

# Toowoomba Second Range Crossing - Safety, Reliability and Flexibility

CLIENT: POSITION PARTNERS / NEXUS DELIVERY (Ferrovia Agroman – Acciona)

How a flexible wireless monitoring solution was used to check integrity of railway track during Queensland highway construction works

## Challenge

The Toowoomba Second Range Crossing (TSRC) was the largest Australian Government funding commitment to a single road project in Queensland's history (\$1.6 billion – 43 km). One of the main engineering elements of the project was an 800 m bridge constructed to negotiate the steep terrain of the range and carry the new road over the Brisbane-Toowoomba Railway.

In order to safeguard the railway during the construction programme, the construction team chose to use Senceive wireless remote condition monitoring technology to detect movement of the track and associated railway assets.

The initial phase of monitoring coincided with early earthworks, piling and blasting activity. This involved the rapid relocation of the monitoring system to different areas of the valley as works progressed.

## Solution

The initial monitoring area was located directly under the bridge path. A total of 42 wireless tilt nodes were positioned on the sleepers of the two train lines, measuring cant and twist (3 m and 9 m) at a 30 minute reporting rate. A further 21 tilt nodes were deployed to monitor the embankment, the retaining wall and multiple boulders on the side of the valley in order to identify any potentially dangerous movement towards the tracks.

After several months, the first phase of work was finished and the system was moved several hundred metres south to monitor a blasting cut. A total of 58 nodes were relocated and reconfigured in just a few hours to monitor a longer section of track with different specifications (5 m spacing and a swap of fixings).



## Outcome

In addition to providing highly reliable readings (resolution of 0.001° and repeatability of  $\pm 0.003^\circ$ ) which helped keep the public and site workers safe, Senceive was able to provide the TSRC project with a bespoke system that could be quickly and easily adapted. This was thanks to innovations including:

- solar powered gateway
- 3G gateway connected to international cellular network
- 12 -15 years battery life
- interchangeable bracketry
- remotely upgradeable firmware.

The easy to install FlatMesh™ system saved on cost/time and eliminated the need for maintenance. The monitoring contract was fulfilled by Senceive's regional distributor Position Partners.

