



# *La Carrera Panamericana 2009*

## **8) ROLL-BAR**

### **8.1) DEFINITIONS**

#### **8.1.1) Rollcage**

A structural framework made up of tubes, connections and fixation points. It designed to prevent serious deformation in the case of a collision or a car turning aver.

#### **8.1.2) Roll-bar**

Structural framework made up of a main roll-bar, connections and fixation points.

#### **8.1.3) Safety cage**

Structural framework made up of a main roll-bar and a front roll-bar, or of two lateral roll-bars, connections and fixation points.

#### **8.1.4) Main roll-bar**

A structure made out of a vertical frame situated in a transversal plane in relation to the car's axis, near the back of the front seats.

#### **8.1.5) Front roll-bar**

Identical to the main roll-bar but its shape follows the windscreen mountings and the front part of the roof.

#### **8.1.6) Lateral roll-bar**

A rollcage made up of a vertical framework situated in a longitudinal plane in relation to the car's axis placed on the right or the left. The rear pillar must be placed against or behind the back of the driver's seat or that of his co-driver. In case where the main roll-bar is used as the pillar the connection must be near the roof. The front bar must be near the windscreen and dashboard. The driver and his co-driver must be able to get in and out of the vehicle without any inconvenient difficulty.

#### **8.1.7) Longitudinal strut**

Longitudinal tubes which belong neither to the main roll-bar nor to me front roll-bar

#### **8.1.8) Diagonal strut**

Tube crossing the car from one of the corners of the main roll-bar to any fixation point of the other side of the roll-bar or of the near longitudinal strut.

#### **8.1.9) Framework reinforcement**

Tube fixed to the rollcage improving its efficiency.

#### **8.1.10) Reinforcement plates**

Metal plates, fixed to the chassis structure of the cars on which the roll-bar rests.

#### **8.1.11) Fixing plates**

Plates which are attached to the tubes and allow their fixation to the chassis.

#### **8.1.12) Removable connections**

Optional connection of lateral or diagonal struts to the main roll-bar or the front roll-bar. It must be possible to dismantle these pieces of equipment.

### **8.2) SPECIFICATIONS**

#### **8.2.1) General comments**

**8.2.1.1)** Safety cages should be designed and constructed in such a fashion that after they have been properly built in, they prevent the bodywork from deforming and thus reduce the risks of injury to people on board the vehicle.



# La Carrera Panamericana 2009

The essential characteristics of safety cages come from a finely detailed construction, suitable adaptation and fixation to the car plus snug fitting against the bodywork. The roll-bars must never be used as pipes for liquids. The bar or bars must be constructed in such a way that it (they) do not obstruct access to the front seats and do not encroach on the space provided for the driver and co-driver.

However parts of rollcage may encroach upon the front passenger space by passing through the dashboard and the lateral upholstery as well he rear by passing through the upholstery or the rear seats. The rear seat may be folded down.

Any modification to the homologated roll-bars (see Art. 8.6) is forbidden.

