



AUSTRALIAN
INDUSTRY
STANDARDS

SKILLS FORECAST 2019

RAIL

INDUSTRY REFERENCE COMMITTEE



CONTENTS

4

EXECUTIVE SUMMARY

6

**IRC
SKILLS FORECAST**

7

**RAIL
IRC SKILLS FORECAST**

8

**RAIL
INDUSTRY REFERENCE
COMMITTEE**

10

**RAIL
INDUSTRY OVERVIEW**

22

**EMPLOYMENT AND SKILLS
OUTLOOK**

30

**2018 INDUSTRY SKILLS
FORUMS**

31

**INDUSTRY LEADERS'
DINNERS**

32

REFERENCES

34

**PROPOSED SCHEDULE OF
WORK**

44

**AUSTRALIAN INDUSTRY
STANDARDS**

EXECUTIVE SUMMARY

The Rail industry provides valuable services to the Australian economy, providing mobility to millions of passengers, and vital freight services across the country. The industry has an estimated annual revenue of over \$26.56 billion, employing over 60,000 people across private and public operators, passenger and freight operators, track owners and managers, manufacturers, infrastructure maintenance and suppliers.

The Federal, State and Territory governments have committed \$100 billion over the next decade to rail infrastructure projects to ensure the capacity and operating efficiency of the national rail network can keep up with population growth and the demand for services. Improving network connections to capital cities and ports will also reduce freight costs. These large-scale projects demand skilled infrastructure workers and create opportunities for employment across the country. At present, there are significant shortages of trained people to fill a large number of roles across the industry.

Recent technological changes have already transformed rail operations. Increasing automation and driverless systems are expected to have the biggest impact. The first driverless passenger train in Australia was successfully trialled in Sydney in 2018. Driverless single-deck trains are expected to start operating in the near future. To this end, the signalling and communication infrastructure is also being digitalised to accommodate for automation and driverless technology.

New train management systems are being designed which will improve rail network capacity, safety, and system reliability. Sensors are also being embedded into rail assets to collect real-time data which will enable remote monitoring of assets and cost-effective maintenance work. Such technologies can enable predictive maintenance and timely rectification of network faults. The onset of autonomous and remotely-operated systems will necessitate new skills for network control operations and first line responders to quickly provide initial support and minimise delays. These new incorporated systems will improve the safety of rail workers and overall network efficiency.

The industry is driven by a customer-centric approach. Implementation of new technologies, automation, and Big Data will have significant knock-on effects on customer services and improved performance. The workforce will need to be skilled in digital literacy, cyber security, and data analytics to meaningfully interpret data and improve customer services.

New technologies and the ongoing changes within the regulatory environment will require regular revision of the Training Package to ensure the workforce is best equipped with practical and applicable skills. The Rail IRC has identified the need to review the current Rail Network Control qualifications and develop new skills for network fault support. The workforce planning and development activities undertaken by enterprises are essential to creating and retaining a viable and productive workforce.



Victoria Kent

Rail IRC Chair

This IRC Skills Forecast was agreed to by the Rail IRC on 29 April 2019.





IRC SKILLS FORECAST

The Industry Reference Committee (IRC) Skills Forecasts focus on the prioritisation of the skill needs of the industry sectors each IRC has responsibility for. They are developed and reviewed annually and submitted on behalf of the IRC to the Australian Industry and Skills Committee (AISC) for approval.

The document is deliberately brief. It does not seek to identify every issue within every sector. It is a snapshot of a continually evolving story that is intended to alert and inform a wide audience and enhance the industry's capacity to act.

IRCs are required to consult broadly with stakeholders to ensure a whole-of-industry view about the opportunities and challenges for the workforce and the Training Package review work necessary to meet industry needs. The information is then used to develop the four-year IRC Proposed Schedule of Work.

A large yellow and black diesel locomotive is shown from a front-three-quarter perspective, positioned on railway tracks. The scene is set during sunset or sunrise, with a warm, orange glow in the sky. The locomotive has multiple windows and lights on its front. The title 'RAIL IRC SKILLS FORECAST' is overlaid in large white letters on the lower half of the image.

