

FOREWORD

This booklet contains a complete review of the discussional slidefilm, Front End Collision Damage Repairs on the 1961 Corvair L.D.F.C. 95 Series. Each man should have one of these booklets for on-the-job reference, and one copy should be retained in the Service Department file of Technical Information.

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PART I

of this presentation covers Minor Front End Damage Repairs, with special attention given to the replacement of damaged sections of the front cowl panel assembly.

PART II

of this presentation covers Major Front End Damage Repairs, and contains important collision repair information on extensive front end damage and severe structural misalignment.

PART I

Minor Front End Damage Repairs

- GENERAL CONSTRUCTION
- INSPECTING DAMAGE CONDITIONS
- PLANNING REPAIR PROCEDURES
- COWL PANEL CUTTING AND REMOVAL
- INNER PANEL STRAIGHTENING
- DOOR OPENING ALIGNMENT
- DOOR PANEL STRAIGHTENING
- PREPARATION OF INNER PANEL SURFACES
- COWL PANEL FITTING AND INSTALLATION

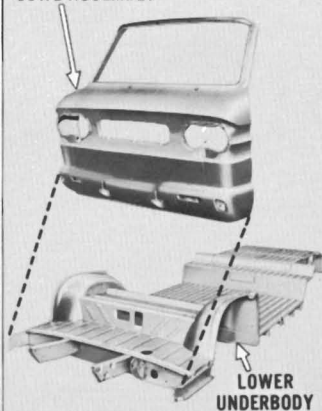
Additional and useful body shop information about various frame machine hookups is included.

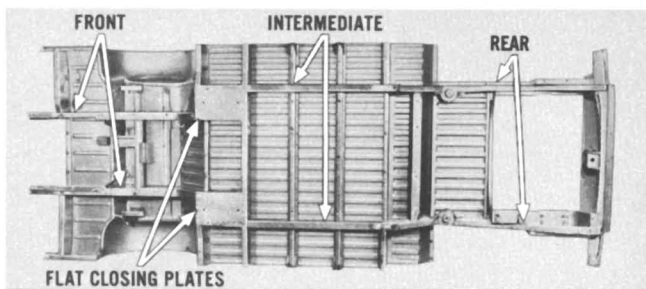
GENERAL CONSTRUCTION

All models in the Corvair L.D.F.C. Series use the same cowl assembly and lower underbody structure with only minor construction differences.

Although the Corvan and Greenbrier are used to illustrate this presentation, basic procedures apply to repairing front end damage and structural misalignment on all four models.

COWL ASSEMBLY





Principal supporting members of the lower underbody assembly are the front and rear "box section" side rails and intermediate "hat section" side rails. These offset side rails are joined and strengthened by heavy-gauge flat closing plates. Outrigger and cross sills help reinforce the entire construction.

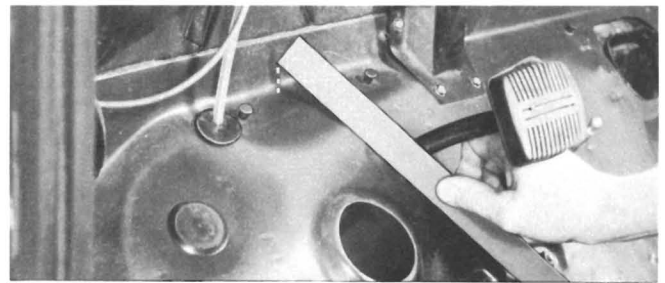
As discussed in Major Collision Damage Repairs on the Corvair (T-O-P SER-12-60), the repair of unitized construction damage which affects suspension, steering and engine mounting alignment is made easier and more profitable with proper body shop equipment.

Many structural misalignment conditions require:

- A frame straightening machine (fixed or portable)
- A tram gauge, which will reach from 8" to 98"
- Three centerline gauges, to check for lower body structural sag, sway or raised members.

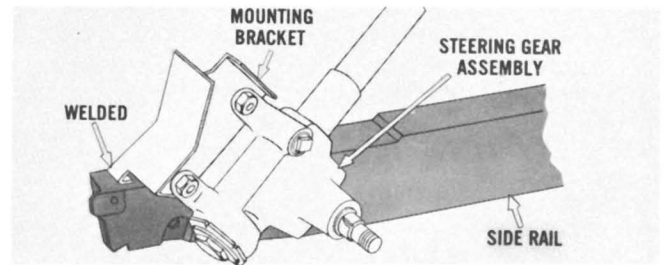


On the exterior, the outer cowl panel above the bumper, the area over the left headlight and the right door are dented.

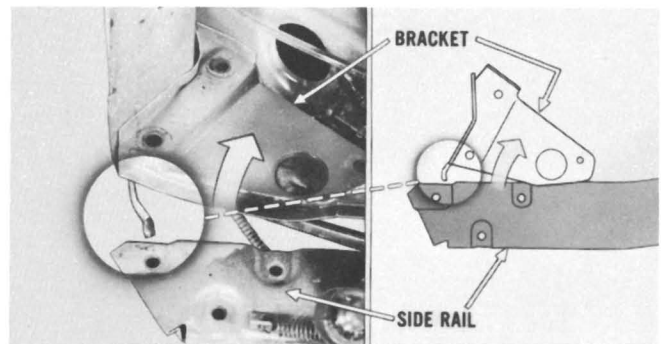


On the interior, the toe panel was forced upward, forming a bulge in the area surrounding the steering gear column opening. Both the steering gear mast jacket and worm shaft were bent. There was no indication of side rail misalignment.

