

Where Eagles Dare



How do you go about building an exact replica of a factory MV Agusta race bike that last sat on the grid 45 years ago when you don't have any drawings, measurements, or assistance from the factory that originally built the bike? With great difficulty, as Mark Kay of Black Eagle Racing explains.



Mark Kay can trace his fascination with MV Agustas back to the late 1970s. As team manager, machinist and engine mechanic for the Black Eagle Racing team and director of Meccanica Verghera Ltd., there's nothing he doesn't know about the exotic Italian marque that made superstars of the likes of John Surtees, Mike Hailwood and Giacomo Agostini. He first began working on MV Agusta road bikes when he was seven and at 19 had machined his first engine. 'It's all down to my father, Dave, really' Kay explains. 'In 1977 the MV factory closed and dad had a 750 Monza road bike. After a few years he could no longer get parts for it, so when things broke he made his own replacements and it just built from there. Eventually we found ourselves repairing, restoring, and replacing parts for MV owners worldwide.'

Black Eagle Racing will line up on this year's Classic TT grid with eye-wateringly beautiful, and utterly authentic, MV Agusta replicas that are practically indistinguishable from the real thing. This year the team will field a 350cc triple, a 350cc-four, and two 500cc triples for their riders Dean Harrison and Lee Johnston. Both

riders have already won races on the bikes, with Johnston securing victory in the Okells Classic 350 TT in 2014 and Harrison deaning up in the Bennetts Classic 500cc TT last year. Johnston's win was the first on the Island for an MV Agusta since 1972 when Agostini took victory in the Senior in what was the factory's last ever appearance at the TT.

But how on earth do you replicate a classic factory racer down to the very last washer when you don't even have any drawings to go off? The story begins with another legendary Italian marque – Gilera – and an Italian collector who inspired the Kays to progress from making parts to building an entire bike. 'About 18 years ago an Italian gentleman brought us a 1957 Gilera in the back of his car – lying on its side with the wheels removed – and asked us to repair it and get it running, which we did. We



Left: 2014 Okells Classic 350 TT winner Lee Johnston at Kirk Michael. (Photo: Kevin Clague)
Top: Dean Harrison took the honours in the Bennetts Classic 500cc TT with Lee Johnston (above right) finishing third. (Photo: Pacemaker)
Above: Podium celebrations for Harrison and Johnston and a jubilant Black Eagle Racing celebrate the 2015 Bennetts Classic 500cc TT victory in pit lane. (Photos: Pacemaker)

then asked if we could keep hold of the bike for a while in order to replicate it because we wanted to race one and he agreed. Ultimately we built six of those bikes for private buyers.' The money raised from building Gilera replicas would prove crucial when it came to funding the MV Agusta project a few years later. 'About 12 years ago a German collector wanted some parts for his Gilera and mentioned that he had an ex-Agostini MV Agusta 500 triple from 1971/72' Kay says. 'Again we asked if we could replicate it and he agreed but we had to pay handsomely for the privilege and he told us we could only have the bike for three months. We were panicking because three months was not a long time and we'd never even been inside one of those bikes before. 'We stripped the bike and measured everything, drew everything, took the frame to

a frame-maker and said "Copy that", and took the tank to a tank-maker and said "copy that" so we had the basics for when the original bike went back to Germany. We then got all the pattern equipment made for the engine, using the money we received as deposits for building the Gileras. The first bike took us about two-and-a-half years to build but now we could build one in about a year. 'Once we had the measurements for the 500 triple we could build the 500-4 and the 350 triple and 350 four-cylinder by reverse engineering. We knew what bore and stroke MV was using for each bike and that determines the length of the con rods and everything else so you just back-engineer it from there.' The Kays manufacture practically every component in-house, with the exception of the



