



**Asia-Pacific
Economic Cooperation**

2017/TPTWG/WKSP1/005

Heavy Vehicle Overloading - Implications of Overloading: Impact on Safety, Productivity and Maintenance Costs

Submitted by: Australia



**Workshop on Regulating High Mass Heavy Road
Vehicles for Safety, Productivity and Infrastructure
Outcomes
Brisbane, Australia
3-6 April 2017**

Heavy vehicle overloading

Implications of overloading: Impact on safety, productivity and maintenance costs

Chris Nagel, Director (Program Delivery)

Andrew Golding, Director (Transport System Asset Management)

Our values, our diversity



Customers
first



Unleash
potential



Be
courageous



Ideas into
action



Empower
people





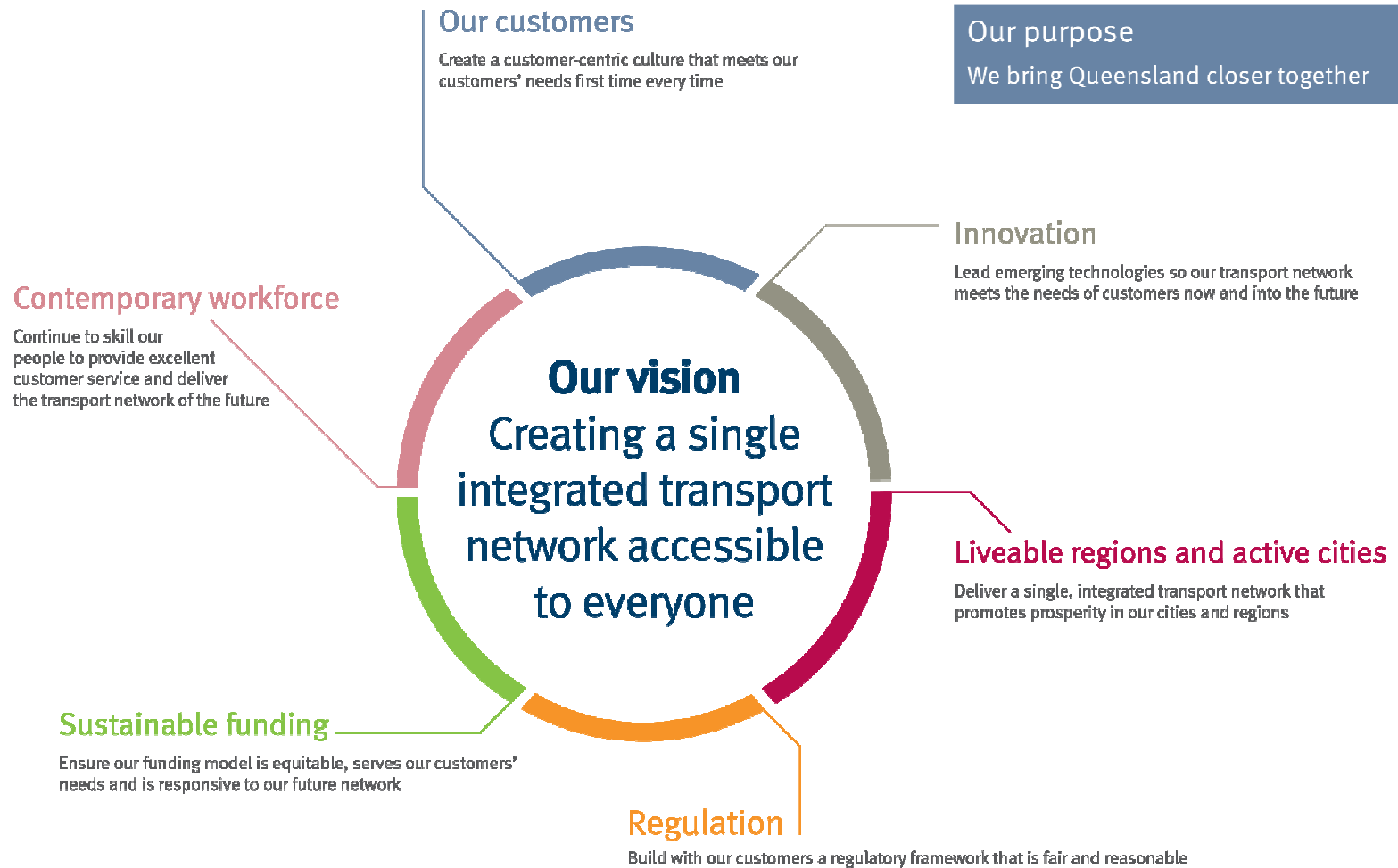
Queensland Government's objectives for the community

Advance Queensland

**ADVANCE
QUEENSLAND**



Our strategic plan



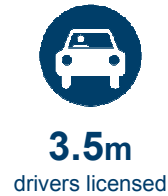
About us...