RAIL IRC SKILLS FORECAST

This annual IRC Skills Forecast will be submitted by the Rail IRC to the AISC for approval.

The IRC Skills Forecast identifies the priority skill needs of the Rail industry following a research and stakeholder consultation process conducted by Australian Industry Standards (AIS) on behalf of the IRC.

Once approved by the AISC, the IRC Skills Forecast informs the development of a four-year rolling National Schedule for review and development work within the Rail-specific components of the TLI Transport and Logistics Training Package.

More information on the National Schedule can be found at: www.aisc.net.au/content/national-schedule.

RAIL INDUSTRY REFERENCE COMMITTEE

The Rail IRC has been assigned responsibility for the Rail-specific components of the TLI Transport and Logistics Training Package.

More information about the Rail IRC
and its work can be found here:[www.
australianindustrystandards.org.au/
committee/rail-industry-reference-committee/](http://www.australianindustrystandards.org.au/committee/rail-industry-reference-committee/)

RAIL IRC MEMBERS

Victoria Kent (Chair)

Rio Tinto

Carol Hedrick (Deputy Chair)

Queensland Rail

Brad Giddins

Level Crossing Removal Project, Victoria

Brian Appleby

Public Transport Authority - Government of Western Australia

Gary Talbot

Rail, Tram and Bus Union Australia

Jocelyn Edwards

Transport for NSW

Laurell McLean

Pacific National

Narelle Rogers

John Holland Group Pty Ltd

Natalie Currey

Australasian Railway Association

Nick Dickinson

Metro Trains Australia

Nicole Catterson

Australian Rail Track Corporation

Paul Daly

Rail Industry Safety and Standards Board

Phil Christie

Department of Planning, Transport and Infrastructure, SA

For more information please contact:

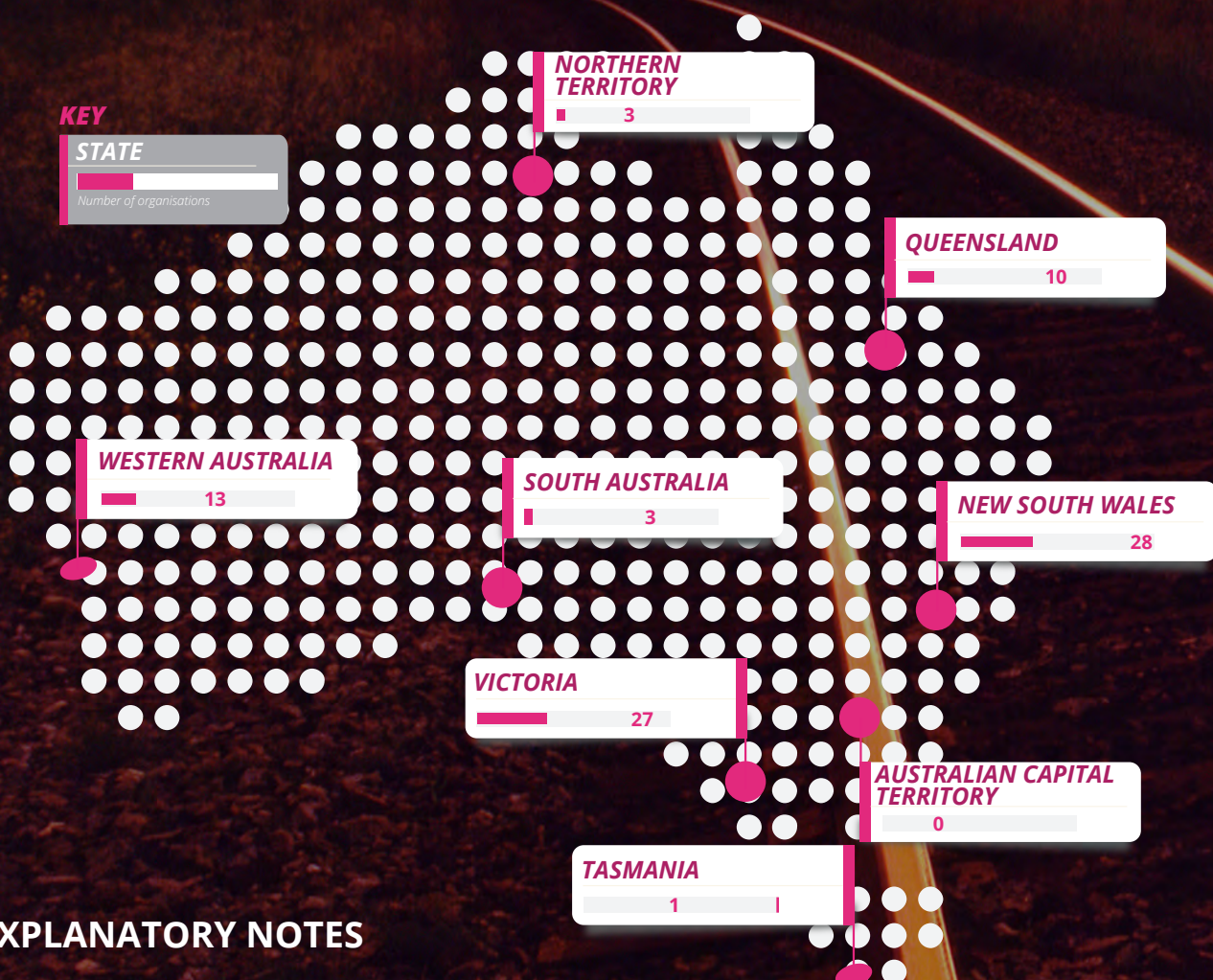
Klausch Schmidt

Rail Industry Manager
Australian Industry Standards
M 0417 568 967
E klausch.schmidt@australianindustrystandards.org.au

RAIL INDUSTRY OVERVIEW

The Rail industry underpins Australian business, as it carries people and commodities on over 33,000km of track across the country. It has an estimated annual revenue of \$26.56 billion, adding \$10.43 billion to the Australian economy in 2018. The industry employs almost 60,000 people across 961 companies comprising private and public operators, passenger and freight operators, track owners and managers, manufacturers and suppliers that operate in urban, regional, and rural areas of Australia.

Investments in the Rail industry across all Commonwealth, State and Territory Governments to 2030 will provide over \$100 billion for new projects and upgrades. This is expected to greatly enhance the rail networks infrastructure, and create jobs for building, managing and maintaining these networks.¹



EXPLANATORY NOTES

Counts of Australian Businesses

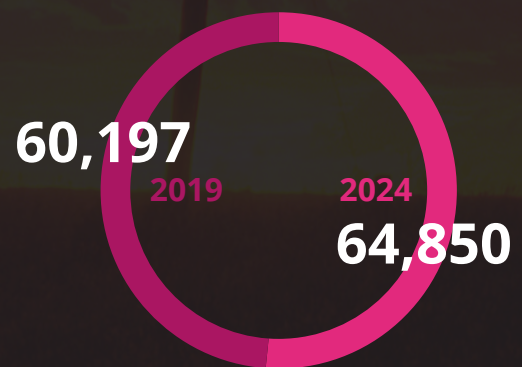
Distinct from the Census and Labour Force data, the Counts of Australian Businesses data uses a top down approach where industries are primarily classified by the single predominant industry class associated with a business' ABN. A limitation of this approach is that organisations with a presence in several States/Territories will be counted only once. This can lead to enterprise figures appearing low for a given state/territory, but it's not that there are no enterprises existing in the state/territory, it's that the headquarters are located elsewhere. A further consideration is that organisations in more than one industry will also be only counted in one industry.

WORKFORCE AGE

AT 45 YEARS OLD, THE TYPICAL WORKER IS **4 YEARS, 2 MONTHS** OLDER THAN THE NATIONAL AVERAGE.

