

GATKY7



Roll Bars & Cages





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Roll bars have been a standard fitment to Caterham Sevens since the 1980s although they were a popular option before then and many Lotus and earlier Caterhams have had them fitted at various stages in their lives. Roll bars and cages are constructed from tubular steel and are then bolted to the chassis at a number of points to form a strong structure which will give the occupants of the car additional protection if involved in an accident. They should not be confused with anti-roll bars which are suspension components that link one side of the car to the other and stop the chassis 'rolling' when going around corners.

As always seems to be the case with Sevens, when you start looking into it there are a large number of different types of roll bars and cages available. Firstly there are different chassis, the more recent variations from Caterham include S3 live axle, S3 de-dion, SV, CSR, manufactured by either Arch or Steel Fabrications all of which are slightly different while being 'the same'. Then there are the types of roll bars and cages available from Caterham such as, standard, FIA, roadsport cage and SLR cage, some of these are also available in different heights.

So which roll bar or cage will suit your car best? As ever the answer will vary from owner to owner depending on both their size and how the car will be used but applying some common sense and using this guide will give you the answer.

The pictures accompanying this guide demonstrate how the level of protection changes with the different types of roll bars and cages particularly if the car rolls over. In all cases the chassis are relatively recent Caterham S3s but the same principles apply to all Lotus Seven and Caterham chassis. The driver is

the same in all cases so that the scale remains constant and the lines on the pictures are an imaginary 'roof'. The roof line joins the two rigid parts of the chassis and shows how close the driver's head would come to the road if the car is inverted. Please note that if fitted a windscreen is bolted through a soft aluminium scuttle so is not rigid enough to remain intact after a serious roll.

The taller the driver the taller the roll bar needs to be but there are other factors which will affect where the drivers head finishes up. A lowered floor will drop the driver by about 40mm in the car and as an aside will also lower the centre of gravity of the whole driver/car combination. The type of seat will also have an effect, a nicely padded leather seat will position the driver higher in the car than a Tillett and a foam race seat can be constructed to place the driver on the floor itself. Tilting the seats using washers or brackets will also change the drivers head height in relation to the car. Roll bars and cages are available in different heights and completely bespoke items can be manufactured to suit any size of driver.

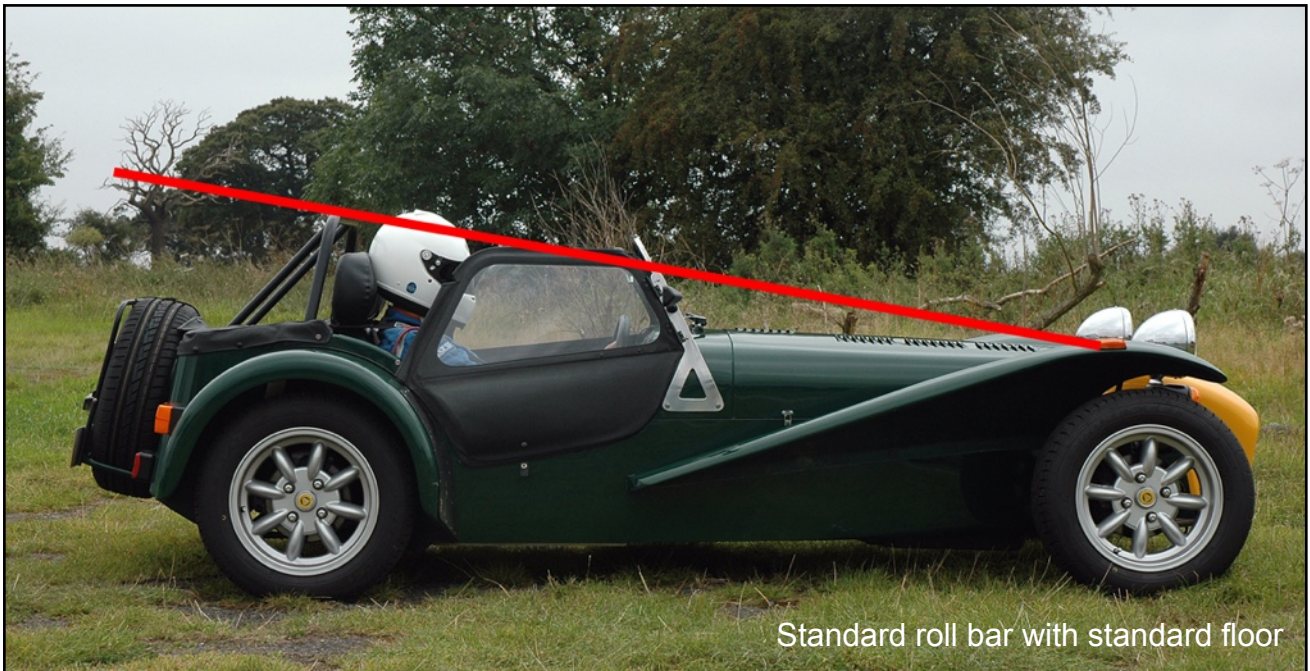
Side intrusion bars consist of a tube with a plate at each end which are designed to bolt to the chassis in two places, at the 'A' frame mounting point and on of the bushes contained between the inner and outer skin just below the front of the sill on most later cars. These are available for either side and designed to give the occupants additional protection from a side impact, they can be fitted in combination with all roll bars and cages, apart from the SLR cage which already has a side impact protection design.