Creating a single integrated transport network accessible to everyone

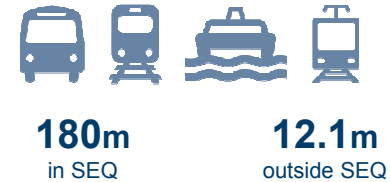
As at 30 June 2016 we manage:



As at 30 June 2016:



As at 30 June 2016 there were:



trips taken annually on bus,
rail, ferry and light rail



Objectives

- Foster productivity
- Keep industry moving

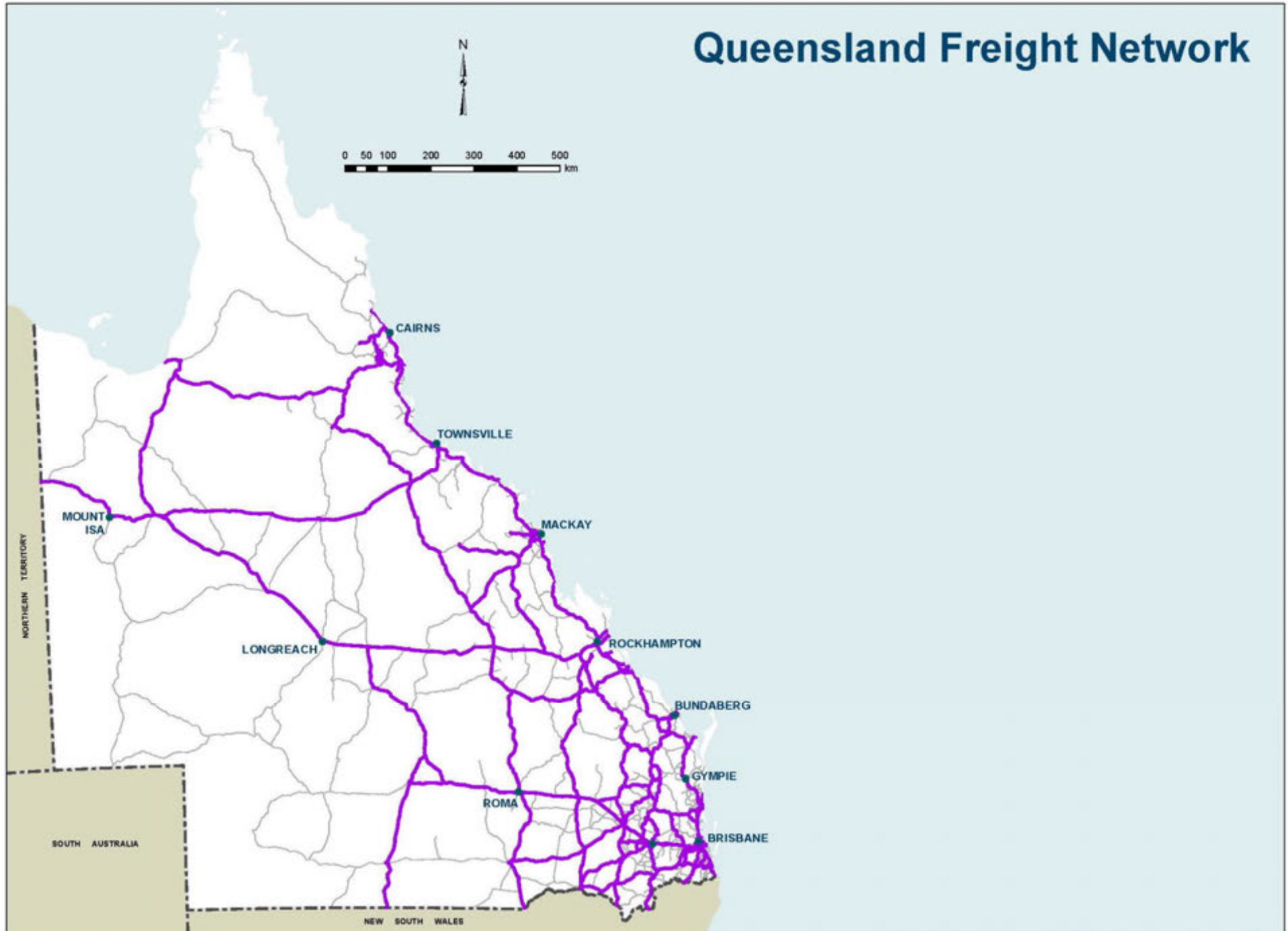


Australia-wide freight task

- 204,575 million tonne-kilometres in 2015–16
- More than 75% undertaken by articulated trucks
- Loads:
 - 30% crude materials
 - 14% food and live animals
 - 12% manufactured goods.

Source: ABS

Queensland Freight Network



2010–2013 major disaster events

Roads closed or with limited access

- 16 disaster events over four years
- All of Queensland disaster declared
- 27,304km (82%) closed or with limited access at least once over the four summers due to natural disasters.

Map shows 2010, 2011, 2012 and 2013 closed state-controlled roads during disaster event periods