THE WORKFORCE IS AGEING AT **1.6 TIMES** THE NATIONAL RATE

WORKFORCE SIZE



BUSINESS COMPOSITION

67
SMALL
BUSINESS

5
MEDIUM
BUSINESS

13
LARGE
BUSINESS

GENDER DISTRIBUTION

73%  **27%** 



EMPLOYMENT
GROWTH TO 2024

7.7%

INDUSTRY VALUE YEAR 2018-19

REVENUE
\$26.56B

**+\$10.43B
TO GDP**

12

KEY RAIL STAKEHOLDERS

Employers

- Accell Pty Ltd
- Arc Infrastructure
- Aurizon
- Australia Western Railroad Pty Ltd
- BHP Billiton
- BlueScope Steel
- Bombardier Transportation Australia
- Downer Group
- Fortescue Metals Group Limited
- Genesee and Wyoming Australia
- Great Southern Rail
- John Holland Group Pty Ltd
- KDR - Yarra Trams
- Laing O'Rourke
- Leighton Contractors Pty Ltd
- Level Crossing Contractors Pty Ltd
- Level Crossing Removal Project
- Manildra Group
- McLeod Rail Pty Ltd
- Metro Trains Melbourne
- Pacific National
- Public Transport Authority
- Queensland Rail
- Rio Tinto
- Roy Hill Infrastructure Pty Ltd
- SCT Logistics

- TasRail
- The Instruction Company Pty Ltd
- Transport for New South Wales - Sydney Trains, NSW Trains
- TransVolution
- V/Line Passenger Pty Ltd
- Voestalpine VAE Railway Systems Pty Ltd
- Voith Turbo Pty Ltd
- Wabtec Control Systems
- Watco Companies WA
- WS Atkins International Limited

Employer Representatives

- Australasian Railway Association
- Rail Industry Safety and Standards Board

Employee Representatives

- Association of Tourist & Heritage Rail Australia Inc.
- Australian Manufacturing Workers Union
- Australian Services Union
- Construction, Forestry, Mining and Energy Union
- Rail & Maritime Transport Union Inc.
- Rail Track Association Australia
- Rail, Tram and Bus Union Australia

Licensing / Regulatory

- Office of the National Rail Safety Regulator

Government

- Australian Rail Track Corporation
- Australian Transport Safety Bureau
- Department of Planning, Transport and Infrastructure - SA
- Federal, State/Territory Departments
- Public Transport Authority - Government of WA
- Rail Accreditation and Registration - Department of Transport, Planning and Local Infrastructure

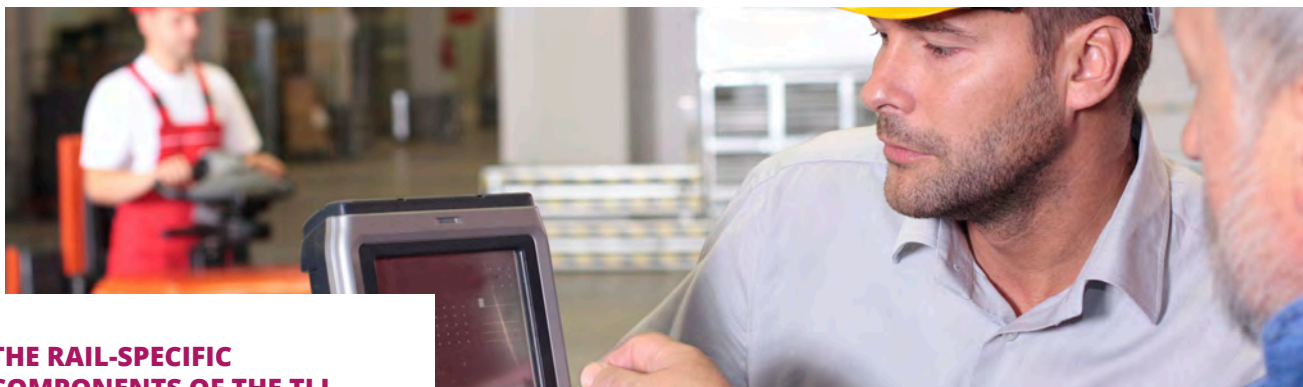
Industry Advisory

- State and Territory Industry Training Advisory Boards (ITABS)

Training Organisations

- TAFEs, Private RTOs, Enterprise RTOs

RAIL-SPECIFIC COMPONENTS OF THE TLI TRANSPORT AND LOGISTICS TRAINING PACKAGE



THE RAIL-SPECIFIC COMPONENTS OF THE TLI TRANSPORT AND LOGISTICS TRAINING PACKAGE COMPRISE

26

QUALIFICATIONS

54

SKILL SETS

247

UNITS OF COMPETENCY

and associated assessment requirements. These cover rail infrastructure, light rail, tram and train driving, rail operations management, signalling and safety management.