**8.2.1.2) Basic rollcage** (drawings 1 & 2 for Rallies only not homologated for Panamericana).

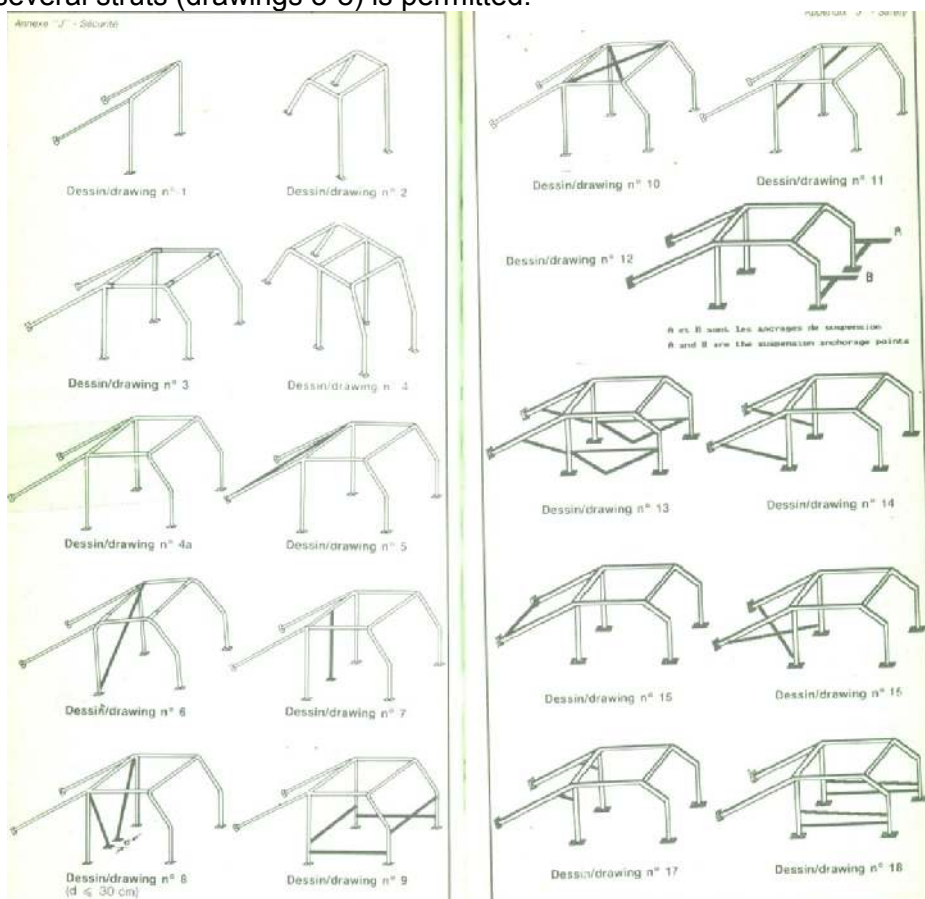
Roll-bar: Production Cars (Group N) and Touring Cars (Group A), Sports Cars (Group B) up to 2,000 cm<sup>3</sup>

Rollcage: Tour Cars (Group A), Sports Cars (Group B) more than 2.000 cm<sup>3</sup> (optional for Production Cars (Group N) and Touring Cars (Group A), Sports Cars (Group. B) up to 2,000 cm<sup>3</sup> (drawings 3 & 4).

**8.2.1.3) Different possibilities of installing the obligatory strut** (with the exception of rallies):

The obligatory strut can be fixed as illustrated in all basic rollcages (drawings 1-4).

The combination of several struts (drawings 5-8) is permitted.



**8.2.1.4) Different possibilities of installing the optional reinforcements of the rollcage:**

Each type of reinforcement (drawings 9-18) may be used separately or combined with one or, several others. These reinforcements can be installed in each of the basic rollcages (drawings 1-4).

## 8.2.2 Technical specifications

**8.2.2.1 Main, front and lateral roll-bars.** The roll-bars must be in a single piece. Their construction must be impeccable without unevenness or cracks. The fitting must be done in such a way that it marries the interior shape of the car, or straight if it cannot be directed upwards. If it is necessary for the lower parts of the roll-bar to be rounded.



# La Carrera Panamericana 2009

These parts must be strengthened and follow the interior shape exactly.

Minimum bending  $r = 3 \times$  tube diameter

In order to get an efficient installation of the roll-cage, it is allowed to locally modify the original upholstery, directly on the legs of the roll-cage, for example by cutting or embedding deformation).

Only those parts of the interior lining which hinder the passage of the roll-bar can be withdrawn.

However, this modification can in no case allow the removal of entire parts of the upholstery.

## 8.2.2.2) Fixation of the roll-bars to the body

Minimum fixations for the safety rollcage:

1 for each pillar of the main or lateral roll-bar.

1 for each pillar of the front roll-bar.

1 for each pillar of the rear longitudinal strut.

1 for each pillar of the main roll-bar, and each rear pillar of the lateral roll-bar at the fixation point for the front seat belt, or in the approximate area of this position.

The fixation of the roll-bar pillars must be done with at least 3 bolts.

The attachment points of the front and main roll-bars on the body must be reinforced with a steel plate of at least 3 mm. thick and with a surface area of 120 cm<sup>2</sup> welded to the body.

The various possibilities are given in drawings 19 to 33.

