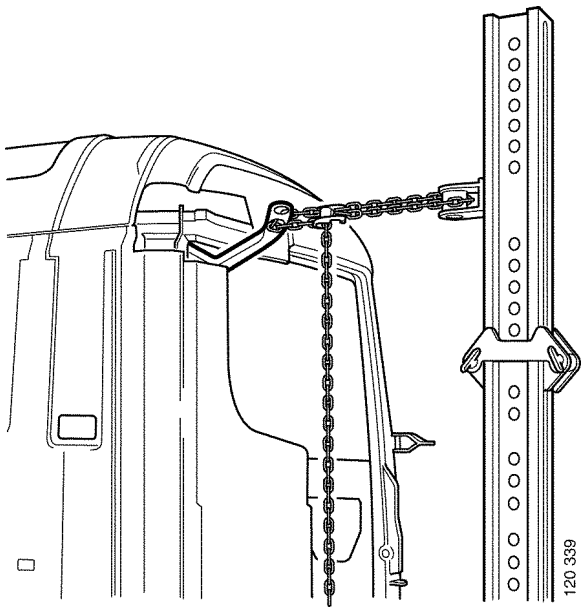
Attach bolts to the spring brackets. Align the brackets if necessary.



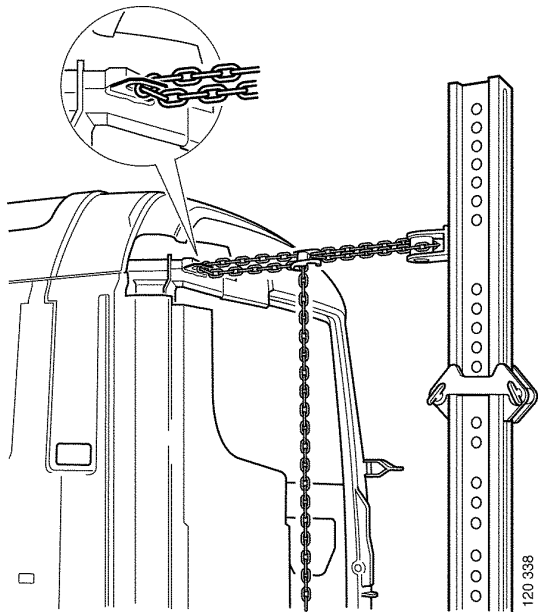
Damage to side of cab



Use several drawing points and switch between them. Draw a little at a time.

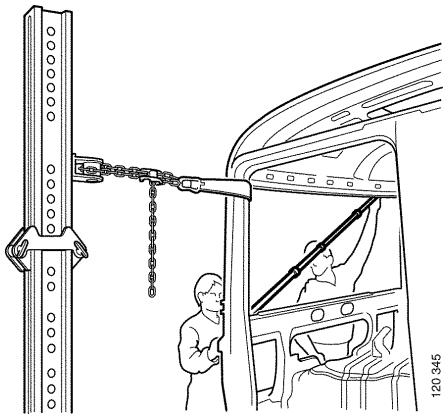


Drawing out a roof member.

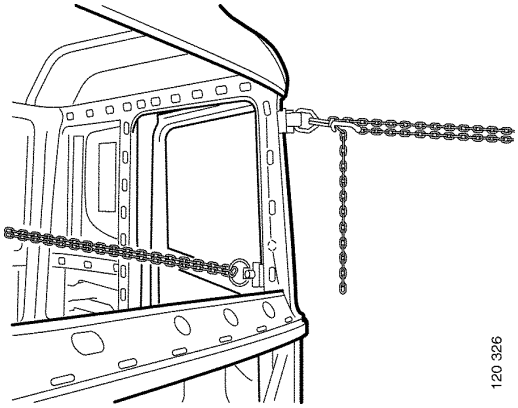


Drawing out the outer section of a roof pillar using a welded drawing eye.

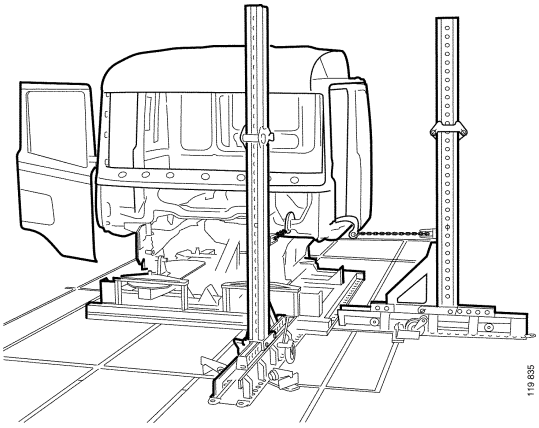
Damage to front



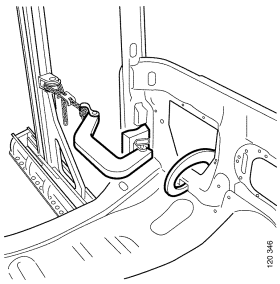
Drawing out and measuring the windscreen frame.

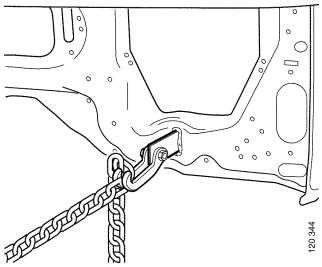


Use a support when drawing.

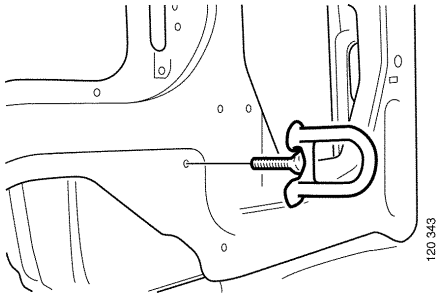


Combined drawing, forwards and to the side.

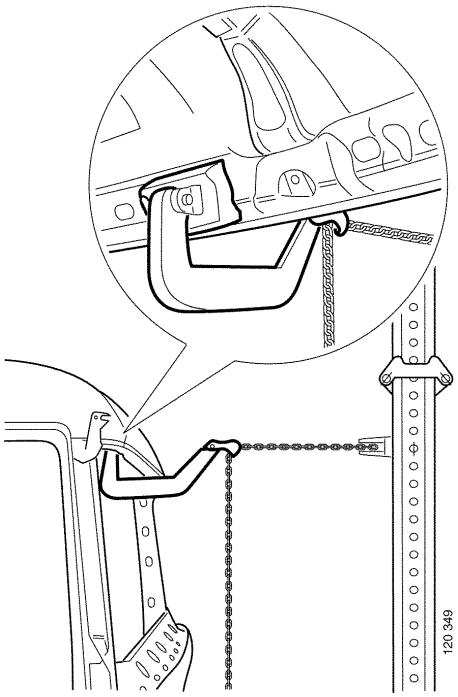




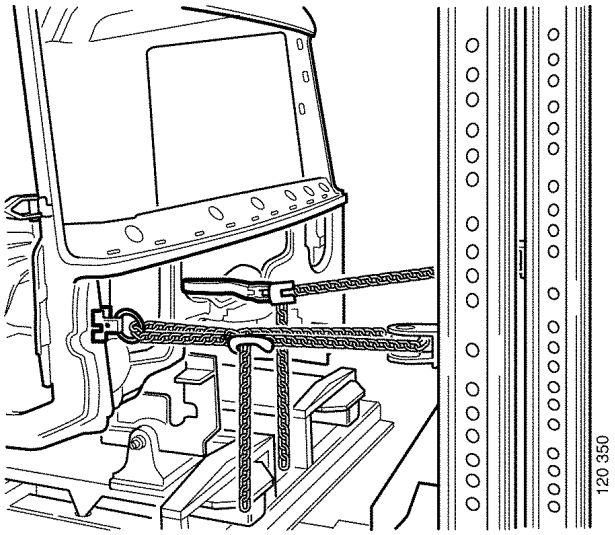
Example of drawing eye to be welded on.



