# ASSC 2018 | Rail system safety: the challenges for industry

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safe railways for Australia

# Introduction

- Introduction
  - the rail industry
  - ONRSR
- Rail industry challenges
- System safety solutions

**Strengthening and integrating system safety engineering for Australia's future**

# The rail industry

## Introduction

# Rail industry: asset complexity

**complex assets**
multiple disciplines
multiple technologies
various lifecycle stages
*and more...*

**complex management**
risks
condition
interfaces
*and more...*



***challenge:***
**manage safely**

# Rail industry: key statistics

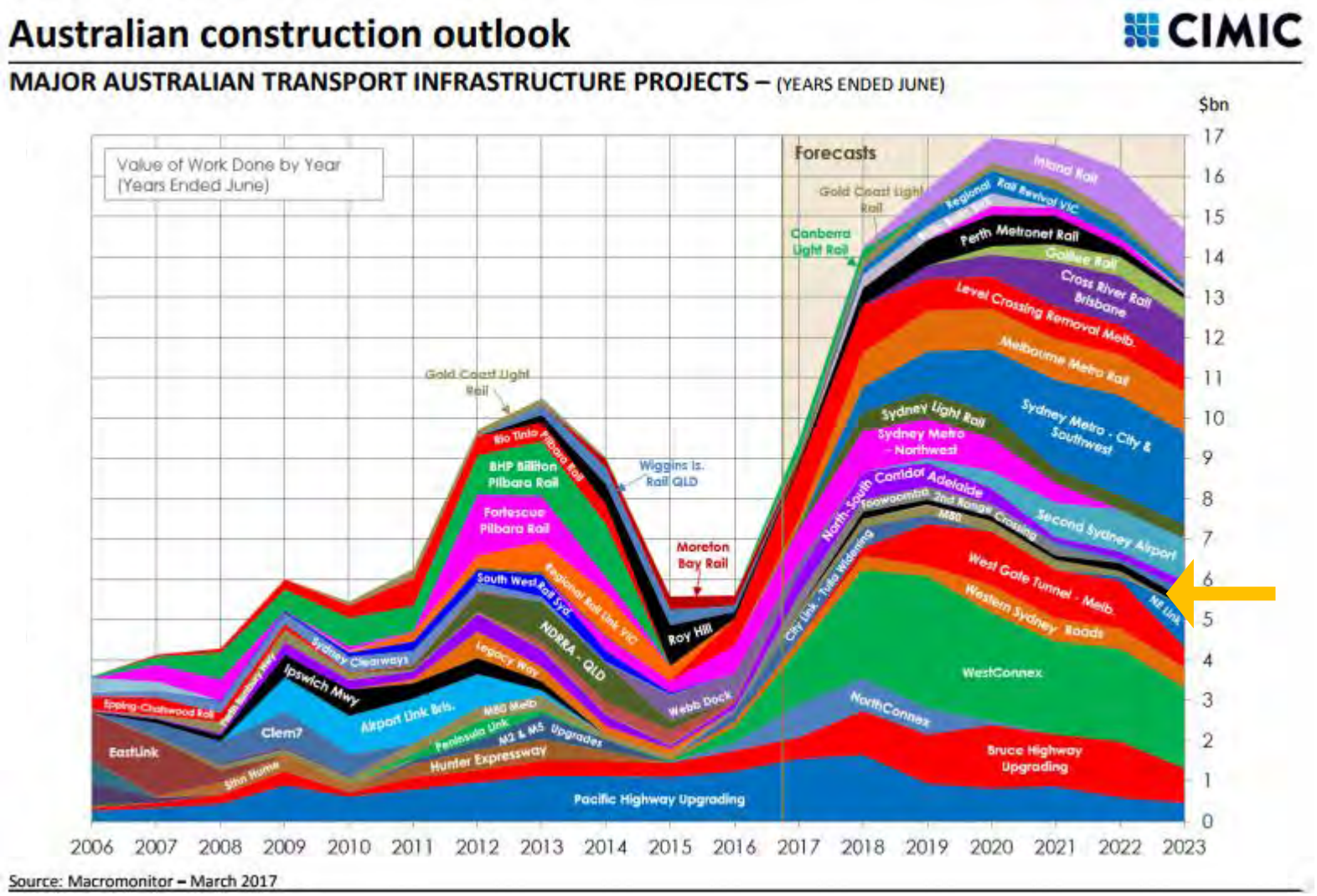
Australia had in 2015/16:

- **33,168 km** of operational heavy railways, approximately 10% electrified.
- **291 route km** of operational light railways
- circa **2,025** operational locomotives
- **1,347 Mt** of freight carried
- circa **680M** urban rail passenger journeys
- circa **47M** light rail passenger journeys

*Source: Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2017, Trainline 5, Statistical Report, Canberra ACT*

# Rail industry: investment

- Australian transport undergoing unprecedented investment
- rail the biggest recipient
- new modes
- new technologies

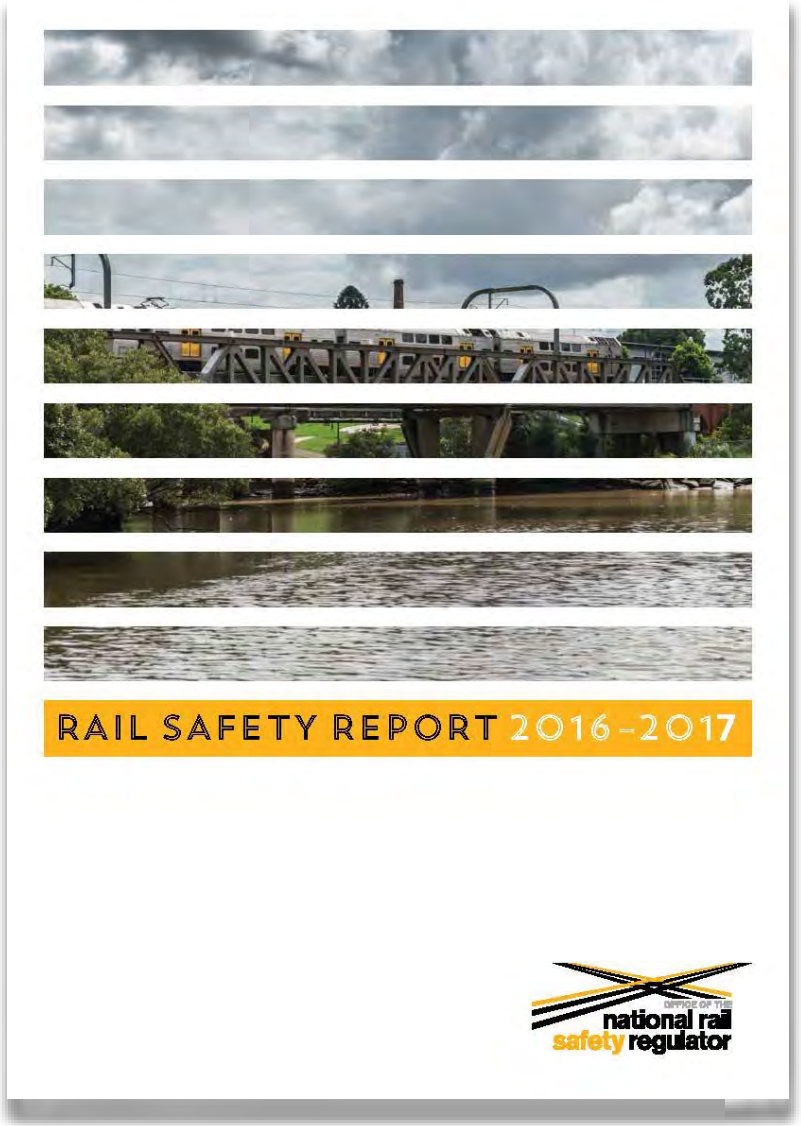



*Source: CIMIC, Macromonitor – March 2017*

# Rail safety: key statistics

Example regulatory safety data (2016/17):

- **16** fatalities (excl suicides)
- **38** derailments (passenger or freight trains)
- **4** collisions between trains
- **27** railway crossing collisions (train / road vehicle)
- **3** railway crossing collisions (train / person)