Pavement vulnerability

- Weather
- Pavement type
- Loads

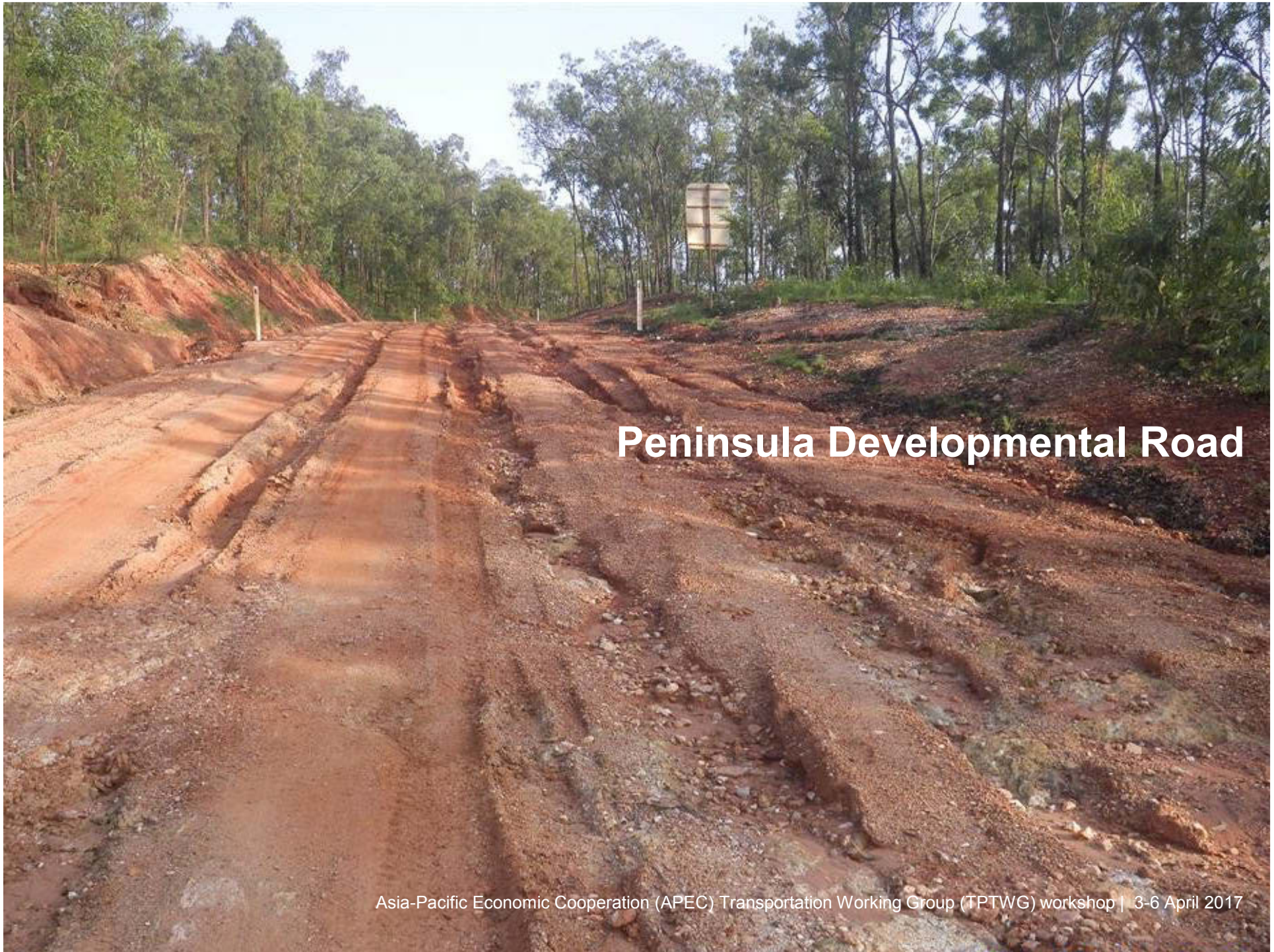
Eyre Developmental Road



East Coast Road



East Coast Road



Peninsula Developmental Road



Ipswich – Rosewood Road



Landsborough Highway

Asia-Pacific Economic Cooperation (APEC) Transportation Working Group (TPTWG) workshop | 3-6 April 2017



