### Monday 11 May 2020

<table>
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<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>0700 - 1400</td>
<td>Exhibition Build</td>
</tr>
<tr>
<td>1400 - 1700</td>
<td>Exhibitor Move In</td>
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<tr>
<td>1400 - 1800</td>
<td>Registration Desk Open</td>
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<tr>
<td>1730 - 1900</td>
<td>Welcome Reception, CORE 2020 Exhibition</td>
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### Tuesday 12 May 2020

<table>
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<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td>0700 - 1800</td>
<td>Registration Desk Open</td>
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<tr>
<td>0715 - 0800</td>
<td>Presenter and Session Chair Breakfast, Compulsory for all chairs and presenters for the day</td>
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<tr>
<td>0700 - 1800</td>
<td>Exhibition Open</td>
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<tr>
<td>0815 - 1000</td>
<td>PLENARY SESSION</td>
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<tr>
<td>0815 - 0835</td>
<td>Welcome to Country</td>
</tr>
<tr>
<td>0835 - 0840</td>
<td>Welcome, Master of Ceremonies</td>
</tr>
<tr>
<td>0840 - 0850</td>
<td>RTSA Welcome</td>
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<tr>
<td>0850 - 0900</td>
<td>Official Opening</td>
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<tr>
<td>0900 - 0915</td>
<td>Minister Address</td>
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<td>0915 - 0950</td>
<td>Keynote Address</td>
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<tr>
<td>0950 - 1025</td>
<td>Morning Tea</td>
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<td>1030 - 1235</td>
<td>CONCURRENT SESSIONS</td>
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</table>
| 1030 | **1A** Track Maintenance  
A Reappraisal of Head Wear Limits for Heat Treated Rails Under Heavy Haul Conditions  
Iman Salehi. Institute of Railway Technology VIC, Australia |
| 1100 | **1B** Rolling Stock Vehicle Design and Manufacture  
Light Rail Passengers - Are They Protected in a Crash?  
Jademond Kiang, SNC-lavalin Atkins, NSW, Australia |
| 1130 | **1C** Signals and Train Control Systems  
Level Crossing Performance Modelling Using Timed Petri Nets  
Steven Gibson, RGB Assurance, WA, Australia  
Kiwirail Long-Term Rail Bridge Renewal Management Through a Structures Health Prioritisation Process  
Rudolph Kotze. Kiwirail, New Zealand, New Zealand |

**There's never been a more exciting time for rail in WA**

Public Transport Authority

Thousands of new jobs to be created

72km of new passenger rail

246 METRONET railcars to be built in WA

27 projects to be delivered

Up to 18 new stations

New $3.4 billion dollars to be spent

Proudly delivering www.pta.wa.gov.au

2020 - 2024

18 stations

100km track renewal

5,000 new jobs

$14 billion

2025 - 2029

130 stations

$27 billion

2030 - 2034

250 stations

$50 billion

2040 - 2044

500 stations

$100 billion

2050 - 2055

1,000 stations

$200 billion

### 1A Track Maintenance

- A Reappraisal of Head Wear Limits for Heat Treated Rails Under Heavy Haul Conditions
  - Iman Salehi. Institute of Railway Technology VIC, Australia

### 1B Rolling Stock Vehicle Design and Manufacture

- Light Rail Passengers - Are They Protected in a Crash?
  - Jademond Kiang. SNC-lavalin Atkins, NSW, Australia

### 1C Signals and Train Control Systems

- Level Crossing Performance Modelling Using Timed Petri Nets
  - Steven Gibson. RGB Assurance, WA, Australia
- Kiwirail Long-Term Rail Bridge Renewal Management Through a Structures Health Prioritisation Process
  - Rudolph Kotze. Kiwirail, New Zealand, New Zealand

### 1D Bridges and Structures

- Can We Break the Mould With ETCS L2 in Australia?
  - Georgina Hartwell. WSP, NSW, Australia
- Making Heritage Listed Rail Infrastructure Future-Ready With Technology
  - Tanya Budzakowski. WSP, NSW, Australia

