Keeping up with **new repair techniques**

Compiled by Robert Renwick, CRA I-Car course coordinator

As previously stated in PanelTalk, motor vehicles have become very product specific, meaning the generic-type repair that was acceptable for most pre 2000 vehicles is no longer. Vehicle manufacturers are developing their own design and construction technology and, for this reason, the repair industry needs to keep abreast of these advancements. Many manufacturers are working with I-Car in order for this to happen. General Motors and I-Car USA have just announced a training relationship for structural repairs to their vehicles. Tom McGee, I-Car CEO stated, "The relationship between I-Car and General Motors will increase the exposure of repair recommendations and believes that this relationship benefits the entire Collision Industry and most importantly, the owners of GM vehicles". The I-Car curriculum will consist of a series of individual, modularized training programs.

Remember, we as collision repairers, are selling ourselves as professionals in the repairing of collision damaged vehicles - that's why damaged vehicles are brought to you. This doesn't only apply to workshop presentation, as the consumer believes you to be experienced and trained in the correct methods to reinstate the vehicle to its pre-accident condition. So we need to be sure that we update ourselves on these advancements. I don't know of many repairers who like losing a vehicle from their shop because they don't have the understanding or haven't bothered to undertake upskilling themselves on the basic awareness of new technology.

Let's Look At Ford

This issue of PanelTalk looks at some of this new technology in relation to vehicles manufactured by Ford. Ford Australia has, since 1998, been using steel developed locally by BHP Australia, which is hardened during the baking process. The bake hardenable steel is used on the outer skin panels of the AU Falcon.

The result is a weight reduction of nearly eight kilograms for the body structure, with bending stiffness up 14% and torsional rigidity increased by 17.5%. There are also advantages for the owner, the harder steel has better resistance to dents.

Ford has also used a number of different types of steels in the body and frame panels of the BA Ford. Many of the panels used are High Strength Low Alloy steels (HSLA).

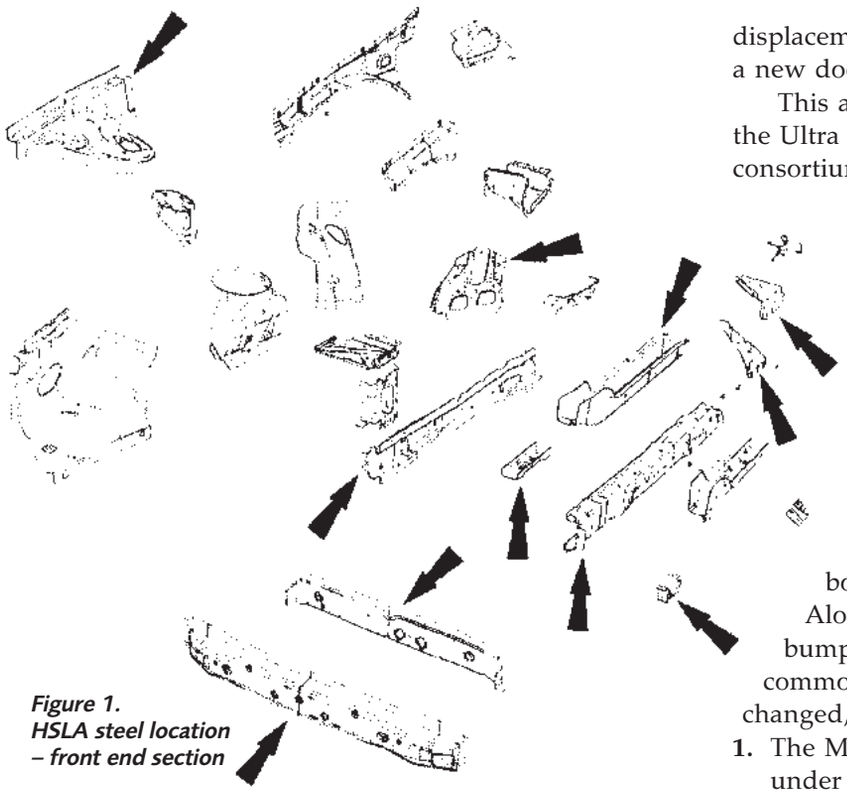

Figure 1.
HSLA steel location – front end section

Whilst these steels appear to be the same as other steels, these HSLA steels are thinner and have a low alloy content which makes them heat sensitive. The location of panels made from this material is shown in Figures 1 and 2.

