TECHNICAL REPORT

I-CAR NEW ZEALAND

OEM PROCEDURES AND RECYCLED PARTS: WHAT SHOULD WE BE DOING TODAY, TOMOROW AND INTO THE FUTURE?? (PART 11)

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So – here we are – time to immerse ourselves in the relatively new era of OEM procedures, recommendations and guidelines – previously, factory body repair manuals – the "BRM" (which have been available for various makes & models for a substantial period of time), were mostly ignored by the NZ auto body repair industry, as certainly in this part of the world, the proliferation of different models sold/imported here (which has historically compromised the ready availability of parts and general information), the substantial "indent" costs, and the inevitable delays in supply etc., determined that both structural repairs, and part replacement decisions were based around the usage of re-cycled components – and that these were entirely appropriate. Add to this the mantra of good old kiwi ingenuity, and the ability to be able to repair almost anything, meant that the auto body industry was reluctant (and to some extent, still is), to embrace vehicle – maker recommendations and procedures.

What needs to be made emphatically clear in this day and age, is that repair decisions on later model vehicles (these include both exterior/cosmetic panels and structural parts), has substantially more to do with safety, structural integrity and long – term viability, than with "cost effectiveness". Essentially, "accurate and correct" collision repairs, in accordance with OEM information, must take precedent over both price and supply time penalties, as well as the invasiveness and/or the increased level of difficulty of any given procedure, often encountered when following an OEM method.

The whole decision-making process of part replacement or reparability of welded – on panels and structures, based around such variables as the availability and cost of a new part, becomes more clearly, and easily defined – if a salvage part is used, or a straightening operation is chosen, who will ultimately take responsibility for that repair? – Position statements available from most vehicle – makers clearly identify that salvage and non OEM components (electronics or otherwise), are not recommended. Other OEM recommendations and guidelines regularly state the prohibition of heat in straightening as well as the total non-reparability of parts identified as being made of AHSS steels.

These are all harsh realities for both service providers and work providers alike, when recent trends identify that repair costs are increasing, cycle times are reducing, and the number of vehicles that are uneconomic to repair (UTR) continues to rise.

While most repair shops are keen to see the end of recycled weld-on parts being used in collision repairs, other issues and factors often come into play – to examine these in closer detail, let us look to some of the pros and cons :-

1. New panels that are supplied in different "service conditions" – this is where mainly outer panels are "pre-cut" at the factory. Particularly in the case of uni-sides, where the vehicle maker does not supply a full body side option, replacement of the sill and pillars will often require the purchase of several pre-cut panels that then require welding together to encompass all of the extent of the damaged area(s) – ***(See Fig 1.0)*** – the added time and difficulty of alignment required is further exacerbated by the fact that these pre-cut parts do not generally match up to each other correctly, as they are only cut approximately to size at the factory – tolerances of upwards of 20mm are not uncommon – ***(see Fig 1.1) – This would add leverage to the argument of using a S/H side section, as the aligning, joining/welding of parts would not be required.***

Fig 1.0 –
Example :- Toyota Corolla – Full sill replacement requires three outer panels to be supplied and welded together

