Preparation Tips for Reliability

The following tips are mostly the results of the experiences of myself and other racers and are aimed at the prevention of the more common and easily overlooked causes of engine, component and chassis related failures that result in a DNF, or a poor placing due to reduced output, or at the worst, an excursion into the scenery. The more experienced may regard some of these hints as very basic, however I have seen the most capable of us sidelined at various times with what really amounts to poor preparation, and lack of attention to detail. Some occurrences are not preventable, and the intention here is to deal with some of the types of things that can be easily prevented during regular routine maintenance and pre-race preparations. These hints are also aimed at our newer or less experienced racers, and may just remove some of the mystery of our sport.

Cleaning of the kart prior to preparation for a race event is important to discover bent, broken or loose components, missing bolts and fixings, and leaking from the engine/ gearbox, the carby, fuel, and brake systems. Cleaning can consist of just a good wipe over with a cloth, as most karts are fairly easy to clean and the object here is to have a close look at the works. Pressure and hose cleaning can force water and corrosive chemicals into sensitive areas of the electrics, fuel and brake systems, and caustic cleaners and degreasers can actually remove the compounding solvents built into race tyres. It is far better to do the clean down shortly after a race event. This will detect leaks that can dry up if left longer and other problems that if undetected may not be able to be rectified in a shorter period prior to the next competition. The extra time available if a problem is detected soon after a race day may be handy to obtain parts or assistance, allow for track testing, and avoid a last minute panic.

Missing nuts and bolts, usually from the likes of the floor tray, fairings, and accessory mountings is at best frustrating, and at worst causes the dreaded DNF. Nylok nuts are a must on karts because of resonances and vibration set up by the engine and track surfaces, and Nyloks that are frequently removed should be renewed after only a few uses. If nyloks are continuing to disappear during races then consider the use of Loctite on them, or using rubber washers or bushings on areas such as the floor tray mounts. Check axles for trueness, wheel balance and tyre condition if vibrations are excessive.

Mounting methods of fuel pumps, ignition coils and other engine hardware is another problem area where fixing or bracket failure usually results in a DNF. Aluminium is often used for ease of working and to reduce weight but is highly susceptible to fatigue, whereas light gauge steel is far stronger, is less susceptible to vibration induced fatigue, and in thicknesses around 1.5 or 2.0mm does not contribute greatly to weight whilst being able to fit more neatly in some instances. Remember that if you are relying on a metal mount to electrically earth a component and the bracket fails, the kart may stop, and damage to the electrics can result.

Fatigue is also responsible for the failure of the wiring and connections to the electrics, return earth wires, and the low and high-tension coil leads. Cables left to flap in the breeze will break off in time where they connect to the more rigidly held terminals or clamps, due mainly to a characteristic of the copper wire, whereby the more copper cable is bent or flexed, the more

brittle it becomes, even resulting in a break inside the insulation that from the outside appears undamaged. It's best to support cables against less movable parts such as clutch or throttle cables, or strapped together with the universal tool kit, the zip-tie, but try to avoid hot parts! It is worthwhile to consider the double earthing of electrics and ignition coil that depends on the metal bracket for the return path so that if the mounting bracket fails a circuit still exists. If your kart should develop an intermittent misfire that is proving difficult to source, consider lightly stretching and moving the cabling to the electrics whilst the machine is at idle, to detect a possible break within an insulated cable or at a connector.

Piston/s replacement needs vary from class to class and engine to engine. Care should be taken when doing so to ensure that damage to the little end and big end bearings does not occur during removal of the gudgeon pin by violent sideways tapping out of the pin, instead it should be pressed out whilst supporting the piston. For the small cost, it is not worthwhile in any respect to re-use a piston circlip, as they are factory tensioned and should be carefully

snapped into place, being careful to avoid any damage to the piston if using tools to assist the process. During fitting of the circlip/s cover the crankcase around the rod in case the clip springs away. Murphy's law says it will end up in the crankcase if you didn't actually see where it went! Double check that the clip is within the groove provided, that the clip is not under undue pressure from the gudgeon which should be a neat fit in the piston, but able to be positioned without touching the clips on either side. Lubricate parts during assembly with similar oil used in the engine to ease the fitting and provide start-up lubrication. Compare new pistons for size and finish as tolerances vary between manufactured batches, especially height and diameter.

Circlips used to retain sprockets are manufactured usually with one sharp edge (you may need a magnifying glass to see the difference!) which is intended to be used against the outside of the groove cut in the drive shaft, i.e. place the rounded edge next to the sprocket to be retained, to ensure that the circlip does not spread over the shaft due to sideways forces from the sprocket.

Chain Link Circlips should be arranged so that the open end is facing away from the direction of chain travel towards the engine, and locating the circlip on the engine side of the chain is an insurance that in the event the circlip fails, the link piece will come out of the chain away from the engine case, hopefully avoiding this link destroying the soft casing and resulting in a massive rebuild job to replace the gearbox half case. Again, only moderate re-use of a chain link circlip is advised because of the low cost and the higher likelihood of failure. Do not run excessive chain tension i.e. too tight. This will pop the chain link clip in no time. Allow for deflection in the chain of between 5% and 10% of the distance between the engine and drive sprockets. Too much slack in the chain will allow the chain to jump the sprocket teeth. Chains stretch when hot and this is the best time to lubricate as well.

