

During the course of the 1990 race season the development effort of the KPS team really showed itself on the race tracks of the U.K., taking all three of the major titles in the 125 Open category on long circuits. As the results have come, quite a number of people have expressed their admiration of the improvement shown by us and have asked me how such a dramatic increase in performance is possible. Concurrent with this, I have been asked if I would write some articles of a technical nature and thought it would be a good idea to combine the above two elements to produce the relevant copy.

Obviously, the content will concentrate on the development of the 125cc Minarelli motor which we used to win the British Championship, Grand Prix, and 'O' plate, but will contain references to the Rotax 124 as well. Having worked with the Rotax for six years and the Minarelli motor for the last five, I feel well placed to compare and illustrate the differences. Hopefully this will generate topics that will interest the majority of drivers in 125cc racing today.

Before getting into the specifics of the articles I would like to publicly thank the small band of people who have made our success possible. I would particularly like to mention Vito Consiglio and his wife Steffi (our mutual interpreter) for their assistance and patience when changes were being made to the engine. Vito's original design of the engine should be commended here as it provided the very strong base on which we were able to build, and his attention to detail



**125cc ENGINE  
RACE DEVELOPMENT  
AND PREPARATION** PART ONE

**BY PAUL MOLLOY OF  
KARTPRO STRATOS LEISURE**

allowed us to increase power output without the attendant parts disintegrating in protest.

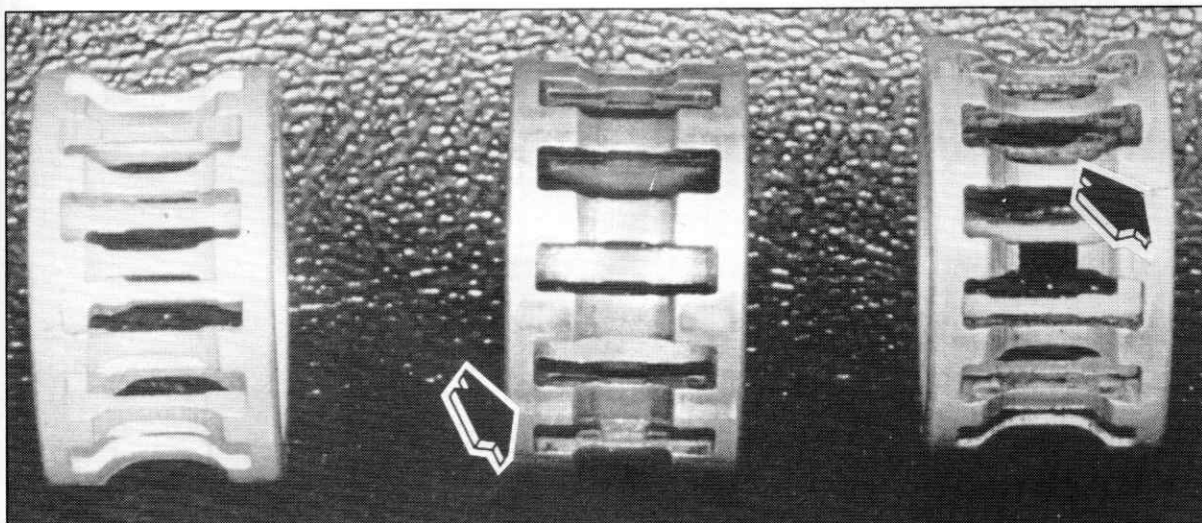
There is also a small team of personnel that is responsible for the development and analysis of new ideas, the building of karts and engines to the highest standards bar none, manufacture of prototype parts, the appearance of

the karts, feeding and watering us and last but not least, driving the damn things! They know who they are and it has to be said that we would be weaker as a team without any one of them. In my opinion the first thing that a successful driver will require is the back-up of a strong team structure. If you look at any driver getting first class

results they all have that in common. Although the driver gets the accolades, the reality is that the major part of the credit is due to the team effort. Racing is a team, not, an individual sport.

Our involvement with the Minarelli motor goes back to 1985 when we were running a Rotax 124 air cooled engine. During the late part of 1984 I had a few outings with a friend's Minarelli and had been impressed with its reliability and general strength. Although it lacked the outright speed we were getting from the Rotax, it had this dependable, smooth feel about it. We also had a customer at that time who was greasing his engine quite frequently and he approached me for advice about which motor to choose for the 1985 season to replace his worn out Rotax. To protect him from himself in view of his energetic use of revs, and my recent experience of the Minarelli, I advised him to purchase a motor from the importer at that time which was Phoenix Karts. The driver who was associated with that company was Kurt Luby (now involved in saloon car racing) and he was achieving mixed results, the engine having only been introduced the previous year.

As the season progressed the basic strength of the Minarelli started to make itself known to us as we had been asked to look after the engine by the customer, even though we ourselves were running the Rotax unit. Less parts seemed to be needed by the Minarelli than by us although, to be fair to the Rotax, we were significantly quicker. The 1985 British Grand Prix was to highlight



◀ New big end cage (left), silver plating starting to polish off (centre) and cracked (right).