### 1D Bridges and Structures

- Kiwirail Long-Term Rail Bridge Renewal Management Through a Structures Health Prioritisation Process
  - Rudolph Kotze. Kiwirail, New Zealand, New Zealand

### 1D Bridges and Structures

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### 1D Bridges and Structures

- Making Heritage Listed Rail Infrastructure Future-Ready With Technology
  - Tanya Budzakowski. WSP, NSW, Australia
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<tr>
<th>Time</th>
<th>Session</th>
<th>Authors/Institutions</th>
</tr>
</thead>
</table>
| 1200    | Advanced Rail-Defect Management with Rail Milling  
Richard Stock, Linmag, Austria, Austria  
Does Demonstration of Design Compliance Also Demonstrate Engineering Due Diligence?  
Alexander Bidanov, SNC Lavalin Rail & Transit, NSW, Australia  
The Potential Benefits of Advanced Train Management System (ATMS)  
Ian Fox, Australian Rail Track Corporation, SA, Australia  
Resilient Reconstruction - the Challenges of Repairing Aging Bridge Stock Following the Kaikoura Earthquake  
Steve Procter, NCTIR, Canterbury, New Zealand |                                                                                                                                               |
| 1230 - 1330 | Lunch served in the Exhibition Hall                                                                                                                                                                      |                                                                                                                                               |
| 1335 - 1535 | **CONCURRENT SESSIONS**  
**2A** Track Sleepers Ballast  
**2B** Wheel/Rail Interaction  
**2C** Safety, Prevention and Investigation  
**2D** Transit Planning and Urban Design | **2A** Modal Analysis  
Advancements in Concrete Sleeper and Ballast Condition Assessment  
Dwayne Nielsen, Central Queensland University, QLD, Australia  
**2B** RCF and Wear Prediction to Develop a Rail Maintenance Regime for New Metro Train Infrastructure  
Robert Schweiger, John Holland, SA, Australia  
**2C** Visual Intelligence and Connected Event and Video Recorder to Enhance Train Operations and Safety  
J. David Semple, Wi-tronix, NSW, Australia  
**2D** Developing a Public Transport Plan for Melbourne with a 30-Year Horizon  
Max Michell, Freelance, VIC, Australia                                                                 |
| 1335    | Estimation of the Sleeper/Ballast Pressure Distribution Without Disturbing the Track Support and Interrupting the Revenue Service  
Iman Salehi, Institute of Railway Technology, VIC, Australia | **4A** Rail Track Buckling Modelling and Simulation Analysis  
Yan Sun, Central Queensland University, Queensland, Australia  
**4B** Parallel Computing Rail Heat Transfer Simulation for Track Measured Temperature Data  
Chris Bosomworth, Central Queensland University, QLD, Australia  
**4C** Project Assurance: Bringing Together Interdisciplinary Assurance to Support the Whole  
Ben Mynott, Public Transport Authority, WA, Australia  
**4D** Effective Crowd Management During Major Rail Construction Activities - Using Dynamic Pedestrian Modelling/Planning Methodology  
Pietro Crovato, Jacobs, NSW, Australia  
**5A** Project Assurance: Bringing Together Interdisciplinary Assurance to Support the Whole  
Ben Mynott, Public Transport Authority, WA, Australia  
**5B** Effective Crowd Management During Major Rail Construction Activities - Using Dynamic Pedestrian Modelling/Planning Methodology  
Pietro Crovato, Jacobs, NSW, Australia  
**5C** Early Human Factors Analysis – a Risk-Based Approach for Understanding What Should Be Done and When  
Andrew Sutherland, HF Integration Pty Ltd, WA, Australia  
**5D** Effective Crowd Management During Major Rail Construction Activities - Using Dynamic Pedestrian Modelling/Planning Methodology  
Pietro Crovato, Jacobs, NSW, Australia  
**5E** Early Human Factors Analysis – a Risk-Based Approach for Understanding What Should Be Done and When  
Andrew Sutherland, HF Integration Pty Ltd, WA, Australia |                                                                                                                                               |