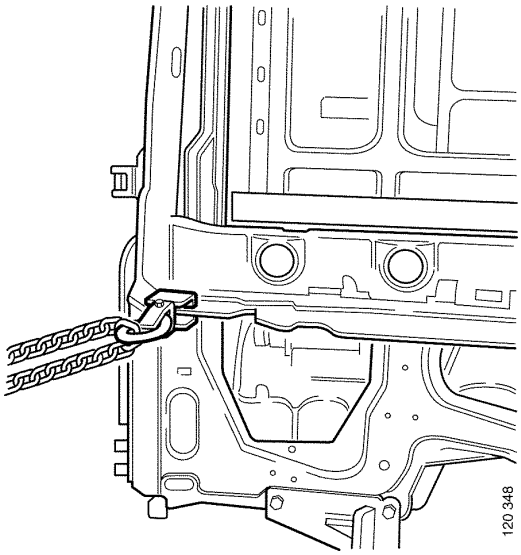
Example of drawing eye to be screwed on.



Aligning a roof member. Use spacers to protect the member.



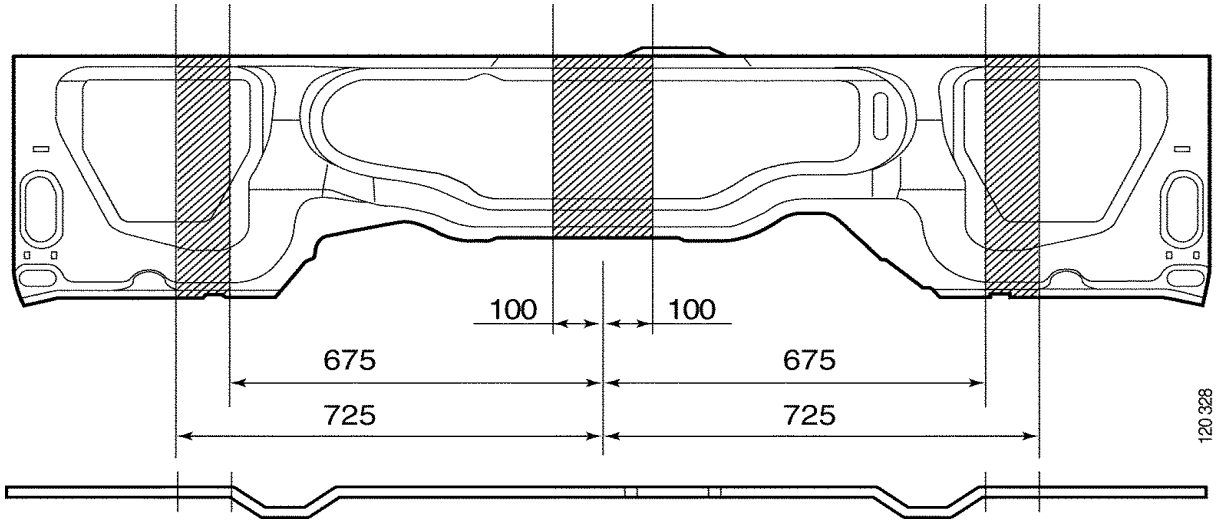
Aligning front damage using two drawing towers.



Drawing out damaged panels.

Pressing out damaged engine tunnel.

Joining front panels

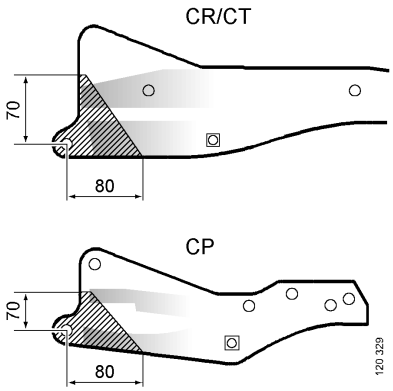


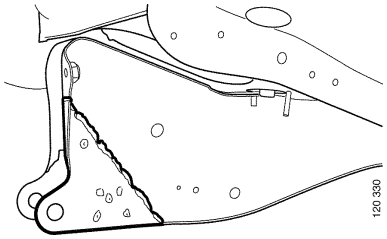
The outer front panel can be joined within the indicated area.

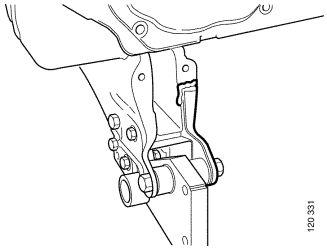
Floor member

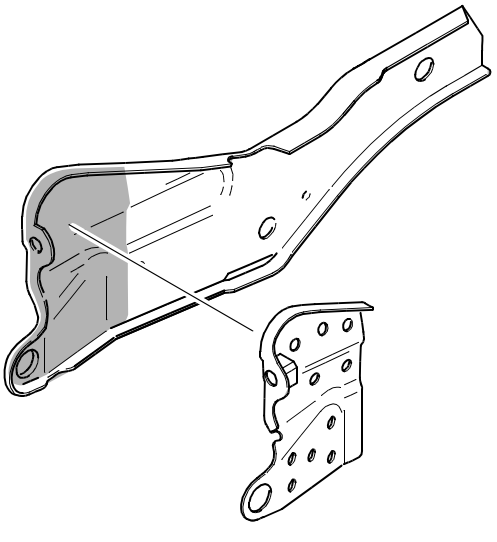
Renewing attaching lug to front cab attachment.

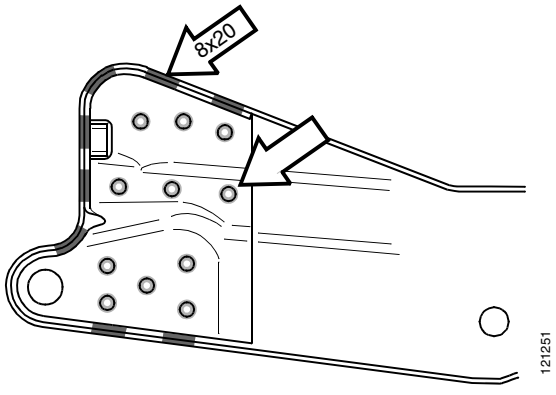
- Cut the panel and weld using a continuous bead as illustrated, plug weld the old spots.
- Use the drawing bench brackets or the base bracket as a template when positioning the panels.
- Grind down the welds and attach Scania reinforcement plates with plug welds and continuous beads.
- P-cab with 4-point suspension: Make sure there is sufficient clearance between the floor member, level linkage and steering gear.