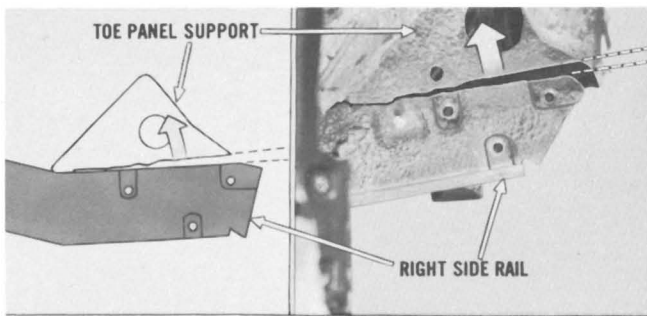
NOTE: Steering assembly removed for clarity.



GENERAL NOTE: Unlike the Corvair passenger car which has the steering gear assembly bolted directly to the left side rail, the 95 Series steering gear assembly is attached to a separate mounting bracket (and toe panel support). An offset extension of the bracket is welded to the side rail and spot-welded at the toe panel and inner cowl panel.

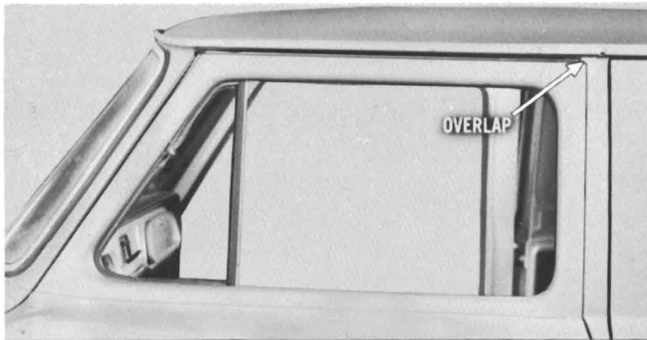


The impact caused the weld to break loose from the mounting bracket extension at the top of the side rail, and forced the bracket upward with the attached steering gear assembly.

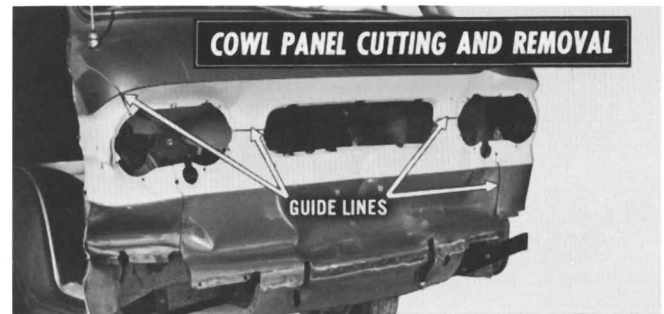


The right toe panel support was also forced upward. However, the front underbody was not misaligned because both toe panel supports broke loose from the side rails and permitted the cowl panel to lift away from the structural members.

Only the lower sections of the outer panels require replacement. Replacement of the complete panels would involve removal, replacement and resealing of the windshield and much more welding. The grille and headlight openings provide surfaces which can be cut and welded easily, leaving the windshield installation and upper panel welds unaffected. The result will be a better and faster job.



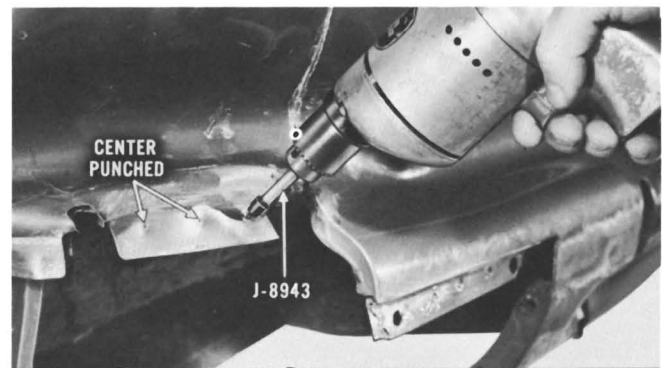
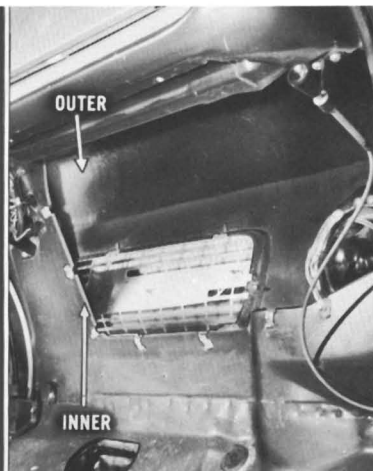
The left front cowl hinge pillar was pushed slightly rearward at the belt line, causing the door to drop and overlap at the lock pillar. This completes the inspection of damage conditions.



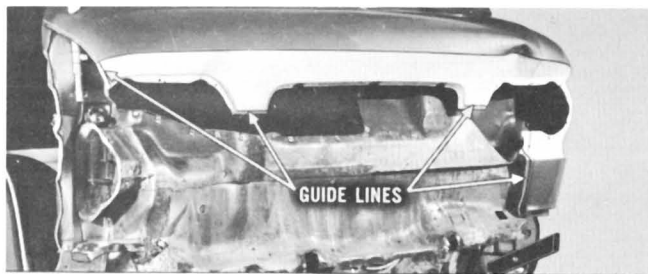
The right front door, the bumper assembly, both front outer cowl panel extensions, the headlight assemblies and the center air intake grille were removed. Guide lines for cutting out the damaged sections were marked on the cowl, as shown.

PLANNING REPAIR PROCEDURES

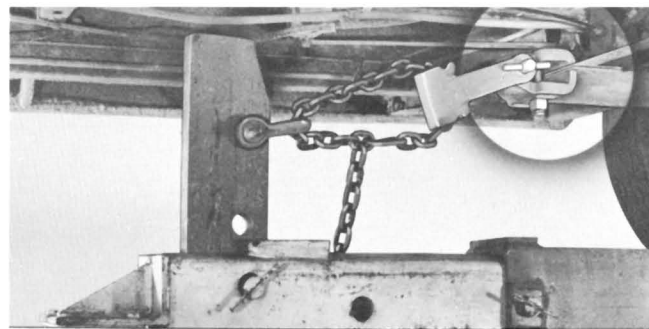
The damage to the outer cowl panel would be easy to straighten if double-wall construction did not block tool access. All the damage is in inaccessible sections of the outer panel, making replacement desirable. This will also simplify inner panel straightening.



