1 Research Achievements Summary

Building Resilient (www.b-resilient.webs.upv.es) is a research group at the *ICITECH-UPV*. Our research is carried out in the structural engineering field and has always been oriented towards **improving the resilience** of buildings and infrastructures. The areas in which we work are: 1) structural retrofitting; 2) "Learning from Failures"; 3) structural assessment; and 4) progressive collapse and robustness.

We consider ourselves **experimentalists**; so our research has always been associated with ambitious experimental campaigns, including many on full-scale structures. We combine **basic and applied research**, with a high degree of **transfer to industry**.

At present we devote most of our time and resources to research areas #3 and #4:

Structural assessment. In this area we have worked on: a) masonry structures; b) Structural Health Monitoring (SHM); and c) the design, production, implementation and decision-making with fibre optic sensors. We have a patent for a new fibre optic sensor that can obtain much more precise measurements than its competitors. We have also directed a research project that involved testing full-scale timbrel cross vaults subjected to the settlement of their supports, which was a pioneer in the international field. We transfer the results obtained in this research area to society through the *CALSENS* spin-off company.

Progressive collapse and robustness. Here, we focus on: a) tests on full-scale buildings, which have provided an understanding of the alternative load paths that become active after the sudden failure of corner columns; b) robustness of temporary shoring structures and buildings under construction, which led to the development and putting on the market of novel "structural fuses" for shoring systems; and c) the first study in the world involving the testing of the robustness of a 21m span steel riveted railway bridge.

We can cite the following as some of the most important merits or contributions:

1) **ERC Consolidator Grant 2020**. We were recently awarded an *ERC Consolidator Grant*, which is one of the EU's most prestigious research grant, for the amount of **€2.5 million**. This is the **first grant of this type** ever awarded in the structural engineering field. The overall aim of the project is to define a novel fuse-based segmentation design approach to arrest the propagation of failures in building structures. The project will range between **basic research**, defining a new building design philosophy, and **applied research**, leading to the design and production of novel structural fuses and two proofs of concept in actual buildings.
2) **CALSENS (UPV spin-off company).** We are **partner-founders** of *CALSENS*, which is involved in monitoring structures, structural assessment and decision making. By means of *CALSENS* we transfer to society the results obtained in my research area "structural assessment".

2 Contact

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