



SVRA ROLL BAR AND ROLL CAGE DESIGN RECOMMENDATIONS

Based on the 1972 GCR

(Revised 1/20)

A. Basic Design Considerations

1. The basic purpose of the rollover structure is to protect the driver if the car turns over, runs into an obstacle such as a guardrail or catch fence, or is struck by another car. It must be designed to withstand compression forces from the weight of the car coming down on the rollover structure, and to take fore and aft and lateral loads resulting from the car skidding along the ground on its rollover structure.
2. A system of head restraint should be designed into the rollover structure if possible. The head restraint should have a minimum area of 36 square inches and be padded with a non-resilient material such as Ethafoam or Ensolite.
3. Forward braces and portions of the hoop that are subject to contact by the driver's body should be padded with the above type materials.

B. Material

1. Seamless, ERW or DOM mild steel tubing (SAE 1010,1020,1025) or equivalent or alloy steel tubing (SAE 4125, 4130)(T-45). Alloy steels must be normalized to relieve stress after welding. ERW tubing must have the weld to the inside of all bends.
2. An inspection hole at least 3/16" diameter must be drilled in a non-critical area of the main hoop to facilitate verification of wall thickness. All bolts must be of a minimum diameter of 3/8" SAE Grade 5 or equivalent aircraft quality.

C. General Construction

1. One continuous length of tubing must be used for the main hoop member, with smooth, continuous bends, and no evidence of crimping or wall failure. Whenever possible, the hoop should start from the floor of the car, and in the case of tube frame construction, be attached to the chassis tubes by means of gussets or sheet metal webs to distribute the loads. It is recommended that gussets be used at all joints.
2. All welding must be of the highest possible quality, with full penetration and must be done according to A.S.T.M. specifications for the material used.

D. All Cars

1 **Minimum tubing sizes** for front and main hoops and all required bracing:

Vehicle Race Weight	Mild Steel	Alloy Steel
Under 1500 lbs.	1.50" x .095"	1.375" x .095"
1500 to 2500 lbs.	1.50" x .120"	1.50" x .095"
Over 2500 lbs.	1.75" x .120"	1.625" x .095"

Optional bars and braces may be of any suitable diameter and wall thickness.

2. **Mounting plates.** Welding is the preferred method for securing the bar or cage within the car. Mounting plates bolted to the structure of the car shall not be less than 3/16" thick, with a back-up plate of equal thickness on the opposite side of the panel, with the plates bolted together. There must be a minimum of three bolts per plate. Whenever possible, the mounting plate shall extend onto the vertical section of the structure, such as a door pillar.
3. **Door Bars.** All cars must have adequate drivers door impact protection, a minimum of 2 door bars are required, installed high enough to protect the driver and not designed for ease of entry. Dual horizontal or an X design are acceptable.

E. Open Cars

1. **The main hoop** may be either the full width of the cockpit, or a partial cockpit width. (only behind the driver.)
2. **Height--**The top of the main hoop must not be less than 2" over the driver's helmet.
3. **Bracing.**
 - a. A full width main hoop must incorporate a diagonal lateral brace.
 - b. The main hoop must have two braces extending forward or to the rear, attaching to the frame or chassis.
 - c. These braces must be attached as near as possible to the top of the main hoop (not more than 6" below the top, and at an included angle of at least 30 degrees).

F. Closed Cars

1. **The main hoop** must extend the full width of the driver/passenger compartment and must be as near the roof as possible.
2. If a front hoop is installed, it should follow the line of the front pillars and be connected by horizontal bars to the main hoop on each side at the top. Alternatively, two side hoops following the line of the front pillars to the top of the windshield (as close to the roof as possible), then horizontally to the rear, attaching to the main hoop. These two side hoops are to be connected together by a tube over the top of the windshield.

G. Removable Roll Bars

Removable rollover structures are permitted, but they must be very carefully designed and constructed to be at least as strong as a permanent installation. If one tube fits inside another tube to facilitate removal, the removable portion must fit tightly, and must bottom by design, on the permanently mounted tube, and at least two SAE 3/8" Grade 5 bolts must be used to secure each joint. The telescope section must be at least eight inches in length.

H. Older Cars

Special care must be exercised in older cars that may have metal fatigue or rust damage, to insure that a sound junction is made between the roll-over structure and the body or chassis. In some cases, it may be wise to strengthen, or double the floor or other mounting point, or to run a lateral bar along the floor, between the main hoop upright legs, to prevent the structure from being pushed downward, and through the floor. For originality sake some owners may not wish to sacrifice appearance. However, it is possible to build a reasonably safe system without altering outward appearance significantly.

I. Modern Materials and Techniques

It is recognized that many new designs and materials are significantly superior to the 1972 standards. There is no limit to the number of attachment points so long as their primary intent is to strengthen the main components of the crash protection system. Parts of the roll bar or roll cage deemed to serve no practical purpose other than chassis stiffening may be considered in violation of the intent of these rules and can be subject to weight penalty or reclassification.

