



SEATBELT SYSTEMS



**SFI-16.1
CERTIFIED**

**SFI-16.5
CERTIFIED**



DRIVEN ***BY*** ***SAFETY***



You're ready to use the technology that protects the world's top drivers. Here are the steps to get started.

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Questions? Call us at 800.654.7223

**OF COURSE, IT'S THE SAFEST.
IT'S A SIMPSON.**

You have purchased a premium set of Simpson Seat Belts. They are designed with attention to detail, just like your entire Simpson system.

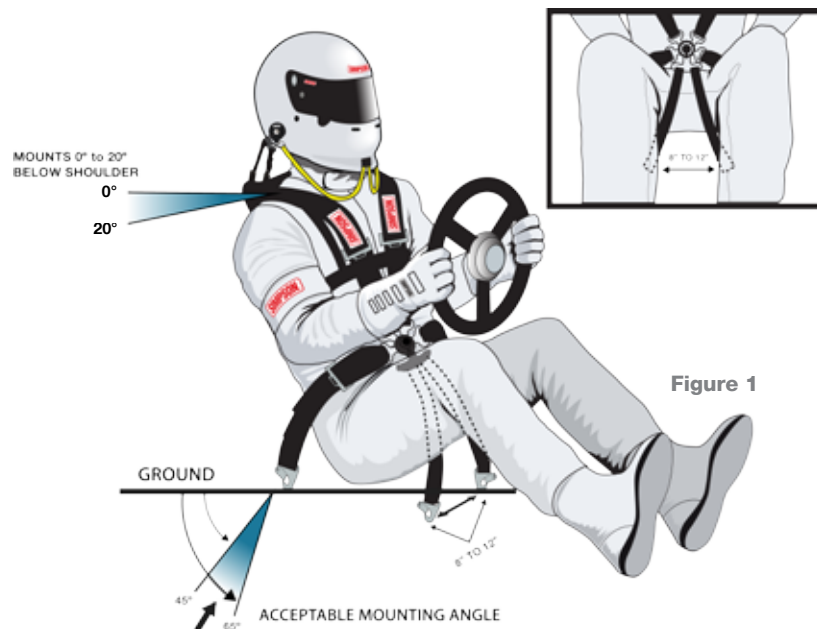


Figure 1

MOUNTING OF RESTRAINTS

Mounting of Restraints to the Vehicle

The mounting of your belt system is extremely important to the function of the product. There are a number of acceptable mounting types.

General rules to follow when placing mounts in the car are:

- 1) Always mount the anchors in the direction of pull when in use.
- 2) If a wraparound mount is used, make sure there are stops on both sides of the belt to stop the belt from moving side to side in an accident.
- 3) Use grade 5 or better hardware to bolt in the seat belt system. Mount all hardware outside the seat belt system where possible.
- 4) Make sure that the locking adjusters are as close to the anchor as possible and that the anchors have been properly locked to insure the ability to take load.
- 5) Keep the belt routing clear of obstruction; if the belt needs to go over an edge, take care to ensure that the belt will not fray on anything.
- 6) Belts will move with you in a wreck, make sure that the belt motion will not make the belt come in contact with a rough or sharp surface.

RESTRAINT SYSTEM MOUNTING

Figure 2: Lap Belt Mounting Zones – Upright Seating Position

The Lap Belts should be mounted off the center of the driver's hip at an angle of 45 to 65 degrees down from the horizontal. **See Figure 2.** All seat belt mounts need to be as close to the seat system as possible. In some cases, it is best to mount the belts inside the seat. The lap belts should be mounted with a double shear type mount and the lap anchor should be allowed to rotate freely. The lap belt mount needs to have a secure anchor to the chassis or frame of the vehicle. The mount should be capable of withstanding a 3500lb shock load.

Simpson titanium spacers are available for purchase. These allow lap belts to be tightly mounted while allowing for proper rotation and clearance.

The path that the lap belt takes from the anchor to the buckle must be free of obstruction. If the belt routes through a seat opening, it must allow for the belt to rotate forward by at least 30 degrees and be free from sharp edges to prevent cuts or fraying.