Fords recommendation of heating HSLA steel

Cold working is best for straightening bent parts. If heat must be applied to relieve stress structural components, the steel must not be heated over 700ºC, and this temperature can only be applied for a maximum of three minutes. A temperature sensitive crayon must be used. It is recommended to replace assemblies of HSLA components rather than separate panels to restore the vehicle to original performance.

WARNING

The towel rail on the front upper crossmember must be replaced if damaged. It MUST NOT be straightened or panelbeaten. This is critical for correct function of the crash severity sensor which plays a major part in activating the front airbags in a crash.

NOTE

Side intrusion bars fitted to side doors are manufactured from Ultra HSLA and must not be heated or straightened under any circumstances. These parts are critical to driver/passenger safety in both side impact and steering column rearward displacement. If a door beam is damaged, fitment of a new door shell is necessary.

This advancement resulted from research into the Ultra Light Steel Auto Body (ULSAB). A consortium of 35 steel companies, including BHP Steel, commissioned Porsche Engineering Services to design the ULSAB using readily available but state of the art technology.

The ULSAB is fabricated from high strength and ultra high strength steel which is laser welded or bonded with adhesives. Some of the technology used in the ULSAB is being used by Ford.

FORD MONDEO

The 2001 Mondeo also has some new body features that we need to be aware of. Along with other makes and models, the bumper systems of the Mondeo (now commonly referred to as crash elements) have changed, requiring analysis following a collision.

1. The Mondeo front crash element is mounted under the bumper cover. It's made out of thick steel sheet and is secured to the front crossmember. In front of the crash element's flange plates is a corrugated impact absorbing structure that prevents impacts of up to 16kmph resisting damage to the metal body structure.

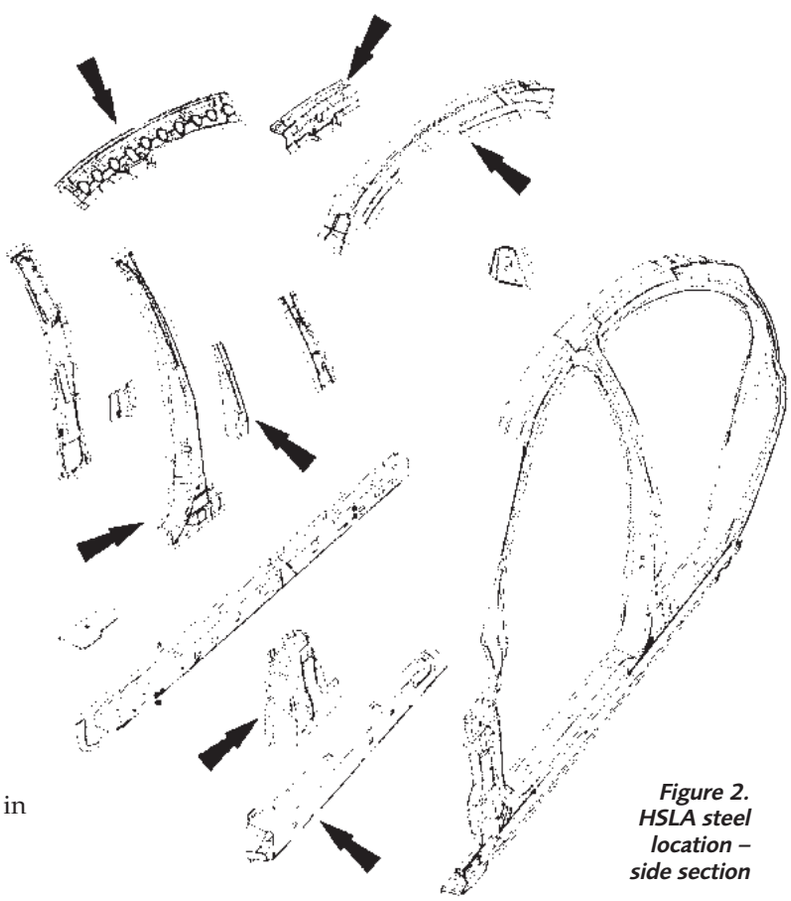

Figure 2.
HSLA steel location – side section

Repairs to the crash element, either sectional replacement or re-shaping, are not allowed. If external damage or deformation is visible after an accident the complete deformation element must be changed.

