

# Slipping and Sliding ...

## Chas McGurk tells all about Cooper handling

In *Loose Fillings 45*, Tony Caldersmith gave us an excellent analysis of early Cooper suspension. The following lighthearted notes are based on recent opportunities to sample each of the three basic variations of these fine little cars on the race track.

So to recap ... early cars up to and including Mk5s of 1951 use a channel section chassis (like an MGTC). Mk6s and 7s have a chassis made of straight 1.5in tubing, while Mk8 and later use curved tubing which breaks all the engineering rules but looks good ... these are the 3 groups.

However, apart from these differences, the other basic dimensions and specifications do not vary a great deal. They all use the same 15in wheels, the same twin-leading Lockheed brakes front and rear, a motorcycle gearbox, and have a similar track and wheelbase.

Having said that, how different are they to drive? Strangely not a lot! The reason being is that, as we have noted, the above basic specifications of all these models vary very little ... although the later cars are certainly lighter and lower. However, on the track all models feel pretty much the same.

A Cooper's a Cooper! There are subtle differences of course from model to model. For instance the early cars used a Norton gearbox called a 'dolls-head' which dated back to the 1930s. Its positive stop mechanism (today we would say sequential gearchange), wasn't always positive, whereas the later AMC boxes in the Mk9s or later are robust and foolproof.

Most cars used the same Cooper-made rack and pinion. Mk9s and on [optionally] used a single disc brake at the rear, which wasn't a good idea because the self-energising characteristics of the two systems are not compatible. The TRUTH is that the essential difference in Cooper handling and performance is determined entirely by the

size of the engine i.e. whether it's a 500cc, or a full blown 1100!

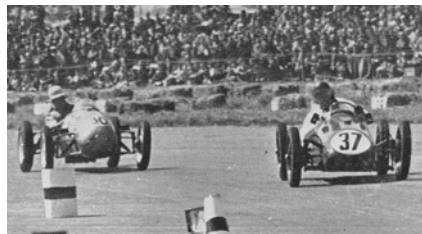
That's when Dr. Jekyll becomes Mr. Hyde! In 500cc. Dr. Jekyll form, a Cooper is a delight to drive. In three words ... it's 'fun without fear'! With wide-ratio gearing the car accelerates briskly up to about 90mph before the available 40bhp is exhausted. But by then you forget your fingers are numb and your mirrors useless. You play tunes on the single pipe as you go up and down the sequential motor-cycle gearbox. You suddenly become the last of the late brakere! And you happily understeer the little car into corners with all four wheels waving wildly. With a solid rear axle, and limited power available to break the rear wheels free, understeering becomes the big problem. On long fast curves with no diff, you can feel the revs drop and the exhaust note go hard as the motor works to compensate! Your lap times aren't red hot, but who cares that you're lapping 10 seconds slower than everyone else. All that matters is that you're having fun!

HOWEVER ... this half-litre Dr Jekyll can be changed into a hideous Mr Hyde at the drop of a motor. Pop in a big 1100 JAP or Vincent V-twin, and suddenly a Cooper is a different beast! A 14:1 compression ratio beast that's impossible to start unless

We only have these grainy magazine extracts to illustrate McGurk's points but they do it quite well. Top: Stirling Moss (Cooper, understeering) who just couldn't take Frank Aikens (lota, oversteering) at Silverstone May 1950.

Centre: Moss again, maybe oversteering, this time in his Keift, drives right round the outside of understeering Eric Brandon.

Bottom: Ken Wharton at Shelsley Walsh in August 1950. He is flying 'blind' between high banks drifting under perfect control.



it's back on compression on the right stroke. An 80bhp methanol-burning beast that spins its wheels for twenty feet in a 13sec standing quarter mile, with a top whack well over 100mph. A rocket ship that shakes and shivers on take-off!

If that sounds exaggerated I apologize ... but crouching in a tiny cockpit with the rev counter creeping up to 6000, and the whole world out of focus - that's what it feels like! A big Cooper on song REALLY does cook-with-gas! So now is probably a good time to confess. Of all the racing cars I've driven.... a big Cooper is the most exciting!

By a long way. No question! However we have to acknowledge that cornering fast in a Cooper is, well, different.

Not that you can't go round corners fast. It's just that you have to work harder at it, because the Cooper's wheels assume some very weird angles relative to the vertical. Weird enough to make small children point excitedly, and for race commentators to say some rude things.

Tony Caldersmith clearly explained to us why this is so. It's simply because the traditional suspension Cooper set up offers insufficient roll resistance, which results in EXCESS BODY ROLL with consequent positive wheel-camber change.