| 1405    | Rail Profile Grinding Strategy for The ARTC Hunter Valley Heavy Haul Network  
Darrien Welsby, Institute of Railway Technology, VIC, Australia | **5A** Design of Rail Formation and Subgrade – Matching Testing to Design Parameters  
Andy Doe, ARTC, QLD, Australia  
**5B** Managing the Wheel Rail Interface – the Benefit of Comprehensive Wheel/Rail Study at the Project Phase  
Harry De Lange, Roy Hill, WA, Australia  
**5C** A Rail Case Study: Developing a Systems Assurance Report Using a Goal Structuring Notation  
Lauren Thompson, Aurecon, VIC, Australia  
**5D** Tram Traction Substations – Not Just a Power Engineering Design  
Guy Hodgkinson, Middleton Group, VIC, Australia |                                                                                                                                               |
| 1435    | Delivering a Safe Railway: Safety Case Approach Applied to Passenger Operations on Sydney Metro Northwest  
Andrew Ward, John Holland, NSW, Australia | **5A** Design of Rail Formation and Subgrade – Matching Testing to Design Parameters  
Andy Doe, ARTC, QLD, Australia  
**5B** Managing the Wheel Rail Interface – the Benefit of Comprehensive Wheel/Rail Study at the Project Phase  
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**5D** Tram Traction Substations – Not Just a Power Engineering Design  
Guy Hodgkinson, Middleton Group, VIC, Australia |                                                                                                                                               |
| 1505    | An Innovative, Real-Time Pedestrian Simulation for Sizing Assessments: the Case of South Bank Station in Brisbane  
Federico Marcantognini, Jacobs Group, NSW, Australia | **5A** Design of Rail Formation and Subgrade – Matching Testing to Design Parameters  
Andy Doe, ARTC, QLD, Australia  
**5B** Managing the Wheel Rail Interface – the Benefit of Comprehensive Wheel/Rail Study at the Project Phase  
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Lauren Thompson, Aurecon, VIC, Australia  
**5D** Tram Traction Substations – Not Just a Power Engineering Design  
Guy Hodgkinson, Middleton Group, VIC, Australia |                                                                                                                                               |
| 1535 - 1600 | Afternoon Tea served in the Exhibition Hall                                                                                                                                                               |                                                                                                                                               |
| 1605    | **CONCURRENT SESSIONS**  
**3A** Track Formation and Geotechnical  
**3B** Rolling Stock Brake and Adhesion Systems  
**3C** Overhead Traction Systems  
**3D** Operating Safety and Human Factors | **3A** Design of Rail Formation and Subgrade – Matching Testing to Design Parameters  
Andy Doe, ARTC, QLD, Australia  
**3B** Optimum Brake Control via Multi-Mode Shifting of Slip Control Zone  
Sundar Shrestha, Centre for Railway Engineering, QLD, Australia  
**3C** Smart Emergency Steel Support Design for Overhead Line Equipment  
Andrew Tay, Romberg Rail Australia, WA, Australia  
**3D** Early Human Factors Analysis – a Risk-Based Approach for Understanding What Should Be Done and When  
Andrew Sutherland, HF Integration Pty Ltd, WA, Australia  
**3E** Early Human Factors Analysis – a Risk-Based Approach for Understanding What Should Be Done and When  
Andrew Sutherland, HF Integration Pty Ltd, WA, Australia |                                                                                                                                               |
Performance-Based Earthworks Specifications for Inland Rail
Mark Drechsler, SMEC Australia Pty Ltd, SA, Australia

Applied Air Flow as a Diagnostic Tool: Benefits of Greater Assessment of Measurable Air Flow
Karen Carriere, WABTEC CORP, Manitoba, Canada

