

SECTION 3: CHASSIS

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i. 3.1 GENERAL

- 3.1.1 All Street Rods must have a chassis. The body and chassis are detachable by means of standard fasteners and the chassis must not rely on the body for strength. A number that identifies the chassis must be permanently stamped or etched on the chassis.
- 3.1.2 A Street Rod chassis must be a platform that resists twisting. A torsionally rigid chassis will not only be stronger and last longer, but will also provide better handling and allow closer fit-up of body panels.
- 3.1.3 An assessment of torsional stiffness may be required at the discretion of the Examiners.
- 3.1.4 Examiners will give consideration to any chassis construction providing sound engineering principles can be shown to have been applied, but have the discretion to seek an engineer's report where;
- there are unique design or construction characteristics, radical chassis alterations;
 - independent suspension is to be fitted;
 - there are considered to be significant differences in the torsional rigidity of adjacent parts of the chassis; or
 - the proposed engine is of a power or mass that raises concerns for any of the above
- 3.1.5 Examiners may require an engineer's report if there is any concern about any aspect of the design, strength, integrity or torsional characteristics of a chassis.

ii. 3.2 WELDING

The chassis must be constructed or modified by a person competent in welding. The welding should comply with the standards specified in the Australian Standard AS 1554.1 *Structural steel welding Part 1: Welding of steel structures*. Numerous effects such as twisting and loss of strength can be caused by incorrect penetration, preparation, or timing of weld deposits. Structural chassis welding should be carried out with the chassis fixed in a jig in order to reduce misalignments and twisting during work. An example of a chassis jig is shown in Figure 3(a). Inspection of all welds and the requirement for rework will be at the discretion of the Examiners.