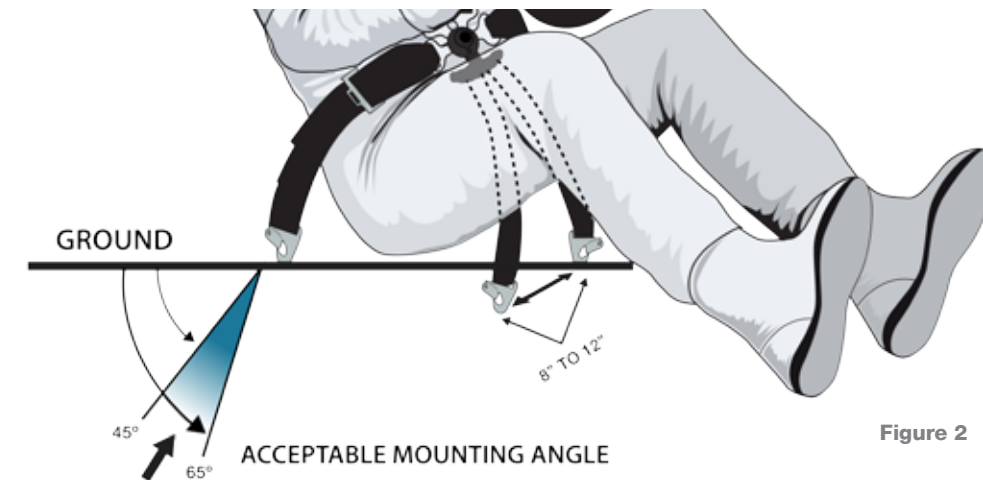
If the driver is <150lbs it is best to have a Pull Up style adjuster on the lap belt inside the seat, just on top of the leg radius. Custom size anchor lengths can be ordered to facilitate this.

If the driver is >150lbs the adjuster must be mounted outside the seat with a short Pull Up mount.

LAP BELT MOUNTING

Lap Belt Mounting for an Upright Seating Position

For Lap Belt mounts in a upright seating position the acceptable mounting zone is 45 degrees to 65 degrees. This is because of the lower angle of the pelvis. The belt should route over the flats on your pelvis on both sides.

**Figure 2**

LAP BELT MOUNTING

Lap Belt Mounting for a Reclined Seating Position (Less than 65 Degrees of back angle)

For Lap Belt mounts in a reclined seating position it is necessary to change the lap belt mounting zone to 0 degrees, vertical, +/- 10 degrees. This is because of the lower angle of the pelvis. The belt should route over the flats on your pelvis on both sides. **See Figure 3.**