The Rail-specific components of the TLI Transport and Logistics Training Package provide the only nationally recognised Vocational Education and Training (VET) qualifications for occupations involved in rail infrastructure, track protection, shunting, rail track vehicle driving, tram or light rail infrastructure, customer service, rail driving, rail track surfacing, signalling, electric passenger train guard, track protection, heritage locomotive assistant or steam locomotive fireman, train driving, safety investigation, network control, safety management, tram/light rail control and rail operations management.

The Rail-specific qualifications in the TLI Transport and Logistics Training Package are:

Certificates

- Certificate II in Tram or Light Rail Infrastructure
- Certificate II in Rail Infrastructure
- Certificate II in Rail Track Vehicle Driving
- Certificate II in Shunting
- Certificate II in Rail Customer Service
- Certificate II in Track Protection
- Certificate III in Rail Track Surfacing
- Certificate III in Rail Structures
- Certificate III in Rail Infrastructure
- Certificate III in Track Protection
- Certificate III in Rail Signalling
- Certificate III in Terminal Train Driving

14

- Certificate III in Rail Yard Coordination
- Certificate III in Electric Passenger Train Guard
- Certificate III in Rail Driving
- Certificate III in Mechanical Rail Signalling
- Certificate III in Heritage Locomotive Assistant or Steam Locomotive Fireman
- Certificate III in Tram or Light Rail Infrastructure
- Certificate III in Rail Customer Service
- Certificate IV in Tram/Light Rail Control
- Certificate IV in Rail Network Control
- Certificate IV in Rail Safety Investigation
- Certificate IV in Rail Infrastructure
- Certificate IV in Train Driving
- Certificate IV in Rail Safety Management

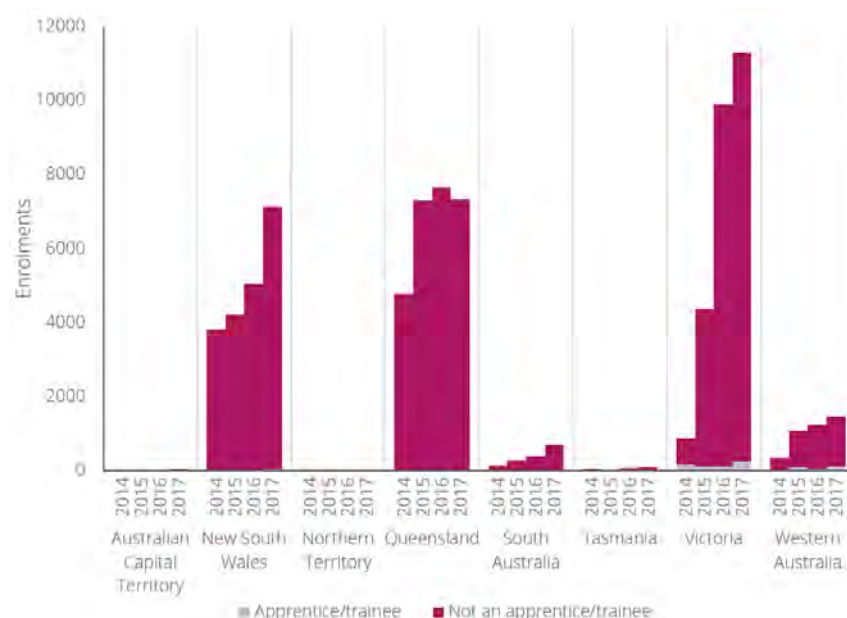
Diploma

- Diploma of Rail Operations Management

COMPONENTS OF THE TLI TRANSPORT AND LOGISTICS TRAINING PACKAGE ARE IN THE SCOPE OF REGISTRATION OF 77 REGISTERED TRAINING ORGANISATIONS.

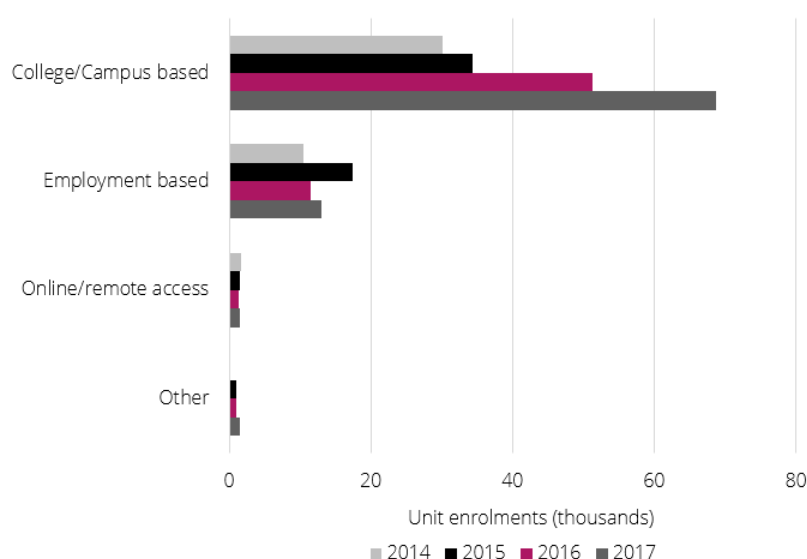
TRAINING DATA

The charts below show commencing qualification enrolments by apprentice/trainee status in each State and Territory along with Unit enrolments by delivery type over four years. At the national level, rail qualification enrolments in the TLI Training Package have nearly tripled, growing by 180% over the last four years while Units of Competency enrolments have almost doubled (99%).



QUALIFICATION ENROLMENTS BY STATE/ TERRITORY

The most obvious increase in Rail qualification enrolments in recent years is in Victoria where 80% of enrolments were in Certificate II in Track Protection alone. Over the four-year period, 76% of enrolments nationwide for that qualification were delivered in Victoria.



UNIT ENROLMENTS BY DELIVERY TYPE

College/Campus based enrolments have more than doubled in four years and employment-based enrolments have increased by nearly a quarter (23.6%). Despite the significant increase in qualification enrolments, online/remote access Unit enrolments have declined by more than 10% in the last four years.

EXPLANATORY NOTES

Training Charts

The Training and the Total VET Activity (TVA) data is collected from all types of training providers and not only those in receipt of Commonwealth or State funding. TVA data collection commenced in 2014. For Enrolments by Delivery type 'Other' includes; Recognition of Prior Learning (RPL), Credit Transfers and Units where the mode of delivery is mixed.

Exemptions

Where the submission of training data to TVA conflicts with defence or national security legislation or jeopardise the security or safety of personnel working in defence, border protection, customs or Australian police departments, an exemption from reporting training data is available.

Organisations that deliver training for vital services to the community (such as emergency, fire, first aid and rescue organisations) may have received an exemption to submit data to TVA. From 1 January 2016 however, the exemption from reporting applies only in respect of training activity not delivered on a fee for service / commercial basis.



CHALLENGES AND OPPORTUNITIES

TECHNOLOGICAL INNOVATIONS ARE RESHAPING THE RAIL INDUSTRY

Technological innovations are swiftly changing many industries. The Rail industry is among those that are significantly impacted by a new wave of technologies which will create great opportunities. The technological innovations of the industry are aimed at improving network operations, reducing power consumption, having smarter monitoring and asset management processes, and advanced safety, threat detection and intervention.² New systems, which are being developed and adopted, need to be interoperable across states and territories and over different networks. The advent of these new technologies and their implementation in the industry will require new and revised skill sets throughout the workforce.

