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In focus: Cooling

INTERVIEWS: Jim Umpleby, CEO, Cat

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6

6

Heléne Mellquist, President, Volvo Penta

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POWER GENERATION



Averting a gen-set disaster

A fuel leak in any part of a generator set can potentially be a catastrophe for the operator. But the issue can be tackled. By **lan Cameron**

TTK fuel sensing cable installed around a diesel generator inside a data centre

New Rolls-Royce engines for gen-sets

Rolls-Royce is introducing a new engine series which will be provided as three variants of gen-sets.

The company is launching the new MTU Series 500 for power generation and with a range of 250 to 550 kW.

The company said that with peak efficiencies of up to 42.6%, the gas gen-sets are suitable for the industrial and utility sector in addition to other applications.

Gas gen-sets and cogeneration plants can be ordered on the basis of six-cylinder in-line engines as well as eight and 12-cylinder V-engines for the 50 Hz market.

In cogeneration efficiencies of around 90% can be achieved. In the 60 Hz market, the units will be introduced from mid-2021.

All gen-sets are equipped as standard with the flexible MTU Module Control System (MMC), a control system that can be customied to perform all functions for continuous monitoring and control of a complete customer solution. The MMC is in a separate panel next to the gen-set. This allows the sets to be integrated into complex systems such as microgrids and provides access to the global MTU service network, Rolls-Royce said.

It added that with their MMC control system, the 500 series sets are suited for use in a range of applications, such as in combined heat and power plants and in complex industrial applications.

n undetected leak in a diesel-powered generator set can have disastrous consequences.

The main fuel storage tank, often containing up to seven days' worth of fuel, is connected to an indoor day tank via the distribution pipes and, in turn, connected to the generator.

A non-detected diesel leakage on any part of this supply and storage chain can be extremely detrimental.

Liquid leak-detection company TTK has, for more than 30 years, suppled ATEX-approved sensing technology-based solutions to detect diesel oil leaks.

In 2020 it delivered fuel oil sense cables to more than 200 projects including installations at data centres, factories, airports, refineries and pipelines.

CONSTANT MONITORING

Recently TTK worked with a printed circuit boardmaker in Taiwan who wanted to protect its diesel generators after a leak incident on one of its sites.

Although the emergency generators are in a regularly inspected area, the client is focussed on constant monitoring, TTK said.

It added that its detection oil sense cable system is installed to the perimeter of each daily tank and generator set.

The TTK oil sense cables detect the presence of

CGM secures major

Italy-based gen-set manufacturer CGM recently signed an agreement with a major telecommunication company in Russia for the delivery of a 1700-kVA generating set with a Perkins 4012-46TAG3A diesel engine and a Mecc Alte EC046-2S/4 alternator.

CGM reported that the gen-set was built in record time inside a 40-feet high cube soundproof container with motorised louvres and sound-absorbing septa. CGM added a 2000 L fuel tank inside the container to ensure a long autonomy to the unit.

Because of the cold temperatures in Russia, CGM's technical team carried out a study for a specific preheating system that is mounted inside the container as well to support the starting of the gen-set under the most

liquid hydrocarbon at any point along their length upon contact.

TTK said that as diesel is a low volatile liquid, the TTK cable can detect it within just 35 minutes thanks to what TKK said is a "unique" silicon layer compared, it added, with 120 minutes (depending on the liquid composition and leak conditions) by traditional sense cables.

The cable quickly absorbs the diesel oil and swells, by consequence increasing the electrical resistance inside the cable and once the pre-set value is reached a signal is sent by the electronic module fitted inside each cable.

The cable can be cleaned and reused after leak detection.

MULTIPLE LEAK DETECTION

Also, TTK worked at a data centre in Kenya where three sets of 10,000 L underground main storage tanks fuel the indoor day tanks and five generator sets with more than two kilometres of diesel distribution pipes.

TTK oil leak sense cables and probes equip the length of these diesel pipes and are installed under the supply, return line and the overflow line of the distribution pipes attached by a cable tie every metre.

