READER'S SPECIAL

# COMOTOR

## RG750 DELTA SIX

There are projects and then there are projects. This home-grown six-cylinder RG/YZR hybrid is from the folder labelled 'ambitious'.

**Words:** Ben Wilkins **Photos:** Paul Bryant, Colin Redmond

Les Coe isn't your typical project builder. He doesn't have a garage full of part-finished specials and this is the only project he's undertaken. That said this is among the most ambitious bikes I've ever seen attempted.

It started in 1993 when Les wanted to buy a new road bike but there was nothing on the market that he fancied. In the 70s he owned bikes such as the Suzuki Cobra, GT550, GT750 and Kawasaki H2. The problem was that Les wanted a two-stroke road bike and 1993 was a complete void for large capacity two-strokes. The big strokers of the 70s and 80s like the Suzuki GT750, Suzuki RG500 and Yamaha RD500 were completely outdated and the only two-strokes worthy of any attention were the 250cc race-replicas like the NSR250, KR-1S, RGV250 and TZR250; not what Les was after. And Bimota's V-Due 500 was still five years away. In the end he decided to build his own. A six-cylinder two-stroke GP-replica for the road. ▶

Through racing TZs in the 70s Les came into contact with the likes of Pete Gibson of the exhaust fame, two-stroke genius Dave Blundell of Lotus Cars and the Harris brothers. Exactly the kind of blokes you want to know if you fancy building a GP bike for the road.

"The RG500 Gamma was the most modern, powerful and easily available two-stroke engine around at the time so I decided to build a bike based around the motor," explains Les on his choice of engine donor. "I've known Dave Blundell at Lotus for years. We worked out that with a six-cylinder motor we could get 165bhp without too high a state of tune. With the six cylinder option we only needed 27.5bhp for every 125cc. That's the same as a 500 making 110bhp. Tuned but not by any means excessive.

"Dave took moulds of the cylinders so he could accurately measure the time-area of the standard engine. Once we knew the state of tune we could work from there. He made tools for a spark eroder and spark eroded the ports so the ports were exactly as Dave wanted them," says Les.

While it's one thing to tune six barrels identically, it's completely another to figure out how to add an additional pair of barrels to Suzuki's square four. The answer came in the form of the water pump pan on the underside of the engine. Removing the pan gives access to the pilot shaft that gears the motors two original cranks together. Accessing the bottom of the engine through here allows a third crank to mesh with the pilot shaft, effectively making the engine a wide V-four with an additional pair of parallel cylinders. It's a neat and compact solution without the need for bespoke crankcases to be cast. That's part of the beauty of this solution; most of the motor is built with original parts, so it can be rebuilt as needed without major expense. The shape of the crank layout inspired Les' name for the bike, "It has a shape like the Delta wings on aircraft. Hence I called it the CoMotor Delta 6." Delta is also the next letter in the Greek alphabet after Gamma. Very neat considering this is a development of the RG Gamma concept.

To give the front cylinders stability and structural integrity, Les had a mounting plate machined for each side of the engine that would also make for easier engine mounting when it was time to put the motor in the chassis.

Once the engine was together Les took it along to Harris Performance and placed an order for one of their YZR500 chassis (Harris were one of two frame builders who were licensed to build chassis for privateer Yamahas).

Harris modified the frame mounting points to accept the hybrid motor. It wasn't a simple job though. Although the engine had a mounting plate that could be used to hang the motor from, once the engine was in the right place for the chain line, the upper carburettors couldn't be mounted to the disc-valve intakes; Harris had to cut and re-weld the main frame spars to allow for the carbs to be fitted.

With the water pump removed another was needed to keep all six cylinders cool. Les sourced a SwissAuto GP waterpump because he knew that it could pump enough coolant for 165bhp. External alloy piping takes coolant to the front cylinders. To transfer the heat away from the cylinders Harris built a one-off radiator with GP cores and one-off side-plates.

As this was to be a road bike, Les didn't want to be fiddling around with pre-mix oil every time he stopped to fill up. The solution was two RG500 autolube pumps joined with a metering shaft. That gave lube outlets for six cylinders and two spare that feed back into the oil tank.