2. The front crossmember is mounted behind the front crash element and is secured to the side members by electric resistance welding. The crossmember consists of an integrated square steel tube which is welded to the outer flange plates using a special welding process (projection welding). Any damage to the front crossmember has to be replaced in one piece. A sectional replacement of the steel tube is not allowed.
3. **Front chassis rails**
   Sectional repair to the front side members is possible. If only the corrugated structure in the front of the side members is damaged, it is possible to do a sectional renewal of the side members. If there is more damage than the corrugated structure, the side member has to be renewed completely.
4. **Radiator support panel**
   Radiator grille opening panel reinforcement is made from one piece of plastic. The single piece construction is bolted to the front crossmember and the fender apron. Small damage can be repaired by using a suitable plastic repair process, but damage such as cracks and sectional breaks will mean the panel must be replaced.

Rear crash management

The rear crash elements are bolted to the body near to the side members. They are joined together with a high-strength steel crossmember. The rear crash elements are made of two different tubes, sliding one into the other. In case of impact, the inner tube is forced into a tighter passage. This causes the diameter of the inner tube to get smaller and the force of the impact is reduced ensuring that there is no sheet metal damage during impacts of under 16kmph. Repairs to the crossmember or to the rear crash elements are not allowed.

Measurement, rear crash elements

If there is no visible damage and the rear crash element's measurements are in tolerance (see figure 3), the crash elements can be reused.

For an exact diagnosis, the rear crash elements must be measured exactly, therefore the rear bumper cover has to be removed.

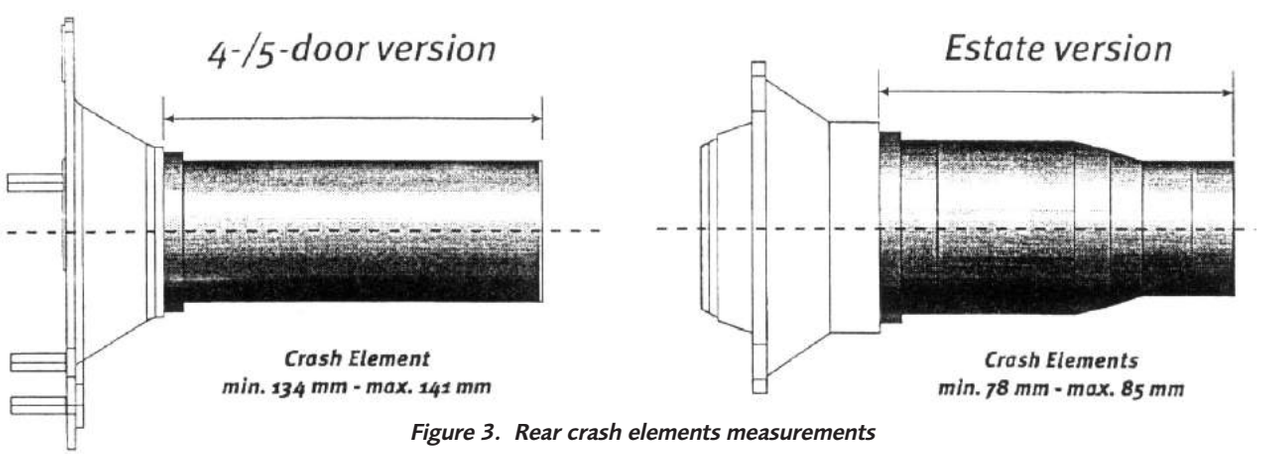

Figure 3. Rear crash elements measurements

FORD USA

Ford USA has redesigned the F 150 and introduced a new repair procedure.

Some of these changes are different construction to the radiator core support, a new airbag system, different steels used for the chassis which now use Hydroformed steel. The radiator support panel is a bolt on cast magnesium structure. Although the panel is stronger and lighter than steel, magnesium has a tendency to crack during a collision and since welding can not be performed on magnesium, replacement is the only manufacturer's recommendation.

Sectioning to the R.H and L.H front frame rail is permitted. The frame section and repair instructions are available as a kit from Ford USA when purchasing the part.

As more and more vehicles become product specific, instructions when buying parts are going to be the way of the future from many manufacturers.

We acknowledge, with thanks, the assistance given by Ford New Zealand Ltd in presenting this information.