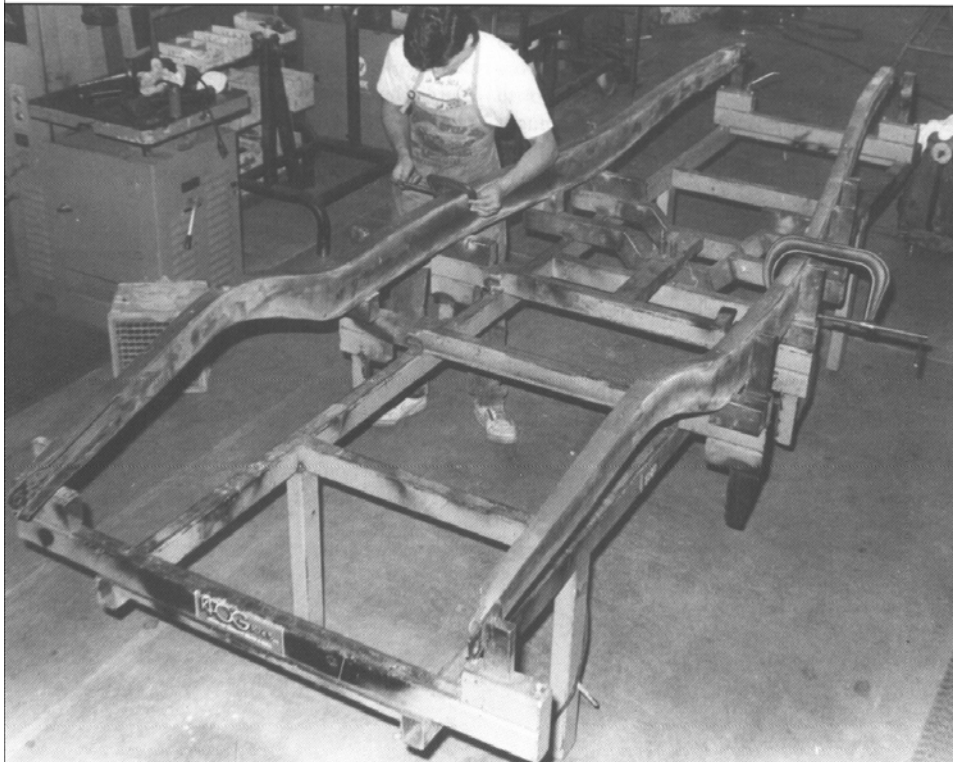


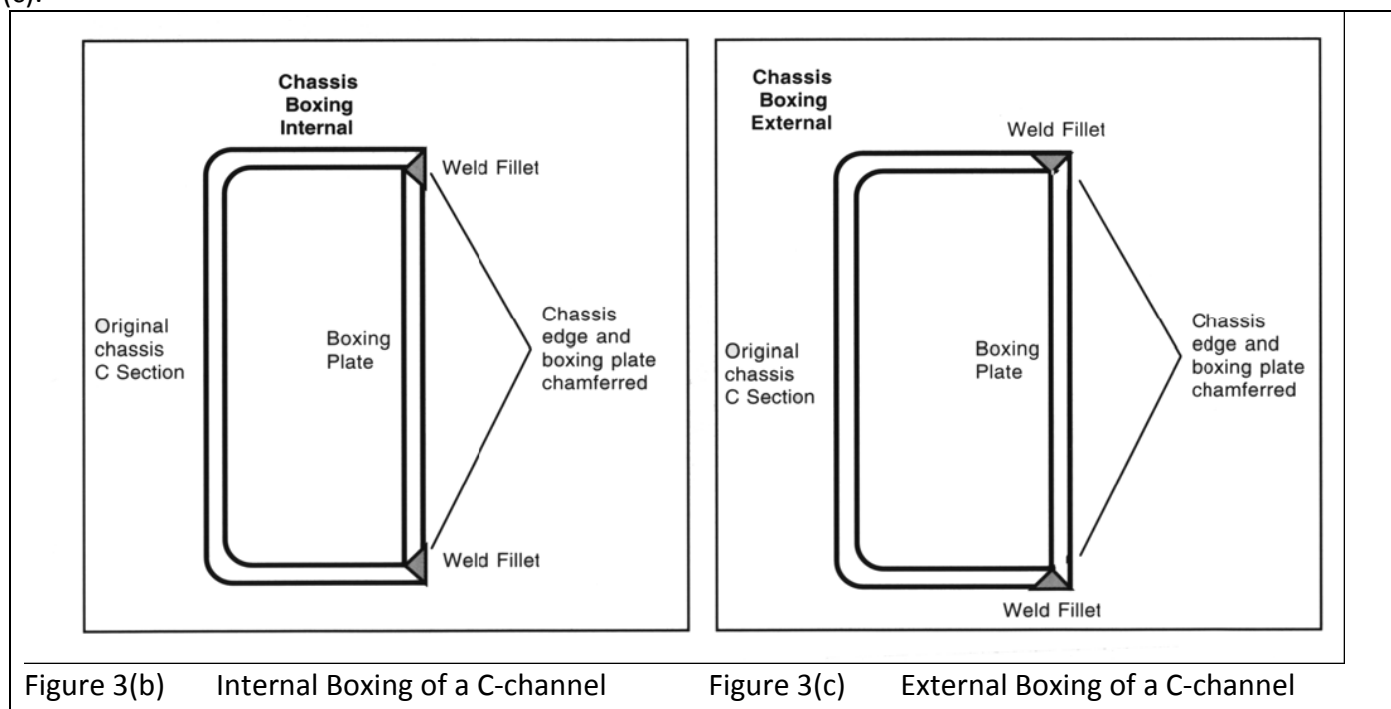
Figure 3(a) Example of a chassis jig.

