Introduction:

When one thinks about a reinforced concrete building element, clearly it is associated with an inanimate being, in the same way that a stone is also associated with an inanimate being. But what if it were possible to provide this element of reinforced concrete, this inanimate being, of a nervous system that would enable it to transmit data about its health condition (cracking, warping, moisture, carbonation, oxidation, etc.). What if it were possible to do with the whole
structure of a building?.

Clearly this would provide significant benefits, to significantly facilitate the maintenance of buildings and the existing early detection of pathologies.

As a starting basic concept is clearly demonstrated that it is much better perform preventive maintenance on buildings, that don't do it and intervene when there are serious injuries (corrective maintenance). Indeed, with preventive maintenance on the one hand we avoid risk situations for people (very serious injuries that can cause collapse of buildings or parts thereof, loose street façades, etc.). On the other hand is more economical to do building maintenance and periodic inspections, that don't do maintenance and then rehabilitate the building when it is heavily degraded.

In this context, it may be of great interest to use new technologies, to facilitate and optimize the structural health management and maintenance of buildings, and thus contributing decisively to extend their useful life and reduce costs.

The basic concept is to provide a building structure of sensors (especially continuous and composed of Optical Backscatter Reflectometer (OBR)), so that the structure is provided with a "nervous system" and is capable of transmitting useful information on their state of health (deformation, cracking, stress, humidity, etc.). Similarly, the structure can warn through a voice system if any part of this structure suffers an injury that exceeds pre-set parameters. In recent research in the School of Civil Engineering of Barcelona has been demonstrated that OBR gives right data of deformation in reinforced concrete structures.

Everything about it is clearly included in the overall concept of Smart city and Smart materials. In fact, this type of referred structures are often called Smart structures.

Project Brief:

The Outcome of this project is to evaluate the economic viability of the proposal, because if it were the case that it had a cost of deployment in buildings very high, much higher than any savings that could reverberate back, it would be clear that the proposal would not be feasible to apply extensively in buildings, but only in some specific cases for scientific study.

Therefore the study should be of cost benefit, as is known in the field of Applied Economics. In this study must be analyzed on one hand which is the initial cost increase which involves the implementation of the proposal in a building. On the other side must be evaluated which is the saving of money along the time involved in implementing the proposal, which allows you to set the return period of the initial investment, and from what time you can expect net benefits.

In this context, it is also appropriate to consider the savings of money along the time that represents the application of the referred technologies in the field of domotics and building energy efficiency, as well as issues related to the so-called social cost.

The final goal would be to apply the OBR technology in a real building, and study the technical and economical behaviour of the proposal.

In this project is planned to collaborate with the School of Civil Engineering of Barcelona, since they are researching precisely on the economic feasibility of smart structures.

Company

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**Project team:**

<table>
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<tr>
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