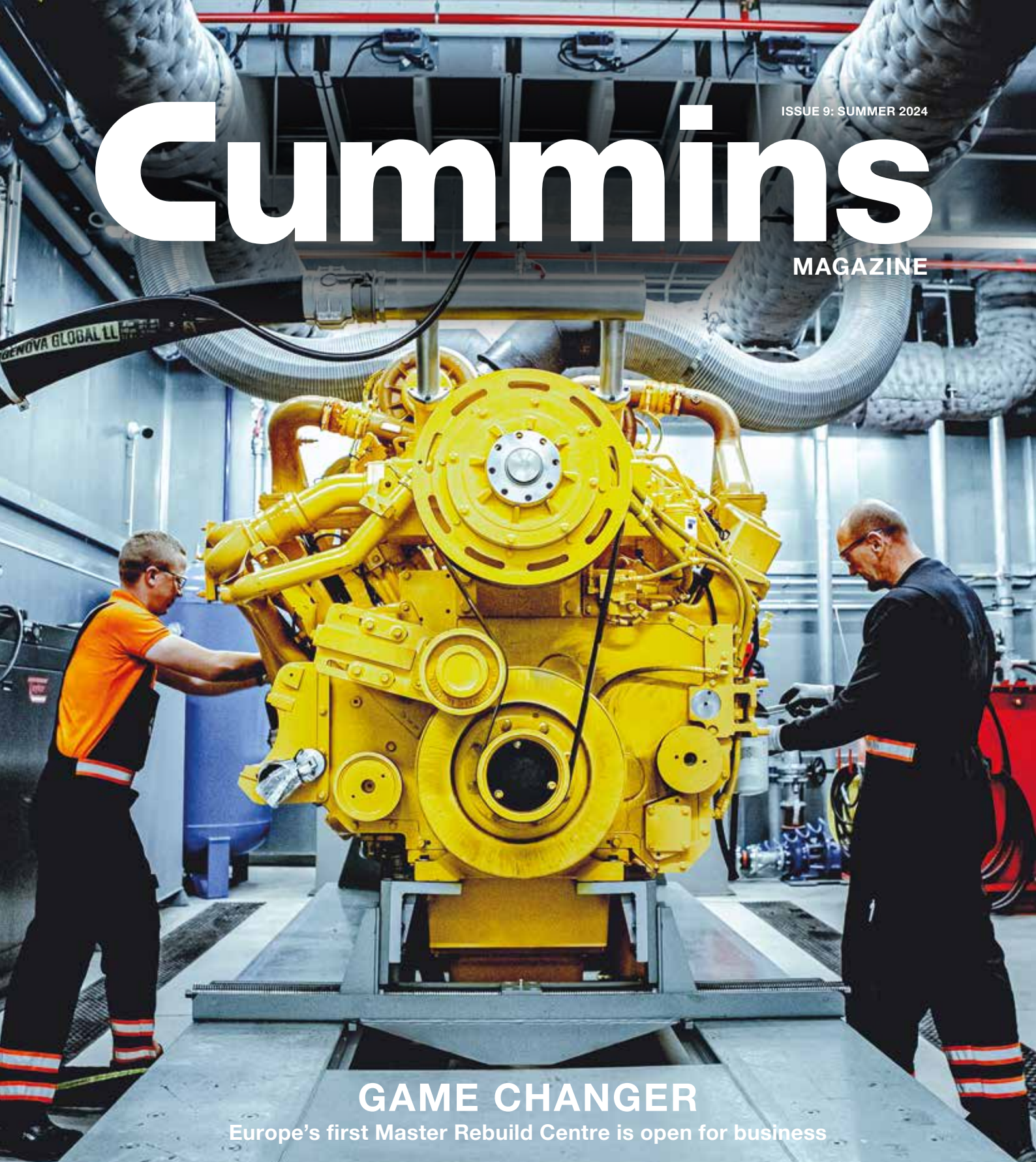


ISSUE 9: SUMMER 2024

Cummins

MAGAZINE



GAME CHANGER

Europe's first Master Rebuild Centre is open for business

FUEL TECHNOLOGY

ZERO HOUR GETS CLOSER

Hydrogen internal combustion (H₂-ICE) engine technology is putting Cummins on the path to zero emissions



AGRICULTURE

CLAAS LEADS THE FIELD

How Cummins played its part in making CLAAS one of the most admired brands in the global agricultural equipment market



ON-HIGHWAY

SOARING SOLARIS

Polish bus giant Solaris is helping cities breathe easier with its Cummins-powered CNG and hybrid models



Welcome

Welcome to the summer 2024 edition of the Cummins Magazine.

As you will see in the stories ahead, there are more and more ways Cummins is driving the decarbonisation agenda and solidifying its reputation as a global power solutions leader.

With such a diverse base of customers operating in so many business sectors, Cummins understands there will be no one-size-fits-all solution, a view expressed by Chief Technical Officer Jonathan Wood in our ‘In Conversation’ article with Ann-Kristin de Verdier, Executive Managing Director DBU Europe (see pages 4-5).

But one thing is for sure: By continuing to work in the spirit of partnership, Cummins will always find the best answer for the task at hand.

Get in touch

We love hearing about customers’ experience with Cummins. If you are using Cummins products and services and would like to tell us more about your project, contact Cummins Distribution Europe Marketing Department via marketing.europe@cummins.com

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The Publisher accepts no responsibility for any opinions. Every effort is made to ensure that information in the Cummins Magazine is correct but Cummins accepts no responsibility for inaccuracies or errors or any consequences arising from them.

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In Conversation...

With Ann-Kristin de Verdier and Jonathan Wood

Ann-Kristin de Verdier, Executive Managing Director of Distribution Europe, talks to Jonathan Wood, Vice President and Chief Technical Officer (CTO) about how Cummins, a global power technology leader, focuses on delivering the right technology portfolio for its customers for both now and into a future filled with possibilities.

Cummins is at the forefront of the drive to decarbonise. It's a mammoth challenge that Cummins will meet head on, but it will not be easy.

To discuss those challenges and how Cummins sets up to deliver the solutions that its customers have come to expect, *Cummins Magazine* brought together senior leaders Ann-Kristin de Verdier and Jonathan Wood.

We asked Jonathan, who is based at Huddersfield in the UK, to kick us off by outlining the role of the Chief Technology Officer.

"Basically, I'm the voice of more than 9,000 Cummins engineers around the world," he says. "It's my job to ensure we have the right technology portfolio for the business and are deploying the capital to deliver on it. I'm constantly evaluating where and how we should be making our technology investments to support the different markets and business areas.

"But I don't do this in isolation. I need to consider the needs of all our regions and business units; they have their own product plans and will be thinking through what they need to do to meet their commercial targets and serve their customers.

Finding the right balance

"I look across the portfolio to determine if we are spending the right amount in different areas of technology and product types, so we have a balance and are consistent with the strategy of the business."

Among his other responsibilities, Jonathan is charged with future-proofing the technical function by ensuring, to the best of his ability, that Cummins has the right talent, is training people the right way and is mindful of what skills and processes might be needed in the future.

"Our customers are facing the biggest technology evolution for many years. In fact, it's more like a revolution. Big changes are already starting to happen, and our business teams are having to gear up to support products that could be based on hydrogen, battery, hybrid or dual-fuel."

Partnership is vital

Jonathan and Ann-Kristin agree partnership is the key to picking a way through the technology maze

and unlocking the enormous opportunities ahead, starting with the way information and insight is shared across Cummins.

"Our engineers, our sales people and everyone who is interacting with customers needs to be so knowledgeable, because our customers are interested in technology and technical developments and they look to us for guidance," says Ann-Kristin.

"Jonathan brings together all the technical leaders across the business at least quarterly to look at best practices and drive alignment on technical objectives, and we're delighted to be represented by our first chief engineer for our European business unit, Dawn Whiting.

"Dawn started as an apprentice with Cummins, which is a great story in itself. She will play her part in helping Jonathan to understand how and where we as a business are going to need support, to upskill or develop the capability to deal with products that are in the pipeline."

Jonathan says it makes sense for the business units to get visibility at the earliest stage of technologies that might be five to 10 years out from hitting the market.

"That's why the technical leaders review is an

essential part of our business. It helps the business units plan ahead and be ready to support new products as soon as they are launched."

Deeper involvement

Ann-Kristin detects an important shift in the nature of the support required of her team by customers.

"We've always done a lot of application engineering and been equipped and ready to deal with technical issues in the field, but now we are starting to do more product development design work. For that, we need our technical organisation to support us for tools, processes and expertise."

Ann-Kristin points out that Cummins in Europe is working with a number of small and medium-sized original equipment manufacturers (OEMs) that typically do not have the same technical

resources enjoyed by larger manufacturers, "so they are more reliant on us coming up with the right technical advice, telling them about different solutions.

"We have to give them the knowledge and the confidence that we can help them navigate through the transition phase, so it really is essential we understand these new technologies."

Jonathan agrees big changes are ahead and more collaboration will be required. "In the past in our industries the answer was typically always a diesel or natural gas engine of some shape or form.

"There was some tailoring but not huge variation in terms of the core technology. Looking ahead, there will be no 'one technology suits all' solution. Whether it's diesel, gasoline, hydrogen internal combustion engine, a fuel cell, or battery – it will be considered in Cummins' portfolio of solutions.

"I think it's fair to say our customers don't always know the right answer to manage the decarbonisation transition at the right pace to keep them profitable, meet their business objectives and maintain regulatory compliance.

"They are looking to us to tell them what we think is the right answer, the right technology solution. And after selecting the technology, they naturally assume they will get the same support from the distribution business unit (DBU) as they had with diesel in the past.

