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COMPETITION ELECTRICS

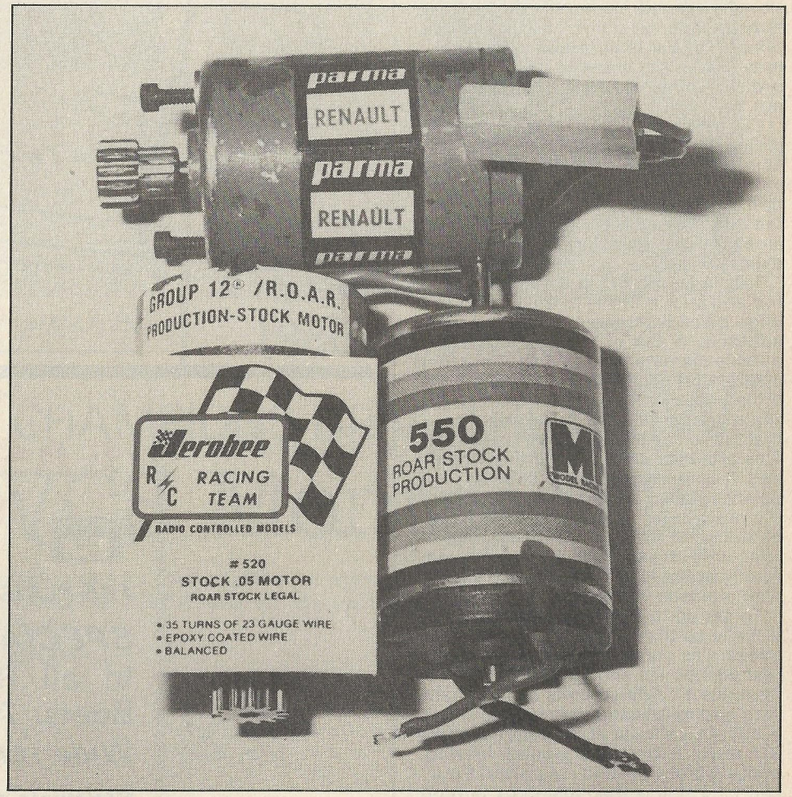
1981 is going to be even more fiercely competitive in National 1/12th electric car competitions, than previous years, due mainly to the new rules introduced by the governing body, British Radio Car Association (BRCA), but due also to the new and advanced parts and ideas which are constantly being developed, both in this country and the USA.

Parts from America are produced by several manufacturers in that country such as, Parma, MRP, Associated, Jerobee, Bo-Link, Jo-Mac etc, as well as many others who make a smaller number of specialist items. The bigger manufacturers all offer complete car kits, as well as a range of spares and tuning items. Unfortunately, all of the American goods have to be imported by firms or individuals into this country, with the resultant wide variation in mark-up of prices and also the limited, and sometimes annoying, shortage of spares.

The situation in regard to the cost of American items is becoming quite ludicrous, since the official importer will have a recommended retail price, whereas the same items coming through the back door by the endeavours of various enterprising individuals, result in them being able to sell at a much cheaper and more realistic price, as far as the purchaser is concerned.

A case in point is the Associated parts which vary enormously in price and whose recommended prices are severely higher than the same items offered by other manufacturers. This is illustrated by considering the case of the standard class Igarashi motor.

The Igarashi motor, manufactured in Japan, is bought by all of the American manufacturers either separately, or as a combine, and then resold with their own labels attached to the can. However, by the time it reaches the shops in this country, the price varies as follows:
£4.86 for the Jerobee 520
£6.50 for the MRP 550



£6.60 for the Parma Renault
£8.16 for the Associated 3500.

I must add that the Associated has a plug with it.

However, the price limit set by the BRCA is £7.50 and it must be debated at Committee whether the addition of a plug or anything else allows the price limit to be exceeded, or whether the price limit is too low.

Continuing on the standard motor theme, the photograph shows the standard motors as offered by three kit manufacturers and the appearance of the respective labels. As you can see, each is easily identified, but the Jerobee gives you the details of the armature.

The rules allow for the motors to be quality controlled at the Japanese factory, but under no circumstances is any rework or modification allowed after leaving the factory.

As stated, the armature consists of 35 turns per pole, of which there are three, of 23 gauge wire. After winding, this is either epoxy or lacquer coated to ensure reliability. Balancing of the armature may be carried out if necessary and this varies from batch to batch, probably depending on the quality control of the manufacturing machines.

As a point of interest, the early motors were neither balanced nor epoxy coated and suffered badly from shorted turns and variation in performance. These latest motors are exceptional in their consistency and reliability.

When you buy one of these motors, they may appear unbalanced when running from new. However, this is due to sparking at the cummutator, causing the motor to jump. Careful running in at two volts for at least two hours will bed the brushes into the commutator and the motor will become extremely smooth.

This bedding in, or breaking in, is offered ready-done by some manufacturers, such as in the case of the Associated 3501, which carries an additional 'REEDY' sticker to identify it. However, the price rises above £10.

I have not shown the Associated since the labels on all Associated motors are colour-coded and do not show any reference number. This does lead to confusion when trying to identify the model type.

The situation is further hampered by the fact that the 'REEDY' stickers are easily removed. As far as I am aware, the standard 35 turn Associated motor has a blue label, whereas the 32 turn variation has a red label.

As far as breaking the motors in goes, my own investigations show that at least 90% of the standard motors perform equally after being run in, and even the others perform as well in the car. When run in you can expect around 16,000 rpm at 0.8A and 7.25V, and a very smooth, unfaltering note from the motor.

