



## CASE STUDY: Paradise Gorge

A section of the Tasman Highway, near Orford Tasmania, is bounded by the Paradise River and 30m high dolerite cliffs that form the Paradise Gorge. Minor rockfalls had been reported from the cliffs impacting the road. Geotechnical assessments indicated that a section of the dolerite rock presented an unacceptably high risk to the public. Consequently, the Department of State Growth Tasman closed the Tasman Highway for 6-weeks to perform emergency remediation works involving the removal of over 2,000 tonnes of boulders from the rock face. Geotechnical assessment and remedial works design was undertaken by **pitt&sherry**. Surveying, 3D digital modelling and rock slope monitoring was undertaken by **Veris**.

## THE CHALLENGE

Monitoring of individual boulders was an essential element of the safety management plan for both the remedial works period and for the following year to assess that the remaining key dolerite columns were stable.

Veris initially implemented a systems of survey prisms and 30 tilt meters to monitor the dolerite rock face. During the initial works it was identified that additional boulders required monitoring. Viotel were contracted at short notice to provide additional 3-axis IoT tilt meters to provide real-time monitoring with data streamed to Veris's Trimble 4D platform.

## THE SOLUTION

### Rock Face Monitoring

The **Viotel** Tilt Meters performed well over the monitoring period. Very minor movements of individual boulders were able to be related to weather events and seasonal shrink – swell characteristics of underlying clay bands. Despite minor periodic/seasonal movement, the specific boulders being monitored returned to position with no progressive displacement and were deemed suitably stable.

## AT A GLANCE

Viotel's Geotechnical data provides on demand real-time Structural Health Monitoring (SHM) solutions for high risk emergency remediation works to ensure road safety.

SMART systems and proactive monitoring can be used to assess the impacts of geotechnical conditions on structures and rock face.



*A boulder that was dislodged previously due to wet weather*



## THE SOLUTION cont.

**Viotel** IoT Nodes are ideal for monitoring natural rock faces, rock cuts and deep excavations.

A simple rapid to deploy system of **Viotel** Tilt Meters provides near real-time monitoring and alerting if wedges of boulders start to move.

**Viotel** SMART Nodes equipped with Crack Meters, Extensometers, Load Cells, and Inclinometers can provide further insights on ground movements.

The **myViotel** platform, accessing Cloud-based data, transforms a sensor from a disconnected unintelligent asset to a networked live data device. Each **Viotel** Nodes has GPS location and the **myViotel** platform automatically searches for and sources the nearest weather station data from the Bureau of Meteorology, which with appropriate nodes can provide insights on groundwater response and ground movements in relation to weather events.

A **Viotel** Tilting Bucket Rain Gauge node can provide a more direct source of rainfall data local to the area of interest.

The **Viotel** Nodes are safe, self-contained IoT sensor packs which are discrete, simple to install and calibrate, powered with mains/ battery &/or solar power and with analysis power via on-board microprocessors.



*Viotel Wireless Triaxial Tiltmeter*



Integrated data path from source to decision

**Viotel SMART** Geotechnical Monitoring Systems are applied to monitor; landslides, rockfaces, excavations, dams for settlement, displacement, tilt, strong ground motion (earthquake), piezometric head, and rainfall.