

Press Release

The RoBétArmé project consortium is proud to announce the commencement of this ambitious and innovative endeavour, financed by the European Commission under the Horizon Europe Research and Innovation Action (RIA) Grant Agreement n. 101058731. The RoBétArmé consortium comprises 19 high-profile European research centres and universities, world-class construction enterprises, established non-profit organizations and industry-leading companies and SMEs.

From Industry 4.0 to Construction 4.0

The construction sector carries a strategic importance for the European economy, involving a wide range of stakeholders and companies, and providing millions of jobs which, according to the forecasts of the World Economic Forum, will rise from the current 6% of GDP to 14.7% in 2030.

To attain a level of automation in construction similar to Industry 4.0, sensors, augmented reality systems, high-performance computers, additive manufacturing, improved materials, autonomous robots, and simulation systems have been adapted. Construction 4.0 describes this shift. Construction 4.0 promises to deliver the same benefits to the construction area as Industry 4.0 by automating manual, tedious, repetitive, and unhealthy human labour.

One particular method that is gaining ground in construction of public works and infrastructure is shotcrete – concrete applied by spraying. **Shotcrete** is becoming increasingly popular among construction stakeholders, as its application is **extremely economical** and **flexible**. According to construction market needs, the increase in mining activities around the world, the increase in tunnel construction due to rapid urbanization in emerging economies, and the growth in construction repairs in developed countries, demand excessive automation of **concrete placement**. **Shotcrete is compatible with the Construction 4.0 vision, as application can be mechanized to a high degree**. Nonetheless, existing shotcrete application methods still suffer from a high degree of arduous manual labor, which increases construction costs and exposes workers to health risks.

The RoBétArmé Project Vision

Targeting a step-change in Construction 4.0, the RoBétArmé project aims toward automating particularly laborious construction tasks in all phases of shotcrete application, through a highly digitalized robotics solution, which is robust and versatile enough to perform autonomous shotcreting in diverse construction environments e.g. tunnels, buildings, bridges, retaining walls, etc.

To this end, RoBétArmé will research and develop collaborative construction mobile manipulators, specifically: (I) **An Inspection Reconnaissance manipulator (IRR)** to address fast, high precision modelling and rebar reinforcement through metal additive manufacturing in the preparatory phase, and (II) **A Shotcrete and Finishing mobile manipulator (SFR)** to address autonomous shotcrete application and surface finishing during the construction and finishing phase, respectively.

The RoBétArmé architecture **follows the three shotcrete application phases** exhibiting in each one the advanced technological solutions for the automation of the complete shotcrete application chain.

The RoBétArmé consortium was carefully selected for their acknowledged excellence to provide the necessary knowledge, expertise and state-of-the-art background required to ensure the project's success. In terms of partner's profile, the consortium is well balanced, with **five world-class research centers and universities** (CERTH, DTU, EPFL, KUL and SDU), **eight leading industrial companies** and **SMEs** (COBOD, ROB, ANIMA, TITAN, DTT, ICE, IA and DS4), **three non-profit organizations** (UNI, MORE and EFF), and **three end-user representatives, with international presence in the construction sector** (BYCN, ARUP and CEAS). RoBétArmé partners stem from 11 European Union countries including Greece, Denmark, Belgium, Germany, Italy, Spain, Bulgaria, Portugal, Austria, Ireland and France, and one partner from Switzerland.

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