KD Info

1st Edition 2016

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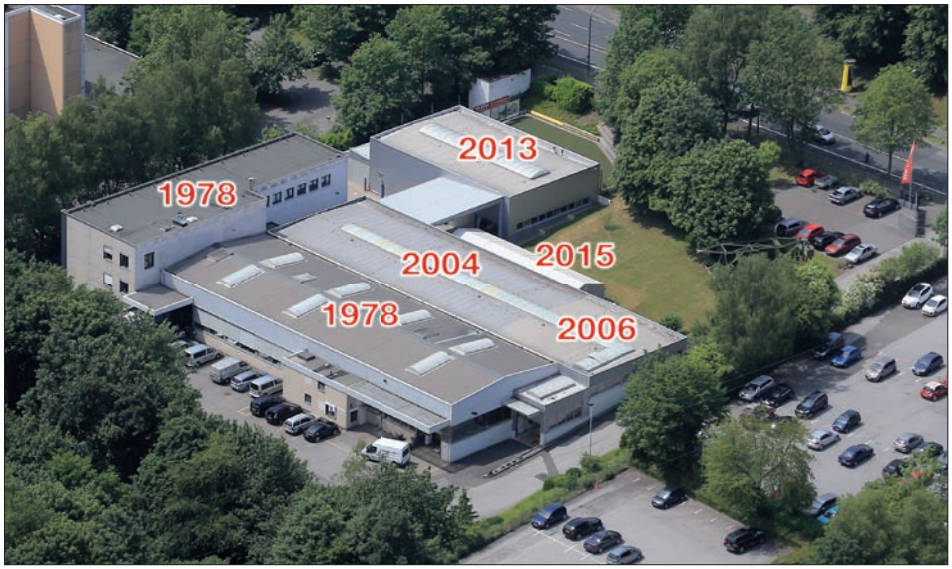
KARL DEUTSCH's Record Year!

The year 2015 was a special one for the KARL DEUTSCH company. The turnover reached an all-time high. The portable ultrasonic flaw detectors ECHOGRAPH 1095 and GEKKO were successfully introduced into the market. All systems departments were well booked and a provisional assembly hall had to be erected quickly near Works 2 in the beginning of 2015. Especially, the new product line for penetrant testing systems needed a lot of space. The top view of our Works 2 nicely shows the positive development of the systems departments.



Works 2: Successful growth of testing system business during recent years

For ultrasonic testing systems, it was again the year of the pipeline tubes. Three spiral pipe mills have received a total of eight testing systems from KARL DEUTSCH for the inspection of strips and welds. Technically almost similar, the systems for PROCARSA in Mexico are explained in more detail in this KD-Info edition. Also the railway sector was important in 2015. The Turkish company KARDEMIR has received one ECHOGRAPH-TTPS ultrasonic phased array system and one DEUTROMAT magnetic particle testing system for new railway wheels. For the department of magnetic particle testing systems also a record turnover was achieved.

We would like to thank all customers from 2015 and are very grateful for the fantastic year. We warmly invite you all to the upcoming trade shows in 2016. In April 2016, the Tube fair takes place in Duesseldorf, Germany. Shortly after, the CONTROL show presents a good overview for quality testing equipment in Stuttgart, Germany. The highlight of the

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KARL DEUTSCH

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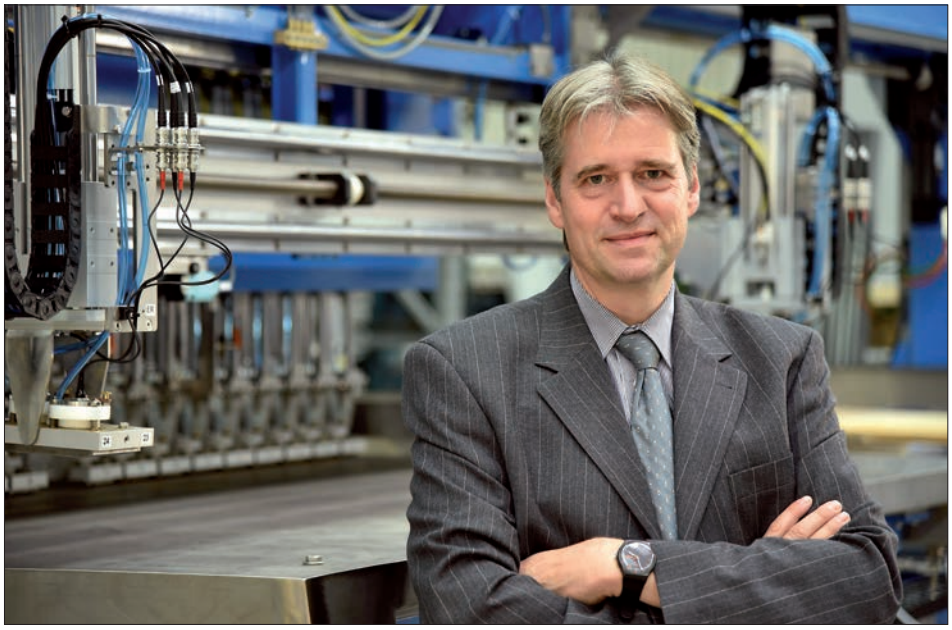
year will be the WCNDT in June 2016, where KARL DEUTSCH will be present as sponsor, exhibitor and lecturer. We will have a nice booth and hope to welcome many international NDT experts in Munich, Germany.

Yours Dr. Wolfram Deutsch



Dr. Wolfram Deutsch was pleased with the year 2015

ECHOGRAPH Systems: Ultrasonic Testing of Spiral Pipes (HSAW)

Tuberias Procarsa is a leading producer of carbon steel line pipes in Latin America. It is a 100 % Mexican company with private capital, and commenced production in 1963. It currently has a presence in more than 15 countries around the world, and its exports account for approximately 90 % of the annual production.

The pipe production plant is located in Monclova (near Monterrey). In 2014, a new spiral pipe mill was ordered from the German Schuler Group in order to increase the annual production capacity by 220,000 tons. The entire mill is 450 m long and uses an offline concept with a tack welding stand and a final welding stand using the submerged arc method. The pipe diameters range from 508 mm to 2134 mm (20-84”), the pipe lengths vary from 12 m to 24.4 m and the wall thickness can reach 25.4 mm.

ECHOGRAPH-BAPS strip testing system with 41 probes which are currently moved into the calibration position

KARL DEUTSCH received the order for three ECHOGRAPH ultrasonic testing systems which are of major importance since the pipes are later used for oil and gas extraction. The input material (coil-wound steel strip) is checked for laminar defects before the welding process and the weld quality is tested on the finished pipe.

An ECHOGRAPH-BAPS testing system is used for the inspection of the steel strip. The strip width ranges from 1000 mm to 2050 mm. The testing system is positioned just before the tack welding stand and is operated in a continuous mode, i.e. the coil is unwound and fed into the strip tester. In order to achieve full ultrasonic coverage, up to 41 probes with a test track of 50 mm are employed. In case of narrow strips, a smaller number of probes becomes active.

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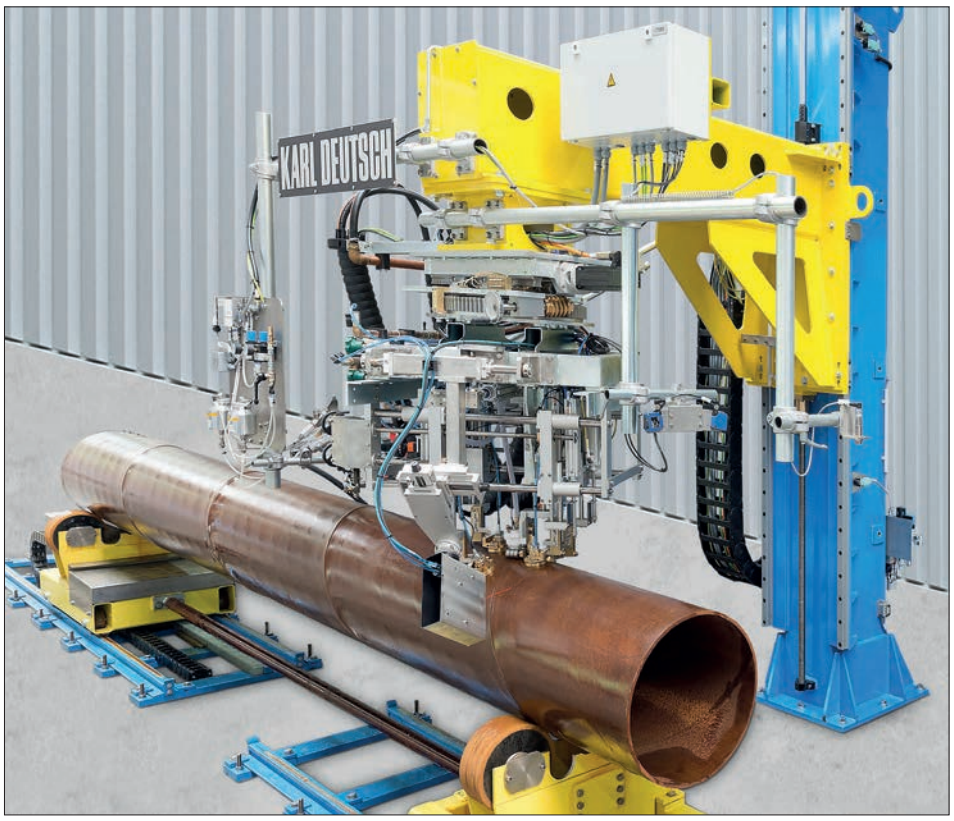
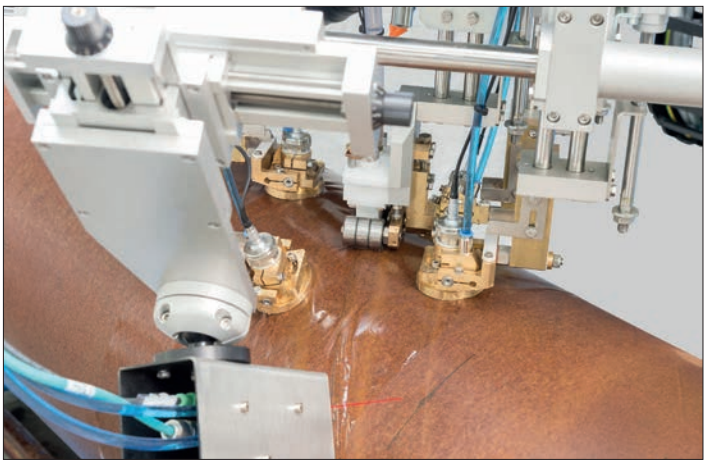
Since the strip edges later become crucial during the welding process, two specially designed probe holders with steel roller guidance along the strip edge are provided. The testing speed of 10 m/min is in accordance with the typical welding speed. The waviness of the steel coil is reduced by massive steel rollers, forcing the strip into the perfect test position. A ¼" flat bottom hole (FBH) is the defect size to be detected in accordance with the API 5L specification. For a convenient calibration, all probe holders can be moved into the service position where a strip segment with artificial defects is mounted. The strip segment can be linearly moved with respect to all probes and therefore a dynamic check and automatic calibration of the test sensitivity can be carried out. The test result can be stored as an amplitude strip chart or as a live C-scan (scrolling top view image of moving strip).



ECHOGRAPH-SNUS weld testing system before shipment in KARL DEUTSCH workshop

After tack and final welding, the welding quality is monitored with ultrasound. This is usually done in two steps. A first ultrasonic inspection is carried out before the pipe is hydrotested. This test provides useful information about the production process and detected defects can still be repaired. A second and final ultrasonic test documents the output of a flawless pipe. Both ECHOGRAPH-SNUS weld testing systems use six ultrasonic probes, four probes for the detection of longitudinal defects and two on-bead probes for the detection of transverse defects. Again, the testing speed is typically 10 m/min. The calibration defects are notches with a depth which corresponds to 5% of the pipe wall thickness. Alternatively, a through-drilled hole with a diameter of 1.6 mm can be used. The probe positions are constantly readjusted by means of a laser seam tracker using the triangulation method. The seam tracker software also includes a live image of the control camera which is available on the PC screen of the master PC. Therefore, the operator is always informed about the proper functioning of the machine.



ECHOGRAPH-SNUS probe holders and laser seam tracker

Mr. Gustavo Gunter, technical director of the pipe mill, was pleased that the shipment took place in 2015 in accordance with the contract schedule. Onsite erection of the testing systems will take place this year. **WD**

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ECHOGRAPH Systems: Rotational Bar Testing Concepts

There are many different ways to inspect metal bars. Smaller diameters up to 100 mm are often tested with a linear conveyor and high test speeds between 1 m/s and 2 m/s. The probe arrangement around the bar can provide partial or full coverage, depending on the requirements and the respective price of the testing system. Solutions using only three mono-element probes and a gapless phased array probe ring for full coverage are practical solutions. All these solutions should be carefully evaluated with respect to their shot distance in transportation and circumferential direction. Shot distance, bar diameter and material properties then lead to the minimum detectable flaw size.

In general, three test angles are provided: Straight-beam testing for core flaw detection and angle-beam testing in both circumferential directions for surface flaw detection.

These days, the requirements concerning the minimum defect size become more and more stringent. Flat bottom holes with diameters between 0.7 mm and 1.2 mm are often specified. In general, the flaw size which can be detected in static mode (calibration bar in test system is not axially moved) is smaller than flaws which are detected in dynamic mode with full test speed.

Rotational testing concepts are slower concerning the achievable throughput. On the other hand, they provide the advantage of full volumetric coverage with a flexible shot distance in both directions in accordance with helical feed and rotational speed. Also, these concepts provide efficient solutions for larger bar diameters using a reasonable number of probes or test channels. This article compares three testing concepts which were lately realized.

The highest sensitivity is often achieved in full immersion. The following example shows an immersion tank for typical bar diameters between 40 mm and 100 mm. The machine inspects aluminium bars for automotive industries with three straight-beam probes and six angle-beam probes. An efficient loading and unloading concept was provided by the customer to achieve the highest possible throughput.

ECHOGRAPH-TTPS immersion tank for aluminium bar testing

The next example is a solution for bar diameters between 60 mm and 160 mm. The mechanics resembles to an immersion tank but the stainless steel tub just collects the excessive coupling water. Roller units are mounted at the base of the tub providing a smooth bar rotation. The probe holders are moved pneumatically between safety and test position. Normally eight straight-beam and 16 circumferential angle-beam probes are used. Some customers from the oil and gas industries also require transverse defect detection and therefore, a second probe holder with five test angles was provided for this test task. All probes are coupled via a column of water (squirter technique). The total length of the testing system was 17.5 m and a maximum bar length of 12.5 m can be handled. The height of the test mechanics was kept as low as possible in order to ease bar loading and unloading. Only the yellow support of the probe holders is above the bar to be tested. Collisions with other steel mill equipment (cranes, loading devices) are therefore avoided.

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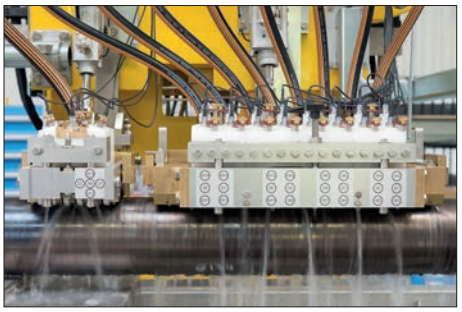
ECHOGRAPH-RPTS rotational bar testing system

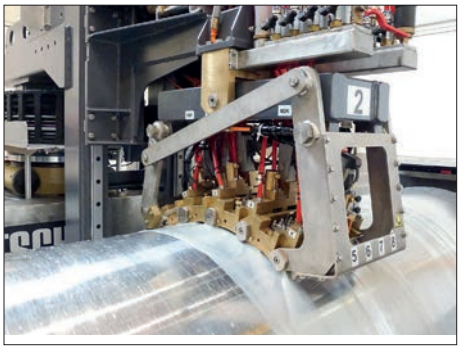
The third testing concept is using either a test portal or a test bridge. Normally this concept is useful for larger bar diameters. In this case water gap coupling was specified by the customer.

This facilitates the operation of dual-element probes for checking for surface flaws with a very small dead zone. Since the width of the water gap should always be perfect for all bar diameters, special attention was paid on the probe holder mechanics. A motorized gap adjustment or highly flexible cardanic probe skids can solve this problem. Also an important goal is to reduce the change-over times to a minimum. **WD**



ECHOGRAPH-RPTS with two probes holders carrying a total of 21 ultrasonic probes

ECHOGRAPH-RPTS bar testing portal with gap coupling for bar diameters of up to 1 m



ECHOGRAPH-RPTS probe holders with gap coupling

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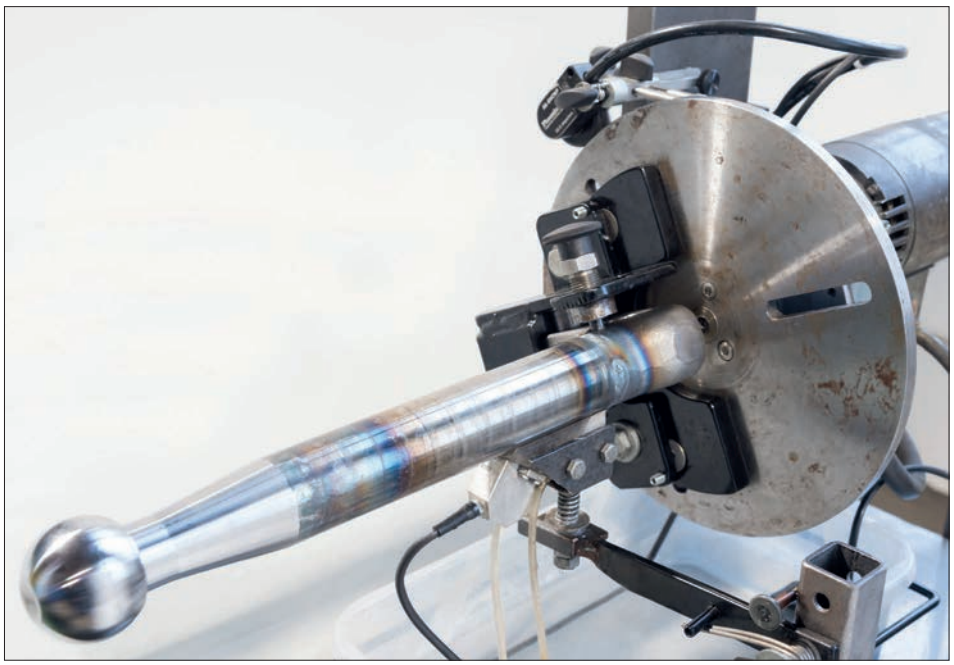
Portable Phased Array Flaw Detector GEKKO: Reliably Towed

For some 40 years now the company MVG-Metallverarbeitungsgesellschaft mbH in Eschweiler near Aachen has been successfully developing and manufacturing tow-bars and electrical kits for passenger cars, commercial and off-road vehicles.

With a special detachable type of tow-bar a straight ball rod is welded to a locking end. The ball rod is later bent and serves the connection to the trailer side. The whole tow-bar then is mounted to the towing vehicle with the locking end. Thus, the welded seam between both components has to take all stresses and strains, highest demands on quality are applied to the welded seam, also including inspection with ultrasound.



Test mechanics of MVG for inspection of welds on tow-bars. The PA probe is pushed from below to the ball rod using a simple spring construction. Coupling water is supplied by a small pump through two small hoses. On top of the rotary disc the wheel encoder for recording the rotation of the rod is visible.

During the development of a corresponding inspection system the following criteria had to be considered:

- 100 % coverage of the whole weld
- Mechanised inspection process
- Simple handling of mechanics and electronics
- 100 % documentation facility

GEKKO and inspection mechanics for testing of tow-bars

First trials with mono-element transducers and insonification under flat angles had not been successful. Due to the welding process, a small area in the centre of the welded seam remains unmelted and delivers signals from the weld area independent of the weld quality. A differentiation between these process-related signals and real defect indications was not possible.

Subsequently to these trials, phased array technique was applied. Using a sector scan the welded seam could be covered completely and due to the visualisation capabilities the unmelted zone could be identified reliably. However, inspection with a sector scan requires an offset of the probe to the weld, and as the tow-bars are produced with different lengths of ball rods this causes coupling problems with very short rods.

Finally the so-called TFM technique (Total Focusing Method) turned out to be the ideal solution. The portable phased array flaw detector GEKKO of KARL DEUTSCH performs TFM in real time and is moreover able to provide TFM as a time or position encoded C-scan. TFM provides the positions of the reflectors and also provides the highest sensitivity in all areas of a defined test volume. This test volume was chosen as close as possible to the probe and thus the problem of probe offsets to the weld is solved. A KARL DEUTSCH phased array probe with 32 elements and an inspection frequency of 5 MHz was applied in conjunc-

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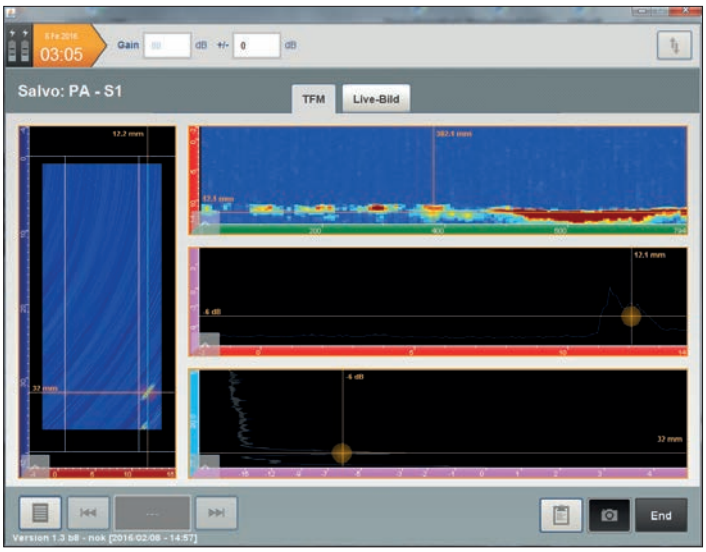
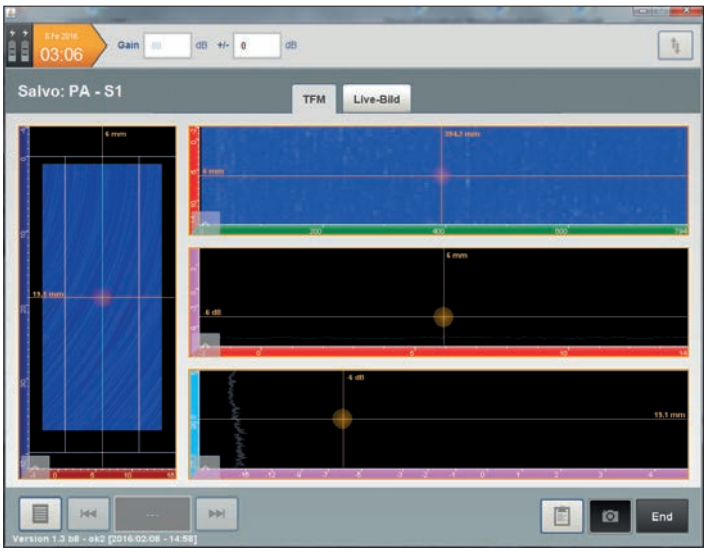


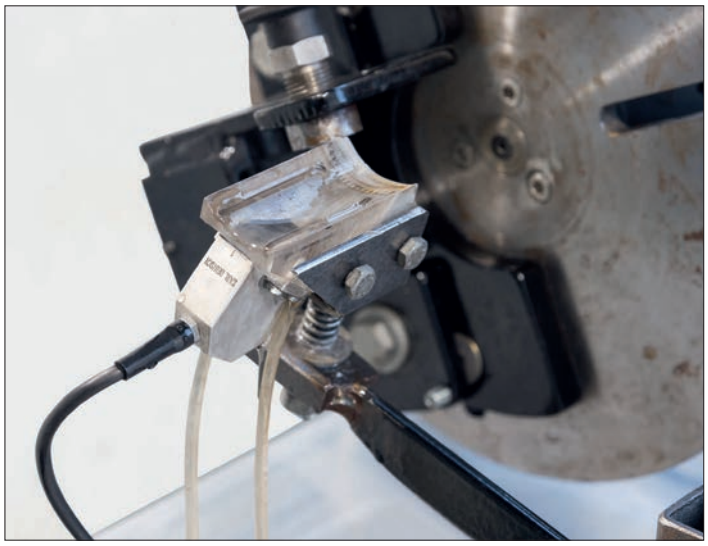
Weld with flaw indication. Top: Inspection track as 360 degrees C-scan. Left: TFM cross section, determined by cursor position in C-scan. Middle: horizontal echodynamics. Bottom: vertical echodynamics.



Weld without indication

tion with a 55 degree wedge, which had been adapted to the rod diameter of 40 mm. The probe is integrated into an inspection mechanics developed and constructed by MVG itself. A spring pushes the probe from below against the rod, while a continuous water flow ensures a constant coupling.

During the test procedure the inspector inserts the tow-bar into a bracket while the probe gets coupled automatically. As a next step the scan mode on the GEKKO is activated and starts as soon as the ball rod is brought to rotation by pressing a foot switch. The rotation of the rod is recorded via a wheel encoder that gives a stop signal to the data acquisition as soon as one complete rotation is done. This process of data acquisition takes about 10 seconds, additionally to the handling of the tow-bar. After completion of the inspection the inspector obtains a complete inspection track on the GEKKO screen as a C-scan (360 degrees) and has to decide now, whether the results shall be stored in the instrument. The analysis mode of the GEKKO afterwards allows to move a cursor within the C-scan view in order to visualize and interpret the corresponding cross sectional views of the TFM scan. Additionally the so-called VIEWER software allows the same to be done on an external computer later on. The VIEWER comes free of charge with the GEKKO.



Detailed view of the probe with surface adapted wedge and couplant supply

Now, with the GEKKO and the self-made test mechanics the company MVG has gained a simple to use ultrasonic testing system whose findings are easy to evaluate. For further questions on the instrument or the used TFM technique please contact our specialist Mr Stefan Kierspel (mobile: +49 170 228 8084 or via e-mail: kierspel@karldeutsch.de). **Ki**

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GEKKO Flaw Detectors for DGZfP-Training

As phased array technique is penetrating current practice of ultrasonic inspection more and more, there is an increasing demand for qualified education of inspection personnel.

The educational centre of the German Society for Non-destructive Testing (DGZfP) in Dortmund offers special phased array training courses for some years now. In order to expand the equipment pool for those trainings, in October 2015 three portable phased array instruments of KARL DEUTSCH had been purchased, which are now an integral part of the education program. **Ki**

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Mr Gerhard Stremmer (left), director of the DGZFP educational centre in Dortmund and 3 students practising the inspection of welds with the new GEKKO instruments

ECHOGRAPH 1095: Beyond the A-Scan

Imaging techniques are a special feature of phased array flaw detectors, like the GEKKO, while line charts are rather found with testing systems. Now, the classical ultrasonic testing instrument ECHOGRAPH 1095 offers the possibility to record line charts, B-scans and to perform TOFD inspections by connecting an encoder.

Traditionally, ultrasonic testing is performed by recording an A-scan, showing the echo amplitude as a function of the sound path travel time. The result strongly depends on the inspector's qualification and skills. Geometry indications could be misinterpreted as flaws and a brief moment of inattentiveness is enough for an indication to slip through. Here the B-Scan can help, especially with difficult inspections. Therefore an encoder is connected to the probe, see figure 1.

Elegant solutions are, for example, hand scanners with roller probes. With the encoder, the ECHOGRAPH 1095 is able to assign an A-scan to the respective position in the test volume. While moving the probe linearly, an A-scan is recorded

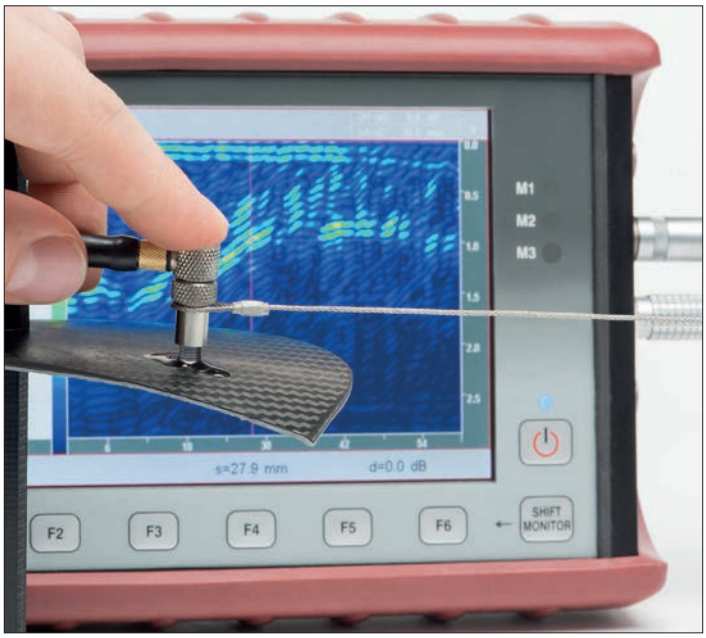

Figure 1: ECHOGRPAH 1095 with encoder at the inspection of a carbon-fibre reinforced composite.

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for each position and plotted in the B-scan against the scan path. Thereby, the A-scan is colour-coded, this means large echo amplitudes are coloured red, while small amplitudes are marked in dark blue, see figure 2.

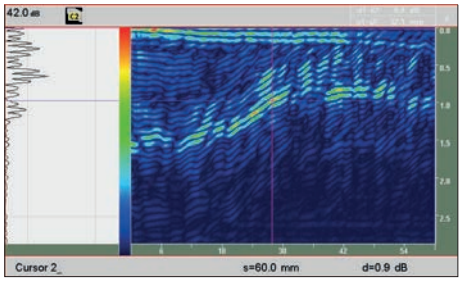

Figure 2: B-Scan of a coated carbon-fibre reinforced composite

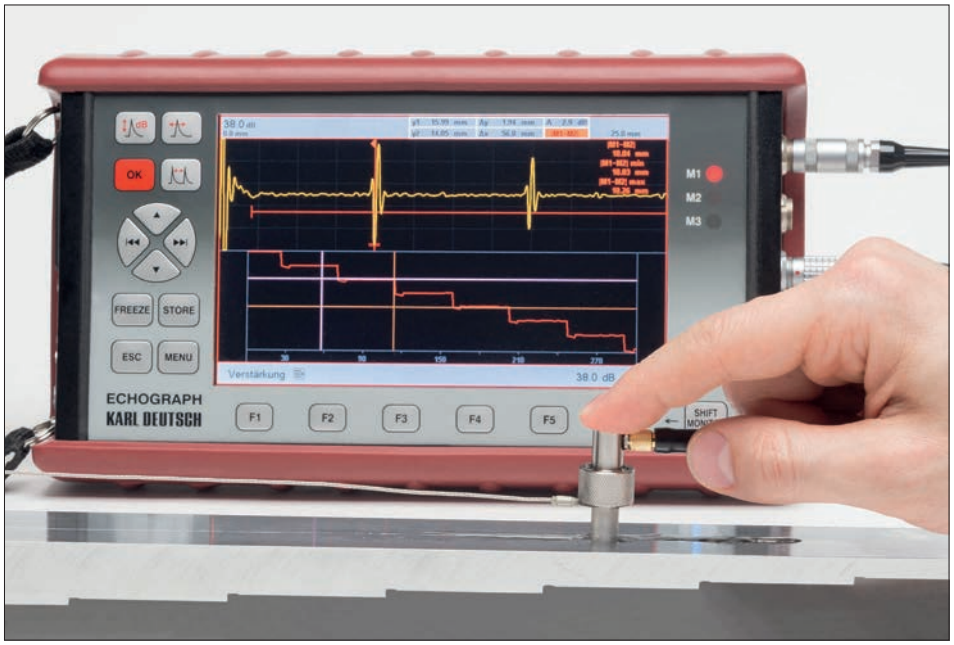

Figure 3: ECHOGRAPH 1095 with data logger and line chart

In addition to the determination of amplitude and depth of an indication, as in the A-scan, the B-scan offers the possibility to laterally size an indication. Since the dynamic of an echo along the scan path can be evaluated in the B-scan, the interpretation of a B-scan is also much easier than that of an A-scan. Additionally, the B-scan is suited for a clear documentation of the inspection.

In case of weld testing with an angle probe the half-width for lack of fusions and shrink-holes can be sized exactly. Another example would be the capturing of the half-width of a lamination during sheet metal testing with a straight-beam probe.

Often the dynamic of a measured value is interesting, e.g. wall thickness, echo amplitude, sound path or velocity. With an encoder and the new data logger, the ECHOGRAPH 1095 is able to record the dynamic and displays it in a line chart for further analysis, see figure 3.

For weld inspection with the Time-of-Flight (TOFD) technique, also B-scans are recorded. The TOFD technique uses two broadband angle probes, which emit very short and divergent ultrasonic pulses. One of which acts as a transmitter, while the other is the receiver. Since both probes have to be moved in parallel and synchronously, they have to be fixed in a scanner comprising an encoder, see figure 4.

The ultrasonic pulse travels on various paths from the transmitter to the receiver. The lateral wave travels the shortest path along the surface, while the longest path is a V-reflection from the back wall.

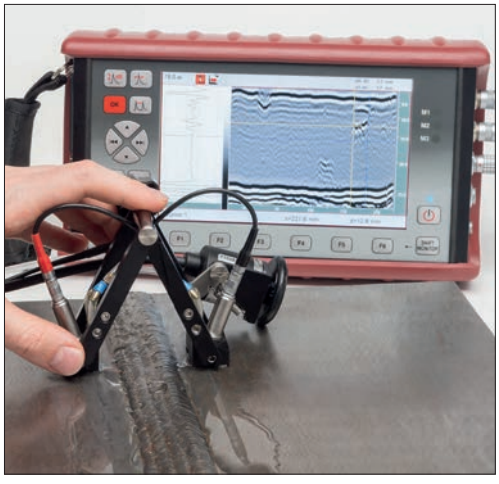

Figure 4: TOFD scanner with encoder

Discontinuities between surface and back wall create additional signals through diffraction at the crack tips.

The TOFD test results are provided in a grey scaled B-scan, formed from A-scans between lateral wave and back wall reflection. From the diffraction signals in the TOFD scan the depth, extent and length of indications can be determined with high precision. **Ra**

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ECHOMETER 1077: Probe Selection and Application

A large variety of broadband transducers is available for the high precision wall thickness gauge ECHOMETER 1077 from which the right one has to be chosen for the given task. Standard tasks, like testing the wall thickness of thin carbon or stainless steel panels from 0.25 mm to 10 mm can be handled precisely with the transducer DS 6 PB 4-14 MHz. Larger wall thicknesses between 1 mm and 25 mm are treated with the transducer S 12 PB 1-7 MHz. But even difficult testing problems are solved easily by the ECHOMETER 1077. The following three application examples demonstrate the flexibility of the ECHOMETER 1077.

Figure 1: The A-Scan ECHOMETER 1077 with challenging material samples: A) Tube with a severely corroded inside wall and pitting, B) Stainless steel bellow with a thin wall, C) Sound attenuating plastics with large wall thickness

Thin walled: The bellow, showed in figure 1B on the right, is made of 250 µm thick stainless steel. For this task a high frequency transducer with large bandwidth and delay line is needed. Using a transducer with a delay line minimizes the dead zone due to saturation effects. Then, the very short echoes of the back wall echo series (**BE-BE-Mode**) can be evaluated to determine the wall thickness. In this mode, it makes no difference if the test piece is coated or not. For testing the wall thickness of the bellow mentioned above, the transducer

Figure 2: A-scan view for a thin metal sheet

SDS 3 PB 6-16 MHz was used. Figure 2 shows the corresponding A-scan. It has an element diameter of 3 mm and enables the testing of wall thicknesses down to 150 µm in steel. Due to its small diameter, this transducer is especially well suited for small contact areas.

Thick and attenuating: The test piece C in figure 1 is just the opposite. The component is made of a plastic with a high ultrasound attenuation and a significant wall thickness. For this task one chooses a low-frequency contact transducer, like the **DS 12 HB 0.3-3 MHz**, with an element diameter of 12 mm. Combined with the low-frequency version of the ECHOMETER 1077 it is even possible to observe a series of back wall echoes from this component, as shown in figure 3.

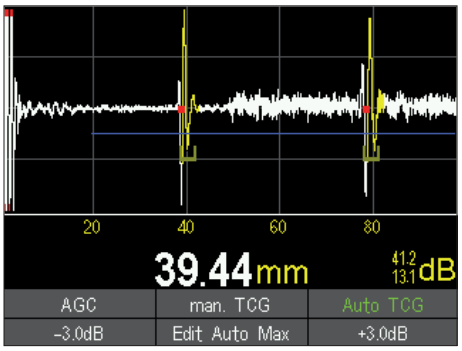

Figure 3: A-scan view for a material with high ultrasound attenuation

Severely corroded: Pipes with severe corrosion and pitting on the inner surface (A in figure 1) are a particular challenge. In this case, it is difficult to get a back wall echo at all, since the inner surface is rough and the pittings don't provide a flat back wall. Typically TR-transducers are used for this application. They comprise two acoustically separated elements, one of which acts as a transmitter, while the other acts as a receiver, giving the transducer its name: **T**ransmitter - **R**eceiver transducer. Both

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are mounted on a roof-shaped delay line, creating a very sensitive region close to the surface of the test piece, depending on the roof angle. The sound beam from these transducers does not enter the material perpendicularly anymore, but at a small angle.

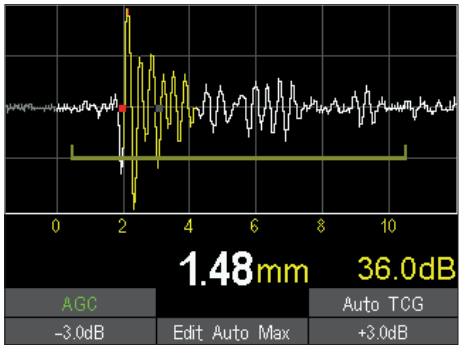

Figure 4: A-scan for a severely corroded pipe with a TR-transducer

This causes incorrect results for the measurement, which can easily be corrected by a simple multi-point calibration of the ECHOMETER 1077. Afterwards, with a TR-probe like the **DSE 4.2/4 PB 10 MHz**, it is possible to get an echo in the A-scan with the correct wall thickness, see figure 4.

The staff from our application lab is glad to support customers being uncertain, which transducer is the right one for their application, by consultation or trials. This service is of course free of charge. **Ra**

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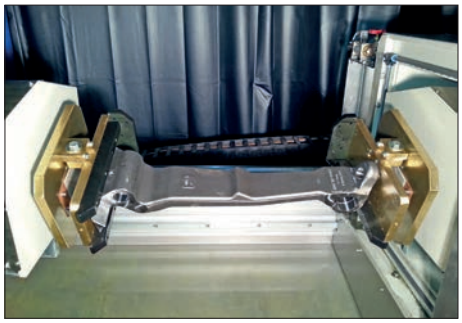
DEUTROMAT: Inspection of Cable Car Components

The LEITNER AG company based in Sterzing (South Tyrol – Italy) is one of the leading providers of ropeway systems worldwide. For the quality assurance of safety relevant components a new magnetic particle test bench was required.

A large variety of components with sometimes complex shape was specified in the duty book. The maximum clamping length was 1500 mm and the maximum component weight was specified to 100 kg. The ECOMAG company, which is the KARL DEUTSCH subsidiary in Milano, Italy, received the enquiry and managed to get the order.



Test part in the rotating device

Short components are tested similarly to a standard 2-contact bench using direct current magnetization for the longitudinal defect detection and two magnetization coils for transverse defect detection. Pieces exceeding a length of 900 mm need to be tested with a moving coil – so two magnetization concepts were realized in the same machine.

DEUTROMAT for the inspection of LEITNER cable car components

Also, it was a requirement of the customer to possibly turn the clamped test piece even in case of difficult geometries. Only this feature allows convenient viewing conditions for the entire test piece surface.

This feature presented a challenge for the mechanical design of the machine. The ECOMAG company provided important input to solve this problem. At the end of 2015, the test machine was successfully put into operation and now works to the full satisfaction of Mr Matteo Del Negro, head of the LEITNER Quality Department. **WD**

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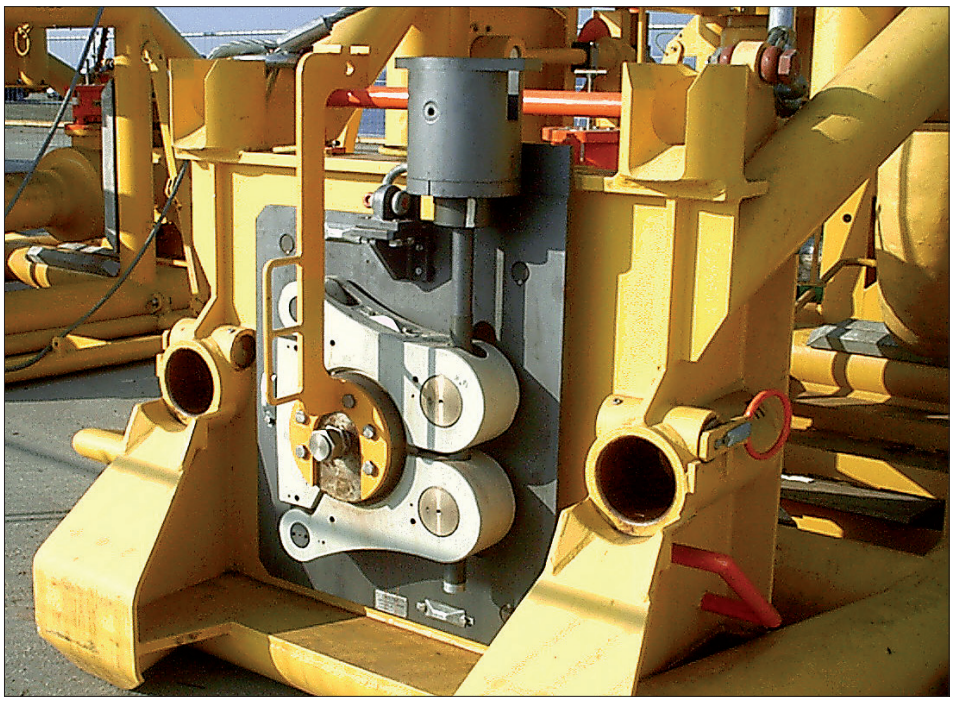
DEUTROFLUX UWS 1500: Crack Detection for Offshore Flanges

DESTEC ENGINEERING Ltd. is located in Washingborough on the outskirts of Lincoln in the East-Midlands, Great Britain. The company, which was formed in 1969 by the current managing director and owner Barry Porter has remained a Private Limited Company ever since. Build on a strong engineering background they have been manufacturing high-pressure containment equipment and portable machine tools for more than 45 years. With its worldwide references, the company has developed a reputation for manufacturing high-quality robust products for the oil, chemical and marine industries.



Picture 2: Pipeline clamp in mounted condition

Since the principal clients are within the oil, chemical and petrochemical related industries, the power generation and marine, DESTEC is obliged to fulfil the highest quality standards. Full traceability of all materials and conforming with existing standards are ensured by a system operated by a team of dedicated personnel, backed up by the very latest in high-tech equipment. Notably the huge GSB Single Bolt subsea connectors for oil pipelines, for example in the North Sea, has to meet highest quality standards.

Picture 1: Pipeline clamp manufactured by the DESTEC

To enhance the existing capacity for future pipeline clamp sets for bigger diameter pipes of 24" DESTEC invested into a new DEUTROFLUX UWS 1500 with 2-phase-shifted AC magnetisation to do magnetic particle inspection on components up to 1500 mm length and up to 500 kg weight.

Beyond the fact that the DEUTROFLUX UWS is a long-term experienced standard solution of KARL DEUTSCH for MPI on large and heavy components, it also offers DESTEC the flexibility to test a big variety of components.

The requirements for the new MPI machine included all GSB clamp set components, starting from the small standard sizes for 10" pipes up to the big components for 24" pipes. The motorized coil movement with adjustable speed (via touch screen menu) and integrated ring nozzles for perfect spraying with magnetic test liquid assures a proper and reliable magnetisation process.

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Furthermore, the integrated MEMORY PLC-software module with touch panel operation allows to store predefined sets of all machine parameters for hundreds of different components (current value, coil magnetisation, coil speed, etc.).

Additionally the MEMORY module records all magnetisation processes and provides a documentation according to customer needs.

Picture 3: DEUTROFLUX UWS Magnetic Particle Testing Machine for pipeline clamps

DESTEC Quality Assurance Manager Adrian Gledhill paid particular attention on the best visibility of possible defect indications and therefore selected rotatable contact plates for the new MPI machine. Rotatable contact plates are a machine option enabling the operator a motor-driven 360° rotation of the test part during inspection.

Picture 4: Visual inspection of a pipeline clamp under UV-light. The part can be rotated within the testing machine.

Further installed features, like multi-adjustable and exchangeable clamping fixtures or additional high-current outputs to connect an extra flap coil, assure a maximum of flexibility to cover the large DESTEC product range. **MM**

www.karldeutsch.de » Products » Magnetic Particle Testing » Stationary Test Benches » UWS

KARL DEUTSCH Expands International Service Network

Increasing worldwide sales of KARL DEUTSCH testing systems raise the need for local service support. International sales of cost-efficient magnetic particle benches, type DEUTROFLUX UWE and UWS, are only made possible by nearby service teams providing installation, training and after-sales service. A high level of on-site technical expertise is also required to offer locally made ultrasonic test solutions on the basis of the multi-channel test electronic ECHOGRAPH 1093. This includes testing mechanics supplied by the respective sales partner or supplied directly by the customer.

Beyond the existing service centres at the KARL DEUTSCH subsidiaries in China, Italy and Sweden, many long-term representatives already provide an excellent service for many years. Hereby, we proudly present newly established service teams at our representatives in the emerging ASEAN region and in Mexico. A regular training of the service engineers of our subsidiaries and representatives at KARL DEUTSCH works in Wuppertal maintains a high service quality level and keeps everybody up to date concerning the newest product developments.

Figure 1: DEUTROFLUX UWE at MAHAJAK AUTOPARTS, Thailand

Figure 2: DEUTROFLUX UWE at AAM, Thailand

Notably our partner NDT INSTRUMENTS with branches in all ASEAN countries accomplishes installations of our MPI standard systems independently and provides the complete after-sales support including training and maintenance. NDT INSTRUMENTS in Thailand finished an installation of a DEUTROFLUX UWE 600 at the Thailand branch of the Japanese automotive supplier MAHAJAK AUTOPARTS CO., LTD., where a universal test machine for a large variety of various automotive components was installed to the satisfaction of the customer. Figure 1 shows the QA supervisor Mr Subin (right) and the machine operator Mr Kongsit (left) after successful commissioning.

Another example in Thailand, shown in figure 2, is the installation of a DEUTROFLUX UWE for American Axle & Manufacturing (AAM) at their Rayong Manufacturing Facility. This test machine is an integrated part of the quality control in the high volume production of driveline systems, including various components for front and rear axles, propeller shafts, etc.

Our Mexican representative TECNICA TEST is located in Queretaro, a region with an outstanding economic growth in the last decades, especially in the sectors aeronautics and automotive.

For improving the support of other major industrial centres in Mexico as notably Mexico City and the Gulf of Mexico, we also started the cooperation with a second representative, the company BRÜDER NDT, based near Mexico City. Important basis of this cooperation is a mutual agreement between both representatives for the Mexican market.

Figure 3 documents the start-up meeting with KARL DEUTSCH and shows Miguel Saldamando Rangel und Miguel Saldamendo Flanagan (TECNICA TEST, left),

Figure 3: Co-operation between TECNICA TEST, KARL DEUTSCH and BRÜDER NDT

Dr. Michael Maaß (KARL DEUTSCH, centre), together with Julio Gonzalez and Diego Gonzalez (BRÜDER NDT, right).

For the satisfaction of our big global customers ZF, SCHAEFFLER, GM, VCST, etc., engineers of both representatives received an intensive training at KARL DEUTSCH works in Wuppertal (figure 4).

Figure 4: Service training of both Mexican Sales Partners in Wuppertal

Today, on basis of the excellent support of TECNICA TEST and BRÜDER NDT, we can offer the full service for our complete product range to our customer base in Mexico. It includes the repair of KARL DEUTSCH test electronics, the installation, commissioning and training for our MPI machines and even the integration of multi-channel ultrasonic test electronics (ECHOGRAPH 1093) into locally made test mechanics.

The new partnership with BRÜDER NDT was also presented to the Mexican NDT market by joint exhibitions, as for example on the AWS WELDEX in Monterrey 2015 (figure 5). This exhibition particularly drew many prospective customers to our joint stand and boosted the sales of KARL DEUTSCH portable equipment in Mexico. **MM**

Figure 5: BRÜDER NDT at the AWS WELDEX exhibition in Monterrey 2015

20 Years KD-China: Customer Symposium in Beijing

Group picture of the participants after the enjoyable event

More than 25 years ago, KARL DEUTSCH started the cooperation with NDT expert Zhengxin ZHANG. Subsequently, the company KD-China headquartered in Beijing was founded 20 years ago.

More than 120 testing systems were sold during that time period and China became the most important export market for KARL DEUTSCH. In 2005, Olaf Deutsch (MBA), KARL DEUTSCH shareholder and brother of managing director Dr. Wolfram Deutsch joined the Beijing office. His Chinese language skills and his talent for sales are remarkable. Our 25 years anniversary was adequately celebrated with a customer symposium. Dr. Wolfgang Weber, Sales Director, and Dipl.-Ing. Michael Joswig, head of the ultrasonic testing system department and often travelling in China for projects, joined the symposium and supported the lectures given during that day. Also, some customers took the chance and gave speeches about the good and fruitful long-term cooperation. The symposium and the lectures took place in the impressive Moon River Conference Centre near Beijing and more than 50 customers accepted the invitation.

The eight colleagues of KD-China did a great job to organize the event. The final highlight was a multi-course menu in a high-level French restaurant which contained many extraordinary specialties. **WD**

Zhengxin ZHANG during his lecture

View into the well-attended lecture room

Romeo and Juliet in Wuppertal

Robert Sturm, the long-term artistic assistant of Pina Bausch and her famous dance theatre, had the idea about a unique project. Shakespeare's piece Romeo and Juliet should be performed in the extraordinary environment of a factory building.

Bernhard Glose and Luise Kinner alias Romeo and Juliet

The factory hall was provided by the company RIEDEL COMMUNICATIONS which employs more than 400 people and realizes communication solutions for large-scale events such as the Olympic Games or the Formula 1. The artist Tony Cragg, long-term professor and head of the art academy in Duesseldorf, Germany, and also creator of the sculpture garden in Wuppertal could be convinced to design the stage setting.

Wolfgang Schmidtke and Matthias Burkert compiled an exceptional mixture of classical music, percussion and jazz. Many musicians from Wuppertal, mainly the Schönberg-Ensemble (Cologne College of Music, Wuppertal branch) directed by Prof. Werner Dickel and with violinist Gunda Gottschalk performed in a perfect manner. In order to realize such an event, many sponsors had to be found.

Also, the KARL DEUTSCH company was ready to donate a substantial amount and invited all employees and their partners to one show. Although KARL DEUTSCH usually works within a very technical field, many colleagues accepted the invitation.

The excellent and dedicated actors such as Ingeborg Wolff, Hans Richter and Jörg Reimers, and of course the principal performers Luise Kinner and Bernhard Glose made sure that the evening was an unforgettable one. **WD**

Romeo and Juliet theatre play with the stage setting by Tony Cragg

Student Internship at KARL DEUTSCH

From the idea to the finished design of an ultrasonic flaw detector: KARL DEUTSCH is a company which is certified in accordance with ISO 9001. Therefore, on-the-job training and further education of the employees are crucial. In addition, the company offers internships for technical students and high school pupils.

A company, which relies on the ideas of the employees also gladly takes responsibility to provide training of the next generation. In the first half of December 2015, KARL DEUTSCH granted an internship to a 10th grade pupil of the Wuppertal high school Am Kothen in the division of portable test instruments and the R&D department.

KARL DEUTSCH is an instrument manufacturer where all development and production steps are carried out in-house. The young trainee was able to visit all relevant departments such as R&D, production and service of portable test instruments. The start was made in the R&D department where CAD-software for electronic circuit design and the mechanical design are essential tools. Afterwards, an insight view was gained about the production sequence of testing instruments.

Mrs Boek, teacher at the high school Am Kothen in Wuppertal, Germany, Pit Schmahl, 10th grade pupil, and advisor Dipl.-Ing. Ulrich Engelke from the KARL DEUTSCH company

The raw material comes from stock. After the production, each unit is carefully checked and calibrated before it is declared ready for shipment.

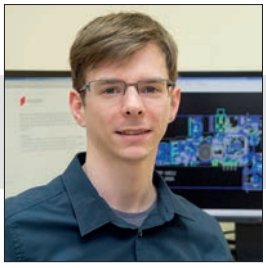
The NAVISION production planning and control system constantly controls the minimum number of units in order to ensure the ability to deliver.

Also, the integration of test instruments into smaller testing systems and the respective PLC-software were introduced.

Practical tasks included soldering, the CAD-software for circuit design and some measuring tasks during the final acceptance tests of the instruments.

A small present of the R&D staff was handed over at the end of the internship. **Eg**

New KARL DEUTSCH Employees



In November 2015, Mr Sven Siebert (M.Sc. Electronics and Information Technology) joined the R&D department for portable test instruments. We wish him a good start at KARL DEUTSCH!

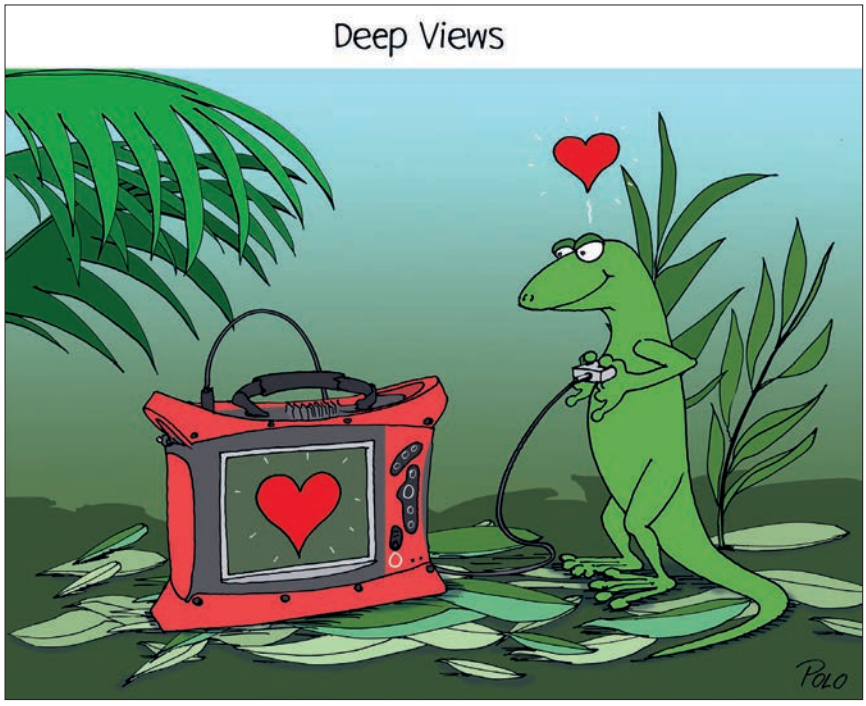
Dipl.-Ing. Dietger Schäle Was Given Procuration

With effect from February 1st, 2016, Dipl.-Ing. Dietger Schäle was given procuration of the KARL DEUTSCH company. Also, he was awarded technical director.

Until 1995, Mr. Schäle studied electrical engineering at the Technical University RTWH Aachen in Germany. Since September 2004, he has been working in our R&D department. In January 2014, he was promoted as head of the R&D department and division manager, a position previously held by Dr. Michael Platte. A company relies on the ideas of the employees! Mr. Schäle's positive attitude is an important prerequisite for personnel management. Also, he understands well to promote our products in front of the customer and to use the outcome of these discussions for future instrument developments. We wish Mr Dietger Schäle all the best in his new responsible position. **WD**

Technical director Dipl.-Ing. Dietger Schäle and Dr. Wolfram Deutsch during a joint lecture

Cartoon



For the first time, this KD-Info edition contains a cartoon by the illustrator André Poloczek, better known under the pseudonym POLO. Mr Poloczek lives and works in Wuppertal, Germany. His cartoons are well-received in many daily newspapers and known from frequent exhibitions. He will describe scenes from nondestructive testing in a humorous way. We hope that you enjoy the cartoons. **WD**

Illustrator Andre Poloczek alias POLO from Wuppertal, Germany

Trade Fairs and Events

04 - 08 April 2016
Tube 2016
International Tube and Pipe Trade Fair
Messe Düsseldorf, Germany
Hall 6, booth 6E21

26 - 29 April 2016
30th Control
International trade fair for quality assurance
Neue Messe, Stuttgart
Germany
Hall 1, booth 1410

10 - 13 October 2016
testXpo, 25th International Forum for Materials Testing
Fa. Zwick, August-Nagel-Str. 11
89079 Ulm, Germany

www.karldeutsch.de »
Dates, Events

13 - 17 June 2016
9th World Conference on Non-Destructive Testing
ICM - International Congress Center,
Fairground, 81823 Munich, Germany

Lectures:

Monday, 13 June 2016, 02.20 pm:
High Resolution Phased Array Imaging using the Total Focusing Method
(Session Mo.1.A Methods - Ultrasonic Phased Array - I)

Tuesday, 14 June 2016, 03.40 pm:
High-Speed Ultrasonic Testing of ERW Pipes
(Session Tu.4.A Semi-finished Products (Pipes, Plates, Bars, Composites) - Phased Array)

Thursday, 16 June 2016, 01.50 pm:
Practical Application of Total Focusing for Sizing of Imperfections in Welded Joints
(Session Th.3.A Ultrasonic - Total Focussing Method 2)

Thursday, 16 June 2016, 04.00 pm:
Ultrasonic and Magnetic Particle Testing of New Railway Wheels
(Session Th.4.A Methods - Ultrasonic Testing)

About KARL DEUTSCH

KARL DEUTSCH
Pruef- und Messgeraetebau GmbH+Co KG

The privately owned company KARL DEUTSCH was founded in 1949 and develops and produces instruments for nondestructive material testing. Portable instruments, stationary testing systems, sensors and crack detection liquids are produced by 130 motivated employees in two works in Wuppertal. Additional 20 employees in international offices and a worldwide network of dealers support the export business which accounts for more than 50% of the turnover. Characterised by continuous innovation and product reliability, the trade marks **ECHOGRAPH, ECHOMETER, DEUTRO-FLUX, LEPTOSKOP, FLUXA, KD-Check** and **RMG** are well-recognised.

Our customers are metal producing and processing industries, e. g. steel works, automotive companies and bearing manufacturers.

Typical test tasks are ultrasonic weld testing, detection of shrink holes in castings, crack detection in forgings with magnetic particles and dye penetrants, safety components for railway and aerospace as well as the wall and coating thickness measurement.