Unit 4 Major Body Repairs

There are four types of collision occurs in the vehicle. These types are for the technical work.

1. Front-end Collision
2. Rear-end Collision
3. Side wipe Collision
4. Roll-Over Collision

1. Front-end Collision:

Different sections in front end Damage

FRAME AND UNDERBODY DAMAGE IN FRONT DAMAGE

The modern vehicle is designed to absorb a certain amount of shock upon impact with other vehicles or stationary objects. Often, when hard impacts occur, a large portion of this shock is absorbed by the frame or underbody. The frame or underbody, when damaged, will not return back to its original position. This is because the thick gauge of metal used in the lower structure of the vehicle rigidly holds the newly formed position.

When major body damage occurs, there is usually some frame or underbody damage as well. Therefore the damaged vehicle must be thoroughly checked for any frame or underbody damage before the actual repairs are begun. This examination is extremely important. The frame and underbody must be corrected before correcting the damage to the upper sheet metal sections. Otherwise, proper alignment of the sheet metal panels becomes almost impossible and much valuable time is wasted.

FRONT END SHEET METAL DAMAGE

Once the damaged frame or underbody has been repaired any sheet metal panels which sustained damage must be repaired. It is important to do this before installing any new sections. Inspect for damage on all sections located near the front end. These sections include doors, cowl panels, and the various inner panels. Failure to perform panel repair at this point will cause problems later in aligning.

1. **Doors' Damage:**

Doors often receive minor damage on the front edge during front end collisions. This damage is caused by the front fenders being moved slightly to the rear upon the initial impact. The doors are often misaligned by this force and can be checked by simply opening and closing the doors and noting the misalignment. Any drag or uneven gap between the rear of the door and the adjoining panel indicates a misalignment. Unit 16 will discuss the proper procedure for door alignment.

2. **Cowl and Inner panel damage:**

Cowl panel damage is often overlooked during initial inspection. The side cowl panel is hidden by the rear portion of the fender and thus cannot be seen from the outside. Although filial finishing of this section of the cowl panel is not necessary, it is important that all buckled metal be straightened. This is necessary to insure proper align- ment of the bolt-on panels and also to seal out air and water. On most vehicles, rubber seals attached to mud guards cover the space between the inner and outer panels. It is important that these sections fit properly. The upper cowl panel is often damaged when the hood is moved to the rear. Any upper cowl panel damage can be detected by the scarred painted surface or distorted metal. Damage may also be detected by installing the replacement hood temporarily to check for proper alignment.

REPAIR OF FRONT-END DAMAGED VEHICLES:

We will explain general repair methods by going through a typical example of front end damage and the replacement of a front cross member, front fender apron on one side, side member, as well as repairs to the front fender on the opposite side, front fender apron and side member. It is important to begin the repair by restoring the front fender apron and side member to their pre-damaged condition and to repair the support structure on the replacement side.

1. First, pull the side member on the replacement side in the direction opposite to the impact direction. Then repair the fender apron and side member on the repair side and at the same time repair the front fender apron and side member installation areas on the replacement side. There are many cases where the entire fender apron or side member on the repair side is deflected left or right only. Since there is practically no

warping in the lengthwise direction, repairs involve measuring the diagonal dimensions (A) (B), as shown in the figure below, and correcting that distance while keeping an eye on the repair condition. The operation can be done efficiently, if the fender apron upper reinforcement is pulled at the same time as the side member.

If the side member on the side is repaired toward the outside, slant the pull toward the front, keeping an eye on the diagonal dimensions. If it is deflected toward the inside, pull it toward the front.

2. If there is severe bending damage to the side member on the repair side caused by pulling, separate the front cross member and radiator upper support at the point where the diagonal dimension is correct and repair them separately. Grip, the inside broken face of the side member, and while pulling it forward, pull the broken piece from the inside or push it from the outside. After repairing the bent portion, match up the dimensions to the standard diagonal dimensions.

3. To repair the replacement side front fender apron and side member installation area, the main repairs are near the dash panel and the cowl panel, but if the impact was severe, the damage will extend into the front body pillar (the door would fit poorly in this case). Simply gripping the front edge of the side member of fender apron and pulling will not repair the major damage to the front body pillar or the dash panel. In this case, cut the fender apron and side member near the installation area, clamp near the major panel damage and pull (keep an eye on the door fit conditions). Good results can be obtained using this method. Also, at the same time that the pillar is being pulled forward, pushing can be done form the interior side with a Porto Power.

2. Rear-end Collision:

Different sections in rear end Damage

REAR END BODY PANELS

While pull is being exerted on the damaged frame section, check the effect of this pull on the sheet metal sections. Indirect damage on the quarter panels should begin to correct itself. Often the damaged sheet metal is automatically straightened at the same time as the frame is being straightened.

