Seat Mounting Guidance

The seat safety system comprises of the seat and its mountings, this is one of the most critical safety systems within the vehicle as any failure here will reduce effectiveness of other items such as harnesses, FHR. Accident data and statistics show that that it is more common for the seat mountings to fail than the seat itself, therefore it is vital that the seat is mounted correctly.

In this guidance we look at how the security of existing seat mounts can be improved, as well as providing information on the current regulations for existing and new build vehicles, and general guidance on seats.

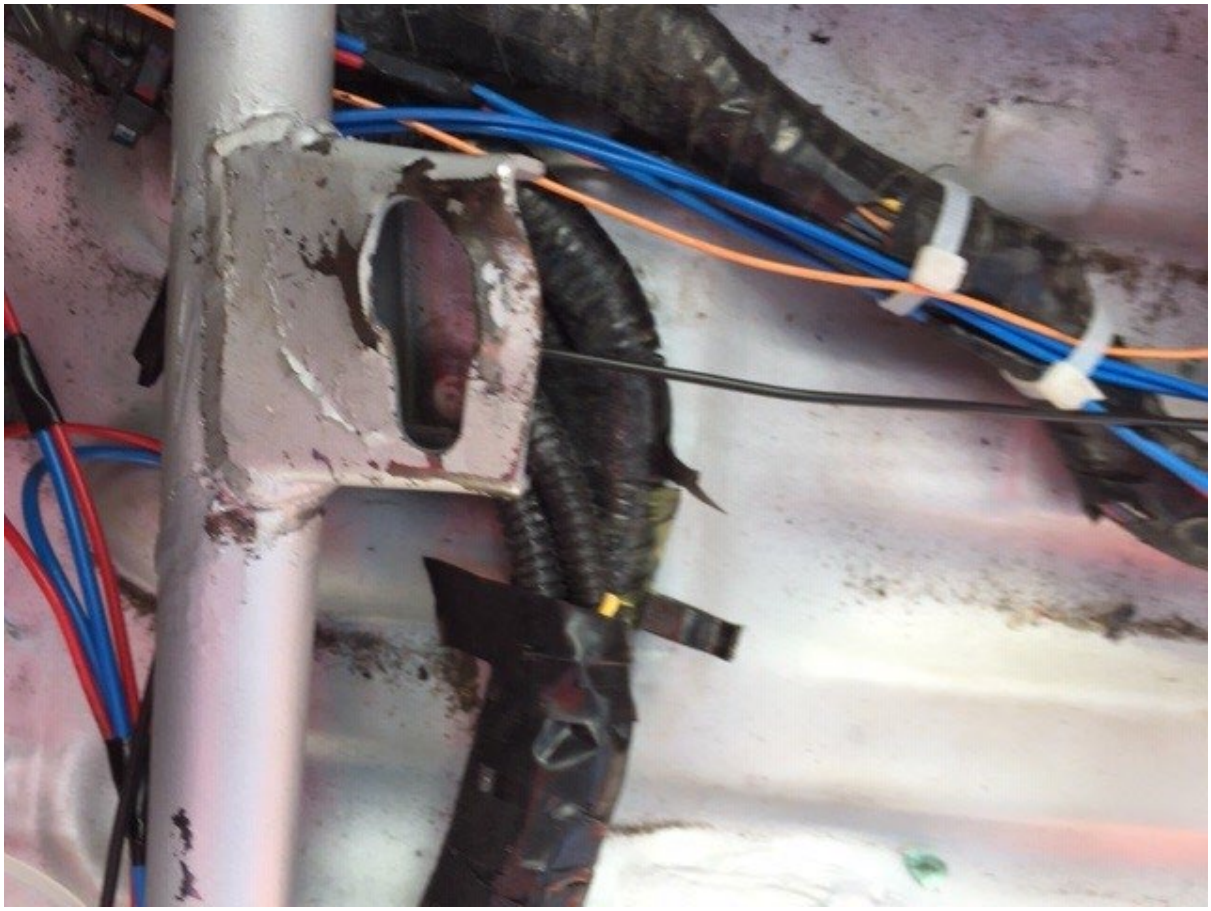
Transverse Seat Mounting Rails

For new build vehicles from 1st January 2021, where transverse seat mounting rails are used, they must be compliant with drawing No. K64(a) or homologated by the FIA or an FIA recognised ASN. As detailed later in this guidance.

