TECHNICAL I-CAR NEW ZEALAND REPORT

BRM -BODY REPAIR MANUALS

Then and Now – The constantly evolving OEM requirements for repairing collision-damaged vehicles and how I-CAR is positioned to respond

As I ruminated on the content of the previous Technical Report about the Landcruiser 300, and some of the complexities of that vehicle platforms' construction, it gave me some inspiration as to what this article would focus on – namely, some of the profound changes that vehicle makers have made to their Body Repair Manuals (BRM's) over the last 10 to 15 years.

I-CAR New Zealand has been in a unique position in that, apart from delivering industry training programmes in various formats over the years, has also been able to develop and maintain mutually beneficial relationships with many OEM distributors in New Zealand.

These relationships have enabled us to develop the model specific courses (and updates), specifically targeted at the New Zealand carpark, and which most of the collision repair industry are now familiar with.

Vehicle-maker model-specific courses include :-

- Ford
- Holden
- Hyundai
- Kia
- Mazda
- Mitsubishi
- Nissan
- Subaru
- Suzuki
- Toyota

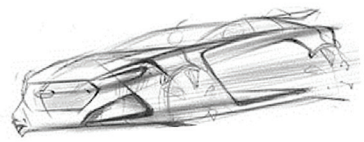
HYUNDAI

Collision Repair

SUBARU

Confidence in Motion

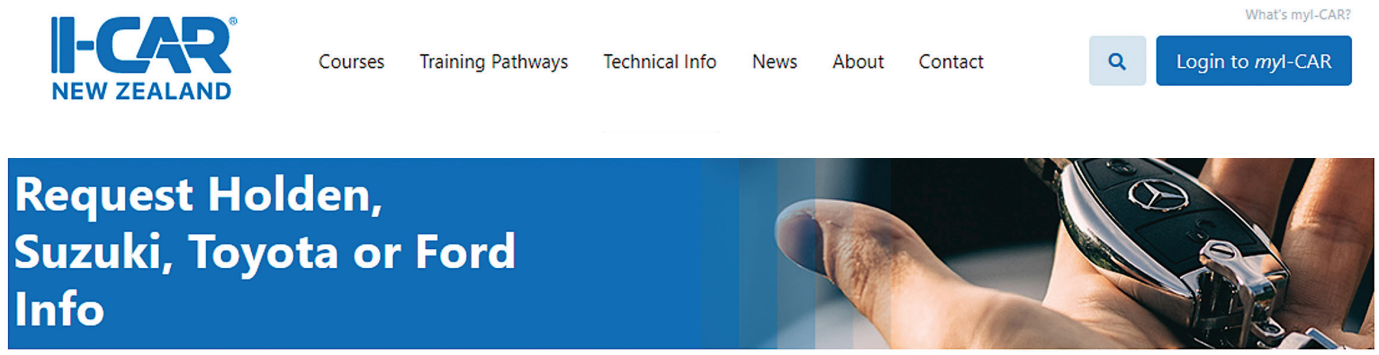
Collision Repair



The pinnacle of those partnerships is the almost unprecedented agreement by four significant vehicle makers into the New Zealand market (three of which feature in the top ten of global production), in giving I-CAR NZ access to their body repair manuals. This has been an enlightening process both for ourselves, and the NZ OEM's in determining and understanding the plethora of written material that is required when repairing newer generation vehicle platforms.

For the record – the ten largest vehicle makers (by production) in 2021 were:

1.	Toyota	10,466,051
2.	Volkswagen Group	10,382,334
3.	Hyundai / Kia	7,218,391
4.	General Motors	6,856,800
5.	Ford	6,386818
6.	Nissan (Renault- Nissan- Mitsubishi Alliance)	5,769,277
7.	Honda	5,235,842
8.	Fiat-Chrysler Automobiles (FCA)	4,600,847
9.	Renault	4,153,589
10.	Groupe PSA (Citroen)	3,649,742



I-CAR New Zealand began providing technical assistance to the trade on all manner of subjects relating to autobody repairs around ten years ago (over and above training courses undertaken since the mid-1980s). With copyright issues becoming a concern, from April 2016, technical assistance was supplied only for Suzuki models, (although some assistance and advice was provided for general collision repair enquiries). Later that same year Toyota also came on board, with Holden and Ford added in 2017 and 2019, respectively.

I-CAR New Zealand have responded to more than **6000** requests since 2013 and has built up an extensive library of technical information over that time – giving accurate insight into the changes, anomolies, differences and similarities that occur in OEM body repair manuals.

