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## Other European: 1931 Riley Aero Special – Rapid Riley – 252

November 15th, 2011 by NZ Classic Car

Teilen 9



Ashley takes a look at a locally built aero-engined Riley.

What makes us build specials? Common sense tells us we can never make anything as good as a factory-produced machine - and there is a host of vehicles out there which the manufacturers' research suggests people want at a cost far less than that of a self-built one-off. But there is something else, something just as tangible. A special is a piece of mobile art, an expression of the constructor's ingenious mind and a tribute to his or her knowledge, skill and appreciation of, for want of a better word, 'rightness.'

In times past, the automotive industry included many outstanding individuals who produced some of the most exciting cars of all time - men such as Ettore Bugatti, Louis Delâge, Ferdinand Porsche and Colin Chapman. Modern production methods generally dumb down designs to cope with the lowest common denominator in order to make things easier for the driver - driving a GP Bugatti is not for beginners, but then, easy does not offer any rewards.

So, what was Robert McNair trying to achieve by building the special featured here?

### Top Priority - Exciting Looks

If you study those early sports and race cars which, by their nature, were at the cutting edge of technology during their era, they were low, had long bonnets to house powerful engines, were beautifully detailed and went like stink. They also exuded a sense of presence that, although sometimes hard to define, remains a dominant feature.

From an early age Rob was inspired by the 1928 Brooklands Riley, Type 59 Bugatti and the 1927 Grand Prix Delage, all of which have become his dream cars, and share subtle similarities with his Riley.

Rob began his project almost 10 years ago after purchasing the remains of a 1929 Riley 9, and using those dream cars as the source of his inspiration, he decided to lay out a



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Brooklands-style car. In 1929, the renowned British automotive company Thomson & Taylor (which, incidentally, was based at the famous Brooklands race circuit) did just this to produce what eventually became the production car.

But Rob knew that for him, the original Riley 1100cc, even with twin camshafts, wouldn't provide sufficient power. As a result, he acquired a 1500cc Riley engine and, with the motive power decided upon, he commenced work on chassis modifications. There is a photograph of a GP Delage on the wall of Rob's workshop - and his 'new' chassis started to look very much like that of the legendary French racer.



Then trouble started. His father, Wallace, built a Sunbeam Special using a First World War 12-litre V12 aero-engine - a car featured in the 2001 NZ Classic Car Yearbook. Rob drove this car many times and also became exposed to Anne Thomson's mighty 14-litre GP Darracq, also piloting that vehicle on a number of occasions.

The connection had been made. Rob, an aircraft engineer by trade, had spent many years restoring Warbird-type aircraft at Pioneer Aero Restorations. During the early stages of his Riley project, he also restored a Tiger Moth for himself. Once the Tiger Moth was back in the air, Rob found himself with a spare engine and it became fairly obvious that a 6.12-litre motor producing upwards of 97kW (130bhp) and weighing no more than a Riley 9 motor would offer pretty good performance when mounted into a lightweight chassis. Anyway, after experiencing the endless power and torque provided by a 12-litre V12 Sunbeam and a 14-litre Darracq, 1500cc was never going to be enough for Rob's project.



#### Aero Engine

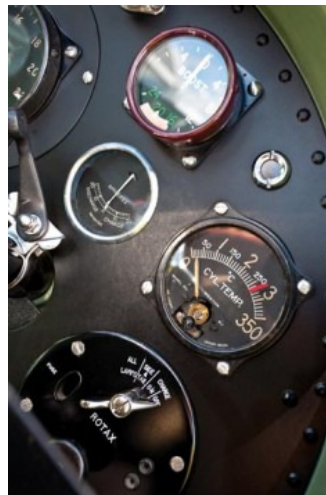
The engineering problems in fitting an aero engine to a road car are many. The torque produced requires chassis strengthening and torsional strength, and the operating rev range is about half, or less, than that provided by a more conventional car engine. That last factor means a rear axle ratio of about 2:1 or higher is required. Rob chose to use a 1.9:1 differential unit from a '20s truck that he fitted into the Riley's diff-housing. Trailing links and a triangular wishbone locate the axle as well as the flat, half-elliptic springs.

