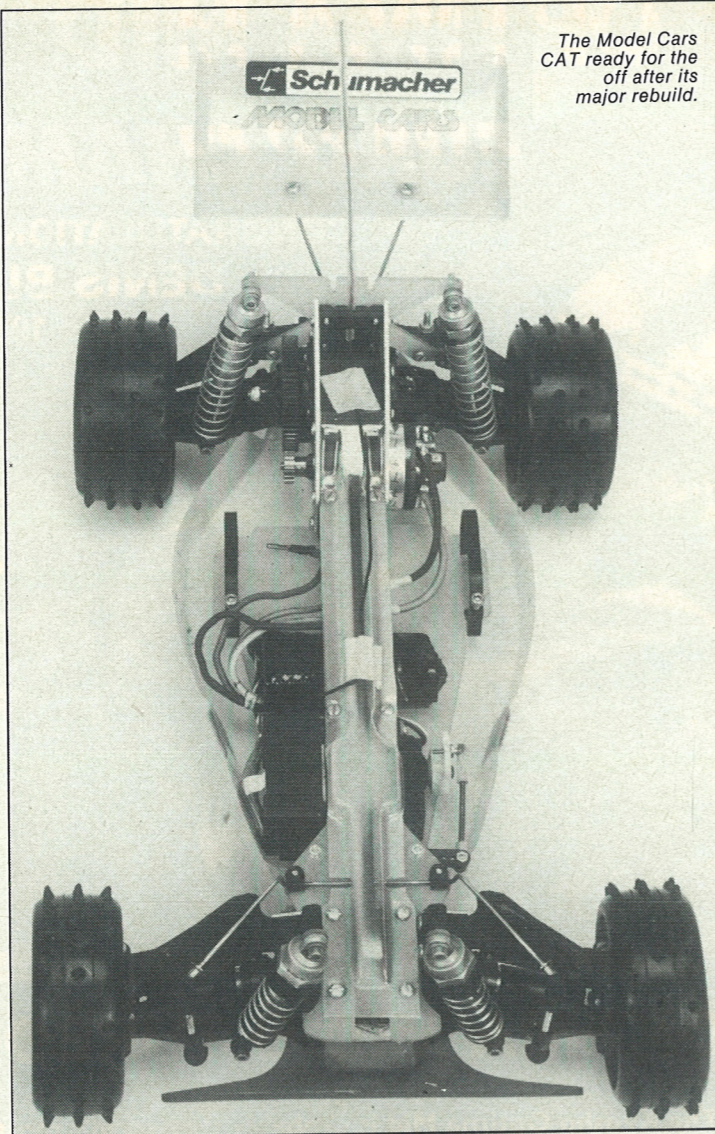


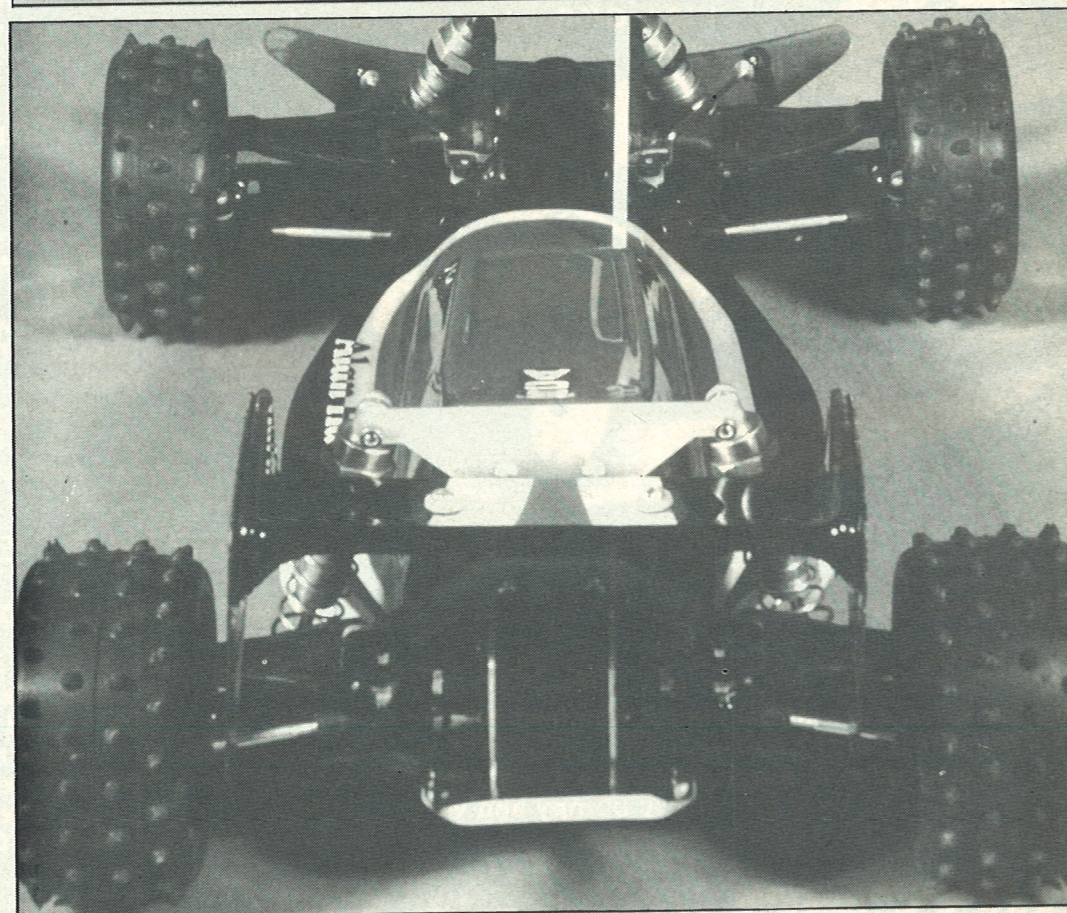
CAT UPDATE



The Model Cars CAT ready for the off after its major rebuild.

One year on and RCMC's CAT gets the Winton rebuild treatment

Without the pressure of a deadline for the monthly Circuit Racing 1/12th column, time has been taken in actually reading RCMC every month from cover to cover. Surprisingly, 1/10th coverage can be as bad as everyone says it is, I just never noticed before! Which is the same problem besetting RCMC's 'CAT', now almost one year old. After the initial review as a 'CAT XL', it underwent a successful campaign at the Chesham Buggy Club (2 wins, 1 FTD, three other top five finishes) and then retired whilst first the MIP, and then the PB 'Maxima', were taken on as projects. Revived for the 1988 Chesham and National races (and courting fame in the *Red Baron Models* advertisement) the car seemed OK, but was in fact sorely in need of maintenance - I just never noticed!



