

Modernizing the Sagrada Familia's monitoring system

Country

Spain

Industry

Geotechnical
Structural

Application Areas

Infrastructure

Context

More than a century after work began, La Sagrada Familia, Antoni Gaudí's emblematic modernist cathedral, is still under construction. Construction on this unique architectural work presents an engineering challenge while also creating a potential risk to the building's own structural integrity. The old structural monitoring systems, based on many metres of cable and local servers, proved unsustainable as a result of the levels of maintenance required and difficulties installing new systems as the work progressed. In 2023, in an effort to preserve and guarantee the stability of the structure, the company [ECR Medio Ambiente](#) was commissioned to undertake the monitoring work and implement a transition to a wireless monitoring system. The main challenge consisted of transitioning from a wired automation system and recreating the database of the entire 10+ year history.



Solution

ECR Medio Ambiente proposed a [Loadsensing](#) monitoring system to gather information directly from the sensor points, which allowed many of the installed sensors to be reused. In addition, this new technology simplified the scalability of the network, allowing new points and measurement parameters to be added easily with no need to run new cable routes. In the Sagrada Familia project, the Loadsensing system is used to collect information from crackmeters, extensometers, pressure cells, piezometry, inclinometers, vibration and meteorological parameters. Furthermore, this information is cross-referenced with topographical information collected by two fully robotic stations.



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Victor Sánchez Vila

Director Barcelona branch office
ECR Medio Ambiente

Benefits

The combination of instruments deployed on the Sagrada Familia provides an overall picture of the structural health of the building. The configuration allows deformations, movements and other parameters that may be relevant from a geotechnical or structural point of view to be detected. It also provides valuable information for future stages of construction, restoration and preservation. The data obtained during the process helps the design teams to better understand the dynamics of the structure, and to make informed decisions about future works. The auscultation of the Sagrada Familia represents an ongoing commitment to the preservation and care of one of the world's most important architectural treasures.

Advantages

The Loadsensing solution allowed ECR Medio Ambiente to quickly recommission the previous network of sensors by installing nodes where they were already located. This provided a simple way to reintegrate the entire existing network by means of an integral system. Thus, parameters such as vibrations or meteorological information could be added to the same platform, facilitating their subsequent integration with data analysis software. This technology has proved to be very useful as it avoids the installation of new cables to new measurement points, which helps reduce the aesthetic impact on surfaces and avoids possible damage to façades and internal surfaces.



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