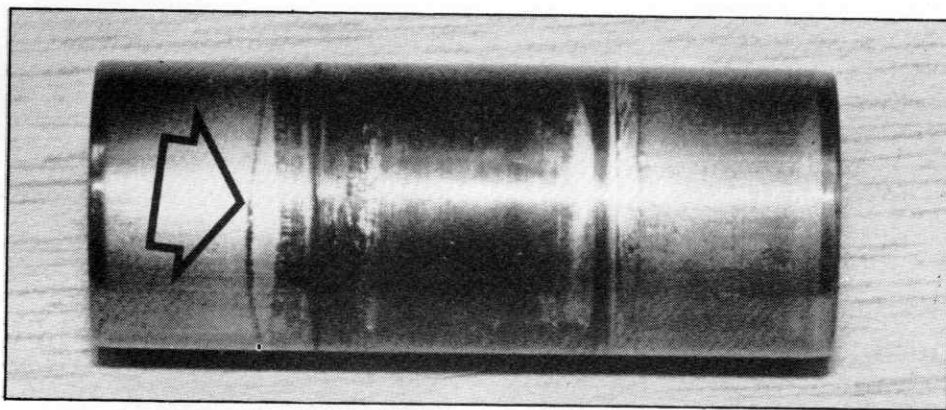
the differences between the two motors and, ultimately, prove to be the turning point for me personally with regard to the selection of power units for racing.

We were determined to improve on the 3rd place finish we had achieved in the 1984 Grand Prix so every effort was made in the course of preparing two motors for the 1985 race. During the intervening period we had been experiencing very short life times on the big end bearing of the Rotax crank. In the main, this appeared to be due to excessive crankshaft flexure and the usual result was that the big end cage would first polish off its silver plating and then cracks would appear in the corners of the cut-out for the roller in the cage itself. I can well recall the inspection that had to be made of the big end cage, after every heat and practice session, to ensure a finish.

For those of you wondering how this was done, hidden away beneath the con rod, an explanation is in order. If you remove the top end of the motor and slide the rod to one side and the big end cage in the other direction, the cut-out in the rod does in fact allow enough of the cage to be visible to make an inspection of its condition in the important places. Movement of the cage can be done (with care) by the point of a good quality scriber. Those of you with Third World toolboxes probably should avoid this type of work as it is relatively easy to scratch the plating thus making matters much worse. You can actually watch the deterioration involved as the cage first polishes and then cracks! In an effort to prevent any crank failures we had a close look at what could be done to assist the big end.

New connecting rod kits were to be fitted complete because Rotax used a process known as selective batch assembly; this actually means that the rods and crankpins are ground to a nominal size and measured. Then, potentially any one of six different sizes of needle roller bearing could be fitted to suit the individual dimensions of that particular rod and crankpin. The difference between the bearing rollers is only microns, but as there is no external marking indicating which particular size you have, changing the bearing in isolation is risky because the clearance between rod, roller, and

► **This crankpin is showing signs of excessive crankshaft flexure.**



crankpin, is critical to the point of immediate failure if the wrong size of bearing is installed. That is why if you look at the original Austrian parts list the rod kit is supplied complete and not listed separately.

Of course the traders involved try to help out the average racer by selling the items individually to try to reduce costs but you are taking a chance. The other factor here is that bearing assemblies wear to a particular profile as they 'settle in' and new cage assemblies will undoubtedly be of a different profile so there is an element of risk involved even if you do have the correct size. Not a lot of people know that, as Michael Caine would say.

Anyway, I digress from the subject matter, our preparation for the Grand Prix. Having measured the cranks carefully, it was discovered that the flywheels were not concentric with the mainshafts. The amount of run-out was only a couple of thousandths of an inch but was large enough to concern us, so we duly had the flywheels ground to eliminate this error, fitted new rod kits, main bearings, and main bearing sleeves (the steel insert in the crankcase had yet to be invented) and meticulously rebuilt and set up the engines for Silverstone. Our customer's preparation for the event centred around cleaning his engine down with a can of Gunk.

We went to Silverstone and had a very successful meeting finishing a very close 2nd to Stephen Coward in an exciting race achieving our objective of improving on last year's result. I think we could claim that we had as much power as anybody else so our performance was representative of the sort of expected load you would place on a race engine.

When we returned to the

workshop and examined the engine that had done two practice sessions, three heats and the final we were, as they say, as sick as a parrot. The big end bearing cage had no less than five cracks in it. Our customer's Minarelli big end assembly was completely unmarked. Granted he had not got our speed but he had finished in a respectable position and his motor looked like it would easily last the rest of the season, something we could not claim. It was becoming clear that major surgery to the crankcase was needed to support the crank in a more positive manner if more power was to be extracted from the engine.

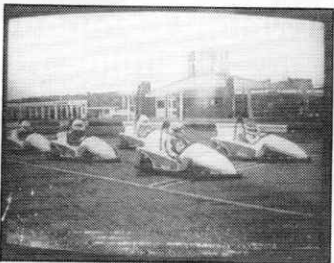
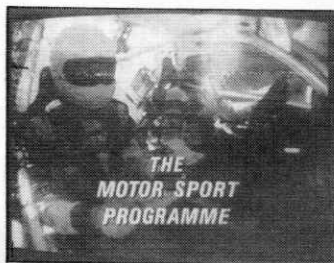
This was going to take up a considerable amount of time and effort on my part to rectify, which I could ill afford, as I was also trying to run a business (nobody was paying me for working on my own kart!). We were also suffering from inconsistent ignition in the form of variation between supposedly identical units, plug fouling, (something that dogs the Rotax even to this day), and various clutch

maladies that took the form of slippage/basket disintegration.

Some of these problems have been partially addressed by after-market add-ons since that time, but with the exception of a few little niggles (more about these in the next chapter) the only element that seemed to be lacking on the Minarelli motor, to me, was some speed. The thing that kept on registering in my mind was its ability to just keep on going. For some months I grappled with the idea that we should use one next season. Shortly after this I became aware that the possibility existed for someone to take over the distribution of Minarelli products in the U.K. as the current importers were in commercial difficulty. This was the last little bit of inducement that I needed, and my mind was made up. I wanted the engine with the crankcases split the other way Mister!

Next Chapter: IS THE GRASS GREENER ON THE OTHER SIDE?

Comparisons of the two types of engine designs.



▲ Insomniacs may have seen Daniel Wheldon and Earlydrive on a recent early morning TV programme.