

Hulu Langat, Malaysia - Retaining Walls Monitoring

CLIENT: EAST KLANG VALLEY EXPRESSWAY SDN. BHD.

How an early warning system has reassured residents living near Terramesh walls

Challenge

The 40 km East Klang Valley Expressway (EKVE) is the latest addition to the Kuala Lumpur Outer Ring Road network. Weaving through the hilly areas surrounding Eastern Kuala Lumpur, sections of the highway have been constructed using near vertical Terramesh walls, of up to 12 metres in height, to support the new carriageway embankment.

With limited space due to alignment, several residential homes, an orphanage and a recreational camp were uncomfortably close to the base of two of the Terramesh walls. Taking the safety of residents and the public as the highest priority, EKVE Sdn Bhd and the Malaysian Highway Authority required the implementation of a reliable and remote early warning system to monitor for movement of the embankment, manifesting in movement of the surface of the Terramesh walls.

Solution

Besides the requirement for a remote system, the distance between monitoring points and the absence of mains power supply meant a cable solution would not be suitable. **Meridian 2000*** was approached regarding a wireless and remote condition monitoring solution using Senceive's high precision triaxial tilt sensor technology. In total, 8 tilt sensors with measurement repeatability of 0.0005° were installed; 5 at one site and 3 at the other. Sensors were fixed onto hollow section beams at various positions on the Terramesh walls.

Each site had a FlatMesh™ gateway enabling secure communication with the sensor nodes and transmission of measurement data back to the cloud-based data management system. Each gateway and solar panel was positioned on 6 metre high poles to mitigate theft.



Outcome

Intelligent monitoring was enabled so if movements were to exceed threshold values, the sensors automatically change reporting rate.

The system has provided the client, residents and general public with reassurance of knowing not only that the near vertical Terramesh walls are being monitored, but movement alerts would be generated automatically in the event of any threshold breach at increasing severity of tilt. Notifications by SMS text and/or email can be sent to all stakeholders recorded in WebMonitor™.

Considering that both instrumented locations are in remote and fairly secluded areas in Selangor's Hulu Langat district, the robust nature of Senceive technology with long life batteries provided the ideal solution. Monitoring is being carried out remotely and site visits will be minimised, providing a huge cost saving to the client.

*Meridian 2000 Sdn Bhd is the authorised distributor for Senceive technology in Malaysia and offers full customer support and technical assistance.

