Andy Benson

Benchmark

We take a close look at some 12 turn double motors - the clubman's choice

Model car racing is no different to any form of competitive sport, you have to have the right ability, the right equipment and the right mindset. The mindset is probably one of the most important aspects but it is often overshadowed by the urge to throw loads of money (either yours or your parents) at equipment which you probably do not really need, or psychologically you think you need to compete. If any of you are still following and understand the point I am making, well done, if I have lost you then I will explain.

Let us focus on electric racing for a moment of which there are two major factors which carry more hype and myth then anything else. Firstly batteries, and secondly electric motors which are the topic of this article. How often have you been at a race meeting and heard the shouts, 'look at that it is a missile!' This is shortly followed by 'I wonder what wind that is, I must get to Joe Bloggs' shop to buy one of them'. The truth is the car you have just been watching probably was ballistically quick, on that one run, with that gearing, those tyres driven by that one driver in those conditions. Motors are not really the black art that most manufacturers would like you to thing they are. True quality standards have got higher and performance has improved, but do you really need to rush out to buy the latest brand to stay competitive?

Following a good natter with the 'Ed', we thought it would be good fun to take some 'off the shelf' modified motors and armed with the latest dyno from Robitronic, undertake some bench testing and track testing to test the myth! My Losi XXT seemed an ideal weapon for some serious track work, so a 12 x 2 spec was chosen for the motors as this is a recognised good all round wind for Stadium Truck racing. All manufacturers spoken to willingly supplied motors, to which I give a big Thank you, so lets have a look at the subjects which I have been torturing recently!

Bring on the contestants

Reedy need no introduction, in fact Mike Reedy is known as 'The Motor man', and with 17 world championships under their belt they are the most successful motor ever. We tested their Sonic S based on the Yokomo can, which is their 'off road spec'.

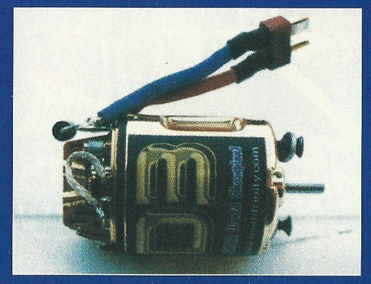
LRP supplied their 'Viper X-2' which has its own unique can and an interesting brush arrangement. Two springs per brush to help with brush bounce is a novel concept.

Trinity supplied their latest D3.5, freshly developed from Dave Spashett's world championship success. The 3.5 is designed to be more efficient than the D3, a motor which was very successful in the USA in its own right.

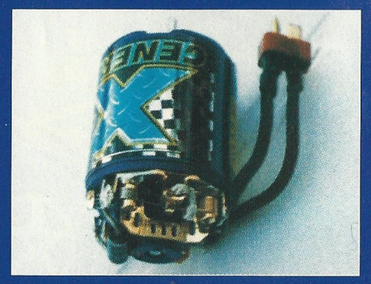
Orion and Corally supplied the final two motors, and these are very similar in design which is hardly surprising as Oscar Jansen developed the Corally range and then moved over to Orion and developed their range of motors. Superbly wound armatures are a trademark of these motors in their Yokomo cans.

Whoops I nearly forgot there is one more motor in this test run, the motor we all started with, it is in every Tamiya kit and has probably sold more than all the others put together, yes, a big round of applause for the Mabuchi 540. I know it is totally unfair to compare a £8 motor with £52 motors, but there is not a person reading this magazine who has not seen or driven something with a Mabuchi 540 in it!

Trinity D3



LRP Viper



Motor Works

Let the games begin

First test was to be the bench test. I was armed with the Robitronic dyno and my home PC and I had sneaked my 12volt car battery into the study. After a quick look at the instructions I set the programmes up. It is worth noting that the dyno runs in MS-DOS, not windows, but once the program had been loaded and transferred from floppy disk to hard drive, it is simplicity itself to run.

I was absolutely amazed at how easy it was to load, just follow the instructions. It has a menu along the bottom of the screen and superb clarity graphics can be produced in seconds. Fitting the motor into the dyno is also a piece of cake, all that is needed is an Allen key and care. The motor is held tight with a thumb wheel and the Allen key is used to fix the flywheel to the motor shaft. Once ready to go just move the cursor to 'motor test' click with the left mouse button and the motor revs up to a maximum, with current and revs constantly measured, with power and efficiency calculated in seconds, and the results displayed graphically as shown. Each motor was taken straight from the packet, and run for 60 seconds on a four cell pack to bed the brushes in. The timing was left as 'standard' to represent the average driver who wants to buy a motor and drive! Each motor was given two runs on the dyno, just in case one reading was a spurious result, but in all cases the two runs were virtually a mirror copy of each other. It is worth noting here that if you look at the revs achieved I was recording up to 38000 rpm, so the importance of doing up the flywheel nice and tight cannot be underestimated!

