

# PEOPLE: THE MOST VITAL COMPONENT OF INGENIUM

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Jaguar Land Rover's Engine Manufacturing Centre is producing this year's most anticipated technology: the Ingenium engine. Here's who is making it happen

The 95,000m<sup>2</sup> Engine Manufacturing Centre (EMC) in the English city of Wolverhampton covers the same area as 14 football pitches. At full capacity it will employ 1,400 people and it will produce Jaguar Land Rover's new Ingenium engine.

Nigel Blenkinsop, director of powertrain manufacturing, describes the engine as "giving us control of the quality of the products that make up the engine – and the responsibility of managing that quality through to the customer". Plus, the engine itself is very competitive in terms of emissions, weight and fuel economy. "A 99g/km or 109g/km CO<sub>2</sub> Jaguar or Land Rover vehicle is a stunning

achievement. It will transform the way our products are considered. It's a game changer."

To achieve this, Ingenium's director of powertrain Ron Lee has brought in a selection of the best technologies in terms of exhaust gas management, turbos, and bearings. It's an exact science: the Ingenium engine's crank bearing has a roundness tolerance of three microns: a human hair's thickness is 80 microns.

To build this engine, you need the right people in place. "We've turned the manufacturing model on its head," says Nigel. "We've made it about the people rather than about the production system." Over the following pages, we'll introduce you to some of them. →



**1** **STUART SUMMERS**  
PRODUCTION TEAM MANAGER  
MACHINING HALL

I've driven Land Rovers for 23 years. It's the main reason I took this role. I used to work at Ford Motor Company in Dagenham but I always told myself, if Jaguar Land Rover opens an engine plant, I'd jump at the chance. Now I'm really proud to be part of the company's future.

In machining, we turn the rough castings that arrive from the foundry into finished crankshafts, cylinder heads and blocks ready for the assembly hall.

We have 173 machines surrounded by over a kilometre of gantry, and it takes us around six or seven hours to take a crankshaft from the start to the end of the line, or 'dock-to-dock'. The crankshaft is made of steel, which is tough and robust. We use lightweight aluminium for the cylinder head and block, lining the block's cylinder bores with steel for added strength.



**3** **AKIFF JANJUA**  
SUB-HEAD ASSEMBLY  
ASSEMBLY HALL

It's more teamwork than manufacturing here – and it's not so much a factory as a family. Most of the time, all you see here are smiles.

My team is based on the headline, a branch off the track. We create the cylinder head – assembling little components like the springs and the valves. If you imagine the track as a wave, we're on one of the crests. Before the engine gets to us it's only the bottom half – the engine block, the sump. When we add our head, we feel it's the heart – there's so many critical parts to the cylinder head.

I wouldn't have missed the opportunity to do this job for the world. When you put on your uniform you feel you're part of something really big.

At the EMC we utilise Kaizen – a Japanese principle that means small continuous improvements. For example, our team suggested that we put the rack where we keep our parts right in front of us so you don't have to twist. This has improved safety and ergonomics.

The engine's low emissions will be better for people's health too, so that's a Kaizen as well. Continuous improvement – it's good stuff. →



**2** **RICKY ANSLOW**  
TEAM LEADER – ZONE ONE  
ASSEMBLY HALL

I'm team leader in Zone One. It's the start of the assembly process – straight after machining – and it's my job to ensure we're feeding the rest of the line. We load the engine block on to the carrier – the platen – which takes it through 17 zones until the engine is complete and into hot testing.

I grew up five miles from here and used to play football in the fields across the road. In fact, I play football now in the same league as someone from the CO<sub>2</sub> emissions department. There's a friendly rivalry.

I've a terrific pride in what I do, I really enjoy it – I even got to meet The Queen when she opened the EMC! I can't wait to see a new Jaguar or Land Rover powered by one of our engines.



“MOST OF THE  
TIME ALL YOU  
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ARE SMILES”  
AKIFF JANJUA





**4 LAURA FELLOWS**  
TEAM LEADER – ZONE 13  
ASSEMBLY HALL

I manage a team of 12. We're close to the end of the line, so the engines are almost complete by the time we get them. After the engine leaves our zone it goes into cold testing. A lot of the stations on my zone make electrical connections with the wiring harness to different parts of the engine. We then fit the breather pipe, T3 (exhaust temperature) sensor, dipstick, vacuum harness and oil filler neck. We put the oil in the engine via a robot and finally put the oil cap on.

