

## **DOCTORAL DISSERTATION**

# **OPTIMIZATION OF TECHNICAL-SCIENTIFIC PROCEDURES APPLIED TO THE RESTORATION OF CULTURAL HERITAGE**

## **ABSTRACT**

This doctoral dissertation is the result of a long research experience on the key role of science and technology in the restoration of immovable cultural heritage. The orderly and systematic presentation of the information increases its applicability by the various parties involved in the intervention. Although this methodology focuses mostly on building preservation, it can also be used as a tool for the elaboration and development of the project and the restoration effort.

It is demonstrated that it is possible to establish feedback mechanisms between the project and the analytic work, thus refining a system that facilitates knowledge application and clarifies the restoration process. This research has resulted in a cohesive set of guidelines that work as catalyst for the application of technical and scientific procedures. These guidelines create a broad network of relationships, highlighting the most prominent aspects of realized experiences and turning them into intervention models.

The method is presented in the form of protocols. They are clearly articulated to create a hierarchical and ramified system in which the logical sequences can be executed independently and easily based on the priorities or needs. The method has been set forth in a direct way, using technical language in a way that is understandable to the different parties involved in the processes. The tool achieved is versatile and can serve as guideline of good practice in interventions.

A fundamental development axis is preventive conservation. It establishes the need to plan the actions by analyzing the risks that threaten cultural heritage, adopt measures to avoid foreseeable affections, and correctly maintain its material characteristics. These strategies allow for a better management of available resources. This integrative view includes constant communication with the parties involved and guarantees the sustainability of the process.

The applied research focuses on the Cathedral of Jaen, which presents exceptional conditions to verify the relationship between different deterioration processes and the application of a restoration methodology in real circumstances and under a limited availability of resources. Although this cathedral is the main source of study, there are numerous examples from other projects in which the same sequential criteria were applied to organize information and utilize it in a coherent and systematic manner.