So what do the results tell us? The dyno itself was set to show four parameters on the screen - Efficiency, Torque, Power and Current. These are calculated as the motor accelerates, reaches full speed then slows down. It is interesting to note that there is a different motor at the top of each of these individual parameters.

Orion Pro Mod

OK, now you want results

The Reedy wins on power, the Orion on revs, Trinity takes the honours on Torque, with Corally winning on efficiency. The poor old Mabuchi 540 incidentally comes bottom on everything recording only 33% of the power and 50% of the revs of the top motors, with a lowly efficiency of 56% which did surprise me, but don't forget that these are produced in millions whereas the modifieds it was up against are hand made in volumes of low-thousands. Analysing the results in more detail and it can be seen that the variance between the top three in each parameter is only minimal.

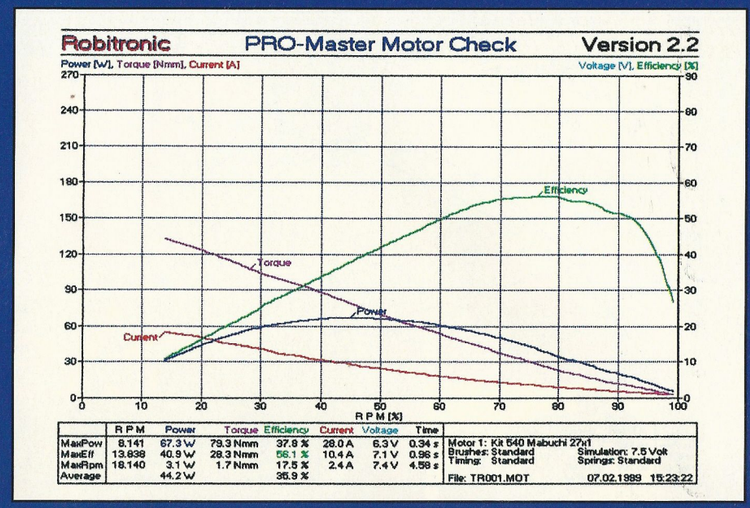
0.9% on maximum power, 7% on revs, 1.8 % on torque and 1.1% on efficiency. 'Power' is the one item that the competitive racer will be most focused on so lets assume a lap of 30 seconds, a 0.9 % increase in power will equate to a lap of 29.7 seconds Now if your Craig Drescher or Dave Spashett this may make a difference, but how many of us can consistently lap time after time within 0.3 seconds? I wish I could but in reality the odd wide corner or lapping a back marker would lose considerably more than this in one lap. That is assuming five minutes of no mistakes! So although the dyno is a very nice tool it has not really shown up any real significant differences so far, so let us move from my cosy desk at home and head south to a Brandon winter league meeting and put some 'real time' through these motors.

Testing, testing

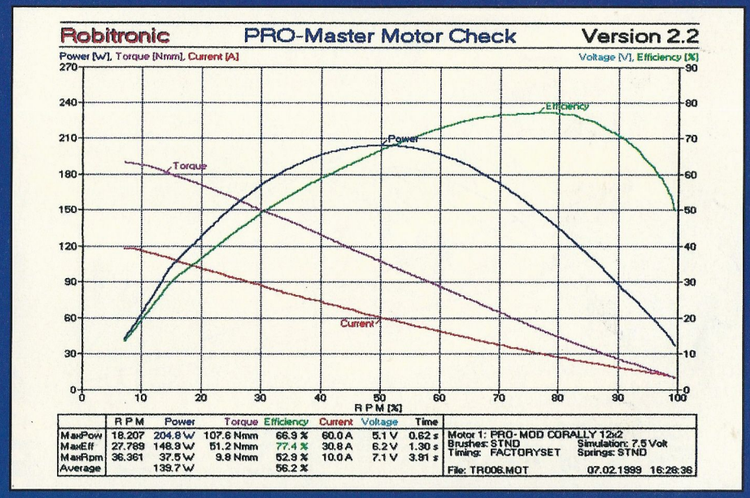
Now the Brandon astroturf is one of my favourite circuits and is a regular haunt for winter Truck racing. With plenty of experience of this circuit it is easy to go out with your Truck well dialled from heat 1. As I said earlier, all of these motors are a 12 x 2 spec so once again having experience of this wind on this circuit it was an easy choice to go for a gear ratio of 19/87 which equates to 11.95:1. Sanyo 2000 cells were used as the power supply feeding their volts through the latest LRP V6 speed controller.

Heat one and I was left with a dilemma, which motor do I try first? Only one thing for it, alphabetical order, so the Corally went in first. Eighth off from the grid so we had battle on our hands getting past the back backers very quickly, but we got up to third with the Corally giving the impression of being slightly overgeared but very smooth and controllable - duration was excellent 300 maH left in the cells.