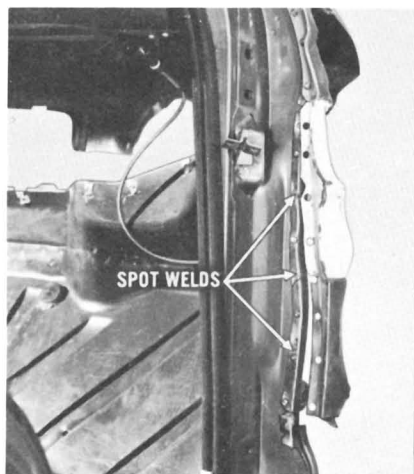
All accessible spot welds in the panel sections to be cut out were center-punched to permit cutting with spot-weld cutter J-8943.



A hacksaw and a pneumatic chisel were used in finish-cutting the damaged sections of the panels. About 1/4" was left inside the guide lines to provide overlap. Spot welds along the right pillar section were not accessible because of the crushed condition. The panel was cut close to the pillar with the pneumatic chisel. Then . . .

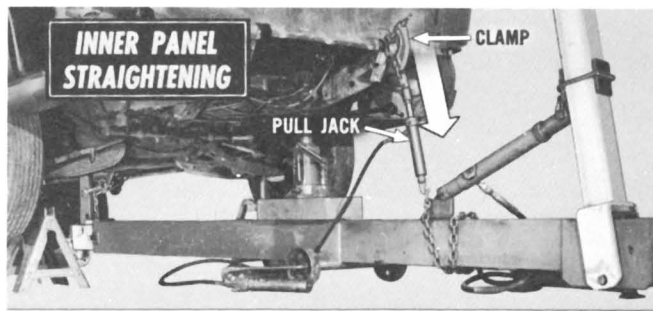
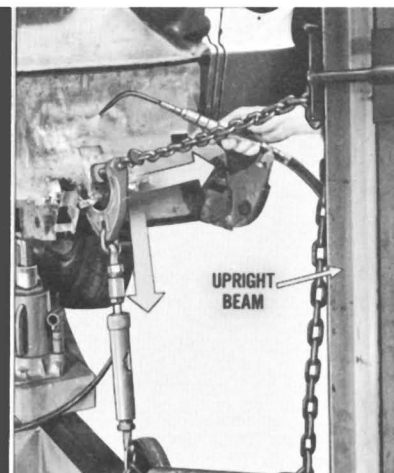


The frame machine was anchored at the rear because both a forward and downward pull was needed. The clamp was attached to the forward cross sill and left closing plate. This is the most solid and secure hookup point.

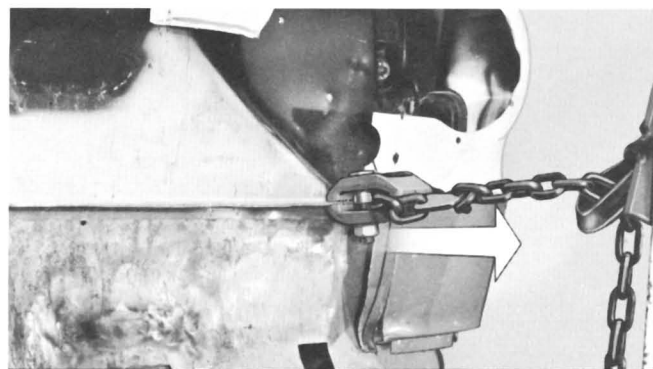


. . . the crushed section was pulled out to expose the welds, and permit the use of the spot-weld cutter so that the jagged section of the cowl could be removed from the pillar. These operations completed front cowl panel removal.

To provide a forward pull, a chain was connected to the clamp and the upright beam. Pressure was applied and heat was used to relieve the sharp buckles. When completed, the steering gear bracket extension was rewelded to the side rail.

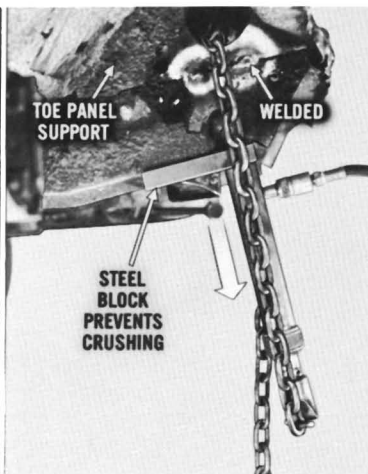


A portable frame machine was hooked up as shown, to begin straightening operations on the inner panel. A vertical pull with a pull jack relieved the upward strains which held the steering gear mounting bracket extension (toe panel support) away from the side rail.

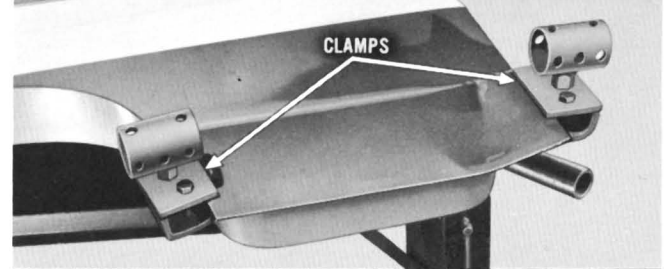


A clamp was attached to the flanged joint of the upper and lower inner panels and connected to the machine with a chain to pull this section back to shape.

A jack and chain was looped through the right toe panel support and around the jack on the underside of the side rail to permit pulling them together. When the strains were relieved, the toe panel support was rewelded securely.



