

A close-up, high-contrast photograph of various automotive engine components, likely pistons and connecting rods, arranged in a cluster. The metal surfaces are dark and show signs of wear and oil residue. The lighting creates strong highlights and shadows, emphasizing the textures and shapes of the parts.

WITHOUT WHOM...

POWERHOUSE AUTOMOTIVE



A relatively new company, Powerhouse Automotive is big in all things braking, but can't half make a bike 'go' too.

You can almost sense the happy frustration at Powerhouse Automotive. Here is a relatively new company, built solidly on no-nonsense Yorkshire principles, that knows how to make a bike fly, but for some reason in modern classic circles, is better known for making a bike stop well.

Like many of us, you may have searched the likes of eBay to find those brake calipers you needed for your project, only to find the ones you get back are knackered, corroded and very second-hand. Well, Powerhouse Automotive offers a service where you send in the gummed up brakes and receive a professionally overhauled set in return. Perfect for those of us who want a quick turnaround. In fact, the service seems a little too perfect if the huge pile of calipers that sit in the parts washer are anything to go by.

But this wasn't what Powerhouse Automotive was originally set up for. Owner Lawson Smith explains: "We set up in September 2010, and the name shows that we were originally going to be focused on engine tuning and dyno work.

Soon this busy market began to tail off. At first you'd have a three-week wait to get a dyno slot, but not anymore. We've recently moved and there's been no rush to get the dyno installed! It's just not as important as it used to be.

"We try and focus on engine rebuilds, cylinder head porting specialist things, really. We're not competing with the top-end performance tuning houses but just try and do everything we can do – and do it well. We do machining and generally repair and fix things that most main dealers can't do. What we can't handle ourselves, like media stripping or powder coating, we know good subcontractors who can. We have high standards so when we sub stuff out we want good jobs done by the best people."

Today Powerhouse Automotive does plenty of servicing and performance work, as well as a dash of classic stuff as seen by what is currently in for fettling: an FJ1100 motor awaits a full rebuild, a 1990s ZZ-R1100 is in the middle of a nitrous power boost, while a Suzuki SP400 lump awaits restoration. ▶

Words: Bertie Simmonds Photos: CMM



Dave Cattell, top boy scout leader and apprentice at Powerhouse Automotive loosens off some seriously tight caliper bolts

So what's the story with the nitrous? Lawson says: "We get a few club racers coming in for head work on their bikes, road riders want more power, and car people too. We've become known for our nitrous work. I first had it on a Rover SD1 Vitesse. It had a 4.6 litre big valve head, different fuel injection – it was an old 330bhp 1980s car with 370lb-ft of torque. Then I added more than 250bhp of nitrous to it... it soon makes you realise how quick something can be.

"We've fitted systems to lots of cars but there are a few bikers who go for it too. I work closely with Trevor Langfield, from Wizards of NOS. He was a drag racer who was using American stuff, but he soon decided he could do better. He's a fascinating character who sadly lost a leg while riding at the Isle of Man, he knows his stuff and we're both mad Yorkshiremen really."

This particular mad Yorkshireman was late into bikes. "I had a protective mother, so got into bikes in my mid-twenties," says Lawson. "Fiddling and fettling came naturally as my father was an engineer. I dismantled a Suffolk Punch lawnmower at 11 and this eventually led

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to both a career in the RAF as a graduate mechanical engineer and working at a friend's bike shop at weekends. I loved the 18 years in the RAF, playing with all the toys and working with people of such high calibre, but I was enjoying the weekend work and wanted to be 'hands-on' again, as more of my RAF time was engineering management: hence starting up Powerhouse Automotive."

Joining Lawson at Powerhouse Automotive is Dave Cattell, who is the 20-year-old apprentice. Interestingly, it must be a happy ship, because while Lawson declares Dave is '...a real find, a good lad and doing well on his apprenticeship,' Dave says Lawson is the best boss he's ever worked for, as: '...in winter he lets me put a reptile heater in the parts

washer.' The reptile heaters were left over from Powerhouse Automotive's 'security staff', two boa constrictors.

