

Study of the structural behavior of traditional masonry vaults and reinforcement solutions. Application to Alentejo vaults

Summary

One of the goals of this research is to study the evolution of traditional structural systems from Prehistory to the Middle Ages, to recognize the factors that triggered this evolution, the technical development and the underlying construction processes, and which civilizations stood out for their pioneering and innovation throughout this process.

Among the traditional construction techniques, one in particular was studied in more detail, called the "Alentejo vault". This is a technique that has been developed over thousands of years, widely used in the past in the Mediterranean basin and in Portugal, mainly in the Alentejo region, but also in the Algarve. However, its use has been abandoned over the years and is at risk of being forgotten. Therefore, one of the objectives of this work is to rescue this traditional form of construction, to seek its origins, to identify its characteristics, the materials used, its typologies, its variants, its construction process, and its strengths and limitations.

In the past, the construction of "Alentejo vaults" was based on the experience that came from a slow process of trial and error that led to the establishment of some empirical design rules. However, nowadays it is not possible to resort to a structural solution without it being supported by a solid scientific basis. Thus, a series of full-scale load tests were carried out to study the structural behavior of the "Alentejo vaults", to investigate their load capacity and, based on the results obtained, to calibrate numerical simulation models of their structural behavior which were subsequently carried out.

Keywords

Traditional construction, "Alentejo vault", loading tests, numerical simulation models.



Regions of greatest implementation of the "Alentejo vault".



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