THE MAGAZINE FOR INDUSTRIAL VEHICLE TECHNOLOGY, DESIGN & ENGINEERING

•

MARCH 2013

VOL 21 No.

www.iVTinternational.com

INTERNATIONAL INDUSTRIAL VEHICLE TECHNOLOGY

New vehicles in depth: Hamm H-series compactors Volvo PL3005D pipelayer

Armed and dangerous

Top tips for preventing catastrophic boom failure on earthmovers



www.iVTinternational.com

 (\bullet)

ISO18752

Interview: Dobroslav Rak, VP Engineering, Doosan Bobcat

Design Challenge: Roadbuilding

What's new in: Mobile hydraulics

43 ISO8643 ISO8

ANNIVERSARY





REGULARS

4 **NEWS**

((()

- 7 **CONSTRUCTION FOCUS BY JIM MANFREDI**
- 9 **AGRICULTURE FOCUS BY JIM MANFREDI**
- 10 **MATERIALS HANDLING** FOCUS **BY MICHAEL LEU**
- **146 BULLETIN BOARD**
- **152 THE INSIDER** A heartbreaking tale of attraction, new relationships and betrayal

"I believe that one of the trends [in the construction machinery industry] will be to develop hydraulics-free solutions" p24



SUBSCRIPTION / CHANGE OF ADDRESS FNOLIIRIES TO:

Subscriptions Manager Suzie Matthews suzie.matthews@ukipme.com Circulation Adam Frost adam.frost@ukipme.com Database Manager James Taylor james.taylor@ukipme.com

Editor Bichard Carr richard.carr@ukipme.com

Production Editor Alex Bradlev Chief Sub Editor Andrew Pickering Deputy Chief Sub Editor Nick Shepherd Proofreaders Frank Millard, Kari Wilkin, Lynn Wright

CASE STUDIES & SPECIAL FEATURES

12 20 YEARS OF iVT

۲

COVER STORY p72

WOULD LIKE TO MEET: 8643 Earthmoving machinery requires hose burst valves to meet this tough ISO standard here are some of the best, plus some amazing developments in hose technology that could prevent hose bursts altogether

> We kick off celebrations of our 20th year with a pick of the forewords over two decades

14 **STARS OF THE SHOW** Our pick of the new construction vehicles to be launched at Bauma this April

24 **CZECH MATES**

Bobcat machines hold a special place in many operators' affections. Dobroslav Rak, VP of Engineering in the Czech Republic, gives iVT some hints as to what to expect in the long term

30 **PIPE DREAMS**

One of the few truly new machine forms in over a decade, Volvo's pipelayers deliver a host of benefits - not least quick conversion into a traditional excavator configuration

40 THE FLAT EARTH SOCIETY

Hamm's design engineers are anything but backward looking and our sneak preview of the new H-Series compactors proves it

48 **DESIGN CHALLENGE**

Six more-efficient machines for roadbuilding, designed exclusively for iVT

60 **FLUID MECHANICS**

Many mobile hydraulics engineers have been working flat out to get their latest innovations ready in time for Bauma

78 **SHOWING OFF**

There's an incredible range of new products on show at Bauma this April - here's our pick of the best, plus a look at some of the trends in technology to watch out for whatever your area of expertise

Art Director Craig Marshall Design Louise Adams, Andy Bass, Anna Davie, James Sutcliffe, Nicola Turner, Julie Welby, Ben White

Head of Production & Logistics lan Donovan Deputy Production Manager Lewis Hopkins Production Team Carole Doran, Cassie Inns, Robyn Skalsky

International Advertising Co-ordinators Kevin Barrett (kevin.barrett@ukipme.com) Michael Briant (michael.briant@ukipme.com)

Editorial Director Anthony James Managing Director Graham Johnson Chairman & CEO Tony Robinson

The views expressed in the articles and technical papers are those of the authors and are not endorsed by the publishers. While every care has been taken during production, the publisher does not accept any liability for errors that may have occurred. *iVT International* USPS 018-627 is published quarterly, in February, July, September and November, by UKIP Media & Events Ltd, Abinger House, Church Street, Dorking, Surrey, RH4 1DF, UK, Annual subscription price is

US\$102/£57. Airfreight and mailing in the USA by agent named Air Business Ltd. c/o

Worldnet Shipping USA Inc, 155-11 146th Street, Jamaica, NY 11434. Periodicals postage paid at Jamaica, NY 11431. US Postmaster: send address changes to IVT International c/o Air Business Ltd. c/o Worldnet Shipping USA Inc, 155-11 146 Street, Jamaica, NY, 11434. Subscription records are held at UKIP Media & Events Ltd. Abinger House, Church St, Dorking, Surrey, RH4 1DF, UK. Air Business is acting as our mailing agent. iVT International, ISSN 1471-115X, is protected by copyright ©2013

Average net circulation per issue for the period 1 January-31 December 2012 was 10,391



UKIP Media & Events Ltd. Abinger House, Church Street, Dorking, Surrey RH4 1DF, UK Tel: +44 1306 743744 Fax: +44 1306 742525 Ed. fax: +44 1306 887546

Printed by William Gibbons, Willenhall, West Midlands, WV13 3XT, UK



Member of the Audit **Bureau of Circulations**

PRODUCTS & SERVICES

106 A FITTING END

The EO-3 fittings system from **Parker Tube Fittings** will put a stop to human error during assembly

- **108 IT'S ALWAYS THE QUIET ONES** Marzocchi's quiet gear pumps can cut noise levels by up to 15dB(A)
- 110 TAKE THE LOW ROAD A low-flow load-sensing valve from Sauer-Danfoss can reduce system costs while enhancing productivity
- **112 LITTLE AND LARGE** Hawe has added axial piston pumps at both ends of the spectrum to meet all load-sensing requirements
- 114 THE LOGICAL SOLUTION New logic elements from Comatrol will play a key role in cost-effective circuits
- 117 TOP OF THE TRIO Stauff's device for monitoring the three

most important hydraulic parameters will streamline testing and performance

119 SPRING CLEANING Comer Industries has freshened up its

axle and drive product lines

120 DOING MORE WITH LESS Caterpillar engines provide increased power and performance, even while producing fewer emissions

- 123 SHOW OF STRENGTH Cummins' 'smallest to largest' Bauma exhibit includes a new 3.8-litre model
- **125 GOOD TO GO** MTU will display a 75-3,000bkW range of engines complying with Tier 4i and Tier 4 Final legislation at Bauma
- **127 THE STOP/START APPROACH** Advanced features on new Volvo Penta engines will notably reduce fuel costs
- **129 FEVER PITCH** More accurate control of fan pitch is now a reality, courtesy of Flexxaire
- 130 HOSE-TINTED SPECTACLES Pooling expertise from two divisions gives ContiTech customers major single-sourcing and synergy benefits

132 IDLE LIES

Webasto debunks old wives' tales with an innovative engine-off technology

- **134 ...IN PERFECT HARMONY** New joysticks and sensors from Caldaro simplify the HMI, while reducing complexity and cost
- **137 INSIDE INFORMATION** Actia's connectivity solutions will ease compliance with functional safety and emissions control requirements
- **139 DRILLING AT A DISTANCE** Soilmec fitted its new rig with clever radio remote controls from Autec
- 141 GLOW FIGURE Don't put your trust in theoretical LED light values, urges Hella
- 143 SEEING IS BELIEVING

An easily viewable display with a dualmode Bluetooth chip from Kongsberg

۲

145 TOUGH CUSTOMERS Need more durable steel, wider plates or improved flatness tolerances? Tata Steel has just what you need



FOREWORD

()

Those of us who attended the Bauma Media Dialogue in Munich this January might not have been expecting too much out of the ordinary in terms of new vehicle launches – after all, January 2014 is the month on which most off-highway machinery engineers are fixated. Nevertheless, I came away with the distinct impression that we are witnessing the birth of several new trends (even if one of them – hybrid technologies – first emerged, blinking in the media spotlight, a decade or so ago, only to decide to go back in again soon after). So you can read about the new hybrid machines and technologies in more detailed form on page 93, as well as the machine that kicked off all the excitement last October, Cat's 336E H, on page 4.

On top of all that, the number of new vehicles now featuring engine-off functions to put a stop to that most recent addition to the list of naughty words – idling – is quite astonishing (see our Stars of the Show feature on p14 and just count them). Elsewhere in the magazine, you'll find a handful of descriptions of the technology that enables such a major contribution to reducing fuel consumption, most notably in articles about Linde Hydraulics (p61), Volvo Penta (p127) and Webasto (p132).

Coming up in the June issue of iVT

In fact, I've just remembered spotting a bit of a trend at Bauma China last November too, with a handful of wheeled loaders from some of the Chinese OEMs – including SDLG, Lovol and XCMG – sporting a tank for LNG behind the driver's cab. It will certainly be interesting to find out what's happening on that front in Munich, especially given Cat's announcement at a recent Natural Gas summit (page 7) that it would be throwing all of its weight behind the fuel. As I wrote in a foreword late last year upon my return from the Cat 336E H product launch where a surprising amount of emphasis was given to the topic, it could be a good time to buy shares in gas.

And speaking of prophetic forewords, check out the first of our celebratory features on p12, where we dig out some snippets of incisive journalism – or inspired guesswork, you decide – that have appeared on this page over the past 20 years. But will I look back at this foreword in 2033 and chide myself for being too eager to spot patterns where none exist, I wonder? After all, I did stroke my chin over a whole bunch of electric mini excavators at Intermat last year... See you at Bauma!

Richard Carr, editor, iVT International

Design Challenge: suspension • Claas Axion 900 tractor • Air cushion technology •
 Traction technology: suspension • SMKY tracked rice harvester • Best of Bauma

We Turn Strong Machines into Clean Power Packs

To satisfy the stringent guidelines for protection of the environment and climate, we have improved our clean solutions for construction and agricultural equipment: The air conditioning lines reduce CFC emissions by as much as 95% thanks to innovative technology – an extremely thin film barrier layer. And the SCR lines, equipped with heated quick connectors that ensure optimized contact, meet the latest emission limits specified for modern engines. Our hoses, hose lines and connection elements contribute substantially to the construction of future-proof and eco-friendly vehicles and machines in many industries.

ContiTech Fluid Technology - the connecting force.

o www.contitech-online.com/aga





Fluid Technology info@fluid.contitech.de 15-21 April, 2013 Munich Germany Hall B2, Stand 301/402

Ontinental S CONTITECH

ContiTech. Engineering Green Value

NOUTION

۲



AKASHI, JAPAN – Caterpillar has unveiled the first model in what it promises will be a new line of hybrid excavators. To be officially launched at Bauma, the 336E H is described by Gary Stampanato, VP of Cat's Excavation Division, as "the most revolutionary excavator to come onto the market in decades". (For a description of how it works, see the 'Swing Time' box, right.)

As a hydraulic hybrid, the new model provides up to 50% greater fuel efficiency than the 336D, or up to 25% over the standard 336E. In fact, Ken Gray, Cat's global product manager for large hydraulic excavators, claimed that 75% efficiency improvements had even been seen. On the basis of current fuel prices and a high-production application, Cat estimates that a return on investment for the hybrid technology could be expected in as little as a year (2,000 hours) – in contrast to the seven years for payback it says electric hybrid excavator owners have reported.

Conserve, optimise, reuse

In addition to approximately 98% parts commonality with the 336E, including the Tier 4i Caterpillar engine, three building block technologies – conserve fuel, optimise performance and reuse energy – have been used in the design of the 336E H, which has more than 300 filed patents. In the former, the Electronic Standardized Programmable (ESP) pump provides greater engine power management, with smooth transmissions between the hydraulic hybrid power sources, engine and accumulator. This helps to reduce engine rpm for savings in both fuel and noise.

Restriction management via the Adaptive Control System (ACS) valve helps to optimise performance by governing flow to seamlessly control motion with no loss of power.

"If there is an operation in the machine that has excess energy, normally it would be flushing that back to the tank," said Gray. "ACS allows us to flush it to the circuit that needs it, across virtually any combination

WHAT'S NEW



🖺 What we still don't know

The press launch at Cat's Mossville Design Center last October was certainly informative, but left much unanswered. *iVT*'s enquiry as to how much of the current excavator range could become hybrid, and whether there was a size limit where the technology is no longer feasible, was answered with "Good question! Next?"

The same went for questions about whether the engines in future models could be downsized to save fuel and space; when the next hybrid model(s) will be launched; and if and when the 336E H would be made available in China, following its initial launch in western European, North American and Japanese markets.



Choose your hybrid

It emerged at the press conference that Cat has been working on a variety of hybrid excavators for several years. "There are many ways to store and reuse energy," said Gray. "In 2009, we were still using a dual-path approach, identifying the best technology for both electric and hydraulic approaches – but at some point you have to choose which horse you want to ride. No other commercially available technology has a higher power density than hydraulics.

"But we learned things from both programmes that could be applied to each other; we learned about control strategies from the electric machine, and about power management from the hydraulic machine."

One disadvantage of an electric hybrid is that kinetic energy has to be transformed into electric energy and then back into the hydraulics to ensure full utilisation. However, a hydraulic model eliminates that extra step and complexity.

Customer feedback certainly suggested a level of scepticism that electric models, partly due to their complexity, would not significantly reduce owning and operating costs. In contrast, there is little new for service technicians, who already know how to take care of accumulators and valves, etc, to learn about the 336E H. And should part of the hybrid system fail, the rest of it is shut down and the operator alerted, while the excavator continues to operate in the traditional way as it waits for service.

Caterpillar hasn't given up on electric hybrids, however, and says it is considering incorporating hybrid technology in other lines of its equipment. "We're continuously working on machines that will meet our customers' future needs," said Tana Utley, chief technology officer and VP of product development and global technology. "That's why we're continuing our R&D in electric hybrid technology, which actually began our hybrid development path several years ago."



Swing time

Providing exactly the same performance and productivity as the standard 336E excavator, the new hybrid model is built around two non-flammable pre-charged nitrogen gas hydraulic accumulators that have been tucked between the engine compartment and in front of the rear counterweight.

"Think of the system as a pendulum swinging back and forth, or a big coiled spring," explained Ken Gray. "As we sway in one direction and slow down, we capture that energy as we compress that spring and keep it as pressure in the accumulator. As we swing again, we let go of that spring, and as we slow down again we essentially wind up the spring in the other direction until it stops and accelerates the machine back.

"It's effectively just a hydraulic cylinder with a piston in it – on one side is an inert gas, on the other is the hydraulic system. The excess energy compresses the gas for storage as energy – then, opening the valve at the end of the accumulator allows that energy to flow back into the hydraulic system. The difficult part was how to control it, or ensure the operator wouldn't feel it or be annoyed by it."

In a high-cycle loading application, a slewing excavator effectively stops and starts twice every 15 seconds, producing a huge amount of energy that would usually go to waste.

Machine layout has changed relatively little, though Gray said Cat "had to accommodate the counterweight design for the space gain without extending it. We had to work some magic with weight distribution."

A constantly slewing excavator wastes an awful lot of energy - unless it's fitted with hydraulic accumulators, like Cat's new 336E H

on the machine. By reducing pressure losses, we also reduce fuel consumption."

For the final building block, 'reuse energy', the hybrid swing system collects and stores the superstructure's swing braking energy in accumulators, and then quickly releases it for swing acceleration. By reducing the load on the engine, fuel savings are an inevitable result.

Gray claimed that by reducing the engine rpm so much (as yet unspecified – see 'What we still don't know', above), the 336E H is the "quietest machine in its size class by a margin". Indeed, preliminary results suggest a 1.4dB(A) reduction in spectator noise level, to 103dB(A), over the 336E.

Smallest to Largest

۲

Cummins at Bauma - 49 hp to 4200 hp.

Cummins will feature one of the most impressive engine line-ups ever seen at the Bauma show, with a 'smallest to largest' engine display featuring the QSF2.8 at 49 hp (37 kW) and the QSK95 at 4200 hp (3132 kW). The 2.8-litre and 95-litre engines highlight the recent extension of Cummins power at both the low and high ends of the range, now the broadest and most capable in the industry meeting the Tier 4 Final very low emissions standards. Be sure to visit Cummins in Hall A4, Stand 315.

۲

Contact telephone: +44 1325 554829 Email: enquiries.engines@cummins.com Twitter: @cumminseurope Websites: www.tier4.info www.cumminsengines.com



HALLAS COMPANY

۲



LIFTING EXPECTATIONS

PEACHTREE CITY, GA, USA -

Filling a niche between 440and 660-ton machines, Sany's 550-ton SCC8500 provides 500-ton class lifting capacity with the transport capability of a 400-ton crawler crane.

Launched at Bauma China, it uses auto counterbalance equalisation (ACE) to sense boom angle and automatically adjust the position of the upperworks counterweight with hydraulic cylinders. This has helped keep overall crane weight down by avoiding the use of an inefficient carbody counterweight. The standard ACE system has one upperworks tray with hanging brackets and 20 upper sideblocks for 217 tonnes of counterweight. The optional UltraLift package adds another tray with hanging brackets and 36 upper sideblocks to give 394 tonnes. The crane needs no counterweight wagon, which improves mobility around the jobsite. The base machine can be transported on 21 trucks, just like a 440-ton model.

Power comes from a 600bhp Cummins engine; hydraulically driven planetary gears are used to raise and lower the load. The swing system uses dual drives and planetary gear reduction to automatically centre the load and precisely regulate swing speed up to 1.8rpm.

۲

Styled by Porsche Design, the UltraCab tilts 20° for an even greater field of view through its reinforced glass windows. Overhead structural plates provide extra security.

A dedicated auxiliary diesel generator powers the HVAC, so that the main engine can be switched off for long periods. It can also power the engine and reservoir heaters during coldweather shutdown.

MODEL BEHAVIOUR

WUHAN, CHINA – One of the most interesting vehicles to be displayed at Bauma China, even if only in model form, was the WTW220E from CSSG (China Sanjiang Space Group).

This 220-tonne payload AC mining truck is powered by two Cummins KTA38 engines, delivering 896bkW at 1,800rpm. Independent electrical motors then drive every individual wheel on the four axles for high levels of traction at a top speed of 45km/h. With a GVW of 380 tonnes, the truck can come to a stop from 30km/h within 25m.

The large-stroke hydraulic suspension and swing-axle design provides comfortable travel over obstacles, providing higher stability and enhanced road adaptability. CSSG says



that this can reduce the need for haul road maintenance and extend tyre life. Rated gradeability is 8%.

Two steering modes give the truck increased mobility and a smaller turning circle, with the 15m-long machine having a minimum turning diameter of 24.5m. With a 110m³ dump body volume (flat loading), it takes 32 seconds to raise before discharging the payload.

In the event of an engine or wheel drive failure, the truck can still be driven back to the service area. Easy access to main service components helps maintain uptime.

CONSTRUCTION FOCUS 🥣

JIM MANFREDI, MACHINERY OUTLOOK

SANY EYES INDIA

Sany hopes to capture 15% of India's excavator market in the next three years, and make it a manufacturing hub for the region. The company, which established a manufacturing base near Pune with an investment of €45m, may consider further investment of about €53m in the country.

The Indian market for excavators is expected to reach 20,000 units per year in the next three years, of which Sany hopes to sell 4,500 units.

MOTORING AHEAD

Hyundai Heavy Industries (HHI) and Cummins are to establish an engine factory for earthmovers in Daegu, South Korea. Each company invested €25.9m for the JV, named Hyundai Cummins Engine Company.

The factory will start production from 2014 with an annual capacity of 50,000 engines, giving Hyundai's Construction Equipment Division a stable supply of high-quality engines.

Starting from $\in 221m$ annual sales in 2014, the JV hopes to achieve aggregated sales of $\in 2.77bn$. HHI's goal is to become a top three OEM of earthmovers by 2016, with annual sales of $\in 7.1bn$.

GOING GAS

At the Natural Gas for High Horsepower Applications Summit, Caterpillar made clear its desire to produce even more natural gasfuelled equipment and engines for a variety of applications. "We have decided to go all-in on gas," stated Joel Feucht, Cat's director of gas engine strategy for the energy and power systems businesses, during his keynote address. "We see a global market long term. Large engines are going gas. It's not debatable; it's our conclusion."

WHAT'S NEW

Feucht confirmed that Cat will provide natural gas fuel as an option for engines across its many high-hp lines for earthmoving, mining, rail and drilling operations.

EXPANSION PLAN

Deere-Hitachi Construction Machinery Corporation will invest €73 million as it grows its Kernersville, North Carolina, home base to 120 acres, increasing excavator manufacturing capacity by 60%. The plant produces 14 excavator models carrying both brands.

GERMAN HQ FOR XCMG

XCMG has officially opened its new Krefeld, Germany, location that will serve as XCMG Europe, its European HQ, and house R&D for hydraulic components.

The R&D will primarily focus on developing core crane components, such as valves, pumps, motors and intelligent controls.

The location will also provide a local platform for purchasing, acquisitions, sales and recruitment.

IMAGE CONSCIOUS

Velodyne Acoustics has granted Caterpillar exclusive rights of use and manufacture for its patented HDL-64 LiDAR-sensing system, which incorporates proprietary laser-imaging technology suitable for offhighway vehicles.

The laser signals are safe for human eyes and offer many advantages over radar, such as providing return signals from a wider variety of materials at greater distances and with more usable points. The system instantaneously provides a high-resolution image that is immediately compatible with computers.





NAF, the world market leader for drive line solutions used in ctl forest vehicles, offers a range of bogie axles for construction machinery with:

- Application-specific designs
- Cast construction
- Speed capability of up to 65 km/h
- Patented oil immersed self-cooling disc brake
- Patented Balance Bogie System PBBS
- Gear drive for high durability and long working life

Our customized design keeps you ahead of the market!



www.nafaxles.com



LIGHTENING THE LOAD

BEAUVAIS, FRANCE -

Blending sophisticated features with straightforward operation, Massey Ferguson's MF 5600 tractors build on the success of the outgoing 5400 series with a series of enhancements that benefit loader work in particular.

Specifically designed for tractors, the three-cylinder 85-105bhp AGCO Power 3.3litre engine provides a high power density at low rpm, in a more compact package than

the task in hand, speeding up

work and boosting productivity.

The tractor can be used in

combination with a snowplough

or snow blower when travelling

at speeds below 200m/h, due

to its hydrostatic transmission

that features Electronic Speed

Control (ESC), enabling the

operator to electronically set

and vary the forward travel

speed independently of the

the traditional four-cylinder models. This has enabled a neat, narrow steep-nose bonnet to be adopted, which provides exceptional forward visibility, while also saving enough space to accommodate the highly efficient and easyclean cooling package design from the high-horsepower MF 7600 range.

Should the 58+33 l/min twin-pump hydraulics not be sufficient, a 133 l/min system that provides 100 l/min at 200 bar for loader operation is an option. Once activated, the flow from three pumps is automatically combined.

A notable addition on the Dyna-4 Eco transmission is an automatic control that selects neutral when the brake is pressed, while the new loader joystick also enables speed and directional changes to be made. The new Eco mode means transport speeds of 40km/h can be reached at lower engine rpm.



engine rpm. As well as setting the rpm of the 87hp Yanmar engine and the PTO, it offers several other operation modes such as Eco and Power reactivity programs. An Automotive function allows the engine revs to be increased according to the forward speed, with a Recall Speed function enabling the system to recover and maintain the preset working speed.

Optional features include a reverse-flow fan to keep the radiator as clean as possible; a StarLight cab with HVAC and activated carbon filters; and a proportional multifunctional joystick to control the PTO, electrical devices and the flow to the hydraulic couplers.

AGRICULTURAL FOCUS

JIM MANFREDI, MACHINERY OUTLOOK

RAIN STOPS PLAY Mahindra & Mahindra has cut its forecast for sales of farm equipment in India as the worst rainfall in three years delayed crop sowing. M&M estimates industry sales will expand as little as 2% in the year ending 31 March 2013. Sales had been initially estimated to rise as much as 10%.

Tractor sales may be little changed at 625,888 units in the fiscal year after an 11% expansion a year earlier. Companies including Tractors & Farm Equipment (TAFE) and International Tractors are tapping overseas markets and adding products to lure construction customers.

International Tractors, the maker of the Sonalika brand, saw exports surge 49%, and now plans to make acquisitions in Europe and expand overseas. TAFE forecasts it will improve upon the 22,000 tractors it sold in the USA last year, despite the drought. M&M sold more than 10,000 units in the USA last year.

DEERE SALES JUMP Deere's worldwide net sales and revenues for the quarter ended 31 January increased 10%, to US\$7.421bn, over the previous year. Net sales of the equipment operations were US\$6.793bn, compared with US\$6.119bn a year ago. Equipment net sales in North America increased 18% for the quarter; sales elsewhere increased 2%.

Company equipment sales are projected to be up 6% for fiscal 2013 and 4% for Q2 YoY. In the Agriculture & Turf division, sales increased 16% for the quarter.

Worldwide sales of this equipment are forecast to increase by about 6% for full-year 2013. Sales in North America are forecast to be flat to up 5%, with continued strength in demand for large equipment such as highhorsepower tractors and combines. In South America, industry sales are projected to be up 10-15% as a result of strong market conditions in Brazil, and Asian sales are projected to be slightly higher due to improvements in the Chinese economy.

Full-year sales in the EU27 are forecast to be down by 5%, and sales in the CIS are also expected to be down slightly from 2012.

SHOW OF STRENGTH

As from 1 January 2013, Antonio Carraro became an official partner of VM Motori, strengthening the 10-year collaboration between the two Italian companies. The worldwide AC sales network will be responsible for all parts and service regarding VM engines assembled on AC tractors.

۲

FIAT RESTRUCTURE

Case IH president Andreas Klauser has been appointed COO for EMEA in the new Group Executive Council at Fiat Industrial. Klauser will take on responsibility for all Fiat Industrial brands in the region, including the position as brand leader of lveco.

The restructuring of Fiat Industrial's management takes place as a result of the merger with CNH Global.

PULL UP A CHAIR

Anand Mahindra, MD and vice chairman, Mahindra & Mahindra, has assumed the mantle of chairman of the Mahindra Group from Keshub Mahindra, who has retired after 48 years at the helm. He will continue as chairman emeritus at the request of the board.

Fortune magazine named Anand Mahindra as one of 2011's top 25 most powerful business people in Asia.

Subscribe online at www.machineryoutlook.com



Ĭ

WHAT'S NEW

HANDLING FOCUS

MICHAEL LEU, FORKLIFTACTION.COM

HANDLED WITH CARE Konecranes is to buy assets

of Linde's container handler business. Having signed a long-term supply agreement with the Kion Group, both parties will collaborate to boost the competitiveness of their activities in this sector.

Each will keep container handlers and reach stackers in their portfolio but, over time, all manufacturing will be relocated to Konecranes' factories. Konecranes has acquired product rights from Linde and will have access to the latter's distribution network

MHI SPINS OFF FLTs

Following an integration agreement, the forklift operations of Mitsubishi Heavy Industries are to be spun off and integrated into Nippon Yusoki Co (Nichiyu), under the corporate name Mitsubishi Nichiyu Forklift Co. Hideaki Ninomiya, Nichiyu's president, will be president of the new entity.

۲

The absorption-type split and integration agreements were finalised on 6 February. Separately, MHI has

appointed Shunichi Miyanaga as its new president, effective on 1 April. Current president Hideaki Omiya will become chairman of the company, succeeding Kazuo Tsukuda, who will become senior corporate advisor.

CHINESE OEM IN TOP 10

Anhui Heli now holds ninth place on dhf-intralogistik's latest world ranking list of industrial truck OEMs, up from its previous 11th spot. The Chinese OEM achieved 25.4% sales growth, to US\$1.022bn, in 2011.

