

Racing in the Standard class of the National Truck Championship has been a real eye opener with regard to the motors used. The rules dictate that these will be factory sealed, 27 turn single wind motors, with no more than 24 Degree advance timing. There is also a ruling that no motor may be skimmed, or opened for any other reason during a meeting, and each driver is limited to two motors per event. These rules make it a very closely contested championship, and much head scratching goes on to try and find that elusive 'edge' on the competition. All Standard motors are equal, the rules make it so, but some still seem to be more equal than others. How is this so? Well let me try to shed some light, with the aid of a Motor Dynamometer, a bag of brushes, some springs, and last but not least, two Standard motors.

## The Dyno

The motor Dynamometer used for the test was a Robitronic ProMaster, which when coupled to the PC provides an excellent means, of producing comparative testing data. The motors and brushes used were the 1998 & 1999 offerings from Trinity, these being the Midnight 2 (Pro) and 4499 brushes from 1998, and the all new Paradox rebuildable motor and 4391 brushes which will be widely

used in 1999. Unfortunately at the time of these tests I was unable to get my hands on a 'Pro' version of the Paradox, and could not update to this version as the springs are wound in opposite directions and firmer springs were also unavailable at this time, however I am sure that they will both be in plentiful supply, at or below the BRCA maximum price of £24-00 by the time you read this article.

## Is it Midnight Already?

Testing was started with my Midnight 2 in exactly the same specification as I had run during the 1998 season, this was then used as a datum for other tests. The next test I tried was on my brand new Paradox equipped with 4391 Brushes, unfortunately as soon as the graph came up on the screen, I knew that I was in trouble. There were peaks and wobbles all over the place, and the figures were abysmal. Motors really do need a good running in period prior to putting them through the rigours of testing or racing in earnest, and that was what I needed to do with this one. One week later, after a running in ses-

sion during the fourth round of the Dudley Indoor series, I was ready to start testing for real.

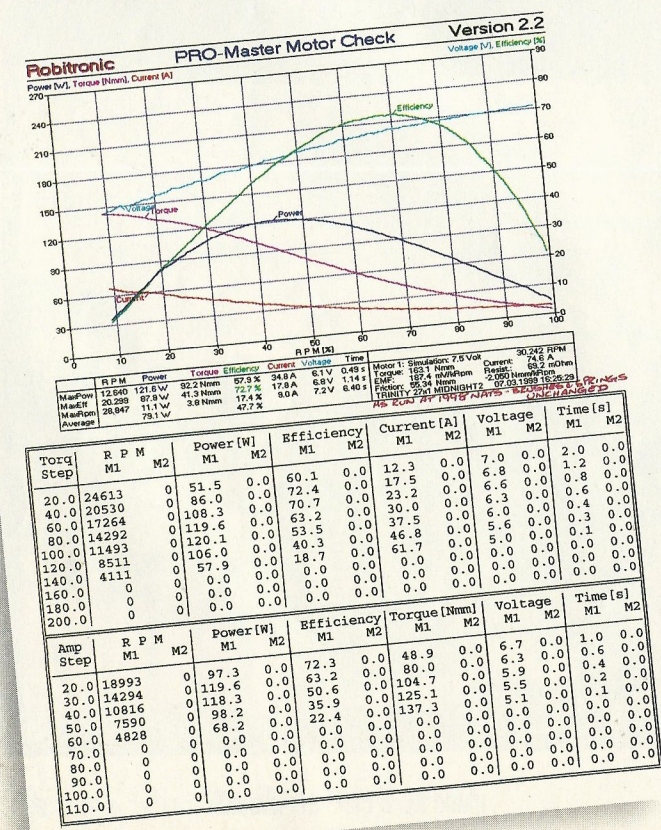
The Paradox motor was put back on test with a set of last years 4499 brushes, and Hey Presto, no false peaks or wobbly bits! This shows the importance of running in a standard motor properly, and I am positive that with a few more runs the graph will look even better. I tested with the 4499 brushes as with the Midnight motor these provided the best graphs both for efficiency and initial torque and power readings. The Paradox is effectively the same can and armature as the Midnight except for the fact that is has the advantage of being rebuildable, it therefore follows that if 4499 brushes work better in the Midnight then they should work better in the Paradox, or it would do if I knew what brush springs were fitted!