Remote Isolating and Rail Connecting - The Conception of the e DT and the Feeder Circuit Status Evaluator
David Stuart-Smith, Arup, NSW, Australia

Unifying Workload and Situation Awareness Assessments in Heavy Rail Through Application of MBSE Tools
William Scott, University of Wollongong, SA, Australia

Track Support Floating Soil Beam on Helical Piles - Canadian National Railway Bala Subdivision
Edward Wu, CN, Ontario, Canada

From Friction Measurement to Track Damage Indexes in High Adhesion Locomotive Studies
Maksym Spiryagin, Central Queensland University, QLD, Australia

New Dynamic DC Fault Level Modelling for Railway Networks
Medhat Al Zaman, Middleton Group, VIC, Australia

Sleep Apnoea: an Under Diagnosed Threat to Railway Safety
James Michel, Marsh Rail Practice, Marsh and McLennan, DC, United States

Wednesday 13 May 2020

0700 - 1800 Registration Desk Open
0715 - 0800 Presenter and Session Chair Breakfast, Compulsory for all chairs and presenters for the day
0700 - 1900 Exhibition Open

0830 - 1000 DAY 2 PLENARY SESSION
0835 - 0850 Welcome Day 2
0850 - 0925 Keynote Address
0925 - 1000 Keynote Address
1000 - 1030 Morning Tea

0830 - 1000 Young Professional Scholarship Presentations

1035 - 1235 CONCURRENT SESSIONS

4A Track Conditioning Monitoring and Data Analytics
4B Rolling Stock Vehicle Dynamics
4C Environmental Issues and Energy Efficiency
4D Engineering Design Systems

1035 Broken Rail Detection – a Reliable and Accurate Onboard Solution
Roy Leslie, Siemens Mobility, WA, Australia

Assessing Wagon Instability in Long Trains Using Parallel Co-Simulation Technique
Qing Wu, CQUniversity, QLD, Australia

Are Hybrids Just Hype?
Frank Szanto, Downer Rail, NSW, Australia

What’s Behind the ‘Why’? The Importance of Human Centred Infrastructure Design
Sam Mcwilliam, WSP, NSW, Australia

Developments in the Rail Profile Quality Index
Darrien Welsby, Institute of Railway Technology, VIC, Australia

Rolling Stock and Twist Test Inputs
Ian Goldney, SNC-Lavalin, QLD, Australia

Lessons Learned in How to Model Strategic Noise Impacts from Entire Freight Rail Networks Cost Effectively
Luke Zoontjens, SLR Consulting Australia, WA, Australia

Digital Engineering – Driving Innovation Through the Wellington Metro Upgrade
Andy Lyon, KiwiRail, WLG, New Zealand
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<tr>
<th>Time</th>
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<th>Speaker/Contact Details</th>
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<tr>
<td>1135</td>
<td>Leveraging New Technologies and Big Data for the Optimisation of Speed Restrictions</td>
<td>Glenn Hardie, Institute of Railway Technology, VIC, Australia</td>
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<td>Detection of Vehicle Hunting Behaviour Using Fibre Bragg Grating Sensors for Heavy Haul Applications</td>
<td>Naveen Muthuraj, Institute of Railway Technology, VIC, Australia</td>
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<td>Experience With an Energy Storage Unit on a 1,500 Volt DC Railway</td>
<td>Ian Cook, Metro Trains Melbourne, VIC, Australia</td>
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<td>Collaborative Rail R&amp;D – Successes, Challenges and Future Opportunities</td>
<td>Stuart Thomson, Rail Manufacturing CRC, VIC, Australia</td>
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<tr>
<td>1205</td>
<td>Using Augmented Reality to Assist Track Inspectors for Turnout Inspections</td>
<td>Siva Naidoo, Institute of Railway Technology, VIC, Australia</td>
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<td></td>
<td>Why Change AS7524 Couplers and Drawgear?</td>
<td>Scott Simson, Bradken, NSW, Australia</td>
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<td>Computational Modelling of Energy Recuperation Systems and Energy Saving Performance Benchmark in an Australian DC Railway</td>
<td>John-Mark Merhi, WSP, NSW, Australia</td>
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<td>Communication of Complex Project Information Using Diagrammatic Tools – Sydney Metro Northwest OTS IC</td>
<td>Allen Ho, GHD, NSW, Australia</td>
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<tr>
<td>1235 - 1330</td>
<td>Lunch</td>
<td>served in the Exhibition Hall</td>
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<tr>
<td>1335 - 1535</td>
<td><strong>CONCURRENT SESSIONS</strong></td>
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<tr>
<td></td>
<td>5A Track- Rail Welding</td>
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<td>5B Rolling Stock Vehicle / Track Interaction</td>
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<td>5C Light Rail</td>
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<td></td>
<td>5D Communications Systems</td>
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<tr>
<td>1335</td>
<td>Poster Showcase</td>
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<tr>
<td>1405</td>
<td>Key Issues in Managing Field Welding of Rail</td>
<td>John Cookson, Institute of Railway Technology, VIC, Australia</td>
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<td>Modernisation of Dynamic Load Factors</td>
<td>Andrei Khaidurov, Aurizon, QLD, Australia</td>
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<td>Entering The Wireless World – Using Technology with Light Rail to Shape a Modern City</td>
<td>Scott Ney, WSP, NSW, Australia</td>
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<td>Managing Complexity on Digital Systems; a Model-Based Systems Engineering Approach</td>
<td>Donovan Roodt, Shoal Group, NSW Australia &amp; Malaeka Nadeem, Transport for NSW, NSW, Australia</td>
</tr>
<tr>
<td>1435</td>
<td>Thermal Modelling to Optimise the Vertical Alignment of Aluminothermic Welds</td>
<td>Cong Qiu, Institute of Railway Technology, VIC, Australia</td>
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<td>Holistic Approach to Rolling Stock Maintenance to Minimise Vehicle Dynamics and Track Deterioration</td>
<td>Nithurshan Nadarajah, Institute of Railway Technology, VIC, Australia</td>
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<td>Minimising Vehicle to Tram Collisions</td>
<td>Mike Ford, Jacobs, VIC, Australia</td>
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<td>Mirroring Futures – MCX Vs FRMCS</td>
<td>Rodrigo Alvarez, Rail Systems Australia, WA, Australia</td>
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<tr>
<td>1505</td>
<td>Basic Mechanical Properties and Ratcheting Behaviour of Flash Butt Welds in High Strength Steel Rails</td>
<td>Hang Su, Monash University, VIC, Australia</td>
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<td>Implementing New Wheel and Rail Profiles Using Digital Data on the Central Queensland Coal Network</td>
<td>William Schuh, Aurizon, QLD, Australia</td>
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<td>The Evolution of Tram Terminus Designin the Melbourne Urban Environment</td>
<td>Ben Droscher, Jacobs, VIC, Australia</td>
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<td>Netflix for Rollingstock – Driver Video on Demand</td>
<td>Stephen Endicott, Public Transport Authority of Western Australia, WA, Australia</td>
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<tr>
<td>1540 - 1610</td>
<td>Afternoon Tea</td>
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<tr>
<td>1615 - 1700</td>
<td>Closing Session</td>
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<tr>
<td>1615 – 1700</td>
<td>Keynote Address</td>
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<tr>
<td>1900 – Late</td>
<td>Gala Dinner</td>
<td>Sponsored by WSP</td>
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**Schedule:**
- **1135 - 1205**
  - **Leveraging New Technologies and Big Data for the Optimisation of Speed Restrictions** by Glenn Hardie, Institute of Railway Technology, VIC, Australia
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  - **Experience With an Energy Storage Unit on a 1,500 Volt DC Railway** by Ian Cook, Metro Trains Melbourne, VIC, Australia
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  - **5C Light Rail**
  - **5D Communications Systems**
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  - **Gala Dinner** Sponsored by WSP