Note: Those persons who have experience, but do not possess certification, should attend a TAFE or Private Provider Certified welding course to obtain the necessary level of competence.

iii. 3.3 EXPLANATION OF PRACTISES USED IN CHASSIS MODIFICATIONS

iv. 3.3.1 Boxing

The addition of a 3mm or thicker plate welded into the opening of a C-channel, or “top-hat” section, to form a box section. This section can either be the full length of the side rail, or added to areas requiring extra strength. Boxing plate attachment should be carried out as shown in Figures 3(b) and 3(c).



v. 3.3.2 Laminating

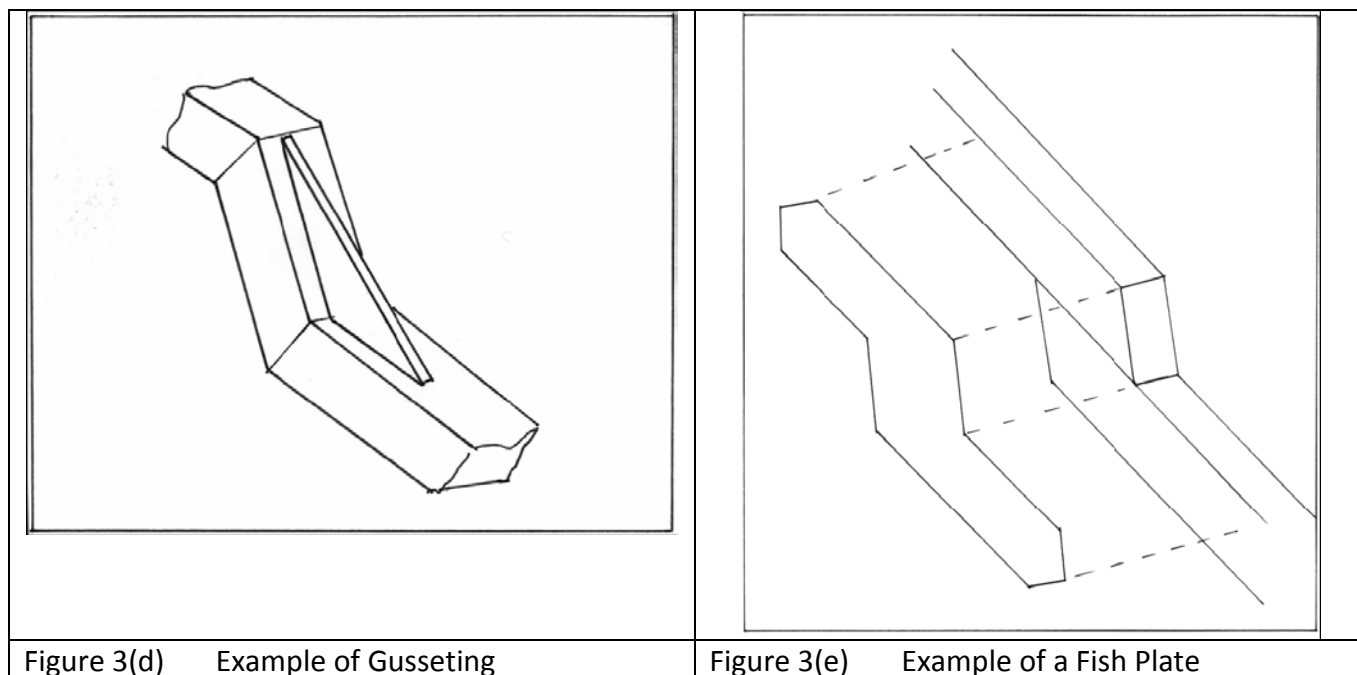
The attaching of an additional 3mm or thicker plate to a chassis side rail. Large lamination plates may require the addition of regularly spaced plug welds to ensure full contact with side rails.

vi. 3.3.3 Gusseting

Gussets are plates used to strengthen butt-welded chassis joints. An example of gusseting is given in Figure 3(d).

vii. 3.3.4 Fish-Plates

Similar to a lamination plate, and is affixed when a gusset cannot be easily utilised, or a vertical slice, pie cut or section has been removed and the parts are butt welded together. Fish-plates should be at least twice as long as the chassis vertical height with triangular extensions to increase weld length and purchase area. An example of a fish-plate is shown in Figure 3(e).



viii. **3.4 CHASSIS TYPES**

ix. **3.4.1 General**

Chassis must comply with these Guidelines and the stated criteria. The chassis should either be built before 1949 or be a replica of one was built before 1949

3.4.1.1 *Original Pre-1949 Manufactured - Modified*

These chassis represent the bulk of street rod foundations, and specific recommendations for strength enhancement are detailed in Clause 3.6 of this section.

