

## THE DYNAMIC ROLE OF NON DESTRUCTIVE TESTING IN THE DIAGNOSIS AND PROTECTION OF CULTURAL HERITAGE

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### Abstract

It is widely recognized that various societal challenges cannot be effectively addressed without preserving our cultural heritage and understanding of our past. Built cultural heritage, in particular, can offer invaluable knowledge regarding the durability of structures and their effective integration in a sustainable living environment, compatible with the contemporary needs of our Society. Built Cultural Heritage covers a wide range of assets: from archaeological sites, to historic buildings, structures and monuments, up to the scale of historic cities. Therefore, built cultural heritage requires an interdisciplinary approach and a diverse knowhow for its successful preservation for generations to come. Non-Destructive Testing (NDT) has been used in the last decades in the field of built cultural heritage, accumulating indispensable experience and providing crucial data, in conjunction with analytical testing. Recent technological advancement in the field of NDTs, as well as the recognition that the information provided by NDTs is more efficiently analyzed when NDTs are employed as part of an integrated diagnosis and protection approach, have been the driving forces behind recent Research.

The dynamic role of NDT is highlighted in this presentation through four emblematic use cases, covering a wide spectrum of built cultural heritage assets categories: The Temple of Pythian Apollo at the Acropolis of Rhodes; the Holy Aedicule of the Holy Sepulchre in Jerusalem; the Plaka bridge in Epirus; the Medieval City of Rhodes. This role is dynamic, since NDTs are employed in all stages of diagnosis and protection of cultural heritage, providing when-, where- and as-needed critical information. It will be demonstrated how NDTs, within an integrated diagnosis approach complemented by historic, architectural, geometrical and materials documentation, can provide information regarding the origins of decay and damage, the structure of assets and the interrelation of the assets with their environment. Such information is necessary for an efficient design of any restoration/protection/rehabilitation interventions and materials. During the actual implementation of any interventions, NDTs are utilized to assess the effectiveness of the implemented measures and to support quality control, while more than often in the case of built cultural heritage provide new scientific and technical findings during the works, which may necessitate appropriate modifications of the designed interventions. Furthermore, after the completion of the works, NDTs offer practical advantages over analytical and destructive testing in supporting monitoring and preventive maintenance of built cultural heritage, hence accomplishing scientific support to decision making concerning all stages of Heritage protection process.