For other vehicles using alternative mounting methods such as transverse rails with tab type mounting the following advice applies:

There are concerns over the quality of some 'transverse rail with tab' type mounting, and failure of such mountings, where the seat is held in position by only the overlap of a nut in a slotted tab, have been seen. Example of the type of failures can be seen in the images below, where the nut has torn through the slotted tab in an accident.

This is of particular relevance in the case of rearward impact, where the harness offers less support to the occupants and the weight of the occupant's body acts as a levering force on the seat backrest. Pulling up on the seat mounts.

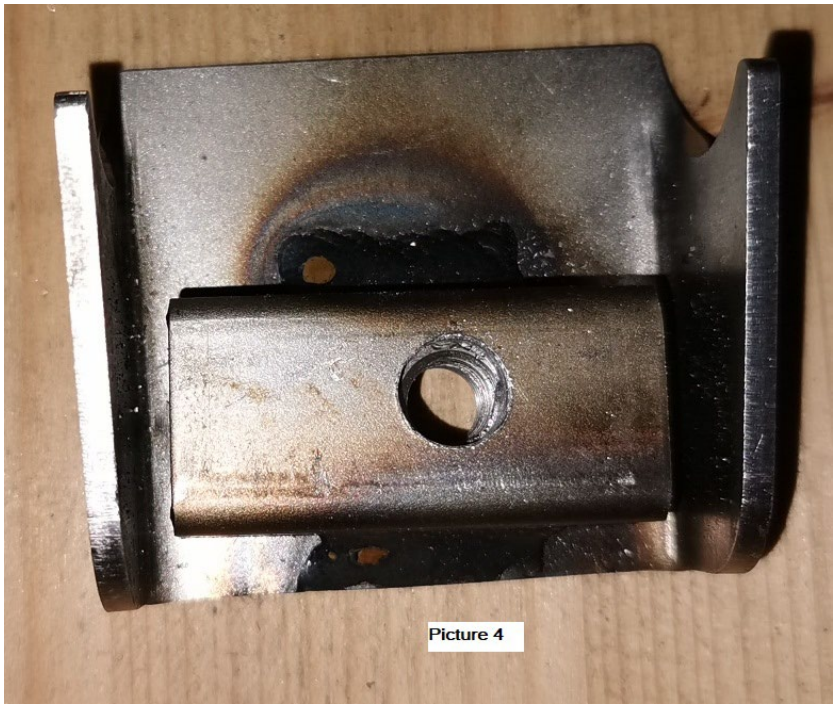


The security is very dependent on the clamping effect of the fixing. It is vitally important that seats and their mountings are not loose, any movement will result in localised movement leading to failure.

The most common design of this mounting type is for the nut to be captive within a channel under the tab as shown in the images below.

