Transportation
Berlin S-Bahn put to the test

ENGINEERING
THE “TRANSPARENT” MOTOR – READY FOR INDUSTRY 4.0
RYFAST PROJECT
WORLD RECORD TUNNEL IN NORWAY
The “transparent” motor – ready for Industry 4.0

Open to change

World record tunnel in Norway

A job as high performance sport

Quality control without test stress

Praised as outstanding
Is a motor running smoothly and free of vibration? Does it operate within its optimum performance range? When is the next maintenance due? Is there even a risk of failure? Such questions must currently remain unanswered when using manually-operated motors for lower outputs. Live monitoring is not possible. Not yet, at least.

**Cloud-based solution**

VEM has already been working on a project which will make motors “transparent” and eventually Industry 4.0-ready for some time. A logical extension – and already practised in a few first cases – is a corresponding retrofit option for existing motors. “We are also looking into this possibility, but our main focus is on a cloud-based solution,” says Dr. Henri Arnold, head of the drive systems department at VEM. The project is built around motor monitoring functions designed to process live data acquired by sensors in the terminal box. These data are subsequently transferred to a cloud for collection and analysis. The customer can then use an individually configured portal to access all relevant information on the life cycle, operation and maintenance of his motor, including a full motor history. This permits timely identification of any need to take corrective action, e.g. the ordering of spare parts, preventive maintenance or the planning of repairs.

It is also possible to obtain specific confirmation that a motor with an optimum energy efficiency classification is being used. It is not always the case that a motor with a higher efficiency classification will result in a lower energy consumption. The operating mode, utilisation and properties of the driven process all influence the result to a greater or lesser degree. That can be proven immediately by way of live data. Thanks to a less than 5% metering error, the measurements are also valid within the framework of ISO 50001.

**More to come at SPS**

“In a further step for the future, we want to enable customers to obtain information via the portal already during manufacture of the ordered motor,” adds Sylvia Blankenhagen, chief designer at the VEM facility in Zwickau. “With the aid of the motor number, and later via a QR code on the terminal box, the customer can call up relevant certificates, test reports or spare parts lists.” Further information on the project “Transparent Motors – Ready for Industry 4.0” and updates on the progress made to date will be presented to visitors on the VEM fair stand at SPS IPC Drives in Nürnberg in November 2018.

Dr. Joachim Koch has further strengthened management of the VEM Group since 1st February 2018.

It may be just four months ago that Dr. Joachim Koch joined the management team at VEM, but he has already known the company for much longer. As an acknowledged business consultant and specialist for financial matters, he was from the very beginning a lead adviser for the Chinese family holding SEC and its owner, Jianyu Wang, during the negotiations on acquisition of the VEM Group. “When I decided to switch from the consulting side into company management, I was already well aware of VEM’s good reputation as a strong company with excellent products and great potential,” he says. “My task is now to further advance the development of the VEM Group in terms of innovation, customer satisfaction and profitability, and in this way to prepare us for whatever challenges the coming years may bring.”

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People

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“In the low-voltage sector, where my main focus lies, we want to bring new motors and other products onto the market, and that calls for certain meaningful investments in our factories,” he says. “Competitors are transferring more and more production to low-wage countries, but we want to maintain our current manufacturing capacities.” Flexible production based in Germany, customer orientation and front-line expertise embedded in innovative motors are valuable trumps which VEM holds in its hand.

For all the manifold aspects of daily business, Dr. Koch is not losing sight of the long-term development of VEM. “We are further intensifying our global activities, especially in the growth regions,” he explains. A strategy which the new owner also supports. He plans to open the Asian market for low- and high-voltage drives.

Parallel to his remit as managing director of the holding company VEM GmbH, alongside Jianyu Wang, Dr. Torsten Kuntze and Falk Lehmann, Dr. Koch will also be serving as managing director of VEM motors GmbH in Wernigerode. Dr. Koch is very grateful to everyone at the various company locations for the immediate welcome into their teams, which made a successful start at the company with excellent products and VEM’s good reputation as a strong company with excellent products and great potential easier. He has observed not only a deep loyalty to the company, but also a readiness to tread new paths.

One of the next sporting challenges which Dr. Koch is planning is a mountain bike tour to the Brocken, at 1,141 metres the highest summit of the Harz Mountains.
WORLD RECORD TUNNEL IN NORWAY

The Ryfast tunnel project in the far southwest of Norway runs under the industrial city of Stavanger and provides a link to the mainland.

This is a traffic project of impressive dimensions. If everything goes to plan, the Ryfast tunnel in the southwest of Norway will break several records with its total length of 23.5 km and a deepest point 290 metres below sea level. That will make it the longest and deepest twin-tunnel sub-sea crossing in the world.

"With such a long tunnel, the demands placed on ventilation and safety are naturally very high," says Dieter Wohlfart from the VEM Competence Centre in Munich. "Not least for that reason, we see it as recognition for our products that the contractor Howden Axial Fans, with whom we have cooperated on various projects since 2004, has again chosen to order fire gas motors from VEM."

