

An Overview of InnovaConcrete Project

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An overview of the project and its first results will be presented. InnovaConcrete is an innovative and ambitious project – started in January 2018 and spanning a three years period – funded by the European Union under the Horizon 2020 Programme with more than 6,8 million Euro. The University of Cadiz coordinates the project consortium composed by 29 partners of 11 different countries. This project aims at preserving concrete-based monuments, the most significant tangible Cultural Heritage (CH) in the 20th Century. To achieve this goal, it has recruited an interdisciplinary team presenting a strong scientific background in simulation techniques and nanomaterials synthesis, combined with a wide knowledge of CH conservation from Humanities disciplines and, a sound industrial perspective. Specifically, a completely innovative approach based on producing C-S-H gel, responsible for the engineering properties of cement paste in cracks of decayed concrete monument, in situ, will be developed. Complementary, these innovative solutions can be functionalised with superhydrophobicity and corrosion inhibition properties. In addition, InnovaConcrete will explore other approaches: enzyme assisted self-healing of damaged surfaces, inorganic nanotubes and atmospheric plasma device for product application. The optimization of the solutions proposed will be carried out by the use of theoretical tools (multi-scale modelling approaches) together with experimental tools (laboratory and in situ validation). Therefore seven concrete-based monuments, a clear representation of European CH, have been chosen as case studies to validate the performance of the proposed solutions. They have been selected according to scientific and humanistic criteria and because they will be used to study economic and societal effects of the proposals and to promote citizens' awareness of 20th Century European heritage. Thus, the selection includes monuments with significant numbers of visitors per year, such as the spectacular Centennial Hall building, included in the UNESCO world heritage list and Chillida sculptures. In addition, other buildings and sites that are hardly recognised by citizens as Cultural Heritage, such as Concrete Shell Structures, an important achievement of the post-war modernist movement, and War Memorial Towers, symbols of the collective identity of European citizens and Kaunas Fort, one of the first concrete buildings of the 20th Century, have also been selected. Finally, the Torroja Building has been chosen as a representative model of interdisciplinary collaboration between architecture and engineering during the 20th Century. An active participation of SMEs and LEs in this project, including a multinational company leading the concrete technologies market in 100 different counties, guarantees an effective market uptake of the solutions developed in Innovaconcrete.