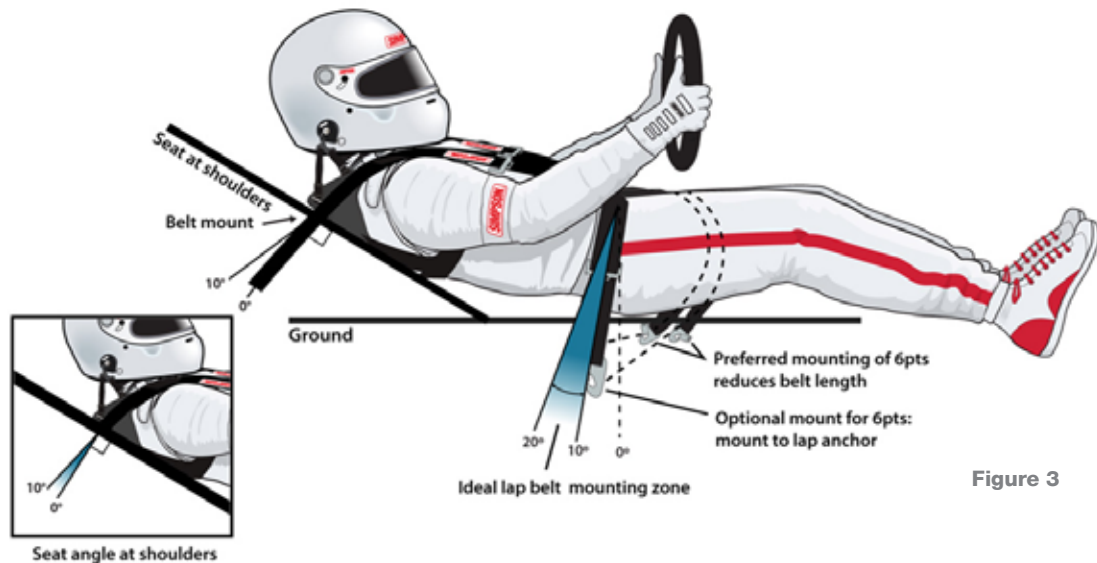


Figure 3

LAP BELT MOUNTING

Lap Belt Anchoring for Simpson Head Restraints

The SAS straps need to attach to the seat belt buckle; the SAS is an additional load path for the restraint allowing for stabilization of the driver.

Camlock Attachment Slide each SAS O-ring onto two of the camlock buckle tongues. **See Figure 4.**

Latch-in-Link Attachment Pair the SAS O-rings and slide them into the latch link shoulder belts or the five point depending on your set-up. **See Figure 5.**

The SAS straps should be adjusted to be snug when the buckle is latched with no more than 2 fingers of room. Adjustment is made by sliding the 1" webbing attached to the loops through the 3-bar adjuster.



Figure 4



Figure 5

5 & 6 POINT MOUNTS

The 5 Point Belt should be mounted directly off the chest line. **See figure 6.** The chest line is found by making a straight line off the chest of the driver, through the buckle. Where the chest line intersects the seat, is where the 5 point should be mounted or have an effective anchorage point.

The 6 Point Mounts are located 3.5" to 4.5" in back of the 5 point mount and at an 8 to 12 inch separation. (4" to 6" off the driver's center line) **See figure 6.** The webbing should come off the anchor at this point

The 6 points should be centered under the driver's legs and be slightly behind the pelvis. In a seat belt system that only uses the 6 points and not the 5 point, the buckle location is determined by the 6 points. They should be tensioned so that they apply mild pressure to the insides of the legs. The shoulder belts are used to set the final tension on the 6 points and buckle location.

Most issues with belt system tension or buckle walk can be solved by adjusting the 6 points tighter.

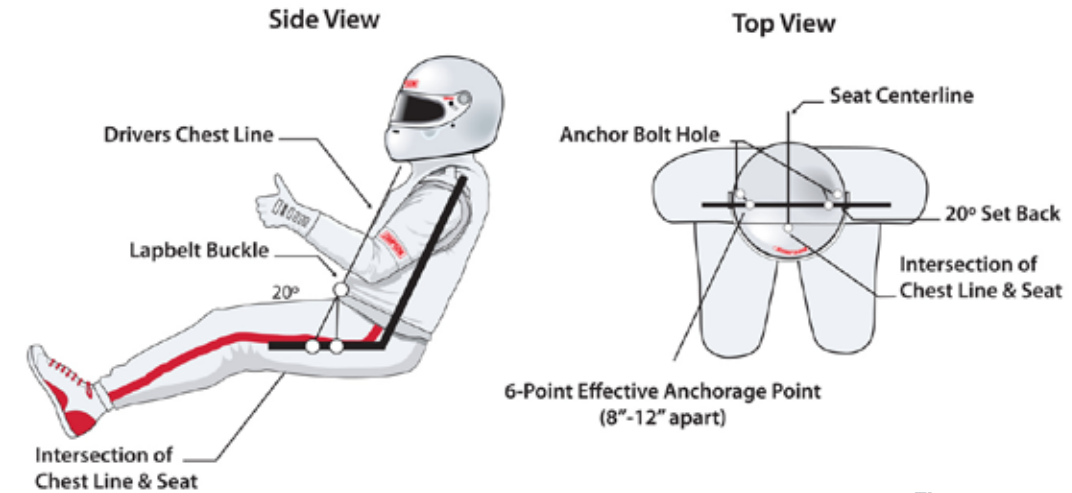


Figure 6
5 Point Mount

7 POINT MOUNTS

A 7-point belt system is simply the use of the 5 point belt in conjunction with the 6 point belts. Follow the mounting instructions for both of these systems. The 5 point belt now becomes the primary belt for holding the position on the lap belt buckle. The 6 points then need to be tensioned as previously explained.

The 7 point configuration is extremely stable. It has shown to be very important in keeping control of the pelvis in major impacts and in normal driving. Simpson highly recommends the use of 7 point systems.

RATCHET BELT INSTALLATION

Ratchet Belt Installation Instructions

*Note: It is important not to put too much webbing on the ratchet spool. Simpson Performance Products recommends a minimum of one wrap of webbing on the ratchet spool up to a maximum of three wraps of webbing. These positions are marked by labels on the webbing. **See Figure 7.**



Figure 7

SHOULDER BELT MOUNTING

The Shoulder Belts should be mounted at an angle of 0 to 20 degrees down from the top of the shoulder. **See Figure 8.** They may also angle inward from each side by as much as 45 degrees.

This will help the head restraints stay in place better in multiple and high angle side impacts. **See Figure 6.** It is best to have each shoulder belt to be mounted to its own anchor. Each anchor must withstand at least a 2500lb shock load.

NOTE: Eliminate as much distance as possible from shoulder to mounting point.

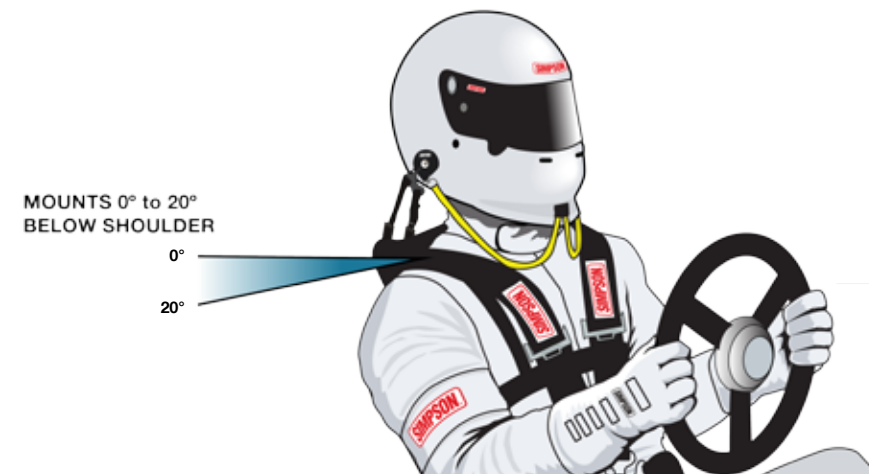


Figure 8

SHOULDER BELT MOUNTS - TOP VIEW

The Shoulder Belts may be angled in toward the center of the driver. **See Figure 9.**

They may also cross in this configuration. **See Figure 10.**

When using a high angle or crossing the belts, the seat belt hole in the seat should be a single hole with no separator in the middle.

The shoulder belt adjusters need to be located low on the chest. In a frontal impact, the torso will slide under the shoulder belts, making the adjusters rise up the chest. It is undesirable to have the adjusters contact the sides of the neck.

The Shoulder Belt Mounting for a Reclined Seating Position (Less than 65 Degrees of back angle) The shoulder belts should be mounted similarly to the upright seating position with the exception that the angle off the shoulder should be moved with the increased back angle to be $90 +20 - 0$ degrees to the back angle at the shoulder.

SEPARATED
BELT POSITION

Figure 9

**CRISSCROSS**
BELT POSITION

Figure 10



DOUBLE SHOULDER MOUNTING

Double Shoulder Belt Mounting for use with HANS device.

Ref. FIA Institute "Guide for the use of HANS in international motor sport"

2.5 Double shoulder belt system: a safety harness system with two straps on each shoulder is approved by the FIA and SFI and may be used.

It provides one body-belt that is positioned on the driver's shoulders (beneath the HANS) and a second HANS-belt that is positioned on the HANS yokes (as for standard HANS use.) It is important that the HANS-belt is at least as tight as the body-belt. A drawing of the double belt system is shown. **See Figure 11.**

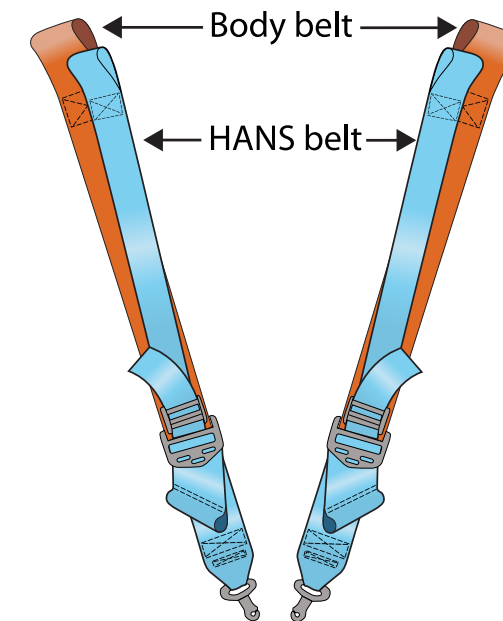


Figure 11 Double shoulder belt system

DOUBLE SHOULDER MOUNTING

For Formula Cars and other cars where the shoulder belt anchorage is less than 200mm behind the rear edge of the HANS-belt-bearing-surface (ie $X < 200\text{mm}$), the body-belt anchorage points should be positioned 60mm +/- 15 mm below the HANS-belt anchorage points. See Figure 12.

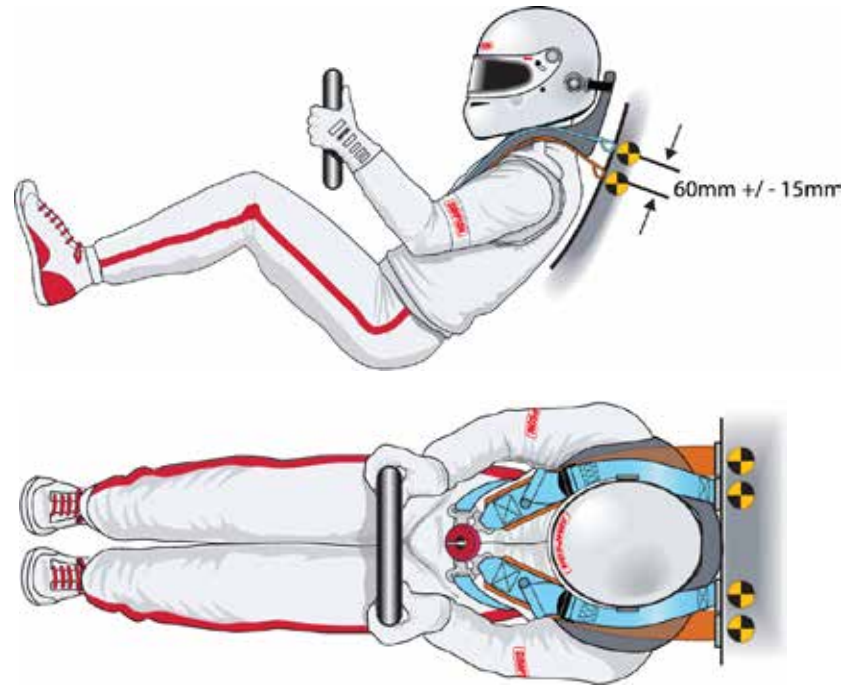


Figure 12 Installation of HANS® double belts in cars where ($X = < 200\text{mm}$)

DOUBLE SHOULDER MOUNTING

For closed cars and other cars where the shoulder belt anchorage is more than 200mm behind the rear edge of the HANS-belt-bearing-surface (ie $X > 200\text{ mm}$), the body-belt anchorage points should be the same height as the HANS-belt anchorage points. See Figure 13.

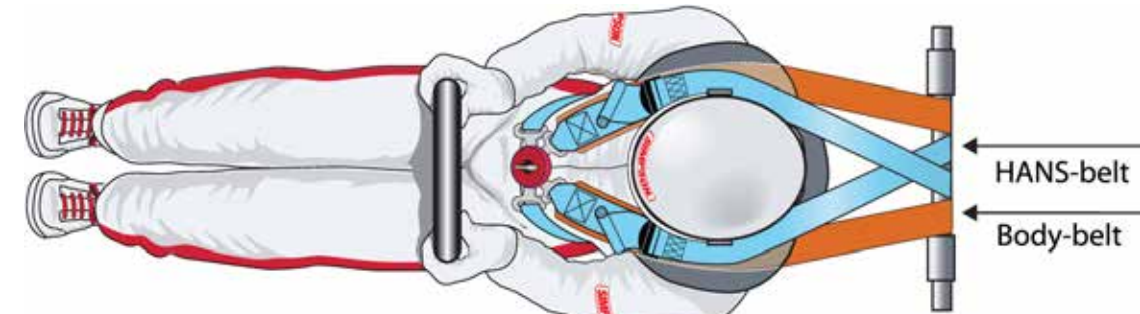


Figure 13 Installation of HANS® double belts in cars where ($X = > 200\text{mm}$)

In both cases ($X < 200\text{mm}$ and $X > 200\text{mm}$), the HANS-belts should be installed as detailed in sections 2.3 and 2.4.

If the HANS-belts and body-belts are installed on the same roll cage tube, the HANS-belts should be attached to the tube inboard of the body-belts. See figure 13. The body-belts may, exceptionally, be installed with a greater dimension Y if necessary to accommodate this, up to the point of being parallel to each other, but not divergent.

DOUBLE SHOULDER MOUNTING

When using double shoulder belts, there **MUST** be a minimum distance B between the lower edge of the HANS and the double-shoulder belt merge point.

See **Figure 14**.

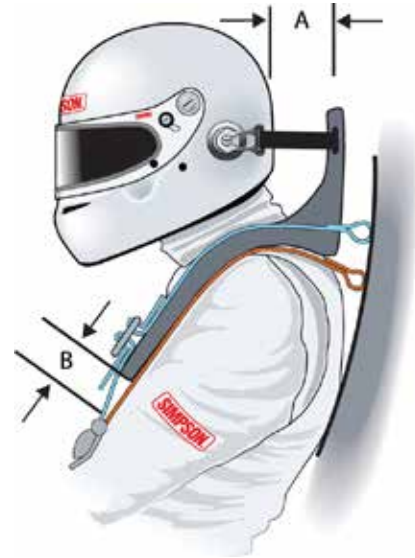


Figure 14 Minimum distance between HANS® yokes and double-shoulder belt merge point

The minimum **distance B** shall be determined as follows:

- the driver shall be seated in the car in the normal driving position, wearing the HANS® and helmet and with the safety harness fastened;
- the driver should lean his/her body and head forward as far as possible - in this position the horizontal distance from the front surface of the HANS®-collar to the rear most point of the helmet shall be measured (distance A);
- **minimum** distance B = 100mm - distance A.

SEAT BELT SYSTEM CARE

Your seat belt system should be treated delicately. It must be covered or removed when welding near the belts. Seat belt material is polyester and will melt when exposed to a high temperature heat source. Always protect the belts from a high temperature heat source. Wash with small amounts of a mild detergent mixed in a bucket of water. Never use a power washer or directly spray the belts.

BUCKLES



Figure 15 Rotate >30° to disengage lap belt tongues.



Figure 16 Rotate 20° to release lap belt tongues.



Figure 17 Push down 180° to release lap belt tongues.

3-BAR ADJUSTER ROUTING

The 3-bar adjusters must be locked down to insure that they will lock down the webbing at the anchors. The adjusters need to be located as close to the anchor as possible. If the adjuster does slide, it will quickly lock down on the anchor or cross bar. Follow the routing. **See Figures 18 through 21.**



Figure 18 3-Bar Initial Lacing with Anchor.



Figure 19 Place the Anchor as loose as possible to the 3-bar to reduce slipping. Lace the free end of the webbing thru both sides of the 3-bar.