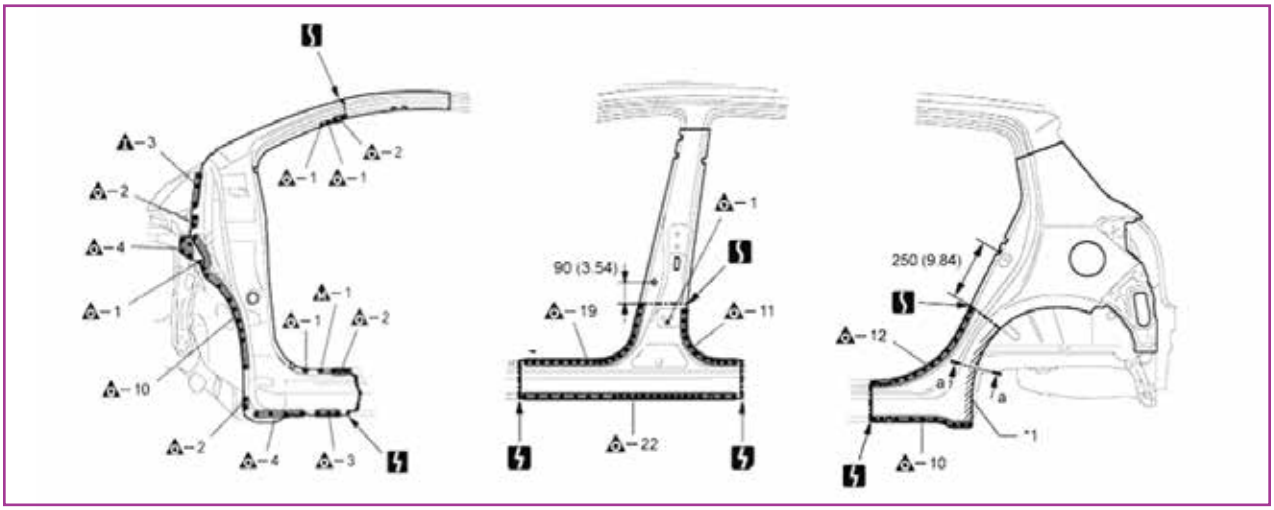
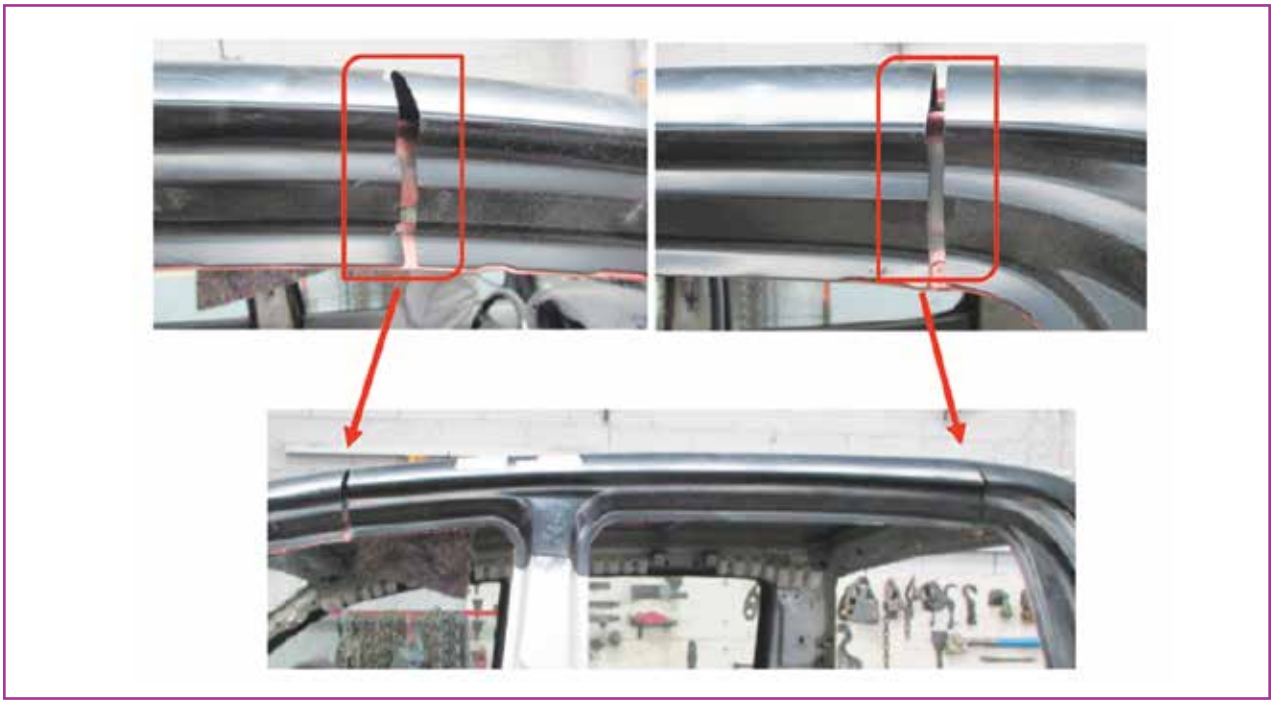
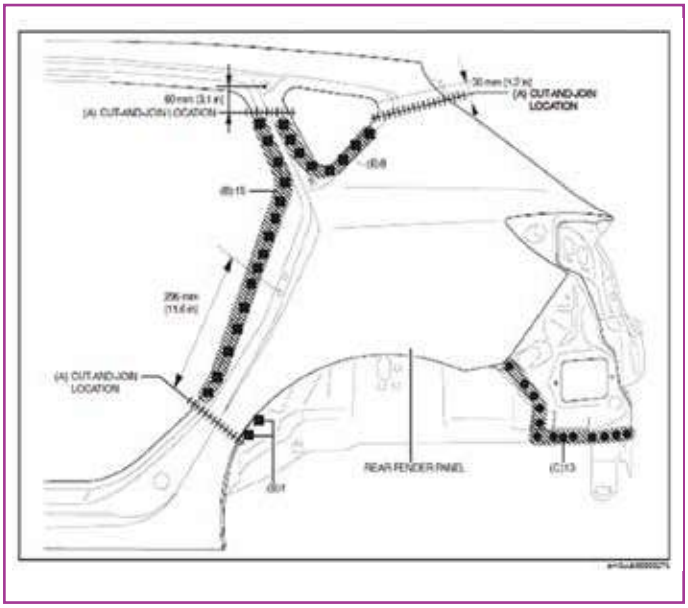