But let's get back to the bikes, the ZZ-R1100 is a classic 1990s machine, now cheap as chips but as hairy-chested as ever, power-wise and more so with a Powerhouse laughing-gas boost. Lawson says: "This ZZ-R is jettied for a 50bhp boost and has a bottle of nitrous that gives around 1min 20sec of boost – in two to three second bursts. When people ask is it safe, you have to remember my background is in aeronautical engineering where the safety factor for parts is around 20%, it has to be that low or they would not get off the ground. In goods vehicles it can be as high as 700% and for cars and bikes around 100% so the



This pile of calipers awaited the Powerhouse team when CMM arrived – but we have to stress they CAN make a bike go fast, as well as stop. But, brakes are big business of late

components are all much stronger than they need to be for reliability. So tuning engines is all about trimming away at that safety factor. For the limits of what you can do, a good rule of thumb is that you want no more than 25% extra power output over the standard bike so it will not put undue stress on the engine. My own Kawasaki ZX-12R runs 60bhp boost, giving me 230-240bhp at the wheel. It's smooth power and makes the acceleration in third gear, feel like second, and so on. It makes for a practical performance increase and we can do the refills too."

And then there are the little things that nitrous can help with. Dave explains: "Having the nitrous oxide bottles here means you can easily free off stuck caliper pistons. Compressed air is around 100psi, but with this we have 600psi or close to 800 on a warm day. We've only ever had one set of pistons that have stuck after a blast of nitrous."

Which begs the question, just how bad are the calipers that some people send in? "It depends, but some are so bad, you can see that the pistons have been attacked with molegrips and the pistons themselves are chewed up," says Dave. "Once a guy brought us some that he swore came off a bike that had recently passed an MoT and yet in truth there was no way in the world they had." ▶



When he's not pulling apart RD350F2/N2 calipers, Lawson could be plumbing in NOs systems which can add 60 or more bhp to a bike



When you're trusting your life to brakes, you want a good job doing – this caliper is spotless and only good-quality pistons and seals will be used in the final rebuild



Examples of Powerhouse's brake refurb: can you name what bikes they are off? Early Triumph calipers were re-badged Nissins, we can spy blue-spot Yamaha calipers from R-series machines or Fazers, as well as more modern radial-mounted Tokicos

Lawson says: "The way the brake business has taken off is interesting. I realised brakes are such an important part of the bike, people often want to go faster and we can do that, but people forget about brakes. I advertised kits of brake seals for caliper rebuilds and realised people often want somebody else to do what can be an awful job without the right tools, we tried it and came up with a reasonable value package and it's mushroomed. To be honest, we're now sick of seeing boxes of calipers come in, but it's good business!"

So what's hot or not in the world of caliper overhaul? Lawson explains: "I'd say that the Tokico six-pot calipers are the most common we get coming in. These were popular brakes in the 1990s. You found them on Kawasaki ZX-7Rs, ZX1100s, ZX-12Rs as well as Suzukis like the TL1000R and various GSX-Rs. With more pistons moving in the calipers you've more chances of one piston or more sticking."

"Many people get annoyed with the Tokicos and upgrade or swap to the Nissin four-pots which can slot straight in, but there's nothing wrong with a well set-up set of Tokicos. We think we found the problem. On the Nissins the overall anodised coating on the calipers even extends to the recesses where the

pistons sit, but on the Tokicos it's simply machined aluminium. This means that aluminium oxide forms around the dust seals, which increases the pressure on these seals until it simply grips the piston until it seizes. We get far fewer Nissins in to strip, but a well looked after set of Tokicos are great brakes. They just need regular cleaning and looking after."

Lawson adds: "Another thing is that the Tokicos are a 'spongy' caliper. You'll also get more lever travel with them than on the Nissins, but we've found a fix for that too. I used to swear by EBC's pads, but we have moved on to using SBS pads and these give a much firmer lever on the Tokico six-pots. I've used them recently on the ZX-12R and they've been great. I did a two week trip to Spain and France and they were brilliant. These pads give a firmer feel to the lever and with no brake fade."

One thing that Lawson and Dave insist on is the use of good-quality parts when refurbishing brakes. "We use the best quality OEM specification parts to rebuild brakes. I saw some very cheap brake seals on eBay recently and decided to order some, both from eBay sellers and a batch of samples direct from Taiwan, to take a look and the difference in the size of them was amazing. They couldn't make a seal if they tried. Also, we try to reclaim as many brake pistons as we can, but



Freeing off a piston or two is easy when you've got some NOs on hand. Just mind your fingers...

often it's not possible, so we have a firm that machines a good quality alternative. We've also got a fork rig which helps us loosen overtight bolts."

Whatever job they get to do, there is an efficiency and appetite about Powerhouse Automotive that is catching. Lawson says: "I like it when we get 'my era' of bikes in, old GS Suzukis, Kawasaki GPzs, Yamaha RDs etc. We can do full restoration rebuilds, as with the single-pot Suzuki, as well as renovating wheels, forks, redoing engine finish etc. And yes, brakes too. We enjoy breathing new life into things. We love to get a scabby chunk of metal coming in only to see a sparkly new-looking one going out of the door."

Amen to that. ★