DOOR PANEL STRAIGHTENING

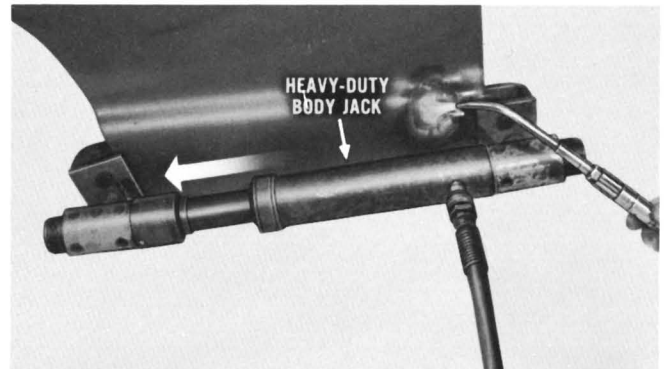


A tension setup is required to pull out the buckle in the door lower panel and realign the lower section of the forward edge. Clamps are shown in the proper position for this pull.



DOOR OPENING ALIGNMENT

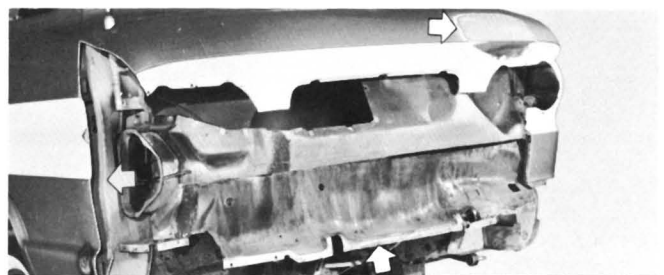
The left front cowl pillar was pushed forward at the belt line, using the diagonal jack setup shown. This restored door alignment.



Heat was applied to the sharp buckle as the dent was pulled out by extending the body jack.

CAUTION:

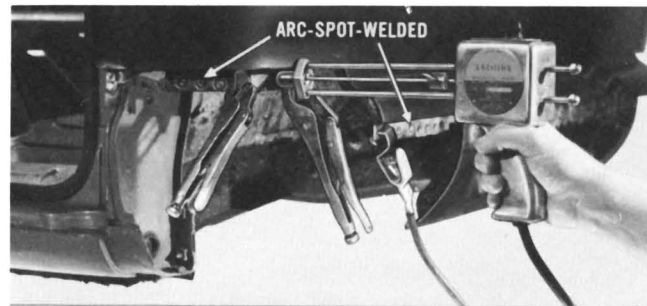
The diagonal jack setup used in the front door opening is only suitable for minor misalignment conditions of the cowl pillar and where only limited force is needed. Full hydraulic force would tend to stretch the rocker panel and shift the entire pillar forward.



Hand tools were used to straighten the "Vee"-shaped dent over the left front headlight. Straightening of the crushed right pillar assembly was completed. The right door was hung to act as a reference for space and alignment to the cowl side panel. All weld buttons along the lower inner panel were ground flush.



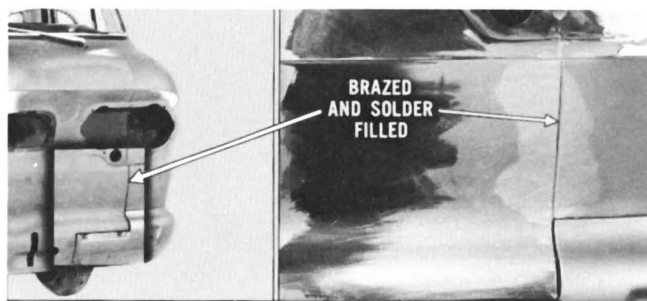
All accessible inner panel surfaces were wire-brushed clean. Bare metal surfaces were cleaned with a rust remover. The cleaned areas were then sprayed with a corrosion resistant zinc chromate primer.



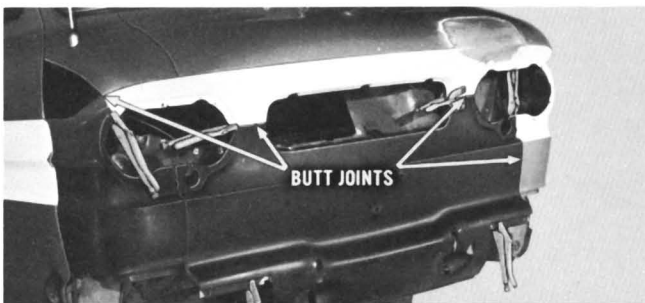
When the panel fitted correctly, the lower panel section was arc-spot-welded to the inner panel along the entire front of the cowl. It was necessary to remove the door to facilitate welding at the joint along the right front cowl pillar assembly.

COWL PANEL FITTING AND INSTALLATION

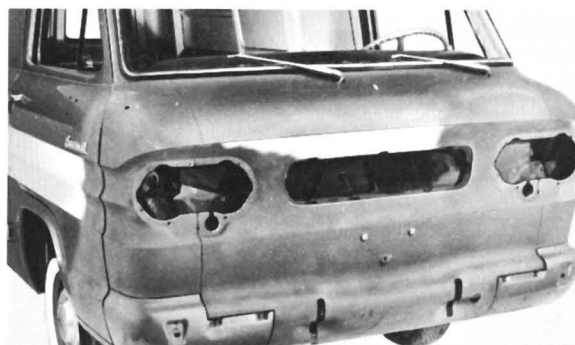
The right and center outer cowl panels are available separately. The sections necessary to replace damaged areas were cut out of the new panels, leaving extra metal in the grille section and along the cut at the upper end of the right cowl outer panel. The hidden flanged joint of the panels were then arc-spot-welded together off the car. This is the easiest method and restores factory appearance.



The upper joints were gas-welded and solder-filled. The joint below the left headlight was gas-welded at the ends, then braze-welded full length, and solder-filled. A vertical cut in the hot solder, using a sharp tool and straightedge, restored factory appearance.



The new cowl panel unit was then placed on the cowl and temporarily clamped in position. Minor corrections to provide butt joining were then made to the new panel by shifting the panel slightly as needed and trimming the metal where necessary.



