

# Case Study

## Structural Health Monitoring

### Coliseo de Puerto Rico

José Miguel Agrelot  
San Juan, Puerto Rico



In Cooperation With



## Background

The [Coliseo de Puerto Rico José Miguel Agrelot](#) is the biggest indoor arena in Puerto Rico dedicated to entertainment. Constructed from 1998 to 2004, the Coliseo, as it is known locally, opened Sept. 4, 2004 to cater to up to 18,500 spectators at a time for a variety of events including concerts and sports. It is located in the Golden Mile of San Juan.

## Challenge

As Puerto Rico is prone to earthquakes and seasonally may encounter high winds and hurricanes, and as the Coliseo had been serving large audiences for 20 years and has a duty to safeguard the public and the premises, the Coliseo wanted to implement a Structural Health Monitoring (SHM) solution.

## Solution

To address the need for Structural Health Monitoring (SHM) at the Coliseo, management contracted our Partner [Estructura](#), a firm specialising in SHM solutions for various structures, including residential and commercial buildings, bridges, dams, and railways. Estructura operates in both Puerto Rico and the continental U.S.

For this project, Estructura deployed GeoSIG's [GeoSMART](#) software to acquire real-time data from a network of advanced sensors strategically placed throughout the stadium. These sophisticated tools offer critical insights into the building's structural integrity, even during high-capacity events. GeoSMART provides not only precise real-time data processing but also long-term data archiving for extended analysis.

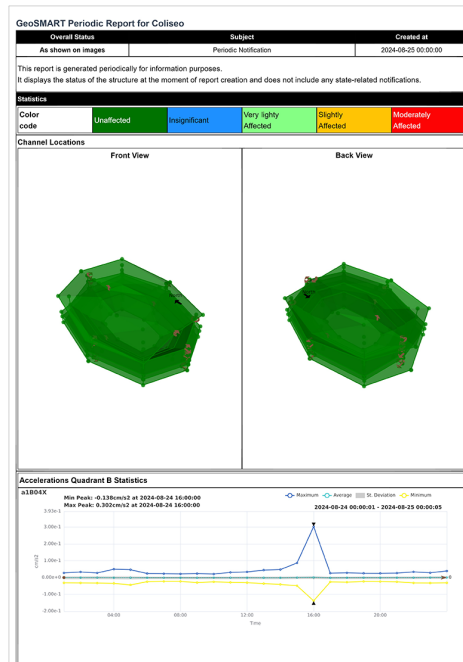
As part of the SHM system implemented at the Coliseo, a comprehensive network of accelerometers—uniaxial, biaxial, and triaxial force balance types—was installed to capture detailed seismic and structural response data. These sensors were integrated with digital data loggers to ensure high-precision data acquisition and reliable long-term performance. The system also featured dedicated interface components for sensor and alarm integration, along with custom cabling designed to support seamless operation. Data collection and analysis were managed through GeoSIG's proprietary software suite, including GeoDAS-ECD for hardware configuration and maintenance, and GeoSMART for real-time continuous data acquisition, analysis, monitoring, visualisation and notifications. To complement the system, environmental and structural conditions were further assessed using an anemometer for wind speed and direction measurement, as well as a tilt meter to monitor roof behaviour.

Data is accessible through a user-friendly web interface, enabling intuitive monitoring and in-depth structural behavior analysis. The software features a 3D model that visually indicates sensor channel threshold exceedances and their potential impact on structural components. GeoSMART also facilitates the generation and distribution of structural assessment and status reports via email to keep stakeholders informed.

Another solution using GeoSIG instruments and a capable partner showing that quality and reliability can also be cost effective.



Coliseo de Puerto Rico José Miguel Agrelot (Choliseo) is a popular entertainment venue in San Juan, hosting a variety of events including concerts and sports, both day (above) and night (below).



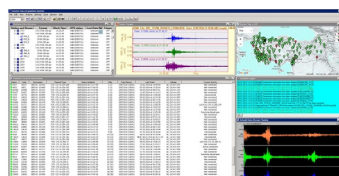
A sample GeoSmart report showing there are no detected problems in the Coliseo.



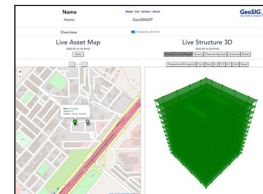
[AC-73 accelerometers](#)



[GMSplusD](#)



[GeoDAS software](#)



[GeoSMART software](#)