Fig 1.1 -
Example :- Toyota Hi lux Double cab – "service condition" cut line anomalies



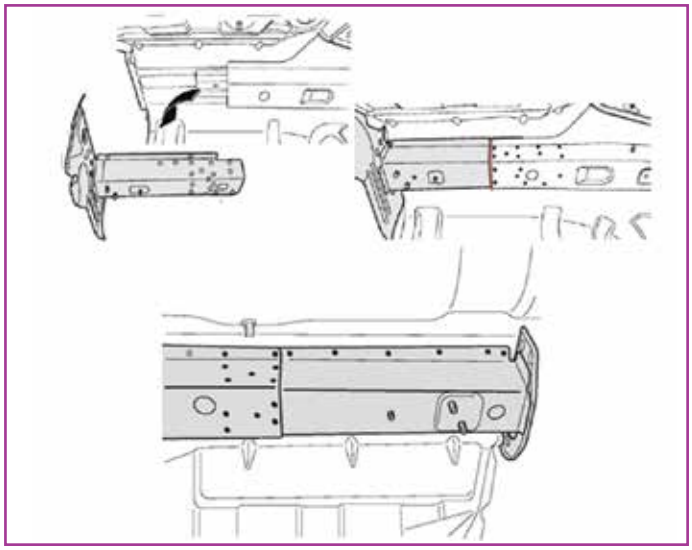
2. Many BRMs from various vehicle – makers specify MIG plug welding as the recommended joining method – typically replacing STRSW from the factory – *(see fig 1.2)* - (there are several reasons for this that will be addressed in future articles). ***Those advocating for recycled panels would rightly point out that re-fitting a S/H part would be utilizing the same connection method as that specified in the BRM procedure.***

Fig 1.2 –
Example:- Mazda 3 Hatch rear quarter – MIG plug welding is specified in the BRM to replace STRSW



3. Partial replacements, that is, parts that are separated at factory joints (as opposed to sectioning) : – there are many opportunities in OEM body repair manuals (obviously model dependent, but also in reference to their general information), to replace damaged parts at factory connection points that do not require full component replacement. The most common areas where this type of procedure is allowed is the front and rear chassis rails, or "side members". To clarify this type of procedure, an example would be where a full, new replacement rail "sub-assembly" (made up of two or more parts), could be "unpicked", or drilled off at the factory connection point(s) and then welded into the undamaged portion of the existing rail. ***(see fig 1.3). Again, as per 2., MIG plug welding tends to be the standard welding connection method – therefore adding logic to the fact that a replacement S/H part could be used.***

Fig 1.3 –
Example :- Hyundai i45 & i40 - Rear rail partial replacements



The appropriate responses to points 1 – 3 are :-

1) There is no denying that the extra joints required make new part fitment more difficult – BUT, as stated throughout this report – when "un picking" a S/H section, is it really possible to remove the thin gauge outer panel from the high tensile, multi – layered and thicker plates, that it is attached to without distortion and damage? – Extremely unlikely. The other real issue here is that the re-used outer panel has already been heat affected at the OEM spot weld points – typical factory requirements state that replacement spot welds must be in different locations than the originals, and the pitch or number of replacement welds increases on average by 25-30% - and still be positioned in the centre of the flange! This cannot realistically be achieved on a salvaged panel.