Panel damage

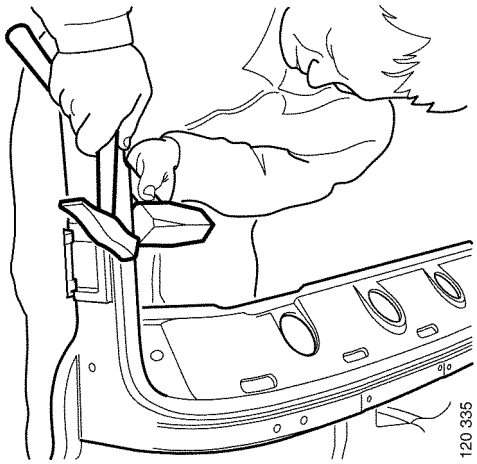
Align minor panel damage using a hammer and dolly. For major damage, the cab and any damaged reinforcement members should be aligned before any panels are removed.

Renew complete panel sections and members if possible. Avoid joining panels if not necessary. Joins in the panels entail an increased risk of corrosion and can, if carried out incorrectly, impair the strength of the structure.

Damage to beams and attachments that are concealed by body panels must be repaired and surface treated before new panels are fitted.

Plug or spot-weld the panels. Use welding primer, see the section on "Welding".

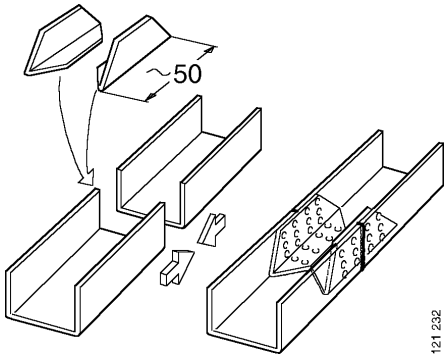
Apply corrosion protection to the plate and seal the joints, see the section "Surface treatment after welding".



Joining panels

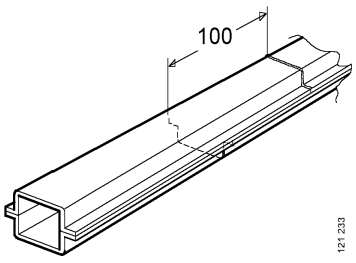
Use reinforcement plates where it is necessary to join panels and beams in the body structure. The reinforcement plate must be at least 1.5 times as thick as the joined panel. Adapt the length so at least two rows of plug welds can be made.

- Cut away the damaged part.
- Cut and position the corresponding part from the new panel.
- Bend a reinforcement plate to fit the cross section of the panels being joined. Drill holes for the plug welds.
- Plug weld the reinforcement plate to a part that is not damaged.
- Fasten the cut part of the new panel with plug welds to the reinforcement plate.
- Weld the joint with a continuous bead.

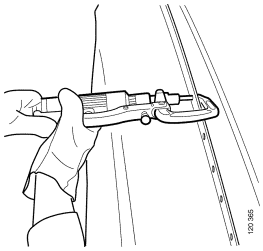


Joining panel sections

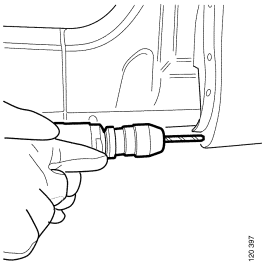
Offset the cut 100 mm on each side of the beam when joining a combined section.

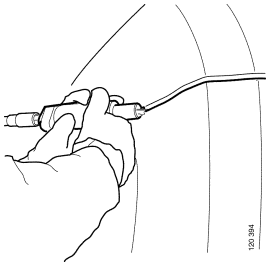


Renewing side plates

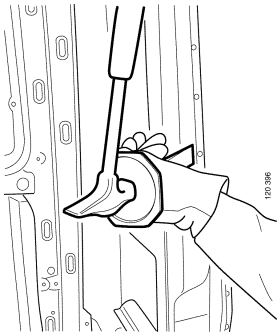


Machine or drill away the spot-welds.



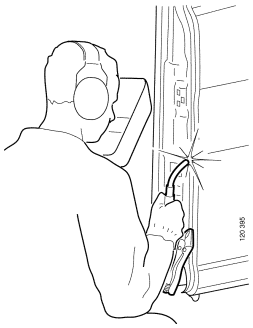


Saw under the roof joint.

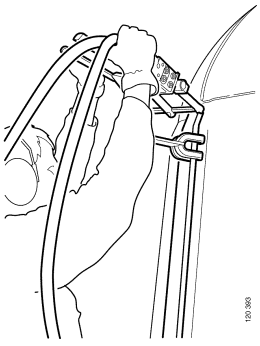


Remove the plate.

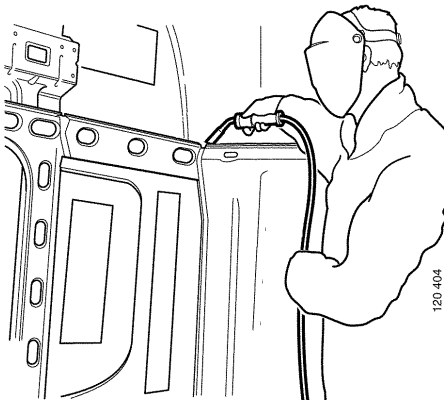
Drill holes for the plug welds in the new plate.



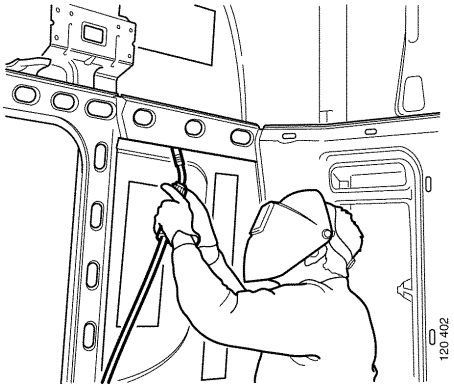
Plug weld.



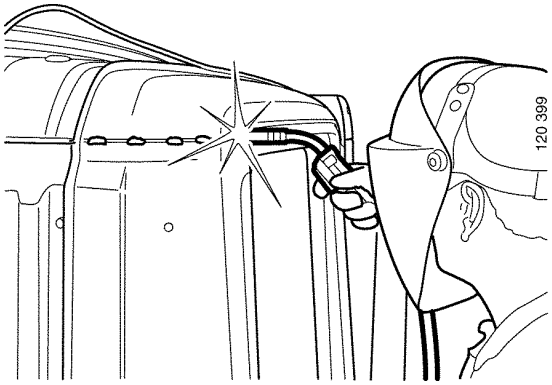
Spot weld.



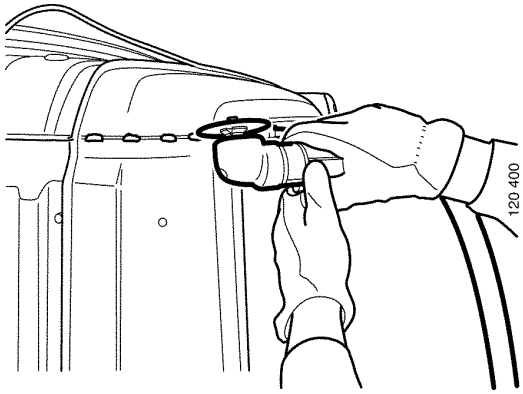
Weld the corner of the plates.



