

Tuscan Apennines - Trackbed Monitoring

CLIENT: GD TEST

How a reliable wireless system provided an early warning alert system for a remote railway line on rugged mountain terrain



Challenge

The Tuscan-Emilian Apennines is part of the Northern Apennines mountain range in Italy where roads and railways have been built on very rugged terrain - steep slopes and plateaus are interspersed with narrow valleys.

Concern had arisen regarding possible slope movement affecting one of the east-west rail routes across the region.

The Italian railway authority commissioned GD Test, a geotechnical and environmental services company to monitor the railway tracks affected.

Due to the remote location and absence of any mains power supply, as well as the requirement of the Italian railway authority stipulating a monitoring system with near real-time reporting rates and alarms to ensure safety of train users, the use of a trusted wireless system was required.

Solution

Due to the relatively small monitoring area and need for a reliable system that could tolerate damage to individual devices without loss of performance, GD Test chose Senceive's FlatMesh™ platform.

They installed 18 Senceive wireless triaxial tiltmeters on the railway sleepers at critical locations, to monitor cant, longitudinal level, and twist at 3 m and 9 m.

Data was transmitted from the sensors to a gateway with solar panel and onto a secure cloud-based server and data management platform - WebMonitor™. The system operated with a one minute reporting rate. Alarms were set to be triggered in the event of any movement outside the defined thresholds and send notifications by SMS and email alert.

Outcome

Once monitoring started, data was immediately available on WebMonitor™ visualisation software. Data accuracy and reliability were very useful, allowing GD Test and the customer to make rapid decisions in case the movement exceeded the pre-set threshold values.

Even in the presence of rainy and cold periods, all data were read by the sensors and transmitted by the gateway to the web portal without any interruptions. The wireless system was powered by a solar panel which proved to be effective despite short winter daylight hours.

The choice of a FlatMesh™ remote monitoring solution proved ideal for this challenging site. The system provided reliable performance and precise measurement to reassure stakeholders that they would get early warning of any significant track movement.