Heavy vehicles on light pavements



Orion Ten Chain Road

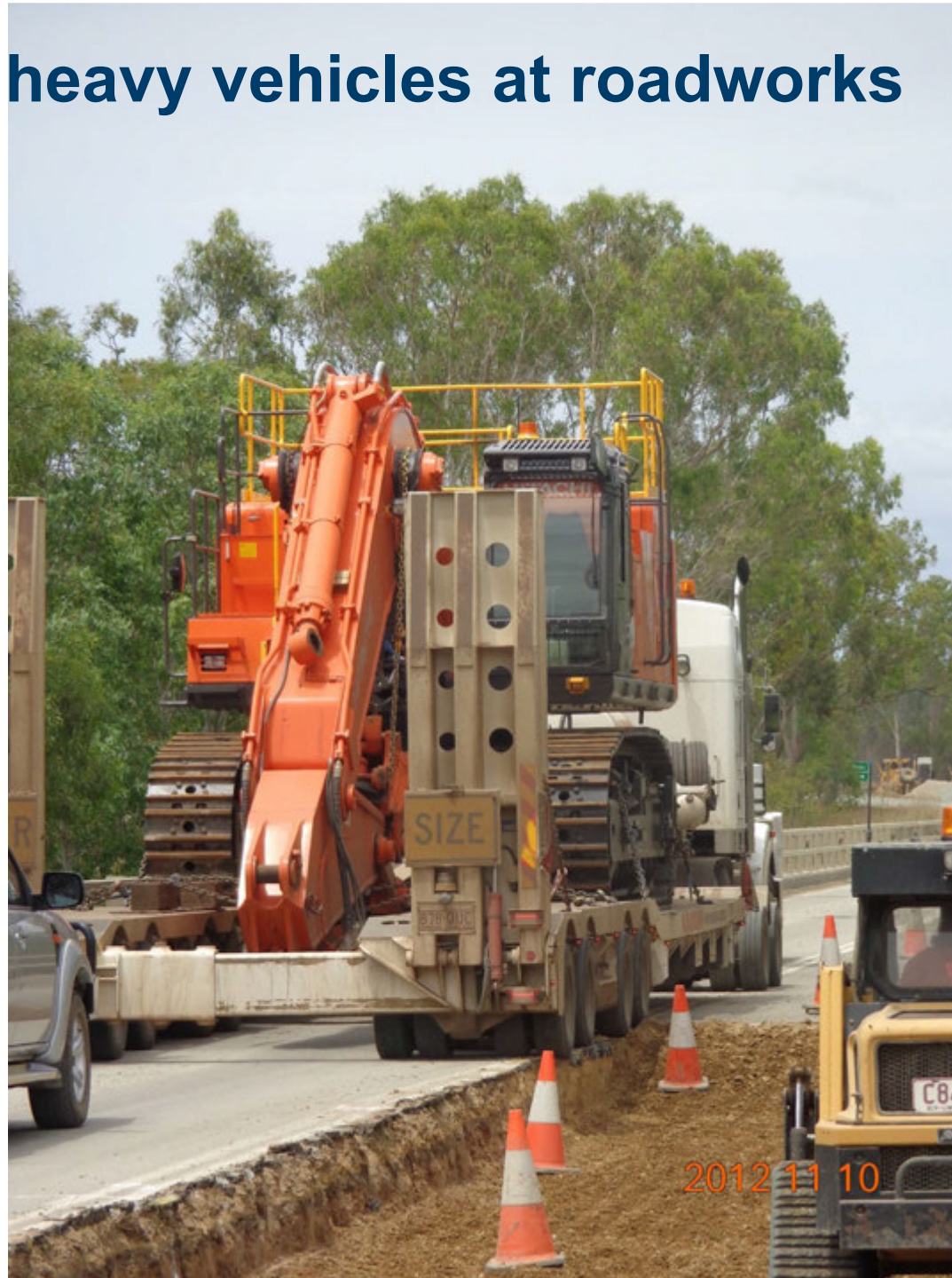


Asia-Pacific Economic Cooperation (APEC) Transportation Working Group (TPTWG) workshop | 3-6 April 2017

Neville Hewitt Bridge



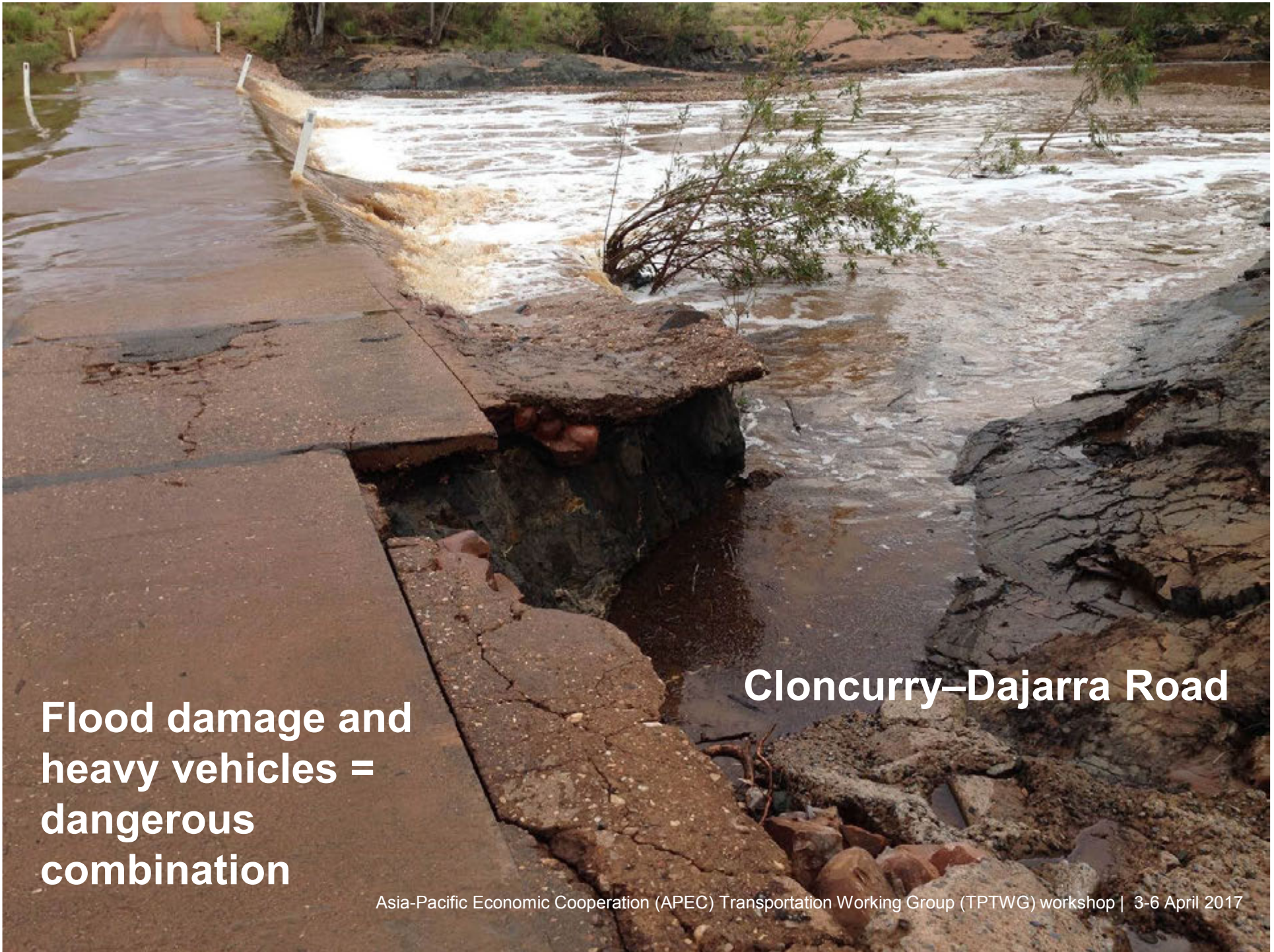
Managing heavy vehicles at roadworks



**Peak Downs
Highway**



Loss of productivity



**Flood damage and
heavy vehicles =
dangerous
combination**

Cloncurry–Dajarra Road



Cloncurry–Dajarra Road



Cloncurry–Dajarra Road

Asset management response to pavement overloading

- Case study – severe overloading of pavement
 - Life cycle cost comparison
- Considering increased axle mass <10% for productivity
 - Marginal costs – low volume roads versus heavy volume/high strength
- Freight productivity improvements at reduced life cycle costs
 - An asset manager's view of concessional mass limits.