To address the issues of service cut line discrepancies :- The accepted approach for bridging any cut line discrepancies on multiple panel replacement operations with new parts, appears to be the utilisation of " backers" or inserts , and the application of good welding techniques for heat control (eg. Stitch & skip) – ***this should always be confirmed with the vehicle-maker.***

2) The "default" drill size for spot weld ***removal*** in the auto body industry is without question, 8mm or 5/16".

Up until the recent awareness of following OEM repair manuals, this drill diameter was also the standard size for ***replacement*** MIG plug – welds. Many vehicle makers clearly identify in their procedures, or under the general information section of the appropriate BRM, that the drill hole size will vary according to both plate thickness and the "panel stack" – this can be from as little as 5mm, and upwards of 10mm in diameter. Effectively, if a spot weld is drilled out of a S/H outer panel and results in a 8mm hole (or larger), that will require filling via the MIG plug welding process, this will be typically outside the factory specification in many procedures. ***(see Fig 1.4)***

Fig 1.4 -
Example :- MIG plug hole specification charts – Toyota and Mazda

REFERENCE: mm (in.)

Thickness of welded portion	Size of plug hole
1.0 (0.04) under	ø 5 (0.20) over
1.0 (0.04) – 1.6 (0.06)	ø 6.5 (0.26) over
1.7 (0.07) – 2.3 (0.09)	ø 8 (0.31) over
2.4 (0.09) over	ø 10 (0.39) over

Panel thickness (mm) {in}	Hole diameter (mm) {in}
0.60-0.90 {0.02-0.03}	5 {0.19}
0.91-1.20 {0.04-0.05}	6 {0.23}
1.21-1.80 {0.051-0.07}	8 {0.31}
1.81-4.50 {0.071-0.17}	10 {0.39}

3) This type of replacement may be the most appropriate use of a salvage part – albeit without any identifiable reference in any OEM repair manuals. Ultimately, all parties involved in deciding to follow this type of repair should be aware that it may not be supported by the vehicle – maker. In consideration of what has already been identified above:-

1. MIG plug welding is most often the obligatory welding method (where panel stack thickness and access to both sides of the structure are issues).
2. Plate and stack thickness considerations require larger diameter holes for STRSW removal and MIG plug welding.
3. "One – for - one " plug welds in the same or similar positions is generally more suitable on these heavier gauge structures.
4. Is the only replacement scenario using salvage parts, that is similar in principle to an OEM procedure.

There are still other variables, such as corrosion protection already having been compromised, distortion or damage to the replacement part (after all, it is highly likely to have come from a structurally damaged vehicle), and that the part is EXACTLY the same – as examples, subtle changes occur between spec levels of any given model, and the country of origin.

Other points that have been raised in recent times by advocates of recycled weld-on parts usage ***(and the appropriate answers or responses)***, include :-

- "There is nothing in body repair manuals that states that salvage panels cannot be used " – ***Rather disingenuous in reality – there is no information in any BRM that would indicate that you can either! OEM Manuals regularly make reference to descriptions such as " Fit the new part" or " Cut the replacement new panel" in their terminology. Warnings and guidelines against recycled and / or aftermarket parts are also found in many OEM position statements.***

Position statements - Excerpts from Ford and Volkswagen :-

New aftermarket collision parts may not be made of the same material or to the same tolerances and specifications as Genuine Ford Original Equipment collision replacement parts, and are not tested with the rest of the system during vehicle development. Thus, some new aftermarket collision parts may not be of the same quality or have the same performance characteristics as OEM parts.

Quality concerns may also exist with salvage and remanufactured/reconditioned parts due to the uncertainty of the source, condition and durability of these parts.

For these reasons, Ford Motor Company strongly recommends the use of original equipment replacement parts for collision repair. Use of new aftermarket, salvage or remanufactured/reconditioned parts could result in diminished value of the vehicle, and both increased vehicle damage and changes to the crash protection offered by the vehicle.

# # #

Collision Repair Note
Recycled, salvaged, aftermarket and reconditioned parts (including body parts, wheels and safety restraint components) are not authorized by Ford. Departure from the instructions provided in the Ford Workshop Manual, including alternate repair methods or the use of substitute components, risks compromising crash safety. Failure to follow these instructions may adversely affect structural integrity and crash safety performance, which could result in serious personal injury to vehicle occupants in a crash.