More than 200 motors of fire gas class F200 have been incorporated into the tunnel jet fans. One notable feature of these specially coated IE3 drives is the use of hybrid bearings with ceramic balls.

Tunnel instead of ferry

The overall project is split into three sections. The main Solbakk tunnel is 14.3 km long. Coming from the south, it dips under the fjord to link the peninsular on which the industrial city of Stavanger stands with the opposite mainland. The two other tunnels, with lengths of 5.5 km and 3.7 km, run under the city of Stavanger itself. All three tunnels of this project are scheduled for completion in 2019.

Enormous time savings

"The ferry across to the mainland takes about three quarters of an hour and only runs every 45 minutes during the daytime," explains project manager Bernd Mötzing from Howden Axial Fans GmbH. "The benefit and objective of the project is to enable traffic to cover the same distance is just 20 minutes."

Ryfast project

VEM is supplying fire gas motors for the deepest and longest underwater road tunnel in the world.

VEH fire gas motor

23.5 km long

290 m deep
“My speciality is the balancing act between production processes and bare figures.”

Dr. Roland Käfer joined VEM Sachsenwerk GmbH as new managing director for operations at the beginning of March.

Vigour, resolve and determination are perhaps the most evident personal traits of Franconian-born Dr. Roland Käfer. And Dresden has been the new working home of the experienced interim manager since March 2018. As managing director for operations, his task is to develop the necessary internal links between the production, design, assembly, purchasing and shipping departments. He is the third member of the management team at VEM’s Dresden location alongside Dr. Torsten Kuntze and Falk Lehmann. Against the background of growing international markets and expanding order books, it was deemed expedient to spread the demanding scope of management duties over more shoulders.

Dr. Käfer’s career began with time as a master toolmaker, which means that he can call on extensive personal experience of shop-floor processes. Anyone who has witnessed his boundless energy will not be surprised to learn that he later gained not only a first degree in business administration, but also further graduate qualifications and a doctorate – all parallel to his work duties. Over the years, he has served numerous internationally active enterprises from the most varied branches of industry, helping them to master changes or exceptional circumstances. “My speciality is the balancing act between an understanding for production processes and bare figures,” he says. That aptly characterises his invaluable combination of practical experience and extensive theoretical know-how.

For Dr. Käfer, the setting screws for corporate success are lean management and maximised value creation. Flow production is here an important tool: “You have to consider the path a product takes on its way through the factory. And that is not necessarily bound to series production.”

People

A JOB AS HIGH PERFORMANCE SPORT

Dr. Roland Käfer is married and has three children. In his somewhat limited free time, he passes his experience on to university students as a visiting lecturer, and is always glad to learn himself from the next generation.

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VEM has received several orders for pumps and compressors for installation at the Hengli Petrochemical Industrial Park in China. The VEM Group is working very closely with VEM China to realise the deliveries to the new chemical complex on Changxing Island in Liaoning Province.

LARGE DRIVES FOR NATURAL GAS PROCESSING PLANT

Sachsenwerk has successfully completed the first phase of a major, technically demanding order received from Linde AG. The large drives and generators were manufactured for one of the world’s largest natural gas processing plants in Eastern Russia.

The scope of delivery comprised a 25 MW synchronous motor for operation at a speed of 1,500 rpm, together with the corresponding 11 kV LCI start-up converter, as well as two synchronous generators for outputs of 9.5 MVA and 2.8 MVA and an operating speed of 1,500 rpm. All these machines are designed with explosion protection according to type Ex “p”.

The decisive challenge, particularly in the case of the 25 MW motor, was that the usual water-based heat exchanger was to be replaced with an exclusively air-based solution. Extensive fluid dynamics studies were necessary in connection with both the cooling and noise levels. The advance calculations relating to rotor dynamics, cooling, noise and losses were confirmed by way of the type tests and in part far exceeded the requirements. The value of the order for the motor with LCI and the two generators ran into seven figures.

Further deliveries have already been agreed for the coming three years.

DELIVERIES FOR CHINESE CHEMICAL COMPLEX

The 25 MW motor was tested together with its start-up converter on the system test bed at the VEM factory in Dresden.
VEM makes a contribution with a rectifier to provide test voltages for DC motors.

The operator of the Berlin suburban railway network (S-Bahn) continues to rely on VEM when it comes to the modernisation of its existing test systems. “The customer was very satisfied with the test rectifier we supplied last year, and so an identical rectifier is firmly planned for the next test bed,” says Robin Schubert from the sales department for drive systems at VEM.

The test rectifier supplied by VEM in conjunction with modernisation of the test facilities of the Berlin S-Bahn

Input transformer with rectifier cabinet

The installation for the testing of DC motors for tram drives comprises an input transformer and a rectifier cabinet. The input transformer is connected to a 3 x 400 V, 50 Hz source on the primary side. On the secondary side, there are two voltage systems supplying 3 x 335 V and 3 x 580 V as input to the rectifier unit.