## Spring Fever

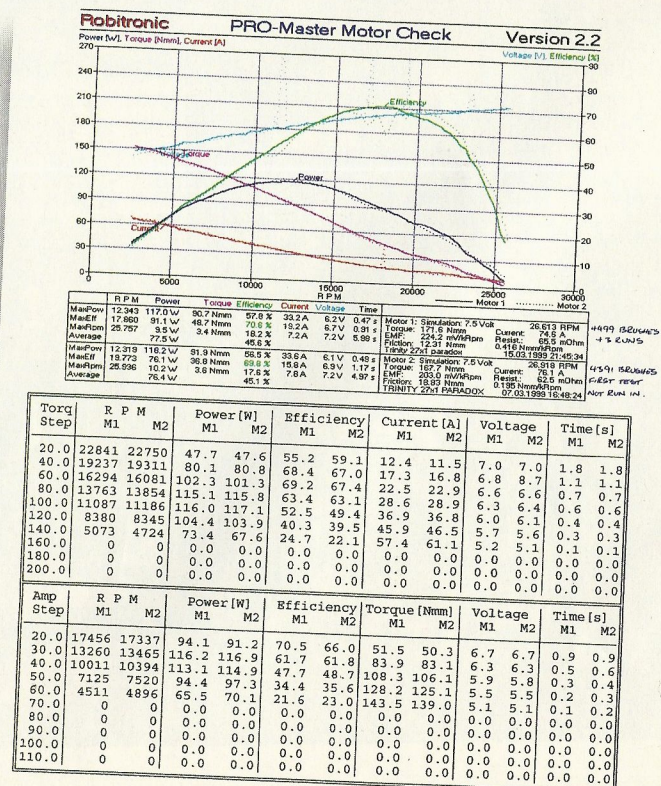
My next course of action with the Midnight 2, as this is the motor I am now going to be concentrating on, was to compare differing springs. With the Pro version of the Midnight 2, Trinity used differing weights of springs on the Positive and Negative brushes, this suggested to me that playing around with

## Optimising Stock Motors

Below: Midnight as it was run during 1998 - no changes to brushes or springs



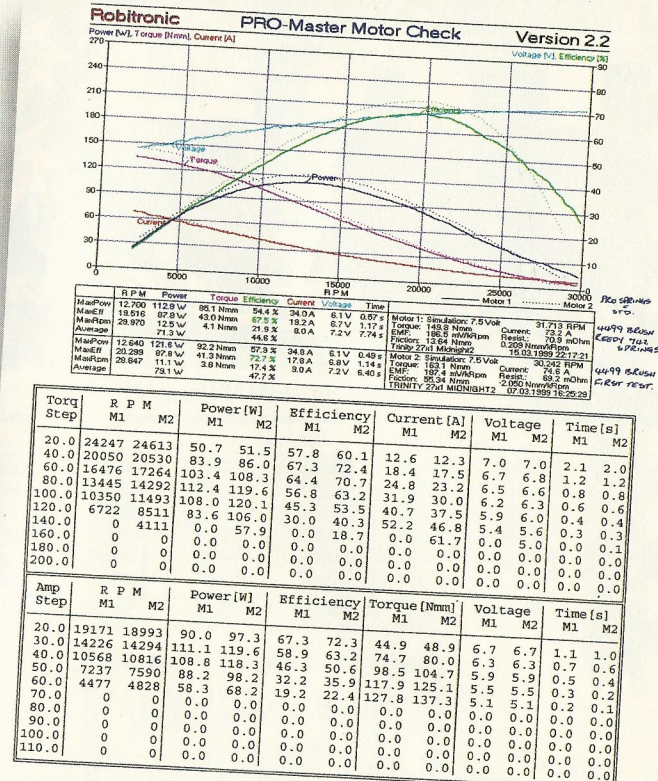
The Paradox - Motor 1 simulation is with 4499 brushes, Motor 2 simulation using 4391 brushes and the motor not properly run in