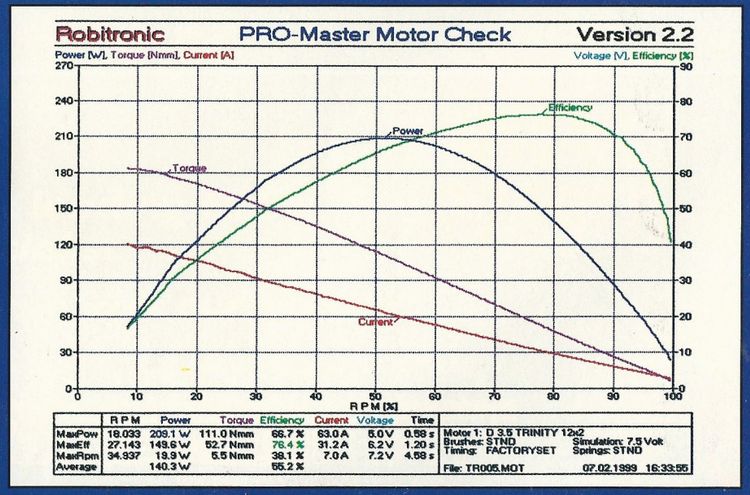
Heat two and the Orion was bolted in, same gearing of course and we had a noticeable increase in grunt (acceleration), but this time it felt undergeared down the straight - TQ was ours with 180 maH left in the cells.



