Advanced solutions for cathodic protection: when expertise makes the difference

Interview with **Marco Facciadio**, **CEO of SAIT Srl**
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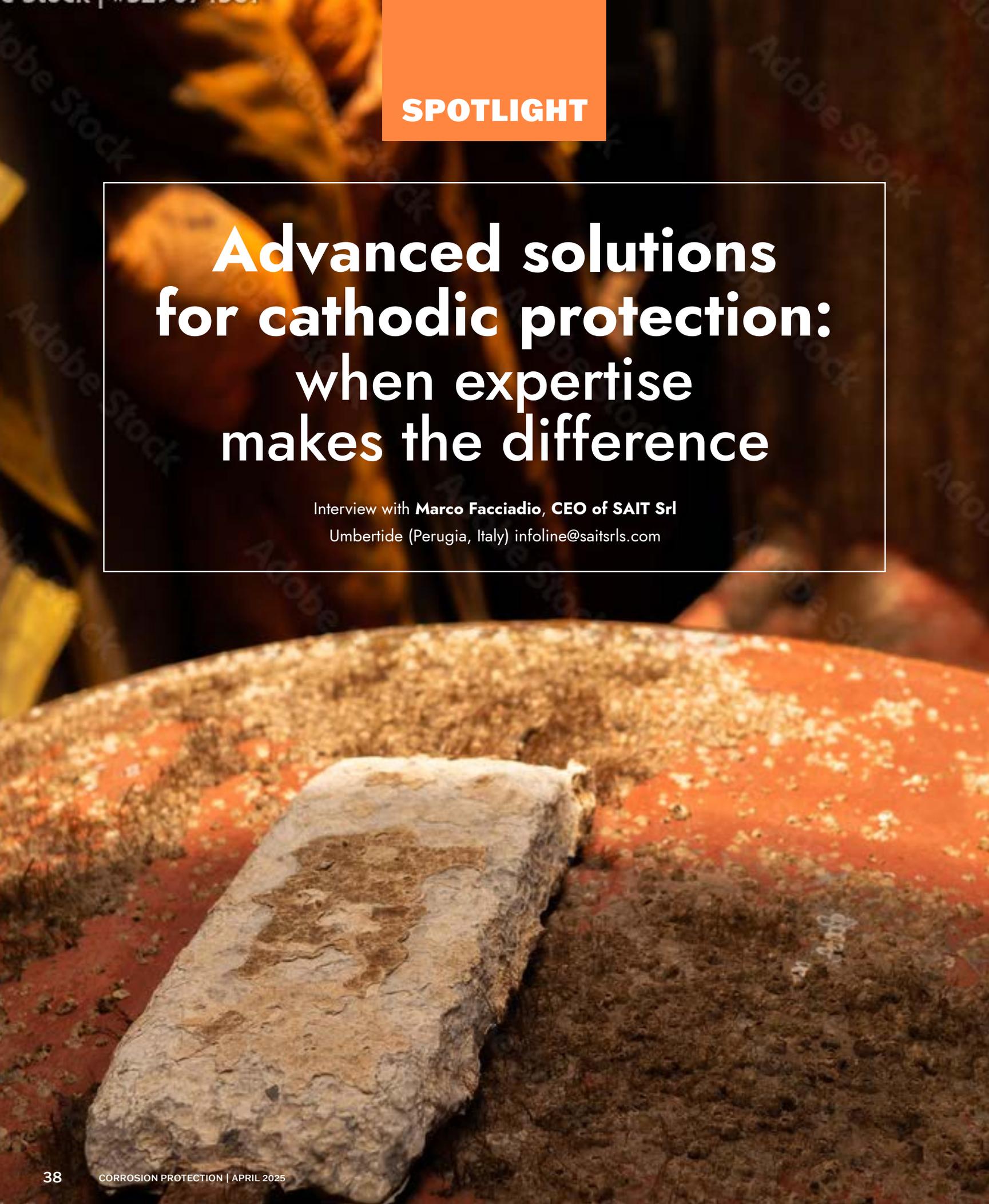


