

REMOTE TRACKBED MONITORING

CLIENT: KIWI RAIL | VITRUVIUS | POSITION PARTNERS | **KIWI RAIL**



"Sending crews out to the site is costly and time consuming. It takes at least an hour of travel time to get to this section of the track and by the time the necessary approvals and so on are in place it would usually be 2-3 hours before someone is on site. Now we can monitor the site remotely via a web portal without going anywhere."

- Terry Hodder, Project Engineer, Vitruvius Ltd

THE CHALLENGE

New Zealand's Main Trunk Line railway in the country's North Island is a vital piece of infrastructure connecting Wellington in the island's south with Auckland to the north. The 680km arterial line carries passengers, freight and livestock.

Much of the line is single track and has been in operation for over 100 years. A section of the railway that runs 160m along the side of a hill was starting to move as the soil gradually slid down into the valley. Engineers at Kiwi Rail carry out regular inspection, maintenance and repair work to counteract these track movements. After particularly wet weather the movement could be quite significant, so much so that engineers needed to walk ahead of the train to ensure it was safe for it to continue its journey.

Due to the extreme remoteness of the track, it was not cost effective to carry out manual monitoring so regularly, therefore a wireless solution was deemed the best option. Vitruvius had previously used Senceive's wireless systems on a wind turbine project with great success, so they selected Senceive's Oceania Distributor, Position Partners, to find a solution.

OUR SOLUTION

Nine high precision triaxial tilt sensors were quickly and easily installed using track bed mounting plates on the sleepers, to monitor track geometry.

In order to relay data to a secure cloud server, the gateway had to be installed which was a challenge due to the lack of mobile connectivity in such a remote location. The gateway was installed on a local farmhouse roof, which was situated several hundred meters away from the track. The flexibility of the gateway allowed for a connection using the farm's internet line. This allowed transmission of the data in near real-time despite the absence of any mobile connectivity. Registered users of Senceive's WebMonitor visualization software were then able to view the data securely anywhere in the world on any computer, tablet or smartphone.



Fig.1 Quick install Triaxial Tilt Sensor with sacrificial track bed mounting plate

THE OUTCOME

Prior to use of Senceive's wireless monitoring solutions, Kiwi Rail and Vitruvius had to manually inspect the track and then send hi-rail inspection vehicles out every time an anomaly was found. The use of wireless monitoring allowed for the data to be reviewed remotely and more precisely, which saved on costly visits. Additionally, WebMonitor also offered the ability to remotely change reporting rates and text alert trigger levels.

The Kiwi Rail team instructed Position Partners to set up automated alert levels, which could be done remotely. For example; a Priority One movement on the track automatically sent an alert to the Train Controller to stop the trains. Kiwi Rail fed back that the speed and automation of these alerts dramatically reduced the risks.