When seeing the motors in colour, you will notice that the plastic endbells come in three colours: white, light blue and black. Until recently, these colours had no meaning in relation to the armatures. However, the situation is now changing.

Looking at the photograph, you will see on the Jerobee motor an additional sticker stating GROUP 12/ROAR PRODUCTION-STOCK MOTOR. This is a paper label fixed over the endbell to try to prevent tampering but also ensuring you that it is perfectly legal for the two classes run in the states, ie. GROUP 12 and PRODUCTION-STOCK.

Without going into too much detail, what has happened is that six of the American concerns have grouped together to run a very special limited-cost class called 'Group 12'. This resulted in the sticker on the motor and, more significantly, the use of the white endbell only for the standard 35 turn motor.

So, if you see a motor in future with a white endbell and sticker, you are assured it is legal.

However, MRP has not joined this combine and their 35 turn motor has a black endbell. Also their 32 turn motor, type 552 also has a black endbell, as do many previous motors; therefore, if you have a black endbell motor without a label, you cannot be sure what armature it has.

The blue endbells have an even longer history, as these were the original colour supplied for all motors. Quite a few motors around still have blue endbells but all the new ones except the ASTRO 05 are now black or white. The ASTRO 05 RACING SPECIAL is a 32 turn motor and can be further identified by its thinner lead-out wires, which also have tiny writing along their length.

The lead-out wires from the endbell are soldered inside to the brush springs, but you must be careful not to pull or bend these at the entry point since the joints are extremely susceptible to fracture and then you will have to open the motor to resolder it back on — which means you will not be able to use it at a National Competition.

Some people are worried that even the motors as identified, may turn out to be of a different wind, but, in my experience, I have never known a motor with a label on it to be an incorrect wind.

Motors imported without labels, which then have the shops put labels on them, could be suspect but if you have access to a rev. counter then a motor which does at least 18,000 rpm at 1A and 7.2V is certainly a 32 turn or modified. Further, the quality of winding at the factory is improving all the time and, whereas it was quite common to find one or two poles with 34 turns instead of 35, this is becoming very rare.

For those interested in other features of the standard 35 turn motor, the shaft which carries the pinion can either be splined or smooth with a flat ground on it. Until recently, the splined type was the only type and it ensured a good tight fit for the pinion, without the need for a grub screw. However, changing the pinion called for a gear puller, as sold by Associated and others, that more often than not resulted in screwdrivers and pliers being used which could end up pulling the shaft out of the armature.

I am slightly confused at the moment whether the shafts with flats ground on them will be standard, but both types are appearing on all winds of armatures. One useful thing to notice is that the splined shafts will not pass through a ball-race such as fitted in the modified motors. Therefore, be suspicious of a standard motor with the splines filed off.

Ball-races are the accepted norm for modified motors, but the oilite bearings of the standard motor are exceptionally good if looked after. It is very rare now to find a tight bearing, but always check. Most people use a light oil such as 3-in-1 on the bearings, but remember, this will also attract dirt and dust. Although a lot of people use TRIFLON lubricant, those with knowledge advise against this, especially since it may get on the commutator.

The commutator itself originally was not trued, but now, even the standard 35 turns motor has a trued comm. done at the factory. This has resulted in a minimum of running in being required for the brushes.

The brushes themselves are extremely well compounded and give excellent life. However, a new brush compound is available for tuned motors, although I am not sure whether it will ever turn up in the standard motor.

Overloading the motor can result in rapid wear of the commutator and overheating of the brush springs. The spring tension again is now well quality-controlled, but overloading can cause them to distort or lose tension.

As the motor is used, a lot of brush

COMPETITION ELECTRICS (cont'd)

and commutator dust is generated inside the motor and can cause sparking and loss of performance. Those in the know, clean out the motors by squirting special aerosol cleaning fluid through the small screw holes and letting the dirt and dust be washed away.

The screw holes themselves are 4-40 thread, and must not be confused with the Mabuchi motor 3mm thread, or with BA screws. Also, do not use too long a screw as it may hit the armature, especially if there is a lot of end float on it.

This end float is controlled by small washers inside the motor and ensures the motor does not seize up when it gets hot. Also, allow for the float when setting up the pinion, since the magnets will always force the armature towards the back of the can when at rest.

The magnets themselves are so important to the performance of the motor. It is amazing that the strength of them is so well controlled. Turning the shaft over by hand reveals the strength of the magnets, but remember bedding in of the brushes will bring up the magnets on an apparently weak motor. Also, one cannot compare the magnets of different modified motors, since the winds and timing will affect the feel.

The timing on the standard motor is now very well controlled and, although twisting the commutator can be used to advance up the timing, this requires opening the motor, which immediately makes it illegal. Also, one or two degrees variation produces virtually no change in performance.

The endbell itself is held by two lugs bent over from the metal can and it is impossible to re-time the motor by turning the endbell, without cutting off the lugs.

I have not touched on the gear ratios to use since that depends a lot on the car and size of track, but, for large tracks with a lightweight car and 8-minute races, 12/46 is a favourite, although some go as high as 13/46.

Finally, summing up, the standard 35 turn motor is now an excellent quality product produced to close tolerances and giving superb performance. You can be assured that the variation between one manufacturer and another will only be the difference of one batch to another and, in my experience, even selecting from a bath of hundreds of motors, is not worth the effort. However, running in and careful maintenance of the motor will ensure a sustained competitive performance.

In a future article I will discuss the modified Igarashi motors and other motors available for competition electrics.