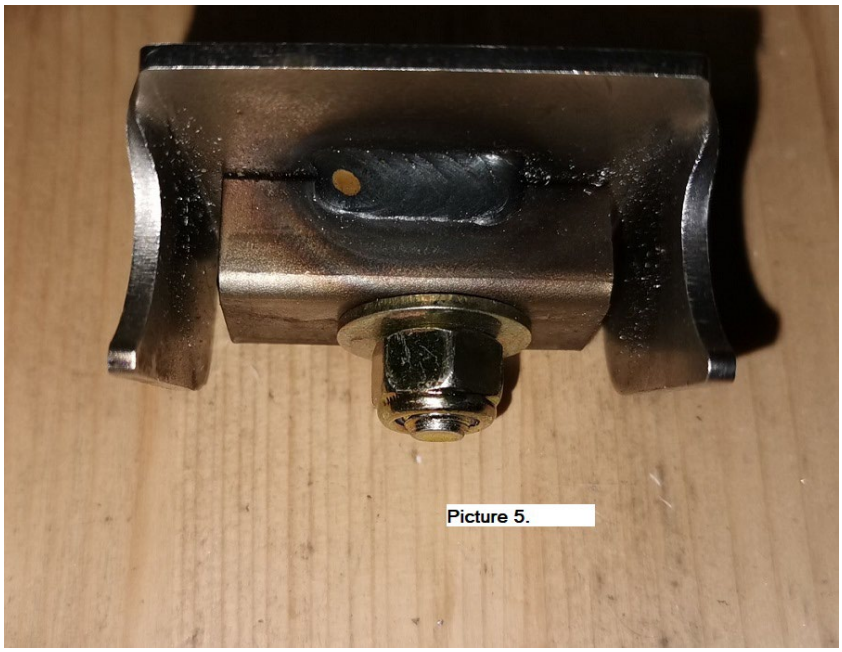
We strongly recommend that for this type of mounting, the security of the mount can be improved to rely purely no longer on the overlap of the captive nut, but on sandwiching the tab/nut and channel by using a longer securing set screw.

This would involve marking where the current seat fixing bolt position is in relation to the sliding bracket. Removing the seat and sliding the captive nut along so that it is clear. Then you can drill an 8mm hole in the bottom side of the sliding nut encasement. The picture below shows an underside view of the hole, obviously when the bracket is installed the hole must be drilled from above.



Picture 4

You can then screw a longer set screw through the captive nut so that it protrudes through the underside of the bracket. A suitably sized washer and nyloc nut are then used to form a secondary fixing to the mounting as shown in picture below.



Picture 5.

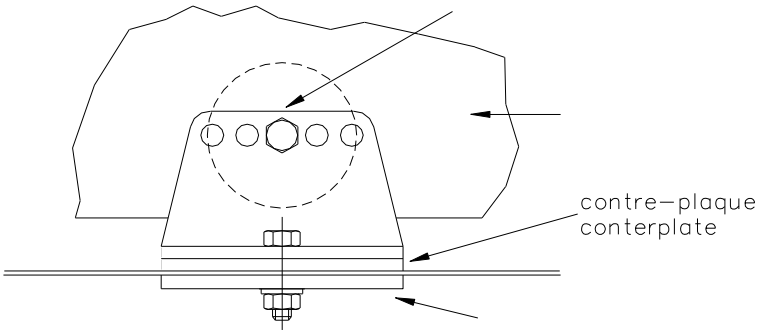
Seat Installation Guidance

Installation

Motorsport UK regulations give a specification for the mounting the seat directly to the bodyshell/chassis in section K2.2.1-2.2.3 of the Motorsport UK Yearbook.

These regulations apply for either a base mounted seat where the seat is bolted directly to the bodyshell/chassis or a side mounted seat where the seat supports are bolted to the bodyshell/chassis and the seat bolted to the supports. They require the seat to be attached via a minimum of four mounting points using bolts of at least 8mm diameter.

Each of these mounting points is to be reinforced by counter plates above and below the bodyshell/chassis effectively sandwiching the vehicle structure. This is shown in drawing 32 of Section K in the Motorsport UK Yearbook. Reproduced below.