The transverse top-leaf spring front and rear with bottom wishbones is certainly a good idea. It's simple, and robust. It's instant independent suspension. But when the body rolls the wheels lean the wrong way! Photos abound of anxious Cooper drivers cornering with body and wheels pointing and leaning in different directions! All of them wrong!

Positive camber is BAD. It's negative camber we want. Just observe the negative camber

on the front wheels of modern racing cars, particularly F1 and V8s, and compare them with the 'wheels at all angles' of a typical cornering Cooper.

In an early effort to address this problem of body roll (and camber change), Coopers simply added more leaves to the springs, which was only partially successful. For instance a Mk5 Cooper rear spring has 7 LEAVES!... enough for a truck! And even Mk5s look like they are falling over on corners.

It wasn't until the Mk8 that Coopers

realized the easy way to increase roll resistance was to widen the clamping points for the springs. This effectively reduced the working length of the springs from 16in to 12in rear and 10in front. Shortening the spring's working length made it stiffer, and significantly reduced body roll on turns. And fitting the famous 'curly leaf' between the clamping points cleverly added even more roll resistance. But despite the above 'improvement' in spring location, even late model Coopers still assume some very weird wheel angles on high speed corners.

This seems to be more apparent to the observer than the driver. Alighting from his car the Cooper driver often has to deal with ribald and unkind remarks about his valuable historic racing car which he would rather not hear. The strange thing is that the driver, if tightly strapped in, is largely unaware of these spectacular body and wheel angle changes, and is later quite surprised to see positive photographic evidence that his life is frequently in danger!

So in summary ... All Coopers are fun to drive! The bigger the engine, the more the fun. All Coopers with live rear axles understeer ... particularly in the wet.

A Cooper with a ZF limited slip diff laps quicker in the wet than one with no diff. If you spin with no diff, get off the throttle, let go the steering and you'll snap back straight. If you spin with a diff, you'll keep spinning.

Other wise there's not much in it ... and the Final Word = Coopers are fun!

*Chas McGurk.*

Below: A lovely crisp Steve Oom photo of Garry Simkin with his Mk4 Cooper Vincent's suspension under load at Eastern Creek recently.



## CLASSIFIEDS

For Sale. "The World's First Pulse Jet Car", Cooper Mk5-12-5 currently in F3 500 specs with a four-stud JAP and AMC Norton gearbox and has been refreshed and repainted. The SNECMA pulse jet engine and all its ancillary equipment will go with the car with a huge scrap book and history file. Expressions of interest invited, [garmey@xtra.co.nz](mailto:garmey@xtra.co.nz)

For Sale. BB Ariel. Well known air-cooled car built by Brian Schlireck in 1958 and raced at Amaroo, Oran Park, Catalina, Silverdale and Bathurst hillclimbs, Calder and Hume Weir. Car is complete, with spare engine. Has CAMS logbook. Ideal for Lb racing or GEAR events. Chris Tracey 0418 441 314.

For Sale. Aussie air-cooled project built in late 1940's by Eddie Thomas, but with no race history. Originally fitted with JAP 500, then at some stage modified to fit a Vincent V-twin, both sadly gone. Essentially a rolling chassis with some panels, fuel tank, BSA M20 gearbox, engine plates. Open to offers, may consider swap for motorcycle or parts. Email for pics Alan 0413 031 075 or 02 9627 3290, [harper6t@aol.com](mailto:harper6t@aol.com)

## NZ BITS & PIECES

A New Zealand-built air-cooled special has re-appeared after many years. The Satellite 500 built in Gisborne in the late 50s or early 60s was advertised on the on-line auction site "Trade Me" and has been bought by the son of a previous owner, Karl Rolfe. Originally the car ran an Ariel Square 4 engine but had been converted to a Triumph 650 twin sometime during its life. Karl would like to restore the car with an Ariel and just happens to have a spare engine for the Square 4 motorcycle which was also his father's.

## THE LOG

Graeme Brayshaw, Cooper-Norton Mk8, ran at the Waitemata branch Vintage Car Club Chelsea Hillclimb on 3 November and was beaten only by a de Havilland Tiger Moth-powered Riley (very) Special. (Another air-cooled?)

Graeme Brayshaw, Cooper-Norton Mk8, at a combined Historic Racing and Sports Car Club/Vintage Car Club race meeting at Taupo on Saturday, 30 November. Graeme won against a 4.5 litre V12 Lagonda - 1 cylinder beats 12 !

Derry Greeneklee ran his Mk5 Cooper JAP 1100 in the Tailm Bend (S.A.) sprints and recorded 14.12 seconds for the standing ¼ mile.

Andrew Halliday (Cooper Norton Mk5 ) and Garry Simkin (Cooper Vincent Mk4) competed at Eastern Creek, or Sydney Motorsport Park if you prefer the rebranding, on November 23-24.

