



Second Time G-round

September '86

The front engined car is uniquely suitable for ground effect in that the entire under-chassis area can be used as one long undisturbed venturi. Flat bottom technology now teaches how to cope with small ground clearances.

Our first ground effect car, the Mk 23 was not an unqualified success, but the reasons were secondary, rather than in the concept itself.

22" rear tyres were needed to raise the axle line. These are now recognised as good in themselves but the shock loads on transmission goes up 21% and at the time, the safety margin proved too small for the week-end racer.

Most of the problem was in keeping axles straight, so the first step was to develop a sophisticated method of checking. Of the 70+ axles we have looked at, all have been bent. With the B.M.C. axle in particular, straightening is not the complete answer in itself as they can bend again in use. This brings us to toe control.

On the old axle, 250 lb ft of toe torque caused $3/8$ " toe change or $3/4$ " between drive and braking. By using twin bearing hubs and a reinforced axle, this is cut by 75%. The reinforcing keeps the straightened axle from bending again and the improved toe control contributes a significant performance gain.

For class 'A', axles are now mostly 'Full Ford'. The casing is a larger diameter but thinner and hence stiffer without being much heavier. Ford C.W. & P. seem pretty bomb-proof and forged star wheels are now readily available. With reasonable care, axle reliability is no longer a problem.

Another weakness of the Mk 23 was sideways location of the rear axle. The Bulldog system was used in the interest of keeping the mechanism above the venturi, but the roll centre was some 7" above ground. The Stage Coach formula tells us that for every inch of one wheel bump, the whole axle moves sideways by $\frac{R}{T}$ when R is the Roll centre and T is the Track. If T is 49" then the movement is 1/7" per inch. Colour it twitchy.

With the current Mumford system, the R.C. is $1\frac{3}{4}$ " so the effect is reduced by 75%. For 1987 we will be using a phase 2 version which gives the same R.C. but is wholly above the venturi.

To contain nose dip under braking, the Mk 23 used 550 lb springs. Colour this skittish. We can now achieve the same effect with 350 lb by using progressive rate bump rubbers and the Mk 27SG has provision for adjustable anti-dive.

T.A.M. of course, already gives outstandingly efficient rear anti-squat and braking anti-lift.

In the hands of the Works, the Mk 23 was outstandingly successful with five wins from five starts and a Thruxton lap record which still stands five years

later and at the time would have made the third row of the full ground effect F.3 grid.

John Fyda persevered with the concept and his Mk 24 was all but unbeaten. For the reasons given however, combined with the necessary skirt maintenance, the arrangement was not popular with customers.

The long tail 'Seemed like a good idea at the time', but there was a weight penalty and the wing mounted above the body lost some efficiency. On the Mk 27 SG thanks to the Mumford, the up-sweep starts earlier and the tail remains at Mk 27 length.

To test the system, Allen Elphic's Mk 26 has been fitted with a full length undertray and the tail upswept to 27SG shape but the phase one Mumford required a slot to clear.

Results were most encouraging. Wing setting turned out to be about as low as we have seen, some 4° less than previously and straight line performance was good. This was no doubt, partly due to the low wing, but the undertray itself should reduce drag. Alternatively, of course, if the old wing setting was combined with greater frontal downforce, the drag would remain as previously but cornering power would improve.

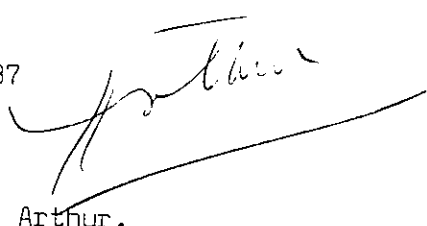
All very exciting at this stage of development and without skirts. There must be a lot more to come.

For Class 'A' our up-rated ventilated disc brake conversion has been proved by Vernon Davies and is now in stock. The improved heat capacity allows the use of intermediate pads without ducts.

Getting the body-work right has been a struggle but a much improved bonnet is the last phase and is due in any day now.

Already one 27SG chassis has been delivered and the second is well on the way. Please form an orderly queue!

Best of luck for 1987



Arthur.