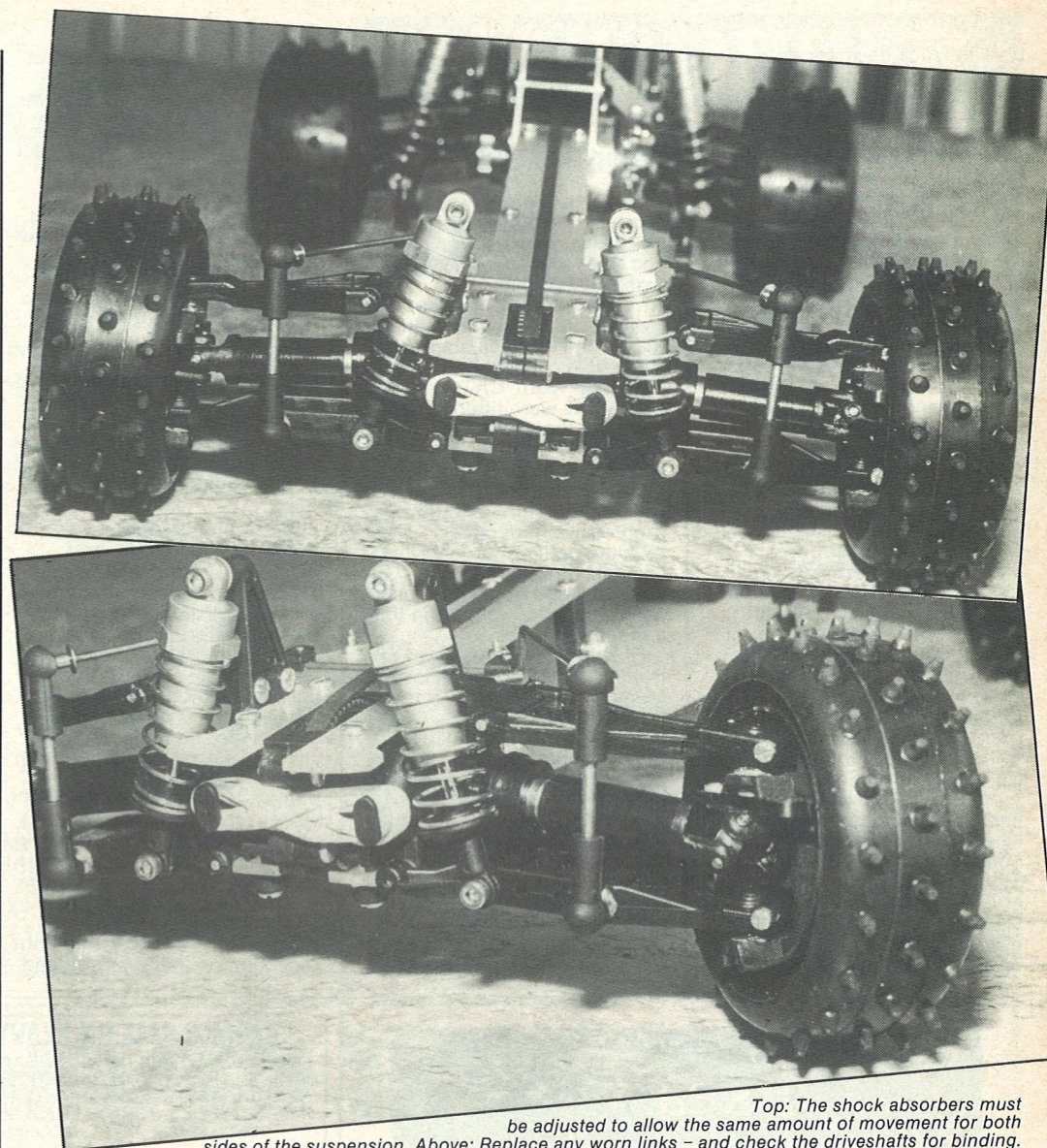
Notchy action

The first clue was a notchy action from the rear gearbox - ignored. Then a propensity for damper oil to escape and lubricate everything in sight followed by the most horrendous noise from the front diff which made Hammer Horror sound like a muted yelp. It was the front diff noise which finally had the 'CAT' in pieces. Armed with an Integrator and differential repair kit, and a damper overhaul kit, the car was dismantled. There turned out to be nothing wrong with either the front or rear differentials that a good clean and regreasing couldn't cure. Since they are cheap, I replaced the $\frac{1}{8}$ in. \times $\frac{5}{16}$ in. thrust races complete at both ends - being small and exposed to the elements they take quite a beating. The 3mm balls at both ends were also replaced. All the thrust washers were in good condition and remained securely fixed to their carriers, so these were not replaced. With the gearboxes removed, all the internal bearings were checked and found in good condition. With a careful wipe to remove dust from the shields these were replaced. The external bearings in the four wheel hubs were not a pretty sight - one partially siezed. Using a sharp pointed scalpel, the light brown shield was removed from each bearing followed by a careful wash in lighter fuel. Once blown dry each was rotated to check for notch free movement, and then given one or two drops of 3 in 1 oil.

