Advanced inspection services for a more sustainable future

For the SAIW Member Profile in this issue, African Fusion talks to Johan Gerber, managing director of DEKRA Industrial RSA, about his company's unique range of high-level inspection services and its digitalisation and sustainability ambitions for advancing the safety and reliability of industrial plants in Africa.

DEKRA Industrial RSA has its roots in South Africa as a leading NDT Inspection service provider called Raysonics. Founded in 1984, in the Vaal triangle, to offer NDT services to the petrochemical and power industries, by 2005, Raysonics had become the market leader.

"Raysonics was acquired by the DEKRA Group in 2013 and our name was changed to DEKRA Industrial in 2014. We opened a SANAS-accredited metallurgical laboratory in 2015 and in 2020 – in partnerships with Africa X, Swift Academy, Wilco Trading, JigSaw and JJ VR Trading – we established the QCTO-accredited DEKRA Institute of Learning, which offers a suite of around 4 000 online HSE training courses, skills development training, and learnerships, some of which focus on health and safety requirements for the local industrial sector," Gerber tells African Fusion.

The Global DEKRA Group operates two divisions: DEKRA Operations and DEKRA Service Division. "We fall under Industrial Inspections in the Service Division, which is based in Europe and is divided into several pockets of excellence with R&D and implementation expertise on a wide range of advanced technologies: robotic inspections; drones; lift inspections; specialised wall thickness techniques; online monitoring systems; and a host of other custom-designed solutions based on real needs and experience across the globe," explains Gerber.

"Our worldwide coordinator for this division is Bennie Groenewald, who is based in Cape Town. Bennie is the global business line director for NDT and advanced NDT (aNDT) for the DEKRA Service Division, Industrial Inspection. He is responsible for all DEKRA countries where these service are provided; as well as those who would like to start using them, providing support and assistance for: NDT Data handling and storage; organic development and business expansion; certification processes, skills and knowledge transfer; and the digitalisation of DEKRA's NDT and aNDT offerings.

Bennie was a certified Level 3 NDT Inspector with us here in South Africa, so he knows us and gives us excellent access to the most appropriate advanced technologies and information available," adds Gerber.

"With Bennie's help, we identify Service Division initiatives already successful in Europe that can implemented in South Africa. Now available in South Africa are specialised drone inspections; online monitoring systems; lifting inspections for overhead and vehicle-mounted cranes and forklifts; a digitised wall thickness scanning technique called FST for boiler tubes; and various robotic inspection systems for nuclear plant," he says.

DEKRA has also recently partnered with a company based in Houston Texas making use of a robot for inspecting fuel storage tanks. "The robot is able to inspect 95 to 97% of a tank floor while submerged in diesel, petrol, paraffin or jet fuel," he tells African Fusion.

A remotely operated underwater vehicle used to conduct visual and ultrasonic testing in hazardous environments such as nuclear pressure vessels. The system can be used at depths of up to 50 m.

"A company of our size cannot survive by offering entry-level MT, PT, UT and RT services. There are more than 300 companies currently registered with the department of Health in South Africa for the use of RT Isotopes, and a very small number of these have more than 30 qualified NDT technicians.

We don't try to compete in this price-driven market segment. We differentiate our services by using high-end technologies for niche and critical inspection applications. With the backing of our global Service Division, we have the advantage of access to purpose- designed solutions using advanced inspection techniques that are available and ready to deploy for critical industrial applications," he notes.

He cites the in situ inspection of electrical generators as an example. "Using a KIRR or ARGIS system, which are DEKRA-designed robots that can carry out phased-array UT, visual and conductivity NDT technologies, we can inspect the service condition of power generators without removing the rotor. All we need is an 18 mm gap to confirm the condition of the conductivity, retaining ring, windings and core. This is an advanced and purpose-designed solution to solve a specific inspection problem," he continues.

In addition, DEKRA's robot systems have been used to inspect various nuclear reactor pressure vessels, a task that takes in excess of 10 days to complete using traditional methods. Gerber says that DEKRA managed to complete a full reactor inspection in four days and 18 hours, which "we believe was a world record".

"It is through unique high-level services such as these that we are able to stay competitive in this very cost-sensitive market," he says.

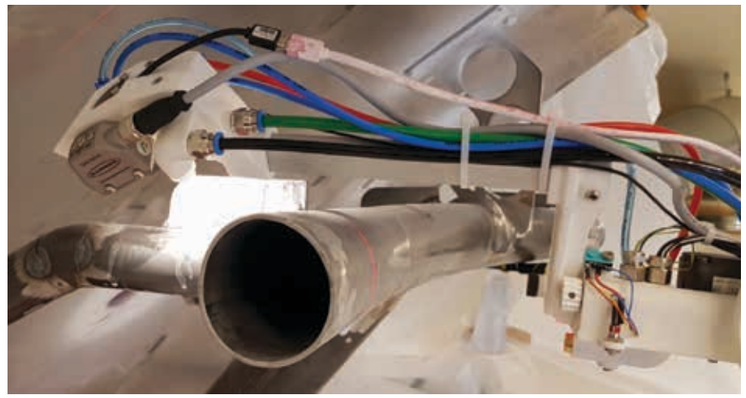
He reveals that DEKRA Industrial has adopted a 'one stop' and total inspections solution strategy. "As well as being able to inspect tank floors for corrosion using UT with the product inside, we are also IWH (Institute of Working at Height)-certified to do rope access inspection, or we can use our Scorpion robot, or we can do LIDAR volumetric inspection using a drone. We are also now accredited by the Corrosion Institute of South Africa to include sand blasting and repainting services where necessary.

"And across all of our services and methods, we have maintained our NOSA five star rating, won seven consecutive NOSCAR safety awards and, as of March 2021, accumulated 5 000 000 injury-free hours, proving that we live by our slogan: A global partner for a safe world."

Into the future, Gerber reveals that a new company slogan is being introduced in the next few years to highlight digitalisation and sustainability. "In my opinion almost all major disasters could have been avoided had proper inspections techniques been adopted by properly qualified people. One missed defect, one wrong interpretation or one ignored indication can result in catastrophic disasters. Almost all accidents can be prevented by applying effective inspection techniques that produce accurate results, which are interpreted by competent people capable of making engineering-based decisions," he argues.

To solidify its ability to more cost-effectively use inspection to prevent disasters, he says that DEKRA aims to fully digitalise within the next four years. "By then, our inspection results will all be delivered electronically in digitised formats. The results will be uploaded into the Cloud, giving clients and their engineering specialists immediate access to the results in a digital format, which makes it much easier to use the data for engineering analyses.

This is already being done using phased array UT inspection equipment. One of our technicians was recently doing an inspection in Middleburg, while our Level 3 NDT Inspector was watching and analysing the data from Cape Town and an experienced DEKRA phased-array specialist in France was overseeing the set up and calibration of the instrument being used. This makes immediate, reliable and accurate results available for interpretation by experts anywhere in the world, with the actual inspection being done in a completely different part of the world," he relates, adding that this makes real-time remote analysis cost-effective and practically implementable.



An automated visual (VT) and dye penetrant testing (PT) system with an automated PT nozzle attached to a 3-dimensional head. The manipulator can also be used as a carrier for repair tools as well as end effectors for a J-groove inspection. The system is qualified for nuclear environments.

Also already in the company's armoury is an autonomous drone capable of flying safely without any tethering or communications network. "This system can fly down a mineshaft into an area where there has been a rockfall, totally autonomously – without the need for a GPS or network signal. It uses LIDAR to produce a map of the area and it will automatically and seamlessly stitch the image into a 3D contour map. The system is currently being used for vertical shaft inspections and it can complete a scan of a 100 m mine shaft in four minutes," he notes.

Highlighting the role DEKRA is starting to play in the field of predictive plant maintenance, integrity services and asset management, Gerber says that the company has partnered with a data analysis and artificial intelligence (AI) specialist. "We are the preferred partner for the supply of digitised NDT results to this company for incorporation into its predictive models and programmes.

Whenever we do a failure analysis, for example, we will do the full analysis on the failed component and then also inspect comparable sound components. Using both sets of data along other engineering parameters, more and more accurate AI models can be developed to better predict and protect plant components."

In terms of sustainability, Gerber suggests that DEKRA aims to be a carbon-neutral company by 2025, by incorporating energy-efficient and renewable technologies into its operations and buildings – and globally, by adding electrical vehicles to its fleet.

"Our services offer high levels of integrity so as to reduce risk and, ultimately, to extend plant life and lower total plant ownership costs. We see investment opportunities all over Africa, particularly in the renewable space, and we believe the continent offers a very exciting future for our company," Gerber concludes.

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DEKRA has access to an autonomous drone capable of flying safely down a mineshaft without any tethering or communications network. The system uses LIDAR to create a map of the inaccessible areas safely, easily and quickly.