Understanding Windshield Repair by Hiteshbhoi

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For most automobile owners, changing oil and doing routine maintenance checks are important aspects of keeping the vehicle healthy. When the car manifests signs of problems, the driver would usually make sure it is corrected immediately to avoid more costly repairs later. But one thing most car owners neglect, but should not, is the windshield. Although the windshield does not belong with the â€˜mysteriousâ€™ underhood components and seems to be transparent in its use, its importance cannot be understated. As with any car component problems, windshield damage should be repaired immediately.

Many people doubt the value of a chip repair. Paying fifty bucks for a chip repair that is barely the size of a nickel seems unreasonable. However, most do not realize that the windshield is very fragile to internal stress. It may look impenetrable, but when subjected to road and temperature stress, the chip can easily become a crack. Searching recent forums, an Acura ownerâ€™s tolerance of â€œan annoying little rock chip [had] finally become a long streak across the middle of [his] windshield.â€• (1)

Your Windshield

As with all things, letâ€™s begin with the basics.

Windshield glass is a type of laminated glass. It consists of two layers of special composite glass with a laminate in between the layers. The laminate usually is made from a form of vinyl plastic, which is in simple terms, a very strong plastic. The laminate acts as a sticking board for the inner and outer layer of glass, which serves to hold both layers together and provides a surface in the event of shattering for glass fragments to adhere to.

A black frame, referred as the â€˜fritâ€™, lines the outer edges of the windshield, commonly 2-3 inches wide and even wider on top. The frit protects the urethane molding (generally speaking, glue that bonds windshield to car) of the windshield from the sunâ€™s ultraviolet rays. Without the frit, the urethane would melt and cease to hold the windshield to the body frame. This is what happens with rear-view mirrors that are incorrectly installed; they fall off the windshield after the adhesives melt in the sunâ€™s heat.

Functions of Your Windshield

Windshields play essential roles in vehicle safety and drivability. First and the most apparent function of the windshield is blocking wind and airborne debris from you and providing a clear perspective of road conditions. This is more of a drivability issue. The next two functions are safety-related, especially during an accident. In a frontal collision, two safety features of the car minimize impact damage to the driver and passenger: SRS Airbag and seat belts. In order for the airbag to deploy properly, the windshield needs to be in place. It stops the airbag from deploying upwards and redirects the direction of inflation toward the driver. In a rollover, windshield serves dually to prevent the roof of the car from collapsing and the passenger from having any body parts hanging outside the car. This issue is more pertinent with side windows, where loose body parts will dramatically increase fatality rates.

An improperly installed or cracked windshield will jeopardize your safety. One, the windshield may crack up and eventually lose integrity and shatter. Two, during an accident, the windshield will fly apart on airbag deployment with shards of glass spewing all over the place. And the airbag will be

less effective. Third, on a rollover, compression stress will first stretch the crack from end to end and then finally break the windshield. Flying glass shards are very sharp and dangerous.

How Your Windshield is Installed

Ok, are you still following me? In the above sections, I have mentioned windshield structure and function. This section will cover windshield installation. The next section will tell you about windshield stress areas that dictate how likely a chip or crack is going to develop further.

Windshield placement is a highly robotic and computer-controlled process in the assembly line of automobile manufacturing. Computerized alignment and placement procedures ensure that both molding and windshield are accurately fitted. Preparation of the car frame provides a clean surface to which the windshield could bond. Furthermore, there is ample time between windshield installation and the end of the production line for the molding to cure. Because of these exacting processes, the quality that comes out the factory is the best.

For aftermarket windshield installation, getting rid of the original windshield properly is foremost to a good replacement. The correct installation techniques require removal of the old molding and lower windshield cowl panel. Subsequently the glass is cut out, leaving around 1/16â€• of urethane bedding. The channel area, where the urethane adhesives bond, should be primed to inhibit rust formation. Rust formation will eventually weaken the bonding of the windshield to the car. After placement of the windshield, the car should be given from 1-24 hours to cure, depending on the adhesives used.

Some unethical replacement practices include shortcuts, such as close-cutting, flush-cutting and jumping-the-cowl. These will not be covered here, but if you are interested, you may read about these shortcuts in brief in the second link in References.

Stresses the Windshield Endures

Whether your car is parked, speeding east on Highway 60 or turtle-ing in the morning rush hour on I-10, your windshield endures many abuses: temperature changes (most notably night cooling and day heating,) road vibrations and car body frame shears, and road debris.

Because glass expands and shrinks at a slower rate than the metal body frame it is located in, during temperature changes, for example a rise in ambient temperature, the expanding metal pushes in on the sides of the windshield; conversely, a decrease in the ambient temperature exerts a pulling force on the edges of the windshield.

Now imagine, in addition to temperature stress, the constant pulling and pushing of the windshield from the body frame absorbing road impact. A stress gradient exists within the windshield. The highest stress occurs around the edges and lessens gradually approaching the center point of the windshield.

So far so goodâ€¦Then a rock hits the windshield and creates an opening. Usually the windshield could distribute temperature and vibrational stress to its neighboring glass molecule. Now, however, tension would accumulate along the edge of the crack until it travels down to the border of intact and separated glass. The extra tension causes the borderline intact glass to separate, since it is the next weakest point and would continue until something is done about it.

Stress gradients correlate directly to the likelihood of a chip or crack developing further. A stone break in a high stress area, i.e. the sides, is more likely to evolve into a crack. Cracks that start from the edges usually travel to the center of less stress, just as water flows from high pressure to low pressure. Depending on shearing forces the car body exerts on the windshield, the crack may actually travel in different directions.

Value Windshield Chip Repair Services

After you read this article, we hope that you have a deeper appreciation of the value of the windshield chip and crack repair that our service sector provides to you. By repairing stone breaks and cracks when repairable, we save you time and expense and give you quality. Cars retain their originally fitted windshield, which is ever more important in new models where windshield design have reached the stage that correct replacement is paramount to ensure a snug fit and prevent stress cracks from developing. (Stress crack can occur even without external damage, especially if the windshield is not designed to fit on certain car models.)

Properly done repairs will enhance the strength of the windshield, reduce optical distraction, restrict damage area and maintain a smooth surface for wiper operation.

To see the full article with extra links and pictures, visit www.gooberswindshieldrepair.com.

References

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