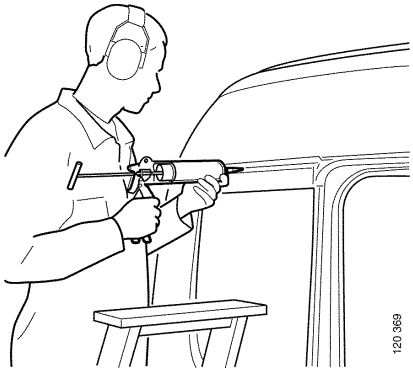
Weld the roof and side plates.



Note: Applies to the 14-cab only. Weld the roof joint from outside.

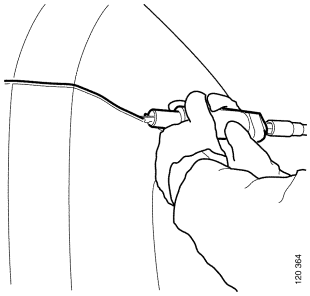


Note: Applies to the 14-cab only. Grind down the spot-welds.

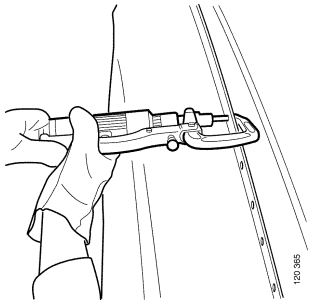


Prime and seal the roof joint.

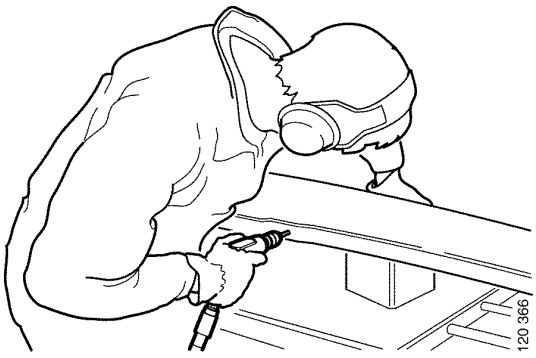
Renewing roof plates



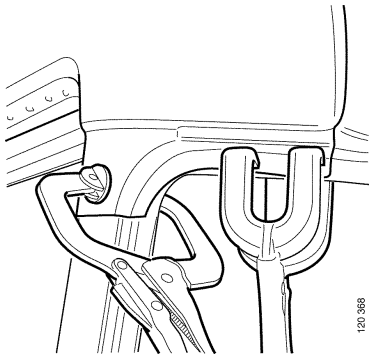
Saw above the roof joint.



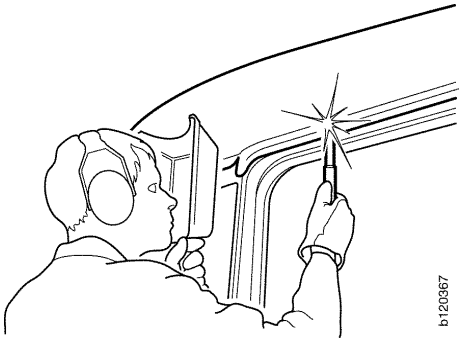
Drill away the spot-welds.



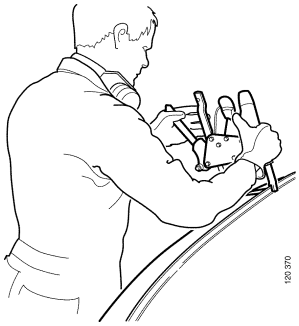
Drill holes for the plug welds in the new plate.



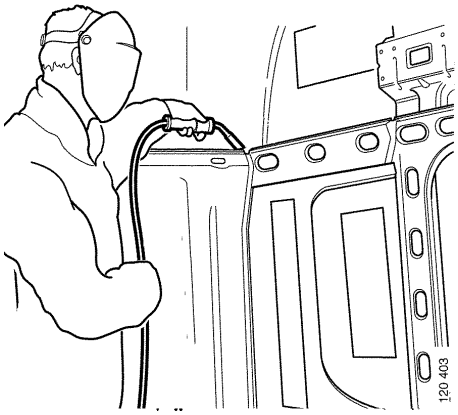
Clamp the panels into position.



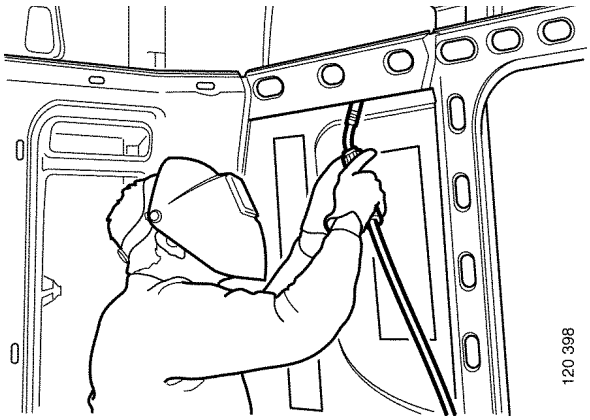
Plug weld.



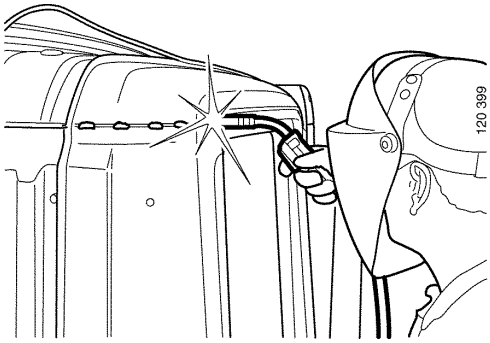
Spot weld.



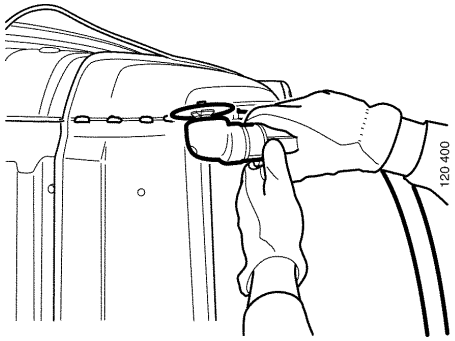
Weld the corners of the panels.



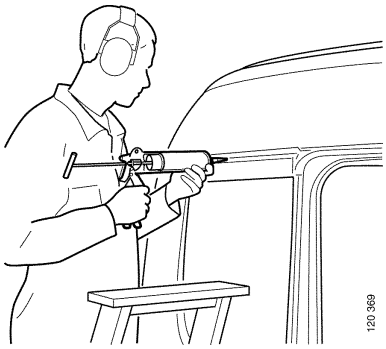
Weld the roof and side plates.



Note: Applies to the 14-cab only. Weld the roof joint from outside.