The Geelong Sprints of December 1 saw Brian Simpson and son Keith compete with Penrite cars, Brian in the Mk9 Cooper Norton and Keith in the Mk5 Cooper JAP 1100.

## EWING SPECIAL UPDATE

The Ewing Norton Special was built by Ron Ewing, a railway engineer, in Sydney in the mid-1950s. Ron was an active Singer Car Club member who loved Buick straight eight motors. He had worked on various race cars using these motors. Around this time he also owned the Cooper Mk5 now owned by the Halliday family from Sydney.

The 500cc formula appealed to Ron and he decided to build his own car. A Norton International motor was used in a round tube frame. The front suspension featured a transverse leaf spring with lower wishbones and Renault Dauphine uprights and stub axles. Rear suspension was by swing arms, rubber springing and fabricated uprights. Renault 15in wheels were used and the same model supplied the front drum brakes. Rear braking was effected by a single central disc and XK120 Jaguar callipers.

The gearbox was an upright Norton. A steel nose was fabricated using mudguards from a pre-war car of uncertain make. The cockpit sides were steel fuel tanks and louvered aluminium panels, depending on whether the car was being used for circuit racing or shorter hillclimbs. At the rear a fibreglass engine cover completed the car.

Ron first competed with the car at Mt Druitt in July 1957. After this the car regularly ran at various venues in NSW over the next 5 years or so. These including Foley's Hill, Silverdale hillclimb, Castlereagh sprints, Catalina and Warwick

Farm. During this time the Ewing was continually being modified. The rear suspension was changed to utilise bottom wishbones and a transverse leaf spring.

It wasn't long before the car was no longer a 500. A V-twin motor, similar to those built by Sid Ward for speedway racing, was built for the car using a Harley Davidson crankcase, custom-made barrels and Norton ES2 heads. Later on the car ran at Catalina with a Vincent. In the mid-sixties Ron started modifying the chassis to take a Skoda motor and VW gearbox, however he lost interest and took up sailing instead!

After 20 years in Ron's garage in Sydney the car found its way to Melbourne where it was rebuilt by Malcolm Thorne with a Norton ES2 OHV 500cc single. Subsequently the Harley Norton was rebuilt and the car ran with this until a major blow-up wrecked the motor. In this period the Ewing Norton Special competed around Victoria winning the Aircooled Cup and also featuring on the front page of *Auto Action* performing a spectacular barrel roll.

After the Norton Harley blew up the ES2 motor was re-installed. I bought the car, and many parts, after it had been sitting in Malcolm's shed for 16 years. After establishing the Ewing's history, and obtaining a CAMS CoD, I stripped the car completely, finding that every component needed rebuilding. This work was carried out over an extended period during which other interests took more and more of my time. Like Ron Ewing before me I eventually realised my enthusiasm was with these other interests. I very much enjoyed learning about this unique example of Aussie engineering ingenuity. The work I carried out on the car gave me considerable satisfaction. Over time though I could see I was never going to get the car running again.

During my ownership I had maintained contact with John Ewing, Ron's son. John had helped his father build and race the car initially. I approached John, and his son Peter, to see if they were interested in taking the car over. The short story is that the Ewing Norton Special has now returned to the Ewing Family who have many memories of its early life.

Bob Morey



## SOUTH AUSTRALIAN SPECIAL

In the late 1950s Adelaide race car builder Garrie Cooper competed in an Austin 7 with an Austin A30 engine at Collingrove hillclimb and sprints. Realising the limitations of this set-up he set about building a space-frame loosely based around a Cooper configuration, albeit wider to accept the A30 engine mounted transverse in the rear. This was to be chain driven to the rear axle, but Garrie moved on to building a Streamliner sportscar and this project was shelved.

The completed chassis with rear sprocket housing and uprights was purchased by Nick Davies who took it home and built the car up by making his own axles, steering rack, wheels and many other components. The front wheels used BSA hubs laced into Fiat 500 rims and Ford brakes. The rears were also BSA hubs laced into 13 inch car rims.

He fitted a BSA Road Rocket engine which was light and fast. Nick ran the car at a few sprints and hillclimbs then sold it to Ron Guppy who had John Webb at Elfins make an aluminium front body section. Ron also did sprints and ran at Collingrove hillclimb where he won *The Advertiser* trophy with fastest time of day. He also ran at the first Mallala race meeting but broke an aluminium con-rod in the methanol fueled engine.



Above: the BSA Special on the hill at Collingrove.  
Below: the Ewing Special on a hillclimb startline.

## LOOSE FILLINGS

*Loose Fillings* is published digitally and in print about 3 times year. Please send a book of 60c Australian stamps to receive printed issues by post in Australia only or supply your email address. Recent issues can be found in pdf format at [www.hsrca.com](http://www.hsrca.com).

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