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Detection of the corrosion in reinforced concrete with GPR: the case study of the Park Guell

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Detection of corrosion is important in cultural heritage assessment. Many structures contain metallic targets embedded in masonry or mortar, and corrosion cab cause important damage. However, detection using non-destructive methods is difficult and highly localized, providing in most cases incomplete results. In order to obtain a more extended analysis, GPR was applied and evaluated to detect damage as consequence of corrosion. This technique is a non-destructive method that covers a large area of study while other methods are constrained to a small areas or specific points. Therefore, some controlled laboratory tests were designed to determine possible differences in radargrams obtained in the case of corroded and non-corroded targets. These analysis allowed to observe that the corrosion seems to increase the attenuation of the radar signal, being difficult to detect targets near the damaged bars.

The results were applied to study the mosaic roofs in the Park Guell, in Barcelona. This park is one of the most important Modernista (Art Noveau) complex in Barcelona. It is characterized by structures with roofs and banks with tessellation. Some of these structures are most likely supported by metal elements, and seepage cause important damage observed over the tessellation. The objective of the study was to define the possible existence of those metallic targets, determining their location. And, in the case of existence of metallic elements, defining which are the zones more affected by corrosion. The results demonstrates the existence of metallic supports in many parts, as well as some defined areas that could be damaged.

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