3.4.1.2 *Reproduction - Australian Professional Rod Shop*

Most reproduction chassis made by Australian Manufacturers are able to comply with the requirements of these guidelines. All chassis must be presented for a first build inspection by the Examiners if the chassis is not of a standard type or build.

3.4.1.3 *Reproduction - Overseas Rod Shop*

US or NZ manufacturers may not be aware of the Australian requirements, for example the chassis cross member must be a minimum thickness of 3mm, and should be checked thoroughly prior to purchase. All overseas built chassis must be presented for a first inspection by the Examiner.

3.4.1.4 *Owner Built Reproduction*

An owner built chassis may require an engineer's report for components such as independent front suspensions and any radical chassis alterations.

3.5 CHASSIS FRAME CONSTRUCTION

3.5.1 The minimum profile for a chassis that will support a light bodied Street Rod (T-Bucket, Anglia etc) is 75 x 50 x 3mm rectangular hollow section (RHS) mild steel.

3.5.2 The minimum profile for a chassis that will support heavier Street Rods, such as an A model or later Ford, is 100 x 50 x 3mm RHS steel tubing, or tubing of a cross section no less than the original production chassis.

3.5.3 All Street Rods must be fitted with a tailshaft loop to contain the tailshaft in the event of front yoke failure. The tailshaft loop should be positioned no more than 150mm from the front yoke, and be constructed to accommodate engine and gearbox movement on the mountings during acceleration

and deceleration, and resulting from suspension movements. The tailshaft loop may be formed as part of the centre cross member.

- 3.5.4 Chassis must not be stepped in at the rear to accommodate wheel rims wider than 10".

x. 3.6 CHASSIS STRENGTHENING AND CROSSMEMBERS

- 3.6.1 The addition of partial or full boxing, lamination of side rails, and the addition of space frame attachments may be used for chassis side rail strength improvement. Full length boxing should be used on all open chassis section chassis. An Engineer's report may be required if a C-section chassis is not boxed.

xi. 3.6.2 Cross members

- 3.6.2.1 The modification of an early model chassis often includes the full or partial removal of original cross members. As a minimum, after removing any original cross member, a "K" member must be installed. The desired layout of a "K" member and other cross member types and alterations are depicted in Figures 3(f) and 3(g) below.

