TECHNICAL REPORT

I-CAR® NEW ZEALAND

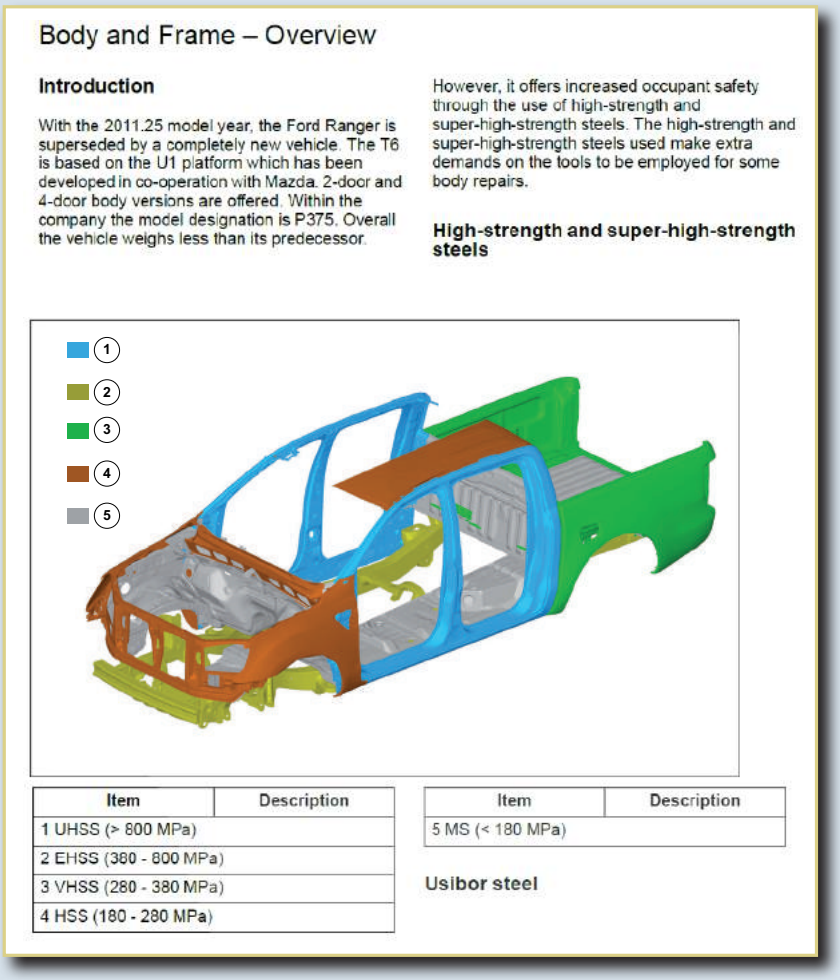
In this, the third and final part of our look at the most popular requests received on the I-CAR technical request facility, we will be examining the body repair information, as supplied by, or available for, Ford's range of vehicles.

Looking back over the last 18 months or so of our site requests, reveals that Ford has the third highest number of enquiries - just ahead of Mazda and some distance ahead of Holden.

FORD RANGER

As most of us are aware, Ford vehicles sold in New Zealand are sourced from around the world - this often requires that the body shop technician and/or shop manager/owner/estimator has a fundamental understanding of the various formats, symbols and general information contained within Body Repair Manuals (BRM), for Ford vehicles. This certainly comes to the fore, for example, when comparing information available for Australian Ford vehicles, with those of their European counterparts. Further to the information supplied by Ford, is the availability of body repair information from other sources (e.g. Thatchem, EziMethods etc).

The most common Ford vehicle that we receive requests for is the new Ranger - designated the T6 platform - this is very similar to the current BT-50 Mazda commercial range. In both instances, specific body repair procedures appear to be unavailable from the vehicle makers. While the Mazda Body shop CD confirms that info is limited to dimensions and other general information, Ford may produce some upper body repair info for the Ranger, as previously viewed by the writer, but as yet have not been made available to the trade.



Body and Frame – Overview

Introduction

With the 2011.25 model year, the Ford Ranger is superseded by a completely new vehicle. The T6 is based on the U1 platform which has been developed in co-operation with Mazda. 2-door and 4-door body versions are offered. Within the company the model designation is P375. Overall the vehicle weighs less than its predecessor.

However, it offers increased occupant safety through the use of high-strength and super-high-strength steels. The high-strength and super-high-strength steels used make extra demands on the tools to be employed for some body repairs.