There were no changes within the top five from 2011. Toyota grew its lead over the Kion Group to US\$1.076bn, achieving annual forklift sales of US\$6.049bn. Kion's sales revenue grew by about

Global materials handling online: www.forkliftaction.com

24% to US\$5.844bn, with 65% of annual sales coming from its Linde brand. Third-placed Jungheinrich achieved group annual sales of US\$2.831bn.

In 28th, a new company on the list is the Brazilian OEM Paletrans. *dhf* believes it to be the biggest forklift OEM in Latin America.

GROWTH SPURT

Clark Europe achieved double-digit growth rates for the 2012 financial year, with sales up 27% to €60m. Its spare parts business grew by 20%, and there was a 13% increase in CB sales and a 10% increase in warehousing technology sales. It forecasts 2013 sales to increase by 20% to \in 72m for new equipment, and incoming orders to grow by 17%.

"We see the markets as being at the same level as in 2012," said MD Egon Strehl. "Thus, our declared target is to continue gaining shares in a stagnant market.

EXPANDING HORIZONS

Chinese forklift OEM Ningbo Ruyi is expanding its North American presence with the launch of wholesaler Xilin-Americas Material Handling.

The company will operate two warehouses: in Chicago, USA; and Toronto, Canada. Already sold internationally. Xilin forklifts were previously distributed in North America through private branded partnerships. They will now be branded as Xilin-Americas.

ISSUE MILESTONE

Celebrating its 600th issue, forkliftaction.com News is emailed to more than 50,000 opt-in members worldwide each week. The news service keeps readers informed of new technologies, products and corporate moves through independent industry news stories, coverage of dealer developments, end-user stories, and market reports.

STRAUBING, GERMANY -

Providing massive savings in running costs, Sennebogen's 8130 EQ balance materials handling machine should be welcomed for use in logging. ports and scrapyards.

Driven by a 400V electric motor producing 130bkW (a 151/164bkW Cummins diesel is an option), the 8130 EQ relies on classic lever principle behaviour to remain constantly balanced, thereby requiring minimal energy to handle 5-tonne loads, or reach 27m.

The machine is controlled via just two cylinders. A bar running parallel to the boom connects the jib to the adjustable rear counterweight, which ensures the machine remains perfectly balanced in any position.

This EQ (equilibrium) principle alone provides savings in running costs of up to 50%. In conjunction with the electrohydraulic drive

concept, which uses just 25% of the power needed by similar diesel-powered machines. total savings of up to 75% can be realised. In addition to its quiet, smooth operation, the powerpack is easily accessible for maintenance.

Mastercab, a brand-new cab design that is around 50% wider and 25% higher than the standard maXcab, will be an option. Almost doubling

the internal space to 6m³, this resiliently mounted design provides room for an instructor's seat and several storage options. The large floor window and excellent all-round view (the stationary version can work in an area of 2,300m²), in conjunction with the pylon structure and raised position, enhances safety - for example when unloading ships.



SPACE EXPLORATION

HAMBURG. GERMANY - With capacities of 4-8 tonnes, Still's RX 70-40/50 and RX 70-60/80 combine power and precision with a compact design. At just 1.6m wide, for example, the RX 70-60 enables the movement of 6-tonne loads in sub-5m aisles.

Featuring Still's proven diesel-electric drive system, the trucks incorporate five adjustable drive programs that enable top speed and acceleration and deceleration grades to be individually set to make the most efficient use of power. The truck is 'glued' to the driver's foot, coming to a halt when the accelerator is released.

As well as the Blue-Q fuel efficiency program, the new models feature intelligent drive technology - after accelerating, they electronically shift up a gear so the engine speed can be reduced by a quarter while maintaining travel speed. In combination with the optional

cruise control this ensures relaxed, fuel-efficient travel.

With an 80bkW 4.1-litre Deutz engine in the larger forklifts, and a 54bkW 2.9-litre unit in the 40/50 models, the new trucks easily fulfil Stage IIIB. Both classes employ a diesel oxidation catalyst, with the RX 70-60/80 models also requiring a diesel particulate filter - this has reduced NOx by approximately half that of the previous range, with PM

down by 97%.

The cabin of the larger models is offset to the left, which frees up the view through the mast as well as around it. The all-round view is further enhanced through the use of low cylinders, large fields of vision through the overhead guard, and the outer contours of the chassis.

Look out for an in-depth report in the 2013 Advanced Lift-truck Technology Annual.





www.hyundai-ce.com





FORKLIFT LINE - UP



 HEAD OFFICE(SALES OFFICE)
 14th FL., Hyundai Bldg. 75 Yulgok-ro, Jongno-gu, Seoul, Korea

 Tel. 82. 2. 746. 4753 / 4609
 Fax. 82. 2. 746. 7444 / 7445
 E-mail. sisky@hhi.co.kr



20 YEARS OF IVT: FOREWORDS

SINCE 1993. IVT HAS REPORTED ON THE LATEST DEVELOPMENTS IN THE INDUSTRIAL VEHICLE INDUSTRY. WE ARE PROUD TO HAVE PLAYED AN ESSENTIAL ROLE IN DRIVING **CHANGE – AS THESE SNIPPETS FROM** PREVIOUS FOREWORDS SHOW

> hen we began to ask the question in January 1993, "What do industrial vehicle designers read which is specific to the design and engineering of industrial vehicles?", we were surprised to find ourselves looking into a void. Nowhere, it seemed, was there anything dedicated to this global community of people who are charged with the task of developing the products which form the artery of the materials handling industry.

In the coming months, we'll reproduce some vehicle case studies on the *iVT* website that will amply illustrate the advances in vehicle design during our lifetime

۲

As we looked closer, one phenomenon became obvious. Here is an industry in the process of a metamorphosis. Led by ergonomics and the parallel demands of users and operators for products which offer greater efficiency, reduced whole life costs and greatly improved user and environmental appeal - it is an industry in the process of discarding a long standing utilitarian image and replacing it with a fresh new look where style and form play an equal role with function itself.

No element of the industrial vehicle, it seems, has been spared from this process of change - from lighter to operate and better designed controls to improved noise and vibration damping; from improved vision to better manoeuvrability; from the use of recyclable materials to the adoption of more cost effective methods of manufacturing. For technology suppliers as well as design engineers the demand to meet the challenge has never been greater.

Industrial Vehicle Technology '93 has been launched as a window into the thoughts, technologies, and process of change - to be a showcase for innovation and to create a forum for the exchange of ideas at an international level.

The publication provides a platform for technology transfer and an opportunity for companies with innovative approaches to discuss their developments in a global forum. Its focus is on vehicles which serve a materials handling function and on the organisations committed to their design, production and improvement.

Over 12.000 loyal readers would surely agree

12

We hope Industrial Vehicle Technology '93 will provide inspiration to its readers around the world and above all that it will serve as a stimulus for discussion between buyers and suppliers in this rapidly changing and vital industry. TONY ROBINSON, iVT 1993, LAUNCH ISSUE

We may have even inspired a few advances in lift-truck design of our own..

The question is, where will this trend take the industry? Is it possible that the day of the fully autonomous robotic industrial vehicle is dawning? Obviously, some applications will



 (\bullet)

always require an operator, but others may well provide an opportunity for this kind of development. Agricultural

machinery seems to be the favourite at the moment - a number of agricultural OEMs are working on farming sys-

As I wrote in my interview with Deere's Mark von Pentz in September 2009. one of the UK's leading newspapers had recently reported this technology as news

Europe would like to you. Please send your

The recent news of Doosan Bobcat's in-house engine activities (see p28) certainly backs up this statement

۲

tems that make use of GPS to provide farmers with detailed information concerning crop data (Case's AFS, p68, is a good example) Marrying this type of system to an advanced vehicle control system would seem to be the next logical step - the question remains as to how far in the future this LINDSAY GALE, iVT EUROPE MARCH 1998

them in the family vity is anything to go by, it must make perfec

conomic sense for OEMs to build their own engines

his being the issue of iVT International devoted in part to offhighway engines, it makes some of the more recent developments to have filtered down to our newsdesk all the more pertinent, namely JCB's announcement that it will start producing its own four- and six-litre engines for launch in 2005. It's not very often that we sit back and debate the content of by incoming press release, but this certainly attracted our attention indeed, the news spurred gossip in other sectors too. Some hours ter first being made aware, I spoke to a colleague in the agricultura larket whose introduction 'Have you heard?' was followed very viftly with 'bad news for the current engine suppliers...'

Certainly it's not a great development for JCB's current supplier o instruction giant still int NICK BRADLEY, iVT INTERNATIONAL

OCT/NOV 2003

But perhaps the real feather in our cap came when, on returning to the office after the Christmas holiday, I opened a letter from the UK Fork Lift Truck Association revealing that the 2010 edition of Advanced Lift-truck Technology had garnered us one of its prestigious 'Archie' Awards for Excellence. What was particularly flattering was that this Design Achievement Award not only came completely out of the blue, but had little to do with the overall look of the magazine (which one product manager recently described to me as 'industrial vehicle porn'). Instead, it was in recognition of our influential role in the industry. While an award for 'Best Magazine' never goes amiss, this award firmly places us in the illustrious company of previous recipients such as Narrow Aisle, Combilift, Linde Material Handling, Jungheinrich RICHARD CARR, iVT ADVANCED and Continental Tyre Group. LIFT-TRUCK TECHNOLOGY 2011

iVTInternational.com March 2013



Caterpillar has a full range of industrial power solutions. Developed by a skilled team of experts, our industrial engines offer customers increased value through better fluid efficiency and longer component life. Don't settle for anything less than a Cat engine.

See more at catindustrialpower.com

CAT, CATERPILLAR, their respective logos, ACERT, "Caterpillar Yellow," the "Power Edge" trade dress, as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission. © 2013 Caterpillar. All Rights Reserved.



۲

BAUMA PREVIEW

STARS OF THE SHOW

HERE'S OUR SNEAK PREVIEW OF THE NEW VEHICLE LAUNCHES ALREADY ANNOUNCED FOR BAUMA



Munich, Germany





Comfort was a prime consideration in the design of Hitachi's ZW-5 range of wheeled loaders. The new ZW250-5 features a more spacious cab as the heated air-suspension seat now slides further back to offer more leg room, while the tilting telescopic pop-up steering column has been repositioned to provide extra space. A pillar-less windshield and large sun visor enhance visibility.

۲

Simpler to manoeuvre than the previous model by virtue of enhanced automatic gearshift controls, it features a new clutch cut-off system to ensure smoother loading operations. The shift-up delay to third gear enhances

safety in confined spaces, as excavating and unloading tasks can be performed more effectively in first and second gears. Looking to the rear, the counterweight is now visible on both sides, which will greatly enhance safety in confined spaces.

Two simple work modes complement its 186bkW 7.8-litre turbocharged Isuzu AH-6HK1X engine. Standard mode controls the rpm for smooth, efficient acceleration during regular operations and travel on level terrain to reduce fuel consumption by up to 10%, while the P mode is used for more demanding tasks and uphill travel. An optional auto-engine shutdown function avoids

fuel wastage during long idling sessions.

A new hydraulic circuit further improves efficiency, by facilitating the combined operation of the bucket and lift arm for loading, while prioritising the bucket for unloading. And with flow control, lowering of the lift arm stops more smoothly, reducing both vibrations and operator fatigue.

For operation in dusty environments, an optional wide-pitch fin radiator will help to prevent clogging although the cooling fan enables that to be easily cleaned due to its oneminute automatic reverse rotation every 30 operating minutes.



Doosan will launch two Stage IIIB excavators, the DX490LC-3 and DX530LC-3. in the 50-tonne class. At 49 and 52 tonnes respectively, the machines feature modified booms to improve durability reinforcing plates have been fitted to the boom end, which has been reshaped, and the material for its main boss is now cast steel. Along with undercarriage improvements, this additional reinforcement has added 1,600 and 1,300kg to their operating weight, respectively, over the Stage IIIA DX480LC and DX520LC.

The common-rail Isuzu AL-6WG1X with VGT, DPF and EGR also provides 16% more power (290kW), a 30% displacement rise and a 41-50% torque

improvement over those IIIA models. A hydraulic reversing fan and a turbo centrifugal air precleaning system boost cooling capacity by 10-15%.

Drawbar pull has increased by 15% to 38,800kg as a result of new swing and travel components, which have also boosted swing torque by 23% and ground speed by 10% (to 5.8km/h). New pumps and valves increase digging forces by 3-6% and ground-level lifting capacities by 5.5 or 9%.

The new ROPS- and OPGcertified cab offers ergonomic improvements, not least a suspension system that cuts vibration by 20% and reduces in-cab noise to 72dB(A). Its lighting capability has been doubled to aid night work.

■ The R25Z-9A fills a big gap between the R16-9 and R27Z-9 in the Hyundai mini crawler excavator range. At 4,030mm long, 2,500mm in height and 1,500mm wide, and with 250mm rubber tracks for a low around pressure. this 2.6-tonne class zero tailswing model can be matched with buckets with a capacity of up to 0.07m³. A boom length of 4,480mm enables what the OEM claims is a class-leading maximum excavation depth of 2,420mm.

Fitted with a Tier 4 Mitsubishi engine, the machine features 2.5 and 4.5km/h driving speeds for improved safety and efficiency around the job site.

Its glass ROPS/FOPS certified cab also offers good soundproofing, with noise levels of 82 and 94dB(A) inside and outside the cab respectively. A spring-loaded operator seat, foldable pedals, sensitive joystick and useful storage space enhance operator comfort.

The instrument panel provides a display of operating hours that promotes timely maintenance - although lubrication intervals have been increased from 50 to 250 hours through the use of selflubricating bushings.

Operating costs are further reduced with a long-life plastic air filter, and the long service life of hydraulic filters (1,000 hours) and hydraulic oil (5,000 hours). All service points are located in the same area to simplify daily checks.

■ JCB is launching several models aimed at the waste and recycling industry. Its 4CX backhoe loader has been transformed into the 4CXWM (Wastemaster), a tailor-made model for arduous waste environments.

Claimed to offer unrivalled versatility at a lower price than the wheeled excavators more commonly seen on civic amenity sites, it incorporates rear stabilisers of additional length and a front frame with hydraulic legs, both of which combine to lift the machine well clear of the ground and provide exceptional views into a skip when compacting waste material.

With a 4.72m extending dipper, the machine features

additional boom protection, rear-screen impact protection, light guards and punctureprotected tyres. It also uses the most robust loader arms and axles available, which have been adopted from the recently introduced 5CX model.

The OEM will also display its first dedicated material handler for this industry, in the shape of the 20-tonne JS20MH. Although sharing the engine and hydraulics of the latest JS160W wheeled excavator, its undercarriage is of a completely new design and the chassis features a centralised slew turret that provides increased stability through 360° in comparison with conventional models.



■ Bobcat has launched the 500 series of compact loaders, with six models in the EAME region replacing the S150, S160, S175, S185, S205 and T190. The S510 and S550 are radius lift-path models, while the S530, S570, S590 and T590 feature vertical lift-path arms that offer increased lift height over the previous generation.

Engineered for better breakout forces through higher standard flow and pressure, their overall performance and cycle times are up by 16%. The quick coupler block is integrated and protected within the lift arm, with hoses routed through the arms for greater protection. With a reduced number of hydraulic connections, and by replacing 45° and 90° connections with straight fittings wherever possible, the potential for leaks has been greatly reduced. The hydraulic oil filtration has been changed from 90µm to 10µm, greatly reducing the chances of contamination.

Although still a sub-2m tall vehicle, the cab height has grown to offer extra headroom and a 10% capacity increase. Complemented with a larger





■ Komatsu's PW118MR-8 ensures great versatility and mobility in confined spaces. A compact design with a small turning radius enables this 12,305kg machine to shine on urban job sites. In tight spaces, the sliding door eases access to the spacious ROPS cab, which provides 360° visibility from its large windows, plus a wide-opening roof top.

The seat's double-slide mechanism, with its pressure proportional control joysticks, aids comfortable operation. With their high grip and short stroke, the latter use smooth proportional thumb switches for improved versatility and greater precision with less

door, the threshold has been

lowered, easing access, while

a surface increase of 40%

promotes greater visibility,

Side, rear and roof window

especially to the attachment.

sizes have also increased, for

better views to the tracks or

tyres or a raised attachment.

There is also a 50% increase

in the front worklights' output,

finger fatigue when operating attachments.

Maximum auxiliary oil flow can be controlled on a large LCD monitor, while an optional second auxiliary circuit is controlled by a lever switch to provide maximum flexibility for an even wider range of attachments.

A 72bkW Komatsu ecot3 engine with electronically controlled CR injection, auto idling and an Eco gauge offers five working modes to optimise productivity and fuel burn. In conjunction with the closedcentre load-sensing hydraulic system (CLSS), this enhances the power, speed and control of all combined movements.

by using optimised reflectors and lenses.

Improved pressurisation (optional), based around a one-piece seal that goes all the way around the door, fitting into a special curved pocket, boosts HVAC performance by 35%. This has helped reduce in-cab noise by 5dB(A) (4dB(A) for bystanders) resulting in a perceived halving of noise.

All of the 500 platform models offer a two-speed option that boosts travel from 11.8km/h in the low range to 17.3km/h. Accidental damage is reduced with the use of a solid-steel tailgate that prevents items penetrating the engine compartment. The new cooling system design features a swing-up oil cooler that enables easier cleaning between it and the radiator.



■ Having concluded its global alliance with CNH at the end of 2012, Kobelco Construction Machinery will be exhibiting in Europe in its own right for the first time in 10 years, and will be keen to use Bauma to recruit more dealers to cover western markets.

۲

Pride of place on the exhibit shared with its sister company, Kobelco Cranes, will go to the SK260SRNLC-3, its 26-tonne short tailswing hydraulic excavator. Meeting current exhaust emissions regulations through the use of a DPF-equipped Hino engine, the new machine also adopts proprietary hydraulic circuitry that reduces pressure loss to deliver improvements in fuel consumption.

In comparison with a dash2 excavator, the new model's digging productivity has improved by 6% in heavy digging (H) mode and 9% in the newly implemented Eco mode, which replaces the previous model's fuel-saving (S) mode.

The innovative iNDr (integrated noise and dust reduction) system reduces noise by 5dB, to 95dB.



Robust solutions for your applications

With over 40 years of experience in sensors and control systems we know about the special requirements for mobile machinery: heat, cold, moisture, dust and vibrations – maximum reliability even under extreme conditions. In addition, practical solutions for operation, communication and remote maintenance. The result: high uptime of the machines. The world's leading manufacturers for mobile machinery rely on solutions from ifm electronic – in over 70 countries worldwide. ifm electronic – close to you!

ifm electronic – close to you!

www.ifm.com/uk Tel (020) 8213 2222

 (\blacklozenge)

۲

 (\bullet)

BAUMA PREVIEW



■ Having launched the WR240 last year – which subsequently went on to win an iF product design award – Wirtgen has now added two models to its new generation of cold recyclers and soil stabilisers.

The WR200 is a smaller version of the WR240 – an 'all-rounder' for the heavyduty stabilisation of large areas of non-cohesive soil and the conservative cold recycling of damaged asphalt layers – but boasts almost identical features. These

((()

include its high productivity with reduced fuel consumption due to state-of-the-art engine management, a large modern cabin with all-round view and intuitive operation.

The WR200, however, comes into its own as a result of its smaller dimensions – its extra manoeuvrability on smaller construction sites is invaluable, and it requires no special transport permits, which makes it ideal for oneday jobs.

As the most heavy-duty model of the range, the

WR250 has been designed for stabilising heavier, swampy soils. It shines in recycling and pulverisation jobs, where it can turn roads up to 25cm thick into homogenous granulate.

There is now also the added option of operating the milling drum from the cabin, enabling the activation of a number of milling speeds. Tailored to the WR250's high output, the Wirtgen drum design helps operators achieve outstanding mix quality at a high feed rate.

outstanding mix quality at a high feed rate. Vögele is claiming 11 'world firsts' in the field of pavers and extending screeds, with the

dash 3' generation enabling some notable cost-efficient operational improvements. The EcoPlus low-emissions package combines distinct individual measures to reduce fuel consumption. A splitter gearbox means that when the paver is stationary, all pumps

for traction, conveyors, augers and compacting systems are automatically disengaged after 60 seconds. Reducing the drag in this way also makes it easier to start the paver at low

ambient temperatures. Driven by a variabledisplacement pump, the tamper only receives the exact amount of oil needed for the current tamper speed, while a variable-speed fan driven by a viscous coupling adjusts output automatically in line with engine load, ambient temperature and temperature of the oil and cooling water. A bypass circuit enables the hydraulic oil to quickly reach its optimum operating temperature - and should it rise above 50-70°C, the oil is diverted through the cooler assembly.

Enhanced communication as a result of the PaveDock Assistant will improve process reliability during material transfer. With two signal lights



■ At 9,550kg and a working width of 1,680-3,030mm, the ARP 95 articulated tandem roller is the new flagship of Ammann's asphalt roller line.

A new roller frame concept was used to design the cab and interior equipment to the highest ergonomic level, ensuring a comfortable, clearly laid-out workplace.

Fitted with the ACE^{pro} compaction measurement, control and documentation system, it enables simplified operation and a continuous overview of work progress in the form of a bearing value on a simply designed display unit. Innovative automatic control of amplitude and frequency in respect of the asphalt temperature guarantees high-quality, efficient compaction.

The 74bkW Deutz Stage IIIB engine sits in a spacious compartment that provides easy access to all servicing and maintenance points.



mounted on the hardtop, visible from all angles of approach, the paver operator can provide unmistakable signals to the feed vehicle driver. In conjunction with the sensor in the PaveDock sprung push rollers, which absorb the impact of a docking feed vehicle, the signal lights can automatically display a Stop symbol to its driver, ensuring smoother material transfer. ۲

A new AutoSet function enables the screed, augers, hydraulic hopper front, conveyors and deflectors in front of the tracks to be restored to the previously saved working position after the paver has been relocated, simply by pressing a button – then quickly switching it back to transport mode afterwards.

The ErgoPlus operating system now features a fourcolour display that is more easily readable in poor lighting conditions. On the platform, the driver's seat and paver operator's console are now more easily adjustable, and side panelling provides better protection from wind and rain.

■ Bomag's latest BW 145 and BW 177 single-drum rollers focus on operating economy. The integrated EcoMode function allows the machine to adjust its speed according to work-load intensity, which results in up to 30% fuel savings. An engine-stop function cuts fuel use even more by switching it off after a defined period of idling.

Highly manoeuvrable, these compact, 5-8-tonne class rollers boast a new dual-circuit drive system with twin pumps for the front and rear axle to improve traction and tackle obstacles. In fact, the new rollers can now tackle gradients of 56% with ease, forwards or backwards. Articulated steering allows for automatic centring, so that long shifts can be worked with less effort.

With two access points, the machine can be quickly and safely dis/mounted from either side. With large glass windscreens, extra room and storage space, the cab features a control panel arranged so logically that even inexperienced operators will master the functions quickly. Bomag's VarioControl system also now features additional functions that simplify operation further.

iVTInternational.com March 2013



۲

Engine off. Climate on. With Webasto heating and cooling systems.

Maximum-efficiency equipment deployment 365 days a year – finally a reality, thanks to Webasto! At the bauma in Munich we are debuting a real world first which puts this goal within your reach: The first Webasto engine-off cooling systems that now complement our product range. In tandem with our established heating systems, this creates a comprehensive solution for every climate situation.

The result: up to 90% lower idle capacity costs and consistent ideal operating temperature for man and machine. Discover all this and more at:

bauma | April 15–21 2013 in Munich | Hall A4, Stand 325

www.webasto.com

۲

*Example for a wheel loader of 527 hp at 2,000 operating hours per year and idling time of approx. 35%.



Calculate your personal savings potential here!



BAUMA PREVIEW



■ As Grove's first fully CEcertified crane in line with the latest EN13000 regs, the YardBoss YB5520 reflects a complete redesign for the 18-tonne class.

Replacing the 16-tonne YB5518, it features a longer (16.6m) four-section boom and higher capacity than similar machines. There are two jib options: a 4.6m boom extension or an adjustable 4.6-7.6m swingaway boom extension. A two-speed hoist enables operators to raise the hook as slowly or quickly as the task dictates.

With a 4.6x2.4m footprint, and just 2.5m tall (an all-cast solid counterweight lowers its profile) it will fit into tight indoor workspaces. Crab steering with self-alignment (in addition to 2WS and 4WS)

۲

and a pivoting boom nose, adjustable in five positions from -30 to 80°, enable easy manoeuvring. Power reaches the ITL powershift tranny from a 3.3-litre Cummins engine, and with larger, more aggressively treaded and higher-load capacity tyres, it can now also operate on semi-

rough, unimproved, terrain. Post-compensated LS hydraulics make boom functions smoother, as a result of using a single piston pump rather than the four gear pump arrangement found on older models.

Ergonomic improvements include LEDs in headlights, brake lights and worklights, a tilt steering wheel and an outrigger monitoring system that signals full extension with a dashboard icon. ■ Sennebogen's 655 HD duty cycle crawler crane has been designed to offer universal deployment in a wide range of heavy-duty tasks, whether in construction or extracting.

The first machine in the OEM's crane line to feature its Green Efficiency technology, the 655 HD incorporates temperature-controlled fan drives, an automatic startstop system and a 261bkW Caterpillar diesel engine with the latest aftertreatment in a package to boost performance while also minimising fuel consumption and emissions. Generously dimensioned hydraulic valves and tubes further enhance the machine's efficiency.





With two winches driven by high-pressure regulated variable-displacement hydraulic motors that ensure efficient transmission of force, it is highly suited for dragline bucket use.

One major strength of the crane is its compactness. Its telescoping crawler tracks and innovative self-assembly system make it simple to transport and deploy, and at just 3.30m in width, it can be carried on a conventional flatbed truck. Its hydraulically adjustable A-frame enables it to independently ballast itself, further reducing set-up time.

Operators will appreciate the ergonomic maXcab, with superb all-round visibility and a sliding door for easy access. It also contains the Sencon control system, which enables all machine parameters to be read, monitored and managed from a central location.

■ Building on the success of its W170C wheeled loader in the recycling industry, New Holland will launch a version purposely designed for such aggressive, dusty conditions. It therefore comes with a full package of protection guards for hoses, lights, cylinders, transmission shaft, fuel tank, windscreen, axles and chassis to improve durability.

Building on New Holland's existing design of a cooling 'box', rather than overlapping radiators, the new Recycler model features a radiator with more space between the fins so that dust and debris can be blown away more easily by the reversible fan.

And, as usual, this box is located behind the cab, where the air is cleanest; enabled by rear mounting the 6.7-litre FPT engine, where it provides easier maintenance from



ground level. By using SCR, rather than a DPF, the AdBlue sprayed into the exhaust kills any sparks to lower the risk of fire ignition. Temperatures in the catalyst are also about half that of a DPF during regeneration.

The machine is enhanced with an EcoStop feature that shuts down the engine and electrics after five minutes of idling, giving the turbo time to cool down first. With lock-up torque automatically activated above 7km/h, the EcoShift five-speed tranny offers higher efficiency and 12% more pushing power in second gear. It also enables steep slopes to be climbed without downshifting into first. Open differentials mean no friction is applied to wheel slip, reducing energy losses, while a 100% front diff lock ensures all available torque goes to the wheel with adherence. ■ Wacker Neuson prioritised ergonomics and comfort in the design of the EZ28 zero tailswing compact excavator.

An innovative opening system for the windscreen, as used on the ET18 to ET24 models, gives the operator the option of securing both sections of the window pane beneath the cab roof. This eliminates the separate removal and cumbersome storage of the lower section, while better protecting it from damage and improving ventilation. This system also enables various opening positions, such as the 'dialogue position' in which the lower window is pushed under the upper window section.