The completed metal repair job is shown in prime. The center grille, headlight assemblies, and bumper assembly will be installed after final painting. This concludes Minor Front End Damage Repairs.

PART II

MAJOR FRONT END DAMAGE REPAIRS

- INSPECTING DAMAGE CONDITIONS
- TRAM GAUGE CHECK
- COWL ASSEMBLY REMOVAL
- LEFT SIDE RAIL REMOVAL
- RIGHT SIDE RAIL STRAIGHTENING
- LEFT SIDE RAIL AND OUTRIGGER INSTALLATION
- ROOF PANEL ALIGNMENT
- COWL INSTALLATION
- BODY SEALING
- PREPARATION OF UNDERBODY SURFACES

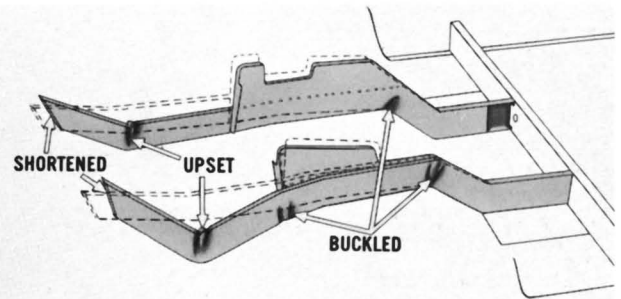


— the toe panel, front floor panel, the left rocker panel assembly, steering column and instrument panel are all damaged extensively. The installation of new parts and assemblies is the only practical and profitable repair procedure.

INSPECTING DAMAGE CONDITIONS

The front cowl panel of this Greenbrier is severely crushed and the left front door is damaged extensively.

Serious damage is indicated on the lower underbody structure, on the interior, and —

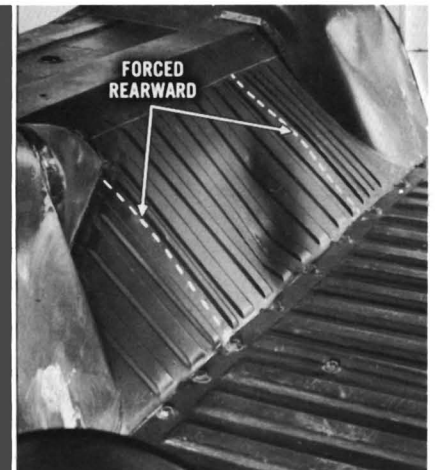


The forward lower underbody structure and front side rails are shortened, upset and buckled severely. The left side rail received most of the impact force and must be replaced. The right side rail can be pulled into shape with the frame machine and the use of heat.

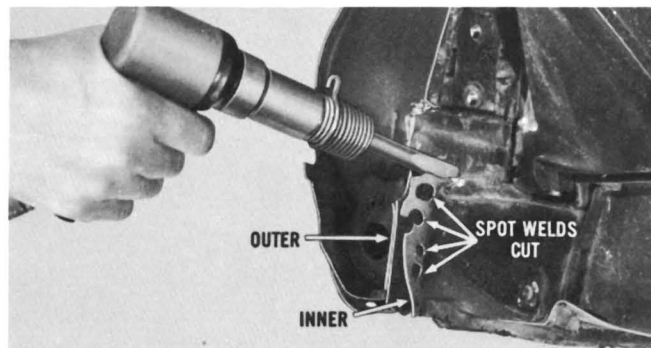
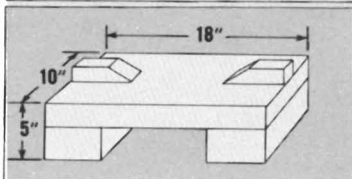
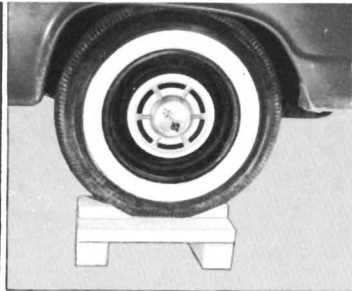


— the roof panel is also damaged. The impact forced the sloping front cowl pillar upward, causing a sharp bend in the roof rail at the lock pillar and buckled the roof panel. On the interior —

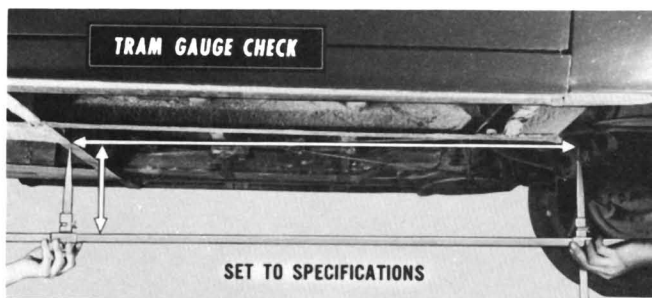
Both side rails were also forced rearward at the back of the front seat riser section, causing the panel to distort as shown.



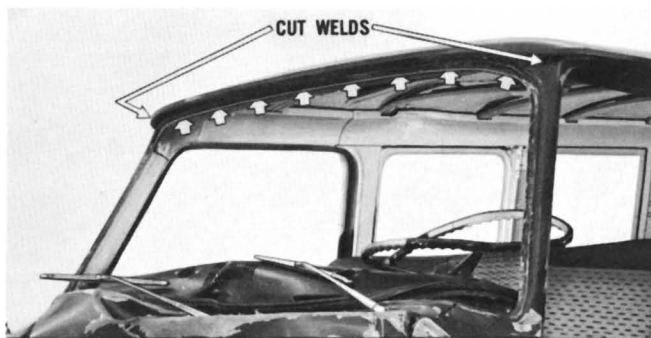
The first operation in preparing the vehicle for underbody checking, disassembly and repair is to provide a safe means of support for the rear wheels. Wooden stands, made locally, supported the rear end without strain at the proper work height. The front end was supported on stands placed under the forward jack pads.



