Aurizon Network Wide Earthworks Risk Assessment

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INTRODUCTION

The Aurizon network

Aurizon's Central Queensland Coal Network is a 2,670 kilometre multi-user track network comprising four major coal systems and one connecting system serving Queensland's Bowen Basin coal region, connecting more than 50 mines to five major export ports on the east cost of Australia.

In 2015 Aurizon started to develop a network wide earthworks asset inventory

In summary the project presents the following benefits:

➢ To identify earthworks defects before they affect operations.

➢ To reduce earthworks instability risk to track personnel and revenue traffic.

➢ To enhance resilience with respect to heavy rainfall / adverse weather effects.

➢ To ensure good practice with regards to infrastructure management.

WHY: Reduce unplanned cancellations

➢ Extreme weather damage to civil infrastructure results in train delays / cancellations

➢ Identification and strengthening of the most vulnerable earthworks can help reduce the extent of weather damage
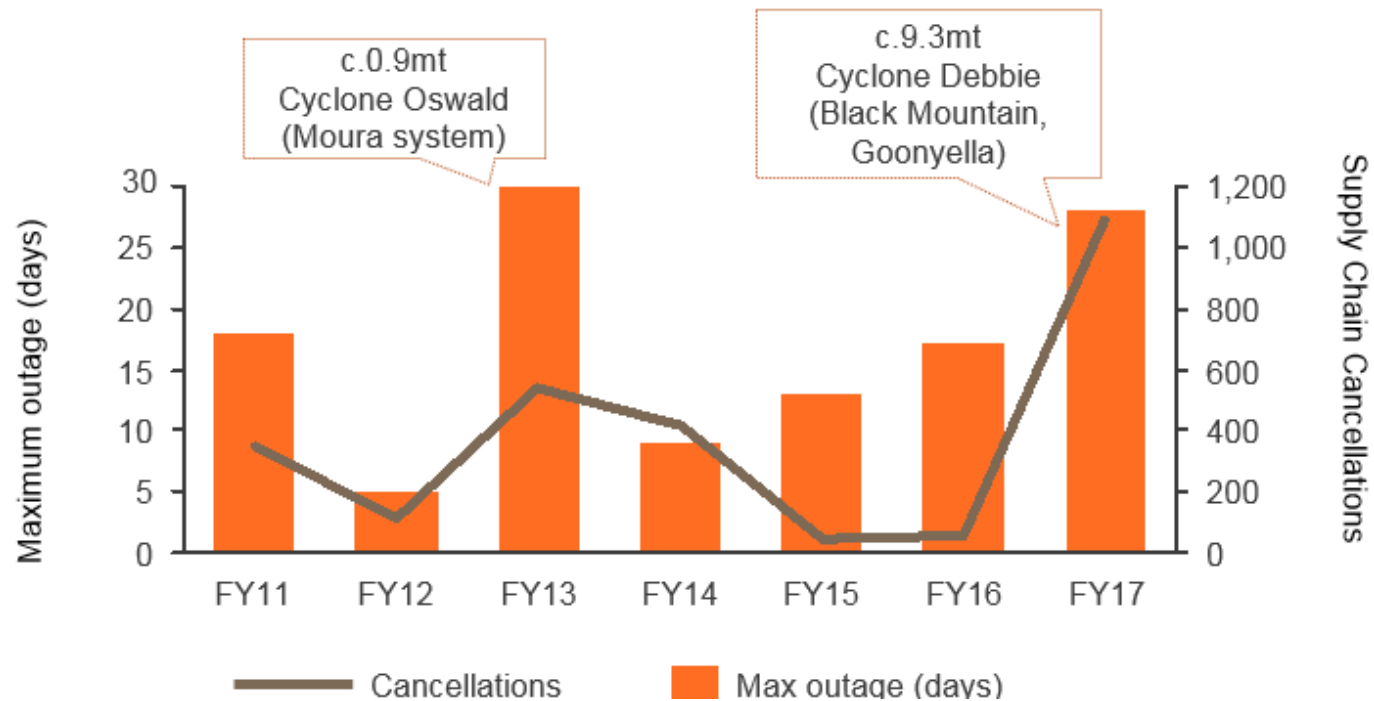
WHY: Delay/Cancellation Typical Damage

Cyclone Debbie (2017) – Goonyella Chainage GA43.1 km

WHY: Delay/Cancellation Typical Damage

Cyclone Debbie (2017) – Goonyella Chainage GA42.5 km

WHY: Delay/Cancellation Typical Damage

Cyclone Debbie (2017) – Goonyella Chainage GA42.5 km detail (note overhead mast)

WHAT: Deliverables from the initiative

The following deliverables formed part of the project:

➢ A high level geotechnical risk assessment (more aimed at eliminating low / no risk assets)

➢ A step toward prioritising assets for strengthening works (where required)

➢ To provide an earthworks asset inventory

The following outcomes were <u>not</u> expected as part of the project:

➢ Expecting to find any obvious surprises (track inspections and civil engineering staff identify problem areas in scheduled inspections, recorded in a 'RIMS' database)

➢ Formation issues (separate initiatives for formation)
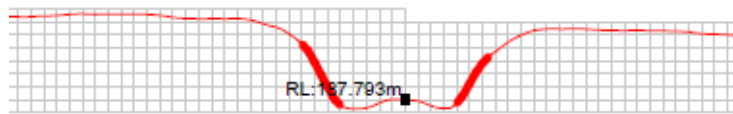
HOW: Lidar Data Analysis

Lidar Data Analysis

➢ Geometric criteria were assigned to separate low risk from medium and high risk assets.

➢ Cross sections were generated at 10 m intervals throughout the CQCN.

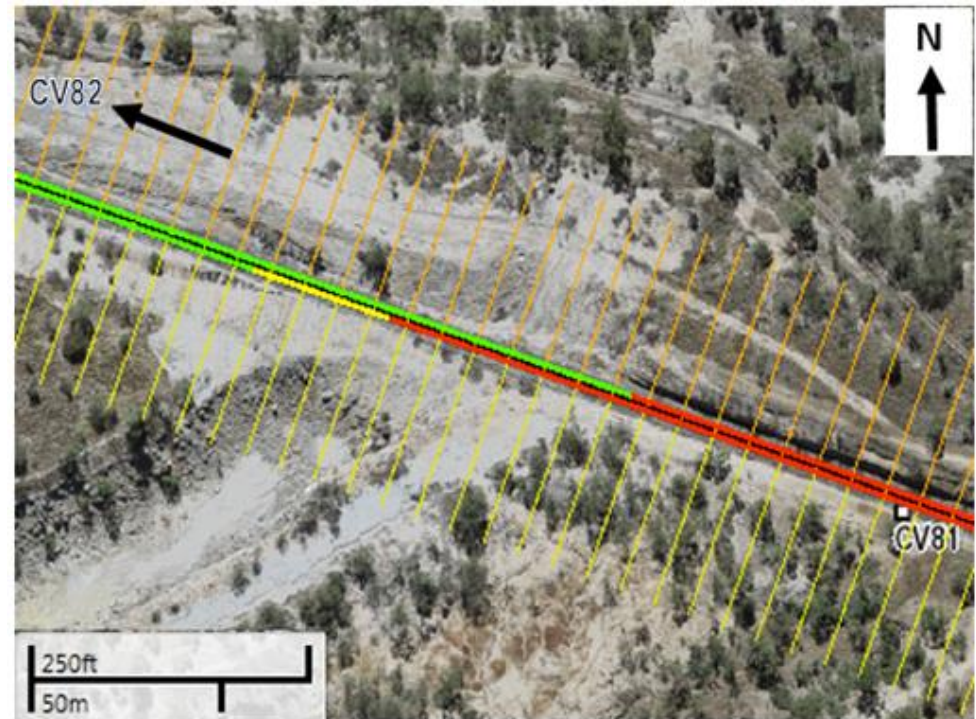➢ Adjacent 10 m intervals of the same nature were combined to create a single asset (e.g. a cutting).
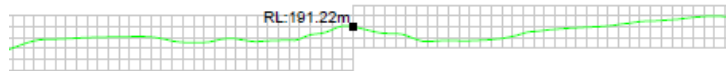
Cross section at grade
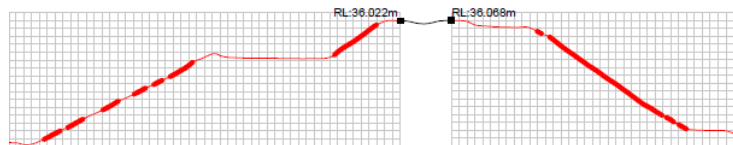
Cross section showing embankment

Cross section showing cutting

Mapped earthworks assets in GIS environment

RESULTS

➢ 72% of the network identified as low relative geotechnical risk in a transparent, repeatable fashion

➢ 221 locations identified for further investigation (desktop and physical inspection)

➢ 30 locations were identified with potential for stream bend erosion (similar to Bells Creek, Moura, Cyclone Oswald)

Asset Type	% of network	No of assets	Average length (m)
Total	100%	11250	335
At Grade	72%	5308	510
Cutting	7%	1867	146
Embankment	21%	4075	194