Instead of a 1.8-metre-diameter propeller, a flywheel had to be mounted and a clutch capable of transmitting the 407Nm was also required. The aero engine does not have a bell-housing, so a chassis cradle was made to mount the engine and an early Moss gearbox together so that they ran in line.

Standard engine cooling is usually simply via airflow, not a problem when cruising your Tiger Moth at 145kph. However, when mounted in a car, the engine has to remain cool even when stationary, so a ducted fan unit driven with a step-up ratio from the rear of the crankshaft and blowing around the cylinders in the normal way was fitted. One benefit of this arrangement is that it dispenses with a heavy radiator and its associated on-board water supply.

It was decided to convert the engine to a wet sump for reasons of practicality and space, while the normally inverted Gipsy engine was turned 'right' way up with the cylinders on top. These early Gipsy engines were mounted in this manner when fitted to Gipsy Moths, so inverting the engine did not present any problems.

Obviously, pull-starting via a propeller is no longer an option so a small (dare we admit, Japanese) starter was mounted on the engine frame. The exhaust system, now coming out of the top of the engine (underneath on the Tiger Moth) did have its challenges though. Rob cleverly fabricated the bonnet around the exhaust, which made an interesting, yet practical feature which is attached by an externally riveted De Havilland hinge, a feature used in early De Havilland and Gipsy Moth aircraft. Removing the cowl is a simple task of removing the hinge pin.



Styling and proportion was also a very important factor in this project, and Rob was definitely influenced by the beautiful lines of the Type 59 Bugatti, on which the body panels are riveted together along an upstanding spine running down the body's centreline. It is not an easy way of creating a body skin because the slightest imperfection becomes obvious, but it is a styling feature which appealed to him.

Rob believes that with many small cars you appear to sit on them rather than in them, so he made sure that when seated in the Riley both driver and passenger could see directly through the aero screens, and the green interior colour scheme, mixed together with Riley, Tiger Moth and other period aero instrumentation adds to the feeling of actually being inside the cockpit of an early British aircraft.

#### Art Meets Function

As with many vintage/veteran-type vehicles, understanding its constituent parts helps prepare you for the experience offered by such cars. Each has its own peculiarities and idiosyncrasies and the Riley is no exception, according to Rob. A 'pre-flight' walk around is always important, and the calibrated wooden stick used as a fuel gauge gives an accurate indication of how much fuel is still in the tank.

The car has no doors so you climb in and down, passenger first from the driver's side which has a lower cut out in the body side, followed by the pilot. You sit very low, protected from the wind by the small aero screen. Starting requires pressurising the fuel tank with a hand pump in the dash up to



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about two psi. Switch the right magneto on, which has the impulse coupling with a retard mechanism, retard the spark on the lever protruding from the dash and press the Rotax starter button. Instant action - switch on left magneto, check oil pressure and allow the engine to warm up.

Now fitted with a two-inch SU carburettor instead of its original fixed jet aviation type, the engine idles smoothly and freely throughout its range. Aviation carburettors are normally effective at maximum power settings, while a car requires more mid-range control.

Moving off in first gear and accelerating hard in second and third is almost shattering if you are used to slow, older cars. Getting into top gear at 1400rpm marks the legal limit, with the engine begging for more up to its normal operating range of 2100rpm - that's equivalent to 160kph. Dyno testing shows that Rob's car is producing 97kW at the wheels at this speed, with brief bursts up to 2400rpm being permissible.

Braking is excellent, the Riley cable-operated brakes with Bugatti-type equalisers proving to be even and effective.

The most obvious aspect of any aero-engined car is the torque, which is available at any speed - delivery being both effortless and seemingly endless. The low operating rpm of the engine lulls one into a false sense of speed and you can find corners approaching much quicker than they should. You do have to have your wits about you. It is not for the faint of heart.

Modern traffic is a depressing side of the enjoyment of motoring. Grim-faced drivers, frustrated and delayed, stop go, stop go, intent on their destination are the antithesis of what motoring used to be.