"Having the DBU is definitely a competitive advantage for Cummins. In these new technology areas, you have a significant number of start-ups, entering the market with batteries or fuel cells, but the thing that takes the time to set up is a distribution network like the one we have

established with our core product over decades."

Cummins is in a uniquely strong position, being represented in every European country either through a Cummins-owned distributor or local country or specialised dealer.

"Aftermarket support is critical with any new technology," says Ann-Kristin. "You don't just deliver the

upfront product, you have to be able to support it through its lifecycle. That's how you build the confidence that is so vital to long-term success."

Skills and capabilities

Jonathan expects many of the skilled Cummins engineers and technicians who learned their trade on combustion engines will transition their skills into new technology solutions. "There's this view that internal combustion engine technology is old and obsolete, and you are going to need new skills and new people to deal with future technologies," he says.

"I don't buy into that thinking. We have people who work on complex engines that are ready to deploy their skills and capability on learning new products and

ADAPTING TO CHANGE: The development of zero-emissions technologies will require more skills in areas like software, controls and electro chemistry, says Jonathan Wood



how to support and engineer them."

Jonathan says there's a steady stream of people transferring their skills across from the core business into Accelerate™ by Cummins, the zero-emissions technologies business segment of Cummins. Cummins has also made acquisitions to bring in capability and skills from outside.

"As things evolve and change, we need more skills in certain areas, such as software, controls, cyber security and electro chemistry. These are growth areas and they are challenging."

Jonathan says he is always on the hunt for talent. "For me, it starts from how we encourage more young people to get involved with STEM subjects, but there are also great opportunities for people working in our business who can transfer their skills to the new areas of growth."

Ann-Kristin says the growth of Cummins in Europe means more products in the field requiring engineering and service technical support.

She endorses Jonathan's view that more partnerships need to be built with schools. "We want young people to get to know Cummins and appreciate there's more to us than diesel. It's important to pitch ourselves as leading the energy transition, which is something that excites them.

"We also want them to get to know our culture as much as our technology, because that is the thing that makes Cummins a great place to start and build a career."

H2-ICE

Practical pathway to decarbonisation

Work is continuing apace at Cummins on a pioneering project to commercialise hydrogen-fuelled internal combustion engines (H2-ICE).

Starting with a medium-duty B6.7H and heavy-duty X15H engine, Cummins H2-ICE technology represents a revolution in how trucks, excavators, agricultural tractors and other equipment can progress toward lower emissions.

“Until recently, the only powertrain technologies being discussed for zero-emission vehicles (ZEV) were battery electric and fuel cell,” said Jens Huettner, Sales Director – On-Highway at Cummins.

“H2-ICE has changed all that. Original Equipment Manufacturers (OEMs) are now looking at it as a genuine third option and the missing part of the puzzle that will enable the fast and widespread rollout of ZEV trucks and heavy equipment.”

The key attraction of H2-ICE, said Jens, is that it performs like a diesel engine, fits where an engine normally fits and offers the lowest upfront cost of all ZEV technologies. It uses a traditional powertrain layout, meaning OEMs are not required to completely redesign their vehicles to achieve lower carbon emissions.

H2-ICE can also support quicker infrastructure roll-out, which is also beneficial for hydrogen fuel cell technology. Cummins is keen to stress that the two fuel technologies – fuel cells and hydrogen ICE – should be seen as complementary and that they are progressing both options.

Cummins H2-ICE Differentiators

- Based on an all-new platform
- Utilises gaseous fuels expertise
- Adopts direct injection for enhanced fuel efficiency, high power output and class-leading transient response
- Power range 250 – 550 hp

“No-one really knows how the zero-carbon vehicle market will pan out, but because the demands on applications are so different, there is sure to be a place for all three technologies.”

With the clock ticking on carbon reduction (the EU has mandated manufacturers will have to cut the average emissions of new trucks by 45% by 2030, 65% by 2035 and 90% by 2040), urgent action is required.

“Because it carries a lower upfront cost, H2-ICE could well be the fastest route to reducing carbon emissions,” said Jens. “It also comes with a supply chain and parts network that is similar to current diesel operations – it’s familiar to OEMs and operators globally.”

H2-ICE can be classified as a zero emissions vehicle (ZEV) power solution under the new regulation for CO2 Standards for Heavy Duty Vehicles signed in May 2024. When operating on green hydrogen (produced from renewable sources), H2-ICE provides near zero carbon, NOx and particulate matter (PM) tailpipe emissions. H2-ICE will become a critical technology to support OEMs in achieving fleet average CO2 compliance.

Jens said: “The sooner potential investors have clarity on policy, the sooner improvements to infrastructure can be made, and we can start thinking about extensive refuelling networks and producing green hydrogen in quantities that make it accessible and affordable.”

Cummins was already seeing an encouraging appetite for its direct-injection hydrogen internal combustion engine technology, Jens added.

“If you had asked me two years ago, I would have said H2-ICE might come to something. Today, everyone wants to talk about it, so we’re excited about the prospects and happy to be at the forefront of the technology.”

H2-ICE could be the missing part of the puzzle



Three steps to hydrogen heaven

The three key areas where Cummins believes progress on the path to zero carbon can be accelerated:

1

Government policy: Effective collaboration between governments and industry is critical. Policy on zero emission vehicles needs to be harmonised to help manufacturers develop their strategies.

2

Infrastructure: Installing refuelling stations, pipelines and storage facilities is an expensive business, and whoever takes the initiative will expect a return on investment. Governments and the business sector will need to work together to make the commercial argument.

3

Adoption: H2-ICE and fuel cells are complementary technologies and will each benefit from the same infrastructure investment. With refuelling anxiety removed, the path will be clear for a faster uptake of ZEVs.

Cummins ready to go turbo

Huddersfield plant opens after six-year rebuild - and it's good as new

Cummins Engine Components’ Huddersfield campus in the north of England is at full throttle after the completion of a six-year project to rebuild the iconic manufacturing plant.

The more than £20 million invested in the Huddersfield site has yielded a truly world class facility primed to produce in the region of 300,000 turbochargers a year.

The investment can be seen not just in the upgraded manufacturing plant and its three main assembly halls but in a transformed research and development centre, renovated offices, canteen, gym and newly installed electric vehicle charging points.

The plant itself has a new roof (currently being kitted out with solar panels), new external walls, new floor, new electrical and heating and ventilation systems, energy-efficient LED lighting and greater wheelchair access.

From a tiny wooden shed to global powerhouse

Had it not been for the 18-month hiatus brought about by the pandemic, Cummins Huddersfield would have celebrated the opening of its sparkling new facility in its 70th anniversary year.

The original company, incorporated in 1952 as Holset Engineering Co Ltd., was founded by business partners Brian Holmes and Paul Croset. It was acquired by Cummins Inc. in 1973 and rebranded as Cummins Turbo Technologies in 2006.

Starting out in a small wooden shed, Holset has grown into a global technological leader whose products are synonymous with outstanding performance, durability and a high standard of safety.

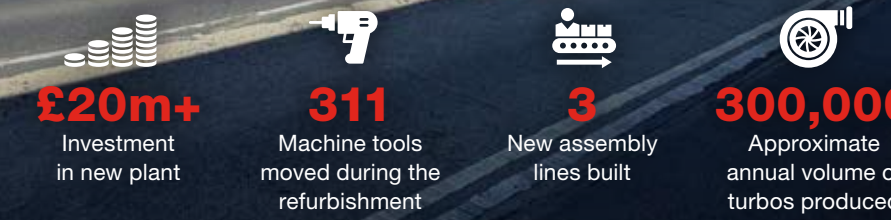
Over the past seven decades, Cummins has introduced a range of

industry-leading air handling technologies under the Holset brand, including fixed, wastegate, variable geometry, two-stage, and exhaust throttle technology.

There are around 200 engineers at Huddersfield focussed on helping Cummins achieve its ambitious environmental objectives.



Huddersfield Plant Refurbishment Project Key Numbers



“The renovation of the Huddersfield plant ties back into our commitment to decreasing carbon emissions. Investing in the site will help us manufacture core technologies more efficiently, getting us closer to our 2050 aspirations for carbon neutral products and operations,” said Shon Wright, Vice President of Cummins Engine Components.

Everything dovetails with the overarching mission of Cummins to dramatically reduce its carbon footprint and improve the sustainability of its operations.

“Everyone is so proud of what the team has achieved,” said Adam Dawson, Plant Manager. “Amid all the work, we kept things running and kept focussed on our customers – on product quality and delivery – so they were not impacted.

There were lots of challenges along the way but the Huddersfield team overcame them all and what they have now is a plant that to all intents and purposes is brand new. “It’s clean and full of light and is very pleasant environment for employees, plus it presents a positive impression of a manufacturing operation to customers and visitors,” said Adam.

The next phase of the investment programme is under way for the assembly lines: a new heavy-duty line has been commissioned and is being ramped up; a new line for variable geometry turbos is being built and plans are taking shape for a new high horsepower line.

Gareth Cooper, Huddersfield Facilities Manager, said: “We were constantly having to move equipment around to create space and allow the contractors to do their work. In all, we calculated we had to move 311 machine tools during the rebuild.”

The site leadership team was keen to stress the success of the Huddersfield refurbishment was down to a collective effort.

“The knowledge, the work ethic, the teamwork and the desire to get this project complete by the Huddersfield team was exceptional,” said Gareth. “The entire plant was involved in the work and they should feel proud of themselves.”



Accelera fuel cells power locomotive in Austrian project HY2RAIL

Derailing emissions and pioneering cleaner transport

Accelera™ by Cummins, the zero-emissions business segment of Cummins Inc., has reached a significant milestone by successfully commissioning its first fuel-cell-powered locomotive for freight rail applications.

Replacing typical diesel generators, Accelera fuel cells now serve as the primary power unit in the conversion project of a light On Track Machine (OTM) Vehicle in Austria developed for the HY2RAIL project.

In partnership with the Austrian railway authority ÖBB, recognised for managing one of Europe's most advanced railway systems, the HY2RAIL project demonstrates how fuel cells can sustainably meet the power needs of heavy-duty freight locomotives.

To power the locomotive, m.ZERO, an Austrian engineering consultancy, integrated Accelera fuel cell power modules into a strong 120kW system. This customised system meets strict rail vehicle standards, including the European

ÖBB's technical service arm, TrainTech, played a pivotal role in overseeing the railcar's modernisation.

The transformed locomotive was previously an ÖBB X534-type catenary construction and maintenance railcar, reliant on a diesel-electric propulsion system. Following installation of the new fuel cell electric system, it now runs emissions-free.

"Expanding our fuel cell technology into locomotives for freight reinforces our standing as a premier fuel cell provider in the European market, particularly for the railway sector," said Alison Trueblood, General Manager of Fuel Cell and Hydrogen Technologies at Accelera.

"Alongside our experience with passenger trains, this project enhances our ability to support the dynamic rail market, further demonstrating the viability of hydrogen technology for zero-emissions heavy-duty transport."

"We made the right decision with our choice of fuel cells for the project as Accelera's units are delivering exactly as specified," said Herbert Wancura, CEO of m.ZERO.

"Modernising to zero-emission technology isn't just feasible, it's an economically and environmentally savvy choice. We are ready to support rail OEMs in their zero-emission endeavours and eager to collaborate with Accelera again on any upcoming projects."

The HY2RAIL project brought together the strengths and expertise of leading rail organisations and received co-financing from the Austrian Research Promotion Agency.

DETAILS

For more information scan the QR code or visit <https://cummins.tech/cumminsmagazine2024-hy2rail>



Accelera fuel cells are now the primary power unit in this converted light On Track Machine (OTM) Vehicle developed for the HY2RAIL project

This project enhances our ability to support the dynamic rail market

standard EN 61373, which outlines testing requirements for railway applications, focusing on shock and vibration.

Furthermore, m.ZERO oversaw the integration of all balance-of-plant components and interfaces in collaboration with Accelera. The fuel cell system was then combined with a ternary battery system to create a hybrid propulsion system that includes cutting-edge power electronics, on-board hydrogen storage technology, a vehicle control unit and software. This integration was led by m.ZERO in partnership with project leaders Hy2RAIL.

The professional evolution of Leen Stolk

From apprentice to leadership

Behind the scenes of the industrial sector, we often find the most fascinating stories of growth, dedication and passion.

Such an example is Leen Stolk, who has been committed to Cummins for nearly three decades. His journey from a mechanic for a public transportation company in the Netherlands to the off-highway lead for engineering in Europe and the Black Sea/Caspian Sea area at Cummins is an inspiring tale of professional development and personal growth.

Passions and Achievements

Leen is an engineer from Rotterdam. From motorsports to restoring old mopeds, from model trains to mechanical watches, his hobbies and interests reflect his love for mechanics and innovation.

Within Cummins, Leen has followed an impressive career path. "I actually never applied for a job anywhere. I was always asked," he says, proudly. This shows Leen is not only skilled in his field but he has a work ethic and dedication that have not gone unnoticed within the organisation.

The Past and Now

Leen began his career as a troubleshooting mechanic for buses in Rotterdam, where he was available 24/7 for the repair of stranded buses.

"I wasn't happy with the prospect of spending my whole life under a bridge," Leen reflects. This led to a decisive step toward further education in mechanical and automotive engineering, as well as applied electronics.

Although Leen was initially found mostly on the shop floor among the products and machines, his current role within Cummins is mainly focused on the organisation, strategy and people.



Leen Stolk shares his career journey and business insights with Jo-lynn Kylie de Wit, a student at Inholland Rotterdam University

The Driving Forces Behind Success

The key to Leen's long stay at Cummins lies in the appealing company culture and the opportunities the organisation offers for further development. "We are very much involved in the development of people," he says, referring to the programmes and opportunities for employees to grow within the company.

His own journey is a testament to this.

Leen also speaks highly of Cummins' commitment to equality and inclusivity. "We treat everyone equally, and there's no difference." These values resonate deeply with him and have been crucial for his ongoing commitment to the company.

A Look to the Future

While the idea of starting his own business still lingers in the back of his mind, it's the freedom to be creative and innovative in his current position that keeps Leen satisfied. "I have such a great job with so much flexibility and freedom," he says.

Three Decades of Innovation

Leen's deep interest in technology and innovation, along with his dedication and work ethic, have made him incredibly valuable to the organisation. Cummins has also played a significant role by recognising and utilising his talents. What drives him is not only the company culture of the organisation but the opportunity to make a difference within the sector and to inform and motivate students for a career at Cummins.

Asked if he has any words of advice for students dreaming of a career at big companies like Cummins, his advice is simple yet profound: "Make sure you have a purpose, a goal."

Leen's story is an inspiration for students and aspiring professionals. It shows that with the right mindset and values, a career can be much more than just a job. It's a continuous journey of development, new insights, and ultimately, fulfilment.

This article was written in partnership with Inholland Rotterdam University and Cummins by Jo-lynn Kylie de Wit, a student from the University.

New remanufacturing options for Europe

Huge potential to cut total cost of ownership

Following the launch of the \$10m Master Rebuild Centre in Krakow, Poland, it is now possible for the first time in Europe to arrange a rebuild or full-scale remanufacture of a high-horsepower Cummins engine to original equipment standards, fully supported by Cummins warranties.

The remanufacturing option is available in three 'packages' and caters for engines between 19 and 78 litres that require more than a conventional in-chassis rebuild.

"We now have a solution in Europe for every situation in the lifecycle of a high horsepower Cummins engine," said

Alan Routledge, Manager – New Business Start-up Leader.

The benefits of remanufacturing are well understood, especially in the mining industry where taking a proactive approach to engine maintenance has saved Cummins customers vast amounts of money.

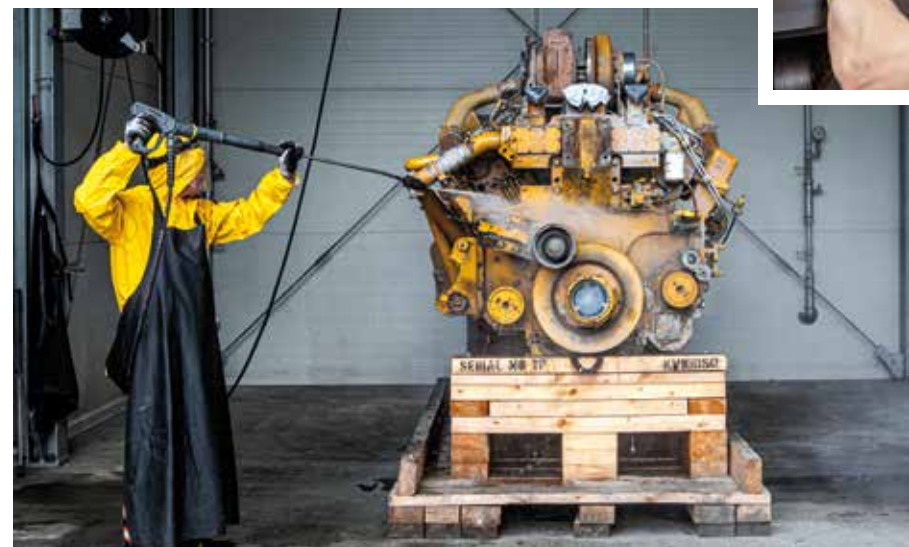
"Our mission now is to switch on our high-horsepower engine users across Europe to the commercial advantages of planned remanufacturing carried out to the highest quality standards

in a factory environment," said Goran Galic, Aftermarket Key Accounts Sales Leader.

At Krakow, Cummins offers three remanufacturing packages – Advanced, Ultimate and Ultimate SE (Service Exchange). Advanced has a standard bill of materials and warranty coverage to help keep the costs down for customers.

The next level up is Ultimate, which is basically a 'zero hour' remanufacture where the life-to-overhaul expectation is exactly the same as a brand new engine and the work is backed by a

The remanufacture process takes around 35 days, and you will receive an engine that is good as new



12-month unlimited or two-year/2,000 hours warranty which may also include Cummins pro-rata policy coverage beyond warranty.

With Ultimate, the engine is completely dismantled and individual parts are cleaned with the most advanced tools, techniques and solvents to remove debris without degrading important metal surfaces. Each part is then individually inspected and replaced.

Following assembly, the engine is then full dyno-tested with advanced parameters to ensure expected performance criteria of power and torque are met, along with in-test spectrum oil analysis.

The entire remanufacture process takes around 35 days.

"If you're concerned to get your machinery back up and running in the fastest possible time with all the quality assurances in place, remanufacturing is going to work better for you than waiting for a 'new' engine off the production line, which could be months depending on the demand," says Alan.

"It's also less expensive, and there's a big environmental benefit because the remanufacturing process requires around 85% less energy than manufacturing new engines." >>>

Sustainability at the core of Krakow

Cummins has set itself the goal of creating a circular lifecycle plan for every one of its products by 2050.

The remanufacturing of Cummins engines and parts expands the life of the product while contributing to a circular economy.

Cummins remanufactured engines use up to 85% less energy compared to the production of a new engine, reducing unnecessary waste and lowering the cost of ownership by extending the life of the engine.

Sustainability solutions are everywhere at the Krakow MRC. They include a thermal blast cleaning system equipped with dedicated afterburner system that avoids the need for solvents and cleaning chemicals; a microbiological wash bay that reuses 100% of the water, and a dyno test cell that reduces diesel burn through simulated test patterns.



Alan Routledge, seen here in the orange jacket at the Press launch of the European MRC, says the new facility means there is now a solution in Europe for every situation in the lifecycle of a high-horsepower Cummins engine

Attached to the Ultimate package, providing it is planned with at least four months' notice, there is the option of a service exchange (SE) engine unit.

"With the required notice or a part of a service agreement, we can have a replacement good-as-new, plug-and-play engine ready on-site to keep any disruption to an absolute minimum," said Goran.

Alan Routledge said it is also possible to customise the SE engine to a certain extent, for example specifying ELIMINATOR technology in place of disposable oil filters and larger volume oil capacity sumps, where the engine design allows.

There is a fixed price on the Ultimate and Ultimate SE packages subject to the condition of the returned engine core being complete and no evidence of misuse or abuse.

Goran highlighted the wisdom of addressing the two biggest variables in the total cost of ownership equation: fuel and engine oil. "A timely exchange could save a great deal of money by ensuring the engine is running with optimum power and fuel efficiency and saving on unnecessary oil drains," he said.

Excessive fuel consumption is just one of the tell-tale signs that an engine might be ready to be rebuilt or remanufactured. Others include a loss of power, increased oil consumption and increased exhaust smoke.

Six stages of the rebuild process

Cummins engine rebuilds go through a six-stage remanufacturing process that sees the engine disassembled, cleaned, inspected, re-machined, reassembled with Genuine Cummins parts and tested. As a result, the engine's life is extended and its performance is enhanced.

The Krakow European Master Rebuild Centre is equipped with the latest manufacturing technologies and tooling to control the six-stage rebuild process.

Stage 1: Disassembly
Engine is completely dismantled, laid out and every component is removed down to individual parts, allowing specially trained Cummins technicians to evaluate the condition of the engine and prepare components for cleaning.

Stage 2: Cleaning
All the reusable parts are cleaned and any debris is removed. A thermal cleaning and blast system – unique within Cummins – uses heat to decarbonise oil and grease from all the engine components, including large cylinder blocks.

An afterburner system limits the amount of waste to the atmosphere. Components are conditioned to bring the surfaces back to original finish ready for the next stage.

Stage 3: Inspection
High quality inspection and assembly tools gauge the condition of

each of the salvaged parts to see if they can be reused from a quality perspective, avoiding additional cost and waste.

Stage 4: Component
Product tolerances are measured, so all parts meet Cummins specifications. Electronic gauging equipment ensures efficient, reliable and functional parts. Any parts that do not meet specifications, right down to cylinder head screws, are replaced.

Stage 5: Reassembly
More than 150 quality checks are completed to make sure the engine fulfils Cummins standards. Specifically designed manufacturing level assembly tooling is used to support process flow and efficiency.

Stage 6: Testing
Engine is tested to make sure it meets Cummins quality and performance standards. A new state of the art engine dynamometer with auto test capability has been installed that can provide 20 test validation parameters over the full range of engines.

Engine reports are computer-generated and can be provided, including post-test spectrum oil analysis for Ultimate engines.

The final part of the process is paint and finishing the engine to a colour of choice.



One of the first Cummins high-horsepower customers to send an engine to Krakow was ShannonFerry Group Limited, operator of the longest domestic ferry service in Ireland.

Shannon Ferries' two roll-n roll-off ferries, the *MV Shannon Dolphin* and the *MV Shannon Breeze*, run between Killimer and Tarbert, connecting the counties of Clare and Kerry and forming an unforgettable part of the Wild Atlantic Way tourist route along the west coast of the Emerald Isle.

At that point, the crossing of the Shannon, the largest and deepest river in the British Isles, takes about 20 minutes.

Each of the ferries is powered by four

Cummins marine engines – KTA19-M3s on the *Shannon Breeze* and QSM11s on the *Shannon Dolphin*, which has a smaller propeller unit than its sister vessel and requires less propulsive power.

The KTA19 proves its worth around the world on challenging commercial marine operations, although it is increasingly seen in recreational boating applications including super yachts. The QSM11 is another proven workhorse.

Patrick Deegan, Country Leader - Ireland, invited Shannon Ferries' operation manager Pat Moloney to the opening of the European

MRC, certain that the remanufacturing option would be of interest to him.

Sure enough it was, and Cummins Ireland arranged for one of the *Shannon Breeze's* KTA19s to be despatched to Krakow for an Ultimate remanufacture and for the ferry's spare engine to be fitted back at base in Killimer.

"We had a great couple of days in Krakow," said Pat Moloney. "I was really impressed by the set-up and all the technology, and I could see how, with a planned maintenance approach, it could work financially for operators."

"Our ferries run every day except Christmas Day and are back and forth across the Shannon up to 48 times a day in

peak season. They carry around 600,000 people per year on just over 12,000 trips, so they work hard.

"I've been with the business for over 20 years and have been impressed not just with the reliability of our Cummins engines but by the service too: Whenever we

need an engineer out, they are on site next day. They are incredibly responsive."

Pat Deegan said: "Our aftermarket team supports commercial vessels all over the island of Ireland. We understand the importance of this transport link on the west coast for local communities and the growing



Shannon Ferries is a much-loved ferry operator, carrying around 600,000 passengers a year. Inset: the Cummins KTA19 ready to return from Poland

number of tourists who want to experience the majesty of the Wild Atlantic Way."

ShannonFerry Group Limited was inaugurated in 1969, with six families based on both sides of the estuary investing to create the company.

Before the introduction of the service the quickest way to travel between Tarbert and Killimer was via Limerick city, a 137-kilometre (85-mile) journey.

The company's two ferries were built by Appledore Shipbuilders in Devon, England. They can each carry 350 passengers and the *Shannon Breeze* can take 60 cars – eight more than the *Shannon Dolphin*.

DETAILS
For more information visit <https://cummins.tech/cumminsmagazine2024-shannonferries>



Combining forces: Cummins and CLAAS

Strategic alliance helps partners set new standards in agricultural sector

Cummins and CLAAS are continuing to strengthen a strategic partnership that has set new standards for combine harvesters in terms of performance, durability and reliability.

It was in 2014 that Cummins and CLAAS sat down to explore the possibilities of aligning their commercial interests.

They would soon emerge with a groundbreaking plan to collaborate on global product strategy, with local supply of paramount importance.

At the heart of the plan was a 'smart platform' approach to accommodate Stage V and Stage IIIA engines which Cummins could produce in Europe and China, regions where CLAAS builds combines.

It also considered the best marriage of Cummins engines with CLAAS powertrains as well as global aftermarket support, a uniquely powerful asset for the Cummins brand.

CLAAS also has the comfort of knowing it can source engines from Cummins in other regions, including China, allowing it to be agile in its production planning.

The first product from the partnership, the AVERO, was launched in 2017, and

with the launch of the TRION model in 2021 and the Evion Model launch in 2023 the business grew significantly.

The new generation of Cummins-powered CLAAS combines have been a hit with farmers, making their work less arduous, more efficient and, as a consequence, more profitable.

The partnership extends beyond the integration of Cummins engines with CLAAS combines. The partners have



Over the past 10 years the relationship between the two companies has become more and more streamlined and we have become true partners



worked closely together to develop cutting-edge solutions tailored to the specific needs of the agricultural sector.

They have collaborated on engine control systems during integration of the Cummins engine into the powertrain to ensure the best in terms of both engine and powertrain.

Jürgen Ackermann, Key Account Manager for Cummins, said: "The partnership with CLAAS is extensive, and it is rewarding to see the collaboration of teams in different areas and at various levels. These teams are working closely together in all the key areas, including research and development, application engineering, quality control, service and parts, logistics and leadership.

"It is really a pleasure managing such a complex and global construct. Over the past 10 years the relationship we have between the two companies has become more and more streamlined and we have become true partners, from the factory floor to the boardroom."

Jürgen said Cummins' ability to draw extensively on its heritage in the agriculture industry was core to the success of the CLAAS partnership.

"We know how to build robust engines with high uptime to deliver phenomenal total cost of ownership results.

"Our engineering expertise means we can provide the best engine and collaborate with CLAAS to tailor power and torque curves to deliver the best powertrain for its customers."

The power behind the productivity

Specially designed for the TRION, the most flexible combine harvester ever built by CLAAS, the Cummins L9 Harvest utilises Cummins in-house air handling, combustion, fuel systems, exhaust aftertreatment and electronic controls capability. Key technologies such as turbocharging are specified for optimum responsiveness, cost of operation and productivity.



AN EMPIRE FOUNDED ON QUALITY

Founded in Harsewinkel in northern Germany in 1913, CLAAS is the world's largest family-owned agricultural machinery company, a brand associated with supreme quality and the leading manufacturer of combine harvesters in Europe.

Cummins played a key role in the development of the TRION – voted Farm Machine of the Year 2022 – and the more compact EVION combine, aimed at smaller-scale farms.

The TRION range comprises up to 20 models across three series. Power is from Stage V Cummins' 6.7 and 9-litre engines built in Darlington, UK. With a capability of 190-320 kW (255-435 hp) they have high power density and excellent fuel efficiency. Darlington also supplies Stage IIIA versions of the engines for markets beyond Europe, North America and China.

The engines satisfy CLAAS's demand

for global flexibility by sharing the same block and envelope, making the build process and servicing more efficient.

They also have simple and robust exhaust gas recirculation (EGR)-free designs, meaning they are reliable and easy to maintain in tough farming operations.

The launch of the EVION range in summer 2023 was another important milestone in the relationship with Cummins, completing the refresh of the CLAAS combine harvester family.

Common to both EVION models is the Cummins B6.7, the same common-rail six-cylinder unit used in the TRION and yielding the same excellent level of torque at low revs.

The full rated output of 152 kW (204 hp) (EVION 410) and 172 kW (231 hp) (EVION 430) is available at just 1,900 rpm, while the idle speed is a low 800 rpm (1,200 rpm with active hydraulic functions).

As with the TRION, the EVION comes with DYNAMIC POWER as standard across the board. The technology ensures the engine delivers only as much power as is actually required at any time, saving precious fuel. On the TRION, the rated engine speed is just 1,900 rpm, dropping to 1,650 for road travel.

Cummins' in-house air handling, combustion, fuel systems, exhaust aftertreatment and electronic controls capability means the engine operation on the EVION is closely aligned with that of the machine.

Jürgen Ackermann said the EGR-free architecture of the Cummins Stage V engines was a massive advantage to CLAAS as it reduced complexity and relieved space that would have otherwise been claimed by the cooling system.

For operators toiling in dusty conditions, it means less heat in the engine compartment and fewer 'traps' where crop debris could potentially ignite.

DETAILS

For more information scan the QR code or visit www.cummins.tech/cumminsmagazine2024-claas



IT ALL BEGAN WITH A HUMBLE KNOTTER

CLAAS traces its roots back to April 1913 when August Claas founded the company as a manufacturer of straw binders for farmers, based at the family farm in Herzebrock-Clarholz, Westphalia.

In 1919 the Claas brothers purchased a disused quarry and buildings in nearby Harsewinkel and turned it into a factory.

In 1921, August filed his first patent application, a knotter device for tying sheaves of grain.



The CLAAS knotter, 1921

The 1930s saw CLAAS venturing into combine harvester production. With its innovative design and efficient performance, the CLAAS combine quickly gained recognition.

During the 1940s and early 1950s, under the leadership of brothers August Jr., Franz and Theo Claas, there was further expansion and diversification for CLAAS.

In 1953, the company introduced its self-propelled combine harvester, the HERCULES, which set new standards in harvesting efficiency.

In 1967, the company introduced the Dominator combine harvester, featuring a hydrostatic drive system for greater speed and manoeuvrability. It became a European top seller.

For decades, CLAAS had considered a move into the tractor market, and those



August, Franz, Theo and Bernhard Claas, who together founded the company in 1913.

ambitions came to fruition in the XERION range, launched in 2003 on the back of the company's acquisition of a stake in Renault Agriculture, which it acquired fully in 2008.

Today, CLAAS is a global enterprise with production facilities in Europe, North America and Asia. The brand is represented in more than 130 countries.

The CLAAS product portfolio includes state-of-the-art farming information technology.

CLAAS employs more than 12,000 workers worldwide and reported a turnover of 6.1 billion Euros in the 2023 financial year.

Partners in the urban transport revolution

Cummins and Polish bus giant Solaris are united in the drive to improve air quality across Europe

Over two decades, Cummins and Polish bus manufacturer Solaris have forged a powerful alliance that is revolutionising urban transportation in Europe.

Both partners are deeply committed to finding innovative ways to deliver cleaner, more efficient buses, with their most recent successes in the exciting area of CNG (compressed natural gas) and hybrid buses.

Cummins has played a pivotal role in providing Solaris with advanced CNG and hybrid powertrain solutions. The ever-dependable Cummins L9N natural gas engine, now being produced in Darlington in the north-east of England, powers the Urbino CNG bus series.

These highly acclaimed buses, admired for their low emissions, extended range and comfortable ride, have become a welcome presence on Europe's urban roads since the first one appeared almost 20 years ago.

Since 2009, Solaris has delivered close to 2,000 Cummins-powered CNG buses to customers across Europe, supporting emissions reduction from public transportation systems.

Dariusz Kosek, Territory Manager – Southern and Eastern Europe for Cummins, said: "The successful partnership between Cummins and Solaris

Solaris is Europe's leading provider of CNG buses, using the Cummins L9N on its Urbino 12 and articulated Urbino 18 models

has had a ripple effect across Europe, encouraging the adoption of CNG in cities seeking to reduce their emissions and improve air quality. More recently, it has also opened the door to growing number of hybrid bus orders for Solaris."

Solaris is a part of Spanish Group CAF. The company is a leading European manufacturer of city buses and trolleybuses. To date, Solaris has manufactured over 25,000 vehicles operating in 33 countries and more than 850 cities.

Solaris is Europe's leading provider of CNG buses, using the Cummins L9N on its Urbino 12 and articulated Urbino 18 models.

In June, Solaris announced an order for 244 Cummins L9N (CNG) engines to power a fleet of Urbino buses operated by ATAC in Rome.

In Tallinn, Estonia, bus operator Aktsiaselts Tallinn Linnatransport (TLT) has shown its enthusiasm for CNG by topping up on its initial order of 100 Urbinos. By the time its orders are complete, there will be 350 Urbino gas models, all powered with the Cummins L9N, running on the roads of the Estonian capital, predominantly Urbino 12s but with more and more Urbino 18s joining the portfolio.

Solaris won an order for 250 of its Urbino 12 CNG buses for Empresa Municipal de Transporte (EMT) Madrid, almost half of the total CNG fleet serving the Spanish capital. Five roof-mounted 1,575-litre CNG storage tanks on each bus enables them to cover approximately 400 km on one refuelling.

In Solaris' home market of Poland, the City Bus Plants (MZA) in Warsaw received 100 CNG Urbinos – 40 of them Urbino 12s and the rest Urbino 18s. MZA Warsaw is the largest and one of the first customers to be served by Solaris. It has already purchased more than 1,300 multi-generational Solaris vehicles in total. MZA forecasts that by 2027, half its 1,500 Warsaw buses will be low- or zero-emission.

In recent years, there has also been demand among operators for buses equipped with a hybrid solution. Solaris is ready to fill this demand with hybrid versions of its Urbino 12 powered by the Euro VI-compliant Cummins B4.5 and Urbino 18 with Cummins B6.7.

In Barcelona, Solaris will provide 87 Urbino 12 hybrid buses for the Area Metropolitana de Barcelona (AMB) network. They will include a hybrid drive, consisting of an electric motor and a Cummins B4.5 diesel engine with more than 150 kW of Euro VI power.

With supercapacitors to store and recover energy, the buses will be able to achieve lower energy consumption and reduced emissions.

In the city of Galati in the east of Romania, Solaris provided 20 Urbino 12 hybrid low-emission buses fitted with Stop-Start technology which shuts down the Cummins B4.5 diesel engine when the bus stops and restarts it when the

vehicle starts, saving on fuel and cutting emissions. Solaris has a strong history in Romania, delivering almost 500 vehicles since 2002, including 180 trolley buses.

In 2021, the three Belgian cities of Namur, Liège and Charleroi – all part of the Opérateur de Transport de Wallon (OTW) network – ordered a total of 161 Urbino 12s to take the size of OTW's Solaris hybrid fleet to nearly 400. The latest vehicles are equipped with the eco-friendly HybriDrive hybrid electric drive system.

The city of Elche in Spain received 17 Solaris Urbinos to bring the size of its hybrid fleet to 28, almost half of its entire bus fleet. There are now more than 500 Solaris buses operating throughout Spain, three-quarters of which are equipped with a zero-emission or low-emission power.

Technical advancements flowing into Cummins from its recent acquisitions, plus the launch of Accelerera, will enrich the Solaris partnership

In the Sardinian capital of Cagliari, 100 Urbino 12s hybrid buses are due to enter service this year, operated by ARST, the island's largest public transport company.

Dariusz Kosek said the technical advancements flowing into Cummins from its recent acquisitions, including Meritor and the Siemens Commercial Vehicles business, as well as the launch of its Accelerera business, would enrich the partnership with Solaris.

New capabilities in axle, brake and electric drive technology positions Cummins as a leading provider of integrated powertrain solutions.

"By making our product range and portfolio much wider, we are confident we can make Cummins even more attractive to Solaris as well as to other OEMs," said Dariusz.

Original article was written by Aleksander Kierecki: Editor, Infobus.pl and has been adapted for the Cummins Magazine

DETAILS
For more information scan the QR code or visit <https://cummins.tech/cumminsmagazine2024-solaris>



SOLARIS WINNING ACROSS EUROPE



244

Solaris has ordered 244 Cummins L9N CNG engines ready to fit into a fleet of Urbinos operated by ATAC in Rome



500+

Following orders from Madrid (250 CNG models) and Barcelona (87 hybrids), plus a hybrid top-up from Elche, there are now more than 500 Solaris buses operating in Spain



350

Bus operator TLT will soon be running a total of 350 CNG Urbino models in the Estonian capital Tallinn



100

In Poland, MZA Warsaw, one of the first customers served by Solaris, has recently taken delivery of 100 CNG Urbinos



400

Three Belgian cities (Namur, Liège and Charleroi) in the OTW network have received a total of 161 Urbino 12s to take the size of its Solaris hybrid fleet to nearly 400



20

The eastern Romanian city of Galati has ordered 20 Urbino hybrid models powered by the Cummins 4.5 diesel engine

Europe welcomes local production of L9N

Darlington takes on its first natural gas engine

European bus and truck customers have welcomed the production of Cummins L9N natural gas engines at the Darlington plant in the UK in the ongoing mission to reduce emissions.

Designed to meet Euro VI Phase E emissions regulations, the L9N is in high demand, particularly in towns and cities with low emission zones. It is currently helping to transport passengers on city bus routes throughout Azerbaijan, Estonia, Poland, Spain and Türkiye.

Cummins transferred production of the L9N from its Rocky Mount Engine Plant in North Carolina, US, to provide its Europe-based L9N customers with

in-region supply. It is the first natural gas engine produced at Darlington in the plant's 59-year history.

The move, which was completed in just six months and after a significant investment in Darlington Engine Plant, has reduced supply chain complexity and supports more sustainable operations by shortening shipping distances and times.

The L9N shares many components and parts with Cummins L Series diesel engines, inheriting not only their renowned simplicity but also allowing Cummins to build it on the same assembly line as its diesel engines.

The 8.9 litre L9N (280 – 320 hp) combines an ultra-low emissions profile for CO₂, NOx and particulate matter, with diesel-like performance and reliability. It can operate on compressed or liquified natural gas as well as renewable natural gas, which significantly reduces well-to-wheels carbon emissions.

"Bringing L9N production to Darlington ensures we can continue to deliver a high level of service to key customers at a time of increased demand for our products, particularly in Europe," said Account Executive Stephen Gill.



"It also broadens our capabilities: producing spark-ignited engines for the first time in Darlington positions us well for other low and zero carbon fuels in the future. This is enormously positive for the plant, our people and our local economy."

The L9N is one of Cummins' many lower emissions power solutions that are either in development or powering vehicles and equipment right now. Cummins' power portfolio includes ultra-clean diesel, natural gas, hydrogen fuel cells and battery systems – all contributing toward the achievement of Cummins' Destination Zero strategy to reduce emissions from the world's hardest working sectors.

DETAILS

For more information scan the QR code or visit <https://cummins.tech/cumminsmagazine2024-19n>



Darlington, in the north-east of England, has a rich industrial heritage

Quietly confident

Baltic Yachts harnesses Cummins power

Baltic Yachts of Finland has taken a step forward in sailboat design by introducing the new BALTIC 110 CUSTOM yacht, fitted with twin Cummins 4.5 marine engines.

The 110-foot carbon sloop was launched in the summer of 2023 after a 30-month construction project. It is designed to offer unforgettable cruising experiences around the world. This project showcases Baltic Yachts' continuous commitment to innovation and sustainable sailing.

One significant innovation in this vessel is its electric powertrain. The boat is powered by an electric motor, enabling smooth and silent movement.

Additionally, the motor converts into a generator using the boat's propeller while sailing, generating electricity while the boat moves on windy seas. This increases the boat's energy efficiency and reduces reliance on traditional fuel.

The pair of Cummins B4.5s power the generators. The electric propulsion system, along with the Cummins engines, is exceptionally



The choice of engines considered power, size and weight. The goal was to achieve 129 kW of power as efficiently as possible with a compact engine

quiet, enhancing the comfort of the sailing experience.

The choice of these engines considered power, size and weight. The goal was to achieve 129 kW of power as efficiently as possible with a compact engine.

Given these criteria, the Cummins B4.5 proved to be the right choice.

During testing, the engine performed excellently, even in overload situations, meeting the project's requirements.

"All in all, it has gone very well. Just based on how the engine sounds," said Kim Kolam, Baltic Yachts' electrical systems engineer. "The turbo whistles just right, and you can tell there's no cause for concern. After this experience, if we need 130 kW engines, this is a very good option."

After a short trial, Baltic Yachts has been so satisfied that it will also use the Cummins B4.5 in its next project. The engines have undergone successful tests, and after nearly a day of testing, they are confirmed to operate as expected.

The cooperation between Baltic Yachts and local Cummins authorised dealer Machinery Oy has been very smooth, and Machinery Oy has provided the necessary expertise for the project.

"It has been great to be a part of such an advanced construction project and deliver the first Cummins B4.5 engines to customers," said Petri Flinkman, Machinery Oy's sales and application engineer. "These engines offer a lot of power in a compact package, which is why they were perfect for this project."

Founded half a century ago, Baltic Yachts has built almost 600 yachts from a series of highly acclaimed production boats to the most successful, award-winning super-sailing yachts afloat.



Cruising in style

The technical specifications of the BALTIC 110 CUSTOM yacht are impressive. It has an overall length of 33.5m, a width of 7.6m, and a draft ranging from 3.8 to 5.8m. The displacement is 95 tons. These features, combined with the efficiency and environmental friendliness offered by the powertrain, make the yacht an excellent cruiser.

STEM project unites children in the UK and Uzbekistan

Youngsters 4,000 miles apart come together to build their own basic electric racing car

If you ever doubted the ability of young minds to grasp what many adults would consider complex concepts, then you'll be amazed by the achievements of two groups of young children – one in a school in northern England, and the other 4,000 miles away in an orphanage in Uzbekistan.

With the support of Cummins, children ranging from six to 12 years of age have managed to bridge the language, culture and time divide. They are collaborating with great success on building a basic electric racing car.

The story begins with a visit by Cummins to Rudmash Export Service, which has been representing Cummins in Tashkent, the capital of Uzbekistan, since 2018.

Rudmash is a highly respected supporter of community initiatives, which is a key focus for Cummins.

During his visit, Amit Kumar, Cummins' Technical Territory Manager for the Commonwealth of Independent States (CIS) region, suggested Rudmash might consider introducing local children to the fantastic learning opportunity that comes from building an electric car.

The Rudmash executive team loved the idea and reached out to their friends at the local orphanage (Children's Home 22), about the proposed connection with children from West Park Academy – a primary school near Cummins' manufacturing plant in Darlington, England.

Speaking through a translator, Rudmash Sales Manager Mavlonberdi Akhmedov said there was no hesitation from the orphanage. "Everyone was excited about it," he said. "When we showed them pictures of the car, the children's eyes lit up with interest.

"The only issue we encountered was not being able to involve the older children,

but I think Amit has something in his mind for them."

Over in Darlington, teacher David Fraser and his group of nine to 11-year-olds were thrilled at the prospect of working with children from another country.

"Before our first session, I showed the children a map of Uzbekistan and explained how the time zones worked," Mr. Fraser said. Tashkent is four hours ahead of us.

"When they started hearing a different language, they were a little hesitant although still excited. However, towards the end, once they got used to the translation pauses, lots of questions were being asked.

"They adapted very quickly, and every session with the orphanage has become more engaging. The children have greatly benefited from the relationship. It's been a great learning experience."

The car involved in the project is called the Greenpower Goblin G2. It comes as a flat-pack kit including chassis, wheels, steering, disc brakes, a 24V electric motor and two 12V batteries.

The build introduces children to basic mechanics and electronics and might be the first step on the pathway to a career in engineering or another STEM field.

Mr. Fraser said the children soon started discussing aspects of the car such as frames, brakes and steering geometry. There was a lively question-and-answer session on different materials that could be used to design and make the car's body. Their last session was about controls and driving.

"There are also other general discussions, as the children are eager to learn more about each other's countries," said Amit, who leads the sessions.

Rudmash service engineer Abdullayev Shakhzod said the children were enjoying the experience of working in teams. "It's a fantastic new chapter in

the history of a place that has a storied past. It was established in 1942 during the Second World War to care for evacuees from all over eastern Europe. Children of over 40 different nationalities have been cared for by this children's home.

"The home is named Antonina Pavlovna Khlebushkina after the woman who ran it in the early days. She would be so proud of what is happening there today."

Amit said the UK and Uzbekistan cars were fully complete mechanically and had been tested successfully. Now the focus in Uzbekistan is on the bodywork. "The children are enjoying the experience immensely and have proved to be fast learners," said Amit.

Mr. Akhmedov mentioned that the management team at Rudmash was considering how the project could expand beyond the children's home and into schools and youth organisations throughout Uzbekistan.

He praised Amit and Cummins for all their support, saying: "They have shown great responsibility at every stage and been very proactive, always striving to ensure things are done right.

"This is just the beginning for these children. It's already motivating them to learn more and develop their skills in broader technical applications.

"The project is not only important for the children's home but also for our city of Tashkent and the Republic of Uzbekistan, as it is nurturing an educational culture that is highly valuable. I can't thank Amit and Cummins enough."

Amit said it was a privilege to help Cummins inspire young people about engineering and science from an early age.



Working wonders with water

Cummins volunteers in Spanish geopark project

A team of volunteers from Cummins is working on an important environmental project within an internationally recognised protected nature park 55km north-east of Madrid.

The project, to preserve the water-linked ecosystem of the Molina and Alto Tajo UNESCO Geopark, is part of the multi-million-dollar Cummins Water Works (CWW) initiative.

The goal of CWW is to advance water security for 20 million people by 2050, by which time it is forecast at least one in four people will likely live in a country affected by chronic or recurring water shortages.

The project is based near Cummins' new 20,000sq m Guadalajara proton exchange membrane (PEM) electrolyser plant, scheduled to come onstream in 2024.

The plant will play an important role in the decarbonisation of European industry and the transition to clean energy.

Cesar Rodriguez Matas, Health, Safety and Environment Manager at the electrolyser plant and the leader of this CWW project, said: "As a new employer to the region, we feel we have a duty to show our support for conserving this precious natural resource and helping the local community."

Working alongside the Cummins volunteers and providing expert direction is a not-for-profit organisation, Asociacion Nacional Micorriza.

Micorriza is highly respected for its environmental restoration work in partnership with rural organisations in Guadalajara and the wider Molina de Aragon region.



The Cummins and Micorriza teams first met in April 2023. "We really liked what they had done and the way they promote sustainable water management in our region," said Cesar.

"We agreed on a two-year programme of activity to help preserve water-linked ecosystems in the geopark, which will be split into three phases: revegetation of the Linares River waterfront; recovering water sources and springs; and clearing debris that has clogged many of the waterways."

In June, the project group walked along the bank of the Linares River and learned about the soil quality and plants and trees species native to the Molina and Alto Tajo Geopark.

The first action involved a team of 20 employees creating a trough to make it easier for reptiles and small animals to have access to water.

"In partnership with Micorriza, we hope to plant 650 trees, preserve two

kilometres of riverbank, and deliver improved water flow," said Cesar. "In the process, we will be restoring the natural landscape and creating biodiversity hotspots and shelters for birds and mammals."

At least 50 employees are expected to be involved in the Micorriza project, volunteering more than 250 hours to support the work.

Awareness of the importance of water conservation was heightened by the heatwave that engulfed Spain last summer, with temperatures in excess of 40 degrees Centigrade.

"People are seeing the consequences with their own eyes," said Cesar. "Areas that used to be green are now brown. We will need to ensure the plants and trees get the water they need this summer."

This project aligns with the Cummins Planet 2050 goal to be net water positive in every region by 2030, and net water positive in every community by 2050.

Micorriza project key numbers


650
trees to be planted


2km
of riverbank being preserved


400 million
gallons of improved water flow





Extended warranty plays major role in maximising uptime

We love the products we make at Cummins. There's a pride and a passion that goes into the process of turning raw materials into sophisticated machinery that's designed and built to yield many years of outstanding service.

'Made by Cummins' is a mark of excellence recognised the world over and across multiple business sectors.

It's no exaggeration to say that Cummins has been at the heart of industrial progress from almost as far back as when Clessie Cummins founded the business more than a century ago.

In today's fast-paced world and with so much focus on cost and efficiency, Cummins craftsmanship and durability is valued more than ever.

What is also valued is a degree of certainty

that should something unexpected happen, your Cummins-powered equipment can be back into action quickly and working as well as ever.

All Cummins engines come with a manufacturer's warranty as standard and the option of extending that warranty by two, three or five years.

"Our customers need to be aware of the benefits of extended warranties because they offer an extra layer of protection that could reduce downtime and bring down the total cost of ownership," said Darren

Wilde of the Cummins Care Europe team.

With an extended warranty from Cummins, customers can rest easy that should anything untoward happen, they don't have to go shopping around for quotes: they will have immediate access to a highly skilled

network of trained technicians that can rapidly diagnose and fix the issue using specialist tools and fitting quality Cummins genuine parts.

"Using all our experience and resources, we can ensure our customers' Cummins-

powered application is back up and working as it should with the minimum downtime," said Darren.

"This fast and effective response is an important consideration when looking at productivity and the total cost of ownership, which in many cases is a considerable investment."

Because the extended warranty is matched to the engine model, if there has been an upgrade to any component, in the event of a service issue the customer will always receive the very latest part, which means the business can stay in step with advances in engine technology.

The extended warranty is flexible in its application and can relate to either the engine or the engine and aftertreatment system.

It can also dovetail with any service agreement that the customer might want to put in place to provide further certainty on running costs.

The service agreements, which are becoming increasingly popular in an era of rising labour and parts costs, can be tailored to specific needs and typically encompass maintenance (scheduled and non-scheduled), general servicing, 24/7 service and repair, parts and consumables.

Setting up an extended warranty and service agreement with Cummins is simple. Customers can approach their account manager or contact their local distributor.

DETAILS

For more information visit www.cummins.tech/cumminsmagazine 2024-cumminscare



Smooth running

Transport UK London Bus enjoys service confidence from Cummins

A comprehensive and uniquely crafted service agreement between Cummins and Transport UK London Bus is proving its worth not just for both companies but for travellers who between them take millions of journeys each year.

The agreement is centred on improving the reliability and efficiency of Transport UK London Bus's 560-strong fleet of Cummins-powered Alexander Dennis buses which make up the bulk of its total fleet of around 800 buses operating in the west, south-west and central areas of the capital.

Since it has been in place, the service agreement has helped Transport UK London bus gain a firmer grip on budgeting and operational planning while reducing performance penalties from Transport for London (TfL) and increasing customer satisfaction.

The Cummins team met with Transport UK London Bus directors at Hayes – one of six depots in its London network – to discuss the future of the bus market.

"We agreed that partnerships such as ours are

key to unlocking the full potential of existing diesel bus fleets and transitioning toward a more sustainable future," said Janis Krauklis, UK Business Development Manager for On Highway for Cummins.

Janis explained that the relationship between Cummins and Transport UK London Bus has been in place for six years but entered an exciting new phase in 2021 with the appointment of Chris Remnant as Transport UK London Bus's engineering director.

"Chris is a strong advocate for the

Cummins brand. He was very receptive to the idea of a service agreement built from scratch, so we set about visiting the depots and talking to people on the front line to find out where things could improve in terms of service and parts supply.

"Reliability is of extreme importance to Transport UK London Bus, its customers and TfL. We offered our expertise with complex repairs and supporting their engineering team with formalised training as well as upskilling Transport UK London Bus's technicians on engine maintenance and best practices."

The case for replacement

Replacing the Cummins engine with a new like-for-like engine improves fleet performance and uptime and lowers service and maintenance costs



A key component of the service agreement is the availability of like-for-like replacement engines. Cummins maintains good stocks of complete Euro V and Euro VI B4.5 and B6.7 engines built at its factory in Darlington. Replacement of the engine is handled from start to finish by Cummins' team of service experts.

"Replacing a faithful old Cummins engine with a factory-fresh unit improves fleet performance and uptime and lowers service and maintenance costs," said Janis Krauklis. "The net result we are always looking to achieve is lowest total cost of ownership for our customers."

Transport UK London Bus was happy to be featured in a Cummins video demonstrating the process of installing a replacement engine.

Chris Remnant said: "What we have with Cummins is a true business partnership. We feel we can trust Cummins to help us improve our service, increase our reliability and customer satisfaction while ensuring we have the lowest total cost of ownership."

DETAILS

Watch an Cummins experienced technician replace a bus engine

<https://cummins.tech/cumminsmagazine2024-replacementenginevideo>



AmpSentry® Ultimate alternator protection

In our technology-rich society, generators are playing an increasingly important role providing the stable and reliable power on which so much depends. Cummins has a proud heritage in generator set design and installation, helping the world push forward to meet new consumer demands.

In the spirit of constant innovation comes AmpSentry®, a unique-to-Cummins feature that is an integral feature of the sophisticated PowerCommand control.

AmpSentry guards the electrical integrity of the alternator and power system while offering a safer working environment for front-line technicians.

Every alternator has a thermal damage curve relating to the electrical insulation used in the stator winding. When a fault sends the output current soaring, there is a risk to the integrity of the alternator and the potential for major damage.

AmpSentry knows the shape of the thermal damage curve and mimics it but on the 'safe' side, creating an operational security buffer between the two. When the PowerCommand control measures current in any phase as exceeding 110% of the generator set standby rating, AmpSentry kicks in, protecting the alternator and, subject to their rating, the feeder cables connected to it.

AmpSentry provides single and three-phase current regulation which limits current in any faulted phase to 300% of the generator set standby rating, for up to a maximum of 10 seconds for a 3-phase L-L fault and two seconds for a L-G fault before de-exciting the alternator.

The importance of this feature is that downstream overcurrent protective devices (OCPDs) have fault current available to quickly clear downstream faults while

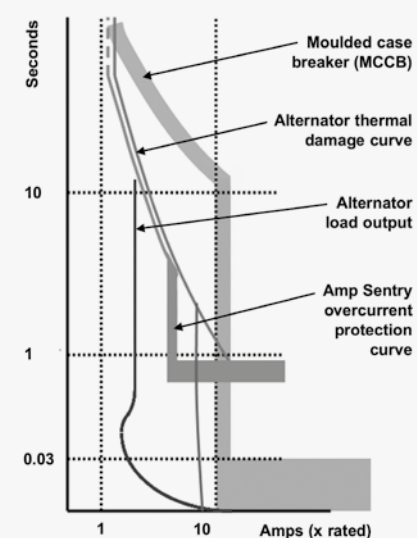
protecting the alternator from thermal damage.

AmpSentry Maintenance Mode can be enabled when work in the vicinity of downstream equipment that may be energised by the generator is undertaken. AmpSentry will shut down (de-excite) the generator within 50 milliseconds of recognising that current on any phase has exceeded 300% of the generator set rating. This rapid response dramatically reduces the available energy to support or sustain an arc flash and the dangers associated with it.

"Specifically in LV systems, AmpSentry helps protect the alternator from potentially catastrophic damage in the event of a system electrical fault, protecting the customers investment in a Cummins generator," said Andy Frazer, Consultant Development Leader.

"Additionally, the associated Maintenance Mode of AmpSentry can be used to enhance worker safety in systems to which the connected generator is a potential source of power."

HOW AMPSENTRY® WORKS



DETAILS

For more information scan the QR code or visit <https://cummins.tech/cumminsmagazine2024-powergeneration-ampsentry>



5 little-known facts about filtration

We asked the Fleetguard experts at Atmus Filtration Technologies to highlight some key issues around filtration that can impact the performance of your equipment. They gave us five facts to consider to maximise performance, gain cost efficiencies, and minimise down time.



Unfiltered Bulk Fuel Can Become Contaminated

Achieving higher engine performance and longer fuel system life requires minimising fuel contamination which can occur during transportation and handling, especially with biodiesel blends and ultra-low sulphur diesels.

If you use bulk fuel, your first line of defence is utilising filtration at storage and transfer facilities to remove water and particulate matter (PM). This prevents the corrosion of engine parts and deters microbial growth in the fuel which can plug filters.

Many Fleetguard fuel filters incorporate StrataPore™ synthetic media to maximise protection for bulk filtration and recirculation applications.

In addition, a high-quality fuel filter on each piece of equipment is recommended.



Additives Can Plug Fuel Filters and Limit Performance

Additives are sometimes used by fuel suppliers to improve diesel fuel flow. They can also be used in bulk storage to inhibit corrosion and deter microbial

growth, and equipment operators may add them to enhance engine protection.

But these additives can inadvertently plug fuel filters, choking the fuel flow rate and limiting engine performance.

If you use bulk fuel, consider adding a filtration system to reduce contaminants. If you use fuel additives, inspect your fuel filters regularly.



'Will-Fit' CV Filters Can Cause Leaks, Drips and Engine Damage

Properly fitted crankcase ventilation (CV) filters remove oil from engine crankcase gases (i.e. blow-by) generated from normal engine operation. Your diesel engine blow-by should contain minimal oil aerosol before routing to the turbocharger (closed system) or directly to the atmosphere via the vent hose (open system). Benefits include reduced emissions and oil consumption while maintaining peak engine performance. Superior-quality CV filter media withstands high engine heat that can melt the media found in some 'will-fit' CV filters. The melted material can clog the drain line or block engine ports.

Inferior CV products may void OEM warranties and emissions standards.

Look for CV filters that feature unique polymer webs with varied fibre sizes that protect the air intake system and the environment.



The Hidden Costs of Cheap Coolants

Nearly 40% of all engine problems originate in the cooling system. Corrosion, scale build-up and cylinder liner damage

can cause premature engine wear and equipment failure.

Conventional coolants are the least expensive but they require more frequent replacement and maintenance of additives, increasing costs. Hybrid coolants such as Fleetguard CC2825 ES Compleat™ combine conventional and OAT technologies to provide superior liner protection and extend service intervals.

OAT coolants are the most expensive upfront but they require no additives and generally last longer without maintenance.

Engine coolant must be tested regularly and periodically replaced following OEM instructions.



Industry Standards Do Not Always Reflect Real-World Needs

Filtration standards such as ISO 19438, SAE J905 and ISO 5011 represent the minimum performance levels or ranges. But like many industry standards, they lag behind the latest technologies and trends.

For example, current standards do not factor in the most recent advancements in high-pressure common rail (HPCR) fuel injection systems, renewable fuels and stricter emissions regulations. They also do not take into account all of the real-world conditions that impact filtration performance.

Fleetguard performs 14 proprietary tests to confirm performance beyond the minimum industry standards.

FILTRATION SCIENCE TO KEEP YOU GOING

Visit <https://cummins.tech/cumminsmagazine2024-fleetguard> or contact your sales representative for more information on Fleetguard products and services



Valvoline and Cummins

A PARTNERSHIP THAT KEEPS DELIVERING

Cummins and Valvoline have been partners for almost three decades, developing premium lubricants technology that delivers superior performance, efficiency and durability for customers of Cummins engines and generators. We spoke to Alistair Weston (right), Valvoline’s Technical Applications Manager for Europe, about the enduring relationship and what lies ahead.



How long have you been involved with Cummins, Alistair?

I’ve been working alongside Cummins for the past 23 years. It’s one of the great industrial partnerships and we’re proud to have developed lubricants for numerous heavy-duty applications, including fluids for vehicles driven by alternative fuels like compressed natural gas.

How important are the fluids for modern high performance power systems?

They are vital, not least because modern internal combustion engines have a much higher power output-to-weight ratio these days and the engine torque has also increased considerably. This is especially the case with Cummins thanks to its precision engineering processes. At the same time, those engines must meet some of the tightest emission standards in the world. With all that in mind, the fluids need to stay stronger for longer, and it’s safe to expect the demands will only increase with every new emission standard.

How does the latest range of Valvoline engine oils enable customers to achieve lowest total of cost of ownership?

Modern heavy-duty engine oils are formulated to keep engines cleaner for longer, saving customers money on oil drains. The detergents in the engine oil keep the engine parts clean while the dispersants keep the contaminants separated so they are not allowed to build into larger particles that may damage the engine. When the oil is drained these harmful contaminants are carried away with the old oil and leave the engine and the oil galleries clean and ready for the next oil drain cycle.

How does Valvoline keep developing world leading fluid for customers?

Basically, we don’t rest until we are satisfied that all areas of research and development have been explored. That includes engine hardware compatibility, turbo design, piston and ring design. Then, just as we have done since we started back in 1866, we test rigorously.

We’re proud to be the oldest trademarked lubricant and the first supplier of engine oils for the first mass-produced vehicle. Today, we’re at the leading edge of developing lubricants for low and zero-emission applications.

“We don’t rest until we are satisfied that all areas of research and development have been explored”

Our Premium Blue One Solution and Premium One Solution Gen2 oils have won multiple industry awards for their superior quality and unmatched savings to end-users.

Why is the link between exhaust aftertreatment systems and the engine oil so important?

Most emissionised engines and newer applications use a diesel particulate filter, or DPF. This is a filter that’s fitted in the exhaust system whose job is to capture the harmful particulates created during the combustion process. The engine emission system will perform regular DPF regeneration cycles that will burn off these deposits.

The engine oil needs to protect the engine but at the same time work in harmony with the aftertreatment system. If the wrong oil is chosen, more particulates will be created during combustion and they will start to block the DPF, leading to significantly reduced power and efficiency and a reduced filter service life.

Cummins is taking steps to decarbonisation through its next generation engine platforms. What does oil technology need to do to support that low carbon transition?

As Cummins global oil partner Valvoline (and the oil industry in general) needs to continue to develop and find new solutions to assist with the move to lower CO2 strategies and alternative fuel technologies, whilst at the same time ensuring that engine durability, life and performance of the engine remains a key priority. The Valvoline partnership with Cummins that this year enters into its 30th year celebration is a good example of how a technology partnership can continue to create new innovative mobility solutions designed for the new world.

What would be your top tips for maximising the performance of your Cummins power system?

The most important recommendation we at Valvoline can make is choose the right oil for the right application. Then it’s a case of following the viscosity charts recommendation to ensure you make the right choice for the climatic condition. Finally, it’s critical that customers faithfully observe the engine maintenance guidelines to avoid the excessive build-up of particulates that could lead to a costly engine repair, and what’s best to achieve all of that than Valvoline Premium Blue, the only oil tested and exclusively developed for Cummins engines.

DETAILS

For more information on the Valvoline Cummins fluid portfolio, scan the QR code or visit: <https://www.cummins.tech/cumminsmagazine2024-valvoline>

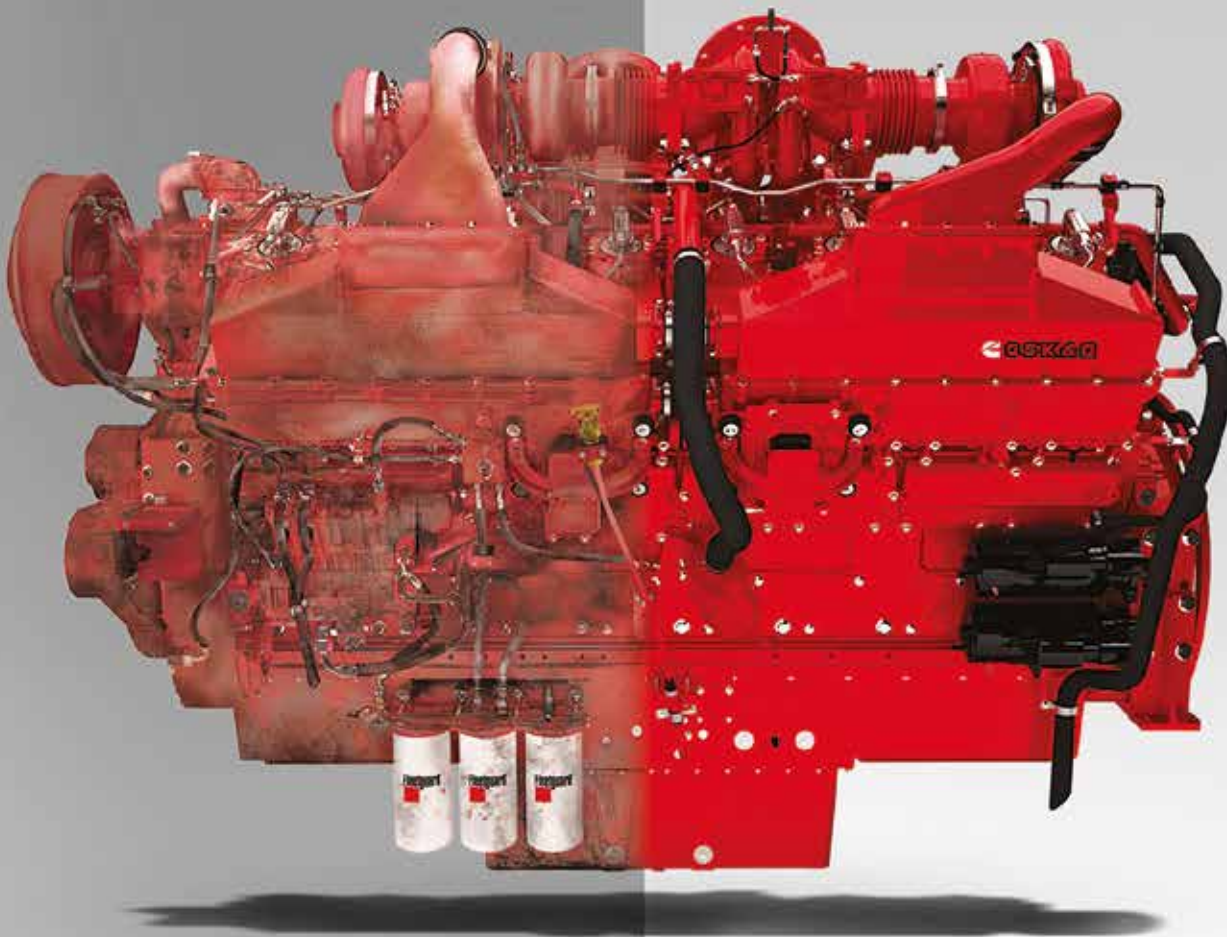


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TOTAL ENGINE LIFE MANAGEMENT FROM CUMMINS

Cummins has a global service network dedicated to repairing, rebuilding and remanufacturing engines that maximise uptime and lowers total cost of ownership.

Our European Master Rebuild Centre can rebuild and remanufacture Cummins' engines to meet the exactly the same standards as a brand new engine.

For more information contact your Cummins' account manager or visit:

