MIKE HASWELL

RACING ahead

THIS MONTH MIKE COVERS MOTOR TIMING

Timing is only adjustable on modified motors and effects all areas of the motors performance. You advance the timing when you rotate the endbell in the opposite direction to which the motor turns when the car is going forward. To retard the timing you do the opposite. The motor's timing is the angle in degrees that the endbell has been rotated from the neutral/zero point - the brush hoods on the endbell are at 90 degrees to the centre of the magnets. Remember that each 1 mm around the can is equal to three degrees of advance. Always make sure that you have marked where the timing was originally set before you start to adjust your motor. The manufacturers all have varying motor ranges, some of which are the same winds, but have been set up for a different uses. What is best for an off-roader is not necessarily ideal for someone running a Touring car or a twelfth car. The motor used in this test was a 12 turn D3 Trinity and the timing is as per the motor label and not degrees (if you got to forty degrees the endbell would fall off). A Galeforce Dyno was used and the figures shown are the maximum obtained.

What happens if?

One of the first things that will happen as you increase the advance on your motor is that there is an increase in the amount of the current drawn. The current draw will increase exponentially the more you advance your motor as seen here in fig.1 (amps).

You will see that initially there is not much change but in the latter stages the current draw increases by over an amp. The next thing you notice is an audible increase in the rpm which is demonstrated here in fig.2

From this you will see a more linear increase in the rpm as the motor is advanced. The next area we look at is the power generated by the motor. As you can see from fig.3 the power output increases as the advance is increased.

In fig.4 we can see on the efficiency graph there is a definite point at which the efficiency peaks and after that it tails off. Whilst this might not be so important for Off-road it is quite important for those racing On-road with their lighter cars which use all the battery power available. It is a particular concern for those racing twelfth scale over eight minutes. If you looked at the average discharge of a battery pack over the race distance it would equate to 25 amps for a 5 minute race and 16 amps for a 8 minute race.

The graph in fig.5 shows the power generated at differing levels of current draw (15, 25, 30, 50 amps and the maximum power produced) at the various amounts of advance. As you can see, the maximum amount of power produced is very close to the 50 amp mark and if you were constantly running at this mark, you would go flat very quickly. Running less advance will give you more power at lower current draw than the more advanced motor.

On the efficiency graph fig.6 you can see that the motor with less advance is more efficient at lower current draw than the more advanced motor, but at higher current levels the more advanced motor is more efficient than the less advanced motor.

Advancing a motor will increase the torque slightly and the amount of the effect really depends on the state of the magnets in the motor. This will also alter the amount of braking your motor produces, some drivers actually tune their motors by the amount of braking the motor produces, more advance gives you a greater braking effect.

So at the end of the day it is a question of looking at what you use the motor for and by trial and error finding the best set-up that suits you. I hope this article has given you some food for thought and if you have any further questions about motors you can e-mail me at Mike_Haswell@compuserve.com and I will endeavour to answer them as best as possible. RRCi