The Midnight again - Motor 1 with Pro Springs and standard 4391 brushes Motor 2 with 4499 Brush



Above right: Motor 1 - 4499 Brush and Reedy 742 Springs, Motor 2 - 4499 Brush first test

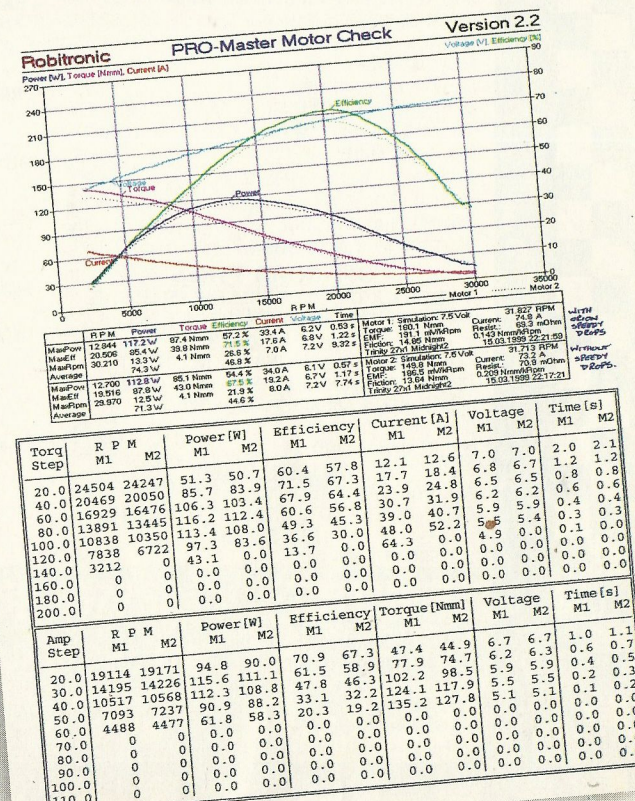


can do to even the humble standard motor in their effort to squeeze the last ounce of torque and extra few revs of speed out of it, and maybe it has given you sufficient info to make your standard motor a little quicker as well.

## The Ed' says

Amazing is it not? Here we have an article on how Brush and Spring choice can effect your standard motor and lo and behold the July 1989 issue of Race Car featured in Reverse Gear this month has an article on Brushes and springs, The 'X' files strike again...**RRCI**

Motor 1 is the Midnight without Speedy Drops is the Midnight without Speedy Drops



springs and leaving the brushes alone may provide another way of altering the motor characteristics whilst staying within the rules. Firstly I tried just swapping the positive and negative springs around, I did this with my other 1998 Midnight 2, and as you can see from the graph and tables it gave an increase in torque, max efficiency, and RPM. The problem was the efficiency dropped off along with the power when it got toward maximum RPM, now whether this will give a problem on the track I do not know, but I will find out during the coming season. The next test was with some Reedy 742 springs that felt less strong than the Pro springs and would give the same force on both positive and negative sides of the comm. This test proved to be very informative, and basically proved my expectations to be correct, the stronger the brush, the greater the RPM. I know this is very simplistic, but to a point it is true. The max RPM was up from 28,850 to 29,970, but the torque and efficiency were down by 10%. It may be that some of the losses in these areas can be made up by adjusting the slipper (a bit looser to get the motor speed up without the need for the torque), but this will have to be checked out on the track.

## Long Drops

The final test involved the substance much loved by many Standard class drivers, and the subject of many a tale of woe regarding burnt out motors, Comm Drops! The Comm drops in question were actually the Orion offering, called Speedy Drops. I first tested the Midnight 2 without the drops, and then added one drop to each brush (4391 Brushes were used for this test) to get fair comparison, there was a definite and irrefutable increase in all three major readings, Max torque up by 4%, RPM up by 1.5%, and efficiency up by 4% with the current draw coming down. It should however be remembered that this will not last for a full five minute race, and the motor will require serious cleaning after using these wonder fluids, to get rid of the residue.

I hope that his has in some way helped you to understand the many and varied things that motor tuners

## 'false peaks or wobbly bits!'