Modular control lever carriers enable what the OEM says is a completely new operating concept for greater clarity and safety. Perfect integration of the switch panel, display element, joysticks, throttle lever, adjustable arm rests and dozer blade lever ensures that everything is well within reach. A new locking lever adds extra security, requiring actuation before the engine can be started.

A wide access door with low entry height makes reaching the seat more convenient. A flat, spacious footwell area offers ample legroom and is very easy to clean.



Know-How in Motion



Unsure About Vehicle Safety? Ask our Functional Safety Team

At Sauer-Danfoss, we've brought together a crossorganizational **functional safety team** to support you in assessing vehicle safety.

Using our extensive expertise within steering, propel and work function design, we can help you manage the potential safety pitfalls at a system, sub-system or individual component level.

Involve us in your risk assessment from the start, and we can significantly optimize your vehicle's safety design. Many of our components are pre-certified in accordance with ISO 13849 or IEC 61508 for safetyrelated systems.

Learn more about our **functional safety support package**; visit www.sauer-danfoss.com/ FunctionalSafetySupport



Visit us at bauma 2013 April 15 to 21, Munich, Germany Hall B4, Booth #313



BAUMA PREVIEW



Cifa has upgraded the CSS-3, the best-selling model in its shotcrete product range. The more advanced CSS-3 Evo features a Deutz Stage IIIB engine that has boosted power to 82kW, an improved driver's cab that now offers ROPS/FOPS certification, and CAN management to provide greater communication between control units.

The Uniflux admixture batching system has also been enhanced, with a series of sensors monitoring in real time every parameter needed to make top-quality shotcrete.

With four-wheel drive, a hydrostatic drive system with three steering modes and a maximum speed of 27km/h, the CSS-3 Evo relies on four self-levelling outriggers to

۲

under all conditions.

Its pumping unit enables a variable flow rate of 5-30m³/h. coming from a three-section boom (with a 1.8m telescopic section) mounted on top of a double-axis turret installed on a skid that traverses longitudinally by 3.7m. This enables it to spray admixtured concrete into tunnels with a radius up to 16m – yet boom opening only requires a height of 3.1m (the same as the contour of the machine). Six powerful xenon worklights perfectly illuminate the working area.

As an optional extra, a Mattei air compressor built into the control panel provides an independent air supply (11,500 l/min at 7 bar).

provide efficient stabilisation

added to the display screen a service icon informs the operator when that is due, ■ A full-time oscillating axle is bringing rough-terrain ability and full-height driving capability to Genie's electricdrive scissor lifts. By sensing the terrain and adjusting the

■ The results of a three-year

R&D project – what Hinowa

describes as a new concept of

tracked aerial platform - will

be on display in the shape of

the first two models of the

Featuring a high load

capacity of 230kg in the cage,

the Lightlift 17.75 and Lightlift

20.10 enable two operators to

work at height (to 17 or 20m

respectively) with all necessary

tools. The pantograph system

provides a simple yet precise

vertical trajectory, enabling

work to be carried out flush

with a wall. Latest-generation

hydraulic components enable

rapid and efficient movement.

New parameters have been

Performance IIIS series.

safety during loading and placement.

To ensure greater resistance to everyday wear and tear, especially when working with buckets, the boom head and outer section of the boom have now been reinforced with thicker, double-plated steel.

With the boom grease points grouped together and main components also easily accessible, maintenance is relatively trouble-free.



and a download icon alerts when updated software is available for downloading through the integrated modem. The RAHMino system enables constant remote monitoring of the machine, permitting remote diagnosis.

There are four power source options: a Honda Igx440 petrol engine with automatic rpm control; a Hatz diesel with HD Autorev technology including an automatic accelerator for maximum working comfort; a standard AC 110-230V motor; or a li-ion system with 48V 90Ah battery pack is ideal for where there are no external electrical connections.

The 17.75's Auto2Speed traction system offers speeds up to 3.5km/h, while the 20.10's triple-speed drive enables 3km/h. Inclination control automatically decelerates the machine to improve safety.

> changes to partially recharge the batteries and enable a full shift from an overnight charge. Unlike an equivalent DC unit, the AC motors do not suffer the same drop-off in performance while the batteries' charge levels fall.

۲

T

The three GS-69 models have working heights of 9.9. 12 and 14.2m respectively. An increase in extension deck length to 5ft, rather than the previous 3ft, now applies to all GS-69 DC models, regardless of the fitting of outriggers.



21

■ JLG will launch the PS series of telehandlers, with four models to handle a variety of jobsite requirements.

Models 3706 and 3707 have a maximum capacity of 3.7 tons, with either 6.1m or 7.3m maximum lift height. Equipped with stabilisers, the 4014 and 4017 have a 4-ton capacity with 14m or 17.3m lift heights.

Four-speed powershift transmissions are standard, as is the Deutz 75bkW Stage IIIB engine. However, 90bkW engines and six speeds are optional on some models.

Complying with EN15830, which specifies operator visibility requirements, the comfortable ROPS/FOPS cab improves the all-round view. Designers paid great attention to the controls, dashboard and indicator panels for more efficient operation.

A new joystick enables simultaneous movements of the boom, and features lift up and down, tele-in and tele-

out functions, drive direction, gear selection, auxiliary controls and tilt roller functions for quicker operation. Proportional control and improved oil flow in the boom further improve the response of lift and lower functions. An EN15000compliant adaptive load-

control system enhances

axle position to match the conditions, regardless of the scissor's elevation, all four wheels can maintain ground contact for enhanced machine control and traction. Despite having just two

driven wheels, the GS-2669 DC, GS-3369 DC and GS-4069 are capable of driving through sand and mud, and climbing 35% gradients when stowed. Genie says it was the first to offer AC drive on articulating booms, and has now introduced this to its rough-terrain scissor lifts.

An inverter converts the stored DC current into threephase AC electricity for the new drive motors. The use of AC motors delivers 30% more energy efficiency and 50% faster travel speeds (7.2km/h stowed) than the older DC scissors. They are also said to be 30% guicker than their diesel-engined counterparts. Regenerative braking

systems capture energy from slowing down and directional

BAUMA PREVIEW

■ Volvo's three new compact excavators boast a digging performance to rival that of their larger counterparts. The ECR25D, ECR58D and ECR88D are powered by 15.5, 36.5 and 43bkW Volvo Penta engines respectively; the two bigger models being Tier 4 Final-compliant for North America.

۲

Their auto-idling system reduces rpm when the controls are inactive for a specified time – which the operator presets for between 3-20 seconds via the display on the ECR58D and ECR88D. With a narrow body design

and centrally positioned boom, the superstructure on these two models is so compact that it swings within its own track shoe; the smallest model only exceeds track width when fitted with an additional counterweight. The ECR25D also benefits from high mobility, being transportable with up to three buckets and a breaker on a small trailer, all with a combined weight of under 3.5 tonnes.

The ROPS-certifed cab, standard on the two larger models, features modern styling with large expanses of glass for all-round visibility. An adjustable seat, superior noise and vibration insulation, ergonomic armrests, optimally placed controls and a large footwell increase operator comfort. Hydraulic travel pedals provide easy and accurate track control, with automatic two-speed travel ensuring optimised traction for enhanced on-site manoeuvrability.



The CANbus is also used to automatically adjust the engine rpm to suit the speed of the required hydraulic movements.

The machines are currently powered by Mercedes-Benz Stage IIIB engines, but will switch to JCB Ecomax units for Tier 4 Final. The latest-generation electronically controlled Bosch Rexroth transmission provides travel speeds of 40km/h, with fuel burn reduced by 10-15%.

The load-sensing hydraulic circuit comprises a variabledisplacement Bosch Rexroth pump, SIL 2 Sauer-Danfoss valve system with electroproportional control and instantaneous spool position detection in accordance with EN13489.



■ The impressive performance of Terex's TLB890 is largely attributable to its new highpressure hydraulics and highforce cylinders, resulting in an impressive slew torque for powerful and quick backfilling. Its curved boom design

enables trucks to be positioned closer for faster loading cycles, while the Deep Dig innerslide extending dipper produces a high retraction force for rapid bucket filling. The slim bucket cylinder enhances the view of loader operations.

Working with one variabledisplacement piston pump, instead of tandem gear pumps, the latest pilot controls feature thumbwheels on the joysticks to control the dipper extension and any attachments.

A 74.5bkW Perkins Stage IIIA engine is located behind a castiron hard nose counterweight

With a body volume of 27m³ with rear tailgate, and specially shaped to speed up discharge of the payload, Liebherr's 40-tonne capacity TA 240 is ideal for fast, cost-effective transport of large volumes of bulk material.

Powered by a Stage IIIB 350bkW 16.2-litre Liebherr D 9508 V8 with SCR, it reaches speeds of 57km/h on the flat. A high-performance retarder incorporates a variable braking function, with the desired value being preselected by the operator. At the end of a descent, the retarder automatically shuts down, but the braking level remains saved for the next time the driver removes his foot from the accelerator. designed to improve damage protection. The engine has a new charge-air system that improves performance at low-speed and reduces both fuel use and noise levels.

A standard 4F/4R synchro shuttle manual gearbox, or an optional Servo Power Synchro (SPS) with manual control and autoshift capability is available, with hydraulic selector fork gear engagement instead of clutch pack operation reducing drag by 9%. A new rear axle with outboard planetary gears provides 41km/h travel speeds.

In the ROPS/FOPS cab, a large up-and-over rear window improves views of the digging operation, while opening rear quarter windows provide some extra ventilation. The more powerful HVAC system cools the cab twice as quickly as in other Terex backhoe loaders.

The oil-cooled multidisc brakes are therefore only operated when the truck comes to a halt for loading or emergency braking.

The high-performance 6x6 driveline features three HD axles, lock-up clutch, an automatic transmission and torque converter. High-quality spring damper units on the front axle, rated to withstand the most arduous conditions, ensure the driver remains comfortable and alert.

The restyled ROPS/FOPS cab boasts an exceptionally large window to enable safer and quicker positioning. The air-sprung operator's seat can be individually adjusted to suit the driver's height and weight.



■ Newly established Magni Telescopic Handlers will be exhibiting its RTH range of seven rotating models, and HTH range of three heavyduty models for mining.

With clear glazing instead of the conventional dash, the cab features some notable innovations. For instance, the controls are grouped on a glass touchscreen display or as an alternative, its pages can be controlled with a joystick, similar to those in modern luxury cars. Two Sauer-Danfoss CANbus multifunctional joysticks are used to cater for all movements of the boom, turret and

attachments.

22 iVTInternational.com March 2013



۲

Hall B4 Stand 314

LSC⁺. Discover the Plus of Productivity.

Extreme fine control or maximum digging performance? Load-independent dynamics or load-dependent precision handling? The new electrohydraulic LSC⁺ lets you do both and turns your construction machine into a piece of universal work equipment. Using the touchscreen, the driver can switch continuously between the extreme "hard" and "soft" characteristics of the work functions. The system also identifies driver commands, such as soil compaction, shaking out the bucket or changing tools for an excavator, and optimises these movements.

Discover how you can benefit from the intelligent combination of electronics and load sensing hydraulics. Discover LSC⁺.

www.linde-hydraulics.com



Czech material place in the affections

OF MANY OPERATORS. DOBROSLAV RAK, VP OF ENGINEERING AT DOBRIS IN THE CZECH REPUBLIC, GIVES *IVT* SOME HINTS AS TO WHAT THEY COULD COME TO EXPECT IN THE FUTURE

> Dobroslav Rak is yet another of those guys who've arrived in the off-highway industry after making their name in the aerospace sector. Dobro began his working life as a design engineer of aircraft in the 1980s, spending the best part of two decades at Aero Vodochody before moving to Ingersoll-Rand at what is now Doosan Portable Power. After building up its Czech engineering team from scratch, he moved on to Bobcat's Dobris facility in 2004 as VP of Engineering.

My first question was therefore about the differences between the disciplines. "Aerospace is much more regulated by standards," he replies. "However, there was a lot of scope for the development of some exciting concepts – and if I look back to some of the top-secret programmes we were working on, such as head-up displays and electronic equipment, those innovations are now being applied to cars, and will likely be coming to our industry too."

Sadly, when I eagerly latch on to his use of the words 'head-up display' and a comment about how these are being replaced in some aircraft

with displays projected onto a helmet-visor, he quickly brings me back down to earth when I ask him how much potential HUD technology could have for Bobcat's type of equipment. "Their use is quite questionable – I think the basic philosophy should be to feed the operator the minimum of information so as not to disrupt his concentration. As long as the machine is working properly, there is no need to show him anything. There need to be warnings when danger arises or machine limits are reached. There are definitely other, more efficient, ways to do that.

"One viable use could be when operators are tackling delicate work where they need to receive precise, measured data while they're fully concentrated on machine operation. On the other hand, many of our customers prefer to have no door on their skid-steer or to lock up the front window of their excavator, so an HUD could be a controversial feature!"

Slightly embarrassed that such an obvious flaw had never crossed my mind, I decide to avoid having my hopes for any more of my favourite technologies dashed against the rocks, and ask instead about which major innovations he expects to see. Luckily, Dobro doesn't disappoint.

"Looking to the long-term future, our industry – like the automotive industry – will look for alternatives to oil-dependent products," he says. "I believe that one of the trends will be the development of hydraulics-free solutions. The most likely alternative will be electric, generated by power sources such as fuel cells, or energy networking. This will create new approaches for machine controls



OEM INTERVIEW



ABOVE: The S100 platform series of skid-steer going down the Dobris production line

and increased automation, even revolutionising the attachment concept with the development of multipurpose fully robotic solutions."

Environmental initiatives

This energy switch would not be solely due to the limited oil reserves, he points out. In addition to safety issues, he expects future legislation to prioritise environmental protection – targeting machine noise and adding yet more stages of engine regulations in response to EU plans for dramatic reductions in CO₂.

"We are expecting new standards that will affect construction vehicles as well," he predicts. "But our concern is that legislation will again be in one direction, purely addressing engine emissions limits. The lessons learned from previous emissions standards implementations show that enormous R&D capacities had to be allocated to redesign product just to meet engine regulations, rather than being used to increase customer benefits or to develop more complex solutions to protect the environment.

"The right strategy for reduction of CO_2 will be to introduce a properly balanced approach addressing the whole product life – which covers environment-friendly processes, manufacturing, recyclable materials use, alternative energy sources and effective operation that minimises emissions."

THE TRENDS WILL BE TO DEVELOP HYDRAULICS-FREE SOLUTIONS. THE MOST LIKELY ALTERNATIVE WILL BE ELECTRIC"

۲









VISIT US AT **BAUMA 2013** MUNICH, GERMANY, 15-21.04 HALL **A4**, STAND **220**

EUROPEAN PREMIERE at Bauma 2013

PMBEC Evolution Compact Mixer Truck Gearboxes



PMCI Travel Drives with Integrated Motor



۲

PMH MK Hydraulic Plug-in Motors



PMH P/M Hydraulic Pumps and Motors





PMP Industries S.p.A. via dell'Industria, 2 | Coseano (UD), Italy | T+39 0432 863 61 I sales@pmp-industries.com | **www.pmp-industries.com**



I mention that 'hybrid' seemed to be something of a buzzword at the recent Bauma Media Dialogue and ask if there's any likelihood of such technology being seen in any sort of Bobcat machines soon.

"In the automotive industry, hybrids are competing with a new generation of very efficient diesel engines – we can expect something similar to happen in our industry," he replies, somewhat enigmatically. "Doosan and Bobcat engineers are working very closely together across several power areas to introduce the most effective technology – including hybrids – for each application."

It should be remembered, of course, that one of the big news stories late last year was the announcement of a Doosan-developed compact engine series, primarily aimed at helping Bobcat equipment meet Tier 4 Final (see box, p28). As Dobro points out, meeting that target called for a huge effort and investment from engine manufacturers – but on the OEM side, it has required a substantial design effort to accommodate the new engine packages, complete with aftertreatment devices and cooling packages, in compact machines in particular. In many cases, it has even required major machine redesigns which is why this DPF-less compact engine package bodes so well for the next stage of emissions compliance.

Practically the entire Bobcat range, and most compact Doosan machines affected by Tier 4 regulations, will switch to these new engines, except small and mini categories of Bobcat loaders and excavators, where the current engine types will remain. Not quite a robotic attachment just yet – but Dobroslav Rak believes there are great things to come on that front

Complementary range

With its US\$4.9bn acquisition of Bobcat in 2007, Doosan gained a generally complementary product range, with virtually no duplication - aside from those mini excavators, anyway. And that's the way it's likely to stay, he says: "They are historically two brands with specific customers. Then there's the regional split of the brand strengths – this is the typical heritage when companies merge. But from the very first minute, we began working hard on optimising our technologies, the material supply chain and manufacturing organisation to improve our products.

"The principal focus is mainly on the definition of next-generation compact excavator platforms, which will be optimised in all aspects to satisfy the needs of our wide range of customers. Another principal goal is to gain maximum benefit from our global R&D operations."

So what sort of improvements could we expect from this next generation? Something on the mobile hydraulics side, perhaps?

"Mobile hydraulics are complex integrated systems where there is

WHAT DOES DOBRIS DO?

Bobcat's Dobris manufacturing plant produces two product lines: compact skid-steers (SSL)/tracked loaders (CTL) and compact excavators. There are three platforms of SSL/CTL – a small and medium range covering seven models of skid-steer and one tracked loader – while compact excavator production, which accounts for approximately 40% of the site's total output, is based around micro, mini and small platforms covering eight models.

There were also three platforms of compact backhoe loaders produced for the US market, but production was discontinued in 2005.

Bobcat applies a global platform concept for the design of loaders and compact excavators, drawing on a range of common design approaches. However, practically the entire Dobris compact excavator range is designed in the Czech Republic, while most of its loader development is based around adapting US designs for EMEA use. The \$100 and T110 models, however, were developed in Dobris.



OEM INTERVIEW

still space for principal changes – particularly for the integration of electronics and digital controls," he replies. "Yet there is still extensive use of manually or pilot-controlled valves. The wider integration of DDV and electrohydraulic servo valves can bring about major improvements in machine operations and automated controls, resulting in much higher work productivity. The integration of electronics will drive the simplification of hydraulics systems."

How much more room is there for simplification of machinery in these days of increasing electronics, I prompt?

"Engines are the most difficult area because increasingly tough emissions legislation is driving the technology and complexity of current and future models," he states. "Current and future machines are complex, and integrated across all their systems. So while technology development is the driver for simplification on one side, there is also the possibility to add features and parameters that were just a dream for previous generations. For instance, developments in HMI, electronics and hydraulics mean that operators can enjoy the comfort of air-conditioned cabins, easily and precisely operating machines and attachments with joysticks, while achieving great work productivity.

"And of course, modern materials and technologies can also simplify the manufacturing processes."

Skid-steer innovation

There's not much debate about who invented the first skid-steer loader – a product that Bobcat is now virtually synonymous with. So does Dobro feel that his company has maintained the lead in innovation in that sector despite increasing competition? In other words, where has it pushed boundaries in skid-steer technology?

"I would say that we are always ahead in performance, reliability, robustness and operator comfort – and do not compromise in any of those areas," he says. "Thanks to the use of advanced hydraulics and the Selectable Joystick Control concept, our machines have quicker cycle times for the highest productivity. We design for the easiest and fastest serviceability to reduce operating costs – for example, the rugged

OEM INTERVIEW



Dobro highly rates the industrial design qualities that have gone into Bobcat's compact excavators

۲

Bobcat chain case is the only maintenance-free option in the industry. The cabin is designed 'around the operator' providing great all-around visibility, more space, cab options, fingertip and selectable controls, and operatorfocused comfort.

"And the area where we are permanently at the leading edge of the industry is our tool carrier, with its wide range of attachments that can be very easily and quickly changed, enabling the performance of practically any kind of work in landscaping, construction, agriculture and other areas." You can't rest on your laurels though, I counter – in which areas do you feel you still have room for improvement? "There are always areas that can be filled better, whether with machine features or by plugging gaps in the portfolio," he replies. "But I don't think you can mark one area as specific for improvement – only a balanced approach will maximise customer satisfaction in the area of performance, work productivity and operator comfort. But that said, there are no limits for operator comfort level improvement!"

Doos an and Bobcat are currently working hard on new concepts that will differentiate them from the rest and deliver added value for customers, he continues, with the main drivers being advanced power systems, electronics and IT integration.

And with that, we come almost full circle, with my final questions relating to more immediate changes in market requirements and how that might affect machine design. Dobro highlights two strong current trends – demands for higher efficiency and work productivity coming from the operator, and a continuous push for environmental protection. "Both demands require new approaches and thinking in the engineering community that will impact product design," he says. "But I don't believe we'll see notable changes in the size or general concept of machines. The big changes will come in the area of applied and integrated technologies.

"There is huge potential in the use of information technologies and networking, which will bring new approaches to fleet management and increase work efficiency. In many cases, the technologies introduced for higher machine efficiency are bringing benefits in environmental protection as well. For example, power management systems are ensuring lower operation cost by means of lower fuel consumption and lower emissions.

"Machine styling and operator spaces are the major selling points of machines. I believe that the new generation of our products, especially our compact excavators, will further demonstrate that together, Doosan and Bobcat are not just leaders in industry, but also in industrial design!" **iVT**

A NEW NAME ON THE BLOCK

Development of the new Tier 4compliant engine was a collaboration between Bobcat, Doosan and some of the world's top engineering consultants and engine design firms, including FEV and Ricardo. The new range consists of three models, none requiring a DPF: the D18 is a 1.8-litre three-cylinder engine producing up to 37bkW at 2,800rpm. At 2.4-litres, the D24 delivers a top rating of 55bkW at 2,600rpm, while the largest model, the D34, is a 3.4-litre diesel rated up to 74bkW at 2,400rpm. Both the D24 and D34 are in-line, four-cylinder engines.

Kwangsup Hwang of the Doosan Engine Group told *iVT* why the company – which has a history in large marine engine development and production – felt there was a need to produce its own models for compact equipment: "The project concept is very complex. It is not just an engine project – it also covers the development of our new compact engine factory, designed to be operated with minimum workers, using high levels of robotics in all phases of engine manufacturing. "The engines, which will be Tier 4 Final-compliant right away, have been designed to be as compact as possible and are quite different in displacement. This is very important for compact equipment manufacturers, as it provides them with more options for positioning the engine, and more room to include other components in the engine compartment. As a result, they will benefit from easier access to routine engine maintenance and service items, and greater protection for components that otherwise may have had to be placed in a less protected area.

"However, we understood that horsepower and torque could not be sacrificed to provide a more compact design. To accomplish this, we needed to optimise our peak engine cylinder pressure. This was done through a new turbocharger, different requirements from the high-pressure common rail, and a unique engine cylinder design.

"Having engine and construction machine development teams working together created a huge opportunity for complete package optimisation – best power and torque match, installation and assembly optimisation, and serviceability. There is a great deal of synergy within our company, which brings many benefits to our customers, who will receive an optimised, integrated product without any compromise.

"Our customers and dealers told us they preferred a non-DPF solution – it minimises long-term Tier 4 parts and maintenance expenses, and reduces maintenance requirements and complexity. The new engines were tested for many thousands of hours in severe duty cycles on Doosan and Bobcat machines in laboratories and at our proving grounds, where they demonstrated high performance and durability parameters.

"There are not too many engine makers able to provide Tier 4 Final solutions without a DPF, which gives us a favourable position in the engine market. There are ongoing plans to apply this new compact diesel engine to other off-highway OEMs, and we expect its application range to become wider in the near future." TOP TO BOTTOM: D18, D24 and D34 engines open up new opportunities for Doosan in the construction equipment market

VALUES FIRST. FFISTER®











IT'S NOT WISHFUL THINKING – ONE OF THE FEW TRULY NEW MACHINE FORMS IN A DECADE IS A PIPELAYER THAT DOUBLES AS AN EXCAVATOR AND PERFORMS A FEW OTHER TRICKS AS WELL

During the 11 years I've been at *iVT* I've personally witnessed the launch of countless industrial vehicles. Yet in all that time I can count on one hand those that could genuinely be described as 'new'. Undeniably, many of those series upgrades contained some innovative improvements – perhaps making a wheeled loader a far better wheeled loader, for example – but few actually constituted a totally new machine form to carry out a traditional offhighway task. The PL3005D is a pipelayer with the manoeuvrability - and even the digging capacity - of a standard excavator

•

۲

OLVO

THE EVOLUTION OF POWERVIEW[™] CONTINUES

۲

PowerView[™] 780

DDDD

۲

 New, Brighter screen (from 400 nits to 1,000 nits)

LOADER

1/18/2011

- Full-Color, Bonded 7" LCD
- Superior Sunlight Readability
- Five Digital Inputs

۲

PowerView[™] 380

- 3.8 QVGA Monochrome LCD
- Integrates Standard J1939
- Parameters and Fault Codes
- Advanced Engine Diagnostics
- Setpoint Alarm & Shutdown Control
- Superior Sunlight Visibility

The wait is over – the PowerView[™] line just got even better. The newest Murphy displays include the PowerView 780 and PowerView 380. They come packed with features and functionality perfect for electronic and mechanical engines. New size options, same rugged design – the PV780 and PV380 provide yet another level of display options perfect for a variety of off-highway and industrial applications and environments.



by **ENOVATION** CONTROLS P.O. Box 470248 • Tulsa, OK 74147 Find the latest updates on the PowerView[™] displays at: http://www.fwmurphy.com/PV780_Evolution_ad or call +1 918-317-2644 or scan this QR code



Come visit us at Bauma Germany April 15-21, 2013 2013 New Munich Trade Fair Center - Munich, Germany Hall A6 – Stand 581

Take pipelaying, for instance, where for 80 years or so the usual method has been to use a dozer fitted with a side-mounted boom and winch to lower the pipe into the trench. Great strides in dozer design and efficiency have clearly been made in that time, but it is hardly the most flexible arrangement.

Then, in 2008, Volvo CE launched the PL4611, the first of its dedicated pipelayer range. The third of four planned models – the PL3005D – was then revealed at an event in Lorient, France, last year. Ironically this 'new' machine format relies heavily on a lot of proven excavator technology – albeit combined with advanced



lifting technology – so a 'ground-up design' is not quite the right term, as Derrick Butterfield, responsible for Segment Communications at Volvo CE, explains: "This new model was basically developed around the Changwon, Korean-built standard Volvo EC300D excavator, so we have 80% parts commonality. The 20% difference is essentially things like the pipelayer boom, the winch and the slew lock."

The difference is so fine, in fact, that – should the need arise – these pipelayers can even be reconfigured as excavators – and according to Volvo will perform to the same high standard as a purpose-built model. So although not a typical procedure, it could now be feasible to dig out several kilometres of trench, place



heavy pipes into it and then backfill, all with just one type of machine.

"Ordinarily you would use dedicated machines, but we have a customer in Russia who is switching the kit to avoid transporting an additional machine from Moscow to a remote job site – which can cost €50,000," Butterfield explains. "But the biggest advantage is really that contractors who may not currently be working on a pipelaying project can maximise the availability of machines that would otherwise be standing idle."

Swinging sensation

But other than an ability to excavate, what's the advantage of this new design when it comes to the specific task for which it was designed? Probably the main benefit is the 360° manoeuvrability provided by the MAIN IMAGE: High tipping capacity and a longer boom enables a safe distance from the trench to be maintained

LEFT: A mechanical anti two-block system with wireless sensor prevents the winch blocks from coming into contact with each other slewing upperstructure, in contrast to the jockeying of a dozer's tracks to position a load. This also comes in particularly useful for unloading a delivery of pipes. "You lift the pipe and then you just swing to stack it – the undercarriage doesn't move, so you're not disrupting the ground," Butterfield continues. "You would rarely use a side-boom pipelayer to do that because you'd have to spend time shuffling round on the tracks and the ground would be destroyed in no time."