## 8.2.1.4) Different possibilities of installing the optional reinforcements of the rollcage:

Each type of reinforcement (drawing 9-18) may be used separately or combined with one or several others.

These reinforcements can be installed in each of the basic rollcages (drawings 1-4)

## 8 2.2) Technical specification.

### 8.2.2.1) Main, front and lateral roll-bars

The roll-bars must be in a single piece. Their construction must be impeccable without unevenness or cracks. The fitting must be done in such a way that it marries the interior shape of the car, or straight if cannot be directed upwards.

If it a necessary for the lower parts of the roll-bar be rounded, these parts must be strengthened and follow the interior shape exactly.

Minimum bending  $r = 3 \times$  tube diameter

In order to get an efficient installation of the roll- cage, it is allowed to locally modify the original upholstery, directly on the legs of the roll-cage for example by cutting or embedding (deformation).

Only those parts of the interior lining which hinder die passage of the roll-bar can be withdrawn.

However, this modification can in no case allow the removal of entire parts of the upholstery.

## 8.2.2.2) Fixation of me roll-bars to the body

Minimum fixations for the safety rollcage:

1 for each pillar of the main or lateral roll-bar.

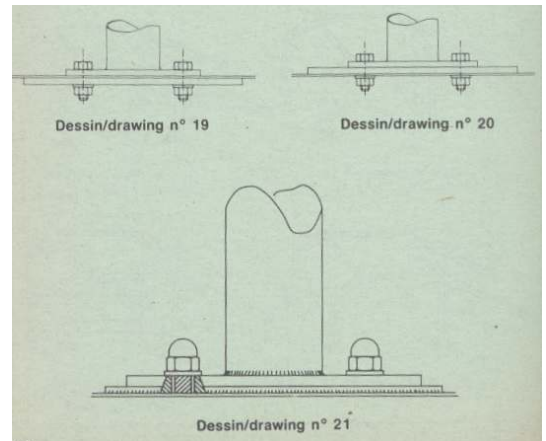
1 for each pillar of the front roll-bar.

1 for each pillar of the rear longitudinal strut.

1 for each pillar of the main roll-bar, and each rear pillar of the lateral roll-bar at the fixation point for the front seat belt, or in the approximate area of this position.

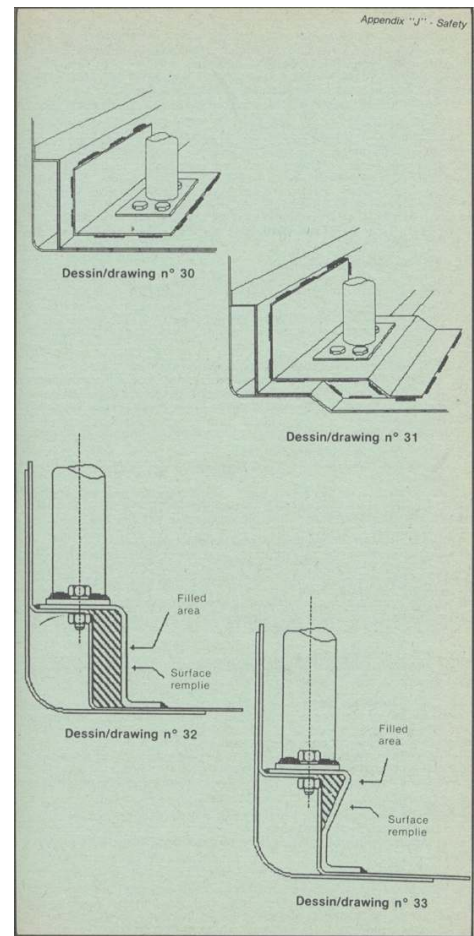
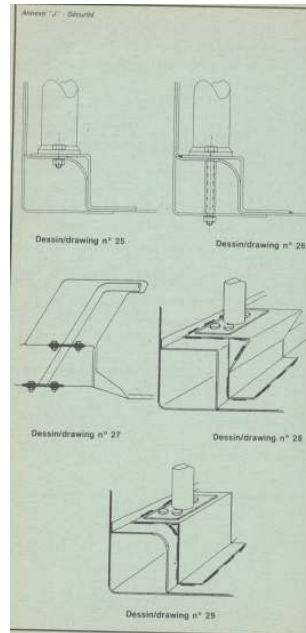
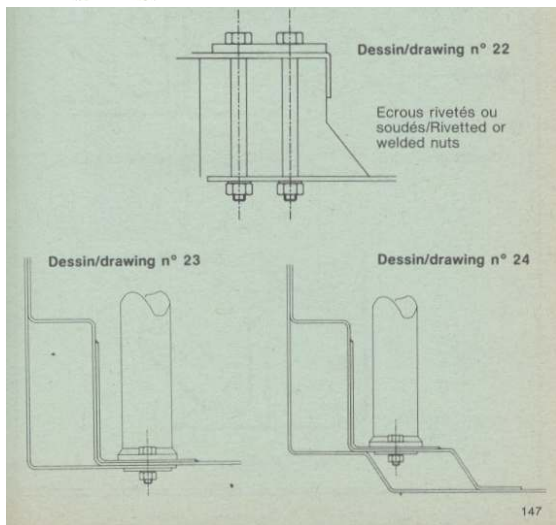
The fixation of the roll-bar pillars must be done with at least 3 bolts. The attachment points of the front and main roll-bars on the body must be reinforced with a steel plate of at least 3 mm thick and with a surface area of 120 cm<sup>2</sup>. welded to the body.