Figure 1

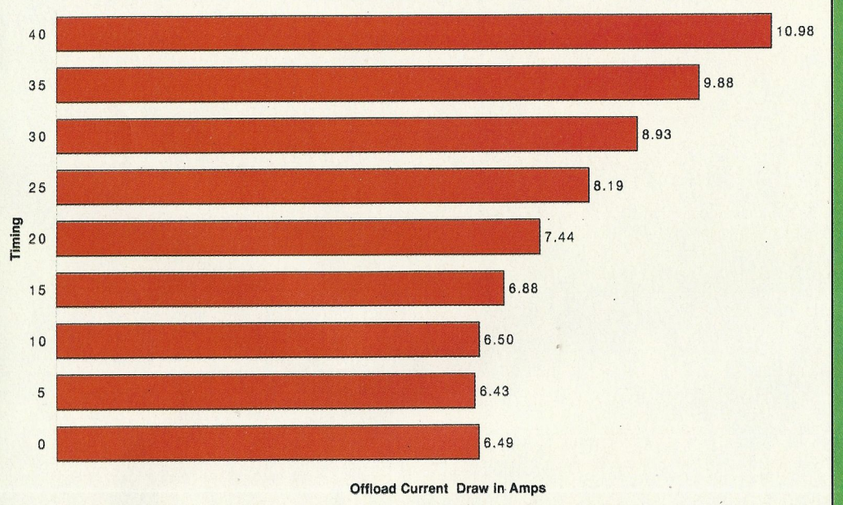

Figure 2

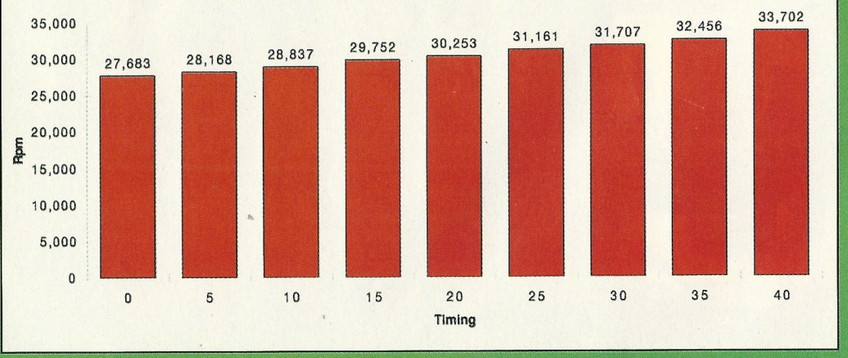

Figure 3

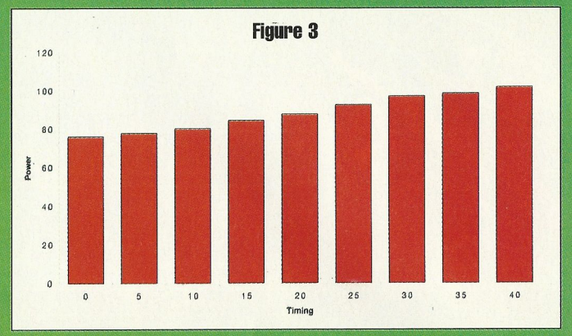

Figure 4

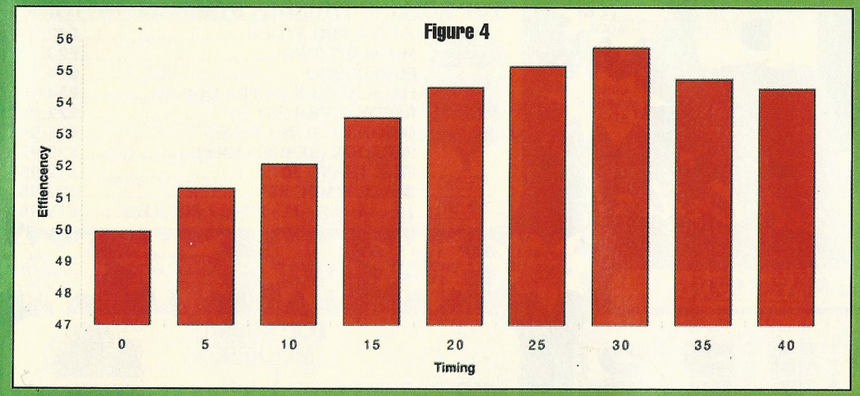

Figure 5

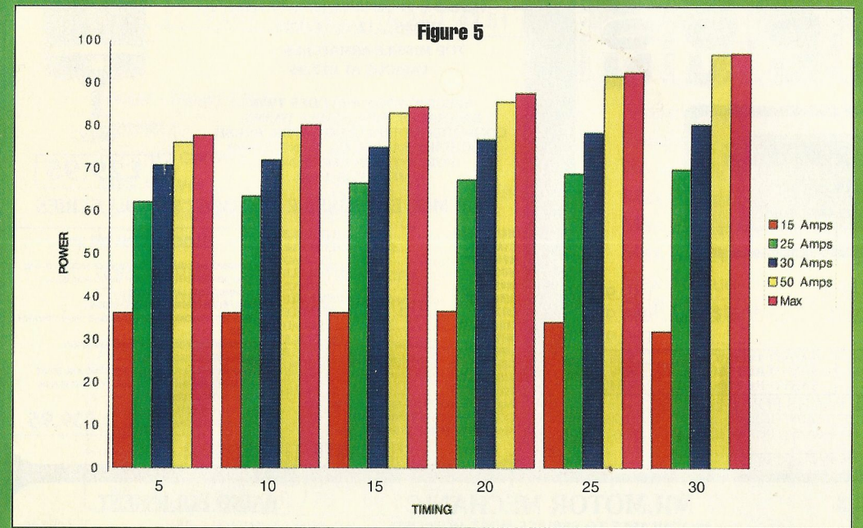

Figure 6