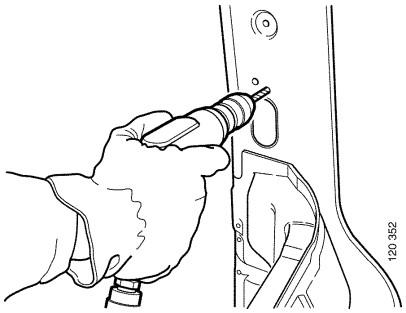


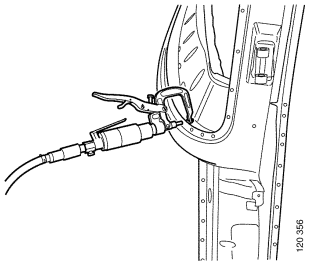
Note: Applies to the 14-cab only. Grind down the spot-welds.



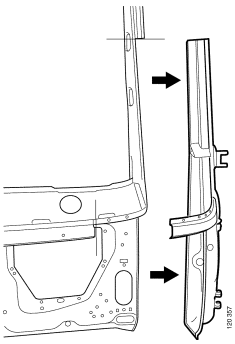
Prime and seal the roof joint.

Renewing the A-pillar

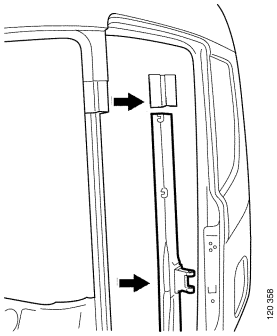




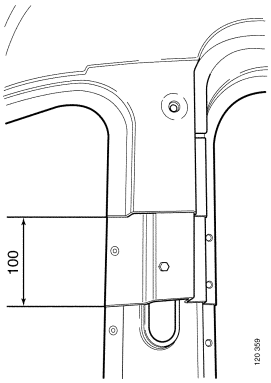
Drill away the spot-welds.



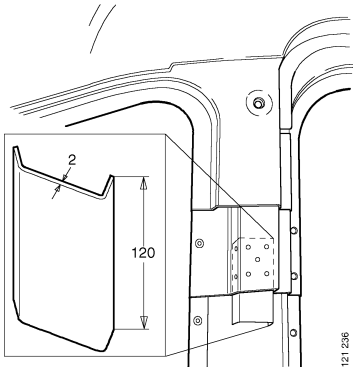
Cut the pillar in a suitable place.



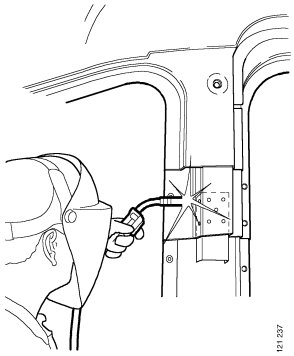
Cut away a piece for the overlap between the inner and outer parts of the A-pillar.



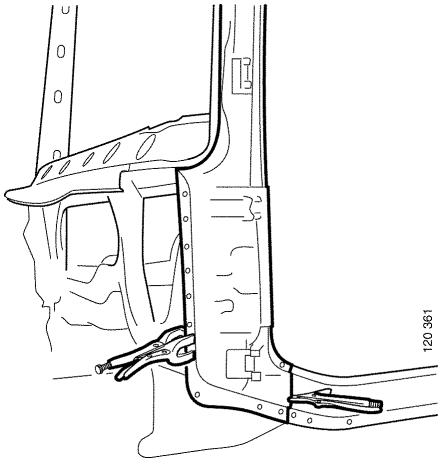
Overlapping when fitting.



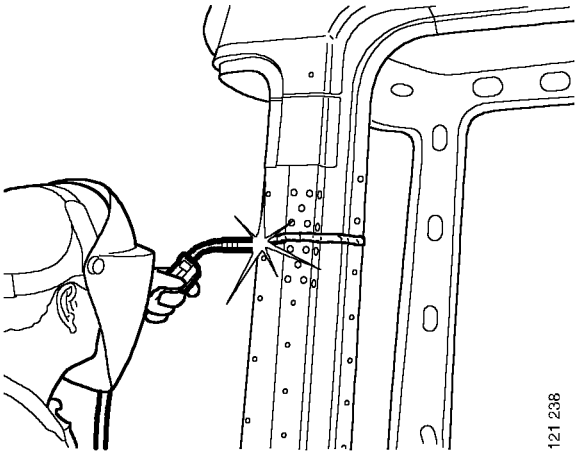
Bend a piece of reinforcement plate and position it. Drill holes for the plug welds.



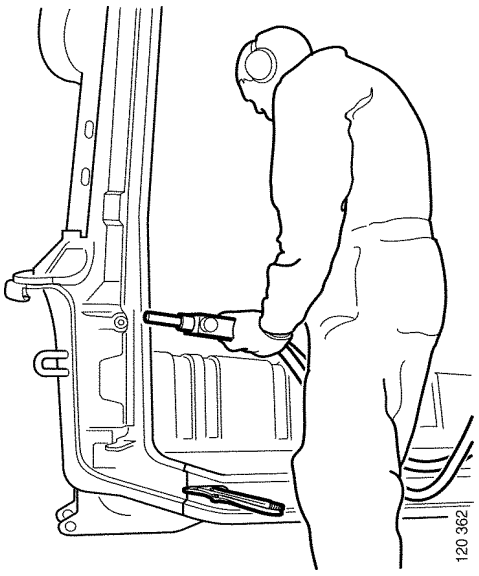
Plug weld the reinforcement plate.



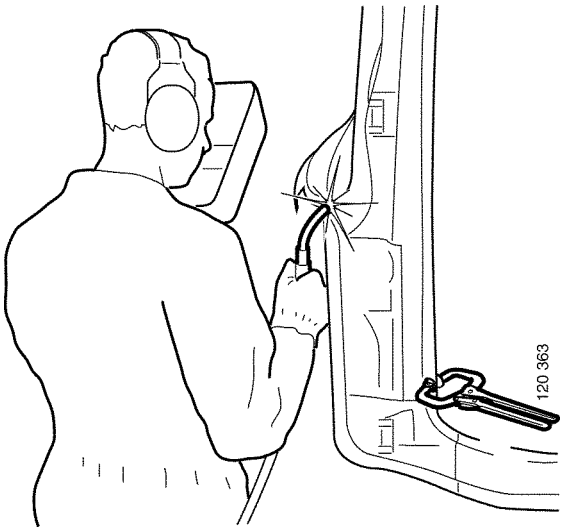
Fit the new plate.



Weld the joint with a continuous bead and plug weld the reinforcement plate.



Spot weld.