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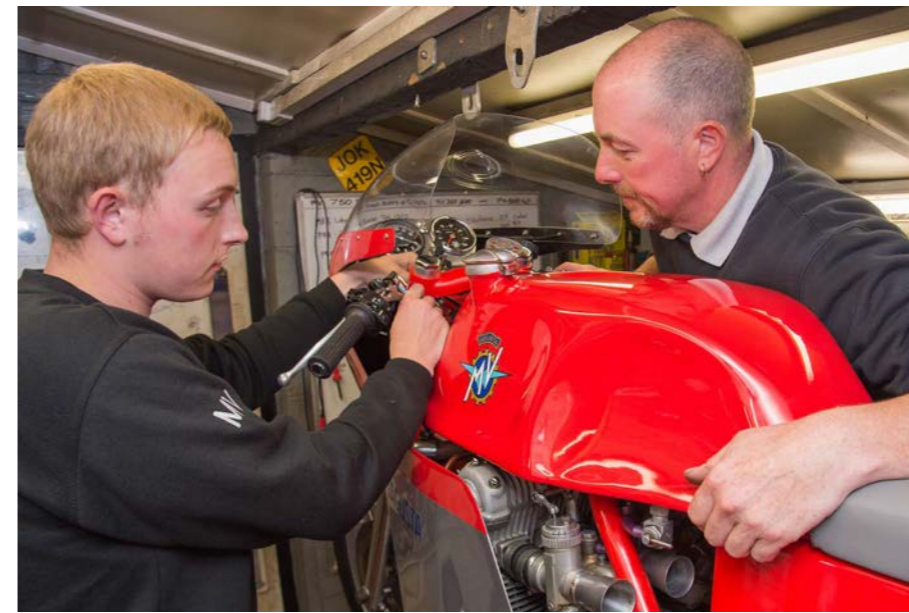
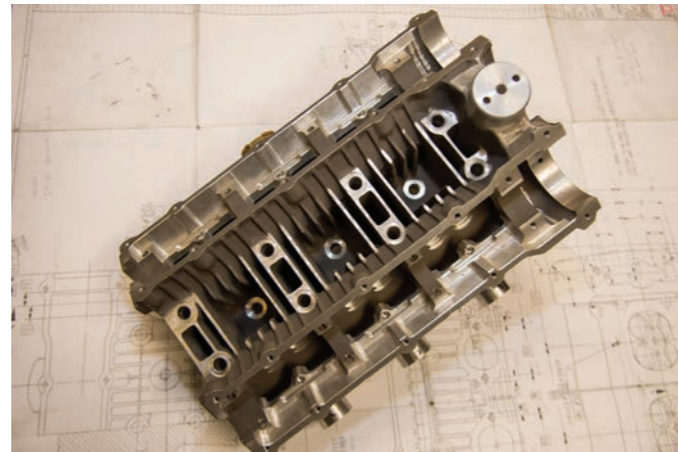
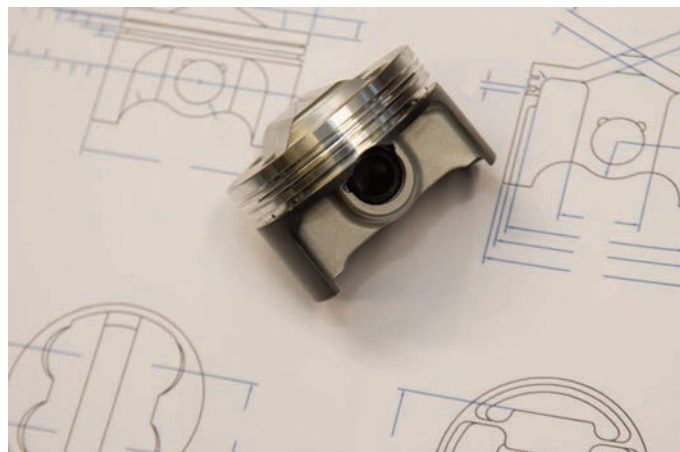
frame and fuel tank which are out-sourced, though still made in Britain. To give you some idea of the work involved, Kay points out that machining the crankcases alone takes four weeks – and that's working 10-12 hour days! But the end results are so accurate that any part from a Kay MV is interchangeable with any part on Ago's original bike.

All of this work is done under the umbrella of the Kay family business, Meccanica Verghera Ltd., which runs out of Brownhills, just north east

of Birmingham. It was set up by Mark's father Dave in 1983. Although he officially retired in 2005, Dave can still be found in the workshop every day, as can Dave's son Mitch who acts as development rider. The family team has built and sold four 500cc triples and one 350cc triple on top of their own race bikes which are run at an even higher spec than those customer machines.

As you'd expect, it's been no easy task. 'None of the drawings ever came out of the factory and when it closed things went missing' Kay says.

'Maybe the mechanics thought they'd get their pensions sorted early, I don't know! But whatever happened, the drawings have never surfaced so we had to do our own. It's not too hard now because we've been doing it for so long but the first build was a challenge because we had to reverse-engineer everything. We'd take a component, measure it, then work out what tolerances MV was using and work backwards like that. The most complicated thing was the cylinder head on the four-cylinder 500. I counted 522 components in the cylinder head alone! Every roller bearing, every nut, every washer – it's built like a Swiss watch, it's just phenomenal. Everything's crammed together. The clearances in the cam boxes are about 0.5mm before they start to touch. It's so tight but these were Grand Prix bikes, not road bikes that had been modified to race spec, so whatever the race team needed, the factory made it. So the four-cylinder 500 was the biggest challenge, no question.'



Because of this complexity, the four-cylinder is also the most expensive bike to build. While a 500cc triple will set you back around £115,000, a four-cylinder version will leave you with no change from £200,000. 'It's serious money, but it's just so complicated' Kay says. 'There's no two bearings the same inside the cam boxes – it's crazy. We've only built three of those so far – one for ourselves and two for collectors.'