A spot-weld cutter and pneumatic chisel were used to separate both the inner and outer rocker pillar panels from the lower ends of the door pillars.



From previous experience with automobiles of conventional construction, it was expected that the rearward shift of the side rails had travelled into the center section. However, checking with a tram gauge, set to 1961 Corvair and Corvan Shop Manual specifications, proved there was no shift.



The front roof trim panel was removed to provide access to the 8 bolts which hold the windshield header to the inner roof rail. Welds were cut to separate the cowl pillars from the roof rails.

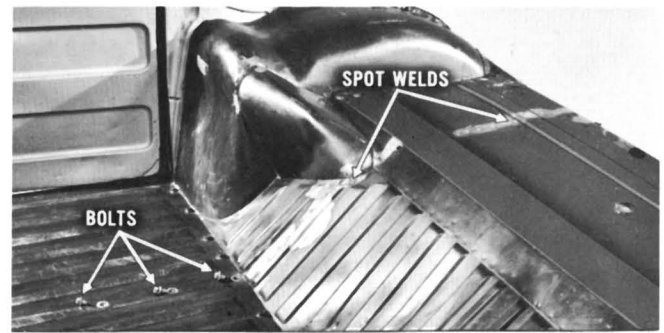
COWL ASSEMBLY REMOVAL

The gasoline tank, front suspension, brake, clutch and accelerator pedal, doors, front seat, wiring harness and all other controls were removed to permit cutting and removal of the cowl assembly and sheet metal parts.

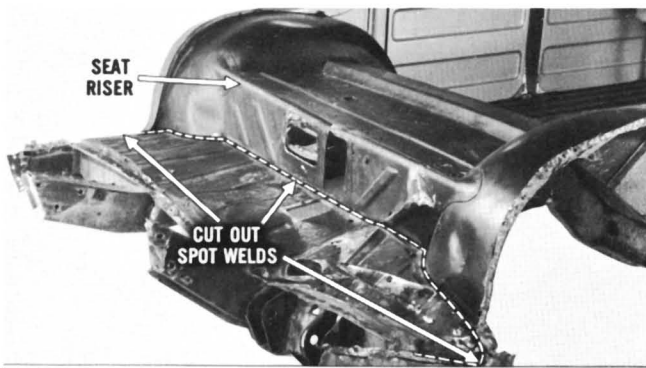


The toe panel was separated from the front floor panel by removing 11 bolts extending across the joint.

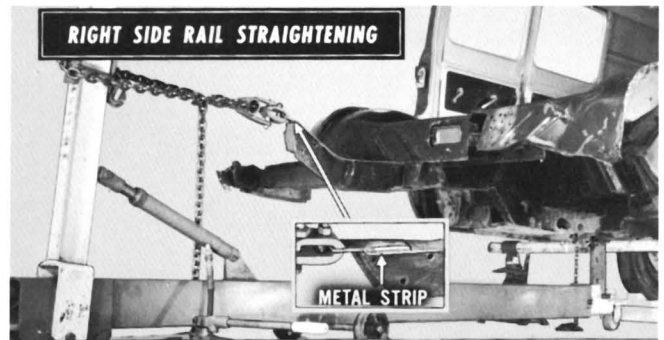
The left rocker panel and damaged cowl assembly were removed together. This provided access to the front underbody structure and permitted straightening operations on the roof.



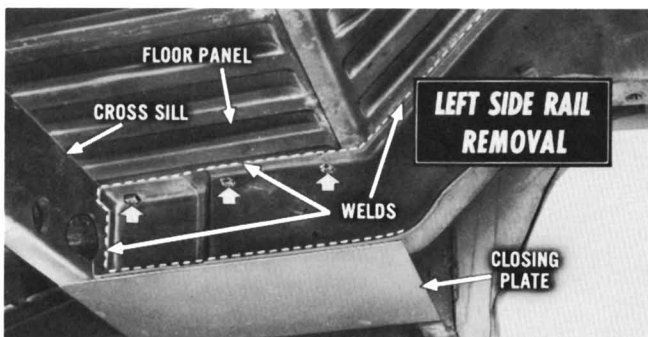
— through the dropped floor panel and the welds across the seat riser are accessible from inside the body. The damage in the kickup panel will be straightened after strain on it from the side rail has been relieved.



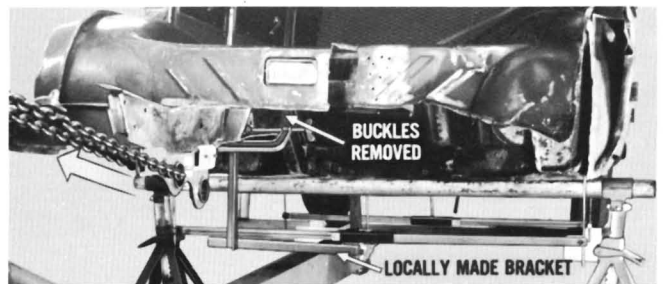
The front floor panel was removed by cutting out spot welds joining it to the seat riser, wheelhousings and inner rocker panels.