The long boom on the PL3005D (7,316mm, or 9,142mm with an extension) is not only longer than that of a similar-capacity dozer model, but – due to its higher mounting point – boosts hook height even more and makes it possible to work further away from the trench, which greatly reduces the chance of subsidence.

At just under 2m long, the boom extension is simply bolted on – and when it is not continually required,

۲

Technical Support

Quick Response

Collaborative & Custom Design

Just In Time Delivery

Reputation

Superior Quality

Advanced Manifold Assembly

Innovative System Engineering

MORE THAN FLUID GOES INTO OUR HYDRAULIC CARTRIDGE VALVES.

HydraForce puts everything we've got into everything we make. Gain an industry advantage with an innovative blend of engineering expertise, collaborative process, customized design solutions, and superior product performance. When you partner with the most focused electro-hydraulic controls provider, you'll power your operation forward.





Visit Hall A4

Visit Hall A4 HydraForce Booth 425 15-21 April, Munich

hydraforce.com

Lincolnshire, IL, USA 847-793-2300 Birmingham, UK 0121 333 1800 Changzhou, China +86 186 2190 9398





it can be folded back along the boom. "The extra height is a big benefit for stacking pipes after unloading," continues Butterfield, "but even more so when it comes to tying-in two strings of pipe prior to welding. You have to get them perfectly lined up and that entails a lot of pushing and pulling – which is where the extra height of the boom is a big advantage."

No tipping necessary

As would be expected, the tipping capacities for the 'rotating pipelayers' are impressive, with the final number in the PL3005D's nomenclature denoting an approximate 50-tonne capability (the PL4611, the current largest model, manages 110 tonnes).

But should that limit ever be in danger of being reached, the Load Management System (LMS) in-cab display draws on the input of wireless sensors on the wire rope, boom and base machine to keep the operator informed about the state of the load in real time. By monitoring boom angle, machine orientation and



inclination, it clearly indicates the weight that can be safely lifted at any position relative to the slope, providing visible and audible warning signals when that limit is in danger of being reached.

Then there is a 'traffic light system' of external light bars on the boom, just like that on the in-cab display, which alerts other site personnel to impending danger. "This allows the lowering-in foreman conducting the operation to look along the line and see if any machine is reaching the safe load limit. He can then get MAIN IMAGE: By monitoring slope inclinations as well as orientation and boom angle via the LMS, operators are always assured of safe load handling

ABOVE: The LMS monitor features the same traffic light warning system that appears on the side of the boom to alert site personnel to possible tipping situations other machines to take up some of the load to balance it out," explains Butterfield. "An operator can also look left to see the state of the load on his neighbour's machine, and adjust accordingly. The red light indicates when you're reaching the maximum safe load. If you go over that, a built-in safety function cuts the machine out."

A stable condition

Built on Volvo's proven excavator undercarriage, these machines can largely take stability for granted – in addition to the heavy counterweight, there are 24in tracks, with 32in available as an option. This provides a wider gauge and a lower centre of gravity than most dozer-based models (the PL4611 benefits further due to the boom being inboard of the track frame and closer to the centreline). All this, incidentally, provides yet another operational advantage, in that it enables the machine to safely straddle the trench when necessary.

These rotating models can also work more comfortably than dozers


ABOVE AND BEYOND





Engineering strength together

Tata Steel is a leading solutions provider to original equipment manufacturers in the demanding earth moving, mining, crane and material handling sectors.

We are committed to supplying innovative steel solutions that add real value to our customers and in forming excellent working partnerships no matter how large, small or specialised the requirements are.

Our product range is extensive, our distribution network is global and we understand how our processes and products have a positive impact on our customers' success in their markets.

For more information contact: Tata Steel Lifting and Excavating PO Box 4 Bridgnorth Road Wombourne Wolverhampton WV5 8AT United Kingdom T: +44 (0) 845 600 7673 F: +44 (0) 870 049 1672

E: liftingandexcavating@tatasteel.com

www.tatasteelliftingandexcavating.com

۲

INSET: Large 24in or 32in-wide tracks provide high stability

on slopes up to 30°, as Butterfield explains: "A standard side boom will be parallel with the trench, with the boom straight out to the side. But if you're carrying a load, it's going to move backwards, which is not good for stability. But with the swing, you can turn the upperstructure to keep the load ahead of the machine."

The pivoting flag block at the end of the boom further enhances stability, due to enabling load selfcentring and preventing damage to the wire rope. However, there is one area in which the machine's slewing technology deviates from that of its excavator forefather, as Butterfield elaborates: "The unique feature of the pipelayer is the slew lock, which is used when working on slopes. There are notches every 10° and the LMS will advise when you need to apply the lock. You just align the swing until it locks – indicators in the cab show when it's safely locked or when it's no longer required. This doesn't just improve safety - the transmission and slew brakes are



protected too as the upperstructure is effectively locked. The slew lock is also useful in applications such as pipe welding, where the pipe needs to be held in position."

Lars-Inge Larsson, customer solution manager for oil and gas, elaborates: "Even though there are only 20% new components, they are key components – you cannot rebuild a standard excavator as a pipelayer to save money! You'd be missing the special joint taking the power from upper to the lower, and you'd have no hydraulic cylinder to MAIN IMAGE: Imagine how much longer it would take to unload and stack pipes using a dozer-based pipelayer!

ABOVE: Exceptional visibility is provided through the right-hand side window. The cylinder has been reversed to cut down obstructions further press a wedge into the outer part of the slew ring to lock it."

Seeing star

A further benefit of this ability to rotate through 360° is improved visibility. There are fine views to the front and rear, in contrast to the bulky counterweight and engine canopy of a dozer. Add to this the Volvo Care Cab, with its generous expanses of glass set in slim pillars, not to mention its location on a four-bar hydraulic riser system that lifts it by another 496mm, and the view into the trench is unparalleled.

What struck me most when I climbed into the cab at the French launch, however, was the atypically clear view through the right-hand window. Whereas there is usually a huge sheet-metal excavator boom in this location, instead there was just an unobtrusive hydraulic cylinder.

Butterfield picks up on this point: "That's one of two fundamental changes in this model. The boom cylinder has now been reversed, so

37

Ð

CASE STUDY

when you look out of the window, instead of seeing the thickness of the cylinder, you're just seeing the rod, which may be half the thickness. The other change is that the winch block, which was mounted right at the end of the boom, is now further back on the adapter. Those two changes have considerably increased both lateral and forward visibility."

Apart from the cylinder reversal, only a few changes were required to the machine's hydraulic system to make it suitable for dual-use, Larsson explains: "It's basically an excavator system with the same pump flow and normal pressure – 330 bar, with power boost for another 30 bar. That's enough to control a pipelayer – we developed the winch to work at that pressure and tried to keep as much standard as possible."

Optimising for both configurations required the use of split pump flow via a Mode Switch for enhanced controllability. "For an excavator, you need to have faster swing, while for a pipelayer it needs to be slow and smooth," says Butterfield. "So for an excavator you would set the bucket, boom and arm as priorities, but for a pipelayer you're thinking BELOW: A pattern change control valve enables operators to choose their preferred joystick to operate the winch



ABOVE: Switching from pipelayer to the standard excavator configuration takes two mechanics less than a day. The same boom foot is used to locate the optional digging equipment

INSET: Factory-installed lines

and connections speed up the

changeover process



Engine: Volvo D8H Tier 4i Power: 169bhp@1,800rpm Torque: 1,139Nm@1,350rpm Travel speed: 5.6km/h Boom length: 7,316mm With extension: 9,142mm Operating weight: 35,111-37,229kg Ground pressure: 7.3-9.5psi Overall transport width: 3,190-3,390mm Overall height: 3,273-3,875mm



about winch, boom, swing and travel. When you raise the boom it can slow the travel, so by splitting the flow you can make sure there is always enough for the winch and boom, but also for the track motors to ensure continuous travel."

However, when it comes to travel mode or stationary pipelaying tasks, combining the flow means maximum performance speed can be achieved. The Fine Work Mode provides high pressure with low flow for high lifting power with low fuel consumption.

In addition, by storing up to 20 hydraulic attachment pre-sets and enabling hydraulic flow (standard) and pressure (as an option) to be adjusted, a variety of tools can easily be handled by the Attachment Management System. "We have auxiliary hydraulics as part of the machine, from its own hydraulic feed rather than an auxiliary kit that you have to fit, which isn't the case with a standard pipelayer where that would be an option," Butterfield says. "It functions in a similar way to using a hammer with an excavator, enabling you to use the pipelayer to power attachments such as a pipefacing machine prior to welding."

In a similar way to the standard excavator boom and arm joystick pattern, the operator can select from either of the joysticks to operate the winch in the most comfortable or instinctive way.

Whichever configuration they're in, the PL series requires hose burst valves to ensure certification with ISO8643 (see our special feature on p72), though Butterfield is careful to avoid referring to them as 'cranes'.

"While they are clearly pipelayers, their heavy lift capability can be useful in other applications. When the first model was launched at ConExpo 2008 there was interest from companies not involved in pipelaying but were looking for a means of righting derailed rail cars."

Now that is certainly a new type of machine! **iVT**

OFF-ROAD 105-565 kW POWER GENERATION 85-770 kVA

UPTIME IN PRACTICE

Mining/Quarrying Construction Materials handling Stationary Agricultural Forestry

20

Power generation

SEE OUR TIER 4F/ STAGE 4 ENGINES IN HALL C4 STAND319/719 & 321/72

2013

Today, machine uptime is decisive for mining and quarrying companies' profitability. You depend on dump trucks, loaders, drill rigs and other equipment to just keep on going. That's why Volvo Penta engines are reliable and safe – and a perfect match, whatever your specific application may be.

By meeting present and future environmental legislation they are also your investment in a more sustainable tomorrow.

POWERING YOUR BUSINESS



۲

The flat control of the second second

۲

HAMM'S ENGINEERS ARE ANYTHING BUT BACKWARD LOOKING – AND THE THREE NEW MEMBERS OF ITS 'ALL-ROUNDER' H-SERIES COMPACTORS THAT EXTEND THE RANGE DOWN TO 11 TONNES PROVE IT

CASE STUDY

Hamm is set to introduce more than 20 new compactors or variants at Bauma 2013. One of the highlights will be its redesigned range of H-series compactors: previously comprising capacities from 18-25 tonnes, this is now being doubled with the addition of three smaller machines from 11-16 tonnes, offering seven configurations between them.

۲

Gottfried Beer, Hamm's product and marketing manager, confirms that the forthcoming H-series machines are new designs in

۲

themselves, rather than smaller versions of the existing larger models: "With our move from Tier 3 to Tier 4, we have taken the opportunity to totally overhaul the machine design too. So instead of refining the existing machines, we have produced a whole new series of compactors from 11-25 tonnes, while extending the previous weight range with new machines at 11, 13 and 16 tonnes."

The redesigned machines include further enhancements to comfort and ergonomics, and new drum scrapers and developments in compaction

MAIN IMAGE: In addition to introducing three new, smaller H-Series models, Hamm has taken the opportunity to give the existing models a few tweaks

INSET FAR LEFT: Weatherprotection roofs are now an option on open cabs

For Mining and Construction Vehicles: the **bauma 2013,** 15–21 April, Munich **Fire Protection** Hall D1 Booth 127 Reliability
Exhaust Aftertreatment Over the second seco đ **Thermamax!**

Leading brands around the globe benefit from Thermamax solutions meeting current and future requirements: We deliver highly efficient and cost-effective insulation solutions for mining and construction vehicles in whatever style and shape is needed – from development stage through to large series-production runs. Do you have an actual problem that needs solving ? Contact us for more details!

info@thermamax.com | www.thermamax.com

Thermamax. Leading technologies for Off-Highway applications.



technology. They are available with a smooth drum, padfoot segments or padfoot drum. Full details will be revealed at Bauma.

Variable qualities

Each of the new H11i, H13i and H16i models features hydrostatic drive for wheels and roller, and a top speed of 14km/h. Variations according to the particular model include agricultural tractor-type tyres with the padfoot roller for use on more difficult terrain. These three models have a static linear load of 28.7kg/cm, 35kg/cm and 50kg/cm respectively, each with a roller width of 2.14m.

All models in the range can be supplied either with an enclosed cab or open with a ROPS bar. A weatherprotection roof attachable to the ROPS bar will be introduced as an option for open cabs with the launch of the new models.

Hamm's reputation for highquality design is well deserved, and Beer points out that with the OEM's continued emphasis on combining design with functionality, comfort and ergonomics, it has won 25 international design prizes in the past 12 years. He feels strongly that a crucial part of operators achieving the best results is a comfortable operating position with superior visibility. The seat, control console and steering wheel are therefore all freely adjustable, and the roof height has been increased to cater for taller operators. Visibility is also enhanced with a slender cover to the engine compartment, while the exhaust has been integrated into the structure to keep it out of the line of sight.

۲

AMMTRONI

CASE STUDY

New, optional LED lighting will make night work much easier, while reversing cameras and a 5.6in in-cab display screen will be an additional optional safety feature with the new range. This can also be retrofitted to all existing Hamm machines.

Intuitive operation is another long-standing key feature of the company's compactors. Hamm describes the instrumentation and layout of its controls as 'simple, logical, language-neutral', and has ensured that this is continued into the new machines.

With a view to auxiliary power requirements for the operator, two 12V power connections have been considerately provided for a lunch box, mobile phone or other similar personal equipment.

Three new large entry steps on both sides of the machine also give the operator easier access.



MAIN IMAGE: Hamm has built Deutz engines and ZF axles into its machines for many years. The new, smaller models maintain this tradition

INSET: Self-locking diffs and automatic traction control in each drive provide high levels of gradeability

Straight on till morning

To minimise cab movement and provide a restoring force to straight travel, each machine features Hamm's innovative three-point swivel joint. Unequal wheel loads are undesirable in compacting, so the company has developed this joint to deliver the most even distribution of vehicle weight possible through the drum and each wheel, even when at the maximum steering angle of 35°, with a consequent minimising of tilting forces during curved travel.

The swivel joint makes the vehicle self-centring and essentially consists of one vertical plate for each half of the vehicle, connected via one lower ball joint and a fixed-length arm between two upper ball joints.

As the front and rear halves of the vehicle pivot around the lower ball joint, the two vertical plates

WORKS HARD IN EVERY CONDITION



YOUR SOLUTION for TIER 4 REGULATION

Sealed, High Performance, Heavy Duty Brushless Fans & Blowers

Spal provides the market with a wide range of high performance brushless fans and blower, specially designed to meet new generation cooling systems requirements in the off highway industry.

Spal can be a strong and reliable partner in order to increase the systems efficiency in your advanced vehicle design.



Main applications:

- Engine cooling
- Auxiliary and After Threatment cooling
- Engine bay ventilation
- Multi-fans array solutions
- HVAC
- Battery and Electronic cooling

Product features:

- Heavy Duty design
- High vibration and shock resistance
- IP6K9K and IP68 sealed motors
- Integrated fully sealed elctronic board
- Extreme lifespan

INNOVATION & TECHNOLOGY SPAL AUTOMOTIVE

Via Per Carpi, 26/B - 42015 Correggio - Italy info@spalautomotive.com - www.spalautomotive.com

1-ADV_IVT_2013.indd 1

۲

CASE STUDY



rotate a small distance relative to each other in opposite directions, while their top edges are inclined towards each other by the securing arm. The resulting relative inclination of the two vehicle halves, combined with their angled longitudinal alignment during a turn, shifts the vehicle's low centre of gravity upwards and outwards towards the centrepoint of the turn radius, giving balanced wheel loading and greater stability, while providing a restoring force to the neutral position of straight travel.

The greater the turning angle of the vehicle, the further the upward and outward shift of its overall centre of gravity in a stabilising direction, and consequently the greater the restoring force will be.

Visitors to Hamm's factory in Tirschenreuth are often shown this self-centring feature on a very uneven section of the test area (where every new model is tested) when the staff member demonstrating the vehicle lets go of the steering wheel for a while. The company is currently updating its test area to provide for advances in compaction technology that it is keeping secret until Bauma.

The 65-70% maximum gradeability of the new machines is achieved through self-locking differentials and automatic traction control of the front and rear drive. This will no doubt prove extremely useful for manoeuvring through large, difficult dips in the ground, not just on steep construction slopes, and with an approach angle of 45°, these latest models offer impressive capability.

۲

The new standard

Described by Beer as effectively a co-pilot, the Hammtronic machine management system was previously optional but will now be included as standard. The system connects and supervises a variety of functions of the machine for greater overall efficiency – principally the engine, vibration/oscillation and travel – adjusting the vibration system and travel speed to the particular demands of the operating conditions.

Hamm states that a fuel saving of approximately 30% is enabled through the resulting fuel economy and greater compaction performance, with a corresponding reduction in exhaust and noise levels. Power consumption and noise levels are additionally kept to a minimum by varying the volume of cooling air for oil and water related to the engine speed.

The 'i' in the model number denotes 'intelligent emissions control': each machine is fitted with a Tier 4-compliant fourcylinder 105bkW Deutz diesel engine. With airflow designed for maximum operability, the machines can be used in ambient temperatures approaching 50°C.



THE P

ABOVE: Revamped steps provide easy access from either side of the machine

BELOW: The three-point swivel joint shifts the vehicle's centre of gravity for greater stability and self-centring



Hamm has worked with Deutz for engines and ZF for axles for many years, and the new compactors continue with this arrangement.

For easy maintenance with fast access, service points and batteries are all located on one side of all the machines in the H-series. There is also a secure storage area under the engine cover for a toolbox or similar.

The new H-series compactors will have an optional telematics interface, proprietary to Hamm's parent group Wirtgen, offering the potential of interacting not just with each other, but with the full range of Wirtgen machines. This has clear advantages for fleet management, particularly with the immediacy of data required in asphalting works concerning machine location, performance and compaction details. The system will also be useful for remote diagnostics and theft-prevention measures. Data can be downloaded to an external computer, and all maintenance and service details recorded - not just for more efficient operation and improved reliability, but also for a higher eventual resale value.

The company will also introduce additional modules at Bauma for its GPS-based HCQ navigator system for measurement and documentation. This is available as an option for more precise, even compaction and compaction control. The company is promoting the new modules as

DRUMS, VIBRATION AND OSCILLATION



Smooth and padfoot roller drums can be used for static pressure or vibration. A padfoot roller incorporates tapered projections to give higher compaction density due to the smaller surface area of the pads, and is therefore used in the early phases of construction work to provide initial compaction. The angle of the tapers helps prevent the surface being partially destroyed when each foot is removed from the surface as the drum rotates. Padfoot segments can be attached over smooth rollers on some models for greater versatility.

The contact area of a roller drum becomes smaller as the density of the ground increases and the vertical pressure therefore increases with each pass, making it impossible to give a fixed value for the specific pressure of a roller drum. As a result, the parameter 'static linear load' was introduced, being the proportion of axle load to width of roller, which is normally given in kg/cm.

Hamm is currently developing new concepts for roller drums and will reveal more at Bauma. Deeper compaction is achieved with vertical vibrations, although an oscillating drum can be preferable for the compaction of earth and sandy soils, or in urban environments where it is desirable to minimise the vibrations SOFT MATERIAL RIGID MATERIAL

۲

transmitted to buildings and, more particularly, bridges. Hamm's dualfunction VIO drum has vibration and oscillation modes, which the operator can switch between even while in motion. A VIO drum can be specified for the new H13i compactor.

Vibration compaction packs the grains of the ground material closer together by vibrating them with the

rapid application of vertical forces. With the oscillating drum Hamm has developed, forces are applied to the material tangentially from the drum while it remains constantly on the surface, giving a faster result.

According to the company, the oscillation system generates only about 10% of the stresses involved with vibration compaction due to a much more targeted compaction effect, thereby prolonging machine life and improving operator comfort. The machine automatically reduces the amplitude as ground compaction increases. The OEM also says there is an approximately 20% greater temperature range over which oscillation rollers can be used in comparison with vibratory rollers.



a move towards 'lean construction', adding that these will improve compaction quality, while making the construction process even more efficient. Details will again only be made available at the Bauma launch.

Roll on the future

۲

Beer sees the rational upper weight limit of compactors as 25 tonnes due to the forces involved, adding that there is a point above which the quality of compaction that LEFT: VIO drum enables rapid changes to be made between oscillation and vibration to suit changing conditions

FIGURE 1 {TOP}:

Faster, more continuous compaction can be achieved with oscillation: Vibration: a rotating eccentric mass provides fast up-and-down movements of the roller drum

Oscillation: two eccentric masses rotate in sync. This produces a rapidly changing forward/reverse, rocking movement of the roller drum extremely large machines would achieve becomes doubtful. In fact, they could possibly even damage the ground surface due to their weight. These disadvantages would be further compounded by transport issues due to their size.

With regards to the potential for future developments in compactors, Beer believes there are considerable opportunities ahead, as electronics and technologies suitable for these machines continue to evolve. "Exhaust gas technologies are already highly advanced and have probably been pushed close to their achievable limits, but there are still a wide range of possibilities for developing electronics and their applications for compactors in measurement, monitoring and analysis," he speculates. Beer foresees that future developments will principally surround increasingly simplified operation, and further advances in visibility and comfort, with greater use of telematics and networking of functions – whether of individual machines or as a group – for an enhanced overall picture and the optimum and most efficient usage.

Hamm will continue to refine its machines and study technologies that can be applied to its products to make further advances, and the introduction of the new H-series models underlines the company's commitment to providing a versatile, highly effective and dependable range of products that will serve customers and operators alike extremely well over a long and productive service life. **iVT**

ZF technology – the intelligent choice. Because we offer future trends like the Continuously Variable

Transmission already today

www.zf.com

This is only one reason for installing ZF driveline technology in your construction machines. Increased productivity, reduced tire wear and easier operation are further benefits leading to reduced operating costs. You can depend on ZF, the leader in driveline technology, for optimum solutions in all types of applications.



Innovations of Great Value. Visit us at the bauma 2013 in Munich, April 15-21, booth A4.213/312 Design challenge INSET TOP: The main unit can be transported on a gooseneck trailer without special permits. Track frames are added with an RT forklift truck to enable it to iack itself off the trailer

> INSET BOTTOM: Front digging head requires no extra equipment to install

IMAGE FAR RIGHT: Cab mounted on a telescopic boom allows operator to swing out to either side of the main excavation unit for maximum visibilitu of the cuttina edae

THE ROAD TERMITE



۲

Pope Design

Jon Pope has designed heavy equipment for over 15 years. He has worked for a variety of off-highway OEMs, whether as an independent design consultant or employed by Teague

DESIGN AN INNOVATIVE VEHICLE THAT WILL MORE EFFICIENTLY UESIGN AN INNUVATIVE VEHICLE THAT WILL MURE EFFICIENT CARRY OUT A TRADITIONAL ROADBUILDING TASK (OR TASKS)

The Road Termite is an excavation system that not only digs the foundation for superhighways but also properly compacts the excavated foundation floor - all in one pass. It is a modular system that can excavate either a two-lane road, a three-lane road, or even a three-lane road with an HOV lane, including an inside and outside breakdown lane with all three options (to US roadbuilding specifications). With the help of GPS location and self-propelled units, it can all be done with one operator in one operator cab.

The main excavation unit has a removable digging head that can dig to a depth of up to 45in. Four track frames mounted on four separate telescopic legs control the angle of the digging head to maintain proper depth and road pitch at all times. The rear track frames raise to begin exaction - this also helps shift the centre of gravity forwards for better breakout force without adding extra weight to the machine.

Augers in a tunnel underneath the main excavation machine carry the dirt from the front digging head to the rear conveyor belt that lifts and deposits dirt into a high-capacity independent autonomous rear unit. This is completely self-controlled with the aid of sensors and GPS (with emergency manual override) and has a rear conveyor belt that lifts and loads dump trucks on the fly. It also has a series of vibratory compactors mounted to the front of the unit, so while the independent unit moves forwards or while it's not loading dump trucks, it is providing proper compaction for the roadbed foundation.

When a wider roadbed foundation is required, excavation units without cabs can be added to either side, or both sides, of the main vehicle. They can also be staggered and overlap each other for custom-width roadbed foundations. The cab is mounted on a horizontal telescopic boom, which enables the operator to swing the cab out and over the additional autonomous excavation units for a better view of the cutting edges of the digging heads.

After a single pass on a pre-cleared properly graded path, the excavated compacted road foundation dug to a depth of 32in is ready for 21in of natural aggregate and 11in of concrete to meet the specifications of a concrete American highway. All in a day's work... www.pope-design.net / jpope@pope-design.net

BELOW: The main excavation unit can be broken down and transported on three gooseneck trailers before being assembled at the jobsite with just one RT forklift truck

۲





Cline Beiling International Energena Reside Exhib **195,000** so.m of show space NUMBER OF VISITORS

NUMBER OF EXHIBITORS

Preemptive Opportunity Value of Innovation Start up New Sustainable Growth

۲



Available on the App Store

Organizer: China Construction Machinery Association (CCMA) China Construction Machinery Co., Ltd. (CNCMC)

12th Beijing International Construction **Machinery Exhibition & Seminar** Oct 15th to 18th, 2013 **Beijing Jiuhua International Exhibition Center.China**

www.e-bices.org

VEX 2013 China Resource Person Common and Sching Internet. Subscripting Belling Internet. Subscripting Statistics Connercial Vehicle Exhibition

ment Exhibito

CCPIT Machinery Sub-Council (CCPIT-MSC)

Exhibition Management Office: Beijing Asiamachine International Convention & Exhibition Ltd. International Partner: Association of Equipment Manufacturers (AEM)





۲

PAVEMENT PRINTER



Kevin Wilson

A graduate of the Reilly programme at Notre Dame, Kevin is a freelance machine designer specialising in the visualisation of mechanisms, vehicles and industrial environments

The Pavement Printer is a vehicle that carries out the economical repair of damaged concrete roads and surfaces. In contrast to the traditional method of laying a new surface, rolls of mastic asphalt sheeting are used for a more precise and clean application. These sheets could be precut to the width of the road surface, or trimmed by the dispenser itself on site.

Loosely based on the architecture of the Scissorhandler (iVT September 2012, p16), the key difference between this machine and traditional asphalt pavers is that the application of the surface occurs transverse to the forward movement of the machine, thereby enabling a wider surface to be paved by a single vehicle. The cab itself moves like the printer head of an inkjet printer.

The specially engineered sheets are laid within half an inch of one another. A large resistive heating element on the underside of the chassis heats the applied surface, causing the underside in contact with the older surface to selectively expand, filling in cracks, potholes and other imperfections, as well as merging seams. A smaller heater can be used for more targeted application of heat along seams and other difficult areas. Rolls of sheeting are stored on top of the chassis and delivered to the paver cab by a roll dispenser.

۲

A half-track fuel cell-powered vehicle, the Pavement Printer provides a tighter turning radius for winding roads. Inside the cab, the seat rotates a full 360° so the operator can drive the vehicle for transit, and have a clear view of the paving process while stationary. The entire vehicle pivots about the rear track, enabling seamless transition between transit and paving. Similar to the Volvo Fenix concept, rolls could be placed along the side of the road to be loaded by forklift, or delivered by a conventional trailer truck. *wilsonme2@amail.com*







THE CLGC 95 TOOL-CARRIER APPROACH



Lumede/Oliver Becker

Lutz Meyer and Oliver Becker graduated in industrial design from the Muthesius Kunsthochschule in Kiel, Germany. They have worked on several projects for Atlas Weyhausen

Our study shows an all-in-one combination of three construction vehicles commonly used for roadbuilding. The idea for the CLGC 95 (compact loader-grader-compactor) concept came from the fact that loaders and compactors are very similar in construction so we began thinking about which other interchangeable front tool units could be used with the same rear motor/cabin unit.

The CLGC 95 is dimensioned like a compact wheeled loader, because in this size, each combination would be just as efficient as each purpose-built machine. The advantage of this combination comes into play mostly in small roadbuilding applications and for the construction of farming and forestry roads, where a single machine could handle all the work. So instead of having one loader, one grader and one compactor, this combination reduces investment in machines as well as operators.

The front units are attached by means of a hydraulic attachment bracket, positioned in front of the lockable articulated pendulum joint. When one tool unit is detached, the rear unit can move with the assistance of a movable stabiliser wheel underneath the cabin, which is retracted once the units are connected. To connect the rear unit to a front unit, there is a quick connection underneath the cabin, consisting of a pyramid-shaped (without a top) part on the rear unit and a housing for this shape in the front unit. This conical shape serves to centre the parts. Two steel bars are located within the housing, onto which two hydraulic-powered clamps in the rear part lock to form the connector, and an electronic connection, which gives information to the onboard computer about which tool is connected. All in all, the changing from one tool to another should not take more than one hour.

۲

Between the wheel hub and the outer rim are carbon-fibre spokes that provide flexibility and shock absorption to the wheel. On each rim are mounted three interchangeable 120° tyre profile segments filled with an elastic material appropriate for each specific task. The profiles can be changed easily within a short time, as the wheel will stay on the machine.

The motive power is supplied from a fuel cell that charges lithiumionen accumulators for driving the engine and the hydraulic pump. The power transmission is via electric motors in the wheel hub, while hydraulic power is used to move the air-conditioned cab by about 60cm to either side for a better view of the work.

All operating information will be transferred via head-up display, with the respective control programs activated automatically upon connecting the front unit. The display is not projected onto the front window, but to an inner glass shield to keep the display away from disruptive outer light. www.oliverbecker.biz / www.lumede.de

TOP: A three-in-one machine. The very large front windscreen allows optimised control of the locking mechanism and tools such as the grader shield

LEFT: The compactor drum is divided into three parts with central mounting, so machine width equates to usable compacting width



۲

The Perfect Solution

Fritzmeier specialists will carry out joint ergonomic analyses with Human Solutions RAMSIS



RAMSIS is the 3D CAD manikin by Human Solutions which has been specially developed for the ergonomic design of drivers' workplaces. This 'state of the art' system enables the realistic reproduction of international body measurement data as well as analyses focusing on visibility, comfort and ergonomics.



۲

Fritzmeier Systems GmbH & Co. KG Forststrasse 2 85655 Aying, Germany P +49 8095 6 0 F +49 8095 6 254 www.fritzmeier.de



Human Solutions GmbH Europaallee 10 67657 Kaiserslautern, Germany P +49 631 343 593 00 F +49 631 343 593 10 www.human-solutions.com

۲

A SHAKER AND A MOVER



۲

Burak Yesildurak

Burak Yesildurak works as an industrial designer at Hattat Tarim Agriculture Corp in Turkey

The goal of my new design (with technical support from Hakan Çokal and Ahmet Alpaydin) was to improve the transportation problem and vibration features of soil compactors. According to my observations, soil compactors and road rollers are parasitic machines – they need to be carried on a truck for transportation, which adds further expense. Without an on-highway mode, a compactor cannot move through traffic on its own drum, as it could easily be damaged. And because the drum's surface area is wide, on-highway travel would not only be incredibly slow, but also consume a lot of fuel.

My solution, therefore, was to add an on-highway mode to soil compactors and other rollers to avoid this problem. In this way, they can travel on the road to reach the worksite easily, and also improve mobility around large construction sites.

Therefore, I designed a system with four wheels on two hydraulic arms. This system mounts on a 'fork' so that there are two on-highway wheels on both sides of the front drum, onto which the compactor's weight is transferred during travel mode. Once the onhighway mode is activated, hydraulic arms push the wheels onto the road, which raises the drum by 15-20cm. In this way, it can move through traffic and around large worksites. When it is deactivated,

the drum moves down to the ground and is ready for work. Compactors are generally used with a vibration system to enhance the drum's effect and compress the asphalt. My system increases the vibration to 106Hz with 15kW hub-motors mounted on either side of the drum via a shaft that forms its axis. The hub-motors turn the two weights mounted on the shaft, each producing 53Hz. If they turn at 180° to each other, the system will provide 106Hz and increase the centrifugal force applied to the drum surface, boosting productivity.

This vibration system would also be applicable to a tandem roller, while the transport system could also feasibly be added to its rear drum – though ideally with larger wheels and a more robust frame.



A HATTAT

ABOVE: Hydraulic arms push down to raise the drum by 15-20cm

۲

RIGHT: Hub motors turn axis-mounted weights to produce 53 or 106Hz vibration frequencies

BELOW: Compactor preparing for on-highway travel

Granes

۲



iVTInternational.com March 2013 55



C.O.B.O. SpA

۲

DEVELOPMENT AND PRODUCTION OF ELECTRICAL/ELECTRONIC COMPONENTS, SEATS, STEERING WHEELS AND COMPLETELY ASSEMBLED COLUMN KIT FOR OFF-HIGHWAY VEHICLES Headquarters: Via Tito Speri, 10 - 25024 LENO (Brescia) ITALY - Tel. +39 030 90451 - Fax +39 030 9045330 email: info@cobospa.it

www.cobospa.it

SHEEPSFOOT TYRES

Alberto Seco

۲

Alberto has been involved in design projects from mobile phones to heavy equipment. After a spell at an Italian design consultancy and as an industrial designer, he now works in the auto sector

The CompactAll is a padded drum and tyre roller designed for the medium- and large-scale compaction of semi-cohesive and cohesive materials. Traction on this sheepsfoot concept would be provided by three hydrostatic motors, for the drum and the independent rear tyres. The lack of a rear axle allows for a very low location of the drivetrain, which also provides enough space for a six-cylinder engine and its aftertreatment, fulfilling Tier 4 Final without compromising the height and shape of the hood.

Outstanding stability would not just be provided by the very low centre of gravity, as the independent wheel position system would turn the roller into a full hillside machine when working on slopes. The suspended wheels would offer a more cushioned movement on uneven ground. The design of the bi-material tyres is intended to replicate the drum effect and to improve side grip while compacting on slopes. Integration of the steering wheel and seat would enable the 360°

Integration of the steering wheel and seat would enable the 360° rotation of the cockpit so the operator could choose the best view for working. For instance, in order to achieve the best compaction outputs, a second pass can be easily carried out by rotating the operator station by 180°. The rotating cockpit would be especially useful on narrow paths or areas, as there would be no need for steering the roller.

The cab is based on a three-double-post structure; this design splits every post into two pillars and creates profiles so slim as to be almost invisible. Visibility is also boosted by 7.5m² of glass and a complete set of working lights for night operation. Permanent LEDs are included as a day safety feature. The shape of the bonnet is also designed to improve visibility from the 180° positions of the operator station.

The cab is accessible from both sides by means of two sets of steps that can be rotated in order to fill the fuel tank or reach other components. The AdBlue tank, located at the rear of the cab, can be easily reached from the cab access platform. Engine parts and batteries are easily and safely accessible from the counterweight by means of electrohydraulic engine bonnet tilt.

The design language for this concept is based on a rectangle with two round sides, which can be seen right from the structural components through to the styled ones. www.behance.net/albertoseco / albsec@euskalnet.net





۲





۲

۲

.....

ENHANCED ERGONOMICS



Amos Boaz

Amos Boaz is a specialist in industrial design and styling of high-performance vehicles. He also lectures at the Bezalel Academy of Arts and

The Orpela Mati C250 is designed with the operator in mind, as making the cab environment more friendly and comfortable to use will mean the machine becomes much more efficient. The first task was therefore to position the cab high up enough to offer a good all-round view. The cab also rotates - in a roller that can be in creep speeds in reverse for long distances, such a feature is a must, and is much more comfortable than merely rotating the operator's seat.

The operator is seated on a unique work station - the seat allows the operator's legs to move freely, in a similar way to the seat of a scooter. In this way, the whole work station can move up and down its piston, enabling the operator to move into a standing position, letting the blood flow to the legs to relieve pressure.

The Orpela Mati has a tilting axle on the roller side and a suspended axle at the rear. These systems help the chassis stay steady during work on uneven surfaces, and improve the operator's comfort when standing.

On the right-hand side of the operator there is a 'control table', where buttons show up only when they are needed and in the appropriate order, which makes it much easier to use for inexperienced operators. This table enables the driver to program the machine's control unit, which can show the work route plan via GPS control, and then tell the operator where to go, where he has been already, and how many times. The Mati cab's large expanse of laminated glass creates exceptional

visibility and noise resistance. The LED work lights use purpose-designed reflectors to produce a large spread of light with high power.

URPELR Powered by fuel-cell, with electric motors and actuators, the Mati is a slow and heavy machine, but one with a light appearance and an elegant yet strong character. This is the result of its unique proportions, the floating arm that holds the drum, the divided bonnet, arms, cab and frame, and the contrast between the units. www.amosboaz.com / amosboaz@netvision.net.il

ON THE WEB 🔍

۲

For much more detailed explanations and extra images of most of these concepts, visit: www.iVTinternational.com



۲

2**5**0



ABOVE: **The seat and** workstation offers the option of operating the roller while standing

۲



Building success needs the right partner.

It's your business to raise your customers to new heights. It's ours to efficiently support you in doing so. We've taken the profound know-how from our leading position in Commercial Vehicles and Passenger Cars to form a strong basis for innovative, individual and reliable electronics solutions in construction vehicles. For your benefit, and your customers. For more information, please contact us at industrial@vdo.com



۲

MOBILE HYDRAULICS

FLUID MECHANICS

THOSE HARD-WORKING ENGINEERS AT THE MAJOR MOBILE HYDRAULICS SUPPLIERS HAVE BEEN BEAVERING AWAY TO PRODUCE SOME SPECIAL TECHNOLOGIES JUST IN TIME FOR BAUMA. HERE'S OUR SELECTION OF SOME OF THE HIGHLIGHTS

Whether you're looking for new and improved pumps, motors, valves, hoses or couplings – and all the widgets necessary for control of them – there's a good chance you'll find all that at this year's Bauma.

Though there appears to be a definite trend towards hybrid

۲

machines and technologies (see p93), many of them hydraulicbased, there are plenty of other new developments scheduled for launch that will help reduce fuel consumption on traditionally powered vehicles. So here's our pick of what to look for in the component halls.

MOBILE HYDRAULICS

bauma 2013 15 - 21 April Munich, Germany

Over the speed limit

■ SAI will be exceeding all normal speed limits at Bauma – but there is no cause for alarm, as it will simultaneously be enabling greater efficiency, better controllability and outstanding performance. That's because the innovative design of its radial piston hydraulic motors enables them to achieve extremely high levels of speed, power and overall efficiency.

Most mobile plant requires high starting torque, efficiency and controllability, especially when heavily loaded and consequently subjected to high working stresses. All of this can be easily obtained with SAI's new generation of variable displacement motors, which are capable of meeting the wide demands of the market, keeping efficiency at high levels throughout the entire speed and load ranges while maintaining excellent displacement control.

This is achieved by changing the shaft eccentricity using an electronic controller that drives a proportional valve working via signals from the operator, which are balanced by electronic feedback from the motor.

The use of variable displacement motors creates several positive benefits for hydrostatic transmissions, especially those that demand high power. High efficiency levels are maintained throughout the whole operational range and are specifically noticeable at very low displacement ratios. Together with high speed and high pressure capability, this all represents a novel combination of parameters in the current fluid power discipline. Even operating at minimum displacement, the latest range of SAI variable motors can reach speeds up to 3,000rpm with the capability of reaching 5,000rpm when eccentricity is equal to zero.

The wide operational range of these units, coupled with very high efficiency across all working conditions, enables machine designers to set the prime mover within a tight designated speed range where it is working at its maximum efficiency.

The consequences are a considerable reduction in exhaust emissions and a decrease in thermal losses, which increases machine life while improving overall equipment performance. BOOTH A5-228

Friends with benefits

■ Linde Hydraulics will be showcasing new hydraulic components and systems that deliver benefits in terms of dynamics, reliability, operating comfort and productivity.

Integrating all of the key hydraulic control functions within a single cast housing, the VW30 M3 monoblock valve system has been specially developed for the Linde Synchron Control System.

During the design stage, the proven design principle of the VT modular series was adopted, optimising flow paths to ensure the minimisation of pressure losses.

Additional functions can easily be added by valves in sandwich design. By adopting this approach, vehicle OEMs can reduce the risk of leaks, save on space and simplify the process of hydraulic assembly.

In enhancing energy efficiency, the electrically controlled MPR 50 mediumpressure axial-piston pump plays a key role. The up to 3,000rpm suction speeds that this compact pump delivers produce a high output per litre. Already proving its worth in new machine generations, it is primarily used in conjunction with high-pressure pumps in Linde's 02 series. Practical tests have shown fuel savings of 11-20% are possible, when compared with conventional hydrostatic drives fitted with gear pumps.

The company is also unveiling another energysaving function, in the form of a hydraulic start/stop system using a compact hydraulic accumulator charged via the MPR 50 mediumpressure pump. When the electronic LINC controller detects a defined standstill in driving functions, the engine is shut off. As soon as any operator activity is detected, the pump starts up and is fed by the charged accumulator while the engine ramps up to its pre-set engine speed.

This starting procedure is four times quicker than using an electric starter motor, ensuring the machine is immediately ready for operation. The system not only saves energy, but also reduces noise.

B00TH B4-314

The new VW30 M3 monoblock from Linde Hydraulics can reduce the risk of leaks and ease assembly



WHAT'S GOING ON?

"The subject of energy efficiency does not stop at the working hydraulics of industrial vehicles. As a result, the co-operation between OEMs and suppliers of components becomes highly important. The experiences of both sides enrich a machine design right from the concept phase to achieve a high level of energy efficiency."

MICHAEL KNOBLOCH, DIRECTOR MARKETING, HAWE HYDRAULIK



Taking Controls to New Heights! bouma Data User-friendly 2013 Loggers Development PLEASE VISIT US AT BAUMA BOOTH 205 HALL A4 Software Telematics Displays ent Vehicle Controls CAN Keypads Controllers **HUEGLI** HUEGLI TECH is leading Supplier and Wholesaler with core competences in vehicle controls, engine HED Inc. is a recognized leader in the development and manufacture of mobile electronic controls. HED with core competences in vehicle controls, engine has been supplying to fire and rescue, refuse, truck, governing systems, generating set controls and gas SWITZERI AND bus, military, construction, agricultural, forestry, engine starting/management systems with locations

material handling, and stationary power equipment markets for over 20 years. For more information

visit us at www.hedonline.com

۲

throughout Europe, China, Russia, Japan, Korea,

Asia-Pacific, India and the Middle East. For more

۲

information visit us at www.huegli-tech.com

۲

<text><text><text>

www.saispa.com

MOBILE HYDRAULICS

Cost cutter

Bosch Rexroth has created a high-performance software and component package that can potentially reduce fuel use in excavators by up to 20% without compromising performance.

With conventional systems, more hydraulic oil than the consumers require is often pumped through an excavator's system. In contrast. Rexroth's Virtual Bleed Off (VBO) technology determines the actual quantity of oil needed via pressure sensors.

It comprises a hydraulic twocircuit closed-centre system, with specially developed VBO software and an electrically pressure-controlled pump used to electronically (virtually) reproduce the conventional OC system as well as the resulting load sensitivity. The electrically

pressure-controlled pump can safequard maximum system pressure and individual consumer pressure without losses by using variable pressure cut-off, for instance in the slew drive.

VBO guarantees fast machine response and high dynamic system stability. The requested flow rate and the pressure rise in particular are specified by the software. This improves compatibility with Tier 4 engines and supplies just the amount of energy that the consumers need.

The VBO software is being implemented on Rexroth series 30 RC controllers. The reliable and freely programmable RC controllers are a key element of the Bosch Rexroth Design and Application System (BODAS). BOOTH A4-319/414



Virtual bleed off guarantees fast machine response with high dynamic sensitivity and greatly reduced fuel consumption

WHAT'S GOING ON?

"As a result of skyrocketing fuel prices, operators are keeping a closer eye on fuel consumption. With our comprehensive Rexroth 4EE (Rexroth for Energy Efficiency) approach we help OEMs design machinery for the best possible level of energy efficiency.

The 4EE concept applies four



levers to improve energy efficiency of machines throughout their life. First, energy system design focuses on energy efficiency in the early development phases of new solutions and optimisation processes. Second, efficient components ensure energy is used in the optimum manner by applying energy-efficient products and systems. Third, energy recovery aims to use accumulators to store unused energy that can be used at a later date. Finally, energy on demand focuses on managing energy needs to achieve high energy savings, for instance by switching off unneeded components.

PETER DSCHIDA, VP SALES MOBILE APPLICATIONS, **BOSCH REXROTH**



The sum of many parts

HUSCO will be promoting Flow Summation, described as the most important technical innovation in spool valve design in the last 20 years. This is making big inroads in the miniexcavator and backhoe loader market due to its capability to consistently generate efficiency gains beyond 15%, as well as offering a level of controllability previously unavailable in anything other than 20-ton and larger excavators. The technology is productionproven on a number of machine applications and can be experienced on a machine demonstrator at the booth.

The company is showcasing its dual-pump adaptation of Flow Summation for 20-ton excavators. Multiple-pump Flow Summation systems improve fuel efficiency and

controllability relative to today's positive control systems - with notably lower system complexity. If having one of the most advanced, efficient hydraulic control systems is what you desire, then check out its Rhino independent metering valve technology, which offers the absolute best in performance, efficiency and control, built exclusively on its patented INCOVA platform.

HUSCO product engineers will be in attendance to answer questions about customising solutions, whether it be a specific application, product line, or local manufacturing capabilities. If you would like to arrange a more formal meeting, email inquiries@ huscointl.com to set aside a suitable date and time. F13-1311/3

Custom controls

HydraForce will display several of its innovative electrohydraulic control solutions for the mining and construction industries at the show. The company specialises in the production of custom-designed hydraulic manifolds, cartridge valves and electrohydraulic controls that will improve efficiency, performance and functionality of mobile equipment. There is a special emphasis on loadhandling, ride control and suspension systems, Tier 4-compliant fan drives and hydrostatic transmissions for construction vehicles.

However, protecting equipment from corrosion is also a primary aim, with the launch of corrosion-resistant coatings for standard-rated, as well as high-pressure

rated, cartridge valves. The zinc-nickel plating withstands 1,000 hours of salt spray tests before rusting and meets the ASTM B117 standard for corrosion-resistance.

More than 2,000 models of solenoid, directional, flow and pressure-control cartridge valves can be ordered with this corrosion-resistant coating. All HydraForce environmental solenoid valve coils (E-coils) are protected with corrosion-resistant coatings, at no extra charge to the customer.

Also on show will be multifunction cartridge valves that reduce hydraulic footprint by incorporating two or more functions, such as load-sensing, load-holding, directional and flow control capabilities, and pre- and

post-compensation of hydraulic flow into a single valve. Models HSPEC (a proportional solenoid with built-in compensator) and SPCL (proportional solenoid with integral load-sense and check valve) are two examples of cartridge valves with multifunction capability.

۲

On the electronics front, the company offers a CEqualified EVDR-0201 twooutput valve controller, which is ideal for electrohydraulic attachments and many other applications that need an additional output.

PED-compliant pressurerelief valves, HyPerformance high-pressure cartridge valves and numerous system solutions can also be seen at the HydraForce booth.

BOOTH A4-425



Multifunction valves combine two hydraulic functions into a single cavity, optimising space as well as improving machine performance



()

MOBILE HYDRAULICS

Getting functional safety under control

■ The new series of PLUS+1 SC controllers from Sauer-Danfoss offers outstanding functional safety capabilities to OEM designers.

Designated SC024-010, SC024-020 and SC050-020, and on show at Bauma, these devices simplify and streamline the application process, facilitating easier compliance with stringent functional safety standards. The three Sauer-Danfoss safety controller variants help vehicle manufacturers meet European Machinery Directive 2006/42/EC and are designed to achieve SIL 2 (Safety Integrity Level 2 according to IEC 61508) and PL-d (Performance Level d per ISO 13849-1) standards, with third-party certification pending.

"Our three new PLUS+1 SC controllers will provide superior functionality and system design flexibility," declares Boris Laudenbach, product marketing manager for Sauer-Danfoss. "These solutions enable our OEM customers to safety-certify their control systems, meet functional safety mandates, bring vehicles to market and certification faster, and also reduce development and

maintenance costs." The company's

Automotive Control (AC) offers OEMs a complete SIL 2- (Safety Integrity Level 2 according to IEC 61508) certified solution that greatly reduces the scale of OEM vehicle development, timeto-market and qualification expenses for new products.

The PLUS+1 Compliant system incorporates an H1 variable piston pump with embedded electronic control, H1 bent-axis variable piston motor, sensors and associated HMI devices. Combined with intelligent software, Automotive Control provides an automotive-style automatic transmission driving experience that enables operators to adjust the hydrostatic transmission characteristics to suit specific operating requirements.

Finally, the OSPE electrohydraulic steering unit incorporates a range of innovative features designed to meet stringent new safety legislation. Featuring proven OSP steering technology and an integrated electrohydraulic steering valve, the unit helps simplify hydraulic system architecture.

The high level of integration minimises the need to install additional components and provides OEMs with a complete package – all designed, developed and tested for optimum performance.

With a 'safe state', selectable reactive and nonreactive steering modes, load sensing and open centre options, and variable steering ratio, the OSPE is the ideal choice for highly demanding off-highway applications.

B00TH B4-313



"The key differentiator for the future lies in the application and system software. Increased variation and complexity in functionality will be managed via software instead of hardware, which will support vehicle manufacturers by increasing flexibility and customisation, and reduce their time-to-market.



Using software for building intelligence into hydraulic systems is key to maximising gains in productivity and up-time, increase safety, reduce energy consumption and reduce overall system cost."

STEEN ROHLEDER, DIRECTOR OEM SALES EUROPE, SAUER-DANFOSS



Cartridges for high flow

■ A complete programme of size M42x2 proportional screwin cartridges is being displayed by Wandfluh. This comprises spool valves and pressure valves, as well as flow valves, all designed for maximum pressures of up to 400 bar. With volume flows of up to 400 l/min, they are optimally suitable for controlling large consumers.

Wandfluh's many years of experience in proportional technology, along with the actuating of its high resolution and low hysteresis proportional amplifiers and controllers, means the valves are highly suitable for use in demanding industrial and mobile hydraulics applications.

An exchangeable coil greatly simplifies the logistics, because the solenoid coil is also suitable for retrofitting. The various alternatives make the proportional screwin cartridges a very flexible system. A selection of plugvoltage alternatives are available ex-stock and are complemented with high levels of flexibility to meet individual adaptations.

In addition, the performance of the valves has now been increased by virtue of the improved solenoid coil. Therefore, operation under ambient temperatures up to 70°C can be accepted without any performance loss. And with the improvement of the corrosion protection of the solenoid coil, depending on the version, the valves achieve a salt-spray resistance of over 500 hours. BOOTH A5-330

iVTInternational.com March 2013 65

I FFT: PLUS+1 SC

controller

ABOVE: OSPE

steering unit

electrohydraulic



۲

HUSCO

۲

he Biggest Hydraulic Control Breakthrough In 20 Years

Flow Summation mobile hydraulic control valve technology offers over <u>15% efficiency gains</u> combined with controllability previously found only in 20 ton and larger excavator systems. ۲

Come see us at bauma (booth #1311/3) to learn more about how HUSCO can improve your machine and see Flow Summation in action, or visit us online at www.huscointl.com to learn more!

Making Machines Smarte

۲

MOBILE HYDRAULICS

WHAT'S GOING ON?

What we are seeing is that more and more mobile customers are now looking for the same high-performing characteristics and high reliability that our industrial customers have always required. Efficiency is important and therefore pumps in particular have an important role in reducing consumption in the circuits. Customers everywhere try to export and do not want to risk a recall campaign or even experience minor quality problems from abroad.

Another growth area is the noise issue: this used to seem to be relevant only to industrial and high-tech applications but it is now becoming a major request from mobile customers as well." ALDO TOSCANO, SALES AND MARKETING MANAGER, MARZOCCHI POMPE

Environmental spiral

Designers of hydraulic machinery invariably come up with projects that require circuits with tight curves and increased pressures, all in a minimum of space to route flexible connections.

Additionally, equipment used in applications such as construction and mining is frequently employed in areas where work conditions are extreme, for instance with very low temperatures.

Engineers therefore require a complete and extensive medium-pressure braided hose range, with a compact design and no-skive fittings – ideally one that is well established on the market, where it has been tested and appreciated for a long time, and where lots of success stories are in evidence. The Compact Spiral hose range from Parker Hannifin first introduced this concept, by virtue of the reduced use of materials needed in its manufacture as well as its incredible flexibility, which requires less hose to connect different ports.

By reducing the overall weight of spiral hose used on the vehicle, it will also have a knock-on positive impact on fuel consumption and – due to its superior resistance – Compact Spiral can also achieve a high risk reduction in hose failure, preventing oil pollution, maintenance cost and down-time.

Parker's introduction of the Chlorine Free hose range follows the philosophy of having the lowest possible environmental impact as well as reducing environmental risk at the end of the life of the product. New compounds have also been developed to match the severe REACH and RoHS European regulation.

Its Chlorine Free hoses, beginning with the braided medium working pressure range, right through to the high-pressure spiral hoses, combine high reliability and sustainability, two concepts that are prioritised by the hydraulic industry.

This new development is completed by a full range of fittings that are lead- and chromium-6-free, while still delivering a high corrosion resistance in line with market expectations.

BOOTH A5-225/326

Extreme pressure

The WSP series from David Brown Hydraulics (not exhibiting at Bauma) moves the goalposts on what OEMs should expect from a modern hydraulic gear pump.

These pumps deliver one of the highest pressures in the market at 350 bar, enabling OEMs to design increasingly powerful machines that allow for faster operation than ever before.

Parallel to the improved performance on pressure, they deliver superb volumetric efficiency, largely driven by the cleverly balanced sealing, worked out through digital analyses and flow knowledge as well as extensive testing in test rigs to achieve the optimum solution. This improved energy efficiency helps the operator achieve the best drive economy.

The whole project has focused heavily on developing a pump range that manages the harshest conditions in all kinds of mobile applications. In addition to its optimised sealing, it features a two-piece assembly to simplify sealing and increase operational up-time, singlepiece gears for maximum fatigue strength, and greatly enhanced bearing capacity for extended product life under harsh conditions.

Noise is an increasingly important factor for designers and makers of off-highway machinery. The overall noise impression from a hydraulics system can be analysed and influenced in many ways.

No effort has therefore been spared to minimise the pressure ripple effect in the new pump, thereby reducing the noise generated from being transmitted to the rest of the circuitry. This feature is on a par with the helical pumps David Brown Hydraulics currently produces.



WHAT'S GOING ON?

"The mobile market will shift focus from engine emission reduction to emission reduction through lower energy use. Off-highway machine systems have great potential for energy saving due to their dynamic duty cycles. We will also see increased use of hydraulic- and electric-energy storage systems to enable energy reduction.

Smart diagnostics monitoring systems will increase uptime and off-highway vehicles will use 'power on demand' – helping to reduce emissions, as the engine will run only when the machine requires power.

The use of more intelligent motion-control systems will also improve controllability, reduce machine vibrations and reduce fuel consumption."

PETER SJÖVÅG, INDUSTRY MARKET MANAGER – CONSTRUCTION, GLOBAL MOBILE SYSTEMS, PARKER HANNIFIN



New Breakthrough High Performance Hydraulic Gear Pump

۲



David Brown Hydraulic Systems Ltd Tel: +44 (0) 1202 627500 http://davidbrownhydraulics.com e-mail: info@dbhsl.com

see you Gauma 2017

stucchi.it

۲





This new range of pumps is designed for robustness and the capability of giving long working hours in the harshest environments

a constant flow of solutions

DAVID BROWN HYDRAULICS PROBLEMSOLVED

۲

VEP-HD SERIES

- Flat face technology: minimum spillage, reduced contamination
- Easy connection with internal residual pressure
- Optimized pressure drop
- Optimal resistance at impulse pressures
- Compact dimensions
- Safe and simple to use

۲

• Fire tested, Lloyd's certified



MOBILE HYDRAULICS

Extension and retraction



■ Liebherr Component Technologies is presenting its new LiView system. This electrohydraulic system provides precise, reliable measuring of the position taken up by hydraulic cylinders in any size category, to an accuracy as high as ±1mm.

Available for OEM purchase only when fitted within Liebherr cylinders, its robust construction makes LiView particularly suitable for use on construction machinery and mining equipment. The position data it supplies enables machinery movement sequences to be automated, and their performance and ease of control greatly enhanced. The LiView system is built around treating the hydraulic cylinder just like an electronic component, namely a capacitor. An electronic control circuit measures the capacitance of the hydraulic cylinder, which varies according to the degree of extension.

To obtain this information, all that is required are cables attached to the piston rod and the cylinder barrel. No changes have to be made to the well-proven cylinder geometry, which reduces costs and ensures a very low error rate. In addition, the system can be adapted to suit clients' individual requirements. Once measurement takes place, data is transmitted to the machine's control system via standard interfaces.

Precise, reliable measuring of the positions reached by all power hydraulics is a major step towards construction machinery capable of performing automated motion sequences. These positions are often determined by the extension and retraction of hydraulic cylinders. This is where the LiView system plays its part: the position of the piston rod is continuously measured by electronic means. The cylinder can therefore be actuated by the machine control system until it has taken up a predetermined position. By automating hydraulic cylinders in this way, the machine's various positions and operating speeds can. as with a linear axis, be controlled more easily and safely than in manual operation.

Enabling a range of movement sequences to be reproduced speeds up work cycles and makes them more uniform. It also makes possible the restriction of speed in critical work areas, thereby preventing uncontrolled machine movements.

The speed control integrated into the LiView system monitors the damping action of hydraulic cylinders electronically. This then makes it possible to dispense with mechanical components that become extraneous, such as damping sleeves. BOOTH A4-115

Fluid thinking

Parker Hannifin is running a two-day symposium during Bauma, enabling visitors to find out first-hand about the latest engine filtration solutions and innovative approaches to the implementation of cost-effective condition monitoring for mobile equipment. It will take place on 17-18 April in Hall C3, room C31.

Marco van Boven, Parker's Hydraulic Filter Division Europe (HFDE) marketing manager, will lead a symposium discussing the continuous validation of oil cleanliness levels and fluid condition as a vitally important requirement to meet the productivity and safety requirements of mobile equipment.

Adam Pearce, Parker Racor's fuel product manager will then launch the next generation of fuel-filtration solutions, designed to protect the injectors and keep engines running cleaner and longer. For more information, email: mday@parker.com

۲

WHAT'S GOING ON?

"Energy efficiency and the desire to see it continually increase is, and will continue to be, a driving force for the mobile hydraulics industry. With these heightened expectations from both end users and regulatory bodies, OEMs are taking a new view on equipment and equipment



design engineering. As they look to manage power more effectively, they will look at the complete machine, not just individual components. As a result, OEMs will gain a huge advantage by working with teams like ours that can bring application knowledge and a comprehensive integrated solution portfolio, from hydraulics to electronics and controls, to develop tailored equipment solutions." **BILL VAN ARSDALE**, PRESIDENT, EATON HYDRAULICS GROUP

Precise positioning

■ Temposonics absolute, non-contact MH-Series position sensors are approved for operation in safety-related applications. The sensors meet the requirements of Safety Integrity Level 2 (SIL2) to IEC 61508 and thereby the requirements of Performance Level d to ISO 13849-1. This means that the MTS Sensors position measurement systems on show at Bauma are fully approved for safety functions on off-highway vehicles, with measuring lengths from 50-2,500mm available.

This high degree of operating safety is ensured by built-in diagnostic functions of the MH-Series position sensors. In the sensor head, signals are checked and changes are detected immediately. The transducer transmits the position value to the control system only after the diagnostic test. In this way, Temposonics sensors provide a safe failure fraction of 95% at a hardware fault tolerance of 0. They are designed for a high-demand mode of operation and, due to the SIL 2 classification of the sensor, this corresponds to an average probability of failure of $\geq 10^{-7}$ to $< 10^{-6}$ per hour.

Designed for safety-related applications, Temposonics sensors support the functional safety and contribute to meeting the safety targets of the entire machine. Possible applications are a variety of utility vehicles that must be designed in accordance with the special safety requirements. In the field of mobile hydraulics, these applications include steering systems of construction or agricultural machines and crane overload systems.

BOOTH A3-309



Coupling zone

■ Throughout the construction equipment business, Eaton's FF series of flat-face couplings is a good choice when there is a demand for dry-break connections in contamination-sensitive applications. These couplings are available in sizes from ¼in to 1in sizes and for working pressures up to 350 bar.

At Bauma, the company will highlight two new coupling types that complement the main FF range. One of them – the FFCUP series designed by the French Eaton subsidiary Hansen/Coupleurs Gromelle – enables leak-free connection under pressure (hence the CUP acronym) of up to 350 bar.

The push-to-connect design incorporates double shut-off flat-face valves, ensuring there is no fluid loss when connecting or disconnecting. The couplings are manufactured from zinc-plated carbon steel, enabling the provision of superior corrosion protection in the most challenging environments. When, on the other hand, a construction machinery engineer looks for a dry break quick disconnection of hydraulic hoses, the new MLFF series stainless steel flat face couplings will be a perfect choice. Their 316 stainless steel construction provides superior resistance to aggressive environments and corrosion.

The MLFF couplings feature a standard sleeve lock that prevents any accidental disconnection. Their push-to-connect design incorporates double shut-off flatface valves, ensuring there is no fluid loss on connection or disconnection.

Both new couplings are designed and manufactured in accordance with Article 3.3 of the European Pressure Equipment Directive (PED) 97/23 EC. They are also ISO 16028 certified and interchangeable with ISO16028 standard couplings to bring the additional benefits of connection under residual pressure with respect to dry-break quick disconnection in tough applications. **BOOTH B4-211A**



■ For building and construction applications, it has now become necessary to create innovative technological solutions for several problems in a variety of situations.

Forming the interface between the vehicle (power source) and the hydraulic attachment, Faster's quickrelease couplings will be on display at Bauma.

The optimum performance of the company's new FHV quick-release screw-on couplers is confirmed by homologation testing. These user-friendly fittings feature a safety sleeve, Rd thread and a freely rotating female adaptor. Boasting excellent corrosion resistance, high burst resistance and polyurethane sealing technology, they provide a maximum working pressure up to 46MPa, with minimum pressure drop.

FHV screw-on couplings are characterised by the perfect flatness of the shut-off valves, adopting flatface valve technology. This product concept guarantees: • No spillage or air incursion during line connection and disconnection;

Ease of cleaning;

• Female valve is blocked within the coupling by a pair of patented semi-guides made of sintered steel, granting a greater flow cross section.

Faster FHV screw on couplings are available, featuring a wide range of threaded adaptors such as BSP, Metric, NPT, SAE, flange and flange head.

They are also equipped (on request) with dust protection caps in two choices: PVC rubber plug or aluminium screw-on caps.

B00TH C4-322

■ DMC multicoupling plates – Stucchi's latest innovation – are designed to simplify the hydraulic connection of excavators, cranes, drilling and demolition machines.

These comprise a base plate with four or six quick couplings for hydraulic flows over 300 l/min, and enable connection with residual pressure in the pipes, with no effort or need for other equipment. A safety locking system prevents accidental release in the event of impact or vibration. Due to the flat faces, there is no spillage of fluid during disconnection, and no trapping of dirt or air in the circuit when connecting the hydraulic lines.

Other features include the use of DM 1¼in couplings with 42MPa maximum connected working pressure, a lever operated cam that connects the mobile plate quickly and effortlessly, as well as a protective cap and parking station.

The Saturn Block has been designed to meet the requirements of the mobile equipment market. Designed using market feedback and major OEM collaboration, its residual pressure-relief system enables an operator to dis/connect the male and female circuit lines under residual pressure and will provide good resistance at impulse pressures.

Its user-friendly relief system enables easy and safe dis/connection with residual pressure. ISO16028 interchangeable, the flat face makes it easy to clean, helping to minimise the chances of contamination.

Low-cost fieldreplacement spares kits for couplers and valves are available. Its compact, slim and flexible design is highly suitable for multiple port options, and permits ½in, %in, and ¾in coupler sizes. These and other solutions can be found at: BOOTH A3-529 ۲



The President and us

Sometimes a smile could have several meanings:

it means that we **ALL** are ready to leave and reach our Customers everywhere in the world. It means that the Marzocchi's Customer is a partner and we develop the best and effective solutions with him.

That's because every customer is the most important Customer.

Marzocchi Pompe: a smile you can count on!



40033 Casalecchio di Reno, Bologna, Italia - via 63ª Brigata Bolero, 15 - tel + 39 051 6137511 - fax +39 051 592083 www.marzocchigroup.com - pompe@ marzocchigroup.com


MOBILE HYDRAULICS

WOULD LIKE TO MEET: SO 8643

۲

IN OUR NEW SERIES LOOKING AT EASING OEMS' COMPLIANCE WITH TRICKY STANDARDS, WE TAKE A LOOK AT PREVENTING ACCIDENTS THROUGH THE INSTALLATION OF HOSE BURST VALVES – OR EVEN AVOIDING THE SITUATION ALTOGETHER

ISO 8643 requires earthmoving equipment that can be used in crane-type applications, i.e. the lifting and transport of freely suspended loads, to be fitted with a hose burst valve device on critical hydraulic cylinders to guard against the failure of a hydraulic hose.

ISO 18752

So what technology is out there that can be employed on excavators, backhoe loaders and front-end loaders with a rated capacity of over 1 tonne to reduce the risk of a boom or dipper arm collapse?

Rexroth's AVBCN load-holding valves are specially designed to act as the boom-lowering control device that ISO 8643 requires to cope with hose failure. Designed to provide hose burst protection, they are employed as integral components of the lowering control system in vehicles that are also used for material handling.

In order to comply with the requirements of ISO 8643 and

optimise the performance of the machine, the calibration of the valve's opening characteristic is therefore matched with the main control valve.

The Rexroth AVBCN is joystick controlled and ensures the loadholding function through a fail-safe spring design. Besides load holding, it can also control the flow outside the speed range corresponding to ISO Standard specifications. The full metering function means the valve can guarantee fine motion control in any working conditions, with the possibility of employing a simplified main control valve and thereby reducing machine cost.

Besides covering a wide flow range, the AVBCN family has been completed with a new concept in lowering and load-holding valves. This was introduced with the A-VBCN-R valve to make mobile equipment more energy efficient and easier to control, and combines



fine control of the motion during material handling with the ability to comply with ISO 8643. This applies the oil recovery mode to save energy during lowering while also reducing cycle times.

Space-saving solution

Eaton's BoomLoc valve range also provides a reliable, space-saving and cost-efficient way to meet the stipulations of ISO 8643. These over-centre valves can be applied to numerous machines and are particularly suitable for use on the boom and dipper cylinders of an LEFT: The AVBCN guarantees fine motion control as well as fulfilling a vital safety function

Prioritize Your Power Demands

۲





۲

When performance, productivity and uptime matter, Eaton delivers. With our comprehensive hydraulics portfolio and application knowledge, you can tap into solutions that match your needs and build more efficient and tailored equipment solutions.

www.eaton.com/construction

Visit Eaton at booths **B4.211A** and **A3.310** during bauma 2013 to discover how you can differentiate your equipment systems.



MOBILE HYDRAULICS



excavator. Their performance is predictable, so setup and development times can be dramatically reduced even when applied to a new system.

When operating under normal circumstances, i.e. with hoses intact, BoomLoc valves offer high efficiency as the hydraulic fluid is free to pass through the valve to the cylinder with negligible pressure loss. By selecting the most suitable package to match the performance of any given directional valve, pressure losses in the return direction can be kept to an absolute minimum.

In the event of a total hose failure, the hose rupture valve will hold the load and prevent the boom from accelerating above twice its original speed. The flow rate is now dictated by the pressure drop across only the BoomLoc valve.

Another advantage of the valves is their compactness. The valve can be mounted directly on the cylinder or connected using a rigid tube, so they can be used when space is quite restricted. In addition, transfer plates can often be eliminated due to the space-saving design. The cylinder port face is suitable for both SAE3000 and 6000 flanges.

BoomLoc valves can be tailored to suit most directional valves due to the innovative seat and poppet



ABOVE: Reducing hose weight can cut fuel consumption. One way of doing this is to reduce wall thickness while maintaining the same bore



arrangement in the 1CPB cartridge series used and the flexibility of the cartridge valve design. The valves therefore provide very fine control.

A stitch in time...

Of course, a 'prevention is better than cure' approach is always more viable – which effectively means using the very best hoses available.

The performance tests that are required in most hose assembly standards were defined in 1952 with the first release of the well-known SAE J517 standard (the one that contains 100R1 to 100R19). For all these years SAE – but also DIN and EN standards – has kept the same requirement for impulse lifetime.

In fact, it was only the recent ISO 18752 (published in 2006) that brought about the definition of four

CALLING TIME ON PREDICTIVE MAINTENANCE

Predictive, or time-based, hose replacement has long been industry practice simply because there has been no reliable way to determine the actual condition of a hose while it is in service. This is based on various predictive formulae that consider time, pressure, temperature, the number of flex cycles and a range of other factors to produce an approximation of expected hose life. This approach causes millions of feet of perfectly good hose to be discarded every year, often long before the end of its service life.

Post-mortem examinations of hoses from the field can identify the mechanisms of failure. What has been lacking, however, is a technology able to monitor the status of those failure mechanisms while the hose is in service – and then reliably alert the operator when an end-of-life event is imminent.

Eaton's Hydraulics Group therefore initiated a research project in partnership with Purdue University to identify the measurable structural phenomena associated with hose deterioration over time, and develop technology to accurately monitor them.

The result is a system and method for predicting structural failure of the wall of a fluid-containment vessel, such as a hydraulic hose.

The wall of the vessel features an innermost layer in contact with the fluid, and an outermost layer parallel with the innermost layer. The setup includes strainsensing between the layers, and comprises at least one conductor parallel to the innermost layer of the wall. The system and method entail sensing the changes in an electrical property associated with at least one conductor resulting from distortion of the wall of the vessel, thereby causing distortion of at least one conductor.

Known as LifeSense, Eaton's system includes a new hose incorporating at least one conductor in its construction, a special end-fitting that serves as both a hydraulic and an electrical connector, and a diagnostic unit that contains the monitoring electronics and operator notification interface.

LifeSense hose offers performance equal to industry-standard EN856 2SN-rated hose and, although it is a novel construction, is certified to the same industry specifications as conventional hose products qualified to the 2SN spec. Additional sizes and fitting configurations are planned.

The special construction of hose and fittings is required to provide the sensing capability. LifeSense is based on the fact that certain electrical properties of the hose change as the hose approaches failure. Comparing periodic samples of these properties with a baseline value gives a highly reliable indicator of imminent hose failure, with sufficient warning time for an operator to complete an operation, or in most cases a shift, before the equipment needs to be shut down for hose replacement.

The diagnostic unit contains the electronics necessary to implement the sampling schedule and store sufficient data to support the necessary comparisons, a proprietary algorithm to detect the relevant changes, and a simple LED output to notify the operator of hose condition.

In the initial product offering in 2011, the diagnostic unit was hard-wired to the fittings on the LifeSense hose assembly. It is now also available in wireless configurations that can monitor up to 100 hoses and immediately transmit an alert if a situation arises. Data access is provided through a web portal, where users can access advanced system monitoring, hose installation data, connection status, trend reports, diagnostics management and much more.

Waste not, want not

During the laboratory testing phase, it was discovered that many hoses that had been replaced on a time-based schedule of estimated useful life had



actually reached only slightly more than half of their safe useful life. In other words, the ability to accurately detect imminent failure can extend the useful service life of these hoses by over 100% on average.

The level of downtime required for hose replacement is also an important factor in operating cost. Eaton LifeSense technology can considerably reduce unscheduled downtime related to hose failure, saving anywhere from hundreds of dollars per hour on construction equipment, to hundreds of thousands of dollars per day on an offshore drilling or production platform.

Another major financial impact of LifeSense technology will be a large reduction in hydraulic fluid spills caused by hose failure. Laboratory and field testing show conclusively that a LifeSense hose provides sufficient warning of imminent failure to make spills from that source a very rare occurrence.

C

MOBILE HYDRAULICS

'grades' for hoses, based on performance testing, and so raised the hose validation testing from 200,000 cycles to 500,000 (class B and C) and 1,000,000 impulse cycles (D class).

The Gates MegaSys isobaric range is already in conformity with the most stringent of those requirements, providing even lower minimum bend radii for most sizes. The isobaric approach to pressure ratings used by hose manufacturers such as Gates makes it easy to select hoses that meet system requirements based on pressure and temperature. Engineers from many OEMs have come to appreciate the ease and simplicity of the constant pressure approach.

The isobaric approach means that the pressure remains constant but the construction changes to maintain a constant pressure rating across all sizes of the hose to achieve the standard. For the engineer, for example, this means that it is now possible to build entire hydraulic circuits with one type of hose (ISO 11237 R17 isobaric 210 bar), where previous industry standards had pressure ratings that changed with hose diameters. This meant that a

()

variety of hose types and standards would have to be employed to ensure constant circuit pressure needs were met (ISO 1436 2SN R2).

The entire Gates MegaSys hose range now bends up to at least half the ISO bend radius specifications. while still meeting ISO 18752 grade D. In addition to cost advantages due to reduced hose length and weight, half-bend spiral hoses are also more flexible than traditional spiral hoses, which makes for easier installation and routeing. As machines become increasingly compact and lightweight, demand is growing for hoses that can meet requirements such as reduced force to bend, high temperature compatibility and lower weight - making versatile hoses such as Gates MegaSys the ideal answer to all these requirements.

A fitting reminder

Hoses and fittings need to be tested well over the requirements of the major standards. The market naturally gravitates towards products that can comfortably pass more than double the minimum number of impulse cycles demanded by the norms and possess all the required approvals.

KEEPING TAGS ON IT

Hose assembly failure can be avoided through preventive maintenance – but an added-value service can be found that provides a solution through:

- A special hose assembly documentation and replacement programme;
 Increasing the speed, timing and
- accuracy of the next hydraulic hose replacement;

• Tags that contain custom data or replacement options that users can personalise;

ID numbers that are unique to every hose, so replacement is easy and exact;
Barcodes that speed up product identification. Using this information, an OEM knows every detail of each assembly mounted on any machine that leaves the plant. It can then follow the life of each assembly and know how many times it has been changed and why.

Through such statistical data, a preventive maintenance programme may be launched for all or only certain parts of the machine, providing a huge service to the end user, who will avoid having a machine blocked due to hose failure. By including a simple tag with all the necessary information, changing a hose assembly part will be fast, easy and exact. Parker's PTS tags offer this service and help boost the performance of each piece of machinery sold to the market.





ABOVE: For integrity of connections, No-Skive technology is an ideal choice

BELOW: Gates MegaSys

hoses with G and GS

couplings

One highly important factor is reliability, which for a hydraulic hose line often means the integrity of its connection: Parker hoses that use No-Skive technology are an ideal choice. Throughout the progressive rubber and metal compression during crimping, the reinforcement always remains intact. The complete hose and fitting, together with crimping equipment from the same source, offers cost and time savings, and guarantees a defect-free, reliable and durable final product to the end-user.

This is the only way to meet the requirements of SAE J1273 and ISO 17165-2, which concerns the matching of hose and fittings.

Parker's Compact Spiral range first introduced this concept, through the reduced use of materials needed in their manufacture, and also the fact that, due to its high flexibility, it requires less hose to connect between ports. By reducing the weight of hose used, a very positive impact on fuel consumption is also achieved. Due to its superior resistance, Compact Spiral can also achieve a major reduction in the risk of hose failure.

In some applications, pressures up to 350 bar are required – along with the dimensions, flexibility, weight and tight bending radius benefits of braided hoses. Some even require a dynamic working pressure of 500 bar, all achieved with a compact structure of only four spirals, which is tested at twice the minimum requirements of ISO norms. **iVT**



Together, we can set new standards – the indications are clear!

Parker now supplies users with an EO-3[®] fittings system for tube and hose applications that sets new standards in hydraulic technology. With a unique indicator ring for immediately visible assembly results. With compact construction, innovative nut design and taper thread, it's a new fittings standard. With impressively fast and simple assembly, even in restricted installation conditions. With a soft seal integrated in the cone for increased safety. Contact us right now.

aerospace

climate control electromechanical filtration fluid & gas handling hydraulics pneumatics process control sealing & shielding



ENGINEERING YOUR SUCCESS.

www.parker.com 0800 2727 5374 epic@parker.com

EVEN IF YOU'RE NOT IN THE CONSTRUCTION MACHINERY SECTOR, YOU REALLY NEED TO PAY A VISIT TO BAUMA. CHANCES ARE, THERE'S A NEW COMPONENT ON DISPLAY THAT COULD REVOLUTIONISE YOUR CURRENT PROJECT. THE FOLLOWING 15 PAGES ARE THE PERFECT STARTING POINT TO BEGIN PLANNING FOR THE NEXT GENERATION! **bauma 2013 15 - 21 April** Munich, Germany

CM

Nest

12 Messestadt West

HO

ENGINES

WHAT'S GOING ON WITH ENGINES?



۲

"Tier 4 Final regulations appear to be the final step in PM and NOx reductions, resulting in near-zero emission levels. The next step is yet to be defined – however we have seen the US EPA develop regulations focused on reducing greenhouse gas emissions from trucks. Cummins is developing waste heat regeneration technologies to support this drive for improved vehicle efficiency. These technologies could find their way onto industrial equipment in years to come.

Cummins Tier 4 Final engines are designed to provide high levels of performance for a wide range of applications. We have experience installing engines into agricultural, forestry and materials-handling equipment, not just construction machinery. Our latest QSF2.8 and QSF3.8 products are particularly suited to compact equipment (up to 132hp) across all of these segments."

STEVE NENDICK, COMMUNICATIONS DIRECTOR EMEA & CIS, CUMMINS ENGINES

POWERTRAINS

WHAT'S GOING ON IN POWERTRAIN?



"Higher fuel efficiency, lower emissions and increasing productivity are the main driving forces for the construction machinery market today, and even more so in the future. The overall optimisation of the driveline system requires different approaches for the individual driveline components – components considered as being of minor importance also offer considerable potential with limited efforts.

After optimisation of the individual components, additional potential can only be achieved by a system approach. This system approach will play a major role in ZF's future strategies. In combination with our axle and transmission expertise, we see a fuel saving of 20-30% for our products. The ZF Efficiency Package is the recent technology to address this system approach.

Based on our long-term experience in the agricultural sector, we have already made the next step in this evolution – CVT technology for construction machinery. Hybrid modules for all relevant applications will be a final step as soon as markets, customers and environment-political infrastructure request that technology."

HERMANN BECK, HEAD OF ZF OFF-HIGHWAY SYSTEMS

CABS

WHAT'S GOING ON WITH CABS?

"The fact is that excellent ergonomics improve the operator experience! The trend in cab ergonomics is clearly to understand what the customers need in their next-generation products and therefore, being able to apply the right balance between practical and technical requirements while at the same time meeting the needs in ergonomics, safety, comfort and aesthetics – not forgetting that durability and costs are the key words."

SVEND JENSEN, PLANT DIRECTOR, BOSAL-SEKURA INDUSTRIES.

MPH

<u>p</u>pm



ELECTRONICS

WHAT'S GOING ON WITH ELECTRONICS?



"We have only just set off on the journey of increasing software content and complexity. We will see more information management and support systems for the operator, owner and other stakeholders, implemented to manage machines for higher productivity, safety, availability and ergonomics. I believe we will see personal interaction and connectivity devices, i.e. the Smartphones, Surfpads and Kinects of tomorrow, form an integral part

of the operation and management of machines. We will not need a connector plugged into our necks, but we will be as powerful as Neo in *The Matrix*!

At Bauma, we will be showcasing a Smartphone app that enables easy retrieval of condition and diagnostics data to back-office support systems."

MIKAEL ÅKERHOLM, HEAD OF PRODUCT MANAGEMENT, MAXIMATECC

WING OFF





۲

FROM POWER SOURCE > TO POWER APPLIED



GKN Land Systems is a global leading supplier of technology differentiated power management solutions and services.

We design, manufacture and supply products and services for the Agritechnical, Construction, Mining and Utility Vehicle markets and key Industrial segments, offering integrated PowerTrain solutions.

PREMIERE AT BAUMA 2013 – visit us in Hall A6, Booth 424.

- > New eDrive concepts for the off-highway sector! GKN Land Systems will be presenting eDrive concepts for electric and hybrid drivelines for the first time on the occasion of Bauma.
- > Rounding off the product range GKN Stromag will also be presenting itself for the first time since its integration in the GKN Land Systems Division. GKN Stromag has long been a globally acknowledged engineering partner and supplier of multiple-disc clutches and brakes, industrial disc brakes, highly flexible couplings, and camtype limit switches for gearboxes.

eDrive concepts





Further information on the new products can be found on the internet at **www.gkn.com/landsystems/**

EXPECT>MORE

ENGINES

■ The final stage of emissions regulations for off-highway engines of 56kW and above gets under way in 2014 and 2015, maintaining the PM levels established by Tier 4i/Stage IIIB while requiring an additional 80% reduction in NOx.

John Deere Power Systems (JDPS) will therefore display its entire Tier 4 Final/ Stage IV engine line-up, including the PowerTech displacements of 2.9, 4.5, 6.8, 9.0 and 13.5 litres, on A5-219/320. As announced at Intermat 2012, JDPS will continue with its building-block approach to meet the next stage of regulations. It has therefore developed the Integrated Emissions Control system, a solution that optimises engine performance, operating efficiency and reliability, while offering flexibility to customers.

In addition to its industrial range, it will display a power generation unit recognised for delivering quick-starting, clean-running and fuel-efficient power. This unit meets current Stage IIIA regulations applicable since 2011 for mobile generators. JDPS engines are used in a wide variety of industrial applications such as excavators, crushers, loaders, drilling machines, concrete finishers, telehandlers, generator sets and air compressors. Its proven worldwide dealer network of over 4,000 service locations is being trained to fully support customers and their Tier 4 Final/Stage IV engines.



■ **Deutz** is presenting its complete range of engines and DVERT components for Stage IV on A4-321/416. Its newly developed TCD 2.9 L4 covers 30-55.4bkW, and was specially developed for short, tight-fitting installations. This ultra-compact engine enables drop-in installation of the entire system, due to the fitting of a modular aftertreatment system that can be optionally fitted to the engine. The four-cylinder series engine is fitted with EGR and common-rail high-pressure injection, and guarantees high performance



and torque values with extremely cultivated smooth running. It claims 50% more torque than competitive engines.

The TCD 6.1 L6 boasts a compact engine design and optional add-on parts that reduce installation costs and increase the number of applications. The six-cylinder series engine, with turbocharger and intercooler in addition to an electronically regulated common-rail system with high-pressure injection, boasts long engine service life, long service intervals and excellent economics. The water-cooled engine covers a performance range of 100-180bkW, with a maximum torque of 1,000Nm.

■ **Perkins** is showcasing its complete line-up of Tier 4 Final engines up to 225bkW on A4-316. The new compact four-cylinder 854F-E34TA will spearhead the display, which will also comprise engines from the 400 and 1200 Series. The new model incorporates specially optimised SCR technology for the first time. This is packaged separately from the DOC module, for greater installation flexibility. Space saving is further enhanced through the absence of a DPF.

Performance has been boosted to 90bkW, while the 8% improvement in SFC gained at Tier 4i has been retained. Heat rejection remains similar to its predecessor, meaning no major changes to the size of the cooling pack were needed. Also on display is the single-turbo 1206F-E70TA, which meets OEM demands for high torque at low speed by offering up to 151bkW at 2,200rpm, with maximum torque of 870Nm at 1,400rpm.



■ Scania's industrial engines are ready for Stage IV and Tier 4 Final. On B4-201, it will be highlighting a small and powerful 9-litre, five-cylinder model with up to 294bkW; its flexible 13-litre six-cylinder 405bkW engine, and the compact 16-litre V8 boasting up to 566bkW – all ready for 2014.

Each of the three engine ranges has the same installation dimensions irrespective of emission level. The installation remains unaffected, which reduces the efforts required from globally active OEMs.

Clean and refined combustion technology means that Scania manages the very stringent Stage IV and Tier 4 Final regulations without the need for a DPF. Scania has many years' experience of EGR and SCR from trucks and buses. It's engine management and emissions control ensure an attractive blend of customised performance and long-term operating

economy. Versions are available that meet all of today's emissions steps, including Stage II and IIIA.

Scania's engines are developed in Södertälje, Sweden, where advanced R&D is conducted on engine management and exhaust aftertreatment. Parallel development with engines for trucks and buses enables compliance with emissions legislations still several years away.



WILL THERE BE A TIER 5?

■ The potential for reducing NOx and PM content in emissions will be exhausted once Tier 4 Final arrives. Instead, the next environmental goal will be the reduction in CO₂ emissions of all farm vehicles.

Emissions limits already apply to cars in Europe, and are soon due for commercial vehicles. In the off-highway sector, however, setting standards is infinitely more complex – but experts believe that a European regulation will come into force by 2016. In Japan, this will occur in 2015 and the USA will react no later than 2017.

It is unlikely that engine technology developments alone would achieve a reduction in fuel consumption and CO₂ emissions while keeping pollutant levels constant. A variety of approaches will be needed. **Witzenmann** has vast experience in the design of flexible elements installed close to engines that optimise interaction of forces, temperatures and aggregates in the high-load range.

To achieve the CO_2 targets, it offers a variety of development perspectives. For example, it is currently working on the highly promising design of return lines for thermal management systems, exhaust heat recovery and exhaust aftertreatment.

One trend that may assert itself is downsizing. The technological challenge here is to be able to handle the raised operating pressures that all high-efficiency aggregates exhibit. This results in intense demands on pressure-resistant piping and exhaust expansion chambers, especially when of a lightweight, thin-walled design.

In the future, lower-volume engines will be equipped with turbochargers to raise power outputs to the required levels. This may result in high-frequency vibrations, which in turn cause excessive noise if they are transmitted into the exhaust system. Here, Witzenmann is adaptating its structure-borne noise-decoupling elements from the automotive sector.

Future construction machinery engines will probably have a more complex and compact design equipped with even more auxiliary aggregates. The cramped installation space – until now, a marginal issue in this sector, is expected to gain in importance. In this area, too, Witzenmann can draw on its experience in the passenger car sector. Ready-to-install components that are pre-formed and pre-assembled according to customer requirements will free-up more space in future designs.



(

Even Moving Back and Forth, We're a Step Ahead.



Hall A4 Booth 313 Carraro has a complete range of backhoe loader drivetrain systems, available in different configurations and optimised layout for each vehicle application. Our Powershift or Synchro Shuttle transmissions ensure oustanding efficiency to the whole powertrain, reducing power losses and fuel consumption.

Which is why a dedicated team of engineers and our worldwide manufacturing bases are always ready to design global supply solutions in partnership with our customers. This is what makes Carraro not just a supplier of drivelines but a provider of solutions. And this is what keeps us ahead of the field.





Carraro Drive Tech Spa Via Olmo 37 - 35011 Campodarsego (PD), Italy P +39 049 9219111 - F +39 049 9289111 www.carrarodrivetech.com

■ To comply with Tier 4 Final and Euro 6, **FPT Industrial** chose Hi-eSCR technology. Combustion optimisation and development in the exhaust gas aftertreatment system means the new engines feature outstanding efficiency, robustness and quality, with reduced environmental impact. FPT Industrial has achieved an over 95% reduction of NOx emissions, thanks to the implementation of a specifically developed software with the High Efficiency SCR aftertreatment hardware.

The company's commitment to continuous innovation to satisfy the needs of its customers brings considerable benefits. In addition to a reduction in operating costs throughout the lifecycle of the product, FPT Industrial's 'SCRonly' technology guarantees one of the most reliable and fuel-efficient engines at the show (B5-305/404). Great attention has also been given to ease of installation and system flexibility.





■ Managed by the ECU, **Horton**'s Modulator RCV250 fully variable fan drive is an integrated solution with a compact design and reduced weight. Its variable operation reduces fan noise, increases available horsepower, saves fuel and improves airflow. It features a faster response time and lower off-speed for maximum efficiency. Horton's economical variable-speed fan drives are engineered with a 70% fan speed feature to help meet CE noise ratings. VMaster or Stratis Di viscous fan drives and controllers are J1939 compatible and deliver variable-speed fan control. Check them out on A4-422. WindMaster Revolution high-efficiency, hybrid-flow fans

combine the best features of axial-, mixed- and radial-flow technology. WindMaster plastic fans provide maximum cooling performance and efficiency with a longer life. As well as being lighter, these fans are extensively tested for maximum cooling and durability. Offered in clockwise or counterclockwise rotations with single, double or quad spiders, WindMaster metal fans are engineered to meet precise requirements for airflow, size, tip clearance, fan pulley ratio, fan speed range and more.

Constructed with clamshell knuckles that clamp each blade to a steel centre disc, WindShift modular fans offer manufacturing and performance flexibility. Between three and 13 blades can be set to a specific pitch angle for increased versatility and faster, easier prototyping. Blades can be staggered to alter the blade pass frequency. Shogun modular fans deliver more stable airflow and higher efficiency. Blade segments are riveted to a centre disc, providing maximum flexibility, efficient customisation and shorter lead times.

■ Having worked very closely with major OEMs for many years, **Spal Automotive**, the Italian manufacturer of electrical fans and blowers, has gained a great deal of experience on heavy-duty installations. It has been able to translate this into a product range dedicated to the off-highway market, all designed to meet the most stringent standards for performance and durability – a particularly desirable quality in today's tough Tier 4 environment, where cooling systems must be as efficient as possible.

Together with a good selection of fans and blowers, with both brush and brushless motors, Spal will also display its new SBL500, a brushless motor with 500W nominal power but able to provide around 800W according to specific mission profiles.

The entire display (on A5-533) will be applicable for work in harsh and extreme environments, featuring heavyduty design, high resistance to vibration, IP68 and IP6K9K certifications, slinger-hub fan blades for work in the presence of mud, optimised control strategy, low noise, and multiple protective features. All of this has been designed, tested and manufactured by Spal at its plant in Correggio, Reggio Emilia, Italy.



WHAT ARE YOU LOOKING AT?

■ "At trade shows, it's always interesting to see whether competitors launch new products or different machine sizes. I'll be looking to see if new technology – which may or may not be commercially available yet – is being showcased. This could, for example, include the electrification of construction equipment and alternative fuels such as LNG and CNG.



My main focus at the show will be to look at new technology related to fuel efficiency improvements. Volvo CE will, among other things, use Bauma to talk about Tier 4 Final technology. We were the first OEM to produce Tier 4i/Stage IIIB-compliant machines and we continue to be at the forefront of technological development in this area.

Volvo CE will show a broad range of machines, technology and customer services that includes the new ECR25D, ECR58D and ECR88D short-radius compact excavators. We are also extremely proud that the revolutionary bituminous fume extraction system on our ABG pavers is one of three finalists in the machinery component category of the prestigious Bauma Innovation Awards."

ANDERS P LARSSON, EXECUTIVE VP OF VOLVO CE'S TECHNOLOGY FUNCTION



■ For more than 50 years, **Nissens** has supplied thousands of cooling solutions for industrial applications in the on- and off-highway sectors.

Its experienced R&D team drives the innovation of the company by identifying new trends and demands for better products. Building upon its vast experience, this results in products for the future.

Based on the market's interest in indirect cooling, Nissens has developed two high-quality cooling products suitable for indirect cooling systems; both designed on the basis of a modular principle, making it easy to customise the product for any need.

Nissens' WCAC is an indirect cooled aluminium charge-air cooler using water as cooling media. The most important benefits of an indirect cooling system with Nissens' WCAC are fuel savings, decreased fan requirements, faster engine response and lower noise levels. This product has proven performance in demanding applications such as gensets, marine engines and larger diesel engines.

Nissens' AluXstream is designed for water-based cooling systems. The cooler is superior to the traditional plate and bar cooler, as it offers lower cost and weight, as well as longer lifetime compared with AluMcCord. AluXstream was designed and optimised for water/ glycol cooling and already has a strong track record in wind turbine applications and is suitable for most on- and off-road applications too.

Both Nissens' WCAC and AluXstream are flexible solutions that limit the need for space in the engine compartment. Thanks to the integration in an indirect cooling system, Nissens' WCAC and AluXstream are simple and easy to install. To learn more, visit A5-512.

iVTInternational.com March 2013 33

Right performance. Right now.

John Deere engines are built to meet a higher standard — yours

You expect reliable performance from your engines — and nothing less. That's why John Deere always puts engine performance first. PowerTech[™] Final Tier 4/Stage IV engines, with our optimized Integrated Emissions Control system, let you focus on your work and get the job done. Push through the tough spots without losing speed. Respond immediately when you need more power. And do it all while maximizing fuel and fluid economy.

John Deere PowerTech engines. The right technology. Right now.

 John Deere Power Systems

 Tel: +33 2 38 82 61 19
 Em

 Fax: +33 2 38 84 62 66
 Joh

Email: jdengine@johndeere.com Johndeere.com



Come and visit us at Baum Hall A5 - Stand 219/320

JohnDeere.com

INSIGHT: Professor Günter Kunze

Among the many innovations to be launched at Bauma, the 30th International Trade Fair for Construction Machinery, Building Material Machines, Mining Machines, Construction Vehicles and Construction Equipment, being held in Munich from 15 to 21 April, a key focus will be on drive technology for mobile construction machinery. Professor Günter Kunze, head of the Department of Construction Machines and Conveying Technology at the Technical University of Dresden, gives an insight into current progress.



Messe München: International emissions standards are a main factor in the push towards the further development of drive technologies for mobile construction machinery. What technologies and components can be used to facilitate adherence to these standards?

Günter Kunze: The current limits were met mainly by making adjustments inside the engine. But in some cases the constructors were confronted with the contradiction that a combustion process low on harmful emissions leads to higher fuel consumption. The limit values for off-highway vehicles

valid from 2014 require in most cases an additional treatment downstream of the engine, with effective, durable and low-maintenance emissions-reducing components. Depending on the application, a combination of technologies that reduce sootparticle and nitrogen oxide emissions at the same time can be used to meet the low limits of EU Stage IIIB and US Tier 4 Final.

Attention must also be paid to the special conditions in which the machinery is used, to the variable operating cycles and to the performance requirements of the application in question. The enormous variety of off-highway machinery makes it impossible to have a standard solution for emissions treatment. For this reason, the manufacturers define the operating conditions - for example, temperatures - to enable on the one hand filter cleaning in line with soot loading, and on the other, urea-dosing to reduce nitrogen oxides, depending on engine power. As these operating conditions do not apply to every application in the off-highway area, activeregeneration processes are used. Here, emissions systems generate the required temperature themselves, either by means of a flame burner or a combination of a flame burner and a catalytic burner. Other developments are aimed at adjusting the engine for the lowest level of fuel consumption in combination with a major increase in performance of the SCR system. With this, the future emissions standards are met with only two emissions components - CR and diesel oxidation catalysts (DOC).

MM: As well as the drive system, the operating equipment on a mobile construction machine also has to be supplied with sufficient power. What is happening in this area? GK: Generally, IC engines have been installed that can deliver the performance required. In other words the manufacturers work out the peak demand and then design and build the engine to match. However there are many ideas and solutions concerned with the average requirements of the construction machine as a parameter in the design of the combustion engine. To cover peak loads, suitable storage is used,

which is mechanically, hydraulically or electrically operated. This is known as downsizing the installed engine performance. MM: For years the sector has been working intensively on hybrid drives, but so far there has

been no market breakthrough. How do you see the current state of development? GK: First it must be said that it has taken even the pioneer in hybrid design - Toyota

- more than 10 years to gain acceptance and market penetration in the automotive area. In the case of mobile working machinery, the diversity, low production quantities and long working lives lead us to assume that developments will be slower still. Basically a hybrid drive means the availability of at least two sources of power. Many combinations of these sources are possible. For example, it could be a combustion engine and an electrically operated machine in combination with a battery to store electricity. Or two independent batteries, for example in ground conveyors. Machines of both these types have already been designed and marketed. Also possible are solutions that recover energy in mechanical or hydraulic form and then store it. Just which solution is best for which machine depends on the requirements of its application. In hybrid technology in particular, the construction machinery sector is working on many innovations - and they will be on show for the first time at Bauma.

POWERTRAIN

Carraro Drive Tech will

demonstrate its expertise in drivelines for medium and light construction equipment. In fact, a range of solutions specifically designed for compact wheeled loaders, compact wheeled excavators, backhoe loaders, telehandlers and soil compactors will be presented on A4-313.

The display will highlight the high level of design and application flexibility of its modular construction equipment axle range, which gives extensive configurability in both the rigid and steering versions. Drives for crawler excavators and winches will be exhibited too, reflecting its distinctive competence in providing an integrated offer for both wheeled and crawler applications.

Carraro Drive Tech has also just renewed its partnership with CNH, making the most of a consolidated production platform able to respond to the demand of customers, whether they are in traditional markets such as the USA and Europe, or in fastgrowing markets such as China,

Systems will unveil its latest

R2 hydromechanical variable

end loaders, motor graders, industrial

lift-trucks, reach stackers, forestry

applications requiring 180-260hp

Initial tests on front-end loaders

demonstrated fuel savings of up to

HVTs improve productivity by

enabling sensitive, precise vehicle

positioning and stepless drive with

no interrupted acceleration. They

occupy the same space within the

skidders, and other off-highway

of engine output power.

with HVT powersplit systems

torque converter transmission.



India and South America. This means being able to conceive, design and produce solutions tailored to the specific requirements of each market, with a fully 'local for local' approach.

The ability to interpret the needs of the market has led CDT to further focus on the heart of the driveline: transmissions. Bauma 2013 will be the opportunity to exhibit a solution to the most demanding requirements of off-highway customers, i.e. a series of torque converter and hydrostatic transmissions designed to achieve high efficiency, maximum productivity and optimal comfort.

۲

Dana Rexroth Transmission design envelope as conventional torque converter transmissions, and powersplit system on A4-314. The allow for engine downsizing. They also optimise the operating point of transmission (HVT) is a modular the engine by decoupling its rpm platform that delivers a full suite of from drive speed, while maintenance configuration options and software costs are reduced through hydrostatic controls, such as direct or remote braking and wear-free directional reversals. The HVT system helps mounting, flexibility in shift control and drive strategy parameters, and reduce complexity, as the entire the deployment of up to three PTOs. system of gears and hydrostatics is Designed to maximise efficiency and managed by an advanced ECU. reduce overall vehicle ownership and The R2 extends the Dana Rexroth operating costs, it is ideal for front-

HVT portfolio towards smaller machines, and complements the R3 series, which was designed for machines up to 360hp.



iVTInternational.com March 2013 85

Professionals in motion

۲







www.bondioli-pavesi.com

Bondioli & Pavesi has nurtured one passion from the beginning: the transmission of power. The results are a complete and integrated line of products designed and manufactured to satisfy the requirements of our customers.

D

ZF's driveline technology and axle systems – combined with intelligent electronic control systems – provide the platform for the most efficient construction machinery.

Located on A4-213/312, the ZF Efficiency Package will take pride of place. The ZF Converter Lock-Up clutch and other package components increase fuel savings, reduce emissions and extend lifetime. The easy handling of ZF fully automatic transmissions and high-tech axle systems support the operator in all working situations, which results in a notable increase in productivity.

Other modules include Multitrac and Multisteer axles featuring lightness, stability and high transmission power; the Ergopower transmission with five instead of the standard four gears; ZF Direct Drive, which engages the torque converter lock-up clutch by modulation in low gears; Ergotraction, which optimises the (dis)engagement of the powershift differentials in the axle; Powerinch intelligent clutch cut-off with fully automated adjustment; engine derating for overload protection and tractive effort control; and operating mode selection.

Installation-compatible with ZF Ergopower, cPower fully powersplit, continuously variable technology benefits from ZF's experience gained in the agricultural machinery sector and offers notable consumption benefits and productivity increases for the vehicle owner.

With continuously variable drive over the whole range, the system can reduce fuel consumption by up to 25% and deliver 20% higher efficiency. Engine speed is reduced independent of driving speed, and there is hydrostatic-mechanical powersplitting in all driving ranges, including the frequently used range up to 10km/h.



Oerlikon Segment Drive Systems,

with its Oerlikon Graziano and Oerlikon Fairfield brands, will showcase high-tech solutions for demanding applications on A5-133. The GA rear axle system is a new generation of motor grader axle specifically designed with a complete tandem box. Wet disc brakes are fitted outboard on each wheel hub, optimising braking, providing easier cooling without overheating issues and satisfying all safety regulations. The axle portfolio for grader machines consists of five models to fulfil the needs of motor graders from 7.8-20.5 tons operating weight. All Oerlikon Graziano models are in mass production for various leading OEMs, with excellent performance and reliability.

With more than one million synchronisers produced for construction equipment, tractors, cars and trucks, the company is a world leader in this technology, with a range of diameters from 62-170mm, and single, double and triple cone solutions. Powershift clutch units designed, developed and tested based on customer-specific applications, fitted on every powershuttle and powershift agricultural and construction transmission, deliver improved drive comfort, shifting and efficiency.

Oerlikon Fairfield is highlighting its drive solutions for large track-driven equipment. The CT65, CT90 and CT130 Torque-Hub drives provide maximum output torque ratings of 65,000Nm, 90,000Nm and 130,000Nm, and a choice of gear reduction ratios from 70:1 to 147:1. These triple planetary drive solutions extend the range of its commercially successful final drives into larger mobile equipment applications including excavators, track-driven trenchers, drilling machines, tool carriers and cranes.



■ PMP returns to Bauma (A4-220) to promote awareness of its new high-tech complete solutions for a variety of mobile applications. Mixer-truck manufacturers, for example, will appreciate the renowned PMB series of mixer-truck gearboxes, and discover the new compact patented solution – the PMBec. This breakthrough in the mixer-drive technology is 55% shorter and 40% lighter than the traditional solution.

Excavator manufacturers will be amazed by the features of the PMCI integrated travel drives series, coupled with the PMTE swing drive series with hydraulic motors designed specifically for working pressures up to 450 bar in hydraulic excavators of up to 50 tonnes. Those looking for other heavy-duty equipment solutions may be interested in the PMC

gearboxes, now available with the new plug-in variable-displacement (PMH MKV) or fixed-displacement (PMH MKF) motors. These plug-in type axial piston motors are designed for high-pressure (up to 450 bar) heavy-duty applications and feature the most compact design with several valve options available. Investment in R&D is part of PMP's philosophy: even while the economy has been unpredictable, the company has continued to invest heavily in the development of new high-tech products to meet market needs – and the benefits of this approach will be seen in Munich.

I CAN'T WAIT TO...

■ "Bauma is going to be a fantastic opportunity for JCB to showcase its Ecomax engine technology and the fuel savings of up to 10% the engine offers to our customers. The engine, which has no DPF, is truly innovation in action, so it's a great feeling to be able to show our excavators, Loadalls and backhoes powered by the Ecomax for the first time."



TIM BURNHOPE, CHIEF INNOVATION & GROWTH OFFICER, JCB

■ When it comes to the development and production of integrated electromechanical driveline systems for construction and mining machinery, as well as for agricultural and military applications, **GKN Land Systems** is a market leader. The motto of its presentation at Bauma (A6-424) is therefore 'From power source to power applied' – indicating its ability to offer a complete product portfolio of integrated driveline systems for off-highway applications, from the power generator to the power consumer. System components include flexible couplings and shiftable multidisc clutches and brakes from GKN Stromag; gearboxes from GKN Walterscheid; Mechanics drive shafts from GKN Rockford; and wheels and structures from GKN facilities in Europe, North America and China.

For the first time, the company will be presenting eDrive concepts for electric and hybrid drivelines (see Hybrids box, p93). Further GKN Land Systems novelties will include the Stromag Vector coupling, for reliable transmission of torques right up to 9,600Nm; the ICVD with additional, automatic axle disconnection for increased system efficiency; and the Mechanics 15.5C, boasting up to 30% higher torque capacity.



Intelligent Braking



For a World on the Move

The world of Mobile Machinery is on the move.

Environmental Regulations, Energy Savings and Enhanced Vehicle Safety, and Operator Comfort and Efficiency are propelling new machine designs at a rapidly increasing rate. To stay ahead of the competition, you need to focus on machine differentiation, time to market, and cost competitiveness.

MICO is uniquely positioned to help you lead and succeed in a world on the move. MICO engineers specialize in developing collaborative solutions custom tailored to the unique requirements of each machine. Rapid development and prototyping processes ensure you get to market on time and on budget.

The MICO Electrohydraulic Engineering Center brings new levels of intelligent braking integration to machine safety and efficiency while meeting and exceeding the latest regulations. MICO MOBEUS intelligent systems address your latest ABS, ESC and Traction Control requirements.



Talk with MICO today. We help you put your ideas into motion for a world on the move.





Innovative Braking and Controls Worldwide mico.com · +1 507 625 6426

Visit us at Bauma in Hall A5 booth 424

■ In the drive systems of construction machines, there is a definite trend towards one-part coupling solutions. Monolastic is the coupling series developed by **KTR** that is mainly used in hydrostatic drives and which does not only compensate for misalignment, but also allows for elastic damping of torsional vibrations.

The success of the series, which was initially available for drive performances up to 120kW, made an extension appear logical. KTR will therefore present the new size Monolastic 75 with a permissible rated torque of 1500Nm for the first time, on A4-529. It will be used on diesel engines up to approximately 250bkW, enabling compensation of high radial and angular displacements. As a consequence, the power packs of the drive are loaded less, which results in a longer service life.

The pre-assembled hub can immediately be provided with the requested spline. This allows for a simple axial plug-in assembly of the hydraulic pump without the need for any further tools and devices.

Monolastic couplings are now available for torques from 40-1,500Nm and flange sizes to ø395mm. Thanks to the simplified design of the coupling, special connections



without complex adaptors can be realised at low cost. As a result, a perfectly adjusted, one-part coupling system is now available for the connection of engine and hydraulic pump on higher-power mobile hydrostatic drives, which can be easily assembled by the plug-and-play procedure. The vehicle manufacturer merely has to fix the coupling to the engine flywheel and push the pump shaft into the coupling.

■ Poclain Hydraulics (A5-226) will launch the SmartDrive CT 200/300, a new range of ECUs for enhanced operating safety and performance. They offer functional security and operational safety capacities in line with the most demanding standards. Their large calculation capacity and the large number of inputs and outputs allows the most efficient operation of a hydrostatic transmission.

Compatible with the Level-d performance level (PL-d according to ISO 13849-1), their E-certified electromagnetic compatibility and their security architecture capable of the PL-d level allow them to be used for both off-highway and on-highway applications, even in extreme conditions. Operational over a temperature range of -40°C to 85°C, they also function in the case of immersion under a metre of water (IP67). Their electromagnetic compatibility (EMC), certified 'E', makes them compatible with the most demanding uses.

SD CT calculators are made efficient by incorporating an electronic architecture built around a 32-bit microprocessor and an 8-bit auxiliary microprocessor. They have a calculation capacity compatible with the machine's safety, comfort and energy efficiency requirements. These technical characteristics provide access to sophisticated software functions that guarantee efficient and accurate control.



SKF will be present on F7-709/4, with a wide range of lubrication solutions: from application-specific lubricating oils and greases, to automatic lubrication systems.

۲

The company's extensive know-how in bearings and motion technology forms the basis for its highly efficient lubrication systems. Having acquired the American company Lincoln Industrial, a leading supplier of lubrication systems, tools and equipment, SKF now offers one of the biggest lines of products and services on the market, with tailor-made solutions for customers in a variety of industries and for a wide range of tasks.

With this broad foundation, SKF offers solutions for manually operated grease

guns, lubricating oils and greases of all kinds, as well as a complete range of automatic lubrication systems. It even has solutions for special applications such as hydraulic hammers and teeth in open gears.

In addition to these products, the company can help to reduce the life-cycle costs of machinery and equipment and increase productivity. The SKF life-cycle management plan for machinery comprises all the necessary services, from specification and design, to application. SKF experts not only provide advice on selecting lubricants, but also install automatic lubrication systems and provide regular maintenance.



■ With exceptional and innovative new developments, **Knott** (A4-418) is now a market leader in terms of caliper brakes and trailer braking solutions; one notable example being the world's first self-adjusting overrun brake for trailers up to 3.5 tonnes.

"As the first chassis manufacturer for trailers, we have taken a key step forwards in brake technology," says Josef Strasser, head of Knott's Trailer Engineering Department, talking about a new trailer braking system with automatic reversing mechanism. He says the essential advantages are easy to list: "Smaller loss in brake actuation travel, producing a faster response, consistent braking effect and shorter braking distance. Overall, a major improvement in safety for commercial and leisure trailers such as transport trailers or caravans."

However, in spite of all the complexity, the system is actually very simple. "Complicated technology will not get us any further," he states. "At the end of the day, brakes have to function in the cold, the heat and in really dirty conditions. And it is now possible to retrofit all 20-2425/1 brakes, quickly and simply."

As for the large hydromechanical sliding caliper brakes, Knott is introducing a novelty this year. "The HMGS 1x56 was specially built for wheeled loaders, but may also be incorporated into airport ground support equipment and agricultural vehicles," says Richard Hamberger, application manager responsible for their development. "They are not only a service brake, but also a parking brake. They are in a class of their own and distinguish themselves from other companies' products in several ways: they are extremely robust and can manage difficult terrain quite easily; and their especially high braking forces enable vehicles to cope with extreme gradients and be held safely on a slope."



 \odot

High Cooling Capabilities in Small Engine Compartments

Multi-Wing has designed a new high performing fan blade to handle the high heat rejection requirements and ambient temperatures that result from Tier4/Stage III B emissions standards. As cooling demands increase cooling packages become larger leaving less space for the fan in the engine compartment. The 2Z2 is what we call a nearly zero blade deflection profile. Its narrow axial depth makes it a perfect fit for tight Tier 4 engine compartments while still producing the required high pressure rates.

The new 2Z2 sickle fan has an available diameter range of 450 to 805 millimeters and is molded in glass-reinforced polyamide.

Visit our booth at Bauma 2013 in Munich: A6.218

۲

Multi-Wing International Staktoften 16 DK-2950 Vedbaek +45 4565 0133 Tel +45 4565 3133 Fax info@multi-wing.com www.multi-wing.com



■ The perfected technology of **NAF**'s bogie axles has proved its worth in ADTs and graders from distinguished OEMs such as Doosan-Moxy, Hydrema, JSC Dormash and Terex. Exhibiting on A4-203/302, NAF can offer a range of bogie axles between 10 and 40 tons payload, and a wheelbase in several steps between 1,300mm and 1,980mm.

In addition, it offers special features such as the BB-drive, a balancing system to avoid the up-rising effect on front wheels, or turbo brake with self-cooled system running at wheel speed. Use of a bogie axle instead of two single rear axles offers much better performance in rough terrain as ground contact is maintained even in the harshest terrain.

For even more efficiency, NAF has launched a front suspension system for a 30-ton ADT to reach higher driving comfort and deliver 25% more traction. In this complex system are the same differential insert and wheel end with integrated oil immersed disc brake as used in the bogie axles.

For ADTs in particular, the necessity for stable and reliable drive components plays a major role in evaluating the lifetime costs. With the NAF turbo brake, the almost zero wear over its lifetime reduces service time and effort to the minimum. That patented system is able to realise speeds up to 65km/h for the truck, and the turbo brake needs no external cooling.

The brake system is directly integrated in the wheel end and runs at wheel speed. That system is offered in a modular system in a single wheel end (for single wheel suspension) or as a part of NAF's rigid axles or bogie axles to use in different variations, sizes and ratios. This brake is fully protected against mud and other contamination to ensure a long operating life.



■ **MICO**'s 60 years of rugged hydraulic brake design and manufacturing for heavy equipment, plus its 10 years of electrohydraulic braking expertise, came in handy when designing the latest generation of intelligent electrohydraulic braking systems – Mobeus (mobile onboard energy utilisation system).

On display on A5-424, the Mobeus family of braking components uses the integration of electronics to create improved performance and efficiency for braking on- and off-highway machinery. The range includes a complete range of sensors, actuators, valves, controllers and software, all designed to work seamlessly together inside the vehicle network.

The safety and reliability that antilock braking (ABS), traction control, and electronic stability control (ESC) brought to the automotive industry are now available to off-highway OEMs.

Mobeus provides operators with greater predictability by offering similar features to their personal automobiles, making these larger vehicles respond in a familiar fashion. Another benefit is the potential cost savings that can be realised with decreased tyre wear due to the intelligent braking provided by ABS. Also, ESC can reduce vehicle instability, potentially reducing the likelihood of vehicular rollover and damage.

The newest product in the Mobeus line is the load apportioning valve (LAV). In Europe, trailers and tractors are often used instead of commercial trucks and trailers to move product and/or equipment on highways. With this method, there is a large difference in the brake pressure required to stop the trailer when it is loaded and unloaded. The MICO LAV essentially functions as a variable pressure-reducing valve. The maximum pressure available to the brakes is determined by the load on the trailer. The LAV can be a cost-effective alternative to an ABS system where regulations allow.

TWO OF THE HIGHLIGHTS AT THIS YEAR'S BAUMA, BEING HELD IN MUNICH FROM 15-21 APRIL, WILL BE DRIVE TECHNOLOGY AND MINING MACHINERY

MINING PROSPECTS

■ At Bauma, manufacturers from all over the world will be showcasing their latest machinery and technology for mining machinery. Since 2007, sales by mining machinery manufacturers in the German Trade Association of Mining Machinery Manufacturers (part of the VDMA) have risen by an average of 13% per year.

Dr Paul Rheinländer, chairman of the trade association, is very happy with this performance: "These figures show that we are one of the few sectors in Germany that grew right through the downturn." The reasons for this, Rheinländer believes, lie in rising demand for raw materials and in the high quality of the products themselves. The export ratio for this sector in Germany is around 92%. In 2012, the value of machinery exports is put at \in 5.33bn.

In the medium to long term, the signs look good for further expansion in business for mining machinery manufacturers. In increasing numbers of countries around the world – above all, the BRIC countries – demand for raw materials is rising and manufacturers of mining machinery are set to <u>benefit from</u> these trends.

The partner country chosen for the next edition of the trade show is Indonesia, which, because of its extensive raw material deposits, offers tremendous growth potential.

The present conditions are regarded as favourable for new ventures. As part of the general economic upturn in Asia, demand is rising for mineral raw materials, and this in turn is boosting activity in mining. As a result the requirement for mining machinery and technology is also growing.

INDONESIAN OPPORTUNITIES

■ Bauma will be an excellent meeting place for investors in, and companies from, Indonesia. Indonesian mining companies need expertise, technology and capital and they are looking to engage in cooperations with foreign partners.

Adam Pamma, a representative of the Association of Indonesian Professionals for Science, Technology and Enterprises (AIPSE) in Germany, comments: "The mining sector in Indonesia is expanding rapidly, driven by good prospects for profit and rising demand on the international market.

"German partners are particularly welcome, yet so far they seem not to have explored in any great depth the opportunities this market offers. Greater involvement would without doubt have good prospects of success."

No matter what kind of tracks you make...

...we have the drive solution.

We create solutions for mechanically, hydrostatically and electrically propelled vehicles. We have the expertise to solve your greatest challenges for vehicle speed, reliability, fuel savings and emissions.

Whether you need engineering support for a synchronizer, axle, transaxle, planetary, custom gears or gearboxes, our engineers can provide the right answers. And with manufacturing on three continents, our support is close by ... wherever you need it.

You build sophisticated mobile equipment. We design engineered gear solutions. Together, we can drive your business forward.

ПП



Visit us at Bauma 2013 Hall A5 - Booth 133 www.oerlikon.com/drivesystems



innovation has a name graziano

 $(\mathbf{\Phi})$

THE HYBRIDS ARE (FINALLY) COMING

■ It was probably eight or nine years ago when we started to hear the first rumblings of hybrid construction machinery, albeit generally in prototype form. Not much has happened since on that front, although the 2008 launch of Caterpillar's D7E dozer (albeit a dieselelectric 'hybrid', rather than one that recuperates energy) is enjoying notable success, while the HB215LC-1, Komatsu's second-generation electric hybrid excavator, has proved its worth in the 24/7 duty-cycles of the Far East and is now available for the less-intensive applications of western job sites.

Coupled with the launch of **Cat**'s 336E H excavator (p4) late last year, however, the Bauma Media Dialogue seemed to suggest a hotbed of hybrid activity is on the cards. There were a few notable announcements anyway – **Liebherr**, for instance, is applying its well-proven Pactronic recuperation system, as seen on some of its mobile harbour cranes, into the driveline of its HS 8300 HD duty-cycle crawler crane.

This innovative hybrid drive based on hydraulics offers both economic and ecological advantages. Surplus energy is stored in a hydraulic accumulator and subsequently regenerated, increasing the material-handling capacity while also reducing emissions and fuel consumption. Details on the new model are limited, but the technology that was recently introduced on the LHM 550 harbour crane uses the power gained from lowering the load, along with surplus power from the prime energy source, to charge the accumulator. A 30% increase in productivity, with annual fuel savings of €25,000, were said to be realistic for that machine.

Liebherr is also rumoured to be showing an electric excavator hybrid concept, dubbed the 9XX, at the show.



It seems even compact machines are not immune to the encroachment of hybridisation - Wacker Neuson will present alternative drive concepts under the study 'Earth Movement of the Future'. "Energy efficiency, economy and low or even zero emissions are rapidly gaining importance around the world. We are well positioned here for the future and will once again show that our core competence lies in the development of market-oriented innovations," declared Martin Lehner, chief technology officer for Wacker Neuson - while refusing to be drawn any further on the subject until April.

And while *iVT* views truck-mounted machinery as slightly outside its usual remit, one concrete mixer looks well worth checking out at the show. In addition to its new shotcreting machines (p21), **Cifa** will present a hybrid mixer that it says will change the operations associated with concrete transport.

Designed in collaboration with Milan Polytechnic, and offering quieter operation and more savings, Energya 9 uses a 9m³ drum, fitted with an electric motor driven by the latest-generation smart lithium battery unit. The battery can be charged during road transport via the diesel engine, or from a mains power supply during downtime. During





travel, the system also recovers energy during the vehicle braking and drum slowing stages.

Hybrid vigour

The suppliers, of course, are out in full force to support these activities. **Dana** will introduce Spicer PowerBoost, a line of integrated hydraulic-hybrid powertrain concepts. Featured as part of a compact 5-8 tonne front-end loader drivetrain system on its booth (A4-314), it can be deployed in series or parallel configuration to fit into existing vehicle designs with minimal adaptation.

Spicer PowerBoost captures kinetic energy otherwise wasted throughout the drivetrain and working hydraulics, and then uses this recuperated energy to help power the vehicle, which can reduce fuel consumption by 20-40%, depending on vocational application and duty cycle.

An advanced energy-management system evaluates the levels of power needed in the entire vehicle system, predicts operating demands and determines the most efficient means of operation. Hydrostatic energy is captured in an accumulator during low-power operation of the engine and recuperated from braking and working. When more power is required, the stored energy in the accumulator provides an additional source for improving performance and reducing fuel consumption – and allows for potential engine downsizing for power outputs from 55-250bkW.

The system can also be configured to minimise idling by shutting off the engine and accessing power captured in the accumulator for vehicle operations that consume low amounts of energy, such as inching, light working conditions, and low travel speeds.

ZF will also offer hybrid technology such as electric machines and complete hybrid systems. Already well-proven on the market, the ZF-hybrid system is suitable for all ZF transmission forms and can be implemented for direct and The Spicer PowerBoost hydraulic hybrid will be presented as part of a compact front-end loader drivetrain system on the Dana booth



The ZF hybrid system is suitable for all ZF transmission forms and works as a parallel hybrid

separate transmission mounting. The system works as a parallel hybrid with an efficient electric machine, providing up to 85kW or 120kW performance, depending on the size. It is possible to integrate the electric machine into the transmission. The complete hybrid system comprises power electronics for the electric machine and a lithium-ion battery, as well as a hybrid control unit. Thanks to an optimised energy and hybrid drive management, interaction between an electric machine and an IC engine is matched to avoid driving situations with poor efficiency and increased emissions.

GKN will present eDrive concepts for electric and hybrid drivelines. The new AF Series axial-flux electric motor is a three-phase permanent-magnet motor with high torque and high power density. This new motor makes it possible, for example, to electrify secondary drives for off-highway vehicles. The motor is of compact design and low weight, making it particularly suitable for use in electric and hybrid vehicles. It delivers improved process efficiency of machines and implements, as well as very good open- and closed-loop controllability.

Depending on the motor model, a nominal power of 150kW and a peak power of 335kW can be achieved.

Delivering the difference

۲

INDIRECT COOLING SYSTEM & WATER-COOLED CHARGE AIR COOLER









With more than 50 years of experience in the on- & off-road industry, we have developed innovative and advanced integrated cooling solutions delivering **the difference** to the leading OE manufacturers. To learn more, please visit our website **www.nissens.com** or contact our offices in Europe, Asia and USA.



۲



۲

UNITED SEATS is the new brand for off road seating. We manufacture suspension seats in a new and modern facility to the latest standards. We combine modern technology, flexibility in customer design and capability at competitive prices and on time delivery. This newly designed seat is fine tuned to fit most applications and offers comfort and full support to its operator.

The ERGO COMPACT LIFT comes with:

- Semi automatic air suspension with integrated compressor
- 70 mm suspension stroke
- Electric pneumaticlumbar & Backrest side bolsters
- Adjustable backrest extension
- Front control buttons

UNITED SEATS YOUR GLOBAL SEAT SUPPLIER For more information, please visit our website www.unitedseats.com



■ Located on Fritzmeier's booth (A6-315/414) **Human Solutions** will be actively promoting Ramsis ISO 5006, which ensures drivers of off-highway vehicles have an all-round view of 1m at close range and 12m at distance.

Compliance with the guidelines is usually verified on physical test stands. This takes time and effort, because changes during the prototype phase usually involve continual alterations – and then testing has to start all over again. However, the greatest challenge is the range of different vehicle types, because ever-changing superstructures such as cables and water tanks often obstruct the driver's view. This can all be done much faster on a computer.

Many ergonomic aspects, such as operability, space requirements and field of view, can be fully checked beforehand on a CAD model; this also applies to compliance with many regulations. Close co-operation with OEMs at the development stage is a guarantee of quality – the ergonomics software generates a field-of-view based on the driver's position, geometrically and in compliance with the standards, which is displayed in the 3D CAD model of the vehicle, including superstructures and cargo. The field-of-view is automatically evaluated and Ramsis immediately displays any ISO violations. The results can be perfectly replicated, even on different versions of vehicles, which simply cannot be done on a physical test stand. A Ramsis Module for the ISO 13564 guideline is also currently available.

"Digital standards verification has proven itself time and time again in practice. Our customers always used to compare the results of their digital and physical tests – just to be sure. Today the number of physical tests has been massively reduced," says Anton Preiss, director mobility, Human Solutions.



WHAT HAVE YOU GOT?

■ "We are really looking forward to showing visitors our GMK6400, because we're going to have it raised off the ground so that people can walk underneath it. Some of the most interesting engineering on this machine is underneath so we thought it would be a good idea to give visitors an opportunity to see what makes this crane different from other six-axle AT cranes.



۲

In particular, our Megadrive hydrostatic drive system, plus our unique Megatrak suspension system, will be easily visible. To support this we'll also have a video presentation playing that demonstrates other features and benefits on the crane, so as a whole it should be one of our most interesting exhibits on the stand."

ANDREAS CREMER, PRODUCT MANAGER, AT CRANES, GROVE

■ Danish cabin manufacturer, **Bosal-Sekura Industries** (BSI), will present itself in a new way at Bauma, with a new stand position (A6-120) and a more streamlined presentation of its product lines that will define the company's main objectives as quality design, development and manufacture. What began as a roll-bar solution, with one man overturning tractors to show the world the need for increased driver safety, has now turned into a modern production business that always supports its customers with state-of-the-art production of customised cab solutions in small- to medium-series. Customers include major international vehicle manufacturers such as Atlas Copco, Doosan, Atlas Weyhausen and Huddig.

The customer ultimately becomes a partner in producing comfort, safety and functional design right from the beginning of a product's life, from the first line on the drawing board to the production process itself.

In a partnership with BSI, you don't just get the right safety cab for your vehicle – the company can also restyle the design of the whole vehicle.

■ In the Design category of the **Bauma Innovation Awards**, the Kaiser S-line walking mobile excavator is one of the two industrial vehicle nominees (Liebherr's compact loader is the other).

Kaiser's new generation has benefitted from a focus on the dynamic yet functional design of every element of the vehicle. The cab and superstructure form a single unit, harmonising with the vehicle as a whole. Based on the principle of a compact radius excavator, offering outstanding all-round visibility, all of the excavator's pads are clearly visible from the cab.

Integration of the new, more powerful drive and cooling system called for innovative technological concepts and presented a major challenge in the design phase. During development, Kaiser benefited from excellent collaboration with the firm Design Department, based in Linz, Austria.

The large, dynamically designed air suction and exhaust vents provide an immediate clue to the performance class of the new S-Line. And with their lower centre of gravity, the vehicles in the S-Line boast even greater stability on extreme slopes.

Built for deployment in arduous and inaccessible terrain, these machines spend more time on the job than those on more usual construction sites. The cab has therefore been specially conceived – the ergonomic layout of the extensive range of functions has been chosen to greatly facilitate the work of the driver. Enhanced operator comfort was a major focus – the number of functions involved in the operation of a walking mobile is comparable to flying a helicopter and requires full concentration at all times. New joysticks make for easier operation of the many hydraulic adjustment facilities and a wide range of attachments. While the rotary button and switches are readily accessible in the side panel, the standard display on this series is optimally located within the driver's field-of-vision and is intuitive to use.

Various fresh air vents ensure a pleasant climate inside the vehicle. The colour scheme has been revised for this new generation. A combination of grey and black tones ensures a tranquil atmosphere inside the cab. The exterior is dominated not only by the familiar Kaiser blue and yellow, but also by the new anthracite finish for the undercarriage.



KAISER





■ Continental will present a broad product portfolio for construction vehicles on B2-301/403. One highlight will be a camera-based all-around surveillance system for risk-free manoeuvring and electronic viewing of blind spots. This assistance system also enhances the efficiency of vehicle operation as manoeuvring can take less time, and results in a lower risk of damage, less downtime, and reduced repair costs.

The heart of the system consists of four micro-cameras mounted on the outside of the vehicle, with fish-eye lenses for highresolution sweeping of the complete sides, rear and front of trucks and construction vehicles. An ECU merges these four digital, high-resolution camera images on a display – automatically optimised for contrast and brightness – in the cockpit, giving the driver a bird's-eye view of the vehicle. Live, in real time, and at the push of a button even from different angles, an all-round view is provided.

Wall projections, corners of buildings and other vehicles are immediately visible, so the driver can manoeuvre safely in critical situations, in dense city traffic, at narrow loading ramps, in cluttered factory yards, or at bustling building sites. The



system enhances safety, even when the vehicle is standing still, as it can be configured to be permanently active.

For the panoramic view of the vehicle, there are two display modes: at the push of a button it switches between 2D and 3D representation. In the former, the view is focused on the immediate surroundings, whereas in the latter the relations and elevations of the surroundings, as well as other drivers, are more easily recognisable. For even better visibility, the driver can not only change the perspective, but can also control individual cameras to get an even more precise view of critical areas. ■ Located on A6-200A, **UnitedSeats** is a worldwide operating distributor for off-highway seating, supplying seating to the commercial, construction, agricultural and industrial sectors. All seats are manufactured under contract in a new state-of-the-art modern 75,000m² factory to the latest manufacturing techniques.

UnitedSeats remains committed to innovation, providing seating solutions and excellent service to go with them. Working from its original designs or by modifying an existing product, it can offer customers a fitting solution to their seating problems.

Currently, several models are kept in stock, ready to be shipped to customers home and abroad. However, in-house design capabilities enable the company to expand the seating range to create the optimal seating solution for customer needs.

UnitedSeats' worldwide distribution network makes it easy to find the seat you're looking for. Dedicated to providing a quality service from the initial quotation to final product delivery, its commitment to service, knowledge and product availability has made it a preferred source for every seating need. The company is still actively looking for dealers to expand its services.

■ Grammer, a leading supplier of automotive interiors and seating systems, acquired the electronics specialist EiA Electronics in 2011. For more than two decades, this high-tech company has marketed displays, communication modules, multifunctional armrests, control systems, electronic control elements and intelligent sensors. The focus of the company, and the main difference between it and other suppliers, lies in customer-specific solutions for off-highway vehicles.



So Grammer EiA Electronics doesn't deal in 'plug and play' solutions – rather, its experts integrate products specifically tailored to user needs. The company therefore functions like an extended engineering department for its customers. Its express aim is to be integrated as early as possible into the development process of its customers, in order to generate added value through intelligent control solutions in the cab.

Through an intelligent merging of electronic with ergonomic components in its seating systems, it can now offer customers integrated and specialised solutions for optimum design of driver workplaces. These ensure the greatest possible comfort for drivers, as well as maximising the potential from interaction between human and machine. The new capabilities mean that Grammer is far more than just a producer of seats – it is now a total system supplier for driver workplaces and vehicle controls.

This combination of electronic and ergonomic component groups marks the first time that a leading seat manufacturer is in a position to offer customers commercial vehicle driver seats with integrated control elements as a complete system. With the acquisition, Grammer is broadening its technology base and making a targeted investment in the strengthening of its innovation leadership. Find out more on A6-327. ■ Orlaco (C4-123) has developed the RadarEye radar unit in addition to camera-monitor systems. By combining this sight solution with an active signalling system, it offers additional off-highway safety and efficiency.

۲

Orlaco designs, develops, produces and delivers professional camera and monitor systems for all kinds of machines worldwide, including several sight solutions for mining equipment. Due to the extreme conditions those vehicles must operate in, the standards are very rigorous. The vision solutions that Orlaco has developed meet these superior requirements.

The camera-monitor system provides the driver with extra sight when needed. When an object or person enters the danger zone, the RadarEye sounds an audible alarm, then selects and activates the required camera. This is presented on the monitor by showing an overlay of a green, yellow and red signal zones. The audible urgency increases as the person or object moves through to the red zone. Everything that appears within this zone is brought into sight to prevent personal injury and or material damage.

RadarEye is integrated with the vision solution. The radar unit and the camera(s) can be programmed and configured through the monitor. The detection radius is adjustable from 6.5 to 65.5ft and is divided into five equal zones. The operator can view the monitor to confirm the radar unit is working properly. A signal will show when a defect appears.



ADVANCED CONTROL SYSTEM PRODUCTS FOR TOUGH, RUGGED AND EXTREME CONDITIONS



EPEC 5050 CONTROL UNIT BASED ON 32 BIT PROCESSOR MEMORY:

• FLASH 8 MBYTE

Visit us at BAUMA Hall A5, Stand 307

- RAM 4 MBYTE /8 MBYTE
- NON VOLATILE: 512 KBYTE
- PLCOPEN APPLICATION MAX SIZE
- 1 MBYTE / 3 MBYTE
- TEMPERATURE RANGE -40°C ... +70°C



EPEC 3606 CONTROL UNIT BASED ON 16/32 BIT PROCESSOR MEMORY:

- FLASH 1,6 MBYTE
- RAM 1 MBYTE

CRNOCO SAE J1939 e17 1000

- PLCOPEN APPLICATION MAX SIZE
- 768 KBYTE
- TEMPERATURE RANGE UP TO +85°C



BASED ON 16/32 BIT PROCESSOR MEMORY:

- FLASH 1,6 MBYTE
- RAM 1 MBYTE
- NON VOLATILE: 8 KBYTE
- PLCOPEN APPLICATION MAX SIZE • 768 KBYTE
- TEMPERATURE RANGE UP TO +85°C

۲



۲

EPEC OY | P.O. BOX 194 | FIN-60101 SEINÄJOKI | FINLAND | TEL. +358 20 7608 111 | WWW.EPEC.FI



()

We design, engineer and manufacture a complete range of braking systems components for construction, handling and agricultural machinery in either standard or customised packages.

ISO 9001 certification coupled with numerous customer testimonials, demonstrates the continued commitment to quality control throughout our organisation.



Renowned manufacturers, both national and international, have learned to value Vimoter as a highly dependable partner.

All of these factors make Vimoter not just a supplier of components, but a provider of solutions

Vimoter Spa Via Croce Rossa Italiana, 12



20834 Nova Milanese, Milan, Italy Tel: +39 0362 364011 - Fax: +39 0362 40865 Email: info@vimoter.it - Web: www.vimoter.it

ELECTRONICS

■ Freely programmable displays offer OEMs the possibility of creating a space-efficient HMI. With the visualisation and interaction realised in software, a small form factor display can offer operator feedback that would otherwise require a large number of signal lamps, gauges, counters, etc.

In many cases, though, OEMs are hesitating to make this modernisation, as the programming effort can be considerable and may require software engineering skills they simply do not have. The CCpilot XI is developed specifically to overcome these hurdles.

Following the merger of Maxima Technologies and CrossControl, maximatecc will present the CCpilot XI, a new instrumentation display for severe-duty and off-highway applications. This hardware is developed to the highest durability and reliability standards, with a 3.5in colour, highreadability display that enables system designers to create a sharp and appealing interface for the operator. The four illuminated soft keys with tactile feel makes operator interaction easy, even when wearing gloves, and the display can be panelmounted or fitted on a bracket. Dual CANbus makes integration with engine/transmission ECUs and other controllers simple. The CCpilot XI is equipped with configurable digital and analogue I/O ports, enabling easy integration of I/O not accessible via CAN.

CCpilot XI is supplied with the LinX software configuration tool, which runs on a Windows-based PC and allows non-programmers to fully realise the different screens needed in CCpilot XI for a certain vehicle application. After configuring the screens, the program can be run on a PC to verify it does what it should, before downloading the program to the CCpilot XI hardware via USB.

CCpilot XI will be showcased on A3-304, together with the company's total solution portfolio, which now includes advanced display computers, controllers, software application platforms and instrumentation clusters.

| | <u> </u> | |
|---|----------|------|
| Ľ | RPM | 711/ |
| | | |
| C | | |

WHAT ARE WE DOING?

■ "Caterpillar has built on its 85 years of experience to provide technology that is integrated into its products – and that technology goes beyond the products themselves.

Whether we look at site productivity in terms of machine



control or guidance systems, or at optimising equipment management through condition monitoring or, of course, improving fuel economy, customers have at their disposal a range of solutions to provide levels of efficiency and productivity that, in the current environment, can be a game changer. And our dealers are ready to support, worldwide. We look forward to showing those products and solutions to our customers and to be a part of their future success."

PAOLO FELLIN, VICE PRESIDENT GLOBAL CONSTRUCTION & INFRASTRUCTURE, CATERPILLAR

■ Otto's designers and engineers used an optimised product development process to develop its latest CAN-driven operator control module, which met customer requirements for a forestry tractor application. This control module includes indicator lights, a custom backlit keypad, and Hall-effect switches such as a JHM joystick, an HTL toggle and a U2 rocker.

The advancement of CAN technology has facilitated the creation of components that are environmentally – as well as electronically – robust enough to handle the rigours of construction, agricultural and forestry

applications. The plugand-play CAN environment allows the component suppliers to provide a value-added service when developing new interfaces. The component supplier can then provide a component that will plug in at the node in the CAN system that the OEM requires. All error handling, messaging, and prioritisation hierarchy is specified, guaranteeing that the unit will work as soon as it is plugged into the network.

With Otto's rapid product development infrastructure in place, the engineers work on the components and interfaces while the machine shop provides rapid prototypes of the conceptual product.

This prototyping capability provides production-grade thermoplastic models from CAD designs that are accurate and repeatable, providing the customer with the ability to refine the ergonomics and design requirements and produce multiple prototypes prior to spending valuable time and money on standard tooling.

This new operator control module from Otto is a great example of a multi-use device with joystick and keypad functionality combined in one active assembly. Visit Alders' booth (A3-228) to learn more. ■ Control system architects have different preferences on how to implement the physical and logical layout of their application. **Epec** will answer such challenges, as it will introduce its new control units and system development concept on A5-307. The Epec 3724 control unit provides the benefits of the efficient 16/32-bit microcontroller and optimal I/O interface proven in several applications over a number of years. This makes the product a real multipurpose controller for distributed control systems.

The Epec 5050 control unit is ideal for applications that require even more I/O and enhanced algorithms. Three 35-pin heavy-duty AMPseal connectors provide an I/O interface that includes 28 PWM outputs, four CAN interfaces and versatile connectivity for sensors. With its efficient 32-bit microcontroller and up to 1 MiB application size, the product fits perfectly to different control system architectures.

The future-proof Epec 3606, for system distribution and standalone applications, is a compact controller with eight PWM outputs for high performance.

All Epec control units provide SWconfigurable I/O connections for sensors and actuators from different manufacturers. CAN interfaces and communication libraries are available to connect CANopen and SAE J1939 networks. All control units are based on robust design and are produced in-house to meet harsh operating environments. IP67 class housings, -40° to +85°C temperature range, and protection against mechanical shocks up to 100*g*, are common to the control units.

The tool suite and a growing number of application libraries are available to speed-up development projects and improve overall quality. Epec Multitool is available for system configuration before entering into application software development. Programming is done according to the IEC 61131-3 by using CODESYS.



