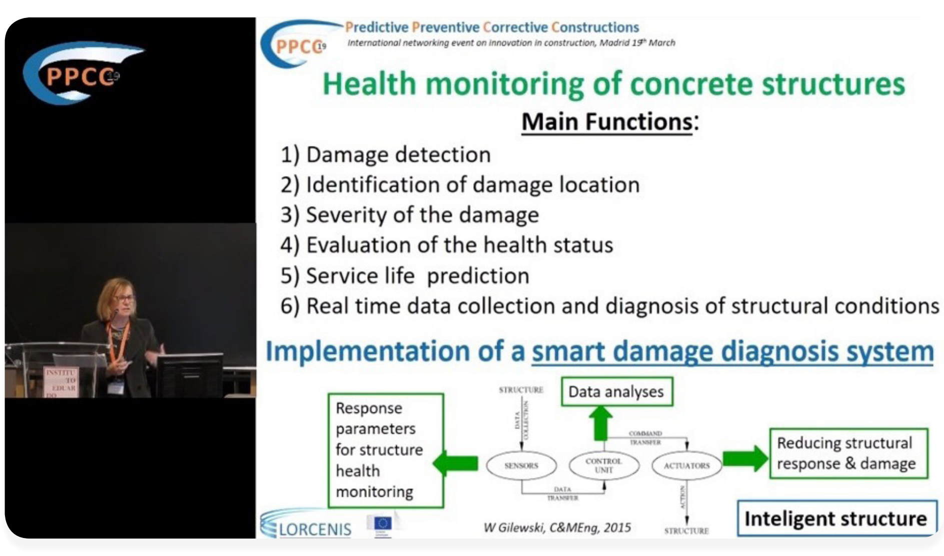
HEALTH MONITORING OF STRUCTURES

M.C. ALONSO (SPAIN), INSTITUTE EDUARDO TORROJA, CSIC,(LORCENIS/ RESHEALIENCE PROJECTS)

Longer service life of concrete structures is more and more required to follow sustainable construction principles. Especially in very aggressive environments, where new concrete compositions and designs are needed; besides, energy infrastructures in many cases, like offshore, need to operate in extreme environmental conditions. The health monitoring of these structures can help to identify through real-time data collection the detection of the appearance of damage, its severity and the diagnosis of structure conditions that will contribute to more accurate service life prediction.

The structure health monitoring considers the implementation to smart new technologies and sensors in concrete, as: Fiber optic, fiber brag grating sensors, piezoelectric sensors, electrochemical sensors, wireless sensing and self-sensing concrete. Through these technologies the monitor of key structural performance parameters is possible: Pressure, strain, humidity, temperature, concrete chemical properties, rebar corrosion risk, self-sensing properties.



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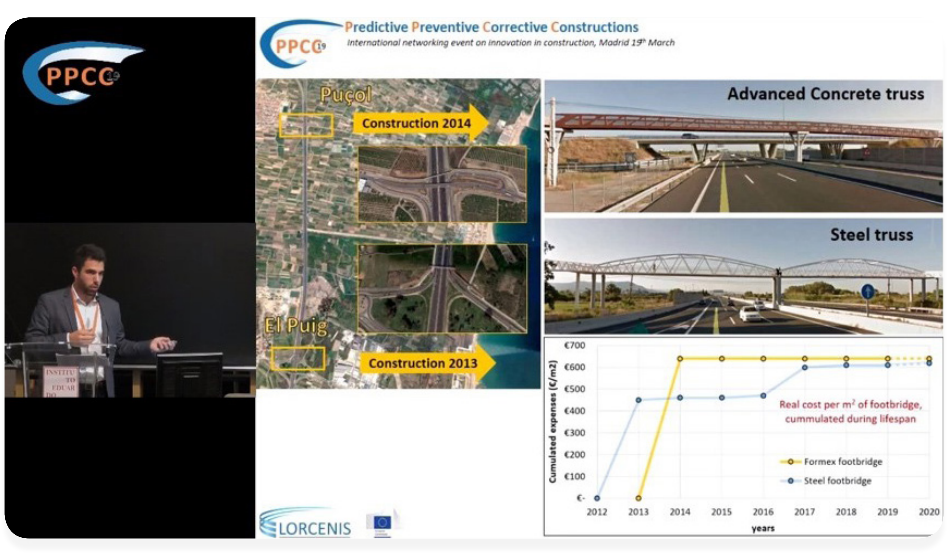
SITE MONITORING TO PROVE EXTREME DURABILITY

E. CAMACHO (SPAIN), SME RESEARCH & DEVELOPMENT CONCRETES, (RESHEALIENCE PARTNER)

The implementation of new materials as an alternative, has the difficulty of lacking experiences that contrast and generate trust in the end user. Against this background, RDC is committed to the development of resilient and durable structures with fewer resources. In order to acquire this confidence, it is necessary to invest and contrast experiences that demonstrate the performance in pilots of structures with design criteria based on durability and with more economical alternatives from a sustainable point of view as well. RDC presented two case studies of continuous monitoring of structures of various uses, as opposed to traditional solutions with conventional concretes.



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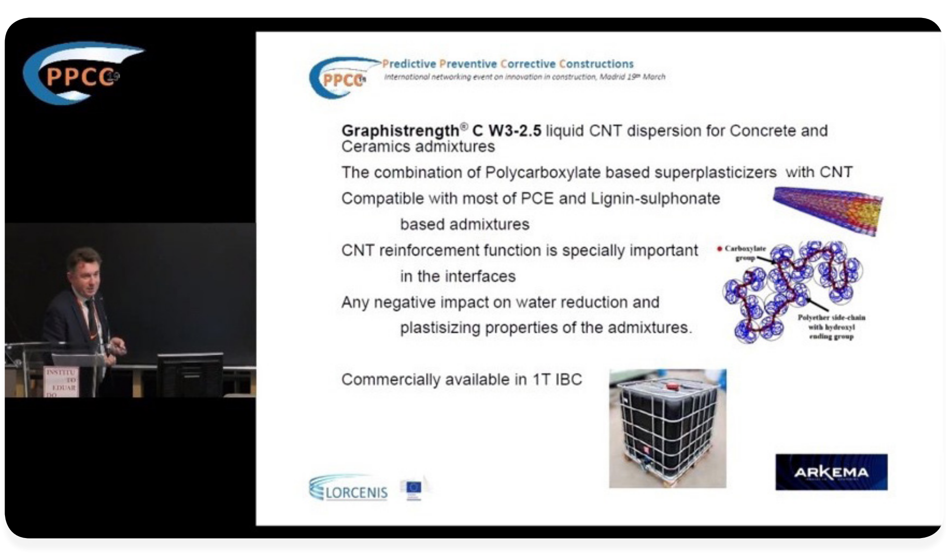
NEW MATERIALS FOR SELF-DIAGNOSIS IN CONSTRUCTION

A. KORZHENKO (FRANCE), ARKEMA, (PROFILE: IND)

Future expectances from product production to market introduction and application.



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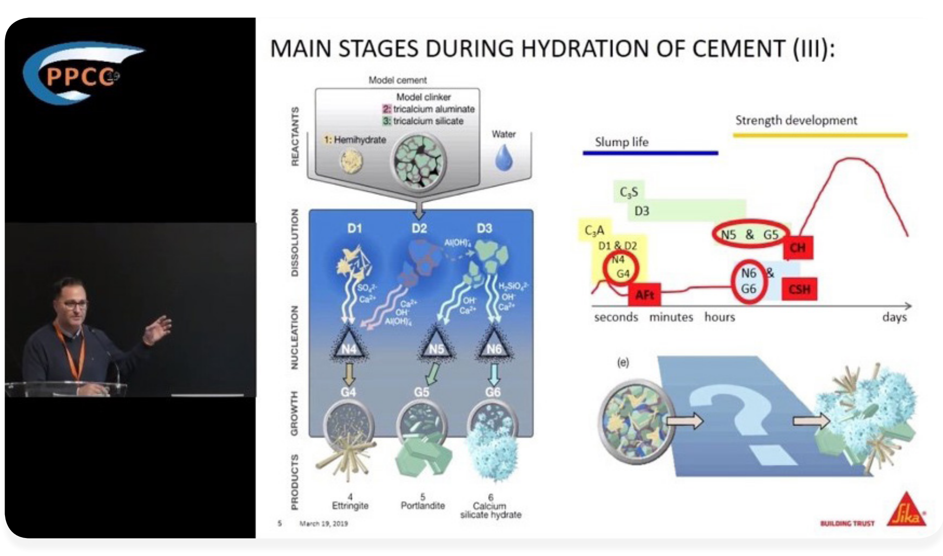
ACTIVE CONTRIBUTING TECHNOLOGIES IN THE FIELD OF DURABILITY

R. GARCIA (SPAIN), SIKA, (PROFILE IND)

Technologies already available ready to mitigate and increase durable features, focusing in supplementary cementitious additions and nanoparticles. The durability of concrete structures is related to three stages of the cement hydration process: dissolution-nucleation-growth. Understanding the process is the way to improve durability. The incorporation of additives can vary the hydration processes and the formation of the microstructure modifying the properties of the concrete. Through the study of the combined use of additions such as nanosilica and metakaolin in concrete, as opposed to a conventional concrete, the importance of modifying the characteristics of concrete as a consequence of the variation of the formation of the microstructures and the characterization through different tests was shown. The study establishes the importance of understanding hydration mechanisms to optimise the design of mixtures, the development of test methods and applied techniques to evaluate and improve durability and service life.



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EXPECTANCES FROM INTERNAL CURING IN CONCRETE

M. FRANCINI, S. IRICO (ITALY), BUZZI UNICEM, DYCKERHOFF, (PROFILE: IND)

Cement and concrete supplier point of view and practical experience on concrete curing and other concrete topics which could require self-responsive admixtures.

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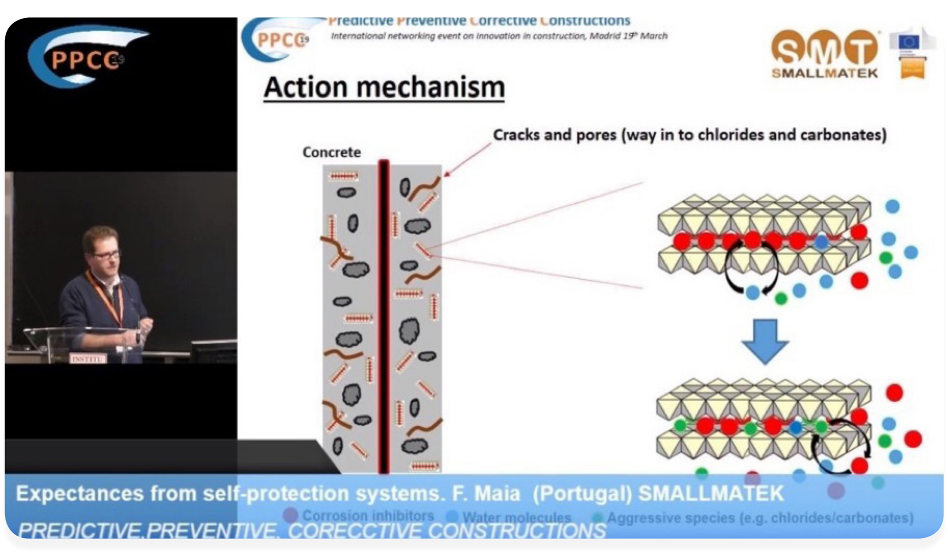
EXPECTANCES FROM SELF-PROTECTION SYSTEMS

F. MAIA (PORTUGAL), SMALLMATEK, (LORCENIS PARTNER, SME), R&D DIRECTOR OF SMALLMATEK

Layered double hydroxide (LDH) is one of the most expected additives for self-protection properties in concrete. The objective of this additive is the reduction or suppression of carbonation, chloride diffusion and corrosion. Thanks to its structure and versatility, LDH clay can be combined with corrosion inhibiting materials that act when the pores and cracks of the concrete allow the penetration of water and aggressive agents. The mechanism of action is to trap the aggressive agents through the capture and again generate a balance of the system. The development of the technology at this time is focused on the size of the particles, the effect on the setting kinetic by Zinc effect (Zn). The positive aspect in the incorporation of the material to the market to take into account is the possibility of reducing maintenance costs and increasing the service life of the structures with a multifunctional additive for self-protection purposes.



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