Case study – overloaded pavement



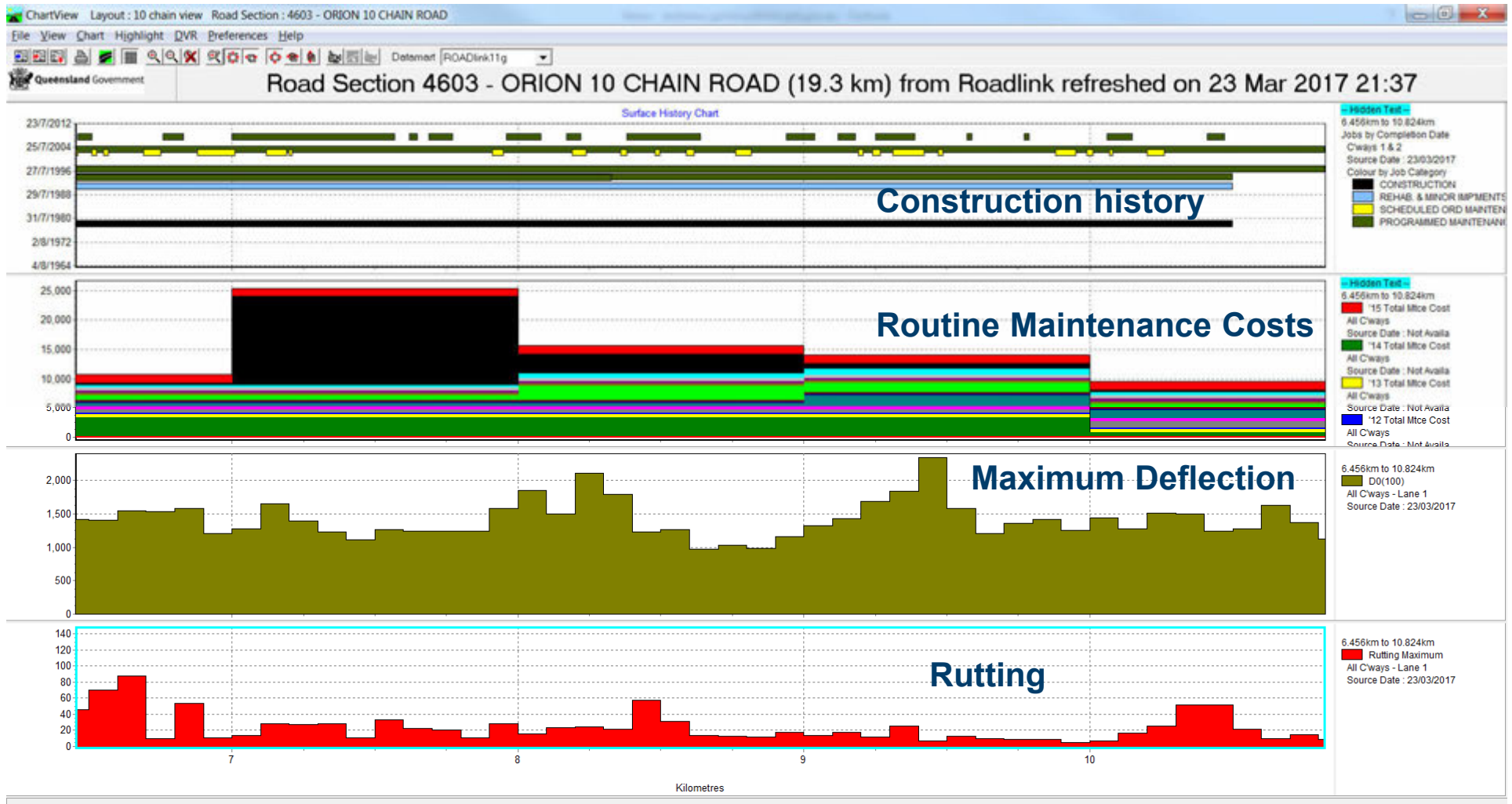
Orion Ten Chain Road

Case study – overloaded pavement

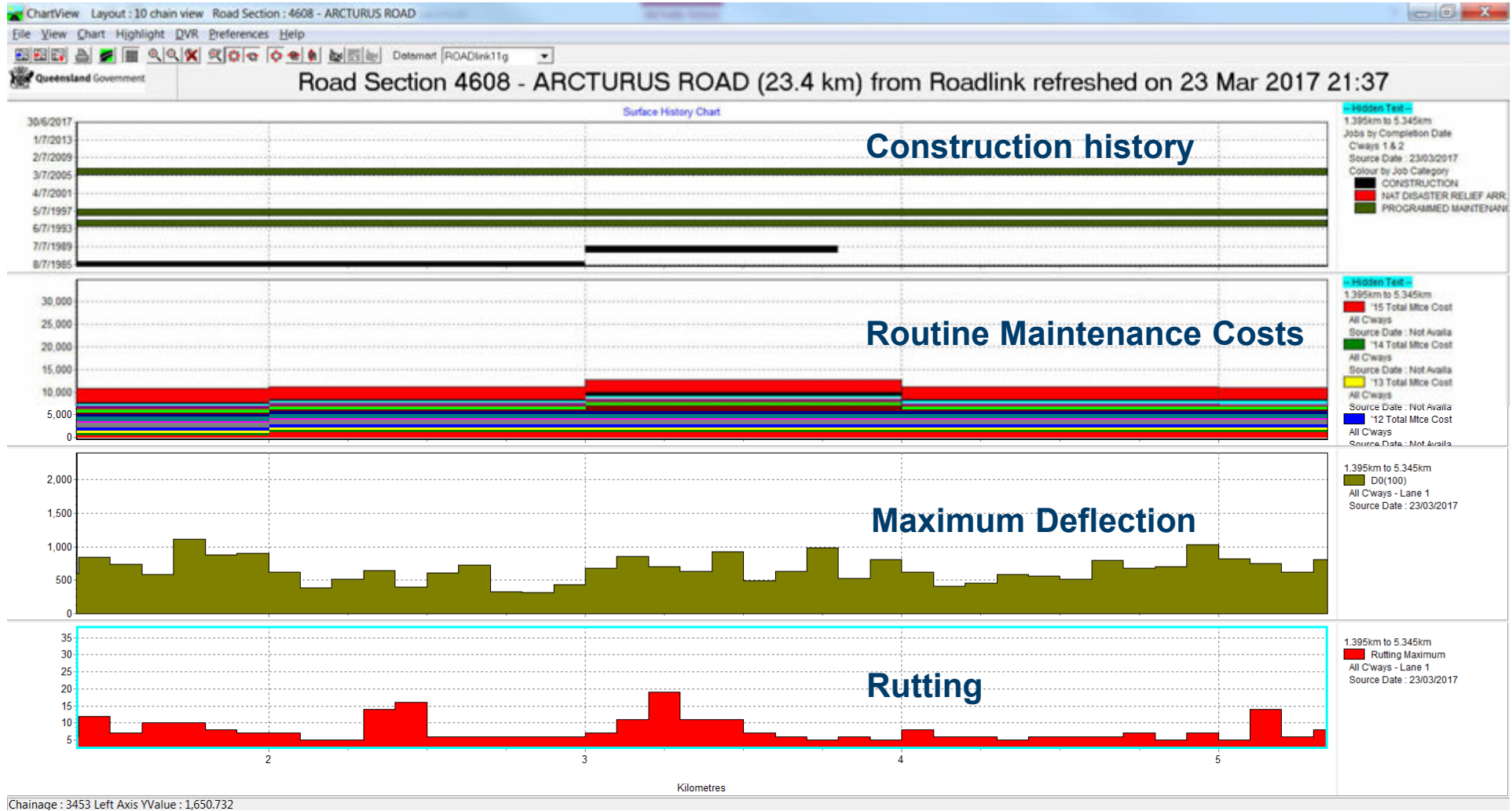


Orion Ten Chain Road

Life cycle costs – pavement overloaded



Life cycle costs – normal loading



Life cycle cost comparison

- Maintenance life cycle with pavement overloaded
 - 5 reseals, 4 pavement repair projects, routine maintenance approx. \$1000/km per annum
 - annualised total cost \$10,000/km
- Maintenance life cycle without pavement overloading