Lets have a brief look into some of the changes that have taken place with two of the brands that we work with :-

SUZUKI :-

Suzuki Motor Corporation are a relative late-comer in supplying BRM's –

The first generation, new Swift (2004 – 2010) and the Grand Vitara / Escudo (2005 – 2019) are the only platforms that had a BRM, prior to the introduction of the SX4.

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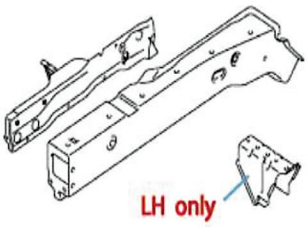
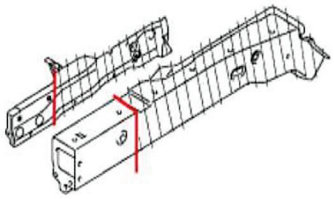
Both of these platforms' BRM's were very basic and relied heavily on video clips found in the bodyshop CD. In their favour though, was a range of options for sectioning both inner and outer panels across the Body In White (BIW).

2004 to 2010 Swift front rail :-

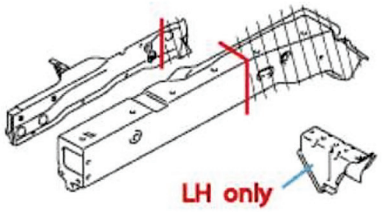


[A] Service Condition

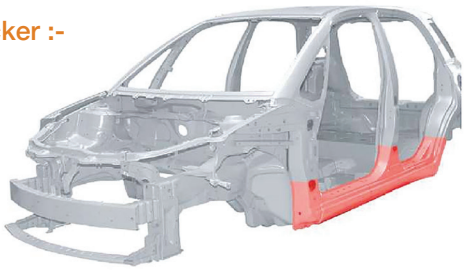


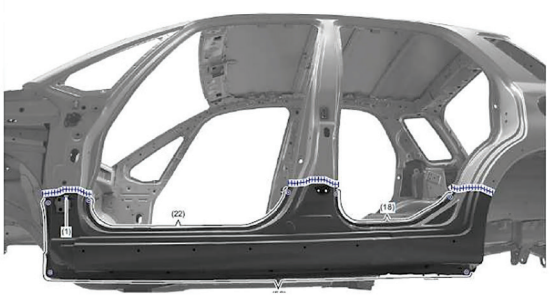
[B] Rail Tip Sectioning

With the introduction of the SX4 came an all new BRM format that was more in line with other vehicle-makers literature and has since been upgraded with the expanded use of colours and weld symbols for the 2nd and 3rd generation Swift models, as well as the Baleno, new Vitara, new Jimny, S-Cross and Ignis.
All BRM's are still supplied as a bodyshop CD, rather than on-line, as per most other vehicle-makers.



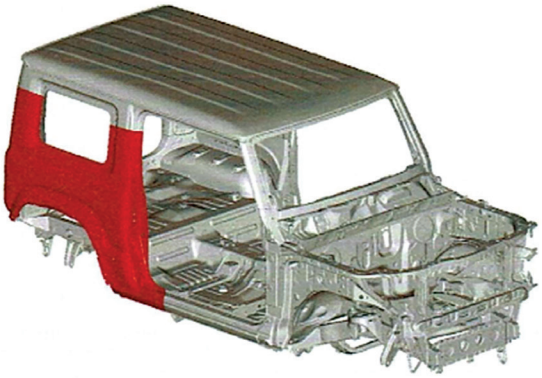
2006 to 2013 SX4 sill / rocker :-

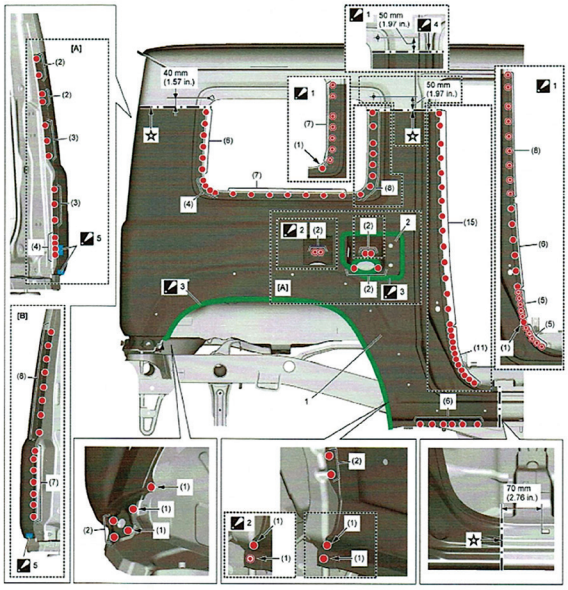




7) Resistance spot weld.
8) Plug weld.
9) Continuous MIG-weld.

