

Porsche promise

That rare breed, the rear-wheel-drive rally car, has a new potential champion in the shape of Tuthill Porsche's 997 R-GT

By MARTIN SHARP

Last month we detailed the Toyota GT86 CS-R3, a rare new rear-wheel-drive rally car, eligible for rallying up to world level from next year. But another new rwd car is already eligible. Tuthill Porsche's 997 R-GT demonstrated promising potential while contesting and finishing its first rally, the Rally Germany in August, round nine of the 2014 WRC. It is 28 years since Saeed Al Hajri drove his 911 SC RS to fourth overall on the Acropolis Rally, the last contemporary Porsche to finish a WRC event before this year.

The R-GT regulations were announced in 2011, enabling Grand Touring cars to contest rallies to World Championship level. That year the FIA received just one R-GT homologation request; from Lotus for its Exige R-GT. The homologation process became prolonged and

FIA technical department has seen fit to revise the eligibility criteria for R-GT cars from this year. Homologation by manufacturer into the specific category is no longer required and each individual R-GT car must have an FIA Technical Passport, a quasi-homologation document issued by the FIA against each individual car's VIN.

The car's owner or preparation team must have the proposed R-GT car inspected – and with luck certified – by the relevant national ASN and undergo the time-consuming process of readying the individual Technical Passport for submission to the FIA for approval, at an admin cost just shy of £6,400 (€8,000).

During his former career at Prodrive, engineer Graham Moore became well-versed in liaison between manufacturers and the

different direction, but we thought at the time that the Cup car gave us the best option for performance and good components.

With their competition spec conrods and pistons, Carrera Cup engines are renowned as reliable units, in particular the 3.8-litre option chosen by Tuthill in its purchase of a 2012 Generation Two ex-Cup 997 racer as the basis for the rally car.

However, circumstances just before Rally Germany have caused the Tuthill engineer to reflect that 'obviously we weren't expecting such a drastic restrictor size, so we need to review that and it may be that a standard engine with that restrictor might be reliable.'

On the Friday before rally week the Tuthill R-GT was on its trailer being towed to rally HQ town Trier. The technical passport issue

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homologation was granted in July 2012. That month the Lotus contested only the first two special stages of the Rally Vinho de Madeira before crashing out of the event on the third. The car has not been seen on a competitive stage since... so far.

R-GT rules specify road-legal series production GT cars with two doors, two, or two-plus-two seats, one or more luggage compartments available for sale through a manufacturer dealer network, and of which at least 200 identical examples must have been produced in 12 consecutive months. Four-wheel-drive GT cars can be used as the basis but a kit must be available to make them two-wheel-drive. But crucially, cars derived from a production model which are built specifically for a Manufacturer's Cup are allowed, so long as at least 30 such cars have been produced.

There are rumours of an R-GT Cup beginning next year, encompassing six tarmac rounds, three in the WRC and three in the ERC. However, GT car manufacturers are evidently loath to homologate cars for the sport of rallying. It is therefore encouraging that the

FIA on homologation issues. Moore is now in charge of the Tuthill 997 R-GT project and says: 'The hardest bit was the technical passport with all the photographs. They say it is a simplified homologation document – I would say it isn't that simplified; it's a good start – it will evolve; we are already on version two.'

The R-GT rule allowing Manufacturer's Cup cars results from a direct Tuthill enquiry to the FIA about the eligibility of Porsche Carrera Cup cars for this rallying category. It is an idea that the FIA GT Championship introduced in 1999 with the Ferrari 550 Millennium.

Moore: 'I started the homologation process, all the discussions, once we got the all-clear for homologating or using a Cup car as a base. Obviously, Porsche made more than 30 of them so that's the criteria, a minimum of 30 cars. That was accepted and we used that as our base because you get a lot of really good bits with it – engine, gearbox, brakes, carbon doors, all the lightweight stuff, all the air intake system for the engine, so it's a good base for the [rally] car. You could do one from a standard road car and come at it from a

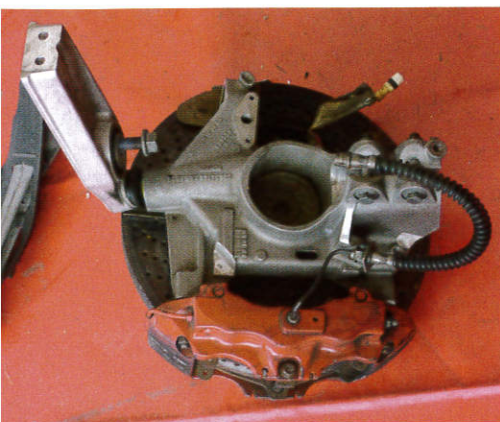
was to all intents and purposes a matter of getting the approval sticker and applying it to the roll cage before scrutiny. To equalise the performances of the widely varying types of GT cars eligible for R-GT the rules stipulate a minimum weight-to-power ratio of 3.4kg/bhp. The MSA inspectors' calculations showed that a 65mm diameter inlet restrictor plate would exceed the minimum ratio comfortably yet provide competitive performance.

No conformation of this diameter had arrived before the car was trundling its way towards Trier. Until that Friday, when an email announced that the restrictor size was to be 36mm. Surprised, Moore 'lathed' one up in a Trier machine shop, fitted it to the engine, whose Bosch engine ecu crunched car weight and acceleration figures through its maths channel after the car was tested and came up with a fairly accurate estimate of 325bhp. That figure was some 100bhp and 1500 fewer maximum rpm than with a 65mm restrictor and would severely hurt performance.

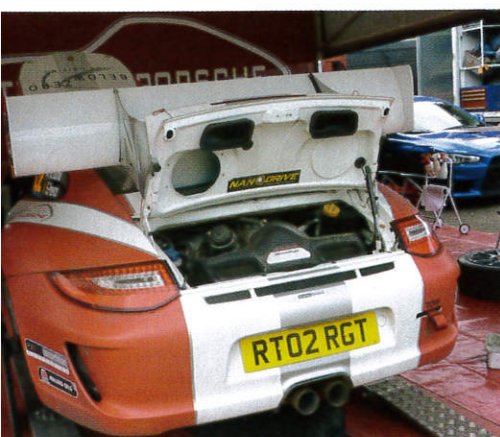
The minimum R-GT car weight limit in the 997's capacity category is 1200kg, yet



The Tuthill 997 R-GT project is being run by former Prodrive man Graham Moore, who is well used to the sometimes precarious liaison between manufacturers and the FIA on homologation issues



Standard Porsche calipers are used for the rally car



With the flat-six power train rearwards of the rear axle line, the R-GT's weight remains rear-biased

because the rules call for what is essentially an equivalent to Group N specification it is not allowed to remove areas of metal and it is therefore impossible to build a 997 to that limit. Post-Germany, Tuthill Porsche did the sums, as its boss, Richard, recalls: 'It weighed 1307kg on M-Sport's scales before the rally, without driver and co-driver. So, a WRC regulation is the true weight of the car, they allow 160kg for crew and equipment – and, apart from Google, no-one's got a car that drives itself yet! So if we're talking about 3.4kg/bhp weight/power; shouldn't it be as the car's driving down the stage?'

The best weight/power ratio the team calculates it can achieve is 4.1kg/bhp. It ran in the Rally Deutschland at 4.6kg/bhp, 'and that's massive,' Richard Tuthill says, adding: 'it does depend on what they think the weight is – and wouldn't it be helpful if they told us what they think?'

'It was more about a passion for decent cars and proper driving. These projects are driven by passion not business'



With a front-mounted spare and a fuel tank up-front the static weight balance has been brought forward

But the rally was a success for the team. Despite the performance deficit, Tuthill and co-driver Stephane Prevot finished the rally 27th overall after 326 stage kilometres after one front-right puncture and a driving mistake when Tuthill followed a left arrow after a crest when clearly Prevot had called a right.

After the puncture Tuthill knew there was no chance of a top 20 finish. 'That just reinforced even more that I was there to get a finish,' he said. The car had no mechanical problems and Graham Moore achieved his aim of building data as a building block for further developments.

Wet surfaces

Tuthill is very comfortable driving on wet surfaces and relishes the challenge. It rained on the Monday before the rally at a test stage set up for 15 cars by event organisers ADAC. Rated Estonian, Ott Tanak, came 10th overall on the rally in his Drive Dmack Fiesta R5... yet was slower in the wet on that Monday test stage than Tuthill in the Porsche 997 R-GT.

The Briton was convinced that 'in the right hands it will be a top 20 car without a doubt, and I think that on the right stages it will definitely beat the R5s. The car can be quick. The problem in Germany was a rusty driver and a need just to deliver a finish.'

This R-GT project has severely dented Tuthill's piggy bank, but he has gone about it for all the correct reasons. 'The principal reason was that I just think that to drive these cars is great fun, and something that I believe the spectators will enjoy and that the drivers will enjoy, so it was more about passion for decent cars and proper driving. These projects are driven by passion, not business, and then the business follows.'

As deliberations over weight/power ratios continued at press time, Tuthill had already

entered the car for the Rallye de France at the beginning of October. If budget can be secured the French WRC event holds great R-GT promise. Tuthill's intention is for the ideal driver to take the wheel; François Delecour, a man with experience of rallying Porsches who is most definitely not short of driving talent and a natural application of enthusiasm. The Frenchman is 'in the loop' for the rally and assisting in the budget search.

The other part of the R-GT promise for Rally France is that works Porsche sportscar racer Romain Dumas intends entering his new 997 R-GT, developed by his own firm RD Limited. An interesting part of this challenge is that Dumas' car is based on the special edition 4-litre RS 997, to which the FIA have applied a 34mm diameter restrictor. This was never a Carrera Cup car so the RD Limited project is based on a road car, unlike Tuthill's Cup-based R-GT.

Richard also has his eyes fixed on November's Wales Rally GB for the gravel specification Tuthill 997 R-GT. As it will be the car's first event over dirt surfaces he wants to drive in GB; thereby gaining data and experience, as in Germany.

'I keep a record of what we've done to the car [during the rally]; it's actually not much really. Nothing broke; nothing wore out. We had a bit of a scare in a road section – he thought he could feel something loose in the steering and we got some stuff out – as it turned out it was just a bolt on the subframe so we tightened that up and it was all right – so really it's been pretty good,' said Tuthill Porsche's R-GT project chief engineer Graham Moore after Rally Germany.

Moore opted to site the engine air intake restrictor between the air box and the throttle body, similarly to the Cup race cars. There is no position regulation such as that for turbocharged engines; dimension from the turbo blades, just that the normally aspirated Porsche engine has to have a restrictor. The single throttle feeds six inlets which have



The car contested Rally Germany using Carrera Cup gear ratios and final drive. Graham Moore says: 'We didn't use sixth gear but the engine did have a reasonable amount of torque and we would look at the ratios in conjunction with the restrictor'

variable lengths to improve torque. 'This is something we'll have to look at, certainly with the [36mm] restrictor,' says Moore. 'Maybe you could spend a lot of time and money trying to find the optimum place for the restrictor... hopefully it will be better if we can get a bigger one. That's the issue really – that's pretty much crippled the engine. This is its first event so we can obviously now go back to the FIA if they want some data from the car so that they can have some data to compare to the top cars.'

The car contested Rally Germany using Carrera Cup gear ratios and final drive, which turned out to be 'not too bad. Obviously we didn't use sixth gear but the engine did have a reasonable amount of torque and we would look at the ratios in conjunction with the restrictor. We looked at ratios but we didn't bother to make new ones because we thought that if the restrictor's going to change we'll end up having a load of ratios that don't match the engine power. There are other ratios – I know the guys over here [Germany] run shorter gearboxes in the national rallies, so we'll see.'

Not that the team was expecting the restrictor size to change, particularly after the MSA inspection, certification and recommendations. Moore is both sanguine and hopeful over the issue: 'It was a surprise really – we didn't expect it to change. So there we are, that's it; we have to comply and... we

did reasonably well with what we had, and the ratios were OK, it wasn't a hindrance anyway. I think there's some leeway there; we can have a go, but it won't happen overnight. So they [the FIA] have got some indication anyway.'

Rally Germany also provided a good base set of data on tyres of the correct size to assist in selecting optimum gear ratios. The Michelins used on the event were 650mm diameter.

The standard – big – Cup racing rear spoiler is approved for the rally car and although it is fully adjustable, Tuthill ran it in Germany on the base setting. An aero aid that size must contribute to the racecars' performances considering the speeds achieved in circuits.

Because the 997 racecars carry just the driver the Cup roll cage is asymmetric; the rally car needs to accommodate a co-driver so the asymmetric cage is ineligible.

As a non-road-legal racer, the Cup car does not have provision for a spare wheel, yet the R-GT car must be homologated with one spare wheel. Front-mounted spare wheel accommodation must be detailed in the R-GT Technical Passport, with photographs which must show that no extra clearance or strengthening is derived.

The rules allow a removable rear window, so for gravel rallies, when two spares may be sensible Tuthill is investigating the option of throwing a rear wheel/tyre assembly in the back in the case of a puncture. The team has already tested a nine-inch wheel at the rear and found it will run, but 'for gravel you would want to run two spares, just because of tyre wear because we've seen that it does have an appetite for rear tyres – funnily enough!' smiles Moore.

With the flat-six power train rearwards of the rear axle line the R-GT's weight remains rear-biased. With a front-mounted spare and a fuel tank up-front the static weight balance has been brought forward a few percent.

The 997 has MacPherson struts at the front with an, effectively twin-wishbone, rear multi-link arrangement. Exe-Tc dampers have been for many years the mainstay of Tuthill's Historic 911s, and also Moore's particular favourites. Of course, these are used on the first, tarmac spec, 997 R-GT, which has an available 180mm of wheel travel front and rear. 'That's about the limit you can get with the suspension links and stuff on it. We don't actually use all the 180mm, but you can see when it goes over a jump that it's got quite a bit of droop travel.'

Toe-and-bump steer characteristics over suspension travel are evidently very different between racing and rallying and Moore has worked hard to get the R-GT's suspension to work with the travel. It was certainly not a case of bolting-on dampers and crossing the fingers.

Moore describes the dampers as 'quite a trick' and each is supported by a triple-rate progressive coil-over spring 'to give you the protection at the end for the landings, which you don't have in a race car. And we try to control the ride. The ride's important; the tyres are totally different [to race tyres], and you're running on bumpy roads so the damper has to suit that. We've developed; a tarmac-specific damper for bumpy surfaces.' Spring rates are roughly half those used on the Cup cars, but the characteristics are quite different.

Dossier request

However, as the plans for contesting Wales Rally GB with the car indicate, the Tuthill team's suspension planning does not stop here. A full dossier requesting some further 50mm of suspension travel was submitted to the FIA on May 1. Tuthill explains: 'You can't expect a GT car to have the suspension travel to cope with gravel. And we're only doing it in a very simple way; no bodysheet modifications, nothing.'

Despite the inclusion of gravel specification brakes in the R-GT regulations, the FIA 'didn't expect people to want to run on gravel'. Tuthill asked why gravel brakes are in the regulations?

Moore is confident. The team has an Exe-Tc damper specification already ideally suited to gravel circumstances and immediately suitable for the R-GT, yet stresses that on gravel stages wheel displacement is the issue which is inherently not available in a current GT car. And so, with the regulations standing effectively at Group N currently, there is no allowance to move anything to gain extra travel.

At Rally Germany Moore was positive. 'Speaking to some of Richard's existing customers they're all very keen to see how it's gone this weekend but with a Porsche you do get the reliability. You've got an extremely good car as a base, and there's a very good parts system – it's all standard bits, they're all available. We may offer a kit to people to do their own, because I think there are some people who would like to do their own; we can do the assistance.'



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