Intelligent Monitoring of Corrosion in Reinforced Concrete

CORROCHIP, the most efficient solution for long-term monitoring of corrosion in reinforced concrete structures

CORROCHIP is an innovative system for the detection and evaluation of corrosion processes in the steel embedded in concrete that allows detecting it when it starts corrupting, remotely monitoring the state of the structure over time and obtaining information on the progression of corrosion with high reliability.

It is an integral solution that uses sensors embedded in the structure to evaluate the condition of the reinforcements, sends and processes the data in the cloud and provides various physical-chemical parameters, also making an estimation of the corrosion rate using an innovative technique, precise and in real time.

THE GREAT ENEMY OF CONCRETE STRUCTURES

Corrosion is one of the most worrying processes related to the deterioration of the reinforcements embedded in concrete structures, and the one with the greatest economic impact. As it is a process that develops internally, when it’s visible on the surface, the damage is usually very advanced.

Accurate measurement of corrosion in reinforced concrete is essential to analyze the durability and service life of the structure. Detecting corrosion in time and acting proactively lengthens the life of the structure, significantly reduces maintenance costs and guarantees safety.

Anticipate Structural Integrity Issues

CORROCHIP is an autonomous system that provides the information necessary to evaluate the progress of corrosion, allowing timely action in the event of deterioration, to guarantee structural safety.

Constant long-term monitoring

CORROCHIP is integrated into the structure and acts as a sentinel system, taking and sending measurements periodically during the useful life of the structure. The durability of the sensors and the technique used allow the system to be used for years.

Integrable into new and pre-existing structures

CORROCHIP sensors are designed for use in both new construction projects and pre-existing structures. In the latter case, the system is integrated into the structure through minimal intervention.

Connected structures: more security at lower cost

Thanks to the remote monitoring and reliability of CORROCHIP's predictive maintenance system, infrastructure management companies achieve significant cost savings compared to other preventive or corrective maintenance strategies.

An innovative technique

The CORROCHIP system combines the potential of Busscollab's advanced sensors with the novel PSV-TE technique developed by a team of researchers from the Polytechnic University of Valencia. This technique is based on the Tafel extrapolation (TE) method

for the detection of corrosion, improving its main drawbacks by avoiding the polarization of the reinforcement, resulting in a non-destructive method.

A 360° service

Busscollab puts at the disposal of its clients a specialized technical team, which at the client's request will carry out the study of the structure and pre-project, the installation of the CORROCHIP system and subsequently, carry out periodic or specific reports and consulting on the interpretation of themselves and the adoption of repair and/or reinforcement measures.

Autonomous system with embedded sensors

Long-term remote monitoring

High precision non-destructive technique

Calculation of corrosion rate using advanced algorithm

Applicable to any type of reinforced concrete structure

Parameterizable alarm system

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CORROSION CONTROL WITH CORROCHIP

Key tool for assessing safety

CORROCHIP allows the state of structures to be known at all times, without the need to carry out on-site interventions, and offers the necessary information to evaluate the progress of corrosion in order to anticipate deterioration situations that could compromise their integrity. This allows us to act in time guaranteeing structural safety.

Long-term continuous monitoring

CORROCHIP is integrated into the structure and acts as a sentinel system, making and sending measurements periodically during the life of the structure. The durability of the corrosion sensing element –which has a lifetime of at least 100 years in any type of structure– and the use of the non-destructive technique PSV-TE allow the control of corrosion in the very long term.

It can be integrated into new and existing structures

The CORROCHIP sensors are embedded in the concrete after identifying the critical areas for the measurements. In new construction this procedure is carried out before pouring the concrete, while in pre-existing structures it is also possible to integrate the system through minimal intervention.

Connected structures: greater cost efficiency

The remote monitoring and reliability of CORROCHIP's exclusive PSV-TE technique greatly optimize the management of structures and achieve significant reductions in inspection and maintenance costs by providing the critical parameters necessary to evaluate a structure from the point of view durability, in real time.

PSV-TE

Calculation of corrosion rate

CORROCHIP is a novel multiparameter system that uses embedded sensors to detect corrosion in reinforced concrete structures. Based on the physicochemical measurements made by the sensors over time and using the innovate PSV-TE stepped pulse scanning technique, CORROCHIP allows estimating the corrosion rate from the initiation period to the propagation period, based on measurements obtained in real time and with a high level of precision.

This technique, developed by a multidisciplinary team of researchers from the Universitat Politècnica de València, is protected by a patent. It uses a method based on the Tafel extrapolation method (TE) for the detection of corrosion and by using potentials static pulses it eliminates its main drawbacks, such as polarization. irreversible embedded reinforcements. The new PSV-TE technique is therefore a non-destructive method that allows constant monitoring over time and is very accurate compared to other laboratory or field techniques.

THE CORROCHIP SYSTEM

- Automatic measurement with cloud data
- CORROCHIP consists of the following elements:
- Measurement sensor, which is embedded in the armor and consists of:
- Data acquisition and pre-processing board
- One or more working electrodes (WE)
- A counter measuring electrode (CE)
- A reference electrode (RE)
- Internal station, which collects the measurements made by the sensors.
- External station with autonomous photovoltaic power, connected to the CORROCHIP server in the cloud via a 3G / 4G / 5G data radio link.

The CORROCHIP software allows the visualization of the physical parameters measured and incorporates an alarm system for different levels of corrosion in the structure.

A 360º SERVICE

Pre-project
Our specialized team will carry out a study of the structure to define the most representative points for corrosion monitoring and recommend the optimal positioning and number of sensors.

Measurement system installation
The first part of the installation of the CORROCHIP measurement system consists of the integration of the electrodes and the wiring to the measurement electronics and hermetic sealing. Next, the final installation of the power station and connection to the

data network is carried out for the transmission of the measurements to the CORROCHIP server.

Reports and consulting

The Busscollab technical team is in charge of monitoring the parameters and programmed alarms and prepares the periodic reports established with the Client. It also offers advice on the interpretation of the reports and the adoption of remedial and/or reinforcement measures.

Contact us

If you want more information or a demonstration of the CORROCHIP system, do not hesitate to contact us using the attached form.

Name

Email address

Message

I have read and accept the Data Protection Policy.

SEND