There are two important facts about cages which are worth bearing in mind, firstly not all chassis contain all the bushes needed to fit the SLR cage but these can be retro-fitted without damage to the paintwork if needed. Secondly cages by their very nature surround the occupants head with hard unforgiving tubes which could prove fatal on the road in a relatively small accident. Even if your head can't touch the tubes when you're strapped into the car the forces present in an accident will result in contact being made, roll bar padding alone is not sufficient so it's advisable to use a crash helmet on the road.

The details below describe each 'standard' structure from the minimum to the maximum level of protection.

See next page for pictures

Standard roll bar: This is the bare minimum of protection even for a small driver, please note these bars are NOT allowed on club organised track days. *Road use only.*

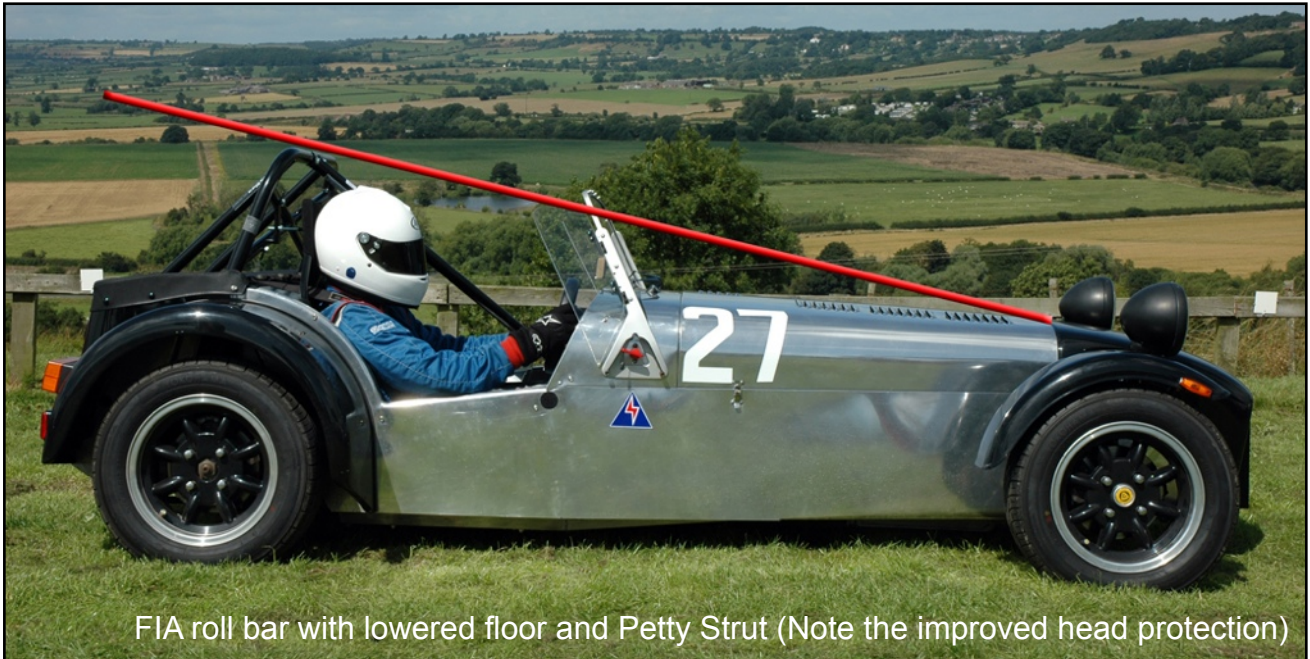


Standard roll bar with standard floor

FIA roll bar: Caterham currently market this as a 'Track Bar' and is the minimum requirement for all club organised track days. There are also two different styles depending on age but both use stronger larger bore tubes than the standard bar, contain at least one diagonal tube and can be used in competitive motor sport events. When being used for motor sport it states in the Blue Book that the top of the driver's helmet must be a minimum of 50mm below the imaginary line in the pictures and in the club speed championship the petty strut must also be fitted. A petty strut is an additional bar that joins the top of the roll bar to the chassis via a boss located in the passenger foot well, this provides extra triangulation and therefore strength. *Good road/track compromise.*



FIA roll bar with standard floor and without the petty strut fitted



FIA roll bar with lowered floor and Petty Strut (Note the improved head protection)

Petty Strut: In these pictures the 'Petty Strut' is fitted to the FIA roll bar. It can be seen located just behind the driver and is fitted to the top central area of the FIA roll bar with the other end fitted to the car's chassis on the passenger's side of the transmission tunnel in the foot well. This gives the FIA roll bar much greater strength through improved points of triangulation support in the rigidity of the safety device.

