CHOOSING YOUR SEAT

One of the most difficult jobs to do on a kart is to fit the seat in such a way that is both comfortable for the driver and beneficial for the balance and handling of the chassis. Over the years I have been involved in karting I have picked up a lot of valuable information in relation to this and, hopefully, within this article I can pass on some of this to you.

The most important factor in correctly sizing a seat is that it must fit tightly to all parts of the body from the chest down to the hip area. Most damage to the body will occur when the torso is able to move independently of the seat rather than with it. The easiest test of whether a seat fits correctly is that if you are able to slide your fingers down between the torso and the seat without too much resistance, then the seat is too big in this area.

The problem with having a seat that does not fit all the way is that it will put undue stress on the part of the body that is not restrained. A seat that is tight around the hip/waist area but is loose at the top will put a lot of energy through the ribcage area and is more likely to be the cause of rib problems than any other. When the situation is the other way round and the rib area is secured correctly but the hip/waist area is loose this is more likely to be the cause of back problems as the lower half of the spine will be constantly twisted whilst the top will not. It is also the most common reason why you can end up with skin abrasions around the base of the spine after racing.

As for the shape of the seat, this has less of an effect on the handling of the kart when compared to the positioning of the seat and the type of materials used in its construction (rigidity level), which do have a major effect. When choosing a seat shape do not be afraid to pick one that is different to the one preferred by the kart dealer, as the fit to *you the driver* is most important.

SEAT POSITIONING

There are three main areas that need to be addressed in the correct seat position and all three will have an effect on the balance of the kart. They are the position front to back in the chassis, the angle or tilt of the seat and the height at which it is mounted.

Most kart manufacturers will have a recommended position for a seat but this is generally based on using a size 2 (MS) seat that they supply as standard and which has been tested with their works driver. This measurement will normally be based on the distance either from the top edge of the seat down to the axle surface or the distance from the front tubing (where your heel sits) to the most forward point of the seat (the toe). The only problem with these measurements is that an XS sized seat has a completely different height and seat depth to an XL, in these situations the dimensions given will be of little help.

The measurement that I always advise to use is taken from a point on the seat that is about 2cm either side of the spine depression and is then the shortest distance from this point to the front surface of the axle. By doing this it gives a very accurate way of attaining the actual position of the driver's back and is not influenced by the shape of the seat or the depth of the seat spine. Currently the average measurement used by race teams in an adult kart is around 16.5 cm although it can be anything from 13.5 – 20cm.

The angle or tilt of the seat is predetermined by the style of the seat, although this can be altered depending on the installation. As a general rule all of our seats will have a flat element on the base

which can be more pronounced on some of the models than others. The main reason for this is to keep the bodyweight of the driver as low as possible within the kart. Holding this angle will ensure that the shoulders remain at the correct angle of attack for steering effectively.

We currently work with mostly two angles on our seats. Seats that are set at 63 degrees (from horizontal) are best for general karting and junior drivers. Our popular shapes at this angle are the T8 and T10.

For karts that will be racing in higher grip situations (eg. KZ, KF and Rotax classes) the 58 degree seats lower the centre of gravity, keeping the kart stable. Most standard seats are now based on our 58 degree T11 and T12 shape.

As for the mounting height of the seat within the kart, there is currently on average about 5 mm protruding below the level of the main chassis tubes.

The only situations where a higher seating position may be used would be either, for wet conditions, using hard tyres, or for a small driver. These are examples of where more weight transfer may need to be applied to the two outer tyres to obtain grip.

Before you attempt to position your seat, do not forget to place any other add-ons to the seat especially the lead ballast. For drivers that need to run with amounts of lead on the kart it is generally better to keep these in smaller quantities on different parts of the seat rather than using one big slab which can tend to stiffen the seat and possibly create fractures and weaken the composite. This would ultimately lead to the seat's effectiveness being diminished. It must also be remembered that large amounts of lead on the back of the seat will affect the handling of the kart and may require the seat to be moved further forward to redress the balance.

Additional seat stays will have an effect on your handling and also need to be fitted before any assessment is made as to the chassis balance. One seat stay each side is a weight transfer device helping to lift and unweight the inside rear wheel whilst pushing down on the outside wheel. Once you run more than one seat stay this actually starts to also stiffen up the kart across the rear working more like the rear removable bar. As a general rule as you add more additional stays the back of the kart will remain flatter through the corners.

Once the seat is fitted into its final position you will then need to adjust the pedals and steering wheel to suit the driver. When setting the position for the steering wheel you will need to try and achieve a position whereby the forearms and your thighs are parallel. You will also need to make sure that at full steering lock the arms are not fully extended and straight. Being laid back too far may feel comfortable but if you are stretching for the wheel all of the time you cannot drive from the shoulders.

SEAT STIFFNESS

Seat stiffness can cause an enormous difference to the handling of the kart and these differences will be accentuated more with higher grip tyres. The one thing to realise is that there is no golden rule as to whether a softer or harder seat is best, as it depends on many interacting factors. The type of chassis, tyres, engine, track surface and kart set up (steering, axle etc), that you are running on all have an effect on this decision. We find that low powered karts tend to favour a soft flexible seat as this frees up the chassis, stopping the inside rear wheel from dragging on the track and absorbing power. As the engine gets more powerful the additional weight transfer of a slightly stiffer seat may prove advantageous.

The way of attaining grip from certain tyres and track surfaces can be totally different so care must be taken not to put any definite rules in place. On some track surfaces or track conditions it may be better to achieve grip by putting as much of the tyre surface as possible in contact with the track, on others it may be that the only way to get grip is to increase the downward forces that act on the outside tyres. There are many folk in karting that have their own theories as to which stiffness level to use in which conditions, some will say that you should use a soft seat in the dry and a hard seat in the wet whilst others will say the complete opposite. The truth is that you should not take too much notice of either as being gospel and you should use your stopwatch as the best source of advice.

The one thing that you learn after many years in karting is to never have any fixed preconceived ideas about the chassis set-up as these will sometimes turn around and bite you in the rear when you least expect. The best rule of advice I could give to you when setting up the kart is not to necessarily go with the flow but to experiment in testing. You may be pleasantly surprised!