

Monaco – L’Anse du Portier Structural Monitoring

CLIENT: GEOMESURE / TOPOSUD / BOUYGUES TP

How landmark French Riviera project benefitted from wireless remote monitoring of critical structures

TOPOSUD

Geomesure



Challenge

In 1971, the Principality of Monaco agreed to a €30 m development project: the Complexe Immobilier des Spelugues. The complex, with its hotel, convention centre and apartments, was built over Boulevard Louis II road on 15 metre concrete columns overlooking the Mediterranean Sea.

Four decades on, land scarcity led the Principality to expand into the sea once again, with the development of a new 6-hectare district, l'Anse du Portier. Construction included:

- Removing existing rip-rap and dredging 600,000 m³ of polluted silt.
- Backfilling and vibro-compacting 1.5 m tonnes of rock.
- Installing 18 concrete caissons measuring 27 x 28 m and weighing 10,000 tonnes.
- importing 750,000 tonnes of new soil
- Installing 1,100 piles.

In order to manage the risk of disruption or damage to the original Spelugues complex, an accurate and reliable monitoring system was needed.

Solution

Regional surveying experts, Toposud first contacted Geomesure, Senceive's French distributor, for technical advice. They wanted to continuously monitor the beams and columns without the unsightly cables and limitations of a fixed optical system. They chose the FM3N-IX FlatMesh™ 3 Triaxial Tilt Sensor Node as it offered:

- **Easy installation.** The wireless mesh system was quickly installed and data was immediately transferred through the congested underground space without any line of sight or reference issues.
- **A robust system.** Because the tunnel is partly open along the shoreline, equipment would be exposed to saltwater spray. Senceive's IP68-rating and track-record in saline environments assured the team that corrosion would not be a problem.
- **Precise monitoring.** Installed on structural elements with known geometry, the triaxial tilt sensors measured both rotational movement of the columns and differential settlement of the slab.

Outcome

The small battery-powered nodes and solar powered battery were discreetly installed on the structure without requiring power/data cabling or heavy anti-theft protection. The batteries can operate for up to 15 years without being replaced. A Senceive cellular gateway connected to the local network enabled all stakeholders to access structural data at any time of day, regardless of their location.

The system was configured to send text or email alerts to more than 25 people in 9 organisations in the event of any threshold breaches.

Benefits of the Senceive wireless solution include enhanced health and safety and significant cost savings on installation, maintenance and site access.