The various possibilities are given in drawings 19 to 33.





# La Carrera Panamericana 2009



Hexagonal bolts or similar, of a minimum diameter of 8 mm (minimum quality 8-8 as per the ISO specifications) shall be used.

The nuts shall be self-locking or fitted with washers.

These fixations represent a minimum. It is possible to increase the number of bolts, to weld steel roll-bar to the bodyshell.

The additional fixations may be bolted and / or welded to the body.

### 8.2.2.3) Longitudinal struts

They must be fixed to file left and to the right above and outside the main roll-bar, then going directly backwards and as near as possible to me interior side contour.

A rounded construction (with a large bend) is allowed if it is placed as near the roof as possible.

The diameter, the thickness and the material of the longitudinal struts should correspond to the norms fixed for the rollcages.

The forces must be efficiently divided and absorbed.

The attachment points must be strengthened by plates if their location does not allow them to absorb forces

### 8.2.2.4) Diagonal struts

With the exception of rallies, the installation of at least one diagonal strut is obligatory.

Their construction must be carried out in accordance with drawings 5 to 8 without bends.

The attachment points of the diagonal struts must be so located that they cannot cause injuries.

They must preferably have the same diameter as the tubes of the main structure.

### 8.2.2.5) Optional reinforcements of the rollcage

The diameter, the thickness and the material of the reinforcements must correspond to the norms fixed for the rollcages.

They shall be either welded into position or installed by means of a detachable connection (obligatory for the front transversal reinforcement).

The reinforcement tubes should to be attached to the actual bodywork of the car.



# La Carrera Panamericana 2009

## 8.2.2.5.1) Transversal struts

The fitting of transversal struts as shown in illustrations 9 and 10 is permitted. The transversal strut fixed to the front bar must not, however, encroach upon the space reserved for the occupant(s). It must be placed as high as possible under the dashboard and must be detachable.

## 8.2.2.5.2 Longitudinal struts (lateral protection)

The fixing of a longitudinal strut at the side(s) of the vehicle door level is permitted. The tube making up this reinforcement must be built into the safety rollcage and its angle with the horizontal tube must not exceed 15° (angled downwards towards the front). No point of the longitudinal strut should be higher than one third of the total height of the door measured from its base.

## 8.2.2.5.3) Roof reinforcement

The reinforcement of the upper part of the rollcage by the strut(s) as shown in illustration 10 is permitted.

## 8.2.2.5.4) Anglo reinforcement

The reinforcement of the upper angles between the main roll-bar and the longitudinal connections with the front roll-bars, is permitted, as is the reinforcement of the upper rear angles of the lateral roll-bars, as shown in illustration 11.

The upper fixation of these reinforcements shall, under no circumstances, be situated to the fore of the middle of the longitudinal linking tube, and their lower fixation shall, under no circumstances, be situated lower than in the middle of the vertical pillar of the roll-bar.