There is a delicate trade off between too little oil and too much. Excess oil attracts dirt which can wear bearings, too little allows bearings to wear themselves out. Two drops of 3 in 1 on the bearing balls prior to replacing the seal seems to work best, wipe excess oil from the shield outers before assembly.

Front gearbox

The front gearbox was reassembled and proved back to its normal smooth self. Upon reassembly the 'CAT' was fitted with the latest wide front suspension kit giving maximum width and 15 degree rake to the front suspension. This replaced the original DIY job features some time ago in RCMC. The new kit from Schumacher is easy to fit and very well made. A careful check was made on the on-way roller clutch drive shafts. The steel rod glued to the inner shaft can come adrift (I've lost one to date) and although it appears to be OK it in fact slips under hard acceleration causing the car to pull to one side under acceleration. Grip the steel shaft in soft faced vice jaws and turn the UJ with



Top: The shock absorbers must be adjusted to allow the same amount of movement for both sides of the suspension. Above: Replace any worn links - and check the driveshafts for binding.

reasonable force. If the UJ starts to give under the pressure you are OK, if the drive shaft turns then remove the steel rod, clean and reglue into the drive shaft with epoxy resin. This is an easy test, it will either turn or it won't, there is no in between. Having reassembled the front end, attention turns to the rear.

I decided to fit one of the new drum differentials sold by MMS so this avoided any problems resetting the Integrator. With all bearings cleaned and reassembled, the twin short drive belts were tensioned in accordance with the instructions. These short belts may fray slightly at the edges but this can be ignored. Check carefully for wear on the belt teeth and if in doubt replace them. After tensioning the short belts replace the gearbox cover and reassemble the rear suspension. Using the 'CAT' instructions, set the long belt tension and the Integrator.

Leaky dampers are not an uncommon occurrence, even on full size cars. However, the repair kit contained somewhat different parts from my originals and sent me scurrying

to the latest instruction manual recently sent from Schumacher. Basically, the original 'lip seal' design has been superseded by a more conventional 'twin O ring' design as used by Associated and Kyosho. Once the assembly of one damper has been completed, the rest are easy, but I do feel that a note to this effect should be included in the repair kit packet since the position of the large black 'O' ring is not obvious without some guidance. The new design is fully interchangeable with the old damper bodies so no problems here.

Get damped

The key to good reliable damping is polished piston rods. After extended use such as this, piston rods become scratched by dirt trapped next to the 'O' ring seals and this contributes to 'O' ring wear and leakage. Once removed from the damper, polish the piston rods to a high surface finish with Brasso or T-Cut. The piston rods should feel smooth and glossy like car

paintwork. Always change the 'O' ring in the cap as well, and remember to replace any spacing washers below the piston on reassembly. Refill with your usual damper oil, fit springs, etc., and replace on the car.

After all that work - and there is a good three to four hours' worth in that little lot - I was very pleased to find that the car felt much better. Gearbox action was smoother, the front differential was quieter than a church mouse, and the damping action is noticeably smoother and more progressive. Again using the 'CAT' instructions, the front differential and Integrator settings were checked with the car in race trim. The major surprise came on the track, where the car was improved in the handling department, especially riding the bumps. I would never have thought that such simple work, largely on the dampers, could derive such improvement. I'm not saying the car is now a whole lot better than before, but it is improved.

After the rebuild it was off to the delightful Chesham '88 circuit at Great Missenden,

Bucks. Track designer Pete Ringsell had laid out a nice testing little number featuring an 'off-camber' S bend after the straight, a superb concrete hump, and a cheeky chicane before the straight. In between were the normal Chesham swoops and turns. This was in marked contrast to the flat-out speed circuit of the previous month, and confirms Chesham as one of the UK's premiere venues.