2018 > Jimny rear quarter :-

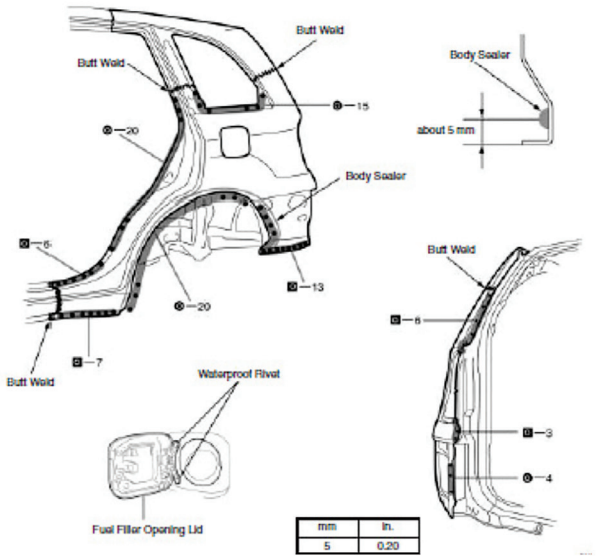




TOYOTA :-

Toyota body repair manuals, along with the individual procedures have by necessity, become increasingly detailed with a lot more text, as well as other information including steel type identification (inc. differences for HV electric options) and damage diagnosis.

2000 to 2005 RAV4 rear quarter :-
(2-page document)



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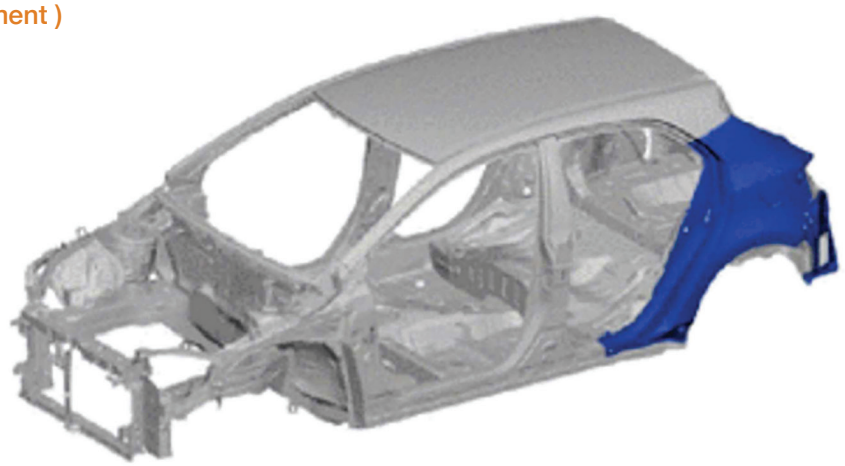
2018> Corolla rear quarter :-
(11-page document)



3. Clean off any adhesive that remains on the vehicle.
HINT:

Using an industrial heater gun or gas burner, heat the adhesive to 110 to 140°C.

Using a scraper, scrape away the adhesive.

If adhesive remains, the strength of any subsequently applied adhesive will be weak.

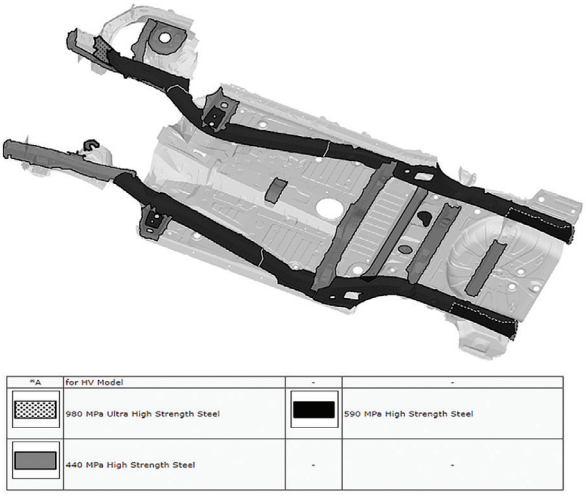
4. Using a disc sander or belt sander, scuff and sand any adhesive that remains on the vehicle.
HINT:
Scuff at a width of approximately 10 mm (0.39 in.) over the previous adhesive coating.

5. Apply adhesive to the exposed metal areas on the vehicle. Using a spatula, spread the adhesive evenly.

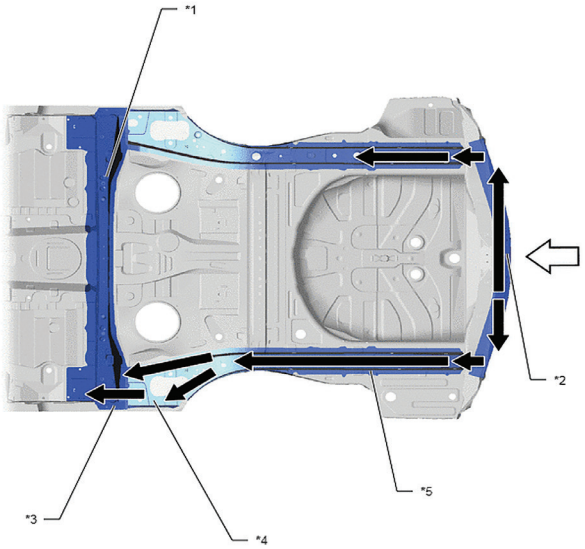
6. Apply adhesive to the vehicle again.
7. Using #60-120 grit sandpaper, scuff the adhesive application area on the new quarter panel.
8. Apply adhesive to the new quarter panel. Using a spatula, spread the adhesive evenly.
9. Using a viCe grip or the palms of your hands, press the quarter panel so that the thickness of the adhesive is even.
10. Complete installation the new quarter panel.
11. Dry the adhesive areas of the new quarter panel.
HINT:

With dryer or equivalent (60°C): 60 minutes (complete hardening: 90 minutes)

Ambient temperature (25°C): 12 hours (complete hardening: 24 hours)



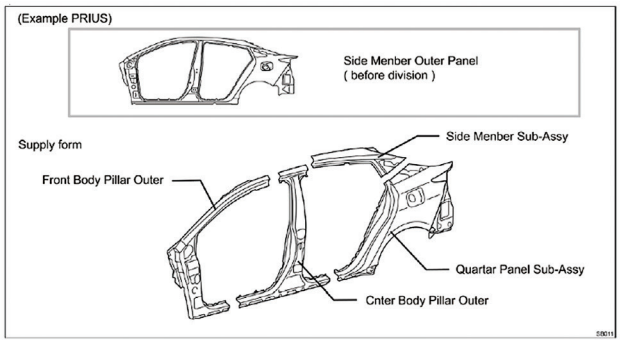
*A	for HV Model	-	-
	980 MPa Ultra High Strength Steel		590 MPa High Strength Steel
	440 MPa High Strength Steel	-	-



The Toyota Technical Service Information site (TIS) that I-CAR accesses, lists a staggering **200** different models / platforms across the Toyota and Lexus brands – and there are still several other models in the Toyota portfolio that don't have a BRM !!!

As is the case with several other vehicle-makers, Toyota have released several bulletins over the last few years that have been hugely beneficial to the collision repair industry - namely the ability to replace MIG plug welds in any given procedure with STRSW (spotwelding), and allowing outer panels to sectioned in positions other than those stated in the procedure – its important to note that these allowances still have some restrictions though …

These articles have been written by Martyn Lane: I-CAR Instructor, Weld Test Administrator and Technical Specialist to the auto body industry



Depending on the state of damage, supply parts can be cut and used.

- Carefully cut the outer panel so not to damage the reinforcement.
- Make sure that butt welding does not heat-affect the reinforcement when weldi the outer panel.

Repair Method Change Details:

Welding Specifications for body components are published in Toyota ServiceNet– model specific Body Repair Manuals (BRM) for all Toyota vehicles. Welding component installation may require a combination of welding methods including:

Symbols as per BRM

- **STRSW (Squeeze Type resistant Spot Welds)**
- **GMAW/MIG (gas Metal Arc/Metal Inert gas – Welding**
- **Arc Brazing**

STRSW may be substituted for GMAW/MIG plug welds, however STRSW must match size, strength and appearance. To ensure this condition the following conditions must be met: