



Impulse

online



■ Vehicle engineering

*High-tech on
four wheels*

Pages 8/9

Racing cars for an international competition series are being built by a team of students from Dresden University of Technology. The electric motor was designed together with VEM in Dresden.



Focus on Industry 4.0

02-05



SAP strategy developed further

06



Fully functional museum piece

07



For the love of engineering

10

Avid interest for a broad agenda of presentations, topics and discussions was characteristic for the 15th Technical Conference.



■ 15th Technical Conference

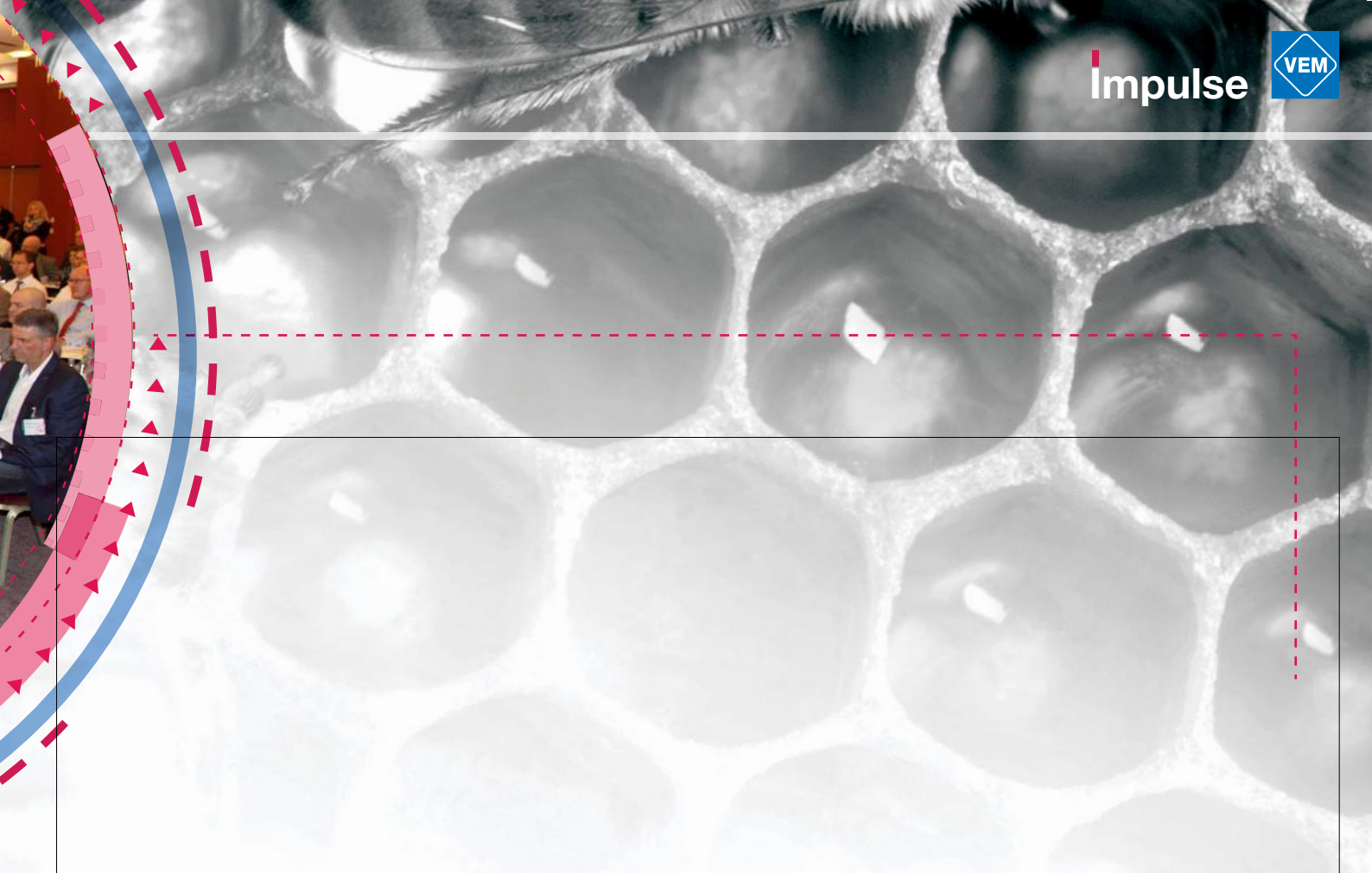
Big data are the gold nuggets of the future

The future-oriented banner unfurled above the 15th VEM Technical Conference on 18th and 19th October 2016 read “Industry 4.0 – What does that mean for electric drive technology”. Experts from 15 countries debated things to come.

New technologies exemplifying the concept of Industry 4.0 are set to revolutionise the world of drives and will open up new paths and opportunities for manufacturers and users alike. That was one conclusion drawn at the 15th Technical Conference of the VEM Group. A total of 223 participants from 15 countries accepted an invitation to join the electric motor manufacturer for the two-day event in Wernigerode. The town is one of three VEM manufacturing locations in Germany.

Presentations and discussions offered insights into likely scenarios for future drive systems. In this context, it is important to focus on data and their intelligent use, not only in product development,

but also with regard to production processes, as a means to generate added value for all concerned. “Big data are the gold nuggets of the future,” said Prof. Michael Schenk, director of the Fraunhofer Institute for Factory Operation and Automation IFF, in his presentation. Further speakers also emphasised how Industry 4.0 will bring more efficiency, new process chains, new products and new business models, but will at the same time pose challenges for companies. The experts are still divided as to whether the intelligence in future drive technologies will be built into the drive itself or shifted out to a control system or even a cloud. Michael Burghardt from the company Danfoss GmbH: “Between the two extremes, there will no doubt be solutions which take up and implement more or less of the various concepts. Industry 4.0 builds a bridge between technologies which are already available today and future innovations in drive technology.” In this respect, it was agreed that no-one is excluded and even smaller players have the chance to participate successfully.



One click brings it back to life!

With our collected impressions from two exciting days, we offer you the opportunity to re-live highlights of this year's conference in Wernigerode. The presentations and discussions focused attention on the future of drive technology. The evening social event on 18th October, by contrast, delved into a unique chapter of technical history with a visit to the Wernigerode Museum of Aviation and Technology.

Save the date

16th TECHNICAL CONFERENCE

10th and 11th October 2017 in Wernigerode



“It is not yet imperative to have Industry 4.0 in our portfolios, but we also cannot afford to ignore the subject, otherwise it will overrun us in two or three year’s time. For that reason, I believe it is important and good that VEM placed this topic on the agenda for the 15th Technical Conference.

Industry 4.0 doesn’t require us to re-invent the wheel, because there are already many points of contact which we can continue to use. One new aspect is the focus on data and data use. Motors and converters are already communicating today, and motors are already linked with a multitude of data such as drawings or mechanical, electronic and logistics data. The added value for companies lies in utilisation of the available data, intelligent data integration and the means to make relevant data available to our customers.”

Michael Burghardt

Danfoss GmbH



Udo Marmann

SEW-EURODRIVE



“In my opinion, Industry 4.0 means revolution in terms of processes – where that is meaningful – in conjunction with step by step product evolution to generate user benefit and added value. But we can only speak of Industry 4.0 if we consider both the process and product levels at the same time, otherwise we are still at 3.0.

Our goal at SEW-EURODRIVE is a fully decentralised factory in which individual manufacturing cells are networked, but nevertheless operate autonomously. There is still no catalogue from which such individual manufacturing modules can be selected and purchased, however. Each individual company – also in our branch – must analyse its manufacturing capacities and formulate objectives which match the demands expressed by customers: Do we want to offer variability or a standard range? And what does that mean for our processes? With Industry 4.0, we are definitely heading in a direction in which fully individualised products are no longer just wishful thinking.”

“For our company, there are two main aspects to Industry 4.0. Firstly, the integration of production technologies with manufacturing data exchanges for which a completely different communication framework applies. And secondly, the actual access to production processes where product data are acquired and made available. Motors will not be communicating directly, but through drive systems as means to an end in the technological process.

When we apply Industry 4.0 to acquire exact data on the utilisation of a specific system, the objective is not maximum, but rather optimum utilisation. At the same time, this will promote an energy-efficient design for the overall process.”

Stephan Schmidt

Siemens AG





*Prof.
Michael Schenk*

Fraunhofer IFF

“From the manufacturer perspective, Industry 4.0 poses an important question: What can we do with the acquired data? Mastering of the technologies is a necessary prerequisite, but still inadequate on its own. It is rather the case that such data are the gold nuggets of the future. We must turn data into information, and that in turn into knowledge about the customer, in order to remain in touch with his needs- The objective is thus not only the networking of machines and systems, but also the networking of companies with their whole environment.

The process industry is currently discussing the impact of Industry 4.0 and the potential benefits for customers with component manufacturers who are contributing to the engineering of individually tailored products. At Fraunhofer IFF, we are developing a strategy platform through which companies can be offered check-ups and corresponding support relating to the key topic areas of Industry 4.0.”

“This is the fourth time I have attended the VEM Technical Conference. And to be honest, I was not expecting such a fantastic event which attracts so many participants every year.

This is the perfect place to discuss Industry 4.0. Everyone seems to have their own understanding of the topic. It was my feeling that sensor manufacturers had occupied the arena and were conveying the impression that machine and motor manufacturers now had to add all manner of sensors to their products. We already have a multitude of sensors, however, and many measured values and data waiting to be used. Service lifetime data, for example, can be collected for purposes of preventive maintenance. Machine control systems already possess interfaces to the Internet. Ways and possibilities to use Industry 4.0, therefore, are already available.”

*Volker
Grabs*

Lenze SE

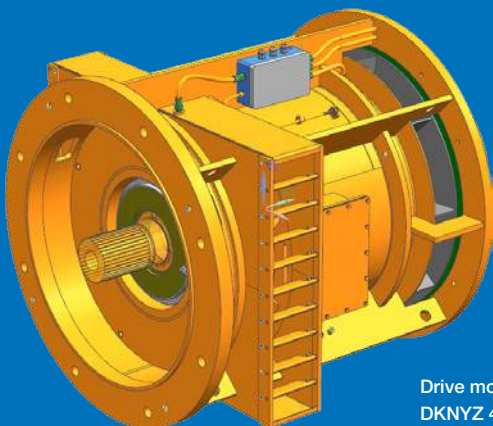


■ Research

VEM motor for a cosmic laboratory experiment

The DRESHDYN project at the Helmholtz Research Centre in Rossendorf near Dresden is gathering further momentum. This truly superlative experiment is being set up to simulate geo-dynamic processes which take place inside the Earth and other planets.

The heart of the experiment is a gyroscope driven by a VEM asynchronous motor. This motor is based on a technology which is otherwise used for railway applications. VEM received the order for the drive from the Dresden-based company SBS Bühnentechnik GmbH, the general contractor for installation of the experiment. The scientists hope to gain further insights into how the earth's magnetic field evolved in its liquid core. Precession here plays a decisive role, as can already be illustrated with the example of a spinning top toy. If the spinning top leans out of the vertical, the tilting moment causes the axis of rotation to wobble accordingly. The data required by the DRESHDYN experiment are to be supplied by a gyroscope arrangement in which the VEM drive enables eight tonnes of hot and flammable liquid sodium held in a 20-tonne container to be rotated at a speed of ten revolutions per second. The drive train itself can be tilted in a number of steps between 90 and 45 degrees relative to the vertical. At the same time, it rotates around its inclined axis at up to one revolution per second. That adds up to a gigantic machine when one considers the arising gyroscopic moment of around five million newton-metres which is acting on the standing points on the foundation via the steel frame.



Drive motor
DKNYZ 4514-8



Enrico Hoerstel, head of IT at VEM, with design engineer Thomas Willmann and Bachelor student Steffen Hendrysiak

■ Research

SAP strategy developed further

VEM and Harz University of Applied Sciences cooperate for a student project

Yet another facet has been added to the long-standing relationships which VEM cultivates with universities and research facilities. Business informatics students from the Harz University of Applied Sciences in Wernigerode have elaborated a long-term database strategy for the use of SAP within the VEM Group. Their project continues a close partnership between VEM motors GmbH in Wernigerode and the local university. In advance of their two-term practical internship at VEM, the students developed the necessary know-how through work on a model company. VEM was represented at the official presentation of the final report by Enrico Hoerstel, head of IT and himself a business informatics graduate from the Harz University of Applied Science, and Marco Macion, head of quality management at VEM's Dresden location.

Enrico Hoerstel praised the constructive cooperation with the students: "I joined them in lectures on several occasions and always received very competent answers to my questions. Their work will have a lasting influence on the VEM Group and includes important modules which will enable us to make correct and long-term system decisions." An important side-effect: Besides the technical know-how, the students gained a first-hand impression of future career life. And one of the participating students is now continuing the cooperation with VEM within the framework of his Bachelor dissertation.

■ AEO certification

Improved cooperation with international business partners

As a globally active company, VEM is always interested in further optimisation of the international supply chain. In this connection, another step has now been taken along the road to a successful future: The application for AEO certification submitted by VEM motors was approved in May 2016.

This certification grants the company a number of privileges. The AEO status is viewed as a guarantee of reliability by suppliers and partners. It simplifies customs procedures both within the EU and in third-party countries. Furthermore, goods and documents must not be inspected as frequently as otherwise, because responsibility is transferred to the company. Shipping delays are thus less likely and the cooperation with business partners is improved. Applicants must meet a long list of prerequisites before being granted AEO-F certification. Companies with

AEO status are thus considered to be especially reliable and trustworthy. In this sense, the status is effectively a quality seal in the international business world and promises competitive advantages. For the system to embrace the entire international supply chain from the manufacturer to the customer, it will be important for more countries to recognise the AEO status. Worldwide agreements are necessary to achieve global validity. Switzerland, Norway, Japan, China and the USA have already signed agreements, and negotiations are underway with further countries. By applying for certification, VEM motors has responded to the ever greater security demands placed on internationally active companies. Timely action was a necessary step forward and will facilitate the use of new distribution channels in the future.



AEO status promises VEM motors faster customs processing and is viewed as a seal of quality among business partners.



The VEM three-phase motor was manufactured in Wernigerode in the mid-20th century and is still in intact condition. It is today owned by the State Textile and Industry Museum in Augsburg.

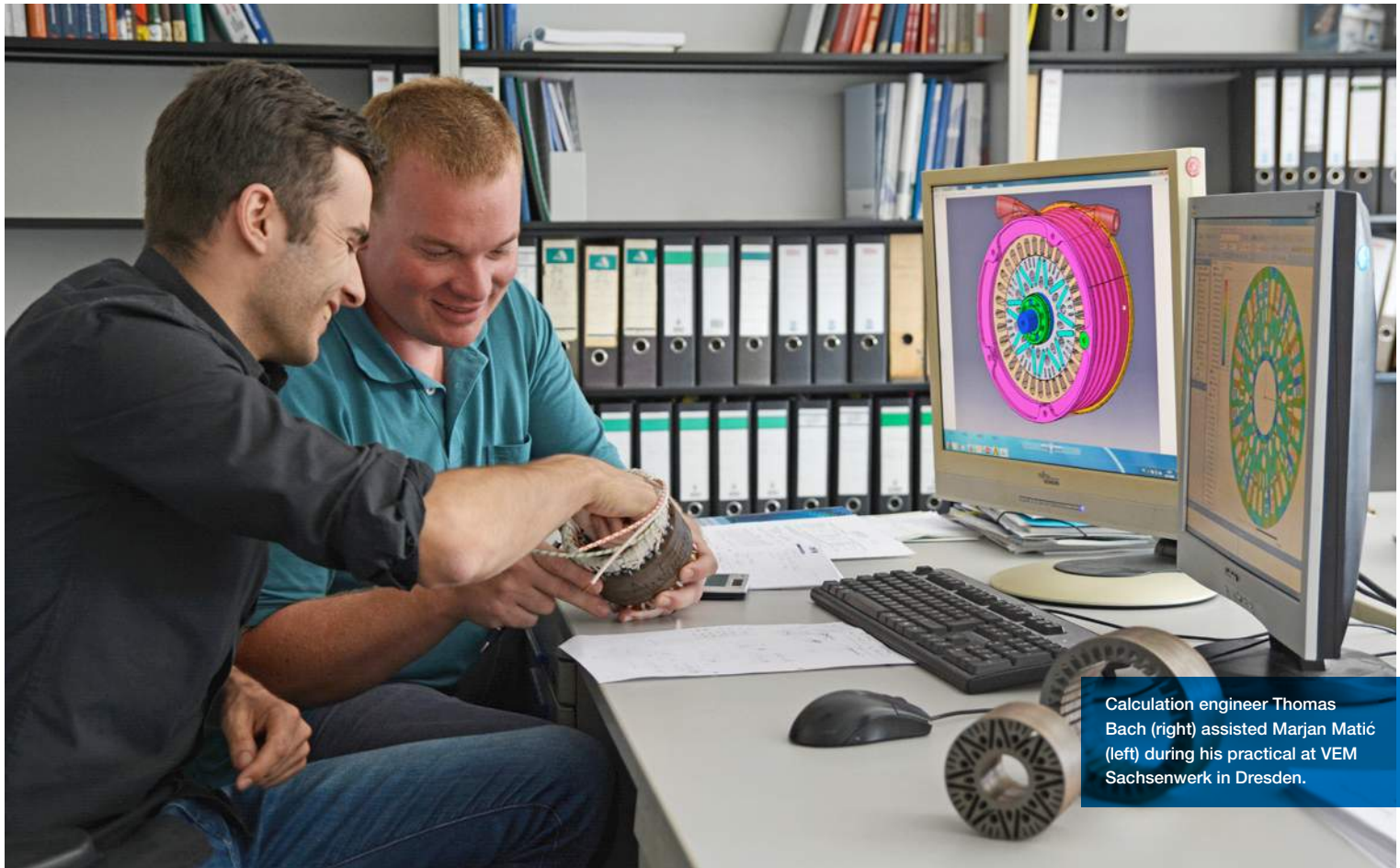
■ History

VEM motor still functional after many decades

The South German city of Augsburg is steeped in history and thus quite rightly a tourist magnet of the first rank. One of the many top attractions is the State Textile and Industry Museum (tim).

Visitors to the museum will also discover proof for the quality and long service life of VEM motors. Among the exhibits is a VEM motor of type KR 160 1/4. Back in the years of the GDR, it drove the first fully automatic spinning machine, a so-called self-actor. The machine and motor probably date from the mid 20th century and were still producing yarns for the

Saxon textile industry through into the early 1990s. The 10 kW three-phase motor was manufactured in Wernigerode and – unlike the rest of the self-actor – is still fully functional. The museum plans to restore the once 24 metre wide machine, so as to be able to demonstrate the functioning of a self-actor to its visitors. That is an enormous challenge for the museum staff, as the spinning machine comprises thousands of individual components and thus represents one of the most complex systems from the history of the textile industry.



Calculation engineer Thomas Bach (right) assisted Marjan Matic (left) during his practical at VEM Sachsenwerk in Dresden.

■ Innovation

Formula One for students

University teams worldwide are designing their own racing cars for participation in international sports events. For ELBFLO-RACE e. V., the student team of the Dresden University of Technology, VEM is an important practice partner.

It is actually a pity that the six-month practical has already come to an end. Electrical engineering student Marjan Matic (25) and his supervisor Thomas Bach were immediately unanimous on that. The central outcome of Matic's Diplom dissertation project is the parameter set for a very special electric motor. This is the motor which, in 2017, will be fitted to a racing car designed and built themselves by a group of

students. The members of the ELBFLO-RACE team at Dresden University of Technology hope that this car will also carry them to victory on the international race circuits in competition with student teams from other countries. A new car every year – that is the challenge for the team, which only students are allowed to join. In 2016, they also decided to build the electric motor themselves for the first time.

Support from VEM

Marjan Matic knows VEM's Dresden location from an excursion to Sachsenwerk with his university's Institute of Electrical Power Engineering. During that visit, the students also met the head of the department for

electromagnetic calculation, Jens Proske. "When I first called him in search of a practice partner for our electric motor, I had gathered a whole list of arguments which I hoped would secure the support of VEM, even though Sachsenwerk is otherwise concerned with much larger machines," Marjan Matic recalls. "But then it all turned out to be very easy, because Jens Proske was so uncomplicated and immediately promised to help us." Calculation engineer Thomas Bach was assigned to assist Marjan Matic where necessary. A task which he gladly accepted. "It was interesting to gain insights into areas which are not usually part of my job," he says. Thomas Bach was at the same time the interface to the calculation and technology offices

and to the production department. The stator and windings, after all, were manufactured at VEM motors Thurm in Zwickau. Laser machining of the rotor was handled by the Fraunhofer Institute for Material and Beam Technology in Dresden, and a hall for assembly of the car has been provided by the Dresden Institute of Automobile Engineering. When the car is rolled out for its baptism of fire next year, it will be driven by four permanent magnet motors with water jacket cooling. Each wheel possesses a separate drive, which is connected to the wheel hub via a special planetary gearbox. "With this motor and the cooperation with the aforementioned partners and sponsors, we have ventured an innovation which will hopefully become proven practice in the coming years. VEM is keeping its fingers crossed!"



An ELBFLORENCE racing car on the testing ground

■ Info

ELBFLORENCE e.V.

- The team was founded at Dresden University of Technology in 2006 to participate in the international design competition of the Formula Student Electric.
- ELBFLORENCE currently counts 70 student members from various university departments, including mechanical engineering, mechatronics and electrical engineering.
- Worldwide, there are more than 400 student teams competing against each other with self-designed and purely electric-driven racing cars.
- Racing events take place on famous circuits in England, Australia and the USA, as well as on the Hockenheimring in Germany.

■ Energy efficiency

New IE3 regulations from 2017 – VEM offers customers an extensive portfolio

With effect from the start of 2017, manufacturers will only be permitted to supply 2-, 4- or 6-pole motors for outputs between 0.75 and 375 kW if they meet the specifications for IE3 classification. That follows from implementation of the third and final stage of the corresponding EU directive on ecodesign requirements. The goal is to reduce environmental impacts and energy consumption in industry.

With wise foresight, VEM already aligned its product portfolio to the demands of IE3 in 2015. Customers can already purchase energy-saving

motors in IE3 versions for the whole range of outputs from 0.12 to 710 kW, even though the regulations do not apply to all these motor variants yet. The VEM approach is to be prepared in good time for future tightening of the EU regulations. IE3 motors are also available in 8-pole versions. An energy savings calculator on the VEM website enables customers to find out exactly what the conversion to IE3 motors will cost, and which beneficial effects can be expected.

The energy savings calculator can be found [here](#).





Charlotte Zschuppe (21), future teacher and specialist for metal engineering, during her one-year practical training at VEM in Dresden

■ Training

Studies and training rolled into one

Charlotte Zschuppe's start in the VEM training workshop in Dresden was something of a premiere. Her one-year practical at the VEM location in Dresden began this autumn. The goal is actually to become a vocational school teacher, but for the time being she is both student and vocational trainee – thanks to the dual study programme “Cooperative studies in technical teacher training” (KAtLA) at the Dresden University of Technology. VEM Sachsenwerk is a supporter of the new study model, and Charlotte Zschuppe is the first student to receive corresponding vocational training in metal engineering. This is quite an unusual career combination and can also be seen as a quirk of fate for Charlotte Zschuppe. While still at school, she followed various paths to identify a suitable career. “I completed some Internet tests and the results pointed to mechanical engineering, even though that was not one

of my original ideas,” she says. “But the more I looked into the subject, the more exciting I found it.” Teacher training, on the other hand, had always been an option. And Charlotte Zschuppe also wanted to put the English skills acquired during a year abroad to professional use.

Perfect career choice

During a career advice meeting, she then received a personally tailored suggestion. The dual study programme KAtLA united all three interests. As a vocational school teacher, after all, she will also be able to teach English. Charlotte Zschuppe will now be spending a whole year at VEM before taking her practical and theoretical examinations. The technical knowledge which she must acquire in this time is no different to that expected of other trainees. In this respect, she is experiencing vocational training from the

same perspective as the young people she will one day be teaching at vocational school. A further benefit is that the technical training can be integrated into her studies. That saves time, because the usual two-year training to become a “skilled worker for metal engineering” can be condensed into just one year. The close meshing of theory and practice achieves interesting synergy effects. At the end of their course, KAtLA students possess two qualifications: A state examination and a vocational training certificate. The VEM location in Dresden maintains close contact with the local vocational schools and views the new study model as a possibility to strengthen and improve corresponding teacher training in Saxony. The instructors look forward to welcoming further KAtLA students in the future, and would be especially pleased to see more girls among their number.

Publisher

VEM Holding GmbH
Pirnaer Landstraße 176, 01257 Dresden
Tel.: +49 351 208-0
Fax: +49 351 208-1028
www.vem-group.com

Responsible editor

Managing director
Falk Lehmann, Dr. Torsten Kuntze

Layout and design

Kommunikation Schnell GmbH, Dresden
Photos: ELBFLORENCE e. V., Steffi
Ehrentraut, Sabine Hartenstein, iStock/
Valengilda, Bernd Schneider

Subscribe/unsubscribe

To automatically receive each new issue of “Impulse online” by e-mail, please subscribe [here](#). If you no longer wish to receive the newsletter, you can cancel your subscription [here](#).