The TTK oil sense cables are provided with a built-in plug-socket connector.

Micro-controllers in each one allows multiple leak detection and location in the same circuit.

The company added that in the event of a leak on a pipeline, the precise location of the pipe section will be displayed on the monitoring system.

In addition, a relay is configured to stop the leak source.

The structure of TTK fuel sense cables allows a selective detection.

They are insensitive to water, pressure, or existing pollution in the environment, the company claimed.

The TTK oil sense cables are ATEX approved, thus suitable to be used in hazardous areas with an explosive atmosphere (ATEX "Zone 0").

Major Cat model roll-out

As part of a large-scale expansion of its diesel generator sets range, Caterpillar has launched no fewer than 31 new models of its GC range and which the company said are suitable for most typical small to medium sized standby applications.

The new models now available include 11 with power ratings from 33 to 400 kVA for 50 Hz applications globally; 11 from 40 to 200 kW for 60 Hz applications in North America and nine from 30 to 175 kW for 60 Hz applications outside North America.

Cat said the GC sets have been specifically configured with electrical contractors in mind and the 31 join the current range of eight Cat GC generator set models from 250 kW to 600 kW introduced in 2020 for 60 Hz applications in North America, as well as the 1100 kVA model launched in October 2020 for 50 Hz applications in Europe, Asia Pacific, Africa and the Middle East.

Powered by Caterpillar engines, the new sets are suitable standby applications such as at health clinics, manufacturing, agriculture facilities, municipal infrastructure, wastewater treatment plants and other utilities, commercial enterprises, and office buildings, the company said.

"The electrical contractor market is responsible for commissioning the largest share of standby power solutions for small to medium-sized standby applications," said Jason Kaiser, vice president for Caterpillar Electric Power.

The sets can be equipped with Cat Connect Remote Asset Monitoring which provides data visualisation, reporting and alerts accessible through a web interface. Select models with commonly specified power outputs and configurations are stocked at larger Cat dealer locations for immediate pickup and delivery, the company said.



Russian contract for telecommunication site

To be delivered to the city of Sochi, Russia, the 1700-kVA containerised gen-set by CGM is for a telecommunication application.



severe weather conditions. Finally, a lighting system has been installed outside and inside the container.

"In an ever-changing market like ours, relying on an in-depth study and a good understanding of the best product and environmental conditions is not enough," said Stefano Chilese, CGM's managing director. "An organisation to trust is a must now. In fact, for this project a selected team was appointed to follow each phase of production till the loading of this generator set for shipment. Just in this way, you can be sure that big projects turn into a success."

CGM manufactures portable gen-sets from 2 to 20 kVAa, industrial gen-sets from 5 to 3000 kVA, rental gen-sets from 10 to 200 kVA and the Transporter range of gen-sets for mobile vehicles (from 5 to 20 kVA) and lighting towers.

Optimising the complete cooling system

n a huge variety of applications, from stationary gen-sets through to marine operations, effective cooling systems play a crucial role.

However, many constraints are placed on the design of such cooling systems especially with gen-sets and marine applications.

In the marine industry ensuring that engines have correct cooling capabilities is required in an environment where space is usually limited and very high levels of reliability are a must.

BESPOKE COOLING

French headquartered company MOTA, based in Aubagne, was established in 1958 and has worked with many major engine makers supplying cooling systems, notably with Volvo-Penta, Caterpillar, Yanmar and Scania. It employs around 200 people, has its own aluminium foundry in Lenta, Italy and also has subsidiaries in Charleston, South Carolina in the United States and Osaka, Japan.

According to MOTA project manager Camille Moreaux, a key feature of the company's product offering is its focus on providing bespoke cooling systems, particularly in the marine industry.

He said: "We have been providing complete cooling systems for marine OEMs for more than three decades, designing and supplying heat exchangers, oil coolers, intercoolers, fuel coolers and gearbox oil coolers. However, one of our main advantages is that

Plug and play

Oesse has developed a high efficiency, low maintenance cooling system for the 90 kW Caterpillar C3.6 Tier 4 final/ Stage 5 diesel engine.