Taking the Gipsy-engined Riley for a drive on a nearly deserted country road provides for an instant trip down memory lane, and is guaranteed to put a grin back on your face - in your heart you are young and exhilarated all over again, and this is an adrenaline-spiked cure for all the ills of modern motoring. Why more people don't take the 'cure' is a mystery to those few who do.



## 1931 Riley Aero Special – Specifications

**Engine:** Four-cylinder, 6.12-litre Gipsy Major ex-Tiger Moth. Solid-mounted, upside down and facing rearwards

**Fuel system:** 51mm SU carburettor. Custom high compression (6.5:1) pistons and dual magneto ignition

**Power:** 97kW (130bhp) at 2100rpm (at rear wheels)

**Cooling:** Air-cooled with period early 911 Porsche fan unit

**Transmission:** Modified Mkl Jaguar Moss gearbox, RH gear change, Mkl Jaguar flywheel and clutch

**Rear axle:** Riley 9 fitted with 1.9:1 crown wheel and pinion ex-1921 International truck

**Front axle and steering:** Standard Riley 9 fettled and polished, fitted with anti-braking torque cables top and bottom of the king pins

**Brakes:** Standard Riley 9 cable-operated with external chains and sprocket compensation (similar to GP Bugatti and Delage)

**Shock absorbers:** Hartford, standard Riley 9

**Lamps:** Original Riley 9 Rotax, 229mm

**Chassis:** 1931 Riley 9 Monaco modified to run under the rear axle (similar to the GP Delage and Brooklands Riley) and fitted with six tubular cross members

**Wheels:** 19-inch Riley 9 with 500x19 tyres

**Body:** Constructed from 16G aluminium riveted to bulkheads built in two halves and riveted together down the central spine, inspired by the T59 Bugatti

**Interior:** Dark green leather as originally used in Tiger Moths, beautifully crafted by Bernie Beckett



### Dimensions:

Wheelbase: 2590mm

Height: 940mm (to top of scuttle)

Overall length: 3750mm

Track F/R: 1168/ 1219mm

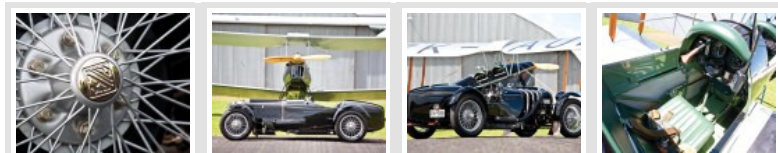
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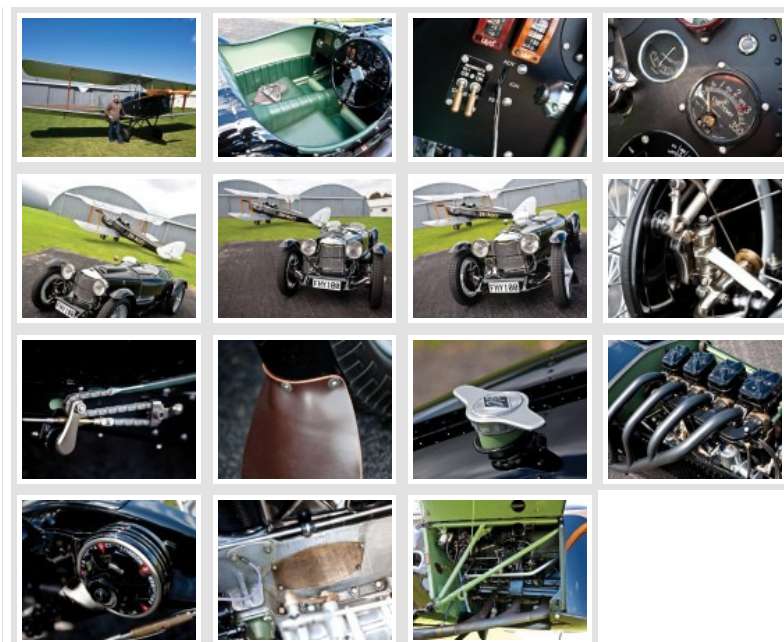
100kph at 1400rpm

160kph at 2100rpm

Max rpm 2500

**Words:** Wallace McNair and Ashley Webb, **Photos:** Adam Croy





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