Foam: Although any cage or roll bar system is a safety device it is also recommended that foam should be wrapped around any areas of the safety device where you or your helmet could impact on the device in the event of an accident.

Harnesses: Correctly fitting and adjusted harnesses are also very important to hold you tightly in your seat in the event that the car rolls and you are reliant on the roll bars or cage for protection. If the harnesses are not tightened and you was in a situation where the roll bars are required, you could find that you do not have enough protection, because your head could be the first point of impact.



Tall FIA roll bar with standard floor and Petty Strut fitted



Roadsport cage: Further tubes run from the top or the roll bar forward to a point near the top corners of the windscreen and down to the dash panel to form a complete cage. This gives the occupants even more protection but makes the car more difficult to get into, windscreen and weather protection can still be used although erecting the hood is a little more difficult than with a roll bar. *More track orientated than road.*



SLR cage: First appeared in the SLR race series hence the name. More tubes than the Roadsport cage including lower side members the bolt to the chassis in four places either side of the car giving the occupants some side impact protection and also contributing to a stronger structure. The level of protection given is as good as it gets from a standard structure but it does have some drawbacks. Weather gear can't be fitted so you will get wet if it rains, apparently a windscreen can be fitted but without the weather gear it would be superfluous and I've yet to see one on a car equipped with this type of cage. Entry and exit from the car is best done by climbing up on top of the cage which will certainly get you noticed in the local supermarket car park. *Track focussed*

If you are thinking of attending a Lotus 7 Club trackday or taking part in club sprints, it is advisable to contact the relevant member of the club's management team in advance. This is to ensure that you and your car have all the relevant car safety equipment (Roll Bars and harnesses) and personal safety equipment for such an event. Further advice can also be sought prior to taking part in any event.



Notes: