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Worldwide Visitors at KARL DEUTSCH

More than 40 participants from 20 countries visited KARL DEUTSCH at the two-day International Sales Meeting, with guests from Asia, Africa, the Americas, as well as many partners from European countries.

The program was as multifaceted as the group of the participants. In addition to strategic topics, new products and applications were presented and human relationships were maintained.

A dinner at Historische Stadthalle Wuppertal (a beautifully restored historic concert hall) and a cruise on the Rhine river conveyed a vivid impression of the region to the participants.

So the three days were used intensively to try out new products and to answer numerous questions. In small groups, various topics could be targeted and product training was carried out.

On Saturday, some of them also visited the historic coal mine "Zeche Zollverein" (world heritage of the UNESCO in the town of Essen, about 25 km from the KARL DEUTSCH premises), to learn about the industrial heritage of the Ruhr District. **Hs**

Continued on page 2



Sales manager Dr. Wolfgang Weber informs on the latest developments and application examples in one of the numerous lectures

Continued from page 1



Not only for professional exchange: Among other things, the social program included an evening cruise on the Rhine river



With great passion: In addition to the theoretical lectures, emphasis was put on practical exercises



The participants of the International Sales Meeting in September 2017 in the outside area of our works 2 in front of the historic steel structure of the Wuppertal Skytrain that was erected there in 2006

MANTIS: The Little but Strong Brother of the GEKKO

During the past 3 years, the first portable phased array ultrasonic testing device from M2M/KARL DEUTSCH has achieved an excellent reputation among experts and users under the name GEKKO. An impressively simple user guidance and outstanding ultrasonic properties, e.g. 64 parallel phased array channels and real-time TFM (Total Focusing Method), have made the GEKKO a universally applicable all-rounder.

From simple weld inspection tasks to the testing of complex and difficult-to-test components, the device can be optimally adapted to the respective requirements. In addition to the phased array technique, the GEKKO offers extra methods such as conventional ultrasound, TOFD and TFM. The latter is particularly suitable for the analysis and assessment of flaws.



The lateral standard interfaces of the MANTIS: USB and LAN

Now, the next development step is the MANTIS - similarly powerful, but significantly more compact. The 16:64 phased array channel configu-



ration plus two conventional ultrasonic channels provide all possibilities for standard and multigroup applications. The user guidance of the GEKKO was kept and allows the inspector to concentrate on the test task without having to deal with complicated operating techniques. In the basic ADEPT configuration, even TFM is available for 16 parallel channels.

For more complex scanning tasks, the MANTIS can be upgraded with the EXPERT module to three encoder axes and 20 kHz pulse repetition frequency. Moreover, with the MASTER extension, it is even possible to realize high resolution TFM with 64 channels by multiplexing - slower than with GEKKO but with the same resolution.

The supplied CAPTURE software is used to generate data records and analyse recorded data on the PC and is compatible with both MANTIS and GEKKO data.

In addition, the software ENLIGHT is available for more detailed analysis and data preparation. To achieve this, the well-known CIVA Analysis has been revised, relieved of rarely used functions and simplified in operation. This now provides a more competitive alternative to CIVA Analysis, which will be even more attractive in a package together with GEKKO, MANTIS or other M2M electronics.



Ideal field of application for the MANTIS: The imaging test on a fillet weld

We will be happy to answer any questions you may have about the products mentioned. Contact person is Mr. Stefan Kierspel (kierspel@karldeutsch.de). **KI**



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MANTIS

ECHOGRAPH 1095: Ultrasonic Weld Inspection

With its versatile features and modules, such as matrix memory, B-scan, IO-module, strip chart and many more, the ECHOGRAPH 1095 is a true allrounder in ultrasonic testing. The inspection of castings, precision wall thickness measurements and even the use as electronics for small systems are just some of many application examples. One of its core competencies is the inspection of welds. Many features and the simple and intuitive user interface support the inspector to execute the inspection task fast and thoroughly.

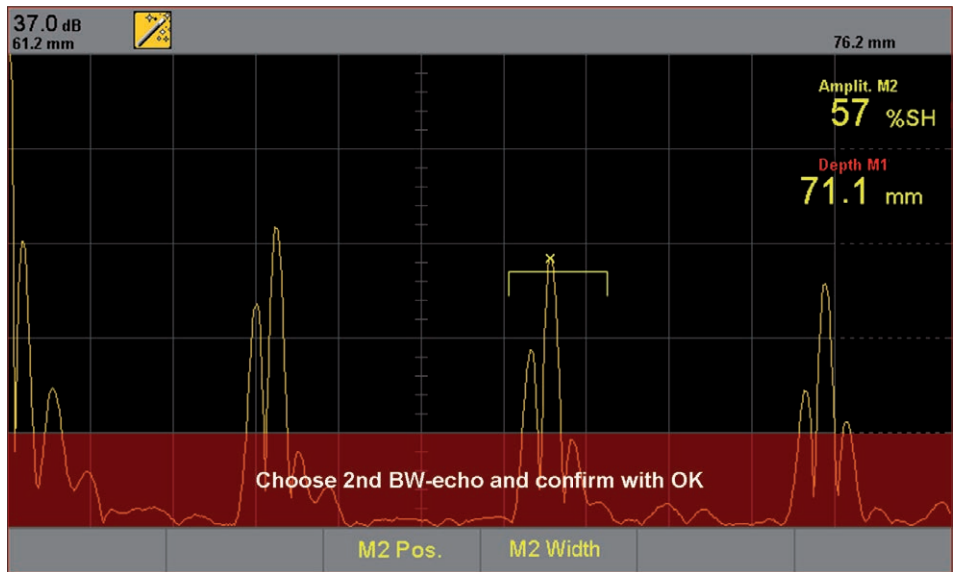


Fig. 1: Screenshot of ECHOGRAPH 1095 with active “2-point adjustment” wizard

Of course, the ECHOGRAPH 1095 complies with EN 12668-1 and enables the inspection of welds according to EN ISO 17640 and EN ISO 11666. By pressing only a few buttons, the probe is loaded from the database, which includes also DGS-capable TR-probes, or can be added manually by the help of the technical data sheet. Wizards

support the inspector by adjusting the sound velocity, delay line and range, see Fig. 1.

Due to the simple user interface, the sensitivity adjustment according to DAC/TCG or DGS is up to 2 times faster compared to other instruments!

For example, pressing and holding the gain button sets the echo amplitude automatically to 80% SH. In addition to the echo height assessment by means of DAC/TCG/DGS, the methods AWS and JIS can be chosen.

For a precise localization of inhomogeneities up to 6 measured values can be displayed on the screen. By using the skip information, the position of a reflector can be determined at a glance. The position of the largest reflector in each of the three gates is visualized, together with the soundpath and the skips, in a schematic view in the upper right corner of the screen, see Fig. 2. Alternatively, for gates 1 and 2 the skip marking feature can be activated to indicate half skip and full skip in the A-scan view. By this, the

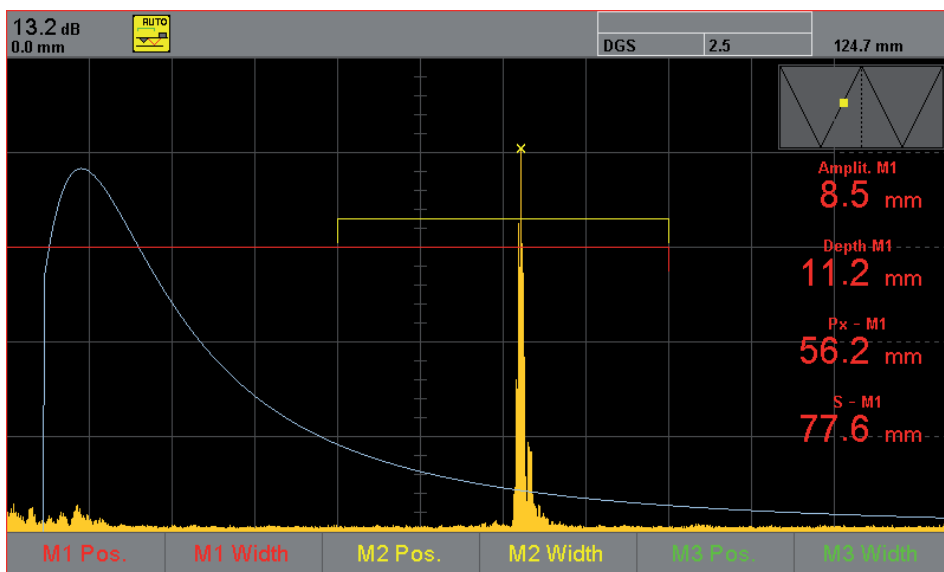


Fig. 2: Screenshot during weld testing according to DGS with skip information (overlay image, top right) and skip marking (red monitor gate = full skip, yellow monitor gate = half skip)



A video complementing Fig. 2 can be found in our “NDTChannel” on Youtube: <https://www.youtube.com/watch?v=X78III6-Hb8>

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Continued from page 4

position of a reflector can be determined quickly. A video with an application example can be found on our Youtube channel.

Access to the menu can be locked by the supervisor with the aid of the password function. Without access to the menu, only gain, delay, range and functions assigned by the supervisor to the function keys F1 to F6 are accessible.

With TOFD, short for Time-Of-Flight-Diffraction, also the depth dimension of inhomogeneities can be evaluated. This technique is based on the interaction of ultrasonic waves with the reflector's fringes (i.e. the crack tips). Thus, for TOFD two broadband UT probes, each with a strongly divergent sound field, are used in a V-through-transmission setup, see Fig. 3. The time-of-flight of the received signals is a measure for the depth extension of the inhomogeneity.

The TOFD technique is optionally available for the ECHOGRAPH 1095. By means of the I/O-connector, the scanner, which is demanded by ISO 16828, can be con-



Fig. 3: ECHOGRAPH 1095 during TOFT testing with scanning device

nected to record the path of the probe. Moreover, the scanner keeps a fixed distance between the two probes. Using the TOFD technique the digitized A-scans are coded in shades of grey according to the amplitude, as described in ISO 10863, and are displayed concatenated side-by-side, according to the probe position, see Fig. 4.

From this special form of B-scan the dimensions of indications (length, depth and height) can be measured with the aid of cursors and evaluated according to ISO 15626.

The TOFD-B-scan and the raw, underlying A-scan data are stored on the SD-card of the instrument.

For more information, please contact Mr. Stefan Kierspel (kierspel@karldeutsch.de) or Dr. Volker Schuster or Dr. Helge Rast from our Applications Lab (alab@karldeutsch.de).

A video example showing a TOFD application can be found on our Youtube channel. **Ra**

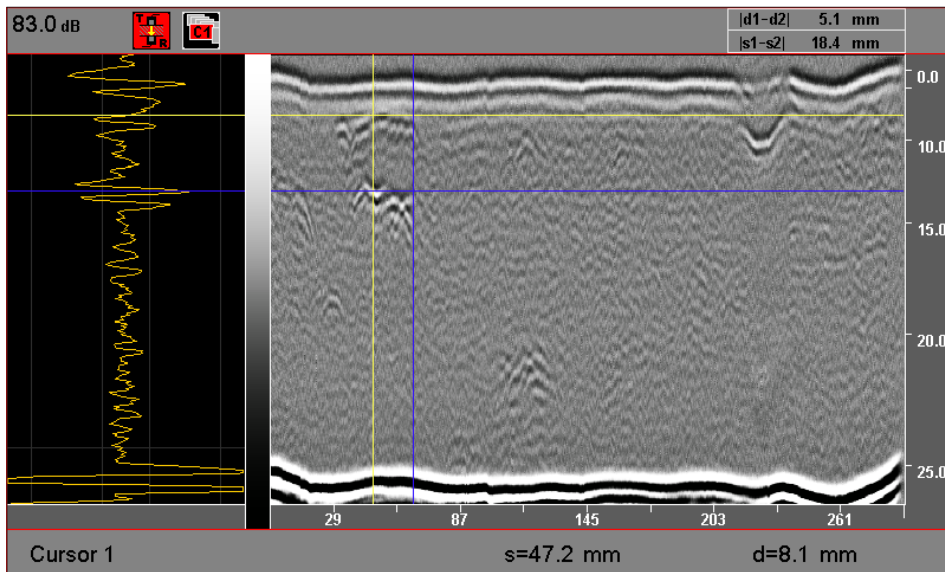


Fig. 4: Screen shot of the result of a TOFD examination with A-scan (left) and TOFD-B-scan (right)



A video complementing Fig. 4 can be found in our "NDTChannel" on Youtube: <https://www.youtube.com/watch?v=z-eQSlr1Z5Y>



www.karldeutsch.de » Products » Ultrasonic Testing Instruments » Instruments » ECHOGRAPH 1095

□ **ScanMaster UT/Mate: Examination of Spot Welds in the Car Body Making Industry**

Since September 2017, KARL DEUTSCH has been the official representative of ScanMaster IRT (only) in Germany, focusing on ultrasonic testing of spot welds. KARL DEUTSCH supports the marketing and sales of both instrument types UT/Mate SpotWeld Inspector and UT/Pro SpotWeld Inspector.

Electro-resistance spot welds are used in automotive engineering to join bodywork parts. Two or more sheets are pressed together with two copper electrodes and subjected to an electric current in the kA range for about 200 ms. The electrical resistance causes local melting of the sheets. A spot weld is formed (nugget) after cooling.

The following flaw types may occur:

- No nugget (lack of fusion)
- Nugget diameter too small
- Stick joint (adhesive bond), if only the zinc coating has been melted



Fig. 1: Examination of spot welds in the car body making industry

Testing is done in pulse-echo-technique using broadband 20 MHz ultrasonic probes. A rubber membrane and a water delay in the probe housing enable a flexible sound coupling over the (often) rough spotweld surface.

Different sheet thicknesses cause different nugget diameters. Thus, in each case a different probe is used that provides an element diameter D_S equivalent to the given nominal nugget diameter.

Depending on the thickness t of the welded

sheets the minimum permissible nugget diameter D_L depends on the smallest wall thickness t according to the following rule of thumb:

$$D_L = 4 \cdot \sqrt{t}$$



Fig. 2: Probe with fluid-filled, flexible rubber membrane (left)

If a spot weld with $D_L \approx D_S$ is rated "good" an echo sequence is only generated by the backwall of the spot weld:

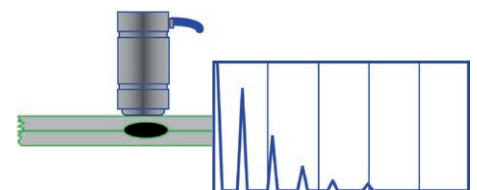


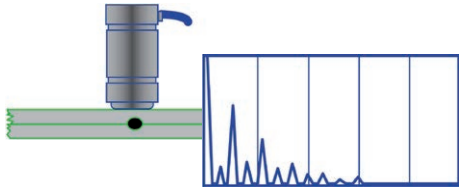
Fig. 3: Rating as "Good Spot" in the ScanMaster user-interface



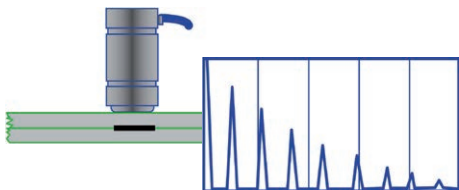
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If the nugget diameter is too small an echo sequence is generated that is caused by the backwall of the lower sheet and simultaneous intermediate echoes from the backwall of the upper sheet:

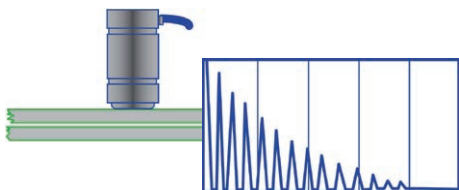


In case only the zinc coating has melted, an “adhesive bond” is created. This bond is acoustically transparent and results in an echo sequence from the last backwall. Due to the lower sound attenuation compared to the coarse-grained structure of a good weld nugget, more backwall echoes are visible compared to a good spot weld.



In the case of a completely missing welded joint, a distinctive echo sequence results from the upper sheet:

The A-scans from Fig. 5 and Fig. 6 represent



Signal	Result	
Short damped echo sequence from the last sheet and sufficient indentation depth	Spot weld ok	OK
Intermediate echoes	Nugget too small	Not OK
Long backwall echo sequence from the last sheet	Stick joint	Not OK
Only backwall echo sequence from the first sheet	No joint	Not OK

Table 1: Evaluation diagram



Fig. 4: Laptop with ScanMaster module UT/Mate, probe and remote control

sent two examples of testing – recorded with the testing instrument UT/Mate from the company ScanMaster.

- an “OK” spot weld with short, damped echo sequence and missing intermediate echoes
- a “Not OK” spot weld with distinctive intermediate echoes (small nugget), marked with a red bar (left)

The automatic evaluation is carried out according to Table 1.

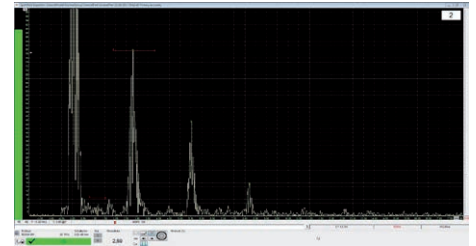


Fig. 5: Spot weld OK

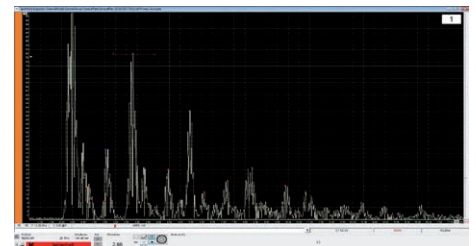


Fig. 6: Spot weld Not OK (small nugget)

Your contact person for test solutions with the ScanMaster UT/Mate Spot Weld Inspector and UT/Pro Spot Weld Inspector are Stefan Kierspel (kierspel@karldeutsch.de) and Reinhold Engels (engels@karldeutsch.de). **Ki**



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Testing (UT) » Instrument

MANTIS and GEKKO: Inspection of Electrofusion Fittings

Polyethylene pipes have been used in piping systems for the gas and water supply and sanitation since 1957. They are highly resistant to corrosion, various chemicals and cracks. As well, they feature a low weight and simple connection techniques. One of the available simple joining techniques uses electrofusion fittings, creating a permanent, tight and force-fit joint.

Electrofusion fittings are also made of polyethylene, in which an helical heating element is embedded. The pre-treated pipe ends are inserted into the fitting, which is connected to an automatic welding machine applying a voltage to the heating element. By controlled heating the fitting and the pipe ends are brought in a thermoplastic condition, by which a permanent force-fit fusion is created.

After cooling down, this fusion needs to be inspected non-destructively. With the Total Focusing Method (TFM), a safe and simple technique is offered by MANTIS and GEKKO. TFM is a mathematical algorithm

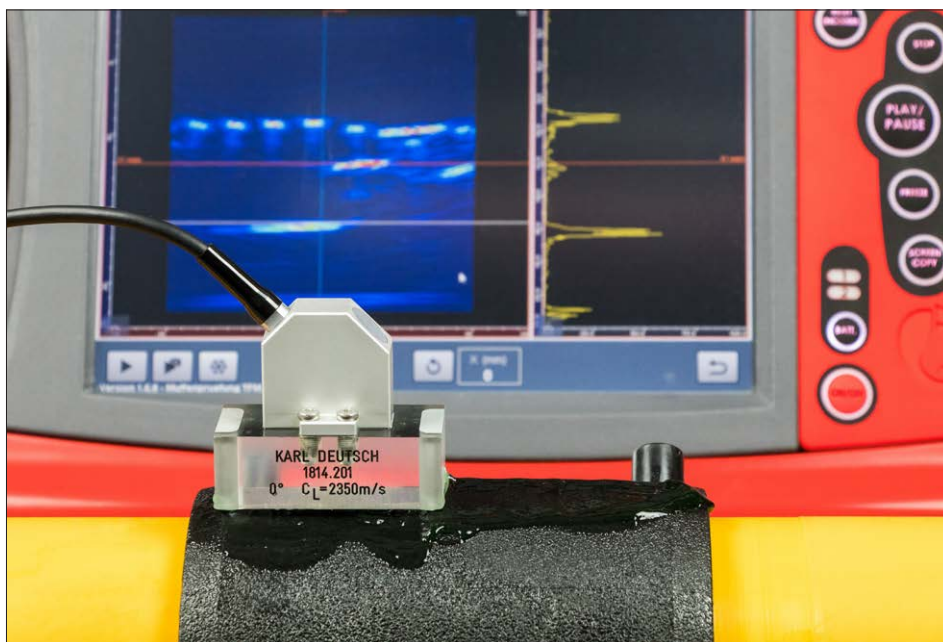


Fig. 1: Inspection of an electrofusion fitting with the GEKKO

for the reconstruction of highly resolved cross-sectional views from a large number of ultrasonic signals. For a long time, due to the huge amount of data and the resulting computing time, TFM was only available in labs with high-performance computers. The MANTIS and the even more powerful GEKKO make TFM available on-site by means of compact, easy to use phased array ultrasonic flaw detectors.

A 5 MHz phased array probe is used for the inspection of electrofusion fittings. During inspection the probe is coupled to the fitting by a couplant gel, while the MANTIS or

GEKKO calculates the TFM-image in real-time with approx. 80 frames per second.

The clearness of the resulting image enables also non-NDT personnel to inspect the condition of the fusion quickly. Also the configuration of MANTIS and GEKKO is very easy: Choose probe and material from database, enter thickness of pipe and fitting and start the inspection! **Ra**

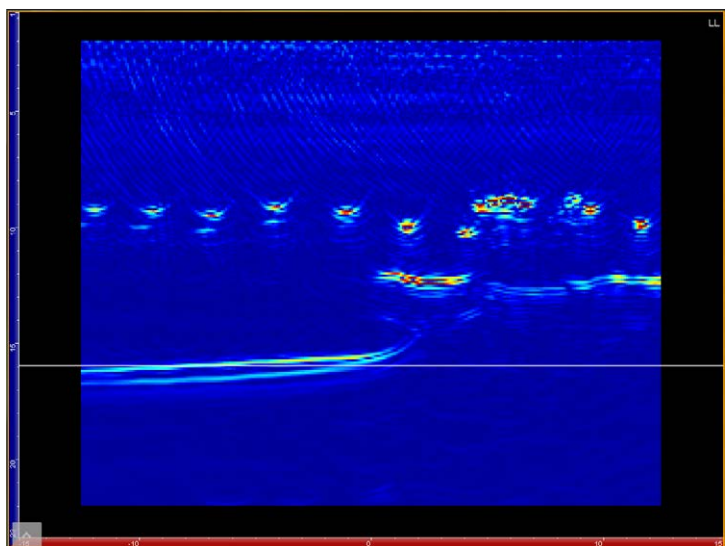


Fig. 2: Result of the TFM inspection of an electrofusion fitting



A video complementing Fig. 1 can be found in our "NDTChannel" on Youtube: <https://www.youtube.com/watch?v=xWhuHIIERw>



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ECHOGRAPH-HRPR: Kalibre Boru ordered Tube Testing System

The renowned Turkish tube mill Kalibre Boru ordered an ECHOGRAPH-HRPR tube testing system from KARL DEUTSCH. Kalibre Boru was established in 1978 and currently has 500 employees. A key market for their seamless and welded precision tubes is the automotive industry and therefore, ultrasonic testing is an important means for quality-assurance.

Operations director Mr. Aytaç Ünlü is responsible for the project and placed the order with Mr. Peter Schulte, responsible for the sales of ultrasonic testing machine at KARL DEUTSCH.

The ECHOGRAPH-HRPR testing system is a well-established concept for the high-speed inspection of seamless and ERW-welded tubes. The pipes are transported in a linear manner through an immersion tank that is fitted with rings of ultrasonic probes (Fig. 1).

For the respective project, two probe rings for the detection of longitudinal defects are applied.

The first ring is fitted with probes which transmit ultrasound clockwise into the pipe.

The second ring transmits ultrasound counter-clockwise. Both rings ensure full coverage of the testing volume (Fig. 2).

The probes are mounted into cassettes which need to be designed in accordance with the pipe diameter. Two cassette sizes are used to cover a diameter range between 40 mm and 120 mm (Fig. 3).

The conveyor systems and the test table is provided by the German company sema Systemtechnik GmbH & Co. KG which is a leading international manufacturer of machines and systems for semis industries and packaging technology.



Fig. 1: ECHOGRAPH-HRPR tube testing system with immersion tank and ultrasonic pre-amplifiers above the tank

The challenge for this testing line was the end-to-end transportation of the tubes. This ensures a high throughput and short untested ends.

Our Turkish representative Teber Kalite in Bursa-Nilüfer is providing the local support and Yasar Aytaç, as managing director, is a well-known NDT specialist in Turkey. **WD**

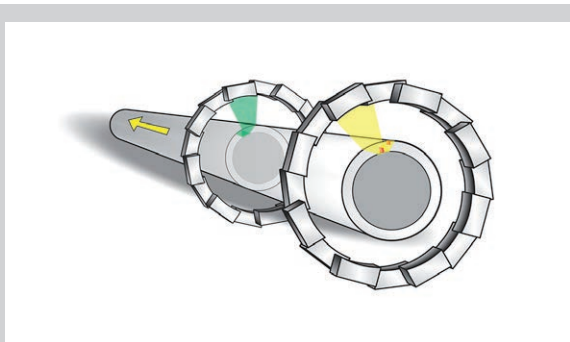


Fig. 2: Tube testing principle with two probe rings and a total of 32 probes

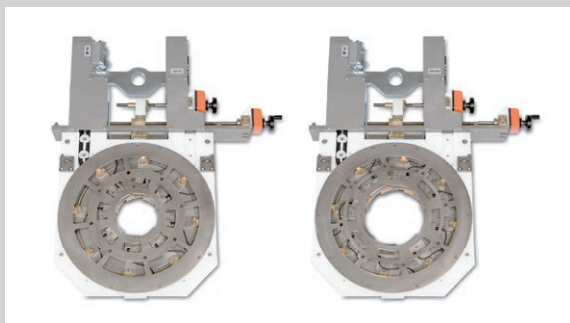


Fig. 3: Probe cassettes for the detection of longitudinal defects in two sizes



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System HRPR

KARL DEUTSCH NDT-Symposium, NDT-Experts met in Wuppertal

The KARL DEUTSCH NDT-Symposium took place on the 11th and 12th of September, 2017. During these two days, more than 100 guests participated in the event to get insight into current developments and to follow numerous specialist presentations.

After a short address of welcome by Dr. Wolfram Deutsch the first day focussed on the testing systems.

Besides the presentations of ECHOGRAPH systems for bars, tubes, welded tubes and railway components with mono-element and phased array probes, the new ECHOGRAPH 1170 ultrasonic testing electronic

and its applications for automated component testing were presented and explained in detail.

The topics of the afternoon were the magnetic particle crack detection systems DEUTROFLUX, the KD-Check penetrant systems and the corresponding new developments of FLUXA and KD-Check crack detection media from KARL DEUTSCH.

In the evening, the participants enjoyed a skytrain tour to “Wuppertaler Brauhaus”, which is a popular craft brewing location in Wuppertal. During the subsequent rustic buffet, there were many lively discussions on the topics of the first day.

The second day focused on the portable instruments. After the presentation of measurement devices for the determination of wall thickness, coating thickness, magnetic field strength and crack depth, a practical demonstration of the ultrasonic flaw detector ECHOGRAPH 1095 followed, together with the portable phased array flaw detector GEKKO.

As a world premiere, the visitors could also thoroughly test the MANTIS. The compact, but powerful phased array portable flaw detector convinced with its convenient and ergonomic handling, the outstanding tech-

Continued on page 11



Dr. Wolfram Deutsch explains NDT application examples to the interested audience

Continued from page 10

nical properties and its 16:64 channel configuration.

At the end of the practical part there was an overview of the current range of probes.

Three external lecturers, who provided “external” views on different applications to the auditorium, completed the program.

Mr. Volker Reusch (from the engineering office *Ingenieurbüro F. Braun*) commented the NDT world as seen by a service inspection company. Mr. Martin Maas (from the company *Testsinn*) presented the integration of phased array technologies into the standard-compliant ultrasonic testing of welds, castings and forgings. Finally, Bernd Huber (from the company *Vector München GmbH*) assessed the characteristics of the ECHOGRAPH 1095 as seen by an NDT training center.

Between the lectures, there was always enough time for technical discussions. Instruments could be tested, specific problems were addressed and solutions were approached together. Thus, despite the tightly organized and demanding program, most of the visitors left the event after two days with a good feeling. **Hs**

Video impressions are available on Youtube under the following link:
[www.youtube.com/
watch?v=KMmxw9GUt8l&t](http://www.youtube.com/watch?v=KMmxw9GUt8l&t)



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NDTChannel »
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NDT-Symposium 2017



Impressions of the NDT symposium: Surrounded exhibition tables of the portable devices (top), exchange of experience in personal discussions, and group tours in the application laboratory for automated ultrasonic testing systems (below)

Control 2017: The International Meeting Point for Quality Assurance

This year, with 942 exhibitors from 31 countries, the Control fair was more international than ever.

The “Decade Festival of Quality Control” – the 31st Control, held from May 9 to 12, 2017, at the Stuttgart fairground, lived up to its name as the world’s leading key fair, as confirmed by many exhibitors and also the advisory board, who commented on this year’s branch event positively throughout the course. The facts are self-explanatory: 942 exhibitors, more than 52,000 m² exhibition area and 29,417 registered visitors from 106 nations. As in the past years, KARL DEUTSCH presented all products in hall 6, booth 6223, demonstrating the ultrasonic flaw detector ECHOGRAPH 1095, the phased array flaw detector GEKKO and the wall thickness gauges ECHOMETER 1076 and 1077.



Reinhold Engels (left) and Stefan Kierspel at the 2017 CONTROL booth

The final résumé on the fair was positive: “The number and quality of the visitors were very satisfying”, summarized Reinhold En-

gels the four fair days in Stuttgart. “Definitely, we will be present at the same place in 2018”. **Hs**

30 Years Chemical Products: Dr. Ralf Wagner retires

In October 2017, after about 30 years at KARL DEUTSCH, Dr. Ralf Wagner went into the well-deserved retirement.

Since October 1, 2017, Dipl.-Ing. (FH) Stephan Robens has been his successor as Division Manager for Chemical Products and Penetrant Testing Systems. He has been working with KARL DEUTSCH since 1998, being deputy division manager already in recent years.

Dr. Oliver Goertz follows as new deputy division manager. He has been working with KARL DEUTSCH since July 2014 and was introduced carefully into the tasks by Dr. Wagner and Mr. Robens. **Hs**



Dipl.-Ing. (FH) Stephan Robens, Dr. Ralf Wagner and Dr. Oliver Goertz (f.l.t.r)



KARL DEUTSCH Summer Party: Sunny in Spite of Rain

This year, our about 130 employees and their family members braved the weather during the KARL DEUTSCH summer party which had to be relocated quickly to the inside of the systems workshop.

Compared to the recent years the sun only showed occasionally this year. Nevertheless, the lack of sun did not detract from the splendid atmosphere. Traditionally, after enjoying diverse barbecue specialties and delicious salads, the participants could discover and venture a lot of things. A special highlight was the virtual reality simulator, which led into virtual worlds by means of an appropriate pair of glasses. Once again, the Segway course, which required a lot of skill from the participants, was very popular. In addition, there were table soccer, air hockey, table tennis and the ever-popular and extensively used goal wall, numerous opportunities to compete with each other in a sportsmanlike manner. Those who liked it quieter, could sit down at one of the numerous tables with a delicious piece of cake or a sundae and just talk with colleagues. Thus, at the end of the day, the sun was shining for almost everyone – at least figuratively. **Hs**



The unparalleled ice cream stand scored again this year



Exciting junior challenges at the air hockey table



Due to the weather, parts of the summer party were moved to a freed-up area of the systems production

Prof. Dr. Volker Deutsch turned 85

On December 13, 2017, Prof. Dr. Volker Deutsch celebrated his 85th birthday with his family and close friends. At this event, the second edition of his memory book “Zerstörungsfreies Schmunzeln” (“Nondestructive Smiling”) could be presented.

Volker Deutsch had asked expert colleagues for contributions to the updated edition. Our former technical director Dr. Michael Platte has put a lot of time and great commitment into this project, to coordinate the big amount of return input. Dr. Elke Herbsthofer from the Castell publishing house in Wuppertal, daughter of the jubilee, proofread the book and managed a smooth realization.

Prof. Volker Deutsch studied mechanical engineering at the RWTH University in

Aachen and received the doctor's degree from the Technical University of Hannover. He influenced essentially the company KARL DEUTSCH over 40 years and was fortunate enough to work together with company founder Ing. Karl Deutsch for over 13 years.

At the age of 50, the University of Dortmund appointed Volker Deutsch honorary professor. In 2001, the sole management of the company was transferred to the third generation – to Dr. Wolfram Deutsch.

Prof. Volker Deutsch is a worldwide acknowledged expert for NDT. He has essentially contributed to the exchange of knowledge within the world of NDT by means of many presentations, technical books and publications. **WD**



The second, expanded edition of the book “Zerstörungsfreies Schmunzeln” by Volker Deutsch and Michael Platte has been published now by the Wuppertal publishing house “Castell-Verlag”



The second and third generations of KARL DEUTSCH celebrated the day of honor together: Prof. Dr. Volker Deutsch and Dr. Wolfram Deutsch

Cartoon

The graphic designer André Poloczek, alias POLO, lives and works in Wuppertal. For this KD-Info he focuses humorously on the high age and the professional career of Prof. Dr. Volker Deutsch (abbreviated VD).

Also the prototype of the “Nondestructive Inspector”, our inspector Oskar (left), who for many years accompanied the fortunes of the company KARL DEUTSCH with funny, witty and thoughtful comments, shows up again respectfully and admiring.



In 2010, Krzysztof Juretko, also an artist in Wuppertal, created the drawing of Prof. Dr. Volker Deutsch that is shown in the cartoon, and since then has also portrayed the extended Deutsch family.

New Colleagues at KARL DEUTSCH



The industrial business management assistant Ms. Vanessa Samol used to work already temporarily in the past and since December 1, 2017, she has been employed permanently in the sales department.

Ms. Stefanie König is a skilled merchant in international trade and wholesale and, since January 2, 2018, she has been strengthening our purchasing and accounting team.



Welcome to the KARL DEUTSCH team!

Trade Fairs and Events



13 - 15 March 2018
10th Symposium NDT for Railways
Kultur- und Festspielhaus Wittenberge
Paul-Lincke-Platz 1
19322 Wittenberge, Germany



16 - 20 April 2018
Tube 2018
International Tube and Pipe Trade Fair
Hall 6, Stand E06
Fairground
Duesseldorf, Germany



24 - 27 April 2018
32nd Control
International Trade Fair for Quality Assurance
Hall 6, Stand 6223
Stuttgart, Germany



07 - 09 May 2018
DGZfP Annual Meeting 2018
KONGRESSHALLE am Zoo Leipzig
Pfaffendorfer Str. 31
04105 Leipzig, Germany

The titles of our lectures, which are held at fairs and conferences, can be found in the section **Dates, Events** on our homepage:



11 - 15 June 2018
12th ECNDT
European Conference on Non-Destructive Testing
The Swedish Exhibition & Congress Centre
Stand C02:22
Göteborg, Sweden



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Dates, Events

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 non-destructive 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 world-wide 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**, **DEUTROFLUX**, **LEPTOSKOP**, **FLUXA**, **KD-Check** and **RMG** are well-



Main Offices and Manufacturing Site for Portable Products (Works 1)

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.



Offices and Manufacturing Site for Testing Systems (Works 2)