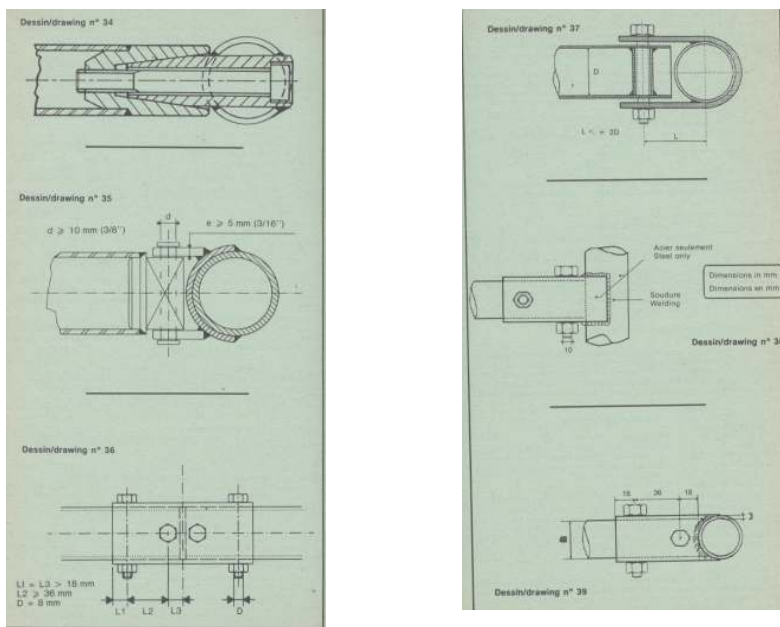
## 8.2.2.6) Padding for protection

The padding of the dangerous points on the roll-bars is recommended in order to prevent injury. The roll-bar may be covered with a detachable protective casing.

## 8.2.2.7) Removable connections

Should removable connections be used in the construction of the roll-bar they must comply with or be similar to a type approved by the FISA (see drawings 34 to 38).

The screws and bolts must be of a sufficient minimum diameter and of the best possible quality (8.8).



## 8.2.2.8) Welding instructions

All welding should be of the highest quality possible with full penetration (preferably arc welding and in **particular heliarc**).



# La Carrera Panamericana 2009

Although good outside appearance of a weld does not necessarily guarantee its quality, poor looking welds are never a sign of good workmanship.

When using heat treated steel the special instructions of the manufacturers must be followed (special electrodes, welding under protecting gas).

It must be pointed out above all else that the manufacture of heat treated steel, and high carbon steels may cause certain problems and that bad construction may result in a decrease in strength (crinking and an absence of flexibility).

## 8.3) MATERIAL PRESCRIPTIONS

Specifications of the tubes used:

Minimum material:	Minimum tensile: Strength:	Minimum dimensions:
Cold drawn seamless	350 N/mm	38 X 2.5 or
Carbon steel	350 N/mm <sup>2</sup>	40 x 2 (In mm)

These dimensions represent the minima allowed.

In choosing the quality of the steel, attention must be paid to the elongation properties and the weldability.

## 8.4) REGULATIONS FOR CARS

### 8.4.1) Production Cars (Group N)

The fitting of a roll-bar or roll-cage is compulsory for all events.

It is authorised to move the fuse box to enable a rollcage to be fitted.

### 8.4.2) Touring Cars (Group, A) and Sports Car (Group B)

The fitting of a safety cage is obligatory for all events.

## 8.5) EXCEPTIONS

However manufacturers of safety rollcages may also propose a roll-bar of free conception to an ASN for approval as regards the material used, the dimensions of the tubes and the implantation of the braces provided that the construction is certified to withstand stress minima given hereafter (and applied simultaneously)

— 1.5 w lateral\*

— 5.5 w fore and aft

— 7.5 w vertical

\*w = weight of the car + 75 Kg.

It must be possible to submit a certificate, on a form approved by the ASN, signed by a qualified technical to the event's scrutineers.

It must be accompanied by a drawing or photo of the roll-bar in question declaring that this roll-bar can resist the forces mentioned above.

Roll-bars must not be modified

## 8.6) HOMOLOGATION

The roll-bar, made from Steel, must be described on a homologation extension form presented to the scrutineer for approval, and must not be modified (see Article 8.2.1).