Testing for new tram types

Two HMI panels are provided on the front of the rectifier unit for display and parameterisation purposes, alongside two analogue instruments to display the output voltage and output current. In addition, illuminated keys can be used to control operation and display, though the test rectifier system is also designed to allow external control. The modernisation of the current test beds, and here not least the incorporation of the VEM test rectifier, not only achieves faster results, but also permits testing for new tram types.
They are designed for use on narrow-gauge systems at altitudes up to 5,500 metres and at speeds up to 100 km/h. Locomotives of the SALi (South American Light Loco) series, built by rail vehicle specialists Stadler at the company’s plant in Valencia/Spain. As part of this project, Sachsenwerk recently supplied the first three traction generators with new, rail-dedicated 24 V exciter units to Stadler. The six-axle locomotives of the latest generation were developed specifically for the Latin American market. The self-ventilated generators deliver an output of over 2,000 kW and attain maximum traction power at a link voltage of 1,800 V. The high altitude and the corresponding influence on ambient operating conditions called for special solutions with regard to fan design, cooling and insulation coordination. The innovative exciter unit is fed directly from the 24 V batteries and communicates with the central computer of the locomotive exclusively via CAN bus. High-maintenance current and voltage transducers are no longer necessary thanks to direct measurement of the link voltage with LEM modules. In addition to speed-dependent voltage regulation in the traction link circuit, the exciter unit also provides important functions for monitoring of the generator.

Emulating the achievement of its predecessor EURODUAL along the Mediterranean Corridor, the SALi locomotive looks destined to become the benchmark locomotive of the planned rail corridor across South America thanks to its exemplary design and performance.

This gigantic transport project is to establish a transcontinental link from the Peruvian port city Ilo on the Pacific coast, via the Bolivian Andes to the Atlantic port of Santos near Sao Paulo in Brazil.

A necessary replacement investment, a new state of the art and expanding customer orders left no alternative – a new assembly line has been commissioned at the VEM factory in Zwickau. Downstream of the new line, a new series test bed was also taken into service just recently. With these investments totalling some €300,000, VEM motors Thurm GmbH is well equipped to handle the increasingly specialised demands placed on individual test steps. Technologist Alexander Bauch, who managed the investment project, is especially pleased that barely a year passed between order placement and final acceptance of the equipment. “The assembly line, a new CNC lathe and a similarly new pre-heating oven to heat the aluminium housings before joining with the stator makes the manufacturing of aluminium motors much more flexible,” he explains. “Very soon, we will also be able to produce cast motors of all sizes on this line, including motors for the increasingly demanded energy efficiency class IE5.”

The greater production capacity will allow customer requests for larger numbers of motors to be realised without delays. And as even single measuring cycles can now be modelled thanks to the more comprehensive and more precise testing possible on the new test bed, it is easier to respond to customer wishes regarding motor specifications or additional features.
Which international trends will affect European drive manufacturers in the years to come? What impact will they have on corporate development and strategies? Which expectations will the market place on the doorstep of the manufacturers?

These are some of the questions which are to be addressed when the umbrella organisation of European manufacturers of electric machines and power electronics invites its members to the 1st CEMEP Technical Conference in Wernigerode on 13th and 14th September 2018. The objective is to discuss important topics relating to the political and economic framework conditions, and to initiate an opinion-building process for the period up to 2025. As a German manufacturer of drive systems and components with a significant market share in Europe, VEM is contributing to both the lecture programme and sponsoring of the conference.

The topics on the agenda for the first day of the conference include industry developments up to 2025, recycling management, monitoring of the market, favourable framework conditions for the European manufacturers and resource availability. The second day of the conference will be considering ways to involve the users in the debate on new demands, alongside digitisation, service, systems and components, training, and the recruiting of new generations of specialists for the branch.

If you have visited the VEM website recently, you have probably already admired one of the latest features – the new image film of the VEM Group. With impressive video clips, 3D animations, concise text information, an individual soundtrack and eye-catching effects, it presents the whole spectrum of products and services offered by VEM, and illustrates how VEM is contributing to many branches of industry with its diverse portfolio. The film was also voted one of the best of its kind at the 19th International WorldMediaFestival which was held in Hamburg on 16th May 2018. Some 780 entries from 40 nations were submitted to this global competition for audio-visual communication media. The VEM image film received a ‘Gold’ award in the category ‘Sales Promotions’. The jury praised especially the outstanding combination of animated motors with real-video sequences from the corresponding branches.

VEM entrusted concept elaboration and realisation of the image film to its marketing agency Juniks Marketing GmbH and the production company AVANGA Filmproduktion GmbH & Co. KG. The managing directors of the two companies, Marion Perplies from Juniks Marketing and Tina Illgen from AVANGA, were present at the gala evening in Hamburg to accept the award. “We also show the film at trade fairs and other events attended by VEM, and have received a great deal of positive feedback,” says Lars Klatte, coordinator of corporate communications at VEM.