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Technical Information For The Collision Industry

Repairing Hail Damage

Hail damage to vehicles is quite common, with most areas of the world experiencing hailstorms at some time throughout the year. Location plays a major role in the likelihood of hailstorms capable of causing vehicle damage, but most technicians will have to deal with hail damage repairs sometime during their career. There are many options available for the repair of hail damaged vehicles. Each repair technique has its own advantages, disadvantages, and limitations. Many times the repair of the vehicle is best suited using a combination of processes.

Hail damage repairs can be broken down into two basic categories, conventional repairs and paintless dent repairs (PDR). Conventional repairs involve removing the damage and refinishing the panels, while the PDR process involves removing the damage in a manner that does not require refinishing of the affected panels.

PDR PROCESS

The PDR process uses special picks to raise the damage area from the backside of the damaged panel. Using a wide variety of different length and shaped tools (see Figure 1), the PDR technician gently removes the damage from the panel. To avoid damaging the coatings on the panel backside and creating a corrosion hot spot, plastic-tipped PDR tools should

be used (see Figure 2) and any damaged coatings on the panel backside should be restored.

One of the considerations for using PDR is that you will not have to refinish the damaged panel(s). Another consideration for PDR is that it is an acquired skill that can take a lot of practice to master. PDR also has some limitations to its use. Some damage may be too extensive for using PDR. In addition, some damaged panels may not be accessible from the backside of the panel. Therefore, damage in these areas may not be repaired using PDR. The PDR technician should not drill holes or cut away reinforcements, foam, or other parts to access a damage area. If there is any damage to the finish, or if the vehicle has been refinished, the vehicle may not be a good candidate for a PDR repair. The paint finish should be inspected under magnification both before and after the repair to ensure that there is no micro-cracking of the finish (see Figure 3). Because of the concerns about backside corrosion and micro-cracking of the paint finish, some vehicle makers do not recommend the use of the PDR process.

REPLACEMENT

There are many options available for conventional hail damage repairs. One method is to simply replace the damaged panel. Factors in the decision to

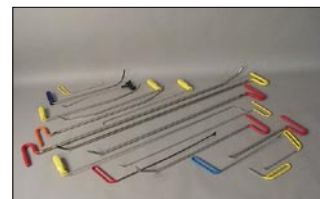


Figure 1—These are just a few of the many sizes and shapes of tools available to the PDR technician.



Figure 2—The plastic tip on this PDR tool will help avoid damaging the coatings on the panel backside.



Figure 3—This technician is using a lighted magnifying tool to inspect the paint finish for micro-cracking in the hail damage.

replace damaged panels include the extent of damage and ease of panel replacement. Horizontal panels, such as hoods, deck lids, and roof skins are the most susceptible to hail damage, often receiving the majority of the damage to the vehicle (see Figure 4). Hoods and deck lids are fastened with bolts and therefore easily replaced. These two factors lead to hoods and deck lids often being replaced when damaged by hail.

Roof skins pose another issue. Since roof skins are welded and/or bonded, and require the removal of fixed glass to replace, they are not replaced as often as bolted-on horizontal panels.

REMOVAL PICK OR HAMMER AND DOLLY

If the damaged panel is not replaced, there are a number of options available for repair of the hail damage. One method is to use picks or hammers and dollies to work the damage out from the backside, similar to a PDR repair, and then refinish the damaged panel. This method may allow the damaged panel to be repaired without the use of body filler, but may require the removal of additional parts to access the panel backsides. As with the PDR process, not all damage will be accessible from the backside, and therefore not repairable with this method. Be sure to replace any coatings on the panel backside that are damaged by the tools used to remove the damage. Also be sure to remove any of the exterior finish that is cracked or damaged.

BLOCK SANDING

Another option for minor hail damage is to block-sand the panel and use the existing finish to help level the surface. The panel can then be primed and block sanded again to completely remove the damage and prepare it for refinishing. This technique only works when the surface defect is less than 10 mils deep. Damage that is 10 mils or deeper could have a skim coat of finishing body filler, compatible for use over sanded fac-

tory finishes, applied and sanded after block-sanding the original finish and before priming. An advantage of these techniques is that there is no disturbance of the original corrosion-resistant coatings on the panel backside. However, be sure to inspect the original finish for any micro-cracking, and completely remove any defective finish in these areas.

HEAT SHRINKING

Another option is to use heat to remove the damage. A small torch can be used to expand the metal in the damaged area, raising the surface up into a small bulge. As the metal cools and contracts, the size of the surface will be significantly reduced, often to the point where priming and block sanding will level it. To use this technique, start outside the damaged area and apply heat from the torch in a circular pattern until the surface begins to rise above the level of the panel. Remove the heat and allow the panel to cool (see Video). Cooling of the panel can be sped up with a damp rag or compressed air. After the panel has cooled, remove the finish where it has been affected by the heat and apply the recommended primers to finish the repair. This technique works best on small damaged areas, less than 20 mm (3/4"), and on panels with a slight crown. If the panel is flat, the metal may want to expand in the direction of the damage, making it worse instead of removing it. Observe the direction of metal movement when first applying the heat. Stop and choose a different repair technique if the metal is moving in the wrong direction. Follow all precautions for the use of open flame heating devices and be sure to restore any damaged coatings on the panel backside.

STUD WELDING

For larger damaged areas with limited access to the backside, dent pullers that weld a stud on from the topside can be used to raise the damage area. The repair can then be finished with filler and primer as required. Be sure to repair or replace any damaged coatings on the



Figure 4—Horizontal panels like this roof skin receive the most damage from a hailstorm.



Video—This video shows the technique for heat-shrinking hail damage.

panel backside when using welded-on studs. When using weld-on dent removal equipment, be cautious of flammable materials that may be located on the panel backside. Another option, when access to the panel backside is limited, is the use of adhesive dent removal tools. With this equipment, a special stud that is adhesively bonded to the panel at the center of the damaged area is used to raise the damaged area from the front side (see Figure 5). After the damage is removed, a release agent is used to remove the stud from the panel.

CONCLUSION

A successful hail damage repair may use one or more of these procedures. A typical repair job may involve replacing the

hood and/or the deck lid, and straightening the roof skin and other panels. The majority of the damage in the roof skin may be repaired by pushing out from the panel backside. Damaged areas that are inaccessible may be repaired by shrinking with heat or pulling with an adhesive or welded-on stud. The smaller, less pronounced damage on the vehicle sides may be repaired by block sanding and priming. Inspect the damage, including the paint finish, and determine what the best repair method for each damaged area is, and then develop a repair plan best suited to the vehicle and damage being repaired. Be sure to restore any corrosion-resistant coatings on panel backsides that were disturbed during the repair process.



Figure 5—To remove damage with this removal tool, the wing-nut on the adhesively bonded stud pulls against the bridge that straddles the damage.