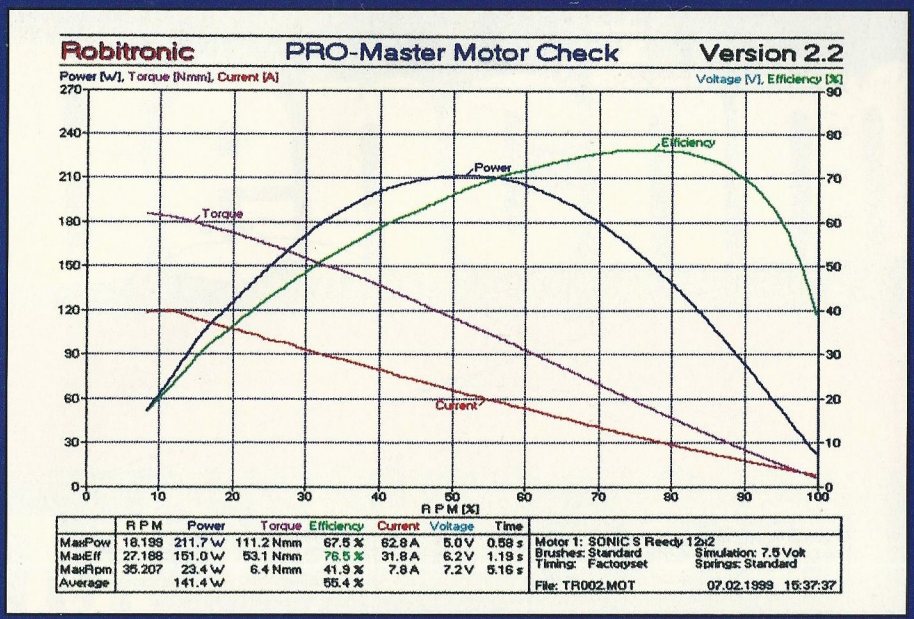
Mabuchi 540 kit motor



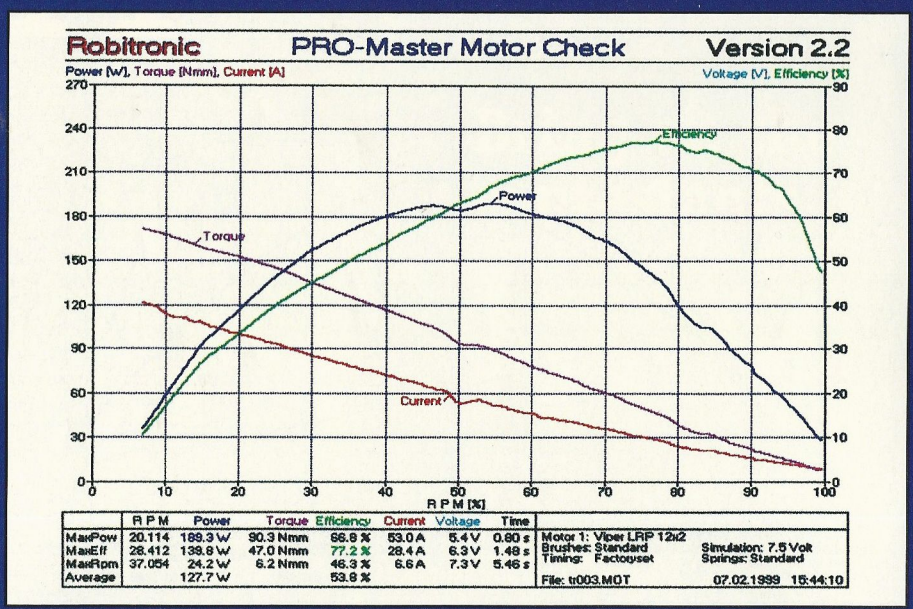
Corally Pro-Mod



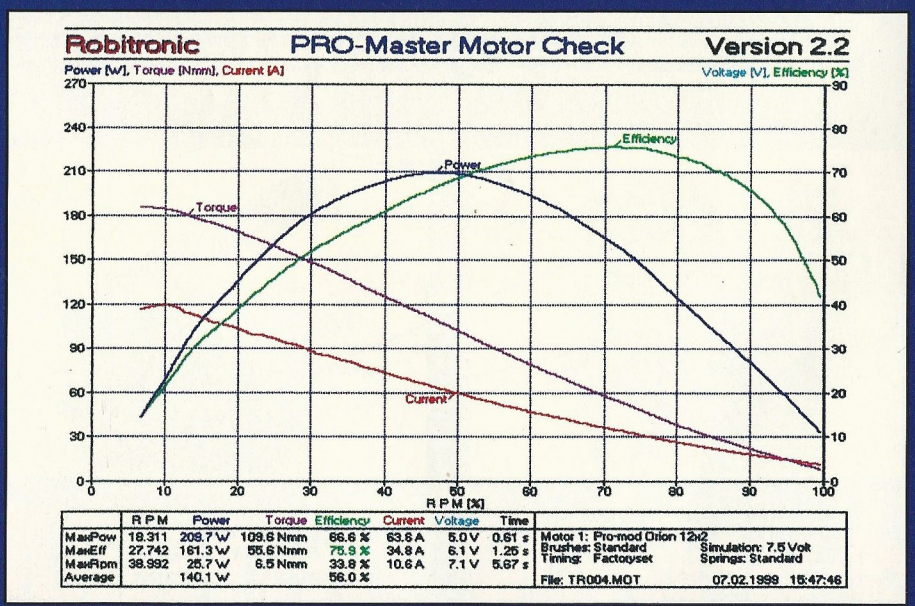
Trinity D3.5



Reedy Sonic S



LRP Viper



Orion Pro Mod

Robitronic Dyno - what a tool!

Next came the LRP, we were quicker down the straight but it felt bogged down in the corners - definitely a candidate for dropping a pinion to an 18, which would give an equal top speed but improved acceleration - duration was excellent at 346 mah left.

Heat four came and we were currently second qualifier having lost our second round TQ. In went the Reedy, and with a 'focused mind' I went out to improve! The Reedy really suited the track, with the gearing feeling spot on, and with a good clear run we took TQ by 11 seconds from Keith Helmke. Duration was the tightest yet, 70 mah was all that was left.

True to form the finals came around so in went the last test motor, the Trinity D3.5. Acceleration was the best yet, but it felt like the top speed was slightly down on the Reedy but not by much - result a win by 8 seconds! Duration was good at 160 mah left in the cells. I think you could say we had a successful day!

Conclusions

It would be very easy now to ask now, which is the best motor? This is very difficult to do and I am not prepared to go any further than to say I would group the motors into two groups. The first group contains the Trinity, Reedy and Orion. These all felt very lively and were lifting the front wheels with ease. The Trinity and Orion would have gone quicker still, there was duration to spare, but there was really nothing to choose between these three. The second group contains 'the smoothies'. Both the Corally and the LRP felt less powerful but in reality they were smoother on the track, very good top speed with the best duration In fact they were actually easier to drive quick with as I could focus on tight lines. Oh yes in case you wondered, I did run the 540 at the end of the meeting, but out of sympathy I only did a couple of laps, yes it was slow, and it had little acceleration, but when you are learning this is what you want. Do you think this could be the reason why they are so successful in Tamiya kits?

So what does this all prove? Well, in my Truck with my driving at a 'one off' meeting, all of the motors were capable of taking the TQ and winning the A final, which tends to blow away the myth of the 'must have' motor. The exercise really does show that today's modern technology in the form of the Robitronic dyno can mirror performance on the track, if the latest pit 'psyche outs' is your thing. Do you need one to be competitive? No of course you do not - looking after your motor with regular skimming and new brushes is much more effective at restoring that 'as new' performance.

I would like to thank 'The Ed' for loan of the dyno (you will get it back honest!) and to all the distributors for making it happen, a big 'Thank you' RRCI