Engine Gaskets if well lubricated during assembly will generally not tear during disassembly and can be reused if care is used to avoid over tensioning which may reduce clearances and

resultant performance. Silicone spray lube stops most gaskets bonding to the cases and cylinder. If the fibre/paper base gasket is torn or damaged, replacement is required as crankcase pressure can result in an air leak, leaner mixture and piston seizure, as well as incorrect barrel height. When renewing gaskets, be certain that the correct thickness is sourced, as most manufacturers make over and undersized head and base gaskets

Fuel Pump maintenance should include the draining of oil that enters the pulse chamber of the pulse type pumps as the oil can build up, reducing the strength of the signal that flexes the diaphragm, resulting in the symptom of running out of fuel. Check fuel lines for leaks, abrasion near engine brackets and other edges, and flexibility. Fuel line will harden in time, particularly if two-stroke fuel is left in the lines, and replacement is necessary when lines show obvious hardness and resistance to flex or bending. If fuel is left in the system between races, the possibility exists that evaporation of the petrol can occur, leaving oil and gum in the lines, pump and carby, causing problems at the next outing.

Fuel Filters should be inspected for build-up of debris from fuel regularly. Transparent filters are best as it's easy to see the condition it's in. Get into the habit of filling the fuel tank through a funnel that incorporates a strainer, you'll be amazed at what you get in the fuel (or oil) these days. Your filters will stay clean longer and there is less likelihood of anything getting into the tank that could block the pickup tube. You *do* have a pickup tube don't you? Better check in the empty tank, if the tank doesn't have a well near the outlet. Look at a photo of a kart with a plastic fuel tank taking a corner at speed and you will see the fuel within that tank nicely stacked up the side of the tank. A decent pickup tube may move over with the G forces and keep drawing on the fuel, rather than sucking air.

Cooling System care is fairly basic, checking the radiator fins for blockage due to oil, chain lube, pieces of tyre rubber and small stones. Non-glycol based additive is used to prevent corrosion and lower the boil point of the fluid and is only required up to about 50% ratio at the most. There is little to be gained using a higher ratio and some engines have experienced a "cold seizure" situation, I'm told, similar to using too large a radiator. Be sure to lock-wire the indent plugs, caps or any parts of the cooling system where fluid may be let out. It is in the rules because coolant additive is extremely slippery and stays close to the surface if spilt on the race circuit.

Overflow Bottles are required to keep excess gearbox oil, fuel and coolant off the race circuit. The bottles should be vented to the atmosphere, as pressure may build up causing a seal to pop. Oil filler and radiator caps are also required to be lock-wired so they can't work loose and come off during racing. Be sure to run breather tubes for the fuel tank or carby away from the rear tyres, grip is hard enough to find without putting oil on the tyres!

Tyres should be inspected after each use and discarded if damaged through to the cords or the sidewall is torn. Tyres provide all of the adhesion to the race circuit and provide the suspension and ride, don't under-estimate what's riding on them! It's rare for tyres to be used until the tread

depth indicators disappear, usually the grip or compound has gone before this stage. Race tyres are quite thin walled and if any of the depth indicators are gone the tyre/s should be replaced. Look for unusual wear, as corrective wheel alignment or chassis straightening may be required.

Spares should be kept for basic race day consumables such as spark plugs, hoses, nylok nuts and bolts, tape, tie wire, zip ties, fuel line, chain links, washers, electrical connections, brake fluid, gearbox and two stroke oil, coolant, chain lube and some gaskets and at least a spare piston and circlips. Spares can be used parts, with the point being try to be a little self sufficient, that way you'll only need to borrow in emergency situations. Also have adequate tools to do your race day maintenance, your fellow racers may be using theirs and reluctant to lend them. If you need assistance, try and find it from someone who hasn't got their own motor in pieces, i.e. use some common sense. Treat anything you borrow as a boomerang i.e. give it back promptly in the case of tools etc, or offer to replace or compensate in the case of parts. What makes motor sport very pleasurable is the willingness of just about all involved to help out fellow competitors, however this trust is to be treated and honoured carefully.

Karts should be presented to pre-race scrutineering in a clean, ready to race condition. Turn up prepared, in plenty of time, make yourself familiar with the timetable set down for the pre-race activities such as scrutineering and Drivers Briefing. Be at the circuit early and have all forms properly and fully filled out and signed where applicable and fees fully paid. The Officials are nearly always Club volunteers, so your co-operation is important and indeed required. You are a member of a Club, and by helping the organisers, you help yourself. Assist as much as you can and your race day will start much quicker and smoothly.

Motor Sport can be supremely stimulating and satisfying, but it can also be cruel and frustrating. Preparation is the key, and at the end of the day, keep it all in perspective with realistic goals, and have some fun!!