

# The Structural Health Monitoring of a Reinforced Concrete Water Tower

Ruben Paul Borg

*University of Malta, Malta*

Luis Santos

*National Laboratory for Civil Engineering (LNEC)*

Edward Gatt

*University of Malta, Malta*

Elsa Pereira

*National Laboratory for Civil Engineering (LNEC)*

Structures can suffer long-term damage as a result of actions and environmental conditions and exposure with time resulting in a gradual deterioration in performance. Structural repair interventions and strengthening of structures are relatively costly. Structural health monitoring (SHM) can mitigate the high repair costs by detecting early on and measuring damage phenomena with time. Structural Health Monitoring can mitigate long-term damage by continuously monitoring the structural condition of key elements and parts of the structure. SHM can be particularly important in the case of new structures, damaged structures and in particular in structures which have been repaired or strengthened, in order to measure their performance with time. A Structural Health Monitoring strategy is applied to a reinforced concrete water tower constructed in the 1930s, for which a repair and strengthening intervention is considered. The objective of SHM is to monitor the performance of the existing materials and structural elements and the repair interventions including the new materials used in the repair intervention. The SHM strategy for the water tower refers to key performance indicators, critical components and elements in various parts of the structure, with reference to specific actions. The SHM is based on various technologies and sensor network systems which are intended to monitor the performance of the water tower with time. The water tower SHM and degradation monitoring framework proposed, based on a sensor network system, is assessed within a wider strategy for the monitoring of performance of repair interventions on deteriorated reinforced concrete structures.