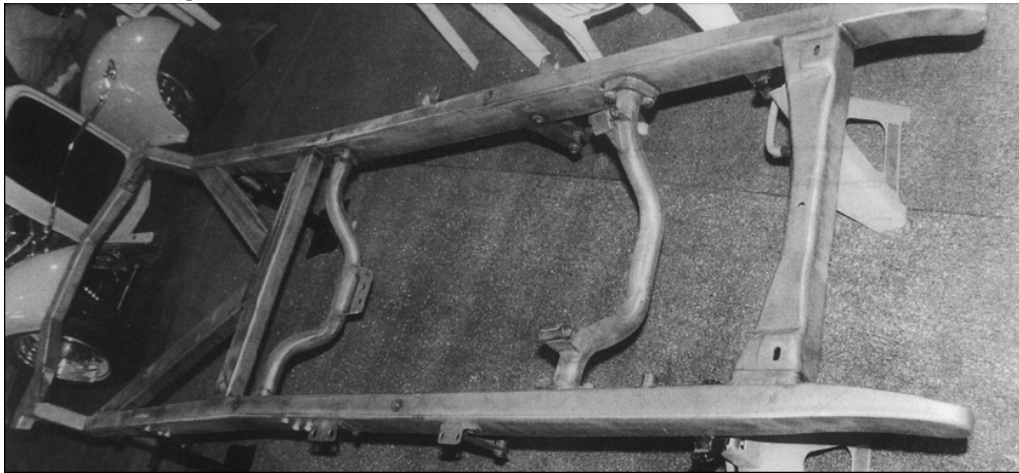


Figure 3(f) Example of "K" member

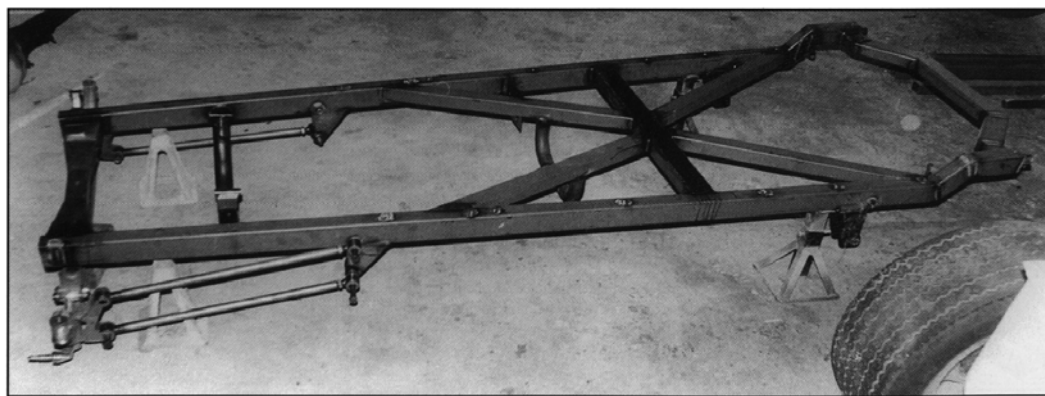


Figure 3(g) Example of "X" member

- 3.6.2.2 All cross members must have a minimum wall thickness of 3mm with an appropriate cross-section. The cross member should be of 75 x 50mm RHS, if one layer is used; and 50 x 25mm RHS or round tube of at least 34mm diameter if two layers are used with ties between the upper and lower layer in appropriate locations.
- 3.6.2.3 The Examiner may consider alternatives that are supported by an engineer's report.
- 3.6.3 Chassis cross members for engine and drivetrain location may be designed to be removed for maintenance purposes. In such cases, the flange plates and bolts used must be suitably sized, and that nuts or threaded bosses must have enough thread depth for the application.
- 3.6.4 A centre cross member must tie together both side rails to ensure torsional rigidity. Figures 3(g) above and 3(h) below provide guidance to help ensure that a chassis will be sufficiently rigid.

Note: Many vintage chassis were not designed as a rigid platform and allowed the chassis and body to flex independently. This is undesirable in a street rod.