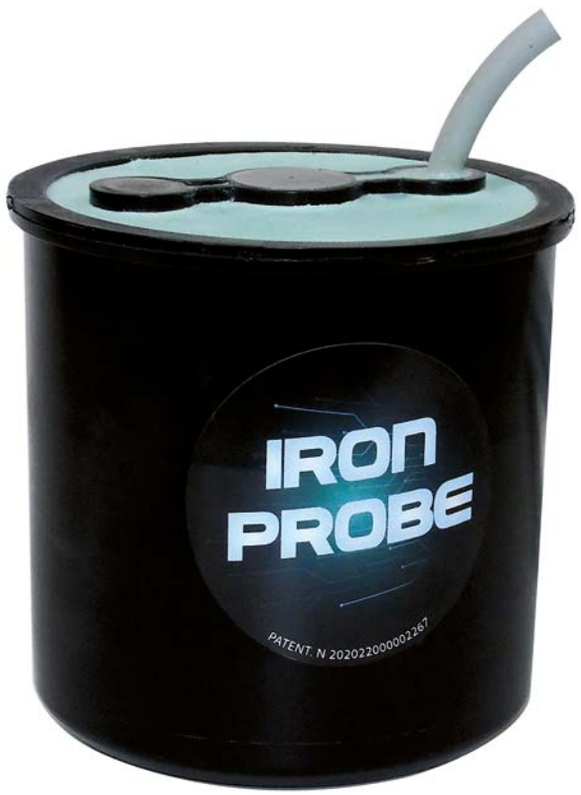
Cathodic protection technology is widely used to protect underground or submerged metal structures and concrete reinforcing bars against corrosion. The first experiments in this field date back to the first half of the 19th century when the first discoveries (and a famous fiasco) by Sir Humphry Davy definitively gave way to the replacement of the copper-coated wooden hulls of warships with more resistant and safer metal ones, which could finally be protected from the aggression of the highly saline marine environment through the first cathodic protection systems. Based on the recent discoveries of the Italians Luigi Galvani and Alessandro Volta, on 22 January 1824, Davy reported to the British Royal Society that when the electrical state of a metallic material becomes more negative, it is possible to eliminate the forces generated and thus prevent the onset of corrosion. Therefore, he had the idea of using iron, tin, and zinc anodes to make copper more negative, eliminating the problem of corrosion. These results laid the foundations for cathodic protection technology and made it possible to use metal materials in maritime structures in total safety. Since then, this technology – still widely studied in university research programmes and many other fields – has developed to become a standard method for corrosion protection, applied in various industries from the maritime sector to bridges and infrastructures, from public and private buildings to underground and submerged pipelines, up to everyday objects such as kettles and water heaters.

Marco Facciadio, the founder and CEO of SAIT Srl (Umbertide, Perugia, Italy), a company specialising in the protection and maintenance of metal infrastructures with a special focus on corrosion prevention through advanced cathodic protection techniques, studied at Politecnico di Milano. “The cathodic protection process has been well established for a long time; the systems and materials are the same for all companies in the sector. Theoretical knowledge is essential for a thorough understanding of the electrochemical process behind the reaction generating it, but what really makes the difference is hands-on experience. That is why SAIT stands out internationally for the degree of innovation and quality of its solutions. And recently, thanks to the many years of experience we have gained and our in-depth specialisation in this corrosion protection technology, we have been able to develop and patent the IRON PROBE® potential probe, a cutting-edge tool designed to monitor the effectiveness of cathodic protection in a precise and reliable way.”

A small company with a wealth of experience

SAIT was founded in 1981 and began offering excavation work to install pipelines and cathodic protection services. In 1990, it expanded its portfolio, specialising in other services linked to this

In the niche sector of cathodic protection, some SMEs offer innovative solutions to optimise this well-established process through their in-depth know-how. With over 25 years of experience in this industry, SAIT has recently launched a new product, the IRON PROBE® high-conductivity potential probe, which improves and simplifies corrosion monitoring operations.



technology, with systems designed to prevent corrosion on steel metal structures such as underground pipes and other assets at risk, e.g. aqueducts and tanks. “Over the years,” says Facciadio, “we have aimed to specialise our staff as much as possible through courses to obtain 3rd-level certifications under the ISO 15257:2017 standard; in 2001, we also obtained ISO 9001/2000 certification. In 2015, SAIT added CANUSA-CPS products for coating steel pipes to its range dedicated to the anti-corrosion sector while also providing technical support in the selection of the most suitable solutions. The following year, we integrated our offer with a corrosion control service for district heating pipes, through which we install and maintain ad hoc control units.
“Finally, in 2022, we filed a patent for the new IRON PROBE® potential probe we developed in-house, which marks a significant step forward in the field of cathodic potential measurement. Thanks to its unique design and patented technology with an integrated single or double coupon to measure the Eoff potential, this probe can operate in extreme environmental conditions while offering accurate and consistent measurements, which is crucial for maintaining the long-term integrity of structures.”

IRON PROBE®, a new high-conductivity potential probe

IRON PROBE® is a specific type of potential probe measuring the Eoff potential of metal structures such as pipelines, tanks, and underground steel infrastructure. “Unlike traditional potential probes,” explains Facciadio, “its high conductivity allows installing it even in particularly resistive soils, obtaining Eon potential measurements that are very similar to the true Eoff potential.”
One of the main characteristics of IRON PROBE® is precisely its ability to provide very precise measurements of the Eon potential, which differs by only 20-30 mV from the true Eoff potential, even in high-impedance soils. It also eliminates interference from disturbance currents that cannot be eliminated with reference electrodes. “Therefore, from an operational point of view, it has two unquestionable benefits: no more doubts – because the use of a probe that simulates the true potential reduces measurement uncertainty and improves the reliability of the collected data – and a better correlation with metal – because, as mentioned, its readings are more closely related to the actual Eoff potential, making the measurement technique simpler and eliminating measurements done with the ON-OFF method.”
The patented porous septum is made of a low-resistance, high-conductivity material suitable for any type of soil. “That means it can also be installed far from the structure to be measured with considerable savings in terms of excavation and restoration while still ensuring a very accurate and precise measurement of the potential.” The mixture of copper sulphate, also patented, prevents leakage by capillarity.

“The effectiveness and precision of IRON PROBE® are guaranteed by compliance with the strictest technical regulations in the industry, in accordance with international standards. This commitment to excellence ensures that each device not only meets but even exceeds the expectations of the most demanding customers.”
This innovative probe can be used to monitor localised corrosion. “Indeed, it can identify specific points along a pipe or structure where the potential indicates a risk of corrosion. It is also useful in electrically complex environments, where stationary and non-stationary interference can affect the results, as IRON PROBE® offers a more representative measurement of the potential, largely eliminating non-real interference.”

Mandatory cathodic protection also in the water sector: the objective of SAIT

“Ever since its launch on the national and international markets, IRON PROBE® has undergone continuous improvements and

IRON PROBE® is a specific type of potential probe used in the context of cathodic protection, especially to measure the Eoff potential of metal structures such as pipelines, tanks, and underground steel infrastructure.

received positive feedback. We have managed to make ourselves known worldwide, even in industries that are difficult for a small company to penetrate, such as the oil & gas sector, where cathodic protection has been standardised for some time now. At the same time, there are sectors where this is not yet the case, such as the water industry, and we are pressing for it to be made mandatory. The control and maintenance of water networks, currently considered a secondary asset, are traditionally entrusted to their managers. But at a time like this, when this resource is increasingly scarce and our society is becoming more aware of the need to find ways of limiting its loss, SAIT is at the forefront of the fight against wastage. According to ISTAT data1, the water lost in public supply networks in Italy alone in 2022 would have met the water needs of 43.4 million people for a whole year. As a service company able to offer effective solutions against such losses, we propose making cathodic protection mandatory also for steel water pipes."

Drawing on its extensive know-how, SAIT can offer solutions to the most complex corrosion issues. "Our expertise is what makes the difference. Cathodic protection systems are affected by many variables, including resistivity, acidity, soil conductivity, pipeline conditions, the type of coating already applied, and temperatures. Analysing and/or predicting all these variables is impossible," concludes Facciadio. "That is why I would like to emphasise that in this sector, experience and professionalism are the key factors at the basis of every service we offer – from design and installation to maintenance and monitoring of cathodic protection systems, from technical consultancy for corrosion risk analysis and for the selection of the best infrastructure protection solutions to training and technical support for companies that need to improve their cathodic protection and corrosion management-related skills."

[1] https://www.istat.it/en/press-release/istat-water-statistics-years-2020-2023/