Described by Oesse as "a customised plug and play solution", it is suitable for the off-highway sector in applications such as excavators, loaders, crushers, dumpers and dozers and agricultural machinery.

The unit comprises a cooling core with anti-clogging fins, expansion tank, housing, axial fan, protection guard, fixing systems and all necessary hardware components.

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we can supply heat exchangers and coolers with integrated functions.

"For example, functions we integrate into the cooling system include the thermostat, the pressure valves and the expansion tank and it is the same on the oil cooler - we can also integrate the oil filter, pressure relief valves and additional functions.

"That means that when we integrate functions we can reduce the number of parts on the engine. This also makes the installation process of the cooling system easier for our engine customers.

"The coolers we provide are also very reliable. For example, we always use two O rings on either side of the cooler to make sure that we have absolutely no mixing of fluid. It would be catastrophic to have a leakage of water inside the intercooler as this would break the engine. With two O rings on each side of the cooler such a leakage would be impossible.

"Another advantage is our capacity to design and to help our customers to define and optimise the complete, bespoke, cooling system.

FACING BIG CONSTRAINTS

"Customers, particularly in the marine industry, need very specific cooling systems but they face big constraints. They have high reliability expectations, low to medium volumes but they don't want high costs and they have space constraints. We can work along with the design department at the engine company and design the complete cooling system to fit all in the best package.

"Our technology was previously confined exclusively to the engine OEMs we work with but now it is available in our standard range of coolers for everyone in "catalogue" format and for other sectors and applications such as gen-sets, fire pumps and irrigation systems. We can now offer top quality heat exchangers and intercoolers for these systems even with very low volumes and no investment."

In the marine sector MOTA mainly supplies engine and gearbox manufacturers for various commercial vessels such as tugboats, inland waterway vessels, pilot boats and pleasure craft mainly with engines up to a 32 L displacement.

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A Doosan engine with a MOTA heat exchanger and intercooler Integrated solution for fan drive system

36

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CAMILLE MOREAUX, MOTA project manager

HANSA'S NEW SOLUTION UNVEILED

Hansa-TTMP has introduced a new integrated solution for the fan drive system - a closed circuit pump with a specific control designed for the operation of cooling fans for internal combustion engines combined with a piston motor for the rotation of the fan.

The Modena, Italybased company said possible applications include construction, material handling, mining, agricultural and forestry machines.

The fan drive regulator is available for closed loop variable displacement axial piston pumps with displacements ranging from 6 to 50 cc/rev. The pumps are available with shafts

and mounting flange SAE-A, SAE-B AND SAE B-B.

A proportional negative solenoid valve controls the cooling fan speed for 12 or 24 V systems. In event of control current absence the The photo shows the TMF series axial piston motor and the TPV axial piston pumps. pump displacement is maximum and this decreases to zero flow until the control current increases. The hydraulic motor rotation can be reversed for radiator cleaning.

ENSURING HIGH EFFICIENCY

As an option, there is a speed-limiter valve, where a pressure compensator that ensures high efficiency in all operating conditions, keeping the fan speed constant, can also limit the maximum working pressure.

The kit is completed with an axial or bent axis piston motor; or alternatively a gear motor is available.

TMF 600

According to the company the hydrostatic drive of cooling fans has numerous benefits when it is compared to the mechanical operation by pulleys including increased power density, high efficiency, functional safety and easy maintenance. Other benefits are low noise and energy savings, greater flexibility in machine design and compact dimensions, it added. **dpi**

TPV 1500

30

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RELIABLE SOLUTION FOR LEAK DETECTION ON ANY DIESEL GENERATOR SYSTEM



FAST RESPONSE



SELECTIVE DETECTION NON-SENSITIVE TO WATER

> Unique Address

PRECISE LOCATION

Silicone detection layer

RE-USABLE CABLE