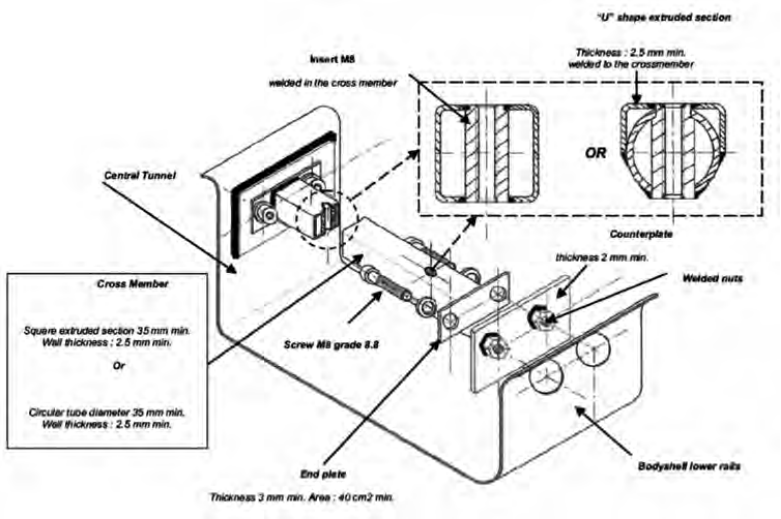


These counter plates must be at least 40cm2 per mounting and must be a minimum thickness of either 3mm for steel or 5mm for light alloy.

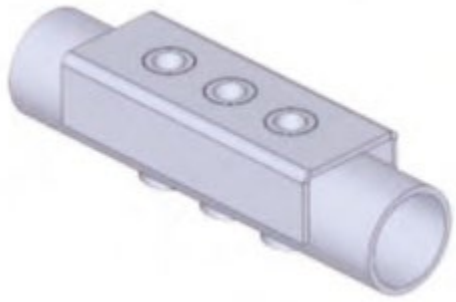
Transverse Seat Mounting Rails

There is also an option within Motorsport UK regulations (K2.2.1.1) for mounting seats to a transverse cross member. Drawing K64(a) below, reproduced from The Motorsport UK Yearbook, details the requirements for this mounting method. The transverse cross member of either square or tube section with end plates is bolted, or welded, to a counter plate at each end, the counter plate is welded to the transmission tunnel and the bodyshell outer rails.

The seat supports are then bolted through M8 inserts in the cross member. Multiple Mounting holes to a maximum of four at each mounting point are permitted as shown in Drawing K64(b)-(c) note that if a tubular cross member is used then a U-shaped extruded section must be welded to the tube to provide a flat surface for the support to sit on.



K64(a)



K64(b)

K64(c)

For new build vehicles from 1st January 2021, where transverse seat mounting rails are used, they must be compliant with drawing No. K64(a) or homologated by the FIA or an FIA recognised ASN.

Original Manufacturers mounting points

Additional to these methods, in vehicles originating as Series Production Cars, the manufacturers original seat mounting points may be used. There is also the ability for manufacturers of FIA homologated cars to detail a method of mounting within the homologation form as an Option Variant.

Supports

Seat supports are often referred to as mounting plates or side mounts they are used to connect the seat to the bodyshell/chassis.

For seats homologated to FIA 8862-2010 standard the supports are homologated with the seat and these specific homologated supports must be used for the seat homologation to be valid.

For seats homologated to FIA 8855-1999 standard the supports do not form part of the seat homologation. The regulations do specify that the minimum material thickness as 3mm for steel or 5mm for light alloy. We recommend that you seek the manufacturers advice on what supports are compatible with your seat as universal mounts may not always be compatible.

Seat fit

An important point to consider when choosing your seat is to ensure it fits your body size and shape, seats come in a number of different sizes and fits. If the seat is too big for the occupant, they could come

out of the seat in an incident, and likewise if the seat is too small the occupant may not be able to be seated securely.

The shoulder harness holes should be aligned with the occupant's shoulders. If the harness holes are below the shoulders, when pulling the harness tight the occupant's spine will be compressed which can lead to serious spinal injuries in an accident. Whereas if the harness holes are too high the harness shoulder straps will interact with the seat and not securely restrain the occupant. This will also adversely affect the effectiveness of an FHR device.

The Seat Padding is an important part of the seats safety as it ensures the occupant is securely located in the seat and protected in an accident. If the foam is removed to allow a larger person to fit in a smaller seat the effectiveness of this protection is reduced.