High-strength and super-high-strength steels

Item	Description
1 UHSS (> 800 MPa)	
2 EHSS (380 - 800 MPa)	
3 VHSS (280 - 380 MPa)	
4 HSS (180 - 280 MPa)	

Item	Description
5 MS (< 180 MPa)	

Usibor steel

I-CAR® NEW ZEALAND

TECHNICAL REPORT

The T6 Ranger has attracted attention from other interested parties since its introduction, and at I-CAR NZ, we often refer to some general information that we have on file that offers some insight into the types of steels used in both the upper body and full frame chassis.

- The reinforcements at the A and B pillars are made of high strength steel. This material has a yield strength of 1300MPa.
- Sectional repairs must NOT be performed on components made of Usibor!
- The required continuous MIG weld seam in the cut area would cause structural changes in the steel and lead to a signifigant loss of strength.
- In the event of damage, the complete component must therefore always be renewed.
- Also, because of the strength of these components, it is not always possible to work them with conventional body repair tools.

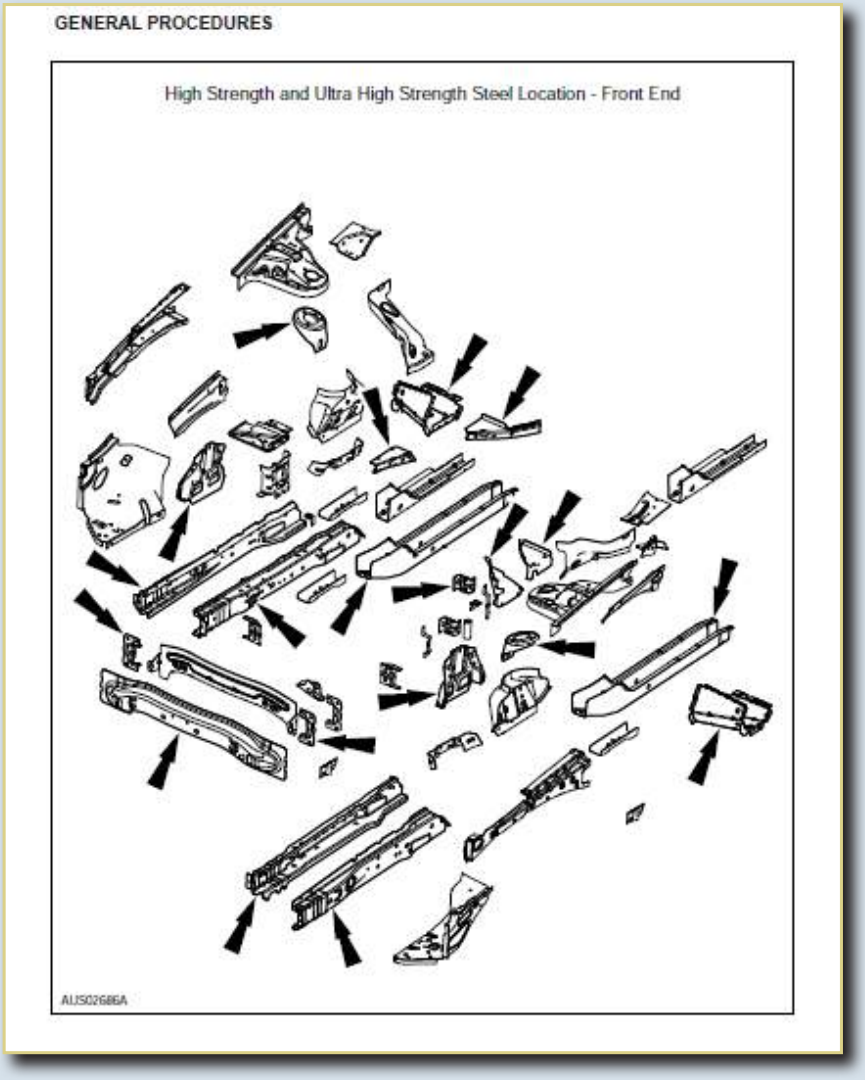
FORD FALCON AND TERRITORY

The Falcon and Territory also feature regularly in requests for information on replacement procedures.

We are able to supply some information on both of these models of vehicles - with the FG Falcon this is confined to Ford's general welding recommendations and several procedures for frontal part replacement - its predecessor, the BA model has numerous partial replacement procedures available.

The same applies to the Territory, with a number of specific partial replacement procedures on file for the earlier models and limited info for the current platform (Your Ford dealership may be able to help with procedures for these vehicles).

EXCERPTS FROM GENERAL INFO - FORD AUSTRALIA



DESCRIPTION AND OPERATION

Safety

All normal workshop safety practices should be observed. Protective clothing, adequate ventilation and proper firefighting equipment are essential when performing any welding operation.

The recommendation welding method for fitment of replacement panels is resistance spot welding or MIG puddle or plug welding. For weld type and location, refer to the interpretation of weld symbols in the previous chapters.

Oxyacetylene fusion welding may be used for butt welds except where high strength steels are being welded.

Precautions

1. Under no circumstances should the battery be shorted to earth.
2. When disconnecting the battery, always remove the earth lead first, connect in the reverse order.
3. Never start the engine without securely connecting the battery terminals, and never disconnect the battery whilst the engine is running or the ignition is turned on.
4. Never disconnect or reconnect the wiring harness plug of an electrical control unit with the ignition turned on.
5. Be certain that all plugs of the wiring harness are properly connected before connecting the battery.

Welding

Before welding work is performed on a vehicle body, all safety measures for the protection of people, modules, air bags and electrical components must be observed.

NOTE: Before beginning the work, please refer to the safety instructions and warnings above. For additional information refer to Section 501-25a. Please also note the warnings of the respective equipment manufacturer.

In body construction, the main type of welding used is resistance spot welding. In the course of repair work, this must be restored accordingly.

However, there are also fields of application for MIG welds.

MIG Welding

Fields of application

- Any joins that are MIG welded in production must also be replaced by MIG welds.
- Puddle welding may be used in certain cases, if there is insufficient access.

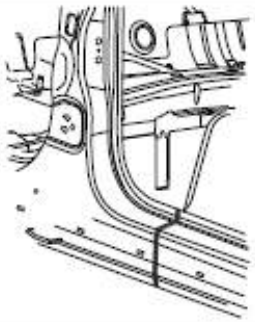
NOTE: The increased application of heat during MIG welding destroys the corrosion protection layers over a much larger area than during resistance spot welding. For this reason, greater care must be taken when applying the corrosion protection afterwards.

Welding repairs can only be carried out properly if the equipment is set up correctly and all welding-related preparations are complied with accurately.

- Please note the instructions of the respective welding equipment manufacturer.
- The hose assembly must be untwisted.
- The core must be free of abraded rod particles.
- The gas and current nozzles must be free of slag and scale residue.
- Pay attention to the quality of the welding rod and the through put of gas.
- Ensure that the joint surface is correctly prepared.
- Prepare a bare metal joint surface.
- Maintain the correct gaps (root formation).
- Produce a test weld.

Full seam

A welded joint with a full seam is suitable for joining highly profiled body parts. Pillar and sill areas are typical application areas.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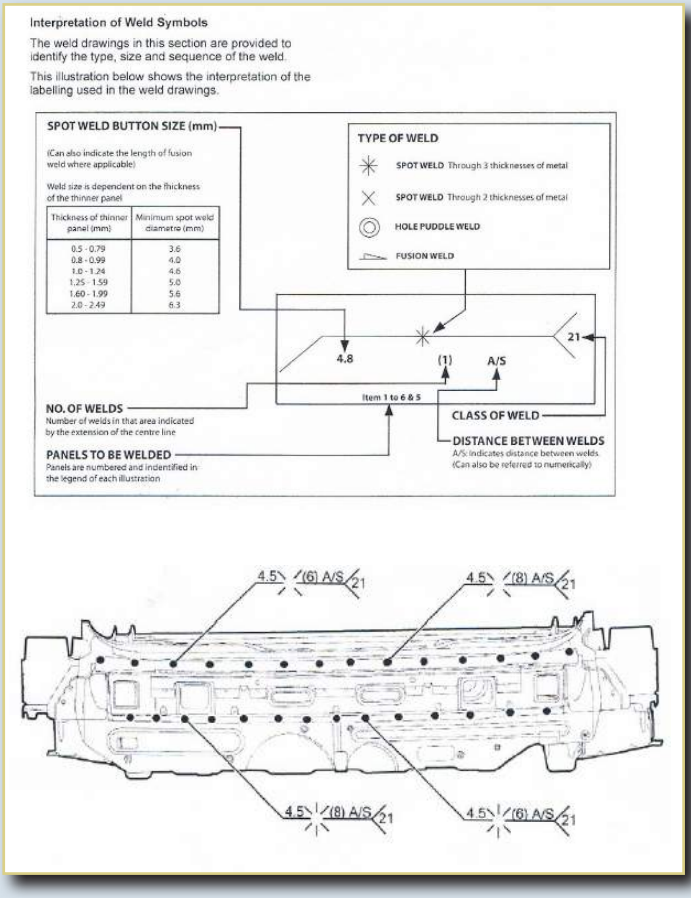
Before the welding process, you must carry out the following operations:

- Both parts of the panel must be bare on both sides over a width of 5 mm.
- Align the parts precisely with clamps.
- To prevent the panel from warping, tack longer joints before welding them.

I-CAR NEW ZEALAND

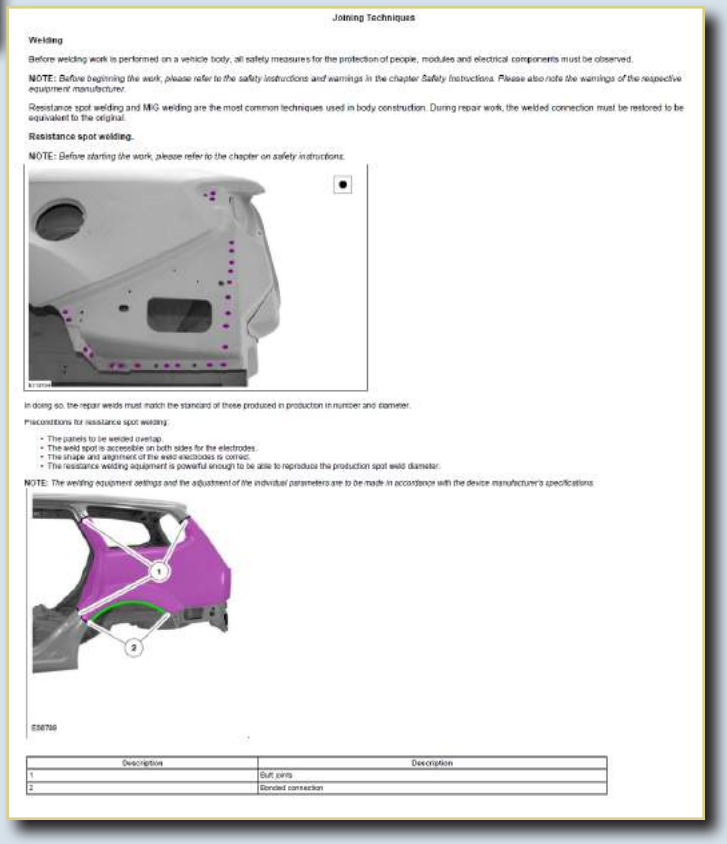
TECHNICAL REPORT



WELDING SYMBOLS IDENTIFICATION

Last, but not least, is the Body Repair manual information available for European and North American markets - certainly for the later model structures, Ford provide an array of replacement procedures - dependent on the model and variant.

Below is an example of some of the general info contained in the Body Repair manuals (BRM) for these vehicles:


Joining Techniques

Welding

Before welding work is performed on a vehicle body, all safety measures for the protection of people, modules and electrical components must be observed.

NOTE: *Before beginning the work, please refer to the safety instructions and warnings in the chapter Safety Instructions. Please also note the warnings of the respective equipment manufacturer.*

Resistance spot welding and MIG welding are the most common techniques used in body construction. During repair work, the welded connection must be restored to be equivalent to the original.

Resistance spot welding.

NOTE: *Before starting the work, please refer to the chapter on safety instructions.*

In doing so, the repair welds must match the standard of those produced in production in number and diameter.

Preconditions for resistance spot welding:

- The panels to be welded overlap.
- The weld spot is accessible on both sides for the electrodes.
- The shape and alignment of the weld electrodes is correct.
- The resistance welding equipment is powerful enough to be able to reproduce the production spot weld diameter.

NOTE: *The welding equipment settings and the adjustment of the individual parameters are to be made in accordance with the device manufacturer's specifications.*

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Description	Description
1	Butt joints
2	Bonded connection