



## **Integrated approach based on non-invasive investigations for the structural diagnosis of monuments: the case of the San Francesco della Scarpa Church in Lecce**

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The paper shows the results of a diagnostics survey, based on the ground penetrating radar (GPR), seismic tomography and microtremor horizontal-to-vertical ratio (HVSR) method, to understand the causes of some static instability problems affecting the Church of San Francesco della Scarpa in Lecce (Apulia region, Southern Italy). The prospecting falls within the more general framework of a diagnostic investigation campaign for the restoration of the monument. This study case points out the great effectiveness of the employed diagnostic methods, when used in an integrated way, for detecting cracks and inhomogeneities in the inner structure of masonry building elements [1-2]. With regard to GPR prospecting, in order to better evidence the micro-fracture, a new algorithm, based on a clutter removal technique, has been used. In particular, it removes various unwanted signals such as cross talk, initial ground reflection and antenna ringing. Moreover, seismic tomographies provided complementary information on the mediocre state of conservation of some load bearing structures of the church. Finally, HVSR method allowed to study the relationship between decay patterns, instability problems and seismic response of the monument.

### Reference

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