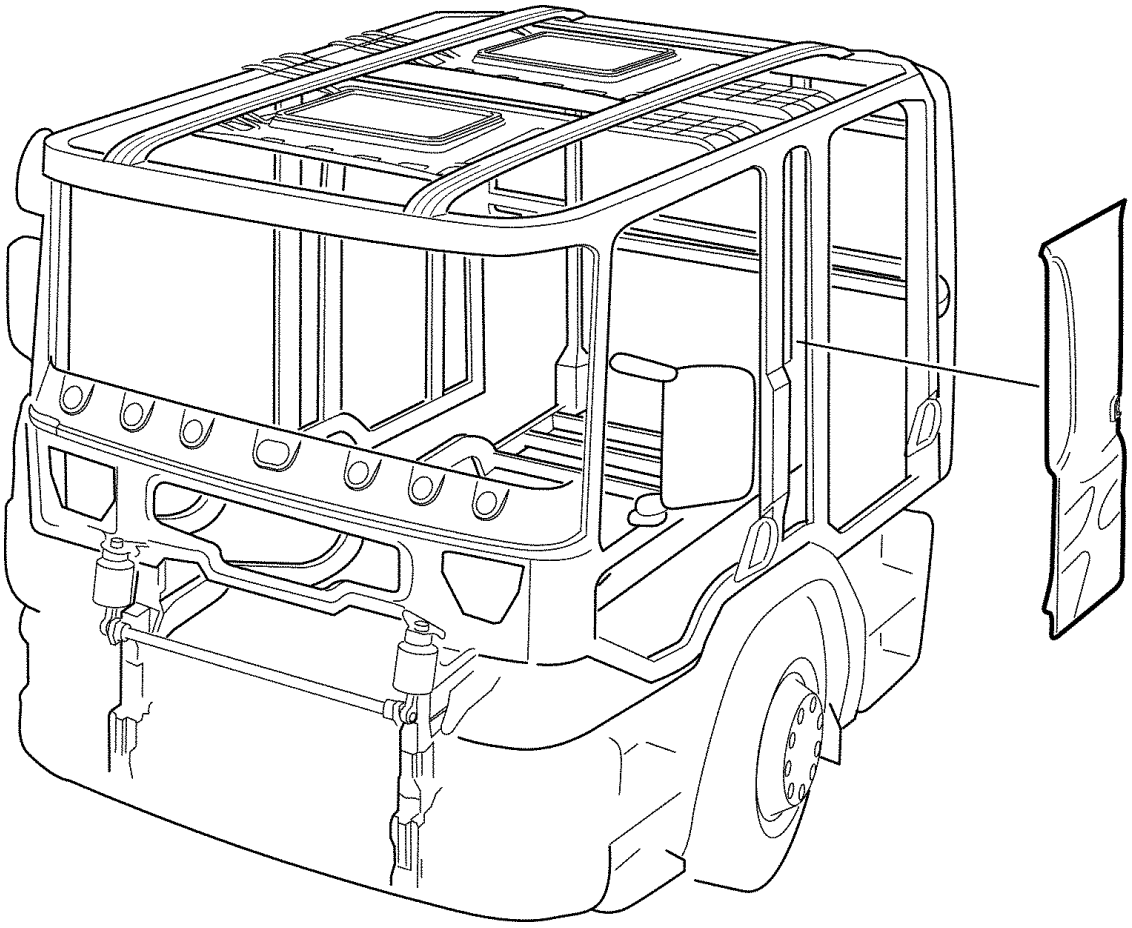


Plug weld.

Crew cab side plate

Glue on the side plate and secure with blind rivets while the adhesive dries.

- Align the cab structure so that the contact surfaces are straight and parallel.
- Drill holes for the blind rivets.
- Apply body adhesive in accordance with the manufacturer's instructions and fit the side plate.



Checking and fine adjustment

Fine adjustment

Check that the embossing on the doors and side walls is aligned and that the gaps between the door and the door opening are the same width.

Check that the cab floor is not distorted. Measure the distance between the cab floor and the drawing bench and at a number of other similar places.

Check the spot-welds in the damaged area. Make additional spot-welds where the plate around the welds is damaged.

Make sure there is no residual tension present when the cab is loosened from the drawing bench.

Measure the diagonals between the cab floor members.

The fit of the door and the paintwork finish will be the first things the customer notices. Therefore, always be thorough in your preparatory work. This will make it much easier for the painter, and the customer will be satisfied.

Checking cab dimensions on the chassis frame

Check that the chassis frame is not bent, distorted or displaced diagonally. Refer to group 11, Frame, for check dimensions and alignment.

For other measurements, see "Check dimensions" 18:01-7 and 18:01-23.

Measuring the windscreen opening

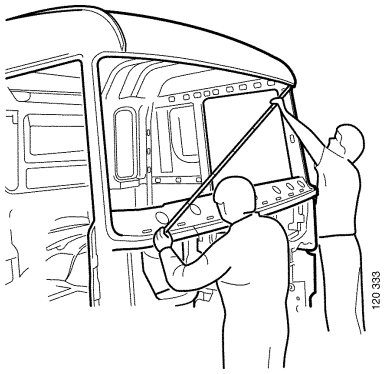
Measure the diagonals of the windscreen frame. Check the fit and the profile of the windscreen frame against a loose windscreen. The following method can be used to see whether the windscreen opening will match the windscreen, see also 18:01-10.

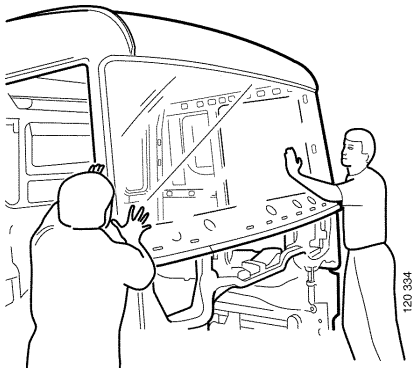
1 Cut 6 pieces of windscreen moulding and place them as illustrated.

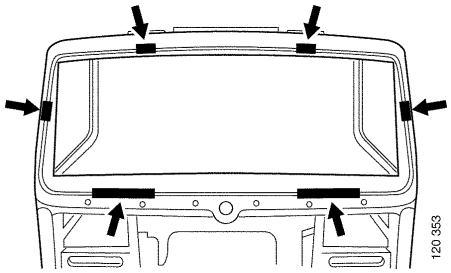
2 Fit the windscreen.

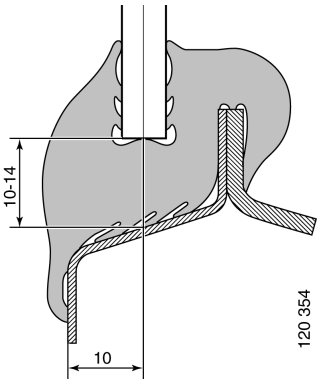
3 Check the distance between the window opening flange and the edge of the windscreen (the distance between the windscreen and the panel). There should be 10-14 mm clearance.

IMPORTANT! Too little clearance may cause leaks.









Welding

Scania uses double-sided hot dip galvanized sheet steel for cabs to improve corrosion resistance.

Galvanized plates require special measures when welding and painting. Follow the directions in this booklet and in group 00.

Welding primer should be applied to bare metal before welding.

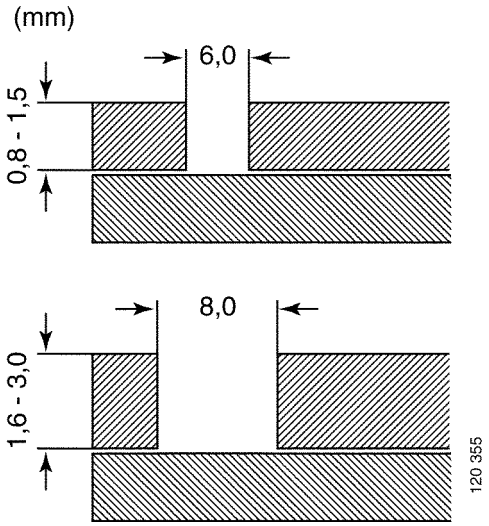
Use either the MAG or MIG welding method. They both use shielding gas that provides a more reliable weld result (argon, helium, CO2 or mixtures of these, so-called gas mixture). A gas mixture is the most suitable to use.

Electric spot welding can be used but it is often difficult to gain access. The current must also be carefully adapted to the panel thickness and the number of panels, which is difficult to do. The current must be increased by about 10% when spot-welding galvanized sections compared with untreated panels.

Remember, when plug welding, to start in the centre of the hole and slowly work towards the edges. This will allow the weld to heat up sufficiently for it to penetrate the galvanized surface.

Plug welding with the MAG or MIG method is preferred with respect to accessibility and quality if it is carried out in the following manner:

- Make holes in the outer panel where the spot-welds are normally located.
- The distance between the plug welds must be approx. 25 mm or the same as the distance was previously between the spot welds.
- The holes must have a diameter of 6 mm in panels up to 1.5 mm thick.
- The holes must have a diameter of 8 mm in panels over 1.5 mm thick.
- Weld up the holes to the inner panel. Start welding in the centre of the hole and work slowly towards the edge. This will allow the weld to heat up sufficiently.
- Grind down the weld mounds.



Note: Control units and other electrical components must be disconnected before welding. Protect components from grinding sparks and welding spatter. Place wet rags inside the cab behind the welding points.

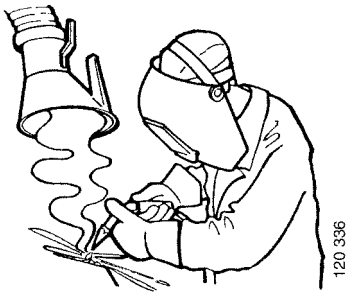
Welding cracks

Cracks in the front panel and crossmembers are to be rectified in the following manner.

- Drill a 4 mm hole at the end of each crack.
- Grind out and bevel the edges of the cracks. Weld up the joints.
- Grind the joints flat.
- Restore the vehicle's paint surface and corrosion protection.
- Place out reinforcement plates where necessary and plug weld them.

WARNING!

Always use an extractor for welding. Gases arising from welding galvanized steel can cause so-called zinc fever if inhaled. The symptoms are shivering and nausea. Seek medical help if the symptoms are excessive.



Strength

It is essential that the original strength of the cab be maintained. Welds must adhere to all the panels. The spacing between spot-welds must be the same as it was originally on the cab.

Cracks in firewall

The firewall on P and R cabs with two-point suspension has been known to crack occasionally. These cracks are often caused by extreme chassis vibration that is not dampened by the fixed front cab attachment.

The cracks can appear in the top of the firewall and spread downwards.

If cracks have occurred, they will be visible without removing any components.

To prevent cracks from spreading farther and to reinforce the firewall, two reinforcement plates have been introduced. These reinforcement plates are to be welded on top of the existing firewall after the cracks have been repaired. An anti-roll bar must also be fitted between the front upright members if one was not fitted previously.

Reinforcement plates have been introduced in production from chassis number:
SSS - 1 241 308.

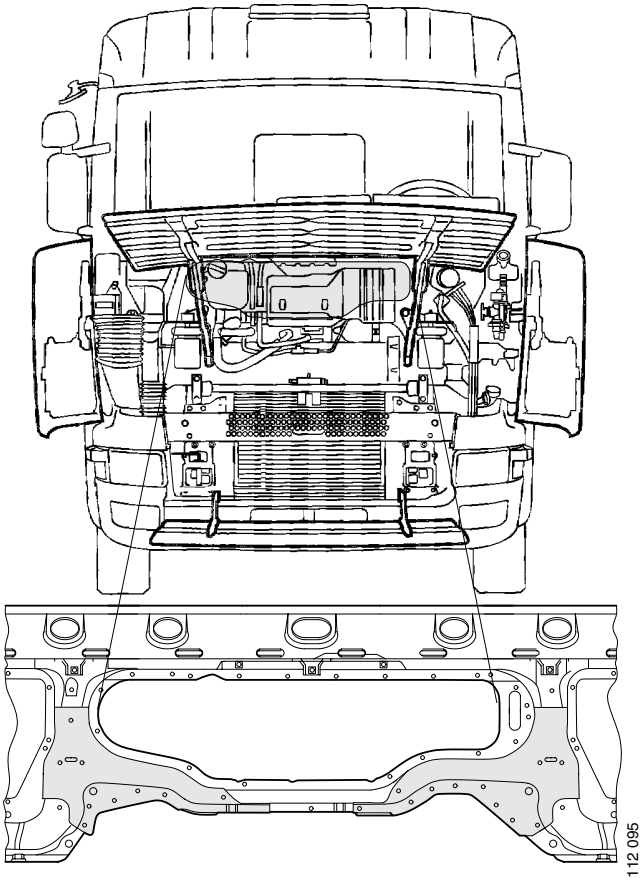
Procedure: Remove the expansion tank, heater unit and wipers.

Lift the cab to take the weight off the bushes in the front cab suspension.

Remove the caps on the front cab brackets.

Lift the cab slightly. Check that cables and hoses do not get stretched.

Support the cab and remove the front cab brackets.



Repairing cracks

Look for cracks in the firewall around the heater unit.

Repair any cracks found in the firewall. Refer to the welding directions in this booklet.

Fitting reinforcement plates

There are recesses made at regular intervals around the edges of the reinforcement plates. Weld with continuous bead into these recesses. Plug weld the holes that are not part of the hole patterns for existing components.

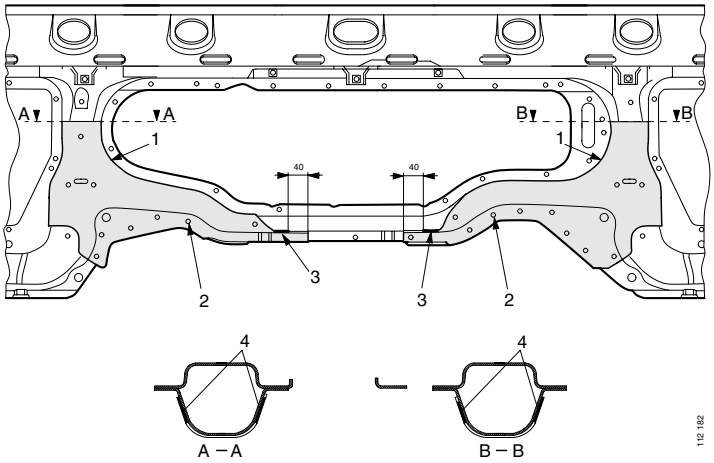
The dimensions (A measurements) of the welds are shown in figure 3.