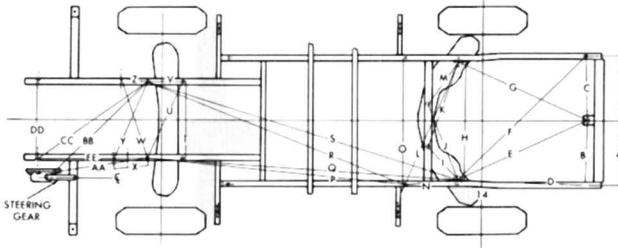
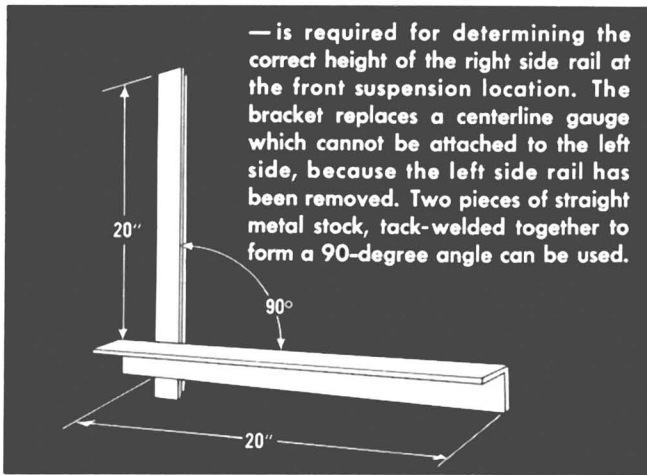
The frame machine was set up to concentrate tension on the front buckle. Attachment to the front end of the right side rail was made by a brazed-on heavy metal strip, clamp and chain. Heat was necessary to aid straightening.



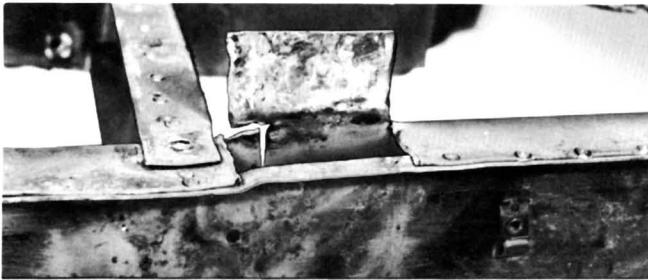
To remove the left side rail it was necessary to remove the 3 attaching bolts and cut the welds holding it to the cross sill, closing plate, dropped floor panel, seat riser and cross bar under the seat riser. The bolts —



Attachment of the frame machine was shifted to the lower flange of the right side rail to apply tension to the buckles under the seat riser. Heat was also used. A locally made bracket was set to datum height and then clamped to the side rail at the front suspension attachment. The bracket —

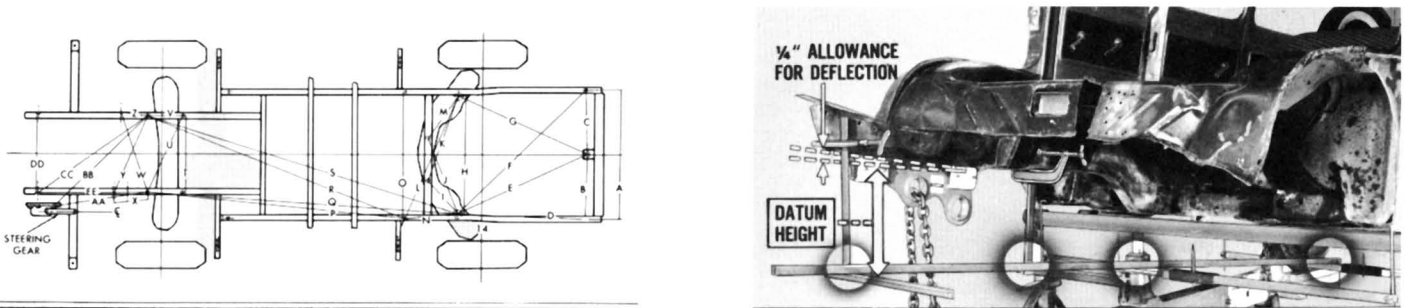
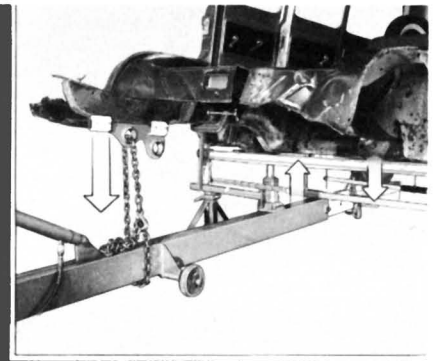


Fore, aft and diagonal measurements were established by the use of the tram gauge set to specifications obtained from the 1961 Corvair and Corvan Shop Manual. This is absolutely essential for front wheel alignment and must be correct before the left side rail is installed.

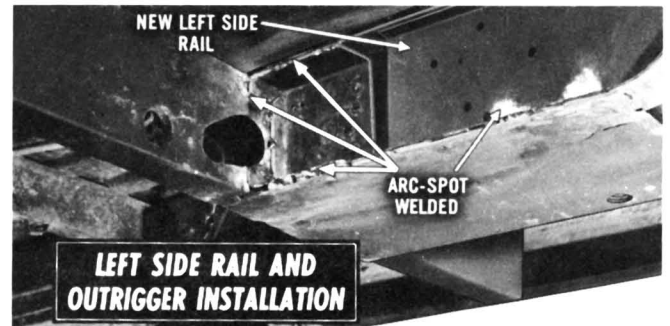


A door was cut in the upper flange of the right side rail. Heat and a heavy curved body spoon were used to force the minor buckles outward from inside the box section. This permitted final straightening with hand tools. Gas welding was used in closing the door and repairing the torn section.

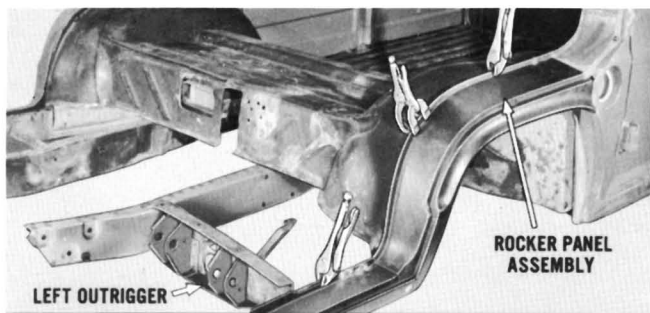
This hookup was needed to pull the front section of the right side rail into proper position. To do this, an allowance of approximately $\frac{1}{4}$ " must be made because the weight of the cowl assembly, doors and other parts will cause the side rail to deflect slightly. A final check was made —



— by adding another bracket at the forward end of the side rail. An allowance of $\frac{1}{4}$ " was added to the datum line height setting of the bracket and then clamped in place. Correct alignment is shown by a lengthwise bar touching each of the brackets and centerline gauges.