Maintenance

With the extended validity of seat homologation, it is important that as the competitor you take responsibility for the care and maintenance of your equipment. If you have any doubts or concerns over the condition or installation of your seats, please consult with the manufacturer.

Seats should only be mounted in accordance with the manufacturer's instructions and MSA or FIA regulations. Do not modify the seat shell in any way as this will invalidate the homologation, remember this includes the seat supports for those homologated to FIA 8862-2010.

During the life of the seat regular checks and maintenance should be performed to ensure the seat remains in good condition

The seat itself should regularly be checked for damage, a solidly mounted seat with a correctly restrained driver can be subject to some extreme forces during regular stage rally use. Therefore, even if the seat has not been involved in any accidents it could still suffer damage through the normal wear and tear of competition. Stresses in the fabrication of the seat can show as cracks or lighter coloured stress lines in the fibreglass or carbon.

Composite shelled seats are often left untrimmed at the rear, so they can be easily checked for cracking and damage, particular attention should be taken to high stressed areas such as the lower part of the back rest and around the support mounting areas. It is also sensible to pull on the shell and look for any excessive flex in the seat and movement in the fixings.

Steel framed seats can be harder to check unless the covers are removable, but any damage visible on the outside of the seat will be an indicator of more serious damage inside.

The Seat supports should be regularly checked for security, ensuring the bolts remain tightened to the manufacturers recommended torque. They should also visually be checked for any cracking, distortion or corrosion. Pay particular attention to ensure the bolt holes have not become ovalized, and for supports with multiple bolt holes/slots for adjustment, check for cracking between the holes.

The mounting points on the bodyshell/chassis should also be regularly checked for any cracking or corrosion

Accidents

It is important that if your vehicle is involved in an accident that you do not simply assume that your Seat System will be OK to use again. Even what appears to be a minor impact can put huge loadings through the seat and their mountings.

Following an accident your seats and their mounting should be carefully inspected for damage, the manufacturer should be able to advise you here. If there is any damage, to the seat or supports, please seek the manufacturers advice before using the seat again or dispose of the equipment.

Homologation & Seat Life

Motorsport UK has committed to an in-depth review of competitor safety equipment. This review includes initiatives aimed to reduce the burden on competitors of the unnecessary replacement of safety equipment, while ensuring suitably high standards of safety are maintained in the sport.

As a result of this review Motorsport UK will recognise an extended life for certain FIA-homologated seats. In stage rallying and Rallycross, seats homologated to the FIA 8855-1999 standard are granted a two-year extension at the end of their initial five-year life

A cornerstone of this new initiative will be to provide greater education for competitors in respect of their own safety and to place more responsibility on the competitor to maintain a level of safety equipment, above a defined Motorsport UK minimum standard.

How will this affect my seats?

To find out when your seats will be valid until you will need to look at the FIA homologation label. All seats manufactured since 1st January 2012 will have an FIA homologation label overlapped by the FIA hologram in in the top left corner.

There are two variations on this homologation label, some will show a manufacture date (Month/Year) and some will show a not valid after date (year only), examples of the homologation labels are shown below;

To work out the validity of a seat with a label which shows a manufacture date, you should add 7 years to the year shown on the label; for example, a label that shows a manufacture date of May 2013 will be valid until 31st May 2020. A seat with a manufacture date on the label will always be valid until the end of the month 7 years from the date printed.

To work out the validity of a seat with a label which shows a not valid after date you should add 2 years to the year shown on the label; for example, a label that shows a not valid after date of 2020 will be valid until 31st December 2022. A seat with a not valid after date on the label will always be valid until 31st December two years from the date printed.

Conclusion

A Seat system is not an "install and forget" piece of equipment and it is your responsibility to ensure it is installed and maintained correctly. Remember that no matter how good your seat is it is only going to be effective if it is installed correctly, as much careful consideration should be given to the mounting points and supports as to the seat itself.

If you have any questions over the use and installation of seats, please contact the Motorsport UK Technical team.