



O' Connell bridge inspection by means of Ground Penetrating Radar

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Ground Penetrating Radar (GPR) is a well-known technique successfully applied in different areas. In structural inspection the methodology may expose information about structural arrangement and pathologies.

GPR emits high frequency electromagnetic impulses allowing to detect changes on the electromagnetic properties: electrical conductivity, dielectric constant and magnetic permeability. The central frequency of the each antenna is characterized by a specific resolution and penetration depth. Therefore, different scales of structures can be analysed. High frequency antennas output high resolution images/signals about the shallowest elements such as rebar and the thickness of the first layer. On the other hand, intermediate or lower frequency antennas locate deeper structures, such as the thickness of the arch. The compilation of distinct frequencies gives a better understanding and a more accurate detection of elements in the inner structure.

O'Connell Bridge (1877) is one of 24 bridges along River Liffey and one the most famous historical structures in Dublin. It is composed by sandstones and granite and covered by asphalt which represents a suitable structure to evaluate by means of GPR. The lack of inner structural information, especially the thickness of the layer, presence of reinforcement or other metallic elements of support required, at least, a dual frequency analysis of the bridge. In this case, it was applied the (200 MHz and 600 MHz) Multi-Channel Stream EM combined with 1.6 GHz GSSI high frequency antenna.

The inspection of bridges by means of GPR may provide not exclusively interesting structural data but historical information and the state of conservation.