The new left side rail was clamped in place and aligned with the right side rail. Measurements on both side rails must correspond. Welding was done on the underside with the arc-spot welder.



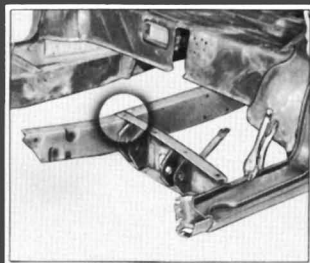
LEFT OUTRIGGER

ROCKER PANEL ASSEMBLY

The left outrigger (clutch and brake pedal support) and the rocker panel assembly were clamped in place and tack-welded. The installation of these parts was necessary to establish a reference point for measuring the distance between the rocker panel and roof.

CAUTION:

The upper flange of the outrigger should be aligned to the threaded hole in the side rail and welded only at this point. The rest of the welding should be delayed until the cowl panel assembly is securely in place and the brake and clutch pedals installed. This will permit a slight fore or aft shift of the lower edge of the outrigger to align the pedals to their openings in the toe panel.

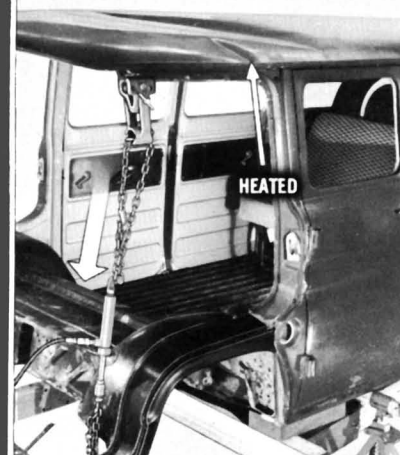


MANUAL ARC WELDING

Manual arc welding is recommended to join the floor panel to the heavy-gauge side rails, because of the holes left by the spot-weld cutter. If gas welding is used, the flange of the side rail should be preheated from the underside.

ROOF PANEL ALIGNMENT

This hookup was used to pull the left front corner of the roof down and relieve buckles in the center area. Heat was used to relieve the sharp buckle on the edge of the roof panel.

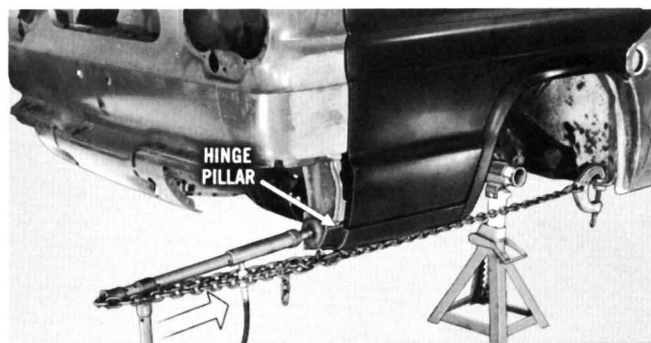


HEATED

COWL INSTALLATION



The cowl panel assembly is now ready to be set in position on the body.

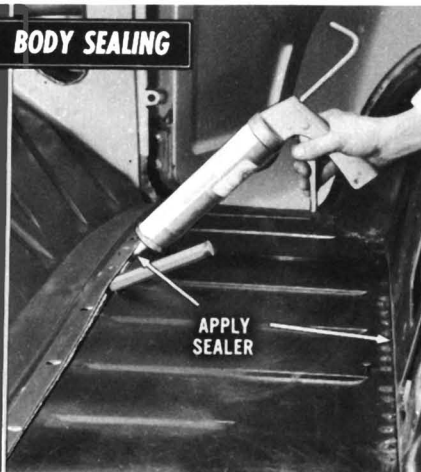


HINGE PILLAR

The lower sections of the hinge pillars must be placed into the openings in the rocker panels. With the door installed, this chain and jack setup was used to force the pillar into proper position for door-opening alignment.

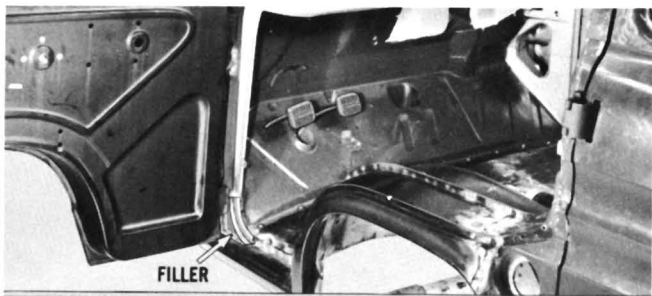
BODY SEALING

Sealer was applied between the floor panel and toe panel joint before installing the bolts. It was also applied along the welded joint at the rear of the front floor panel, both inside and out.



PREPARATION OF UNDERBODY SURFACES

Rust-proofing should be applied to all underbody components whenever repair operations or collision damage destroy the factory-applied preventative. All welding scale, paint flakes, and bare metal should be wire-brushed clean to prepare the surfaces BEFORE priming. Use a ZINC CHROMATE primer or an equivalent type of air-dry primer.



After the brake and clutch pedals were installed, the left outrigger was shifted slightly to permit proper pedal movement in the toe panel openings. The outrigger and door filler reinforcements were then welded in position. All other welding was then completed. Bolts to the header rail and toe panel were installed.



The straightened and rewelded body shell is now ready for painting. The front suspension, gasoline tank and steering gear assembly have been installed. Other parts will be connected and attached after painting. This completes Major Front End Damage Repairs.



The roof panel was then metal-finished and primed.