Welding pos. 1: A measurement 2 mm, welding length 25 mm

Welding pos. 2: Plug weld 8 mm, 15 plugs

Welding pos. 3: A measurement 2 mm, welding length 25 mm

Welding pos. 4: A measurement 2 mm, welding length 25 mm



Fitting components

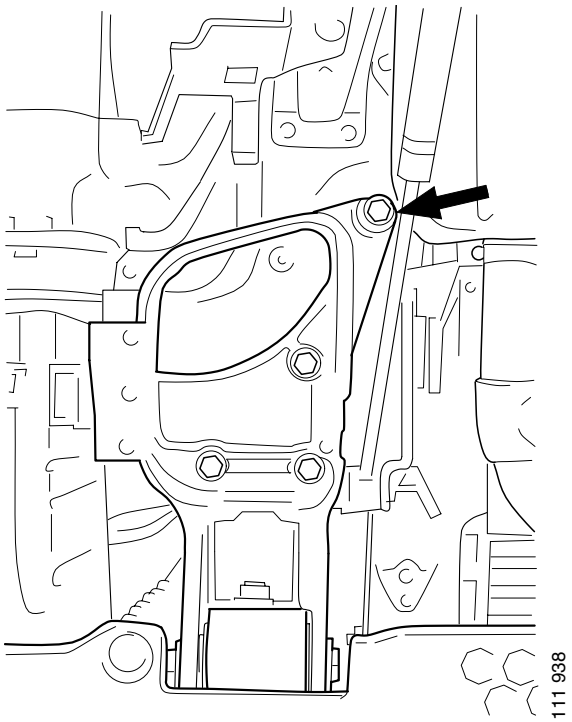
If previously fitted, refit the torque stay or anti-roll bar.

Turn the torque stay so the flat surface at the end is parallel with the radiator.

The torque stay on cabs fitted with such may make contact with the condenser when lowering the cab. In this case, lower the radiator by undoing its retaining bolts. Leave the condenser bracket with rubber buffers on the cab and undo only the four bolts on the condenser. This will enable the vertical position to be adjusted slightly.

The upper attachment points must be bevelled off slightly when fitting the front cab brackets, see illustration. This must be done so that the whole surface of the cab brackets will rest against the firewall.

The plastic covers on the heater unit may require bevelling off slightly because fitting the reinforcement plates will have increased the thickness of the firewall.



Surface treatment after welding

Painting galvanized plates

If painting is to be carried out immediately after welding then any zinc oxide and slag residue must first be removed with a wire brush. Otherwise, the panels must be cleaned before applying primer.

Flatten down existing paintwork with a fine-grain abrasive paper. Do not sand through the paint coat because the zinc layer will be damaged and impair the corrosion protection. Conventional alkyd primer must not be used on galvanized plate because it may make the paint flake. Ask your paint supplier for a suitable primer.

Painting sheet steel

Clean the sheet. Make sure the surface is smooth and free from burrs, round off any sharp edges.

Flatten down existing paintwork with a fine-grain abrasive paper. Prime the repaired area with a suitable primer with regard to the surrounding colour system. Ask your paint supplier for a suitable paint.

Other painting

Paint the cab in accordance with group 0, Painting.

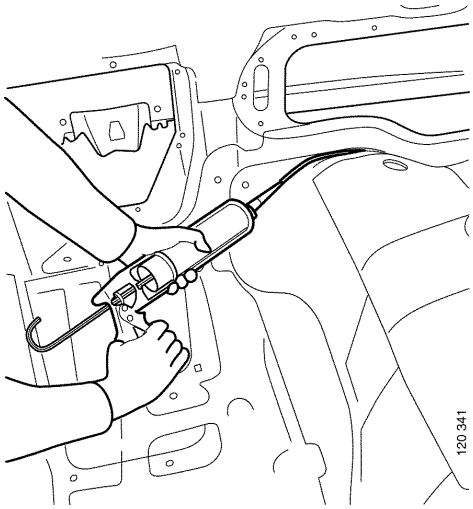
Corrosion protection

Welding, heating and grinding interfere with all types of anti-corrosion treatment on the cab.

Parts of the cab affected by this, and newly installed parts, must be corrosion protected.

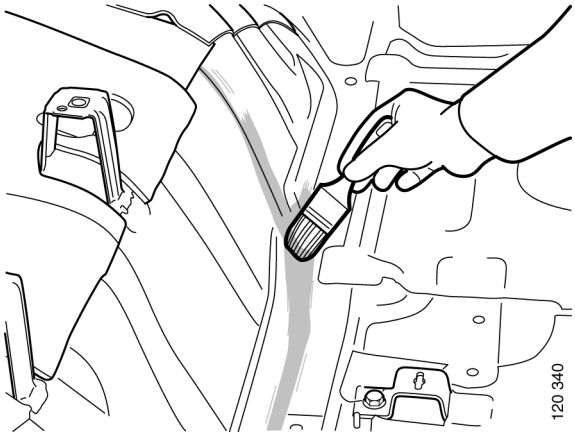
The corrosion protection can be applied with a spray or brush. Ask your supplier for suitable anti-corrosion products.

Sealing body joints



Moisture penetrating between joints in the cab can cause future corrosion or moisture damage to the body and interior. All joints must therefore be carefully protected against corrosion and sealed where necessary.

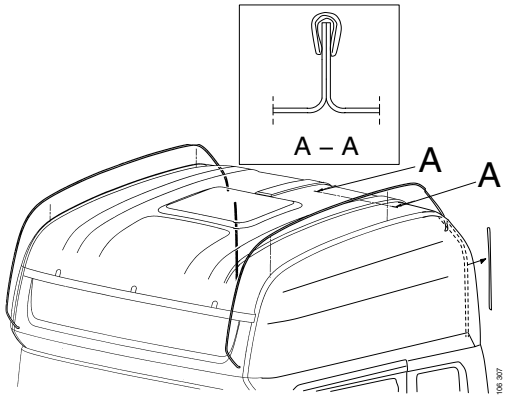
- Grind the joints clean.
- Make sure the joint is smooth and free from burrs, round off the edges of the panel.
- Wash the panel with detergent.
- Brush paint the joint with a primer containing high levels of zinc for steel surfaces. Make sure the joint is filled with primer.
- Prime the joint with a primer suited to the finishing paint.
- Seal the joint with an air-drying sealing agent by applying it with a brush or similar utensil.
- Paint the joint with original top coat.
- Treat the inside of the joint with primer, paint and anti-corrosive agent. Inner panels may need to be removed to gain access.



Cab roof mouldings

When fitting mouldings for the longitudinal joints on the cab roof, the moulding must first be heated to approx. 60°C before being put in place over the roof joint. This is necessary because the moulding must attain the correct temperature to ensure the integrity of the seal. The sealing compound will be damaged when a moulding is removed. Therefore, never refit an old moulding.

Note: Never refit an old moulding. It may cause a leak.



Hazardous materials

The cab design includes materials that can generate hazardous gases when heated.

The materials that are present are:

Polyester compound, floor insulation.

Anti-corrosive agent, in beams and inside the cab.

Bitumen, hot-melt matting for inner insulation of floor and defroster member.

Zinc compound, in roof joint.

Aluminium primer, in welded joints on non-galvanized plate.

PVC joint compound, sealing agent on external roof joints and internal joints on door flanges.

In order to avoid generating hazardous gases from these and any future materials, they should be removed before welding or heating takes place if possible.

Anti-corrosive agent in cavities may ignite in conjunction with welding and cause thick smoke even at some point away from where work is being carried out.

Provide good ventilation and use spot extractors when welding and heating.

Recycling materials

Any excess material should be sent for recycling or disposed of in accordance with company policy.