I'm good at building things and I can handle a drill better than my husband, but I left school before I realised my love of mechanics. I can see this plant from my house and when I saw Trevor Leeks on TV explaining that they were hiring and training people with no previous experience, I knew it was my perfect job. Within six months, I was promoted to team leader.

When I started there were about 30 people. Now we've got almost 500. The effect on local businesses is huge. When I first started, my fellow trainees and I all agreed one thing. We couldn't wait to wash our uniforms and put them on the line so the neighbours could see we work for Jaguar Land Rover.

"I WANTED TO PUT MY JAGUAR  
LAND ROVER UNIFORM ON THE  
LINE FOR MY NEIGHBOURS TO SEE"

LAURA FELLOWS



**5 PHILIP THURGOOD-SMITH**  
COLD TESTING – ZONE 14  
ASSEMBLY HALL

Before I joined Jaguar Land Rover, I built engines that were very different to these. They were big old V16 diesels for ships. We had cold test processes there, but nothing like this. These are the most sophisticated pieces of machinery I have ever worked with. The cold test comes towards the end of the assembly line.

It is the final test before we start the engines for the first time, which is known as the hot test. Cold testing is essentially running the engine without

the engine firing. We artificially turn the engine over, simulating speeds of a few thousand rpm. We test things like boost pressures in the turbo, fuel pressures, oil pressures, sensors and electronics. It's about proving the engine. When an engine leaves us, we are confident that it's a good product. It's safe to be started.

This place is brand new, but it already has a community. I work with identical twins down on the line, and eventually generations will work here.



**6 DANIEL WRIGHT**  
DYNO TESTING & TEAR DOWN  
ASSEMBLY HALL

All engines go through hot testing – but only a selection come through to Dyno Testing and Tear Down. We are the final control and an additional layer to ensure quality and reliability. A certain number of engines per batch come to us, and our job is to first put an engine onto the dyno test bed, where it is run hard to stress test the working engine.

The next step is the tear down. This is a process where we take the engine apart, bit by bit, to check that all the component parts are robust and properly fitted. The final part of the tear down is the torque data capture sheet – essentially checking that the robots on the assembly line are tightening every bolt correctly.

We sit between the customer and the production line. If we are happy with the engine's results, the customers get their engines. If we're not, we feed back to the line managers in the assembly hall. Our challenge is to make sure we don't miss anything. I oversee the whole process but in the team we have a lot of experience in testing so everyone brings ideas to the process. We are constantly developing and improving our area. I wouldn't want to be anywhere else. →



## 7 JADE LIGHTFOOT QUALITY CONTROL PARTS

When I first walked into this room it was a blanket of parts. The role didn't exist until I took it. I was working on the line when my process leader saw an opportunity for me. I'm a very organised person, so I sat down and worked through all the parts. My office is now highly organised. At our daily review, I can tell anyone where any part is, the issue raised in connection with it, and what is to be done about it. Nothing crosses the threshold of this area without going through me. It even says on the door: Please book all parts through Jade Lightfoot.

I've learnt a huge amount. Last year, I was working as a beautician. A bit of a difference! Today, I feel really proud of what we've achieved. This is a new workplace with new processes and a conscious effort to build a certain work culture. Everything is about the detail. So for me, that means that any quality issues, parts defects or contamination is dealt with clearly, thoroughly and finally through me – right down to the smallest bolt.



## 8 TREVOR LEEKS OPERATIONS DIRECTOR ENGINE MANUFACTURING CENTRE

The EMC has just been awarded BREEAM 'excellent' – the highest award you can have in sustainability. We harvest our rainwater, and we have the largest solar panelled roof in the UK. When we're at full volume it will produce 30% of our electricity, equivalent to 16,000 houses. And we have a nature corridor that runs across the site – the wildlife was here before us so we're taking care of them too.

Our goal is to transform the way in which engines are manufactured and be a global benchmark for excellence in everything we do – not just safety, quality and environment, but everything. Being world class is only 20% about the technical side; the other 80% is our people; their values and behaviours.

Being the main employer in this area comes with social responsibility. We've got very close links with local schools and colleges where we train our apprentices and put prospective employees through Powertrain Way, our two-week course which teaches lean manufacturing methodologies and explains our thinking too. We also have close links with local charities. It's important we integrate ourselves with the community.

We will have 1,400 employees – but we'll create seven times that number of jobs in the supply chain. Fifty per cent of our components come from the UK and a big percentage of those come from the Midlands.

We set out to make a difference to people's lives and it's really happening. Manufacturing our engines in-house is the output, but the input is developing great people. □



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