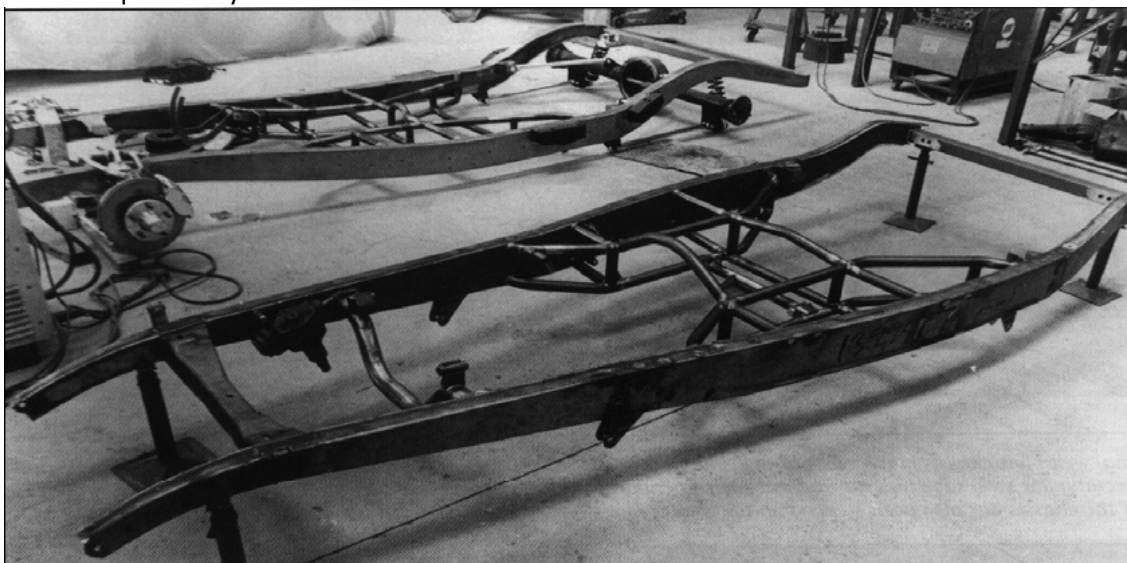


Figure 3(h) Example of a Tubular "X" member

3.6.5 Spacer tubes, crush tubes, or bolts of an appropriate length and section must be used wherever a bolt passes through a hollow section of the chassis. The tube should be 3mm or larger wall thickness and welded in position. Figure 3(i) shows examples of spacer tubes.

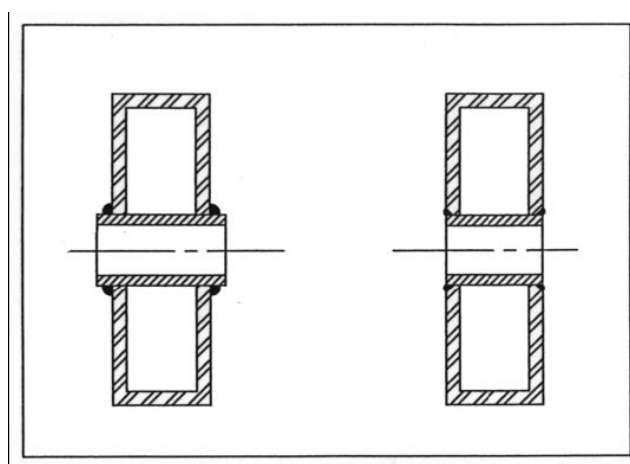


Figure 3(i) Examples of spacer tubes

xii. 3.7 NUTS, BOLTS AND FASTENERS

3.7.1 Table 3.1 below lists the minimum standards that apply to nuts and bolts used in Street Rods.
Note: Refer to Appendix A to Section LZ of VSB 14 for guidance on the use of fasteners.

Ungraded bolts	Panel fixing, floor panel fixing, and lightly loaded brackets.
Grade 3 bolts	Seat belts.
Grade 5 bolts	Moderately loaded members, suspension mounts, cross members and tail shafts.
Grade 8 bolts	Brake callipers, master and slave cylinder mounts, steering arms and all heavily loaded assemblies.

Table 3.1 Bolts used in Street Rod applications

High grade bolts must not be used as seat belt bolts. Bolts designed specifically for seat belts be must be used in this application. See also Section 9.5.

- 3.7.2 Stainless steel bolts must not be used in high load or stressed situations unless they are certified as high tensile steel. Uncertified bolts should only be used in locations where the use of ungraded bolts is permitted.
- 3.7.3 Bolts or fasteners should be long enough to ensure that at least one clear turn of thread is visible. This applies to all nuts, including nyloc and other locking or torque to yield type nuts, and any captive or permanently inserted nuts or bosses where the threaded end of the bolt is not visible when in place.
- 3.7.4 Locking devices must be fitted to all fasteners. These devices include:
- Spring anshake proof of washers.
 - Nyloc nuts.
 - Deformed thread locknuts or Huck nuts.
 - Castellated nuts with split or roll pins.
 - Lockwire.
 - Split pins.
 - Locking Tabs, and staking.
- 3.7.5 Care must be taken to torque lock nuts correctly. Deformed thread lock nuts or stretch bolts (torque to yield) should not be re-used once they have been torqued to the manufacturer's specifications.
- 3.7.6 Nyloc nuts must only be reused once, and only if the nylon locking area is in good condition.