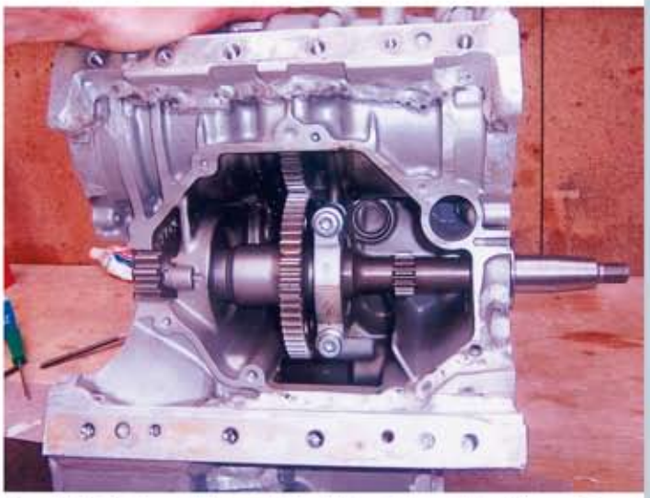
The rest of the chassis is made up with the best kit that money could buy in the

The extra cylinders bolt to the bottom of the engine via the pilot shaft

Additional cylinders mounted and side plate fitted for strength

Carbon, Kevlar and titanium come together to make one of the most gorgeous projects we've seen


A snakes wedding of titanium pipes. Note GP-style exhaust flanges



The pilot shaft gears all the cranks together and is machined from solid

Spa rev counter is fully customisable

GP-spec Ohlins forks compliment the AP Racing six-piston calipers


mid-90s (and still amazing by today's production standards). Marchesini wheels are controlled by Ohlins GP forks and rear shock. The brakes are AP Racing narrow-track discs with six-piston calipers. The ignition is a Formula One unit that is completely programmable. First of all it was set up with a 360° firing order similar to the standard bike but then changed to a 180° order for every three cylinders, which effectively gives a big bang firing order.

To give cool air to the carbs mounted on either side of the engine, carbon-fibre air ducts feed it from the front leading edge of the sidepanels.

With a predicted 165bhp, the standard RG500 wet clutch wouldn't stand a chance of transferring the power, so Les fitted a dry clutch from one of Suzuki's RGB500 race bikes. Before it would fit his crankcases, Les had to make a wooden blank of the side-casing he wanted, have it sand-cast and then machined to fit.

With the engine in the rolling chassis, Les' mate, and exhaust supremo, Pete Gibson started routing and fabricating the expansion chambers. With an all up weight of 160kg in mind, Pete cut and welded the exhausts out of titanium. They're things of beauty too. He also copied the exhaust flanges from the Suzuki XR75 motors that feature two o-rings for sealing and springs to hold them in place. Les' love of the TZ750 led him to have three silencers exiting on one side rather than the more obvious two either side and two peering out from under the seat unit.

Not content with exhausts from titanium, almost every nut and bolt is titanium too. Neat touches include the FZR projector headlight hidden under a flap in the nose-cone that operates with titanium rods and linkages. The tank and bodywork is made of a carbon-Kevlar mix that was made specifically for Les for a red weave, rather than the yellow that is normally associated with the Kevlar brand.

With the bike built up and on the dyno things didn't go so well. As the engine started to be run up to full power it blew up. The problem was the pilot shaft that geared the cranks together. The gear on the shaft has a damping material that just couldn't take the power from the additional cylinders. Another reason why they hadn't made any particularly expensive bespoke parts. The answer was to make a solid gear/shaft without any damping material. It worked. And the engine came on song with a heady 160bhp. That means along with the 160kg of weight, the bike produces 1bhp per kilo. That's mightily impressive even by modern standards (BMW's new S1000RR race replica makes 180bhp with 206kg of weight). It also puts into perspective the screaming 500cc GP two-strokes of the 90s that made around 180bhp with only 145kg of weight. Crazy.

This kind of project doesn't come cheap. For a start you need two RG500 engines (and they're pricey). Then there's a Harris YZR rolling chassis, six bespoke titanium exhausts and all the small parts that add up. Les reckons it cost in the region of £55,000 without taking into account his own labour.

Les is a busy man and, unfortunately, the bike has been sat for almost 10 years since it was last run. This means it will almost certainly need taking apart to check the bottom end before it's started again (the RG's disc valve induction means that at any one time there is at least one intake open to the atmosphere). It's not going to happen any time soon, but when it does CMM will be there to record the moment. We love this kind of project here at CMM. Just the sheer ingenuity and audacity involved to even attempt it should be applauded. Come on Les, get it up and running.

The carbon airbox just peeks out of the fairing and feeds cool, dense air to the six carburettors

Les Coe is a man with plenty of ambition

A Swiss-Auto water pump replaces the standard Suzuki pump

The dry clutch vies for attention with the carbs and pipes