Repairing Rear End Body Panels:

1. **Remove highplaces.**
   After using the low crown surfacing spoon, remove any ridges or high spots surrounding the indirect damage. Additional high spots should be worked with various hammers or hammer and dolly combinations.
2. **Straighten panel.**
   Release a small amount of pressure from the frame to the straightened panel and recheck the work.
3. **Check alignment.**
   Check the trunk lid for proper fit and gap clearance before and after each pull is made.
4. **Adjust hinges.**
   After all the rear body sheet metal has regained its correct alignment, proceed to align the trunk lid by making adjustments at the hinges. Replace any locking parts which were removed.
5. **Bumping andfinishing.**
   Complete the metal work by following the procedures for metal bumping and finishing outlined in earlier units. Check all panels for proper alignment.

REAR BUMPERS

When installing new bumpers, all damaged bumper braces should be replaced with new ones to insure a proper fit.

Installing Bumpers:

1. Remove all reusable braces from the old bumper.
2. Place the new bumper face down on a smooth padded surface. This is done to avoid marring the bright plated surface. A heavy cloth pad is ideal for this purpose.
3. Install bumper braces on new bumper and replace the assembled unit on vehicle.

4. Align the bumper by measuring an equal distance from each end. It is important also that the bumper be located the correct distance from the rear lower body panel. Normally there are sufficient adjustments which can be made to gain the correct alignment.

REPAIR OF REAR DAMAGE VEHICLE:

Since panel construction of the rear body is more complex when compared to the front body, the path of propagation from an impact is also more complex and the damage can be more extensive. Therefore, the damage diagnosis must be done accurately. In most cases the bumper is impacted during rear end collisions and the impact force will usually propagate through the rear ends of the rear side members or nearby panels and cause damage to the kick-up area. Next, the wheel housings will deform causing the entire quarter panel to move forward causing clearance problems between other components. If the impact is severe enough, it will have an effect on the roof, door panels and centre body pillar.

1. Attach clamps or hooks to the rear portion of the rear side member, rear floor pan or quarter panel rear end portion and pull while measuring the dimensions of each part of the under body and while determining the degree of repairs necessary by the conditions of panel fit and clearances.
2. Do not clamp and pull a quarter panels that has little or no strain On it when the rear side member is pushed into the wheel housing or there is clearance problems at the rear door. Relieve the stress in the quarter panel by pulling on the side member only. If the wheel housing or the roof side inner panel is clamped and pulled along with the rear side member, the clearances with the door panel can be maintained properly.

3. SIDe-wIPe Collision:

Different sections in side wipe Damage

QUARTER PANELS

Because the rear quarter panel is the only major side panel which is stationary, it is recommended that the repairs on sideswipe collisions begin at that panel.

Whenever two or more adjoining panels are damaged and one is stationary, the repairs should always begin on that panel. Bok-on panels can be adjusted for alignment. Therefore such panels are replaced or repaired last.

DOORS

With the quarter panel installation completed, proceed next to the doors. If more than one door is damaged, the rear door should always be repaired first. Shown in Fig. 16-9 is a late-model vehicle which has sustained severe damage on both front and rear doors. In some cases of door damage, only the outer panel has to be replaced. However,
in cases of extreme damage to the door frame (inner panel), the complete door assembly must be replaced.

ROCKER PANELS

It is not unusual for rocker panels to be damaged during a sideswipe collision.
Rocker panel damage is of major concern to the technician because much of the vehicle's body strength is furnished by the rocker panels. This is especially true if the vehicle is of unitized body construction. Whether to replace or repair the rocker panel depends, of course, upon the extent of the damage. Whenever minor damage occurs to the rocker panel, it is corrected in the same manner as any other minor damage. If the rocker panel sustains major damage, the chances are great that the panel will have to be replaced.
The vehicle shown in Fig. 16-16 received damage to the rocker panel to such an extent that replacement is required. It can be done by the following procedure.

CENTER PILLARS

The center pillar, found only on four-door body styles, acts as a lock pillar for the front door, hinge pillar for the rear door, and center support for a sedan roof. On hardtop and convertible body styles, the center pillar does not support the roof, but is fastened at the bottom to add rigidity to the body. Very little of the center pillar on the modern automobile is exposed to the outside. Because of this concealment, damaged center pillars are often overlooked during the initial inspection. In many cases where major damage occurred on center pillars, one or both of the doors cannot be opened^ When this happens, the technician cannot determine the extent of damage and gain an accurate cost estimate unless one or both doors are removed at the hinges. The procedure for replacing the center pillar is the same as that for replacing the rocker panel. When only minor damage has occurred to the center pillar, it is corrected by following the repair procedure outlined for other stationary panels.

Exterior trim:

After all side panels are aligned properly and the outer panels have been checked and corrected of any damage, the panels are ready to be drilled for attaching exterior trim. Exterior trim includes moldings nameplates, emblems, and any *other* outside hardware which must be replaced on the repaired vehicle. It is important to do this drilling before the final color coat of paint is applied, to avoid marring the finish.

REPAIRS OF SIDE-WIPE DAMAGED VEHICLE:

If there is severe impact to the centre of the rocker panel, the floor panel will deform and the entire body will take on a curved shape like a banana. This type of damage is called a banana hit. To align this type of damage, use a method similar to straightening a piece of bent wire. The two ends of the body are pulled part and the side that is caved in is be pulled outward (3-wary pulling).