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DPI

DIESEL PROGRESS INTERNATIONAL

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products



Ag and forestry



THE MAGAZINE FOR ENGINE DESIGN, POWER AND COMPONENTS ON A GLOBAL SCALE

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COMMENT

A waiting game (and a departure)

Discussing the state of the industry, the boss of a leading European construction equipment company was trying to remain cheerful despite the current challenges the industry was facing.

The company he worked for had a load of pristine, expensive pieces of off-highway mobile equipment stored at the factory and, for all the world, they looked ready to take on some serious work.

Each machine had a six-figure price tag and looked in perfect condition. But they were, currently, useless thanks to the global lack of semiconductors. The absence of a tiny component meant the machines were not going anywhere soon.

And it's not just off-highway equipment that has been impacted. Far from it. Car makers have been particularly badly hit as they try and source the electronic wizardry required for new vehicles.

The shortage is due to a variety of factors – ranging from a fire at a major chip-maker through to the rise in the use of 5G.

But in the UK, and in many other countries, there seems to be a shortage of just about everything at the moment especially steel, timber, paint, plasterboard and even cement.

The severe lack of truck drivers here has meant that some supermarket shelves appear, at times, to be less than full.

And there is a human factor at work in the United Kingdom. Try and secure tradespeople for anything from small household jobs through to major construction projects and it will be quite a task.

The days when you could contact someone to carry out work and expect them to turn up a day or two later are long gone.

And, on a completely separate note, this is my final issue of Diesel Progress International as I am taking semi-retirement. More of a work-life balance someone described it as.

It's a great honour to have been at the editorial helm of DPI and I'd like to wish all of our readers and advertisers the very best for the future.



Each machine had a six-figure price tag and looked in perfect condition. But they were, currently, useless thanks to the global lack of semiconductors.”

Ian Cameron

Editor.

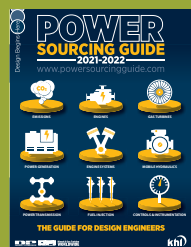
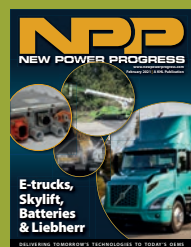
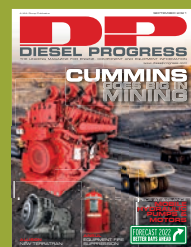
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OUTSIDE

DPI turns the spotlight on farming, forestry and the marine sectors in this issue.

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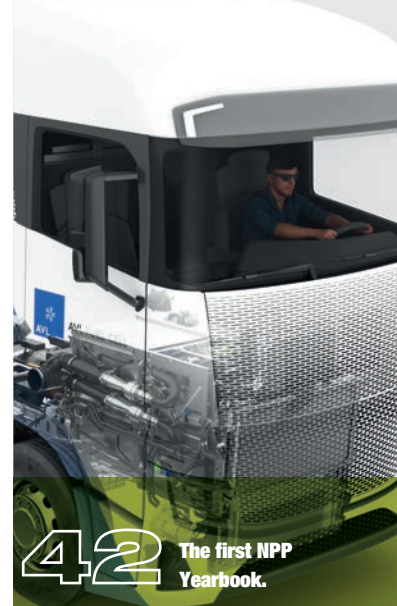
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The latest Industry News.

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Finalists named for Diesel Progress Summit Awards

The awards nominees for the third Diesel Progress Summit and Awards have been selected. The Diesel Progress Awards nominees were selected by an independent panel of judges, with awards to be given in eight categories.

The Diesel Progress Summit is a unique one-day conference and awards dinner for the engine and powertrain technology industry.

The event covers technologies used in off-highway machinery used in construction, agriculture, mining, forestry, and marine, as well as on-highway commercial vehicles.

Returning as a live event after the COVID-19 year of 2020, the Diesel Progress Summit and Awards will be held Oct. 26 at the Loew's Chicago O'Hare hotel in Rosemont, Illinois, USA.

The theme of the Summit is "Power Technologies for

Today and Tomorrow."

The awards are intended to honour excellence and achievement in the engine and powertrain industries.

Past award winners have included John Deere Power Systems, Dana, Caterpillar, Hatz, Kohler, Briggs & Stratton Vanguard and Meritor.

The nominees for 2021 are:

ENGINE OF THE YEAR UNDER 175 HP

- The Deutz TCD 2.9.
- The JCB 430 DieselMax.

ENGINE OF THE YEAR OVER 175 HP

- The Deutz TCD 13.5.
- The Volvo Penta D16.

ELECTRIC OR HYBRID APPLICATION OF THE YEAR

- The Allison eGen Flex.
- The Deutz Hybrid Power Tree.
- The Skylift-Kraft Digger Derrick.

EMPLOYER OF THE YEAR

- Anderson Industrial Engine.
- Catalytic Combustion Corp.

ENGINE DISTRIBUTOR OF THE YEAR – NORTH AMERICA

- Deutz Power Center Florida – South, West Palm Beach, Fla.
- Iowa Power Products, Iowa Falls, Ia.
- Melton Sales and Service, Columbus, N.J.

ENGINE DISTRIBUTOR OF THE YEAR – INTERNATIONAL

- Brinkmann & Niemeijer (B&N), Gelderland, the Netherlands.
- NPS Diesel B.V., Ravenstein, the Netherlands.

NEW POWER TECHNOLOGY

- The Dana ePowertrain.
- The Hatz Digital Solutions.

- The Honda eGx.

A final award, **THE DIESEL PROGRESS ACHIEVEMENT OF THE YEAR**, is selected from among the category winners and will be announced at the event.

The finalists were selected by a panel of independent judges that consisted of:

- **David Hoffman**, former director, Global Sales, Marketing and Customer Support at John Deere Power Systems.
- **Steve Neva**, International Standards and Regulations Manager at Doosan Bobcat North America.
- **Jim Saunders**, Business Development and MurCal, Inc.

For more information on the Summit and how to attend, go to <https://dieselprogresssummit.com>. **dpi**



year period, to reach €426.8 million.

Earnings before interest and taxes (EBIT) before exceptional items came to €16.0 million.

This was up from an operating loss of €38.1 million in the second quarter of 2020, the company reported.

→ **Deutz** said it achieved further growth in the second quarter of 2021 finishing the first half of the year on a positive note.

The Cologne, Germany-based company said revenue for the second quarter increased by 52.3% compared with the prior-

Rolls-Royce sells Bergen Engines

Rolls-Royce has signed an agreement to sell its Bergen Engines medium speed liquid fuel and gas engines business to global engineering group Langley Holdings plc for an enterprise value of €63m. Langley is funding the deal, together with working capital requirements for the Bergen business going forward, from existing cash reserves.

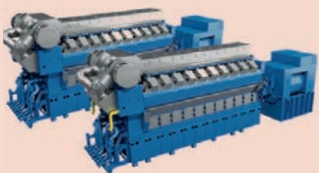
Rolls-Royce said the agreed sale of Bergen Engines is a part of its “ongoing portfolio management to create a more focused group and follows a strategic review of Bergen Engines.

The agreed sale includes the Bergen Engines factory, service workshop and foundry in Norway; engine and power plant design capability; and a global service.

Bergen Engines employs more than 900 people worldwide including 650 in the main factory in Hordvikneset.

In 2020, the business generated revenues of approximately €200m.

The power range of Bergen Engines is 1,400 to 11,830 kWe.



Bergen engines.

Cummins-led hydrogen engine project lands £14.6 million grant

A project led by Cummins has been given £14.6 million to develop a hydrogen-fuelled engine for commercial transport at the company’s Darlington, England plant.

It is part of a package of almost £92 million combined UK government and industry funding which has been committed to various projects.

The Brunel project is headed by Cummins who will oversee a consortium of internal combustion engine (ICE) sub-system suppliers focussed on medium, and heavy-duty engines for trucks and construction equipment, according to the UK’s Advanced Propulsion Centre (APC).

The APC is a private limited company with a board of directors overseeing the investments made by the UK government and industry.

In a statement from the APC it added: “The project will make a major contribution to increasing UK self-reliance in the emerging hydrogen economy and a significant uplift in the UK sourced ICE supply chain.



A key deliverable will be to demonstrate tailpipe carbon dioxide emissions can be virtually eliminated while retaining diesel-like levels of performance.”

Jonathan Atkinson, executive director of Cummins On-highway Business in Europe, said: “This project will significantly accelerate the pace of hydrogen engine development, ensuring that the UK is in the vanguard of this exciting new technology which will play a significant part in decarbonising the global commercial vehicle fleet.

He added that the project “will maintain and upskill many hundreds of key technical jobs, not just at Cummins and our consortium partners but across our total supply base. In the mid-to-long term it offers major potential to

expand our high-value export business, supplying hydrogen engines and sub-systems manufactured in the UK to customers around the world.”

In mid-July Cummins said Cummins it has started testing a hydrogen-fuelled internal combustion engine as part of what it describes “another step forward in advancing zero carbon technology.”

It said that following the proof-of-concept testing, the company plans to evaluate the engine in a variety of on- and off-highway applications, supporting the company’s efforts to accelerate the decarbonisation of commercial vehicles.

Cummins is investing across a range of technologies to support hydrogen-based transportation including hydrogen engines, fuel cells, electrolyzers and storage tanks.

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Alexander Dennis Limited has delivered the first three-axle, electric, zero emission BYD ADL Enviro200EV XLB bus (pictured) for New Zealand to launch customer Auckland Transport.

The 12.6m long vehicle has three axles, allowing it to qualify for reduced Road User Charges in New Zealand thanks to lower axle loads.

→ Motion and control technologies supplier **Parker Hannifin Corp.** said its fiscal 2021 fourth quarter sales were an all-time quarterly record of \$3.96 billion, up 25% compared with \$3.16 billion in the fourth quarter of fiscal 2020, the company announced.

Net income was a record at \$504.8 million, which the company said was an increase of 74% compared with \$289.5 million in the prior year quarter. For the full year, fiscal 2021 sales were a record at \$14.35 billion, an increase of 5% compared with \$13.70 billion in fiscal 2020.

This Doosan DX235LCR-5 excavator has been used to move huge amounts of sand from the seabed and elsewhere to rebuild the protective Trabucador Bar in Catalonia, Spain.

The machine is powered by a Doosan DL06P engine.

In January 2020 Storm Gloria damaged the Bar.

This resulted resulted in the sea invading some 300 hectares of the surrounding land.

It also called major damage to the ecosystem.

The large scale work which has been undertaken on the Bar has involved huge movements of sand which will be able to protect a 2500 hectare area by preventing sea water from entering the crop plantations and other areas.



Deutz and DLR join forces on hydrogen project

Deutz and The German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt (DLR)) are working together to develop new ideas and solutions for the operation of construction equipment and agricultural machinery using hydrogen.

The alliance is a product of the DLR.InnovationHub, which brings together representatives from the worlds of research and commerce, said Deutz.

In a statement, Deutz said the hub “fast-tracks the trialing of innovative new ideas and helps new technologies make the leap from research to application. “The current focus is on the

‘green construction site’, which involves converting existing technologies used in building applications to make them low-carbon or even carbon-free. The DLR’s technology marketing team and the Deutz Innovation Center are coordinating the joint activities.”

Dr. Ing. Markus Müller, Deutz’s Chief Technology officer, said: “The aim is to speed up progress in making hydrogen drives viable for the off-highway segment, and we will be combining our expertise and R&D capabilities to achieve this.”

Deutz added that the researchers from the DLR Institute of Vehicle Concepts will initially be working with Deutz to scope out the necessary parameters – both technological and commercial – for making off-highway vehicles carbon-neutral.

It added that the people who operate the machinery will also be asked about their requirements, particularly with regard to vehicle data, machine variants, and load and usage profiles.

The next phase of the project will see the partners compare and evaluate the different technological solutions.

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A new Rokbak in action.

Terex rebrands as Rokbak

Articulated hauler specialist Terex Trucks has rebranded itself as Rokbak. The Motherwell, Scotland-based manufacturer, has been part of the Volvo Group since 2014.

With their foundation in the predecessor models from Terex Trucks, Rokbak has launched two articulated haulers, the 28-tonne (30.9 ton) payload RA30 and 38-tonne (41.9 ton) payload RA40.

The RA30 is powered by a five-cylinder, inline Scania DC9 diesel engine rated 257 kW with a peak torque of 1387 lb. ft. (1880 Nm) at 1800 r/min. With bore and stroke dimensions of 130 x 140 mm and an overall displacement of 9.3 L, the engine meets EPA Tier 4 final and EU Stage 5 emissions regulations. Tier 2 compliant versions are also available, the company said.

The engines drive ZF 8EP320 fully automatic eight-speed transmissions with manual override and retarder.

The larger RA40 is driven by a six-cylinder Scania DC13 engine rated 328 kW net with 1663 lb.ft. (2255 Nm) of torque at 1300 r/min. The 12.7 L diesel, with a bore and stroke of 130 x 160 mm, meets Tier 4 final and Stage 5 emissions standards, with a Tier 2 version also available, Rokbak said. The engine is teamed with an Allison HD4560 automatic transmission.

Briggs & Stratton deal

Briggs & Stratton has acquired SimpliPhi Power, an Oxnard, California-based manufacturer of energy storage and management systems designed to store electricity derived from solar, grid and wind power for use by residential, commercial and industrial customers. No financial details were provided.

Through this acquisition, Briggs & Stratton said it will accelerate its growth into the energy storage system market, expanding the business to offer a comprehensive range of products that provide safe, reliable and affordable energy solutions to a broader group of customers.

Briggs & Stratton said it intends to offer SimpliPhi Power products through its own distribution channels in addition to continuing to service SimpliPhi Power’s existing distribution channels.

This acquisition adds to Briggs & Stratton’s existing range of Vanguard Commercial lithium-ion batteries that include 3.8, 5 and 10 kWh units.

NEWSBITES

→ **ZF and Locomotion**, a provider of autonomous truck technology solutions, have announced an agreement for joint development of steering units to enhance autonomous truck safety. They will collaborate to develop and test the Level 4 (L4) capable ReAX steering systems

in real-world conditions.

Headquartered in Pittsburgh, USA, Locomotion was founded in 2018 by a team of experts on autonomous vehicles, robotics, and artificial intelligence from Pittsburgh’s Carnegie Mellon’s National Robotics Engineering Center.

→ **Rolls-Royce and Flanders Electric** have agreed to develop a retrofit solution for hybridising mining trucks with mtu engines, batteries, and hybrid control systems, and Flanders drivetrain solutions.

The two companies have signed a Memorandum of

Understanding which enables them to offer a scalable retrofit for hybridising mining trucks in a wide range of mining applications.

The mining truck hybrid concept recovers braking energy using the mtu EnergyPack battery system, Rolls-Royce announced.



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Off-Highway Research reaffirms forecast for record construction equipment sales this year

Global construction equipment sales are expected to hit a record high of 1.13 million units, with a value of almost US\$110 billion this year, according to updated forecasts from specialist consultant Off-Highway Research.

Global construction equipment sales are expected to reach 1.13 million units this year, some 2% cent higher than the previous record of 1.11 million machines, which was achieved in 2018. This is the key finding from Off-Highway Research, following the completion of a mid-year update to its forecasts.

This peak in sales was not forecast prior to the COVID pandemic. It has come about due to the stimulus response to the virus by governments around the world, most significantly in China.

A programme of special bond issues by provincial governments in 2020 to raise funds for infrastructure spending and other stimulus saw the Chinese market rise 30%. That growth continued in to the first quarter of 2021, but the Chinese market has slowed since. A 2% decline in sales is expected for the year as a whole as a result, but

volumes in China will remain at a very high level in historic terms.

While China is slowing and performing slightly worse than previously expected the rebound in many other parts of the world is proving more robust than was anticipated at the start of this year. The European market is projected to rise 15% in 2021, as opposed to the previous forecast of single-digit growth. This should see volumes rebound to similar levels to the cyclical high which was seen in 2019.

Likewise, the forecast for North America has been upgraded to a 13% increase. While this will not see it regain the highs of 2019, these levels should be reached and surpassed in the following years.

A modest 1% rise in construction equipment sales is now forecast for Japan in 2021, as opposed to the previous expectation of a downturn. This rise will build on the modest increase in sales which was seen in 2020 as the government increased spending on public works. This will take the market to its highest since the early 2010s, when a combination

of stimulus measures and the reconstruction following the 2011 earthquake and tsunami drove a sharp rise in equipment demand.

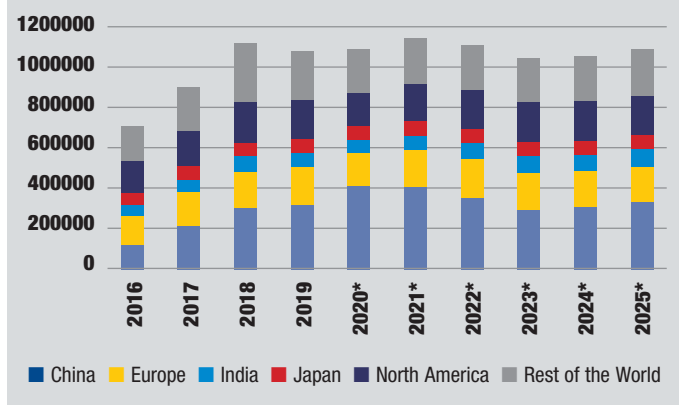
However, the forecast for India has been downgraded from the previously expected 15% increase to an 11% rise in sales this year, compared to the low seen in 2020. This is due to the second wave of COVID infections which swept through the country in the second quarter of 2021.

The outlook for the rest of the world remains unchanged, with the expectation of a 6% rise in sales this year. Commenting on the updated forecasts, Off-Highway Research managing director Chris Sleight said: "The

global rebound in equipment sales over the last six to nine months has been striking. While this is excellent news, the industry still faces many challenges in meeting this demand, including supply chain constraints and bottlenecks around shipping and other logistics. I believe that without these, sales this year might have been even higher than the record volumes we are predicting. However, the positive in this is that the current buoyancy should extend well into 2022 as a result."

For more information about Off-Highway Research's products and services, please visit www.offhighwayresearch.com **dpi**

GLOBAL SALES OF CONSTRUCTION EQUIPMENT BY REGION, 2016-2025*



Source: Off-Highway Research * - Forecast

NEWSBITES

→ **Deutz Corp.** announced it will be adding another Deutz Power Center, this time in Las Vegas, Nevada.

The new location will operate as Deutz Power Center West and is the eighth power center the company has opened since it established the first location

seven years ago.

Dominick A. "Nick" Vermet, vice president, Power Center Operations for Deutz Corp said: "The addition of Deutz Power Center West in Las Vegas will help us not only serve the large number of rental companies in southern Nevada, but it will also

help us provide much-needed Deutz service and parts to our customers in San Francisco, Los Angeles and all across California."

Mark Guriel, the current manager of warehouse operations at Deutz Corp. in Norcross, Georgia will be relocating to Las Vegas as branch manager of

Deutz Power Center West. Prior to solely managing warehouse operations, Guriel also oversaw Deutz Corp.'s customer service department for seven years.

Like all Deutz Power Centers the Las Vegas location will include a fully stocked parts counter and provide Deutz engine service.

Daimler and Cummins agreement

Daimler Truck AG and Cummins Inc. have signed a framework agreement through which Cummins will manufacture medium-duty diesel engines for Daimler. Under the partnership, Cummins will invest in the further development of the medium-duty engine platform and its global production and delivery starting in the second half of the decade for Daimler Trucks & Buses. Daimler Truck AG will no longer invest its own funds in the further development of its medium-duty engines for the Euro 7 emissions standard. Cummins will also set up an engine production facility on the site of the Mercedes-Benz Mannheim, Germany plant for local production of Euro 7 medium-duty engines.



A Volvo truck in China.

Volvo's China move

Volvo Trucks has agreed to acquire JMC Heavy Duty Vehicle Co., Ltd., a subsidiary of Jiangling Motors Co., Ltd. The deal, which includes a manufacturing site in Taiyuan, Shanxi province, China is for RMB 0.8 billion (approximately SEK 1.1 billion and \$126 million).

The objective is to start production of the new heavy-duty Volvo FH, Volvo FM and Volvo FMX trucks in

Taiyuan for customers in China from the end of 2022.

Volvo Trucks said it has been active in the Chinese market since 1934. During the last couple of years, the strong growth of logistics services, including e-commerce, has led to a surge in the sales of Volvo trucks in the country, the company said. In 2020, more than 4500 heavy-duty Volvo trucks were imported and delivered to customers in China.

Roger Alm, president Volvo Trucks, said: "With our long-standing presence in China, we are growing our sales, and we are expanding our strong network of sales and service points together with our private dealer partners."

"Over the last couple of years, we have seen a fast development of the logistics markets and an increasing demand for our premium trucks and services."

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Suneeta Johal.

Major changes at AEM

→ **Suneeta Johal** has been appointed as the new chief executive for the **CEA (CONSTRUCTION EQUIPMENT ASSOCIATION)**. She takes up her role on October 4 and will succeed Rob Oliver who will retire from the position after 20-years' service to the trade association as its first chief executive.

Ms. Johal joins the CEA from the Association of Independent Professionals and the Self-Employed, where she held the position of director of Commercial Development.

Based in Northallerton, England, CEA represents the UK construction equipment sector.

→ **PARKER HANNIFIN CORP.**, a supplier of mobile hydraulic, filtration and control systems technology, announced that **Lee C. Banks**, currently president and chief operating officer, has been elected by the Board of Directors to a new role as vice chairman and president. The board also elected **Jennifer A. Parmentier**, currently vice president and president - **MOTION SYSTEMS GROUP**, to the role of chief operating officer, reporting to Banks.

Berend Bracht, currently vice president of Operations - **ENGINEERED MATERIALS GROUP**, has been elected to succeed Parmentier as vice president and president - Motion Systems Group.

The Association of Equipment Manufacturers (AEM) announced that Dennis J. Slater will retire as AEM president, effective Dec. 31. The AEM Board of Directors has selected Megan Tanel, AEM's senior vice president, Construction & Utility Sector, to succeed Slater and serve as AEM president effective January 1, 2022.

Slater joined AEM's predecessor, the Construction Industry Manufacturers Association (CIMA), in 1982, becoming president of CIMA in 1998 and president of the newly formed AEM in 2002, after a merger between CIMA and Equipment Manufacturers Institute (EMI). Slater led the transformation of the association, which has grown by 50% to more than 1000

member companies, with revenue increasing nearly 700% to \$60 million annually. Tanel joined AEM in 1995 as an intern, becoming a full-time employee later that year and into her recent position of senior vice president, Construction & Utility Sector. She led AEM's exhibitions and events initiatives and helped launch World of Asphalt in 2001, served as Show Director for The Utility Expo (formerly ICUEE) and ConExpo-Con/Ag, North America's largest construction trade show.

"Through Dennis' leadership and impressive contributions to the industry for nearly 40 years, AEM has built tremendous value and momentum for our members and the industry," said 2021 AEM Chair and Trimble, Inc. Executive Chairman Steve W. Berglund. **dpi**



Dennis J. Slater and Megan Tanel.

Meester new Genie president

Simon A. Meester has been appointed president of Genie, effective August 1. Meester will continue to report to John L. Garrison, Jr., chairman, president and chief executive officer of Genie's parent company Terex Corp. Meester will also join the company's Executive Leadership Team.

Meester currently serves as chief operating officer of Genie. He joined Genie in 2018 from Eaton Corp., where he was vice president and general manager of the Industrial Control Division. Previously, he held senior roles at Caterpillar and Sandvik. Meester will continue to be based in Genie's Redmond, Washington, USA headquarters. **dpi**

Jeong takes CEO role

Doosan Infracore Europe has announced that Chris (Kwanhee) Jeong has been appointed as its new chief executive officer (ceo).

In a statement the company described Jeong as having "a strong product background".

He is a graduate of Carnegie Mellon University in the US.

Jeong has been with the company since 2006.

He took up the role on July 1 as the successor to outgoing ceo Charlie Park, who had held the position since 2017.

Doosan said that Park has now left to start a new role with the company and based in South Korea. **dpi**

NEWSBITES

→ **Mark Stuebe**, a 30-year veteran in the commercial vehicle and industrial manufacturing industries, was recently named president of **JACOBS VEHICLE SYSTEMS**, the global manufacturer of engine retarding and valve actuation systems for the commercial vehicle industry.

He succeeds **Dennis Gallagher**, who served as Jacobs' president for more than three years and is now chief operation officer at **HYLIION**, a supplier of electrified powertrains for commercial vehicles.

During his career in trucking,

Stuebe has held operations and plant management positions at **MORGAN CORP.**, a manufacturer of truck and van bodies; and **DANA INC.**, a supplier of drivetrain and electrified propulsion systems for light-, medium- and heavy-duty vehicles.

Gary Gerstenslager,

president and CEO of **HENDRICKSON**, a manufacturer of mechanical, elastomeric and air suspensions, axles, and other products for transportation applications, retires at the end of the year.

He is succeeded by COO **Matt Joy**.



Perkins has launched Hypercare, a new personalised and flexible support programme.

Hypercare from Perkins

Perkins has launched Hypercare, a new personalised and flexible support programme delivered by the company's distribution network. Perkins Hypercare combines major service elements into a package that can include genuine parts, oil, coolant, fluid sampling, engine inspections, preventive maintenance and Perkins Platinum Protection extended warranty in a single support.

Matt O'Sullivan, general manager – aftermarket, Perkins, said: "Delivered by Perkins distributors, Hypercare goes well beyond a traditional Customer Service Agreement (CSA) by offering flexibility in a package designed to optimise and extend the productive life of an engine." Where a CSA simply provides a set of basic actions performed on a fixed schedule, Hypercare monitors engine status to identify opportunities to add value through service changes and additions while still providing necessary routine service and maintenance functions.

"Hypercare helps reduce downtime with diagnostic services and preventive maintenance interventions while increasing productivity and uptime with pre-emptive servicing based on engine-specific data collected by regular fluid sampling and

engine monitoring. In short, Perkins Hypercare delivers comprehensive support over the whole life of an engine," he added.

Hypercare plans are available in industry-specific core service frameworks for Electric Power, Industrial and Agricultural/Construction/Material Handling. Customers within each framework are divided into three categories according to their need for distributor support. The categories are:

Convenience Customers who can manage service and basic repair requirements with minimal distributor support.

Performance Customers who can perform basic service and maintenance but require support from a distributor specialist for more complex maintenance tasks.

Confidence Customers who don't have the ability and resources to support their engines themselves and need complete end-to-end service to support their operations.

Every Hypercare plan includes fluid sampling of oil, fuel and coolant, and engine inspection as standard. These technologies provide information to aid predicting and preventing unusual and/or excessive component wear and developing component failures. www.perkins.com/hypercare. **dpi**

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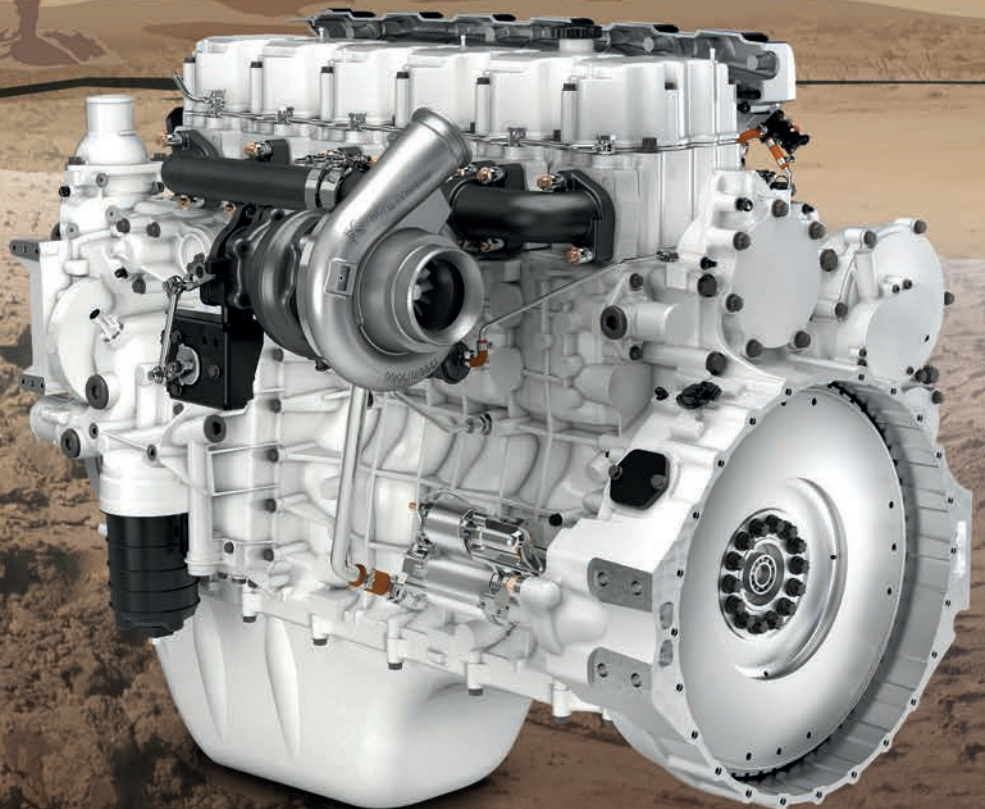


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New system from Himoinsa

Himoina has developed its EHR Battery Power Generator - a new energy storage and distribution system.

The Spanish company, part of Yanmar, said it is specially designed to be integrated into power generation systems with diesel or gas generators, and to connect to the grid and photovoltaic modules.

The new energy storage and distribution system from Himoinsa.

It is equipped with HICORE System, a management technology designed by Himoinsa which, it said, allows a more efficient use of energy. This smart grid controller selects the most favourable energy source for each charging condition, achieving what it describes as “a greenest and efficient energy solution.”

The selection of working modes allows the user to configure the battery power generator for the different

applications or modes of use such as plug and play, low load, peak shaving, Uninterruptible Power Supply or load sharing.

COMPACT CANOPY

The battery power generator incorporates batteries, inverter, control unit, power connections, solar MC4 Connectors and MPPT (Maximum Power Point Tricker) integrated into a compact canopy.

The lithium ferro phosphate batteries are designed for a lifetime of 50000

hours. At one cycle per day, this would give a life of approximately five years, according to Himoinsa. The battery pack can be replaced quickly and economically, it added.

The generator’s mobile rental canopy can withstand extreme environmental conditions, according to the company, with performance in a wide range of temperatures from -15°C to 45°C.

EHR will be available in single phase solution of 10 kVA and three phase solutions of 15, 30 and 45 kVA of nominal power, with two different storage capacity options per model (ratio 1:1 and 1:2). This optimal configuration permits complete the battery charging process in less than 1.5 hours (ratio 1:1).

MINIMISING COST

In all the models the overload capacity is available up to three times for electrical motors starting or can be combined with the battery storage power and the main power source (genset or mains) to increase total hybrid system output with an additional 100 amps.

The diesel generator will only start up if the battery generator needs to be recharged or if large loads need to be used. This, said the company, avoids considerable fuel and maintenance costs per diesel unit, thus extending the lifetime of the generator and minimising the total cost of ownership.

dpi



A Cummins digital development

Cummins said its connected engine solutions are now integrated with telematics service providers; Topcon, Trimble, Saucon and TelliQ, and added that others will follow soon.

Among Cummins Connected Solutions are two telematics offerings for off-highway machines; Connected Diagnostics and Connected Software Updates, which both improve operating performance, boost asset utilisation and uptime, increase efficiency and reduce costs, according to Cummins.

Jeremy Harsin, Cummins Off-Highway Business director said: "Telematics has

emerged as a key enabler to improve operational efficiency of machines at construction sites, ports, distribution centers and farms.

"With the majority of these environments having mixed fleets, managers need a solution that is compatible across their machinery. At Cummins, we are working to integrate our digital capabilities with industry leaders to support our customer needs in a flexible manner, adding value into the systems customers are already using.

"When combined with well thought out aftermarket practices, digital connectivity has a real ability to positively

impact the customer experience."

PEAK PERFORMANCE

Connected Diagnostics wirelessly connects engines to enable continuous monitoring and diagnosis of system faults. Cummins said that site managers can make informed decisions on whether to stop machine operation or continue to the end of the shift by understanding the suggested root causes. They can gain an understanding of how long they have before an issue is likely to escalate to a breakdown or critical failure, said Cummins which added that this means that uptime can be maximised, with any

potential fixes done more quickly. With the information provided in Connected Diagnostics, the correct parts, tools, and technician can be made available to resolve issues in an efficient manner, it said.

Connected Software Updates ensures Cummins-powered assets run at peak performance with over-the-air engine control module software updates. Product enhancements can be sent to connected equipment powered by capable Cummins Performance Series engines from anywhere, using integrated telematics systems and over-the-air connectivity services in lieu of onsite technician visits, eliminating shop and service visits typically associated with this task, the company said. Engine control modules can be calibrated while the equipment is on site, using as little as five minutes of stationary downtime, said Cummins.

SINGLE INTERFACE

Cummins supplies engines to a wide range of industrial equipment manufacturers. A number of these are developing their own telematics capability and Cummins digital applications can integrate with their systems through the machine network too, said Cummins. The benefit is having all the machine information, including the engine, in one place via a single interface, it added. For OEMs that don't have a system of their own, they can select one of the telematics service providers that Cummins is working with to connect with to gain access to all the J1939 public data to manage the engines in their machines.

New Cross Control units have been unveiled.



New CrossControl series unveiled

CrossControl is launching the CCpilot V1000 and V1200 which, together with the V700 model launched in 2020, form a full series of iMX8-based display computers for industrial vehicle applications.

The iMX8 family of application processors has been adopted in the automotive sector and now CrossControl is using this technology in products for industrial vehicles.

"The new Vision Line displays are designed to address challenges created by the rapid increases in software content in modern mobile machines" said the company's director of Market Development, Mats Kjellberg.

The iMX8X application processor gives the displays more than three times the graphics processing performance compared to the many displays based on the common and older iMX6 core, the company said. It added that this allows the new displays to perform as true 'Graphical User Interface experts', supporting advanced graphics frameworks that make it possible to deliver dynamic and intuitive instrumentation and guidance functionality as well as the performance headroom to deliver next generation productivity and safety tools.

They also support new software frameworks that enable advanced operator assistance functionality like displaying multiple video streams, object recognition, 360° surround view camera, and augmented reality, the company added. With this support in the platform, such advanced functionality can be realised with limited programming effort. The platform also has inherent support for functional safety, CrossControl added.

The CrossControl software platform, based on Linux and Qt, supports several graphics Application Programming Interfaces including Vulkan as well as programming languages like C, C++, Python and HTML5.

Engine and machine manufacturer

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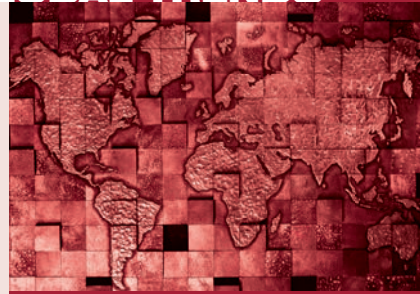


mpfiltri.com

INDIA: STATISTICAL SUMMARY OF HYDRAULIC EXCAVATORS, 2020

NUMBER OF SUPPLIERS	14
NUMBER OF DOMESTIC MANUFACTURERS	12
MARKET LEADER	Tata Hitachi
PRODUCTION (UNITS)	
- CRAWLER	17,209
- WHEELED	-
SALES (UNITS)	
- CRAWLER	16,382
- WHEELED	5
IMPORTERS' PENETRATION (%)	
- CRAWLER	3
- WHEELED	100
POPULATION (UNITS)	162,061
SALES FORECAST 2025 (UNITS)	
- CRAWLER	32,000
- WHEELED	-

Source: Off-Highway Research



ABOUT THE AUTHOR

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Hydraulic excavator demand estimated to rise in India

Demand is spread across a wide range of weight categories

The hydraulic excavator is one of the most competitive product segments in the Indian construction equipment market. Its share of the total construction equipment market on a unit basis stood at 19-21% during 2012-2014. This increased to 23% in 2015, 25% in 2016 and peaked at 26% in 2017 before dipping to 25% in 2018, 24% in 2019 and 22% in 2020. The market is almost entirely made up of crawler machines, with sales of wheeled excavators being almost non-existent due to their high price, and the overwhelming popularity of the lower-priced backhoe loaders. Demand for hydraulic excavators in the country is spread across a wide range of service weight categories, with machines in the 7-258 tonne range being sold in the domestic market last year.

The market for hydraulic

excavators is dominated by domestic manufacturers, which over the years have developed a strong manufacturing base in the country coupled with a widespread distribution network. There are 14 suppliers in 2021, of which 12 are domestic manufacturers. Tata Hitachi Construction Machinery Company Private Ltd (Tata Hitachi), previously known as Telcon, has remained the undisputed market leader.

JCB became the second largest supplier in 2019 relegating Hyundai to third position. Hyundai was placed second during 2016-2018.

However, in 2020, Hyundai regained second position pushing JCB back to third place.

Sany, which started production in 2012, maintained its fourth position in 2020 followed by Komatsu in fifth place.

Amongst other local manufacturers, Kobelco and Volvo commenced production in 2011, Caterpillar in 2012, LeeBoy in 2013, while LiuGong started manufacturing crawler excavators in 2017. BEML also regularly sells a few of its locally built excavators. Case started local production in 2020 but only started promoting its machines commercially in 2021. Tata Hitachi markets imported Hitachi excavators through its distribution network. Similarly, imported machines of Komatsu, Hyundai, Volvo, Kobelco, Caterpillar and Sany are sold by their respective dealers, along with locally manufactured models. Bobcat, Doosan, XCMG and SDLG only sell imported machines. Production of crawler excavators is driven by domestic and export markets, and the country has emerged as a significant

exporter in the last few years. Production increased from 17,730 units in 2016 to peak at 27,139 units in 2018, which declined to 17,209 units in 2020. Currently, no wheeled excavators are manufactured in the country. Demand for hydraulic excavators has remained consistently high in the domestic market during the last decade. It grew from 16,488 units in 2016 to peak at 25,474 units in 2018 before dropping to 16,382 units in 2020. Importers' penetration of crawler excavators has remained a consistent 3% during 2016-2020, because of the increase in the number of domestic manufacturers and the expansion of their local product ranges. The active population of hydraulic excavators is estimated at 162,061 units at the end of 2020. Sales of excavators are expected to reach 22,000 units in 2021 due to the easing of COVID-19 restrictions and an increase in economic activities. Against a backdrop of an increase in infrastructure development activities, demand for hydraulic excavators is predicted to grow in the long term and is forecast to reach 32,000 units by 2025. **dpi**

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“Lettuce” hope for a change in the truck sector

The lack of drivers is causing concern as gaps appear on the shelves

That truck drivers are a scarce commodity is scarcely breaking news and discussion as to the root causes of this paucity has long filled the pages of the trade press. Ask pretty much any truck operator on any continent what their primary restraint to business is and they will offer variations on a theme of both finding and keeping drivers.

And so it is with some interest that we can watch the debate in the UK at present. The United Kingdom – as with many other countries – is, at present, suffering from a shortage of truck drivers. I say at present but the reality is that – as observed previously – truck operators in the United Kingdom have long bemoaned a lack of depth to their recruitment pool. This lack of drivers is nothing new.

SUPPLY FRAGILITY

But this time the effect of a lack of drivers is different. We have remarked – not infrequently – in the past that, in an economy in which a very significant percentage of goods are moved by road, a lack of drivers would, at

a certain point, result in a lack of goods and products available for purchase. With very few exceptions – and these exceptions tend to be caused by other issues – consumer choice in the United Kingdom has tended to be both fulsome and, when compared to other markets in both Europe and North America, unremarkable. Nine times out of ten if you want – say – lettuce then nine times out of ten you can take your pick of any number of Asteraceae candidates aligned upon the shelves for your approval, delight and subsequent purchase and enjoyment. There’s lot of lettuce and seemingly sufficient drivers to enable a robust trade in the same which implies that the lack of drivers is less a lack of drivers but more a lack of drivers prepared to deliver products for less pay than accrues to them whilst delivering lettuce. Conceptually this shouldn’t be too difficult to grasp.

This time around however and things are a bit different. Unlike before there are actual gaps on the shelves and the supply chain’s fragility is on

display for all to see. When companies such as IKEA and McDonalds are struggling to maintain inventory, there is something clearly afoot. Clearly COVID-19 has played a role here – although that this seems to be a problem unique to the United Kingdom at present renders COVID a bit-party player on this occasion – as has Brexit and the decision of a large number of EU drivers to eschew the welcome laid out for them by the UK and to return home. Add to this the unarguable fact that the driver population is an ageing one – the average age of a heavy truck driver in the UK is now 55 – and that the job is – in all honesty – a pretty miserable one and the gaps on the shelves become more understandable and a solution to the same seemingly more intractable. The decision on the part of the UK government to apparently lower the barrier to entry to driving a truck by creating a less onerous driving test is one that seems fraught with interest but to date, this seems to be the best that they have and so we await the near-term

future with some reasonable trepidation.

REAL BATTLEFIELD

However this ends up, one thing is abundantly clear. We now know what a real driver shortage looks like and what impact it has on a modern economy predicated upon Just In Time supply chains. A truck is of no use without a driver – this should be obvious – and leaving aside the notion of autonomous vehicles, – which are, in the case of urban deliveries to Main Street, a distraction at best and more accurately an irrelevance – this is a clear sticking point. Drivers are a finite resource and are getting scarcer.

This is now the real battlefield. A truck’s productivity is predicated upon the presence of a person behind the wheel. OEMs have long touted Total Cost of Ownership as a differentiator between brands; perhaps it is time that a human element – the provision not just of a truck but also a driver – needs to be bundled into that arithmetic.

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MAN Engines has introduced the MAN Smart Hybrid Experience for its marine diesel engines from 290 to 1471 kW.

The system is composed of a diesel engine, a clutch and an electric motor/generator unit. The latter is available in two sizes with nominal power of 184 and 368 kW respectively and an efficiency rate up to 96%. The permanent magnet synchronous motors/generators have a length of 160 mm in the 184 kW version and 320 mm for the unit with 368 kW power output, while the diameter is 560 mm.

The electric machine is mounted on the diesel engine before the marine gearbox and can be decoupled from the diesel unit by an electromagnetic clutch which allows a change to propulsion mode without interruption in propulsion power.

COMPLETE HYBRID SYSTEM

The MAN Smart Hybrid Experience is available for all MAN marine engines series D2862 (12-cylinder vee configuration), D2868 (eight-cylinder vee configuration) and D2676 (inline six-cylinder). For all these engines, the installation of the hybrid system allows a hybridisation degree of up to 56% of the diesel power output: "For example a six-cylinder inline diesel with 290 kW power output can be combined with the 184 kW electric motor/generator unit to reach a combined output of 474 kW,"

MAN hybridises marine engines

DPI'S ROBERTA PRANDI TALKED TO THE HEAD OF SALES AT MAN ENGINES, REINER ROESSNER, ABOUT THE COMPANY'S NEW MAN SMART HYBRID EXPERIENCE FOR MARINE APPLICATIONS.

said Reiner. "On the other hand, a 12-cylinder unit with 1471kW power output can be combined with the bigger electric motor/generator unit (368 kW) to reach a total output of 1839 kW, that is a hybridisation degree of about 25%."

With the MAN Smart Hybrid Experience the company will be able to supply a complete hybrid system from a single source, ensuring the best combination of complex components such as electric motors, batteries, power electronics, and voltage management for every single marine application. Testing on benches as well as comprehensive tests on the field are also

key step in the development of new MAN components and make sure that the company delivers high-

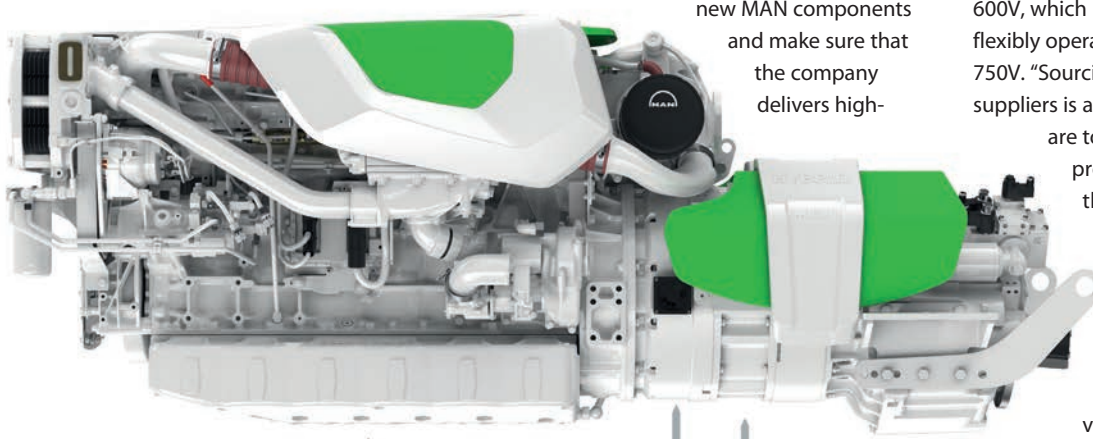
quality standards even with completely new-developed products.

The power sources of the hybrid system are the main diesel engines, the on-board gen-sets, and high-voltage batteries. The latter can be recharged via the Plug-in-Hybrid with an integrated land connection to be used when docked, or during boat operation through the diesel engines or on-board gen-sets. Even solar cells can be an option to be integrated in the power management system.

PARTIALLY TRANSFORMED

For the high-voltage batteries, MAN has chosen components from different manufacturers that operate at voltages over 600V, which means the batteries can be flexibly operated at voltages between 500 and 750V. "Sourcing for batteries from external suppliers is a first step for us. In future, plans are to produce our own batteries profiting of the experience within the MAN Group on batteries for commercial vehicles," said Roessner. "Our plant in Nurnberg, Germany, has already been partially transformed to host battery production for on-highway vehicles and features also a new, dedicated test area."

The MAN Truck & Bus group, which MAN Engines belongs to, already has an electric bus in the field (with a 650 kWh battery pack for the 18 m version) and a van with 36 kWh battery. Truck applications are following suit, in particular with an electric truck that is expected to come into production in 2024 featuring a 223kWh battery and 250kW electric motor, allowing an autonomy in



Diesel engine

Clutch

e-motor/
generator unit

Gear box

The MAN Smart Hybrid Experience is available for all MAN marine diesel engines from 290 to 1471 kW. Here shown with a six-cylinder inline diesel, the hybrid system includes a clutch and an electric motor/generator unit positioned before the marine gearbox.



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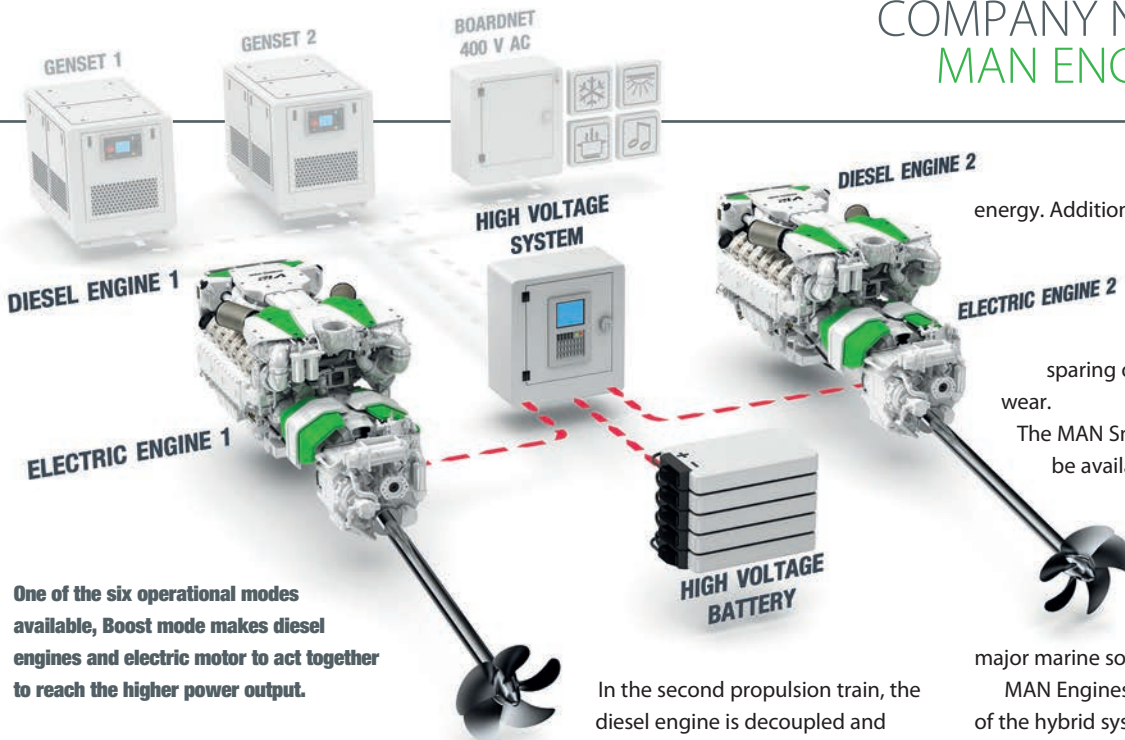
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One of the six operational modes available, Boost mode makes diesel engines and electric motor to act together to reach the higher power output.

electric drive of 180 km.

Roessner added that it has always been MAN's aim to develop standard drivelines with its diesel engines and the same is true for new hybrid drivelines too. In fact, while the MAN hybrid solution is flexible, scalable and allows to deliver the degree of hybridisation that is better suited to the specific customer, the system utilises standard series-production components and is available for any gearbox configuration, such as V-drive, IV-drive, parallel gearboxes, and Down Angle.

DIFFERENT MODES

The MAN Smart Hybrid Experience can be operated with different modes:

■ **ZERO-EMISSIONS:** zero exhaust emissions and super-quiet operation; in this mode the boat receives power from the batteries only both for propulsion as well as for the electricity used on-board.

■ **DIESEL-ELECTRIC:** propulsion and on-board electricity are delivered by the gensets with the support of the batteries upon demand.

■ **CROSS-OVER:** when the boat has a twin-engine propulsion arrangement, the cross-over option allows the operation of each propulsion train in a different mode. When one propulsion train is operating in diesel mode, the electric motor acts as a generator taking energy from the first diesel engine and producing the electricity used on-board; this implies that this diesel engine is operated at higher load with a better fuel efficiency.

IMAGE KEY:

- New hybrid components
- Conventional components

In the second propulsion train, the diesel engine is decoupled and power for propulsion is supplied by the electric machine.

When this mode is engaged, the system itself chooses which diesel engine is operated depending on which unit has clocked less operating hours.

■ **HOTEL:** in this mode all power is derived from the batteries and the innovative technology of the MAN Smart Hybrid Experience allows a long use of the batteries with no need to start the diesel engines. Independently from the power production, the batteries can be recharged in parallel via the land connection.

■ **BOOST:** in this mode the diesel engines and the electric motor act together and complement each other. When power is needed, the electric motor joins the diesels so that the higher power output is reached. For example, a 12-cylinder engine operating together with the electric motor, allows a power output comparable to that a 16-cylinder engine.

■ **DIESEL:** the classic diesel operation that can provide power for propulsion while the electric motor runs without producing

energy. Additionally, diesel operation can provide the electricity needed to recharge the batteries without using the on-board gen-sets, thus sparing operation hours and reducing wear.

The MAN Smart Hybrid Experience will be available on the global market starting mid-September 2021, when the first commercial installation is expected to be released. Classification with the major marine societies is in progress.

MAN Engines announced an official launch of the hybrid system at the Cannes Yachting Festival 2021, in Cannes, France, where it seems a major yacht manufacturer will exhibit the system in a boat on display.

ENVIRONMENTAL ASPECT

While waiting to see a vessel actually equipped with the MAN Smart Hybrid Experience, Roessner gave an example of how a typical configuration will work: "In an 80- to 100-ton yacht with twin diesel engines, a 250 kW battery will cover 12 hours of electricity supply in Hotel mode or two hours pure electric cruising at a speed of seven knots," he said. On such a vessel, the hybrid solution will add about three tons more weight and need a bit over 3 m³ of additional installation space – approximately 1.3 m³ for the battery pack and about 2 m³ for the power management system."

The company expects various marine segments to be interested in the hybrid system: "Applications such as yachts will look for hybrid solutions mainly for the comfort aspect, while super-fast boats will be attracted by the performance. Passenger transport boats will also be interested, looking mostly at the environmental aspect and the capability of entering ports and environmental-sensitive areas in full-electric mode," said Roessner. **NPP** >

The additional components for the MAN Smart Hybrid system take up 160 mm for the 184 kW version of the electric motor/generator and 320 mm for the 368 kW one.

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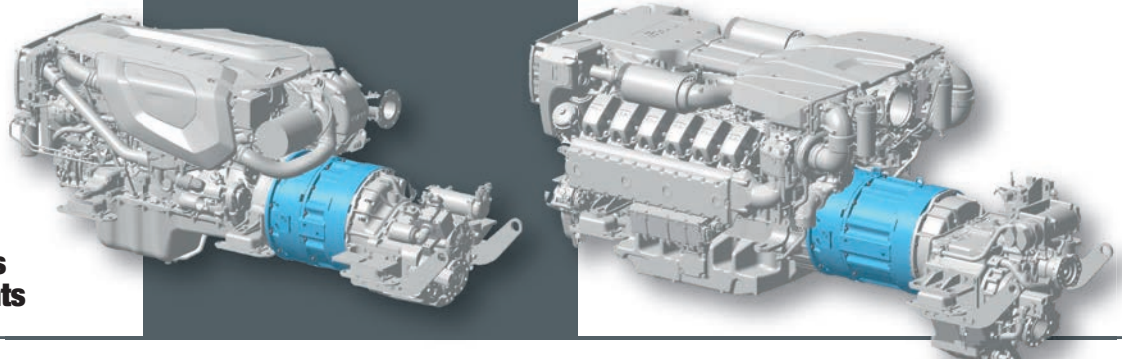


ABB plots way to zero-carbon mining

(Below)
 According to ABB, it can electrify any mining equipment across hoisting, grinding, hauling and material handling.

COMPANY SAYS NEW SOLUTIONS CAN ELECTRIFY MINING EQUIPMENT. BY IAN CAMERON

In a move which the company said can reduce diesel consumption by up to 90%, ABB has launched ABB Ability eMine, a portfolio of solutions that the company said will help accelerate the move towards a zero-carbon mine.

ABB also unveiled the piloting of the ABB Ability eMine FastCharge, a charging system, designed to interface with all makes of electric mining haul trucks.

eMine comprises a portfolio of electrification technologies which ABB claimed makes the all-electric mine possible from mine to port and is integrated with digital applications and services to monitor and optimise energy usage.

According to ABB, it can electrify any mining equipment across hoisting, grinding, hauling and material handling. From 2022, it will include new ABB Ability eMine FastCharge which provides high-power electric charging for haul trucks and is currently in pilot phase. It also incorporates the ABB Ability eMine Trolley System which ABB said can reduce



diesel consumption by up to 90%.

"The global mining industry is undergoing one of the most significant and important transformations of our generation – and that is to become zero-carbon," said Max Luedtke, Global head of Mining at ABB. "ABB Ability eMine is an exciting milestone to help convert existing mining operations from fossil fuel energy to all-electric. Mines can become even more energy efficient with vastly reduced levels of carbon dioxide emissions, while at the same time staying competitive and ensuring high productivity."

Mehrzad Ashnagaran, Global Product Line manager, Electrification and Composite Plant

at ABB said "Today we are extending our engineering capabilities and investment to electric transport, to bring new solutions to meet the growing demand of our customers. Besides the environmental benefits, fuel price volatility, making electricity more cost competitive, and legislation are driving the move to electric-powered mines." ABB said this flexible and fully automated solution is being designed for harsh environments, can be installed anywhere and can charge any electric truck without human intervention at up to 600 kW which, ABB said, is the highest power available on today's market to minimise the downtime of mobile assets. **NPP**

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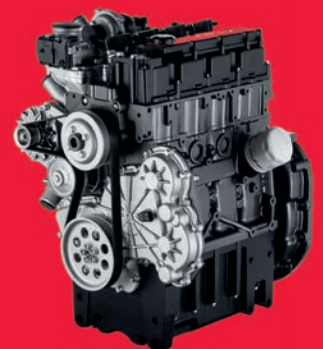


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Discover more about the prototype New Holland Methane Power crawler tractor made for the vineyards of Fontanafredda.

F28 NG



Tackling ever-changing marine requirements

For many vessels there are often numerous duties to perform.

By **Ian Cameron**

For some vessels the type of duties they need to undertake in their lifetime can vary from day to day.

One example is a tugboat whose duties can range from mooring and berthing to pushing or towing vessels often in demanding and restricted areas.

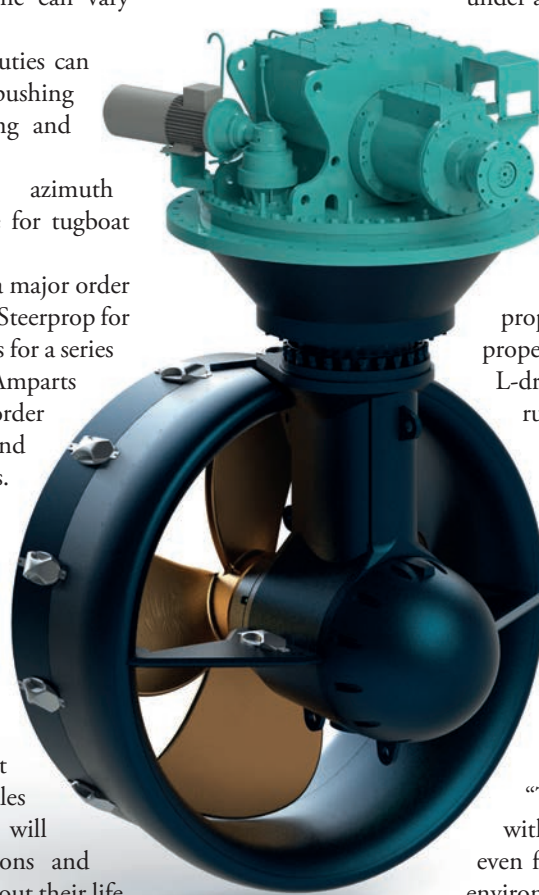
To enhance manoeuvrability, azimuth propulsion units are a popular choice for tugboat builders.

This was underlined recently when a major order was placed with Rauma, Finland-based Steerprop for six SP 20 WD azimuth propulsion units for a series of three Robert Allan Ltd. designed RAmports 2300_UZM tugs being built. The order was from Turkey's Uzmar shipyards and the tugs have Mitsubishi - S16R engines.

The contract for the units, delivering 1,610 kW of power each, was signed in April 2021 and will be delivered in the third quarter of this year.

"The Robert Allan designed RAmports 2300_UZM tugs with 50-plus ton of Bollard Pull (BP) are very efficient and agile tugs, providing a lot of performance in a compact package", said Donato Agostinelli, sales manager at Steerprop. "Since the tugs will be operating in challenging conditions and performing very different tasks throughout their life,

An SP20 WD unit.



the propulsion units must be efficient and reliable under all circumstances. For these reasons, the units also come with our condition monitoring system as standard"

AGILE STEERING

Steerprop's W Series is a modular and scalable propulsion line with a power range from 900 to 7,000 kW, from which customers can select the configuration that matches their specific needs. The propulsion units can have open or ducted propellers and can be delivered with a Z-drive or L-drive configuration. They comply with the rules of all major classification societies.

To increase the achieved BP and to improve the manoeuvrability of the tugboat, the azimuth propulsors have an electrical steering that enables more efficient use of the main engine's power compared to hydraulic steering, said Steerprop.

"The agile electrical steering system in our Z-drive azimuth propulsion increases overall performance and reduces the running costs of the vessels", said Agostinelli. "The electrical system can also be upgraded with a battery pack to enhance performance even further, while at the same time lowering the environmental footprint of the system."

dpi 30»

First cruise tender with hybrid propulsion

Germany-based shipyard Fassmer is building what is thought to be the world's first cruise tender with a diesel-electric hybrid propulsion system. The first sea-trials were completed successfully.

The PLL1099 is a combined tender and lifeboat that can carry up to 114 persons in tender operation.

The hybrid propulsion system is composed of two diesel engines by Nanni, type T4.205 with 147 kW power output at 3600 r/min, and twin hybrid powertrains by Transfluid, type HTM700-20W.

The powertrains include Transfluid-designed gearboxes and LiFePo4 battery packs. With a total of almost 40 kWh energy stored onboard, the tender will have a continuous full electric range of 1.5 hours in operational cruising speed (approximately six knots).

The hybrid propulsion allows the following operation modes: diesel driven, for lifeboat operation and transit; diesel and electric driven, for boost mode and higher speeds; electric driven, for tender purpose, shore operation and boarding.

In the electric mode, the tender does not produce air pollution and allows a very quiet and smooth operation due to the eliminated engine noise and the reduced vibration.

There is also a fourth operation option: Regeneration mode, available in both cruising and steady conditions, where the diesel power is used to recharge batteries through the same electric machine working as a powerful generator. This makes the tender virtually independent from the plug due to its main "taxi" operation profile with limited access to shore power.

Electric motors hit the surf

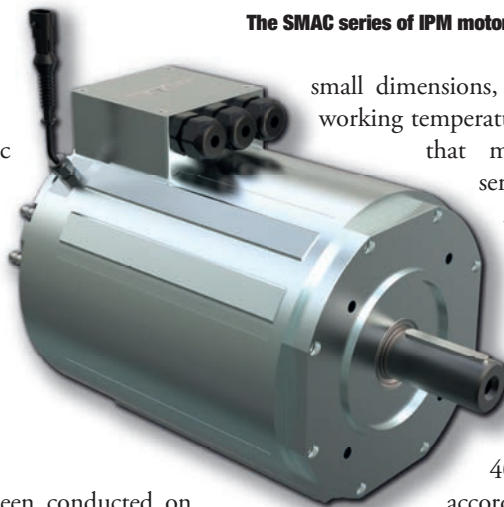
Benevelli is entering the marine market with new innovative motor technologies. By **Roberta Prandi**

Benevelli Electric Powertrain Solutions announced that the company is entering the marine market with its innovative motor technologies that have been adapted with new designs for marine applications, whether hybrid or full electric.

POSITIVE RESULTS

The company said tests have been conducted on pilot projects over the past two years.

It said that the results were extremely positive;



The SMAC series of IPM motors by Benevelli.

small dimensions, high efficiency, and low working temperatures are the characteristics that make Benevelli's SMAC series interior permanent magnet (IPM) electric motors suited for use on boats.

Comparison tests with a market-leading induction motor and the Benevelli IPM design have shown up to 40% increase in efficiency, according to the company.

The solutions were due to be presented at the Genoa Boat Show, Italy, from 16 to 21 September at the Rama Marine stand.

Rama Marine distributes brands such as John Deere marine engines, Kohler marine engines, OXE outboard engines and the electric solutions from Benevelli Marine.

The SMAC series of IPM motors by Benevelli was originally engineered for traction in light- and medium-duty vehicles and to power electro-hydraulics pumps and auxiliary applications.

CONTINUOUS POWER

SMAC series motors work with a voltage between 24 and 600 V.

They deliver continuous power between 0.3 and 104 kW, reaching peak powers up to 200 kW.

Continuous torque ranges among the different SMAC models from 4 to 300 Nm with peak torque up to 500 Nm.

dpi

Majestic Ferries Pte Ltd has selected Perkins' marine engines to power more of their fleet, most recently through the supply of six Perkins E70M auxiliary engines. Two engines will power the generator set onboard each of the three new Incat Crowther 42 series, pictured, offering a high-speed service on the Singapore/Batam route.



Engine heavyweights form new development company with hydrogen on the agenda

Three of Japan's leading marine engine manufacturers, Kawasaki Heavy Industries, Ltd., Yanmar Power Technology Co., Ltd. and Japan Engine Corporation have announced the joint establishment of a new company - HyEng Corporation.

One of the new company's main goals will be to develop hydrogen fuelled engines for the marine sector.

In a joint statement the three companies said they wanted to contribute to decarbonisation in Japan in the shipbuilding and maritime industry.

They added: "With the establishment of HyEng Corporation, the three companies will further advance their joint development activities and accelerate their drive to develop new markets for decarbonisation in the marine domain."

HyEng Corporation will be based in Akashi City, Hyogo Prefecture, Japan, and the president will be Seiji Shindo.

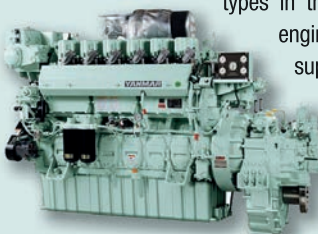
The companies said that other activities of the new venture will be the development of international standards

and rules for hydrogen fuel supply systems, integration of hydrogen fuel supply systems and maintenance and operation of hydrogen fuel engine demonstration facilities. Each company will own one third of HyEng Corporation.

Regarding the engine output of the new engines Yanmar said there is no specific range being targeted at this time, rather, for now, the company will be conducting basic research, surveying the field, analysing market trends and working to ascertain customer needs. This work will inform the company when it comes to deciding an engine line-up, it added.

The companies will be developing technology for a range of different engine types in the marine engine domain including two-cylinder low-speed engines, four-cylinder medium/high speed engines plus tank and supply systems.

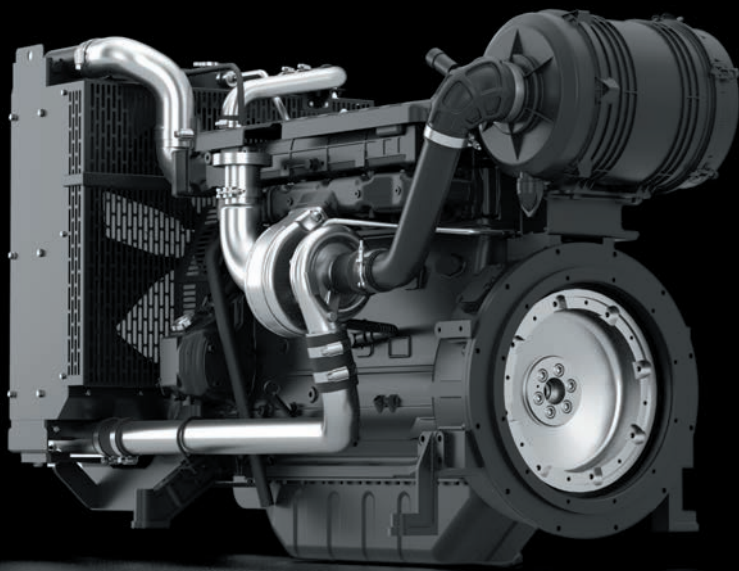
These would be suitable for a range of vessels, however, no target vessel is specified at this time, it added.



A Yanmar marine engine.



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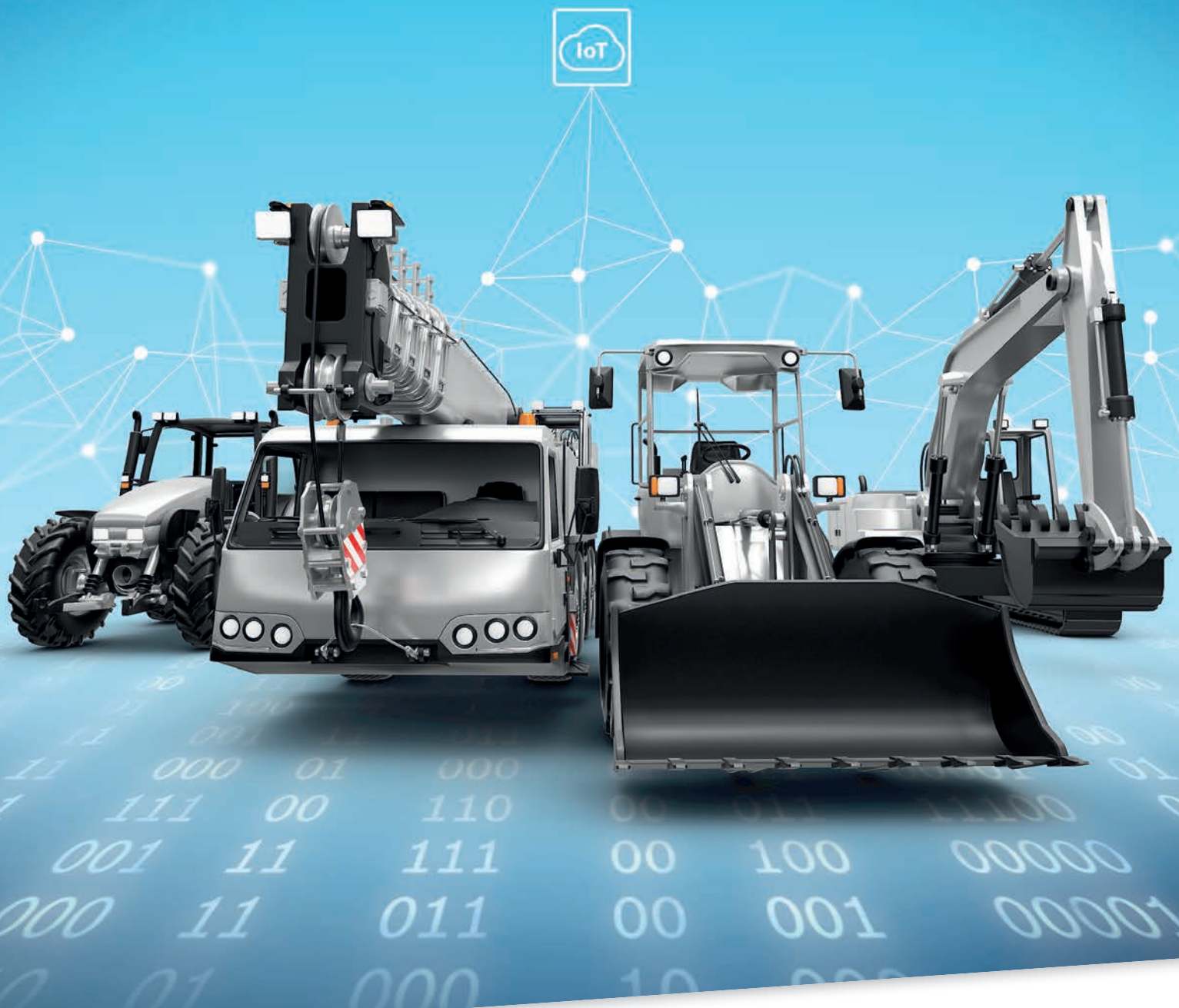
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By **Sven Thiede** and **Elitza Terzova**

In 2020 for example, there was an uptick in lighter vehicles (six to nine tons) carrying out long-distance transport tasks.



Driving efficiencies in the medium-duty vehicle segment

As people across the globe were confined to their homes and regions by COVID-19, e-commerce experienced a sharp growth spike. This is set to continue throughout 2021 and beyond, with research showing that 2.14 billion people worldwide will continue to purchase goods and services online, breaking historical records [1].

The knock-on effect this buying behaviour has had on the commercial fleet sector has been significant. Throughout the pandemic, for example, the road freight medium-duty vehicle segment has proven far more resilient than its heavy-duty equivalent, which faced long-haul and cross-border transport disruption. As a result, the medium-duty vehicle is fast becoming the chosen class for many road freight businesses.

OPTIMISING ON-ROAD OPPORTUNITIES

An example of this shift in vehicle class is the growth of last-mile delivery – the transport of goods from the hub to the final destination – which is set to expand by 78% before 2030 [2]. Although this is just one area where medium-duty opportunities are arising, with the segment increasingly filling roles once dominated by heavy-duty equivalents but left exposed by COVID-19.

In 2020 for example, there was an uptick in lighter vehicles (six to nine tons) carrying out long-distance

transport tasks, allowing organisations to continue operating during the pandemic in an efficient and compliant way [3].

Notably, vehicles in the medium-duty segment also offer substantial savings opportunities - as for non-oversized loads they are a cost-effective purchase compared to heavy-duty trucks and their operating and maintenance costs are also less by comparison. In addition to this, medium-duty compliance costs and road tax are also lesser compared to heavy-duty trucks as in most countries they are taxed based on their engine size/axle capacity.

With the spotlight now on the medium-duty segment, fleet operators cannot afford to allow inefficiencies to prevent them from seizing these emerging opportunities. However, in spite of this urgency, a concerning number of fleet operators are still struggling to improve their operations:

“More than half of fleet operators (52%) find it challenging to increase operating efficiency.” [4]

While COVID-19 has played an important role in raising the profile of the medium-duty segment, it goes without saying that the pandemic has also increased industry cost pressures, tightened margins and further highlighted the need for more sustainable solutions. Fleet operators must therefore identify ways to increase outputs while using fewer resources, to bolster the bottom line while taking action on sustainability targets. To rise to this



It's been a turbulent period for many industries, but as the commercial fleet sector has proven, with challenge comes opportunity.”

SATHYANARAYANA KABIRDAS,
VP Mobility Research,
Frost & Sullivan

challenge, operators must ensure they are optimising the variables they have control of, particularly in terms of consumables.

KEEP FUEL IN MIND TO PROTECT THE BOTTOM LINE

Making the wrong fuel choice accounts for 45% of unplanned vehicle downtime among commercial road transport companies according to Shell research, representing massive inefficiency and lost value for fleets [4]. Because of the huge impact fuel choice has on vehicle performance and business bottom lines, it should be a primary consideration for fleet operators who need to improve their medium-duty operations.

Selecting the right fuel is not only essential at the outset to prevent significant unplanned downtime, but also in terms of limiting overall fuel consumption and reducing emissions. And since medium-duty fleets most likely operate in urban areas under variable speeds, it is even more important to consider how fuel usage can be made more efficient to limit emissions output. Injector system cleanliness serves as a prime example.

Shell FuelSave Diesel has been designed to remove built-up carbon deposits from fuel injectors and increase fuel economy by up to 2.9%. Cleaner injectors subsequently reduce carbon emissions and black smoke causing a double action of improving operational efficiency and sustainability. The formulation has also been proven to generate an average of 6% more acceleration in comparison to regular diesel, providing enhanced performance while maintaining engine efficiency [5].

While two-thirds of transport companies believe investing heavily in new equipment and vehicle types increases profitability [4]; choosing the right fuel and managing it correctly holds the key statistically – with the savings from putting the right fuel strategy in place can be as high as 30% [6].

Above all, identifying and selecting the right fuel is critical because it represents approximately 23% of fleet operating costs on average [4]. Because of the size of this cost area, it is vital that medium-duty fleet operators ensure they are getting the most benefit from their fuel spend.

TECHNOLOGIES THAT CAN HELP

During the COVID-19 pandemic, fleet operations were put under immense pressure. Logistical challenges, fluctuating amounts of goods, and the complexities of navigating local and national restrictions forced businesses to optimise their operations or risk going under. Many fast tracked digitalisation to help improve efficiency and protect their business in an environment that required them to be agile and highly reactive.

The transport industry is also suffering from widespread load inefficiency, with 12.3% of road freight journeys in Europe performed by empty vehicles in 2018 [7]. As per Frost & Sullivan's research and analysis, the inefficiency gap is expected to further increase beyond 2021, attributable to

freight matching technologies not keeping pace with growth in transportation and logistics. This can have a huge impact on costs due to poorly optimised fuel usage and unwanted strain on critical parts, while also adding unnecessary fleet emissions.

Fortunately, Artificial Intelligence-driven, innovative digital freight brokering technologies have the capability to boost transport efficiencies and reduce empty miles by 10%, as well as increase load efficiency by 11% [8]. In addition, route optimisation and delivery scheduling technologies offer opportunities to plug scheduling gaps and get more out of critical consumables like fuel.

Shell Telematics, for example, equips fleet operators with the data they need to optimise operations, helping them monitor all vehicle and Shell Card data through one platform and cut down on administration time and costs through seamless integration. Leveraging data collected by connected sensors on the vehicle, Shell Telematics can also help to identify developing problems before they cause downtime.

With maintenance representing 20-30% of a commercial vehicle's lifetime cost – and unplanned maintenance imposing even higher prices – it is little surprise that 71% of respondents in Frost & Sullivan's Fleet Manager Survey indicated that they would be interested in remote diagnostics or prognostics data being integrated into their organisation's management system [8].

The same research also points to video safety systems – projected to drive a 17.8% market growth rate in 2021 – as another example of how telematics can benefit fleets through the generation of actionable insights. Frost & Sullivan's vice president- Mobility Research Mr. Sathyanarayana Kabirdas said: "It's been a turbulent period for many industries, but as the commercial fleet sector has proven, with challenge comes opportunity. Whether it's the growth of last mile delivery or e-commerce, fleets must be quick to adapt to changing consumer behaviours by integrating effective digital solutions and making the correct consumable decisions."

TECHNOLOGY AND FUEL: A WINNING FORMULA

Ultimately, medium-duty fleet operators are faced with a challenging environment. But they are also presented with a unique and growing set of opportunities. Unlocking these opportunities and staying competitive will require: optimisation of loads; maximised scheduling; sustainability consciousness; and an understanding of the factors that dictate last-mile delivery success. And underpinning the effectiveness of all of these steps is the selection of the right consumables, to ensure efficiency is maintained no matter the conditions.

Sven Thiede, is vice president Mobility at Frost & Sullivan and Elitzja Terzova is Global Fuels Product manager at Shell Commercial Fuels.

dpi

 www.shell.com/commercialfuels

SOURCES

[1] Statista, <https://www.statista.com/statistics/251666/number-of-digital-buyers-worldwide/> (accessed March 2021).

[2] World Economic Forum, 'Online shopping is polluting the planet – but it's not too late', 2020: <https://www.weforum.org/agenda/2020/01/carbon-emissions-online-shopping-solutions/> (accessed March 2021).

[3] Frost & Sullivan, "Global Light, and Medium and Heavy Commercial Vehicle Outlook", 2021.

[4] This survey commissioned by Shell Commercial Fuels and conducted by independent research firm Edelman Intelligence, polled 400 fuel decision-makers in the transport sector in eight countries (Canada, Germany, Malaysia, Philippines, Singapore, South Africa, Thailand, Turkey).

[5] Based on a demonstration test run with a medium-duty truck in real-world conditions and endorsed by renowned independent laboratory UTAC CERAM Millbrook. Fuel economy was improved under all measured conditions by 1.7% average and up to 2.9% under selected test conditions.

[6] Case study: Mayang Bayumas Sdn Bhd's upgrade to the New Shell FuelSave Diesel saw the reduction of unplanned vehicle breakdowns from an average of five per month to only one in three months.

[7] Eurostat Statistics, 'Road freight transport by journey characteristics', https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Road_freight_transport_by_journey_characteristics (accessed May 2021).

[8] Frost & Sullivan, "Fleet Managers' Desirability and Willingness to Pay for Advanced Truck Technologies", 2021.



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A continuous technology leap for forestry

A transmission that carries high loads and allows for continuously variable speeds: the cPower power-split continuous variable transmission technology by ZF also delivers less fuel consumption - up to 25%

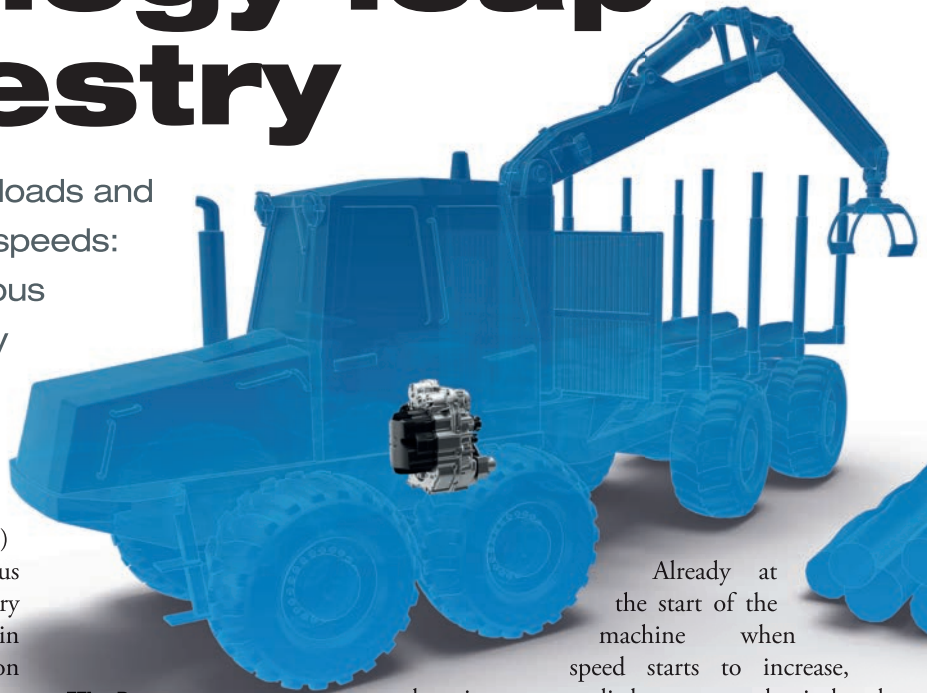
According to ZF, its cPower power-split continuous variable transmission (CVT) operates at low engine speeds, thus increasing efficiency and driver comfort in forestry equipment like forwarders and skidders. The gain in tractive power through the innovative transmission system is particularly beneficial for the user when driving on challenging terrain types, such as steep slopes, soft ground, or deep snow.

Whilst the ZF transmission is already well-established in the North American full-tree skidder market for several years now, the technology is also recently finding its way into the cut-to-length forwarder market, mainly to be found in Europe.

CONSUMPTION BENEFITS

Being in series production for forestry forwarders for more than two years, ZF reported that the fully power-split CVT offers significant consumption benefits and productivity increases for the vehicle owner. Because of rising fuel prices and a growing awareness of CO₂ emissions, the market demands more efficient drive systems. New emission guidelines implicate technological restrictions and constraints with diesel engines that can hardly be achieved today or in the future.

In off-highway applications, hydrostatic power-split transmissions ensure significant consumption benefits compared to hydrodynamic transmissions and purely hydrostatic concepts, ZF added. Continuously variable transmissions clearly demonstrate their benefits in all ranges of the typical off-highway machinery operating cycle, for example during bucket-filling, transporting or loading. During these processes the percentage of hydrostatic power is kept low whereby an optimal degree of efficiency can be achieved.



ZF's cPower power-split continuous variable transmission operates already at low engine speeds and brings fuel consumption benefits and productivity increases when installed in forestry forwarders and skidders.

The new Ponsse Bison Active Frame forestry forwarder is equipped with a ZF cPower continuous variable transmission.



Already at the start of the machine when speed starts to increase,

there is a power split between mechanical and hydrostatic drive. The share of the mechanical power increases with the vehicle speed up to 100%.

Even in very short loading cycles, the utility of the CVT technology becomes noticeable in reduced fuel consumption.

ZF said that the application of an elaborate hydraulic transmission-control unit and transmission-integrated on-board electronic unit optimally completes driving functions.

The application of these units is done with reference to sensitivity and driving comfort and realises an aligned power management.

The cPower series deploys well-known and proven construction kit modules and benefits from ZF competence in transmission and vehicle system engineering. The main characteristics of the transmissions include:

- Continuously variable drive over the whole drive range
- Hydrostatic-mechanical power splitting in all driving ranges, including the frequently used range up to 10 km/h
- Reduction of diesel motor speed independent of driving speed
- No wear through heavy loads as there is no mechanical connection between engine and driveline

SUPPLIER AWARD FOR ZF

Recently, ZF was honoured as International Supplier of the Year 2020 by Ponsse Plc., a leading manufacturer of cut-to-length forest machines. **dpi** 38»

www.zf.com/products/en/agriculture/home/agriculture.html

Compact tractors on display

Italy-based tractor manufacturer Antonio Carraro (AC) will be present at the first in-person international agricultural show on European soil for some time – EIMA 2021 in Bologna, Italy - to exhibit new products

TORA SERIES TRACTORS

The new Tora Series tractors are equipped with four-cylinder, Stage 5 engines with power capacities of 38 and 48 kW. These machines mount an upgraded hydraulic and mechanic system and are available in two reversible drive models.

Altogether there are five multi-functional and very compact models in the new Tora Series, which can be isodiametric or with bigger rear wheels in the orchard set-up and are available in different versions such as: with Actio articulated chassis or with steering wheels, monodirectional or fitted with reversible drive; on a rotating control tower, with a rollbar or cab.

These tractors can be combined with complex equipment such as inter-row machinery, shears and hydraulic equipment for vineyards, due to the increase in hydraulic power with constantly adjustable flow providing maximum control in the management of the equipment.

The dimensions have remained almost unchanged compared with previous models fitted with more compact engines as they were not required to use diesel particulate filters in accordance with Stage 5 legislation.

On request, the new Tora Series tractors can be fitted with the new multi-control device, the Hydraulic Remote Control for the complete management of the equipment, front powerlift with



The Tora Series tractors by Antonio Carraro have Stage-5 engines but kept almost the same dimensions of previous models. The reversible Tora tractors can be equipped with the new RGS reversible drive system on a rotating control tower that rotates 180° to invert the drive direction.

adjustable lifting arms and quick release catches.

An integral part of the multifunctionality belonging to the reversible Toras is the new Rev-Guide System (RGS), the reversible drive system by AC on a rotating control tower that, together with its highly ergonomic controls, aids

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The A-Series





Equipped with an electronically controlled mechanical-hydrostatic hybrid transmission, the Tony 8900 TTR has a 55-kW engine and wide track to be used in haying operations.

task execution by improving accuracy and quality of execution. The new RGS incorporates the inverter controls and the gears on the dashboard that rotate through 180° together with the control tower to invert the drive direction.

INFINITY SERIES TRACTORS

AC will present at EIMA the new SR 7600 Infinity articulated reversible tractor with a hybrid mechanical hydrostatic transmission, an isodiametric tractor with a narrow track. The engine is a Kohler Stage 5, 56 kW, four-cylinder, direct injection engine with turbo intercooler.

From the same series, the company will also introduce two other specialised models: the TR with

steering chassis and the TTR with a wide steering chassis and low centre of gravity (meant for crops on slopes).

This model has numerous end-uses when combined with hydraulic or PTO activated equipment working on specialised cultivations (terraced vineyards, greenhouses, narrow rows) or when carrying out civil maintenance (urban spaces or sports grounds). The engine operates in synergy with the Infinity hybrid mechanical-hydrostatic transmission which allows it to work in both drive directions with the same speeds (each is fitted with three hydraulic ranges) from 0 to 15 and from 0 to 40 km/h, that can be inserted manually or automatically without losing traction.

TONY CONCEPT

The Tony tractor series is made up of five models with a mechanical-hydrostatic hybrid transmission amongst which the Tony 8900 TTR and the Tony 8700 V, the first AC tractor with a conventional chassis, are the latest to have been developed.

The Tony transmission provides automatic functions run by the Intelligent Tractor AC (ITAC) operative system along with Cruise Control (or Tempomat) and Tractor Management Control (TMC) which simplify all the driver's tasks.

The new 55 kW Tony 8900 TTR is a model with a wide track meant for haying operations. Its mechanical-hydrostatic transmission was designed to safely manage tasks that are potentially dangerous for vehicles with a traditional mechanical gearbox. The transmission is run electronically by the TMC system software and is composed of a hydrostatic unit that operates a mechanical unit with four robotic speeds that can be engaged under load without the clutch and can be selected whilst stationary or in motion.

The Tony 8700 V is the first AC tractor with a conventional chassis and the company explained it is an outsider model compared with the AC isodiametric tractors as it is categorised as a conventional tractor

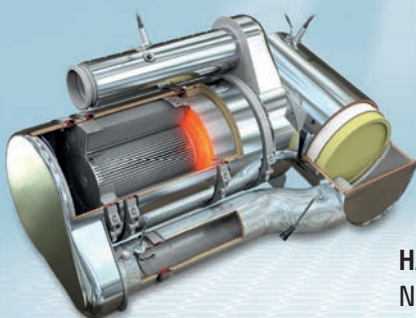
Deere to acquire Bear

Deere & Company has signed a definitive agreement to acquire Bear Flag Robotics for \$250 million. Founded in 2017, the Silicon Valley, California-based start-up develops autonomous driving technology compatible with existing machines. The deal is expected to accelerate the development and delivery of automation and autonomy on farms and support John Deere's long-term strategy to create smarter machines with advanced technology to support individual customer needs.

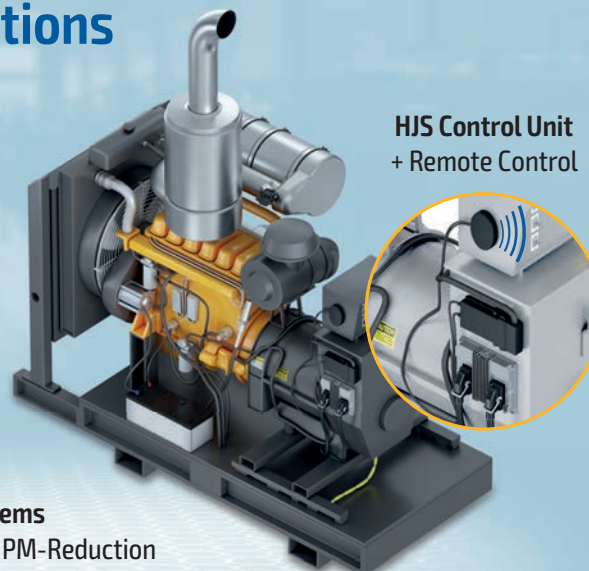
The Bear Flag team includes agriculture professionals, engineers and technologists focused on autonomy, sensor fusion, vision, data, software and hardware. Deere said the company will remain in Silicon Valley.

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- Design
- Validation
- Certification
- Production

Cummins engines fire up in Germany

Cummins L9 engines are powering a fleet of TATRA FORCE T815-7 firefighting vehicles with 4x4 all-terrain capability deployed in the pine forest areas of north-east Germany, where the intensity and frequency of fires has increased in recent years.

The 8.9 L engine, rated at 298 kW, is in the first of 46 firefighting vehicles which arrived in the states of Brandenburg and Mecklenburg-West Pomerania to begin familiarisation with volunteer fire brigades. Although specially equipped to suppress forest fires, the twin water jet capability of the T815-7 can deal with all types of fire and rescue emergencies.

The vehicles have a 62 mph (100 km/hr) top speed and an 18-ton maximum permissible weight. The 1700 Nm peak torque is fully utilised by the TATRA all-wheel driveline to enhance mobility over rough ground and when climbing steep gradients, with the powertrain protected against excessive heat and aggressive environments, said Cummins.

The TATRA FORCE T815-7 cab accommodates the driver, plus two crew with tilting access to the engine and is designed for operational self-sufficiency with an electrical generator, self-recovery winch, lighting mast, and it carries all necessary rescue equipment. Both the TATRA chassis-cab and THT superstructure are manufactured in the Czech Republic with the L9 engine meeting Euro 6 emissions standards, supplied from the Cummins Darlington Plant in the UK.

Cummins L9 engines are powering a fleet of TATRA FORCE T815-7 firefighting vehicles, pictured.



with frontal oscillating bridge. It is designed for narrow-rowed vineyards having a width of just one metre and for working with ventral equipment; its hydraulic system consists of mechanical pumps with gears and a large hydraulic variable pump with pistons. The load-sensing management of the pumps and the large, sectioned pipe circuit have the goal of reducing loss of charge while being able to operate at low engine revolutions and high hydraulic capacity all of which is aimed at reducing fuel consumption and having a low environmental impact. The distributors have CAN-bus control and offer the possibility of customised controls in order to satisfy the demands of all operators.

THE NEW MULTIFUNCTIONAL TTR

The new TTR 4800 HST is a reversible tractor with hydrostatic transmission suitable for working in the civil sector carrying out maintenance tasks in parks and gardens, on sports grounds, hippodromes and riding grounds.

The tractor mounts a hydrostatic transmission with a mechanical selector on the three-speed variator: slow, normal and fast. This type of gearbox offers constant variation of the forward motion speed without having to use the clutch or insert the gears in either drive directions, traditional and reverse, from 0-6, 0-12, 0-28 km/h. The Speed-Fix system allows the tractor's ideal speed to be set for each task.

HOLOMAINTENANCE

Finally, at EIMA, AC will launch its new interactive HoloMaintenance glasses for remote diagnostics and maintenance, which combine effectively with virtual reality. With this new service it is possible to connect via Bluetooth the interactive glasses to a tablet or smartphone. The glasses are fitted with special interactive lenses HoloLens, to carry out assistance remotely in all authorised AC workshops around the world.

dpi

CLAAS opts for power from Cummins

The new CLAAS family of TRION combines will be powered by Cummins 6.7 and 9 L engines which have a capability of 190-320 kW.

The engines will be supplied at Stage 3a and Stage 5 emissions levels for applicability in a wide range of territories.

The engines will be built by Cummins in the UK (Stage 5 and 3a) and Russia (Stage 3a) to align with CLAAS's manufacturing strategy. They share the same block and envelope to enable commonality of installation, reducing complexity in manufacturing and servicing. Both engines have exhaust gas recirculation-free designs, meaning they are reliable and easy to maintain in tough farming operations, according to Cummins.

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

Ann Schmelzer, General Manager of Cummins Global

Agriculture Business said: "Cummins has had a strong presence in the agriculture industry for many years. Our depth of experience has enabled us to offer a portfolio of products to CLAAS that optimise performance in a way that is ideal for harvesters."

The new CLAAS TRION range replaces the TUCANO combine models. It has 20 new combine harvester models across three series.

The range is suited for Europe, North America or South Africa across hilly and flat terrain on wheat, rapeseed, maize, soybean or rice crops. It will be available in European markets for the 2022 harvest and in North America and Russia for the 2023 harvest.

The new TRION from Claas.

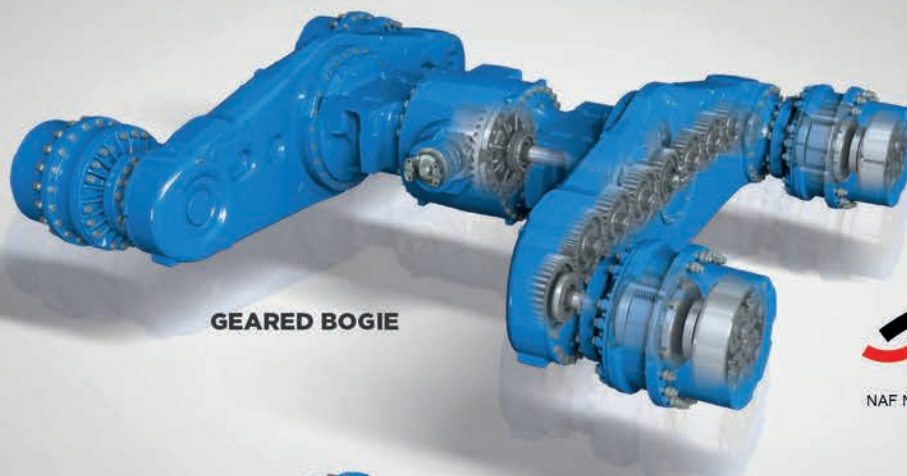


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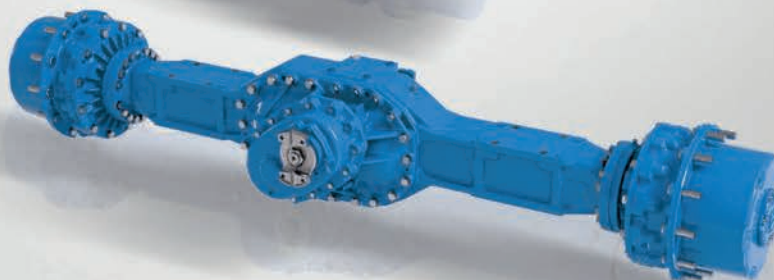
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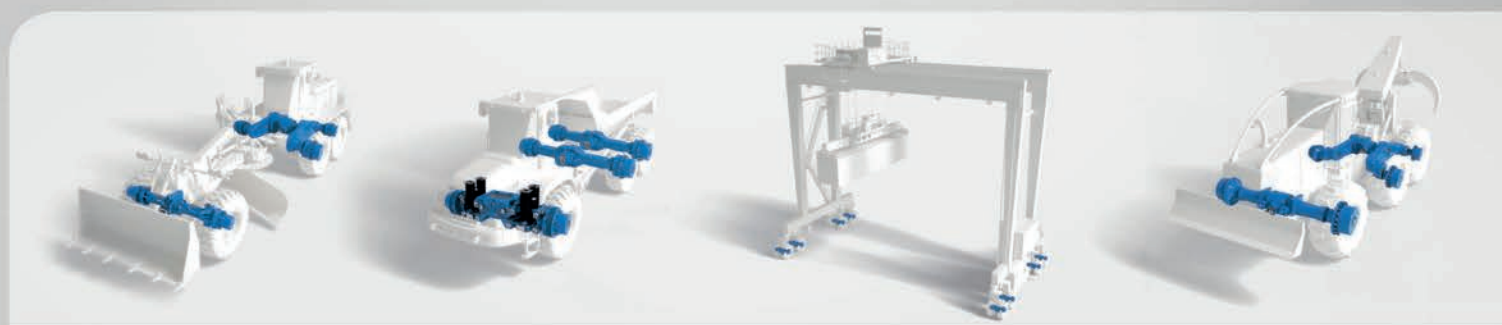
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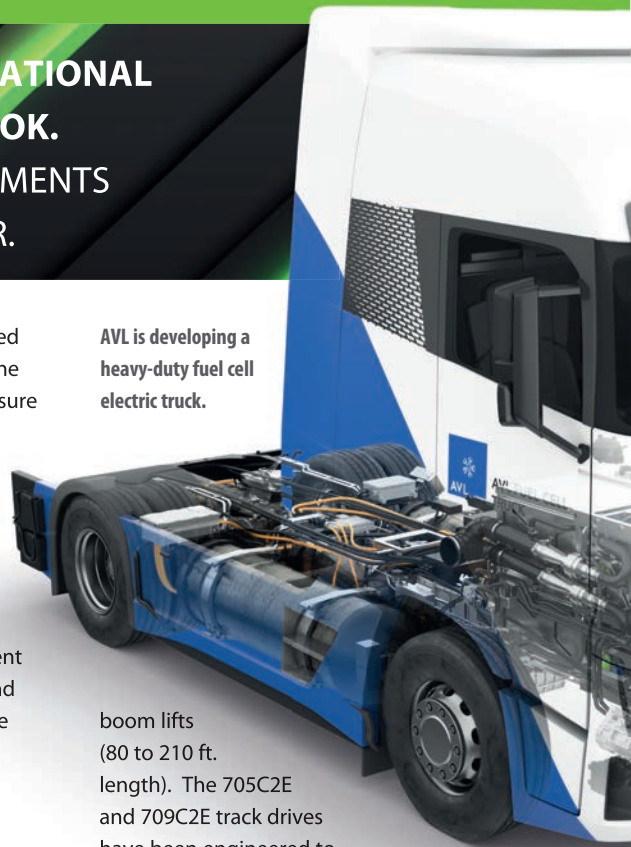
RIGID AXLE





A look at the new

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ALLISON TRANSMISSION

www.allisontransmission.com

Originally designed and developed for buses, Allison said its eGen Flex avoids the inconvenience of having a limited range by deploying electric propulsion selectively and tops-up batteries through regenerative braking.

Their eGen Flex is expected to go into production in January 2022, replacing Allison's H40/50 EP electric hybrid system. It builds on the H40/50 EP electric hybrid propulsion system to provide engine-off electric hybrid operation. Lithium-titanate (LTO) battery technology enables electric propulsion for up to 10 miles.

Allison's eGen Power is a new series of fully integrated electric axles designed to fit between the wheels of trucks and buses and replace the vehicle's traditional powertrain system. This bolt-in solution has fully integrated electric motors, a multi-speed gearbox, oil cooler and pump. The system is compatible with full battery electric vehicles, fuel cell electric vehicles and range extending hybrid applications.

AVL

www.avl.com

e-mail: info@avl.com

PRODUCTS

Internal combustion engines hydrogen combustion engines (H2-ICE), hybrid, battery-electric and fuel cell electric propulsion systems and in-vehicle integration complemented by advanced energy, thermal management, and control systems.

AVL, TUPY and Westport Fuel Systems jointly announced a collaboration to develop a highly efficient hydrogen-fuelled ICE for heavy goods transportation. The direct

collaboration aims at combining advanced material and casting technologies with the latest H2 ICE technology using high pressure direct injection.

AVL is also developing a heavy-duty fuel cell electric truck demonstrating technologies of fuel cell, electric drive, hydrogen tank and battery systems. In late 2022 the vehicle will be running on the road combining predictive energy management with state of health control of fuel cell and battery. To comply with European vehicle length restrictions, all components are integrated into the chassis of a standard European 4x2 semi-trailer tractor.

The 310 kW fuel cell system is being boosted by a high-power battery system. The truck is propelled by an integrated e-axle of 540 kW peak (360 kW continuous). An advanced thermal management system ensures top vehicle performance even at high ambient temperatures.

BONFIGLIOLI S.P.A.

www.bonfiglioli.com

PRODUCT LINE

Electric wheel, travel, track and drum drives plus complete electric powertrains for forklifts, access and aerial platforms, material handling machines, agricultural and forestry equipment, construction equipment, concrete mixers, airport vehicles and light road vehicles.

COMPANY NEWS

Bonfiglioli has developed a range of electric drive technology.

Recently, Bonfiglioli has electrified two new products for compact track loaders, medium excavators and large boom aerial work platforms. The 606W3E series wheel drive was developed for medium to large

AVL is developing a heavy-duty fuel cell electric truck.

boom lifts (80 to 210 ft. length). The 705C2E and 709C2E track drives have been engineered to withstand the harsh operating environments faced by medium to large excavators and compact track loaders.

All solutions incorporate either AC Induction or Internal Permanent Magnet Electric motors integrated into a planetary gearbox for an overall compact solution based on application performances and required space claims for various construction equipment machine designs.

BORGWARNER

www.borgwarner.com

High voltage coolant and air heaters, battery packs, chargers, electric drive modules, e-turbos and boosters, fuel cell air supplies and turbine generators.

NEWS FOR BORGWARNER

Lithium-ion battery system provider Akasol AG became a majority-owned subsidiary of BorgWarner Inc. in June 2021. The acquisition was expected to further strengthen BorgWarner's commercial vehicle and industrial electrification capabilities as well as position the company to capitalize

on what it believes to be a fast-growing battery pack market. Akasol's headquarters are in Darmstadt, Germany, and will be run independently.

This move supports BorgWarner's Project Charging Forward, which it announced during its Investor Day in March

2021. The company said that the project represents an acceleration of its electrification strategy, which is expected to bring the company's electric vehicle revenue from less than 3% of total revenues today to approximately 45% in 2030.

The plan comprises three pillars, namely profitably scaling electric light vehicles, expanding into electric commercial vehicles and optimising the company's combustion portfolio.



BOSCH REXROTH CORP.

www.boschrexroth.com

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BRIGGS & STRATTON

www.basco.com, www.vanguardpower.com

BRIGGS & STRATTON VANGUARD

The Vanguard product line from Briggs & Stratton includes gasoline engines and lithium-ion battery packs.

The company said MarIndustrial, and its division DAC Industrial Engines, will sell and service the full product line of Vanguard commercial lithium-ion battery packs in Canada. MarIndustrial is an industrial and marine distributor whose head office is based at Montreal in Québec, Canada.

The company specialises in the distribution, value-added power unit solutions and service of industrial engines including Vanguard engines.

The addition of Vanguard battery packs will give industrial customers access to an electric power alternative for off-highway equipment.

Briggs & Stratton has partnered with Allen Engineering Corp. to power its new AW16-B battery-powered buggy with a Vanguard 48 V lithium-ion battery pack, which allows it to reach nine-hour run times.

The partnership developed from Vanguard's existing relationship with Kraft Fluid Systems Inc., one of the first technology partners signed on as a distributor of Vanguard battery packs.

CATERPILLAR INC.

www.cat.com

Production hybrid systems and concept hybrid and electric drive systems for

construction and mining machinery and complete machines.

Caterpillar's theme for the 2021 MinExpo event of "Together, we're mining better," celebrated the company's partnership with mines.

The company showed a Cat R1700 XE LHD (load-haul-dump) with 100% battery-electric propulsion. It has a 16.5 ton payload, 53,330lb lift, tilt breakout force and 11.2mph top speed.

To fully charge the LHD in as little as 20 minutes, the company claim that the new portable Cat MEC500 mobile equipment charger is the first of its kind in the industry. It can be moved via towing, fork truck or the Cat R1700 XE plus will eliminate the need for regular battery handling and swapping.

The company signed an agreement in June 2021 with Nouveau Monde Graphite Inc. Caterpillar will develop, test and produce zero-emission machines by 2028 for the Matawinie graphite mining project in Québec, Canada.

CONCENTRIC AB

www.concentricab.com

PRODUCTS

Lubricant, coolant and fuel pumps, hydraulic products encompassing gear pumps and power packs as well as pumps and other key technologies for electrical and hybrid powertrains.

CONCENTRIC

Concentric's electrohydraulic steering pump systems has been specified by an OEM for new battery electric delivery vehicles.

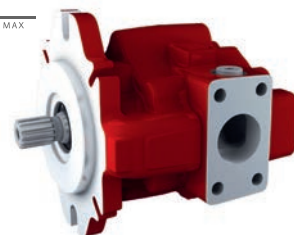
The company announced in June a long-



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term agreement with a global truck and bus OEM to supply electric coolant pumps for a heavy-duty electric truck.

Concentric currently supplies the customer with e-pumps for its hybrid and battery electric buses. This new supply agreement is expected to significantly increase e-pump volumes.

The electric coolant pump boasts a robust design that includes a wet rotor, eliminating the possibility of a dynamic seal failure, a long service life aided by liquid cooled electronics and dc brushless design along with integrated diagnostics and utilising sensors for

temperature and pressure.

Concentric stated that it will also support a North American OEM with its EHS (electrohydraulic steering system). The OEM is developing medium- and heavy-duty battery-electric trucks used in the last mile and return to base segments.

CUMMINS

www.cummins.com/electrification
PRODUCTS

Electrified power technologies and products,

including battery electric powertrain, fueling stations and MW scale energy storage, hydrogen fuel cells, PEM and alkaline hydrogen generators for industrial processes. The New Power Segment, which includes Cummins' electrified power and hydrogen portfolios, represents the company's investment in future technologies to deliver value and prosperity for its customers and communities using materials and technologies that have less impact on the planet. New Power has developed and acquired significant capabilities in electrified powertrains, battery design and assembly, battery management, fuel cell and hydrogen generation.

DANA INC.

www.dana.com, www.danatm4.com

Vehicle integration and engineering, hybrid-electric architectures for Class 8 vehicles, complete e-powertrain systems, complete e-axles, e-drive systems, e-gearboxes, e-hub drives, e-transmissions, electric motors, motor/inverter systems, inverters, on-engine generators and e-motion systems for work circuits, control systems, thermal management solutions including battery cooling plates and electronics cooling.

The company acquired Michigan-based Pi Innovo LLC in March 2021, an embedded software solutions and electronic control unit provider. The acquisition enables Dana to increase its in-house electrodynamic capabilities and electrification product portfolio by adding a library of turn-key electric vehicle application software, vehicle level controllers and auxiliary controllers.

Dana this year unveiled an expanded family of Dana TM4 SUMO HP electric motors and inverters, including the HV1000 and HV2500.

The TM4 SUMO family is designed for battery-electric, range-extended and fuel-cell vehicles. These high-performance motors and inverters are engineered to offer maximum flexibility, enabling direct-drive, series-hybrid or parallel-hybrid applications.

Reaching up to 800 V dc, the TM4 SUMO HP series offers up to 430 kW of continuous power and 540 kW of peak power, as well as a peak torque value of 2500 Nm.

The company stated that it is designed to match the efficiency map of an internal-combustion engine when used as a range extender, and can reduce operating costs by more than 35% when compared with a



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www.oesse.com



conventional diesel-powered vehicle.

Dana said that the series uses a motor with compact concentric winding technology to deliver maximum torque density, and leverages its internal permanent magnet technology for optimal efficiency and cost. TM4 SUMO HP technology has been combined with Dana's field-proven axle designs to support e-Powertrains for heavy-duty vehicle applications.

DANFOSS EDITRON

www.danfoss.com/editron

Danfoss Editron specialises in hybrid and electric powertrain systems for the marine, off-highway and on-highway markets. A business division of Danfoss, it develops and manufactures high-performance power systems for heavy-duty vehicles, machines and marine vessels, based on its synchronous reluctance assisted permanent magnet (SRPM) technology.

Danfoss Editron powertrains are suitable for hybrid and electric applications within the power range of 30kW to 2,000kW.

DEUTZ AG

www.deutz.com

Hybrid, all-electric and hydrogen drive systems for mobile off-highway equipment.

The key building blocks of Deutz's corporate strategy are a technology-neutral approach in the development of the drive portfolio, including electrification and the use of alternative drive solutions.

In 2021 Deutz has launched its first hydrogen engine. The TCG 7.8 H2, which meets all of the eligibility EU-criteria for zero carbon dioxide emission engines, has passed initial tests on the test bench and is scheduled to go into full production in 2024. The six-cylinder with a power output of 200 kW is based on an existing engine design. A first pilot application will be in stationary equipment for power generation, commencing at the beginning of 2022.

As part of its E-Deutz strategy, the company is also introducing electric drive systems into its low-emission combustion engines portfolio to further support the industry for carbon dioxide reduction. The first Deutz hybrid design, consisting of a TCD 2.9 diesel engine and a 55 kW electric drive system, was shown in spring 2018, followed by a fully electric 48 V excavator in 2019 and a fully electric 360 V telehandler in 2020.

EATON CORP.

www.eaton.com

EATON PDU JUNCTION BOX

Eaton's eMobility business secured a contract to supply power distribution units (PDU) and Bussmann series fuses.

NEWS FOR EATON

The company said its eMobility business was awarded a contract to supply a 24 V to 12V dc-dc converter for use in a commercial heavy-duty battery electric vehicle (BEV) that will power accessories, such as antilock brakes

and lights. The BEV will be sold in the North American and Chinese markets later this year.

Eaton's specialty converter, also known as a battery equaliser, works in conjunction with another converter that takes power from the BEV's 600 V system and steps it down to 24 V.

The component then takes it down to 12 V for use in low-voltage systems and to power a backup 12 V battery in case of a fault in the main power supply. Eaton stated that having this equalizer function, the 12 V battery and a split 24 V battery system, ensures essential

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safety equipment can operate on 12 V in the event of a power failure. The dc-dc converter also includes noise reduction and interference rejection so there is no interference between the unit and vehicle electronics.

EDN

www.edngroup.com

PRODUCT LINE

Power electronics for electric and hybrid vehicles: On-board battery chargers.

EDN develops and produces prime

durability, scalable and sealed battery chargers, all with IP67 and IP6K9K protection rating, covering voltages up to 1000 V, easy to be integrated in buses, trucks and vans, underground vehicles and more. These components are all built to resist harsh environments and can be installed in any rugged application.

The latest development regarding OBCs is the HPC series, which is the result of two years of research and development by EDN's R&D team to deploy a new conversion technology that improves power density and specific

All on-board battery chargers by EDN are certified with IP67 and IP6K9K protection ratings.

power. A further step is the new BHP series, based on the HPC technology and able to work both in "charger mode" and "export power mode" (bidirectional operations) to perform vehicle-to-grid (V2G) and vehicle-to-load (V2L) applications. HPC and BHP series both feature a galvanic isolation ensuring a definitive safety separation between the vehicle and the grid.

An 80% share of EDN belongs to MTA SpA and this allows the two companies to provide global OEMs with complete power electronic solutions.

FLASH BATTERY

www.flashbattery.tech

PRODUCT LINE

Flash Battery Customised (LFP) Lithium Battery from 7 to 300 kWh.

COMPANY NEWS

Flash Battery designs and manufacture lithium batteries for industrial machines and electric vehicles with strong needs for customisation.

Flash Battery has established itself in the industrial market in just under ten years, forging partnerships and building a customer base from a variety of sectors, including AVGs/LGVs for material handling, vehicles for deliveries in old town centres, construction machinery, agricultural machines, GSE, aerial platforms, and industrial sweepers.

The company offers over 500 customised lithium battery models. The process, from preliminary consultancy to final testing, is the result of a series of one-to-one steps with the customers to understand their needs and create 100% customised products.

The company has developed its own battery balancing system which it calls the Flash Balancing System that acts both in active and passive mode with a much higher balancing power (20A) and not only at the end of the cycle, but also actively during discharge.

Another aspect of Flash Battery lithium batteries is the automatic remote control system. The Flash Battery Data Center, makes it possible to remotely monitor how every battery installed in each machine or electric vehicle is working and identify well in advance when action is needed.

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FPT INDUSTRIAL

www.fptindustrial.com

e-mail: communication@fptindustrial.com

PRODUCTS

Hybrid power solutions, powertrains.

FPT Industrial's F28 Hybrid combines a 2.8 L diesel engine with an e-flywheel. The engine delivers a maximum power of 55 kW, while the electric motor adds 20 kW of continuous power and has up to 30 kW peak power.

With Landi Renzo Group, FPT signed two Memoranda of Understanding to explore clean fuel projects, focused on the possible development of natural gas and hydrogen technology. The companies will explore potential collaborations on developing complete mobility solutions.

HATZ

www.hatz.com

PRODUCT LINE

Hybrid power solutions.

COMPANY NEWS

The company has introduced the fiPMG (flywheel integrated permanent magnet generator) for use in hybrid systems. The design integrates a generator into the engine.

Hatz stated that the generator alone requires 90% less space and is 85% lighter compared to a conventional, mounted design. The fiPMG can be used in critical applications in hybrid systems, as a power outage backup or by providing a continuous power supply.

The fiPMG won an award in the "New Power Technology" category during the second annual Diesel Progress Summit Awards in October 2020.

HENGST SE

www.hengst.com/en/products/fuel-cell

e-mail: m.diekjakobs@hengst.de

PRODUCT

Filtration solutions: Three filtration solutions developed by Hengst provide support for the fuel cell: the cathode filter, the ion exchanger and a water separator.

The cathode filter ensures safe and optimally efficient operation of the fuel cell system. Since components of the fuel cell react with extreme sensitivity to particles and noxious gases, the cathode filter provides optimal protection and prevent damages of the cell.

In addition, Hengst has developed an effective ion exchanger to ensure low

coolant conductivity. This guarantees short circuit proof operation of the system. Hengst likewise offers solutions for water separation in the hydrogen and oxygen path of the fuel cell. Effective water separation protects components of the fuel cell system while ensuring and enhancing performance.

JOHN DEERE POWER SYSTEMS (JDPS)

www.deere.com

Hybrid, drivetrain and electronic solutions.

John Deere offers engine, drivetrain, and electronic solutions with hybrids.

Implementing alternative power systems such as drivetrain and electric solutions in off-highway equipment will depend on being able to optimise an overall power solution of balancing mechanical, hydraulic and electric power systems and cost.

John Deere stated that it can offer a broad range of expertise in mechanical and electronic solutions.

The John Deere eAutoPowr Transmission is a continuously variable transmission with an >

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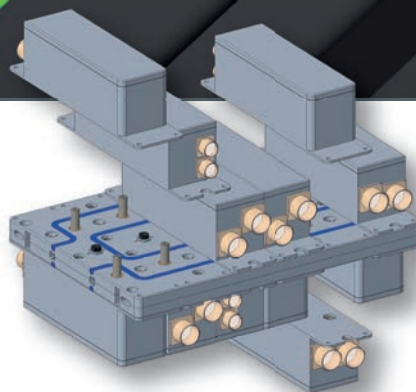
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electro-mechanical power split. The company claim that the drive is more efficient and wear-free compared to conventional CVTs, with another feature being the provision of up to 100 kW of electrical power for external consumption.



All on-board battery chargers by EDN are certified with IP67 and IP6K9K protection ratings.

battery junction boxes and connectors, for 48 V up to 850 V applications, dashboards, displays and electronic control units.

The latest developments for high voltage heavy duty applications include a modular PDU with integrated passive cooling systems which is flexible and adaptable to several platforms. It is made of aluminum plates and an internal resin layer insures Ingress Protection (IP) and electrical insulation.

The company offers a series of PDUs with integrated electronic components that can manage the communication protocols for the electric recharge stations: an Aux PDU, a Front PDU and a Rear Junction box. These components are equipped with a 12 V safety circuit and the rear junction box includes an additional safety circuit which interrupts the current flow when the box cover is opened.

The recent acquisition of 80% share of Italy-based EDN, allows the company to offer also on-board battery chargers and power converters, thus providing OEMs with complete power electronic solutions.

KOHLER ENGINES

www.kohlerengines.com

Products Kohler Engines develops and manufactures diesel and gasoline engines, alternative fuel engines (propane, natural gas, flex fuel and tri-fuel), marine engines, and hybrid solutions.

COMPANY NEWS

Kohler Engines offers its K-HEM parallel hybrid solution for engines between 19- and 56-kW power output. The hybrid system is based on Kohler's KDI range of diesel units that are combined with an electric motor. According to the company the hybrid solution is particularly interesting for the 19 and 56 kW power nodes above which the cost and complexity of a pure diesel solution with exhaust aftertreatment might be a complicated option for manufacturers and users. The addition of an electric generator in this power bands suits applications with intermittent power requirements and where there is a potential for energy recuperation.

Kohler Engines said that K-HEM is a solution for machines that don't need peak power for long periods of time; typical applications for K-HEM are forklift trucks, telescopic handlers, excavators, cable tensioners, chip grinders, and welding equipment.

LIEBHERR COMPONENTS AG

www.liebherr.com/components
e-mail: components@liebherr.com

PRODUCTS

Fuel injection systems and controls, hydraulic cylinders, power units and piston accumulators, hydraulic pumps and motors, e-motors and generators, power electronics and complete e-powertrain systems.

COMPANY NEWS

Liebherr said it has developed "climate friendly" injection solutions designed for use with hydrogen and synthetic fuels. As the internal combustion engine is still the

dominant form of mobile propulsion, Liebherr-Components said it sees it as a logical step to further develop the internal combustion engine and make it able to use CO₂-neutral fuels.

Liebherr is working on solutions for direct hydrogen injection that it said will be ready for series production to meet upcoming CO₂ emissions targets.

Liebherr said it has expanded its portfolio of hydraulic components with a piston accumulator series-production range in the 250 and 350 bar pressure area. The solutions are applicable in both vertical and horizontal assembly situations in a variety of mobile and stationary applications. The products optimally match other hydraulic components by Liebherr and can, therefore, be used as a complete hydraulic system.

MERITOR

www.meritor.com

PRODUCT LINE

Modular electric axles and complete electric drivetrain system.

Meritor produces scalable and modular solutions across its Blue Horizon ePowertrain platforms. These are configured for medium- and heavy-duty vehicles by integrating an electric motor and transmission within the axle. The ePowertrain family consist of 12Xe type optimised for Class 4 & 5; 14Xe type optimized for Class 5-8; and 17Xe type designed for heavy duty 4x2 and 6x2 configuration.

Meritor's ePowertrains ensure efficiency with the motor as the transmission is tuned to keep the motor in the most efficient range. An easy installation is available on current vehicle platforms whilst offering weight savings typically between 272-363 kg, allowing Meritor's platforms to meet medium- and heavy-duty performance requirements.

MTA SPA

www.mta.it

PRODUCTS

Fuses, fuse holders, power distribution units (PDUs),



The new piston accumulator range by Liebherr covers the 250- and 350-bar pressure area.

PMP INDUSTRIES GROUP

www.pmp-industries.com

e-mail: info@pmp-industries.com

PRODUCTS

PMP Industries' range integrates advanced technologies in mechanical, hydraulic and electric transmissions to deliver solutions for several fields of application: construction, material handling, earth moving, agriculture and forestry. PMP Industries designs and manufactures electric traction systems.

Its PMS series gearboxes have become a standard in the market of electric forklifts and electric tractors. The company developed high-speed integrated electric motors (up to 10 000 rev/min), with low copper content and with low-noise. The compact design of the transmissions by PMP Industries led to the internal development of the control units. They include integrated speed sensors and several new functionalities that are optimised for industrial vehicles. Among the latest developments: integrated electric transmission solutions which include transmission, electric motor and controller; and the DigiMix digital control system for truck-mounted concrete mixers. DigiMix adds advanced functionalities to the mixer, including IoT features, without structural



The PMR series planetary drive by PMP Industries is designed for demanding wheeled applications where flexible hydraulic or electric traction is required.



modifications to the truck and without changes to the traditional interaction of the operator with the machine and the dashboard.

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www.mtu-solutions.com
e-mail: info@mtu-online.com

PRODUCT LINE

Rolls-Royce Power Systems provides propulsion and energy solutions and complete life-cycle support under the product and solution brand mtu. Besides using sustainable fuels, the Rolls-Royce business unit is also building on new technologies such as CO₂-free fuel cell systems. From 2025, these will be used in power generation solutions – from balancing energy for compensating fluctuations in the public grid to continuous power and the provision of emergency power in, for example, hospitals and data centers.

SCANIA

www.scania.com/powersolutions

Scania is developing its own electric machine and related components and has continued operational testing and development of what they refer to as Electrified Power Systems. The electric machine and power control unit are modular and scalable with standard mechanical and system management interfaces.

The electric machine – which can be run either together with a combustion engine or as a standalone power provider (motor and/ or all-speed DC generator) – has a compact design and a speed range adapted to that of the engine, eliminating the need for an additional reduction gear, in turn minimising energy loss and facilitating equipment design and installation.

TRANSFLUID SPA

www.transfluid.eu

Transfluid, a specialist in industrial and marine transmissions, develops and manufactures

electric and hybrid solutions and transmission, with its own permanent magnet electric motors, and batteries. The company designed and launched a range of marine and industrial Hybrid Modules which have received DNV-GL Type Approvals, including electric machine, frequency drive and LiFePO₄ battery banks.

Transfluid's parallel hybrid technology offers redundancy on board, a key requirement for several inland water and offshore applications. The parallel hybrid concept makes the propulsion possible either through the internal combustion engine (ICE) or through the electric motor, both being connected to the same powertrain.

An electrical blackout would still leave the ICE capable of operating the propulsion system, and in case of failure of the ICE, the electric motor would replace it. Parallel means also that a booster mode is always possible, to add the electric motor power to the ICE output getting a much higher maneuverability during any kind of difficult situation. The electric machine, that is motor and generator at the same time, allows for fast battery charge during the ICE operation, making the boat independent from the charging infrastructure on land, one of today's barrier toward full-electric solutions.

Transfluid recently delivered its hybrid systems to several marine applications: one project involved the first hybrid taxi boat for Venice's municipality. The propulsion system is composed by a Transfluid HM560-12 hybrid package with permanent magnet electric motor with 12 kW power output and a battery bank with about 10 kWh capacity. The system is coupled with an internal combustion engine by FPT Industrial type S30 230 E.

Transfluid also offers its hybrid systems for the off-highway market, especially mining and railways, for which the company developed a plug and play system complete with mechanical, hydraulic, electric, and electronic components along with battery and cables, all controlled by a proprietary management software.

VOLVO PENTA

www.volvopenta.com/industrial/electromobility

PRODUCT LINE

Currently, the company is working closely with select customers to create e-drivelines for both on-road and off-road vehicles.

Earlier this year, Volvo Penta initiated a

partnership with TICO to develop a emissions-free, fully-electric terminal truck prototype. Volvo Penta started production of electric drivelines for the world's first fully-electric fire truck – Rosenbauer's "Revolutionary Technology". Three Rosenbauer test firetrucks – powered by Volvo Penta electric drivelines – are already successfully running in Berlin, Amsterdam, and Dubai.

XELECTRIX POWER

www.xelectrix-power.com

xelectrix Power is an Austrian based company in the field of on and off-grid battery energy storage solutions.

It is with the XPB-PRO range that xelectrix is targeting the construction industry, off highway machinery segment, rental solutions and the diesel generator hybridisation industry.

The PRO units come equipped with either a 11 or 35 kW inverter and with an expandable battery storage configurations of up to 120 kWh.

The units are able to run various modes including hybrid and smooth start mode.

ZF

www.zf.com

PRODUCTS

Electric drive components and off-highway systems for construction, agricultural, industrial and marine applications.

The company has expanded its range of electrified products for construction machinery. Under the eTRAC series ZF offers zero-emission solutions for compact equipment, mobile excavators and mid-sized wheel loaders. The eTRAC eCD20-40 driveline system for compact vehicles incorporates a 48 V e-motor and transmission, which have been developed especially for this application using actual measurement data from conventional compact loaders, along with front and rear axles, inverters and an electric drive control unit.

Shortly after the start of the eTRAC volume production for compact loaders, ZF developed an electric drive system for wheeled excavators (eTRAC eCD50-90) and, in addition to its conventional axles, swing drive and hydrostatic powershift transmission, now also offers an electric central drive as well as an electrified swing drive system.

With e-mobility solutions (eCD115-210) for the next in size wheel loader class ZF further expands its central drive technology.

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