Volkswagen Collision Repair Standards

Recycled Parts

Applicable to All Volkswagen Models

To promote and maintain its rigorous standards of quality and safety, Volkswagen of America, Inc., an operating unit of Volkswagen Group of America, Inc. ("**VWoA**") provides collision repair centers with important information regarding collision repair and parts replacement on Volkswagen vehicles. VWoA does not support the repair of Volkswagen vehicles with recycled vehicle parts or assemblies. This is of particular concern for any parts and assemblies which are welded, riveted, or bonded to or part of the vehicle structure during the manufacturing process. VWoA does not approve the replacement of structural panels, members, or assemblies on Volkswagen vehicles (e.g., clipping or partial clipping) with recycled parts.

- "The replacement panel can be removed by grinding or drilling from the back – therefore no damage is done to the welded flange" – ***Good luck with that! – as we all know, most modern vehicle body designs utilise heavier gauge and higher tensile strength steels in the inner structures – the "panel stack" thickness and plate count can be up to (and greater in some examples), 5mm and 4 respectively (see Fig 1.5) – trying to drill through these assemblies without damaging the much thinner gauge (0.6mm average) outer panel is extremely challenging, to say the least. There is also the issue of excessive tool bit wear and tear and the necessity to use expensive removal equipment and consumables – additionally, the time taken to try and remove these parts will be exceptional, and difficult to recover.***

Fig 1.5 –

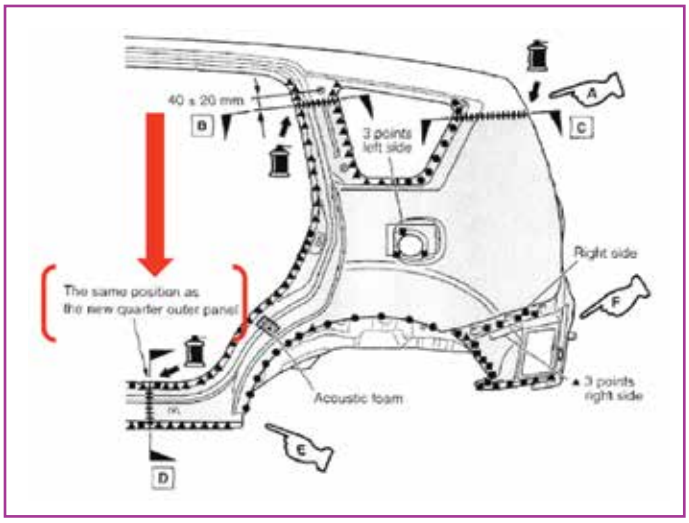
Typical side structure cross section – multiple layers of varying thickness and tensile strengths:-

- "We have always used recycled panels in NZ – S/H parts are likely to be cheaper and more readily available" ***– This is the "default" response from many interested parties, and is perhaps quite appropriate for older vehicles that do not, or have limited HSS steels and/or passive design features, built into the uni-body. Likewise, non – welded components or closure panels (doors, bonnets and boot lids etc.) can, and are used on a daily basis to complete many collision repairs – irrespective of the age of the vehicle. The obvious considerations must be that they are of the same age, type, model and quality (LKQ).***

- "Using S/H parts will save the vehicle – if new parts are used it will be uneconomic to repair" ***– Arguably the most emotive response, and one that often leads to many repairers capitulating on their insistence of new parts – unfortunately, this requires some tough decisions for the business operator, as they juggle the need to remain productive and viable, and at the same time not compromise on an identified standard.***

- Last, but not least, is another aspect of point ***1)*** – "Service condition" - as previously stated, the service condition describes the cut location of the supplied part(s) – Those OEMs that use this description, typically do not provide measurements for these cut locations in the BRM ***(see Fig 1.6)*** – and there is no need to, as the cut area of the supplied new part will determine where these joints are ***– How can the auto body technician determine where these exact locations are, when using salvage parts?***

Fig 1.6 – Example:- Mitsubishi Outlander rear quarter



To summarise :-

The ramifications and impact that the exclusive use of new, genuine weld-on components will have on all parties involved in the repair of late–model vehicles is enormous and far reaching; cost increases, slower cycle times, and reduced vehicle reparability, to name a few.
BUT - What this needs to be measured against is the exposure of the repairer to current, and future liability – as examples, if the vehicle is involved in a future collision event, where safety systems (both passive and active), have not functioned as they should have, and/or the longevity/durability of the repair has failed, as detailed in extended repair warranties or "life time" guarantees - (these often exceed OEM warranties for corrosion protection etc.). How can either of these be validated when the replacement part(s) are installed from another vehicle? – (which are likely to be accident or flood damaged).