EVERY STEP COUNTS

If you've been involved in any form of vehicle body training recently, you would have most likely listened to the instructor stress how important it is to ensure every piece of information supplied by the OEM is understood and applied to the repair.

These little things are often referenced as being the difference between a vehicle behaving as expected in a post repair crash scenario, or potentially failing and compromising not only the vehicle, but more importantly the occupants.

Understandably, people often ask whether something that seems insignificant could become a major safety issue during a collision. *'I understand, but in the real world, we could repair that, couldn't we?'* or *'Would that really happen?'* are not uncommon questions training sessions.

The answers are always the same. 'This is the real world' and 'Yes, it could happen'. If we choose to ignore the OEM advice and instruction provided, then any repair decision becomes the responsibility of the Technician repairing the vehicle. Rather than think of the repair information as a basic guideline, we must interpret it as it was intended, to ensure the vehicle is not compromised during the repair process. If something in the repair information doesn't immediately make sense or seem logical, it is always worth getting a second opinion by discussing it with colleagues or contacting the OEM for clarification.

It is also not uncommon for the information to be lost in translation if it was originally developed in a non-English speaking country. When this happens, **never assume anything**. The customer is placing a huge amount of trust in the repairer to return their vehicle to its pre accident integrity. A quick assumption on the repair of a critical component should always be reconsidered as it could create a weak point in an otherwise good quality repair.

A small amount of damage on the B Pillar can easily become a defining factor in whether the vehicle becomes a total loss. Basing the decision on any potential gains should never factor into the repair decision. That small repair on the B Pillar, or any structural component, should always be considered a trigger that could possibly cause a chain reaction of failures in the structure.

Using the example of a damaged B Pillar, let us assume a vehicle has had moderate to heavy side damage. Almost all OEMs state that the B pillar reinforcement is a non-repairable section of the vehicle; even cold straightening is ruled out due to the high strength and brittleness of the material. It's very easy to fall into the trap of assessing the damage purely from a visual perspective, rather than considering the structural integrity of the component and the vital role it plays in protecting the occupants.

If we investigate the damage further, it will be highly likely that micro fractures and stresses will be found. These are not always immediately obvious and may require some form of magnification or dye penetrant testing to reveal them. If we choose to ignore this because it is only minor damage, then we are immediately overruling the recommendations of the OEM. Pushing out the damage *will* realign the panel and make it a visually acceptable repair, but it will not remove any of the tiny fractures and stresses through the material. Remember, this is one of the key components of the vehicle structure and plays a huge role in preventing intrusion into the passenger compartment.

Surely this is being overly cautious, and everything will be fine? The only time we will ever find out is when the vehicle is involved in another accident and significant impact forces travel through the highly engineered load paths of the structure. If those load paths have been compromised in even the smallest of ways, a chain reaction of events could start to unfold that could turn a heavy collision into a fatal collision. The statement sounds dramatic, negative and unlikely, but when it is broken down into "how it could happen", it suddenly seems more plausible.

If the B Pillar has been repaired/replaced, then it is fair to presume that the doors have also been repaired or replaced during the repair. Many vehicles are fitted with pressure sensors inside the door shell that respond to the pressure change during an impact. As the door shell compresses, the pressure changes within the door shell and the sensor relays that information to the SRS system to determine the vehicles safety system response. Something as simple as rubber grommets not being replaced or a door membrane that has not been refitted correctly, can alter how the pressure within the door shell is measured. The sensor will either send the signal too late or not at all. With air bags and pre-tensioners being deployed based upon this information, it is easy to see how something that initially seems so insignificant can start the chain reaction of failures.

As the collision force travels further into the vehicle structure, the use and placement of higher strength materials becomes ever more important. The placement of these materials is critical to withstand certain amounts of force before either yielding to absorb some of the energy, or remain intact to transfer the remaining energy through the load paths to other parts of the vehicle structure. No two accidents are the same so we can never assume that '*it should be okay'* if a component is repaired. Having made the decision to repair the inner B pillar rather than replace it and total loss the vehicle, the energy being transferred through the repaired section now begins to expose any weaknesses in the material. The micro fractures that remain in the repaired steel will begin to open and separate with minimal force due to the brittle nature of the material. A split will very quickly turn into a crack that can spread across the B Pillar. If that collapses into the cabin, then the occupant sitting alongside the B Pillar will be exposed to the full force of the fractured metal being forced inwards. If the airbags have not deployed due to the sensors in the door not working correctly, the likelihood of serious injury increases dramatically.

At this point, any remaining forces entering the vehicle structure are now transferring directly into the occupant area. The load paths can no longer transfer energy as intended due to the main intrusion beam (the B Pillar) being destroyed, and they no longer divert the force to other areas of the structure; they now begin to absorb the large forces rather than transfer. If the reinforcements in the floor begin to crush as they absorb the collision force, the occupant area becomes ever more compromised and the chances of the passengers avoiding serious injury diminish rapidly. Granted, this is an extreme scenario, but as was suggested earlier, no two accidents are the same. With that in mind, every repair decision should always be taken with a worst-case scenario in mind. The two deviations from the OEM instructions in this example highlight how every aspect of the repair is critical in ensuring the vehicle retains its strength, and safety, in any subsequent accident.

Every step of the repair information provided by the OEMs is there for good reason. Some steps may be more critical than others, but we cannot decide which parts of the process we will use and which parts will be ignored. If the repair information is followed correctly, the vehicle will retain its five-star crash rating and react as intended in any subsequent accident. This ensures the repairer has carried out a high quality, safe repair that protects not only the occupants, but the repair business as well.

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