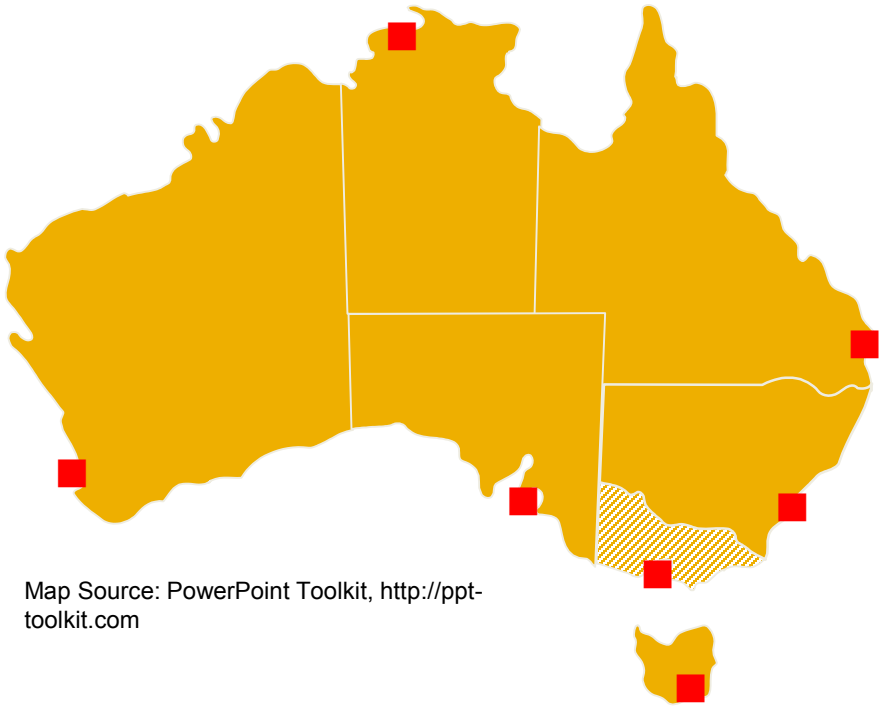


# Introduction

## Overview of ONRSR

# ONRSR key facts

- commenced on **20 Jan 2013**
- an **independent authority**
- funded by industry and government
- National Office: Adelaide
- Adelaide Office: SA, TAS, NT
- Sydney Office
- Melbourne Office (under a SLA, ex Yarra Trams, T&H)
- Perth Office
- Brisbane Office



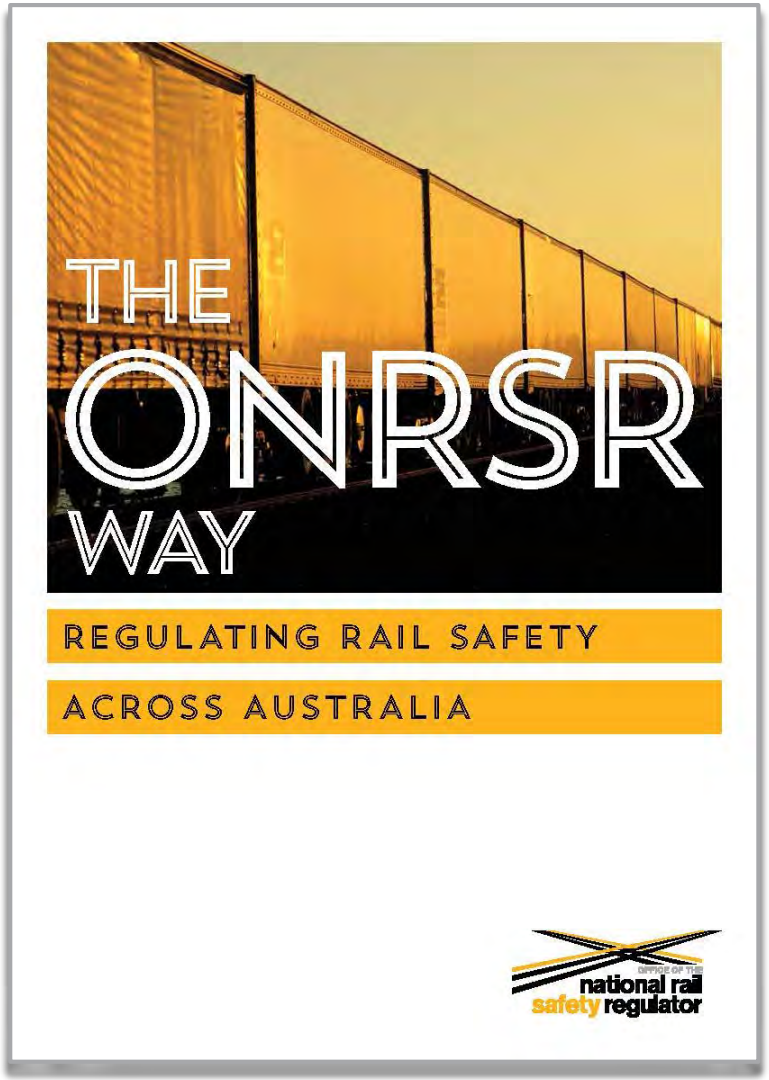
Map Source: PowerPoint Toolkit, http://ppt-toolkit.com

# ONRSR key functions

- **administer, audit** and **review** the accreditation regime under the Rail Safety National Law (RSNL) and Regulations
- **work with** rail transport operators, rail safety workers and others involved in railway operations to **improve rail safety** nationally
- **conduct** research, **collect and publish** information relating to rail safety

# ONRSR key functions

- **provide**, or facilitate the provision of, advice, **education and training** in relation to rail safety
- **monitor, investigate** and **enforce** compliance with the RSNL
- **engage in**, **promote** and **coordinate** the sharing of information to achieve the objectives of the RSNL



# Co-regulation

- distinct but complementary responsibilities
- **Governments** make the law
- **industry** responsible for safe railway operations
- **ONRSR** administers the RSNL

# Challenges

## Rail system safety

# Key Challenges

- strengthening and integrating system safety engineering

# Key Challenges

- Technology
  - unattended operations
  - traditional system boundaries evolving
  - interface risks: brownfield vs greenfield
  - cybersecurity risks

# Key Challenges

- Competence
  - what is system safety competency?
  - applying judgements
  - understanding the discipline interfaces
  - supply chain
  - encouraging new entrants

# Key Challenges

- Operations & maintenance
  - Aging assets
  - Lifecycle management
  - Maintenance review
  - Managing legacy risks

# Key Challenges

- Scaleability
  - Don’t forget day-to-day operations
  - Wide spectrum of operations across the industry
  - Systems need to address safety risks specific to operator

# Key Challenges

- Managing major change
  - evolving requirements
  - approval processes
  - approving complex technological change

# Key Challenges

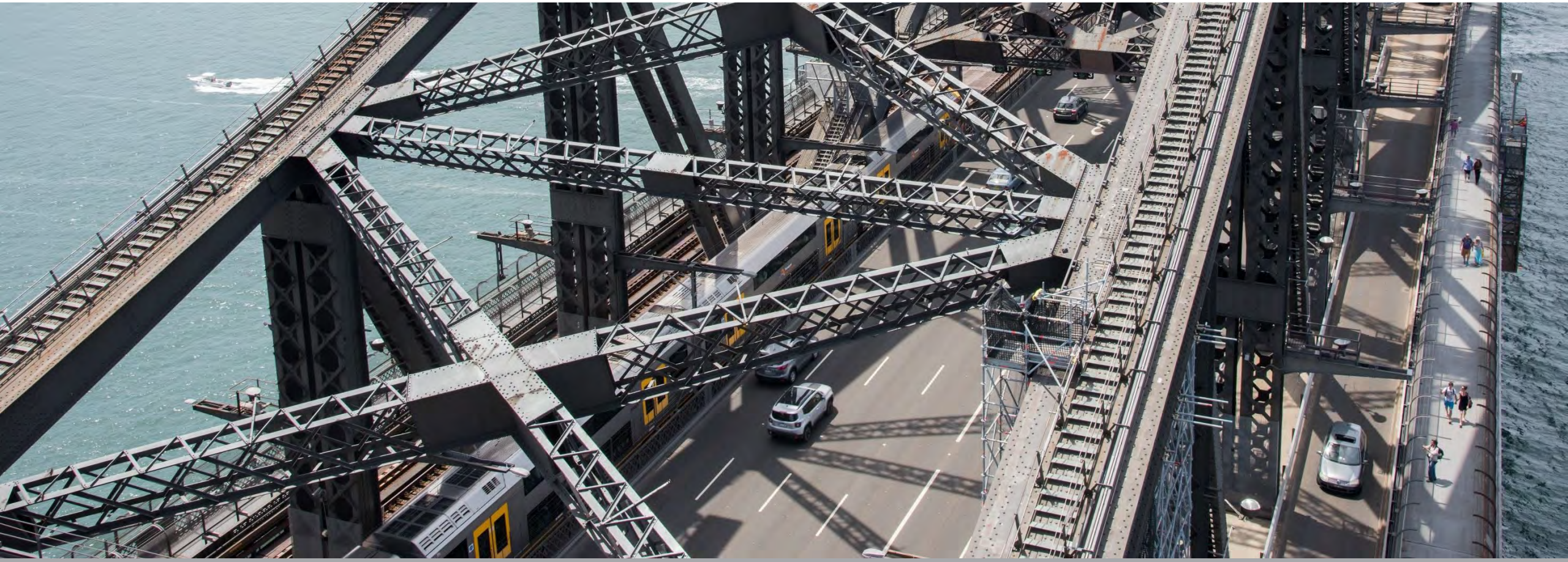
- Resources
  - project assurance
  - independent assessment
  - regulatory

# Key Challenges

- strengthening and integrating system safety engineering

# System safety solutions

## Rail system safety

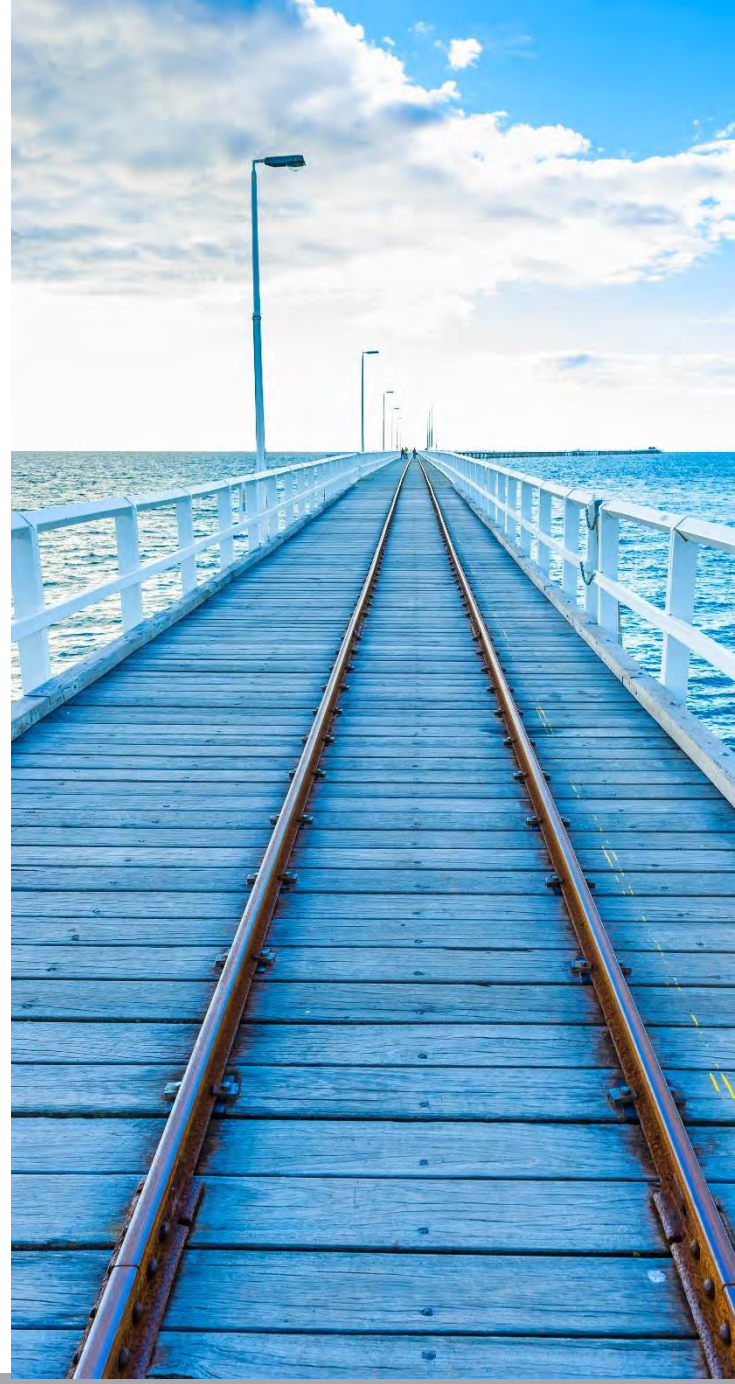


# Current approaches

- systems approach to ensure system safety
- development of system engineering qualifications
- industry training
- ONRSR's Major Projects Guideline
- Independent Safety Assessment

# …and the future?

- strengthen our system safety resources
- integrate system safety into
  - existing disciplines
  - asset management
  - Network planning
- learn from other industries
- define the improvement journey



# Strengthening and integrating system safety engineering for Australia's future