The day racing was marred by short, sharp showers, but the 'CAT' was a delight in the testing conditions. Quite a few 'CAT' runners asked about my set-up since they were experiencing problems. RCMC's car is an 'XL' fitted with front ball differential one-way front drive shafts, wide front and kit and front anti-roll bar (outermost hole in the bottom wishbone). Damper oil is 30wt Syntek equivalent, and the bottom damper mount is in the second hole out from the inner pivot. At the rear we differ from the latest 'CAT XLS'. A normal narrow type rear suspension is used (that is without the spacers) and the car is fitted with *SRM Racing* wide offset alloy wheels on *SRM Racing* adaptors. rear wheels are set parallel with no bump steer, and the dampers are mounted on the farthest hole out in the wishbone. Damper oil was again Syntek 30wt equivalent. Springs all round were the latest standard

kit as supplied since March 1987.

Round the bend

Tyres are normally 'CAT' synthetic hard spikes all round, but at this meeting long grass and thick mud were giving very high grip. In these circumstances it is useless trying to adjust suspension, there is no way adjustments can stop a car rolling over in the turns! Worn 'CAT' rubber soft spikes were fitted to the rear, and the outside row of a worn set of front 'CAT' soft spikes were cut off and then fitted. The car handled well with just the right amount of progressive understeer building up if corner entry or exit speeds were too high, correct speed and approach being rewarded with good lines and fast lap times.

Ride height on Off-Road cars is important. Due to the long grass it was raised to 25mm front and rear, normally one aims for 22mm. Don't laugh, in the range between 20-25mm there can be useful differences in handling which are worth exploiting. The usual effective spring spacers were used to set the correct height. Check the height by dropping the fully laden car from 12 inches or so onto a flat surface. Place a block under each end 25mm thick and ensure it clears the

undertray (not the bumper) at front and rear. Checking the car on a bumpy surface, or the grass, is useless - use a nice flat pit table.

Hold it down

Rear wings are also a useful way of adjusting handling. Low grip surfaces demand a large wing (*PB* 'Maxima' or *Parma* 'Frog' wings are best) mounted up high - level with the top of the rear shock mount. For grass tracks use the standard 'CAT' wing mounted lower, and with some large end plates made of scrap Lexan. The end plates contribute to stability in a straight line by preventing the air spilling off the edges of the wing.

MS drum differential was used and liked. In general RCMC's 'CAT' handles best if the front suspension is slightly over damped, and the rear is set minimally underdamped. Although most of my racing is on grass tracks, I have found the use of softer rear springs (*Mini-Mustang* not *Maxima*) gives better traction on dusty circuits, but the car can bottom out if the dusty track is very bumpy. Varying forms of 'CAT' spikes (cut, worn, hard or soft) usually cope with any surface - a set of new mini-spikes are awaiting tests.

Before we sum up, let's be clear that the need to do this maintenance work is not a poor reflection on the 'CAT', indeed

it is testament to the quality of manufacture and materials in the car that it has performed so well up to now. It cost about £12 to buy the diff repair and damper overhaul kits which on my calculations works out at under 80p per meeting - and I didn't need the thrust washers supplied! I also replaced the nickel plated brass balls in the wheel hubs (where the steering and suspension arms connect) with hardened steel versions from *SRM Racing*. These were but well worth the investment required to buy them.

The *Schumacher* 'CAT XLS' is still the car to beat, and my 'long term test' suggests it will go on giving good performance providing attention is paid to maintenance of bearings, gearboxes, and dampers. It pays to clean wheel bearings after every meetin, and to strip gearboxes for a check and clean every eight or ten meetings. If conditions are dusty, and 1988 is shaping to be a dusty dry summer, then this should be reduced to every three or four meetings. Certainly an untoward noises or notchiness from either front or rear gearboxes should prompt an immediate strip down to clean and check thrust washers, thrust races, and bearings. Don't leave things alone because you are too busy to notice. Spend a little money every month to look after the car and it will look after you.