It may seem surprising to those not in the know, but the 350cc triple actually costs more than the 500 triple, coming in at around £135,000. 'People think it's just a different bore and stroke but it's not' Kay explains. 'There's different timing tunnels, different timing tunnel castings, and the whole engine's totally different with a different crankcase so we had to have a couple of crankcases cast which means having more pattern equipment made, so it's all very expensive. The 350 was always a much more exotic bike and MV made far fewer of those than the 500 triples.'

The Kay MV's are so astonishingly accurate that there's only two differences between them and the originals. The first is that the valve seals have a small rubber seal fitted ('The factory didn't use rubber seals on top of the valve guides but we did that just to clean up the combustion side of things') and the other is the name on the side of the fuel tank. Since 2015, the bikes have sported a 'Kays MV Agusta' badge rather than the standard MV Agusta badge they had used previously – the result of a court ruling that resulted from an objection from current MV owners, Cagiva. 'They objected to our website name (www.mv-agusta.co.uk) when they started trading again, even though we'd been using that for 20 years. But the court found in our favour so we can still use it. We're also allowed to continue building the bikes as long as we put 'Kays MV Agusta' on the fuel tank and not 'MV Agusta.' But we're actually quite proud of that ruling now because it's our family name and it proves it's one of our bikes and not one of MV's own replicas which aren't as accurate.'

The six replicas Kay is referring to were produced by MV Agusta as an official product but he's unimpressed by their accuracy. 'They might look like the real thing from a distance but they don't stand up to closer scrutiny. The frames are totally different, the engine's wrong, they have the wrong carbs on – the whole demeanour of the bike is different. And this was MV making the bikes so that proves to me that they don't have the drawings either!'

While the bikes Kay builds for customers are identical in every way to the original race bikes, the ones raced by the Black Eagle Team have had slight modifications made to enable them to stand up to the rigours of the TT Mountain Course. 'Our race bikes have Maxton suspension internals because that's what everyone else

is using and our riders are knocking out some quick laps at the Classic TT now (the team's 350 laps at over 105mph while the 500 is averaging over 110mph with a top speed of over 150mph) so we have to get them to handle as well as possible. Brake-wise, we've now put disc brakes on the front but retained the drum at the rear. Dean Harrison and Lee Johnston are used to the stopping power of modern Superbikes and with drum brakes you have to squeeze them for ages to get them to work so it's as much a safety thing as anything else. The rules at the Classic TT allow us to do that but if they didn't, we'd be happy to run with the original MV equipment.'

The Kays' reputation for engineering perfection is well-known but perhaps the ultimate



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compliment came from 15-times world champion and MV Agusta's most famous rider, Giacomo Agostini who has ridden the Kay MV's and confirmed that they're practically indistinguishable from the racers he rode in the early 1970s. 'Ago has ridden two of our bikes – one at Goodwood and one at Cadwell Park. He rode the 500 and said it had much less vibration than his original race bike. He also said his race bike had slightly more power but that's because he was riding one of our customer bikes rather than our race bikes which have about 10bhp more.'

This year's Classic TT will see Dean Harrison riding the team's four-cylinder 350 and three-cylinder 500 in the Junior Classic and Senior Classic events respectively, while Lee Johnston will ride the 350 and 500 triples. The 500-4 isn't actually eligible because it's based on a

1972 bike and that's the cut-off year for the machines in the Senior.

Racing these bikes is so expensive that the Black Eagle team only contests about five meetings each year, with the Classic TT being the highlight. But despite winning two races in the last two years, Kay's ambitions remain modest for this year's event. 'We're always striving for just a little bit better than last time' he says. 'We want to get the lads round in one piece and let them have a real good ride. We had problems with bikes blowing up in the early days simply because we didn't have any experience of racing them and there was no manual to tell us what we needed to do – it was all trial and error. And unlike the MV factory when they raced here, we didn't have any spare engines because they're too expensive. We take our bikes and we race them and if they blow up, we come home. All we're trying to do when we go to the Classic TT is improve our engineering – if we come first or last or blow-up we still learn from it every single time and that's why we go.'



The Eagle Has Landed

Aside from MV Agustas, the other big passion in Mark Kay's life is keeping birds of prey. 'We've kept birds of prey for years' he says. 'It's just a hobby to get us out of the workshop and into the countryside now and again to fly them. My dad started it really when he first kept Harris Hawks. The eagle in the pictures is a South African Black Eagle called Yeti. She was bred in captivity, is four years old, weighs 9lb (4kg), and has a wingspan of seven feet. We feed her on quail, rabbits, and day-old chicks. I've got five birds of prey at my house – including two Golden Eagles - and my dad's got twelve. The Golden Eagle is my favourite bird of prey but when we were looking for a team name Black Eagle Racing just sounded better!'



Dean Harrison - 2015 Bennetts Classic 500cc TT
Photo: David Traynor



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