Figure 20 Lace the free end of the webbing thru the 3-bar to LOCK the webbing.



Figure 21 Lock Down the 3-Bar. Make sure to lace the free end of the webbing back thru the 3-bar to lock it down. Leave about 2-3" of webbing after the 3-bar.

2-BAR ADJUSTER ROUTING

The 2-bar adjusters must be locked down to ensure that they will lock down the webbing at the anchors. The adjusters need to be located as close to the anchor as possible. Follow the routing **Figures 22 through 28.**



Figure 23 Lace the webbing over the top of the 2-bar and back into the middle of the webbing loop.



Figure 24 Continue to lace the free end of the webbing thru the top side of the anchor.



Figure 26 Pull the excess webbing through the anchor and adjuster to tighten and lock down.



Figure 27 Side Profile of 2-bar adjuster.



Figure 22 2-Bar Initial Lacing with Anchor



Figure 25 The free end of the webbing then routes thru the 2-bar in the middle of the two pieces of webbing already there.



Figure 28 The 2-bar adjuster may also be used around a bar in the same manner.

DOUBLE ANCHOR PINCH CLAMP

The double anchor pinch clamp is mostly used in the 6-point mounts. Make sure to bolt the anchors down against a flat surface with the webbing coming off the anchors under the anchors.

See Figures 29 through 32



Figure 29 Lace webbing thru two anchors.



Figure 30 Bring the free end of the webbing back through ONE of the anchors.



Figure 31 Tighten the belt around the anchors at the desired length.



Figure 32 The anchor should then be mounted against a flat surface with the webbing routing under the anchors.

FIA RECOMMENDED ANCHORAGES

See additional anchorage details at <http://www.fia.com/>

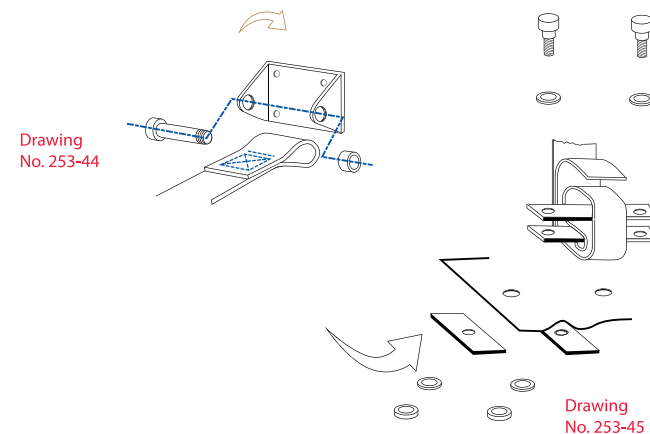
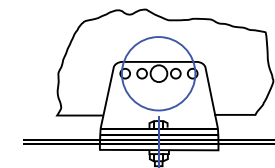
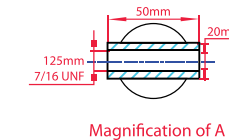
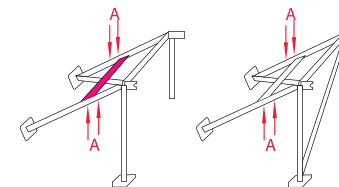


Figure 33
Source: FIA Recommended Anchorages



Drawing No. 253-52



Drawing No. 253-53

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MODEL #

SERIAL #

CERTIFICATIONS

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SFI: THE SFI FOUNDATION, INC is a non-profit organization established to issue and administrate safety standards for specialty and performance of automotive and racing equipment. SFI Oversees testing and standards for fire suits, restraints and many other high performance safety products in the United States. NASCAR and NHRA are among the sanctioning bodies who abide by SFO standards.

MORE INFORMATION CAN BE FOUND AT WWW.SFIFOUNDATION.COM

FIA: THE FEDERATION INTERNATIONALE DE L'AUTOMOBILE is a non-profit organization that brings together 227 national motoring and sporting organizations from 132 countries on five continents. FIA Formula One World Championship, FIA World Rally Championship and FIA World Touring Car Championship are among the sanctioning bodies who abide by FIA standards.

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