Kart Chassis Straightening

A lot of kart chassis straighteners do not do the full process which is required to completely solve a karts poor handling or repair the damage created by an excursion off the circuit or kart on kart damage.

The quick fix is to reset the waist parallel and inline to the rear axel. Often this done at a kart circuit to get someone back racing. But this must be considered as a temporary fix until the kart can be jigged properly as set out below.

So here is for anybody interested the full procedure that should be done to straighten / fix a damaged kart.

Firstly inspect the kart

1. Set the kart on the table on 4 equal size blocks. Placed under the bearing carriers away from any welds and at the start of the kart waist area not in the area of a bend (the tube will be deformed in this area).

2. check the height of the front yokes, the cambers, the side lengths axel to king pins and the bearing carriers for square and flatness (this is an operation that most do not do). Bearing carriers are more often either wound upwards by the brake or have been pushed up in a racing incident or the whole rail just bent up under use this happens mostly on the single rail side particularly in the heavier classes.

3. So now you know roughly what you have to deal with. The starting area is to get the rear tubes and bearing carriers flat down, tooling is required to twist the bearing carrier to the correct position. Then check the bumper support tubes as these may need some adjustment; they are normally up and can be in as well. If the kart has had some rear end damage the whole rear end will need bringing back to the correct alignment. This can be quite a lengthy job but you cannot attempt to straighten the front of a kart without these operations being carried out first. Ok the back is done so you can look at the rest of the kart.

4. Set the kart in the jig which picks up on the straight rear axel, centre the kart in the jig and set the rear tubes level to the first waist bend. This may take a little time but very important. You may need to sort out the bearing carriers a little if the kart does not sit parallel across the back sometimes there is damage in the location slots and holes.

5. Set the front tube support up with the correct increase in height to the side tubes all kart types and models are different. This is very important as it sets the baseline for the kart caster settings and front to back straightness.
6. The kart front tube should sit on the front tube support, normally a slightly domed piece. This may not happen in most cases and is not uncommon these days as the majority of karts are quite soft and with the introduction of the 177 classes. So this needs to be adjusted to sit on the front tube support. This is sometimes a two fold operation say an OTK will start to bend from where the narrow waist meets the back, this needs to be bought down parallel to the rear tubes and held in that position while the front section from the front of the narrow waist forward to the front tube is pulled down. With these operations completed and with the kart sitting on all the various supports evenly. You can start on the front geometry.

7. The top of the front yokes need to be levelled up. You are now in a situation where you can remove the stubs, clean all the parts and check them for straightness king pins and stubs. I have tooling to do all this for any kart. Using you tooling pins and length checking tool check the lengths either side of the chassis, also check if the front is on the jig centre line. If one side is short normally the kart will be off the centre line to that side. Also digitally check the caster angles at a position parallel to the kart centre line on each side. The kart may be short because the caster is bigger on that side but unfortunately this rarely the case.

8. At this stage it is best to reset the caster, pump out the kart to length on that side. Set the camber to the correct angle ie to your setting template for that kart model. Recheck the caster, with the right tooling it doesn’t move the caster much if at all. Re check the camber settings to your pin or flag type gauges. A word of warning on this if you use pin gauges with a digital protractor on them any miss alignment to the centre line of the kart will give you bad readings. You have to take the readings absolutely inline with the centre line of the kart. I use a digital protractor on a plate that has graduated lines on and set the caster angle to the pins in line with the centre line of the chassis.

9. With all this done you are nearly there re assemble all the straightened parts and re check the camber angles with the lazers. You should get the setting you require I normally set OTK plus half a box as they settle a little in the first use. You can counter this by loading the stub axels upwards on final assembly.

10. This is a simple straight forward full jig straighten. Badly damaged karts can have the rear bearing carriers twisted and bumper mounts bent inwards, cracks at the front of the bearing carriers, the kart could be a trapezium shape either over the full length of the kart or just from the back of the waist area forward normally these problems can be sorted out with the right tooling the another common problem would be the steering column support tubes bent to one side. Other major work which can be carried out would be to re-yoke the kart or repair the yoke support tube when the yoke has broken.
off by internal sleeving and welding, the yoke, king pin holes can become badly stretched and out of round this can be welded up and re-cut to new specification. If a new item is not available and the yoke is split at the right angle bends this can also be repaired but is quite an involved process to get the right weld penetration and strength. The work mentioned in item 10 is very specialized work but over the last three years have done of all the above special repairs very successfully. See images which will give a limited idea of what can be done to repair a kart chassis.

I have particulary not described how the actual straightening operations are actually carried out as that is where the kart chassis repairer does his magic.