 - 3 reseals, routine maintenance approx. \$700/km per annum
 - annualised total cost \$3700/km.



Increased axle mass for productivity

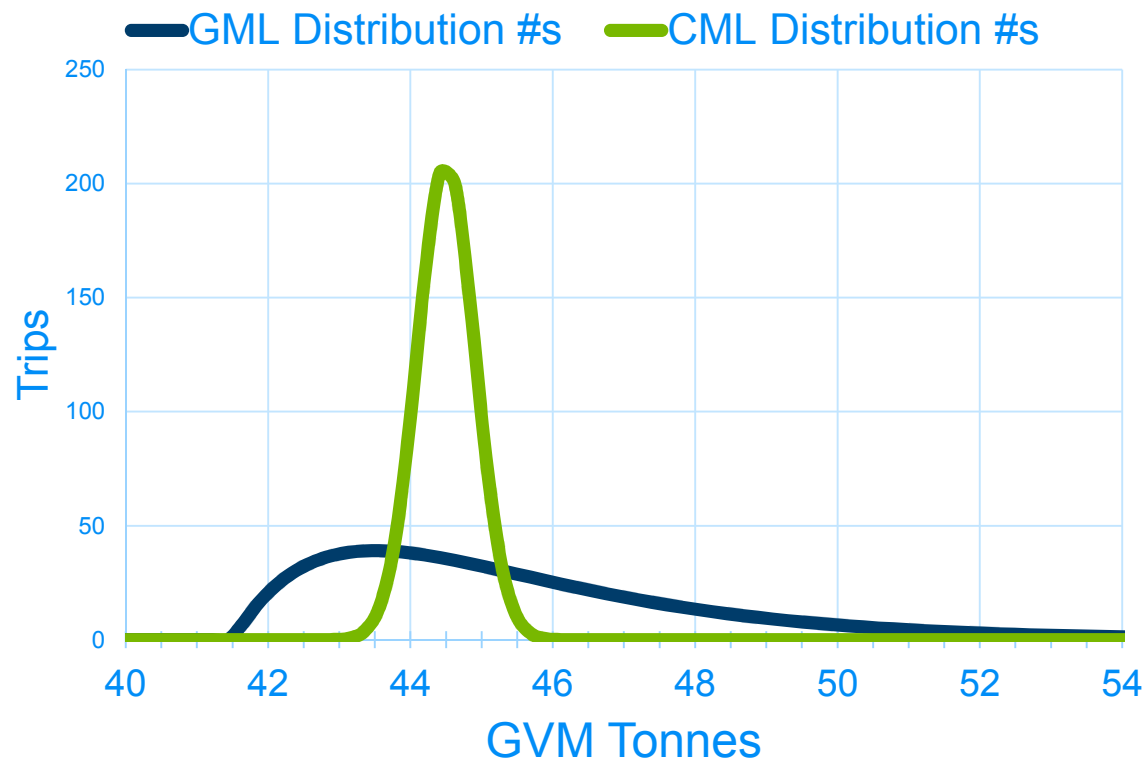


Source: ARRB 2017

- Marginal costs vary from:
 - ~1 cent/SAR.km for strong, high-volume arterials
 - 30+ cents/SAR.km on weak, low-trafficked roads.

Damage comparison under alternate mass limits and controls

GML vs CML



- Based on this theoretic GML distribution with mode 42.5 tonnes and a tail of overloaded vehicles, estimated SARs/1000 tonnes of freight is 241.
- Compare then to the distribution targeted by concessional loading schemes allowing in this case a 2 tonne increase over GML, but with additional mass controls. SARs/1000 tonnes of freight is 227, which is equivalent to 6% less damage.

GML – General Mass Limit

CML – Concessional Mass Limit

GVM – Gross Vehicle Mass

SARs – Standard Axle Repetitions

Thank you and stay connected



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