Australia is following European rail models and implementing the European Train Control System (ETCS). The new ETCS requires workers with specialised skills to implement and maintain these systems. Advanced Train and Management System (ATMS) is also being designed which will improve rail network capacity, operational flexibility, train service availability, transit times, rail safety, and system reliability.³ Communication technology and Big Data are also contributing to changes in the Rail workplace and job requirements, including new systems in wireless signalling and sensors, developed to capture data for use in predictive condition monitoring and maintenance.

AUTOMATION AND DRIVERLESS TRAINS ARE ON THE WAY

Digital technology is causing an overhaul of operations in the Rail industry. Amongst the various new technologies, automation and driverless systems are expected to have the greatest impact on the industry and the required future skills. Driverless technology offers potential to achieve greater operational efficiency, improved safety, reduced fuel consumption, improved reliability, and lower operations costs.⁴ Implementing driverless technology also requires improvements to signalling and communications infrastructure to facilitate the transition. To this end, the Government of New South Wales has invested \$880 million to digitalise the signalling system.⁵ The first driverless passenger train in Australia was successfully trialled in Sydney on the North West Metro line in 2018.⁶ It is expected that 22 driverless single-deck trains will carry the first passengers soon. The world's largest autonomous train carried Rio Tinto's ore assets across a 280-kilometre distance in Australia this year, remotely controlled from their operation room 1500 kilometres away.⁷ The company currently operates 34 trains per day in autonomous mode and plans to increase its autonomous fleet operation to 200 locomotives and 50 trains per day.⁸

Other innovations are also gaining momentum. In 2017, the Federal Government announced a \$12 million grant for a two-year program to test Satellite Based Augmentation Systems (SBAS). The program will investigate the benefits of increased accuracy and availability of Global Navigation Satellite System (GNSS) signals with respect to the four main transport sectors: air, land (rail and road) and water. The technology can improve the positioning accuracy to within five centimetres as

opposed to the current system accuracy which is within five to ten metres.⁹ While several positioning technologies are already well established within the Rail industry, an intended outcome of this program relates directly to the development of an automated management system for trains. In response to the rapid emergence of disruptive technologies, the industry has developed a Smart Rail Route Map which defines industry goals and focuses on key priorities related to digital technologies.¹⁰ As these systems gain traction across the Rail industry, workers will require new skills in technology, remote operations, diagnostics, maintenance, and communications.

TECHNOLOGIES REQUIRE NEW SKILLS FOR REMOTE OPERATIONS

Efficient and reliable operations along with work health and safety concerns are of paramount importance to the Rail industry. To this end, new computer systems are being developed and more and more sensors are being embedded into rail assets to collect valuable data to enable remote condition monitoring of assets and operation of trains.¹¹

The key objective of remote operations is to utilise collected data to generate meaningful information, leading to improved network performance, safety, reliability, and regulatory compliance. The new sensors and systems provide real-time data from remote monitoring that can help to make informed asset maintenance decisions by predicting faults and enabling more cost-effective maintenance work.¹² As autonomous systems are introduced, the volume and complexity of information (i.e. data, train telematics diagnostics of vehicle health) will change the role of the remote operator significantly. The operators will require higher-order skills in data analytics,¹³ problem-solving, and an understanding of autonomous systems. The benefits result in fewer delays, saving millions of dollars for rail network operators, and offering a smooth transition from reactive maintenance (dealing with faults as they arise) to predictive and proactive maintenance where maintenance is conducted ahead of time.¹⁴

Wireless delivery of rail critical communications has already been implemented by some rail operators to increase efficiency.¹⁵ Technological advances are supporting improvements in integrating different systems across different rail modes, i.e. station precincts, and high capacity rolling stock and signalling systems.¹⁶ As these

new technologies emerge, they bring a change in the demand for the skills required of the Rail workforce. Upskilling will be required to ensure the right skills are developed to meet flexible job demands and increase productivity.

BIG DATA IS A GAME CHANGER

Rail is among many industries in which the application of big data analytics is a topic of great interest. Big Data refers to the ever-increasing volume of data being captured by sensors and subject to analysis, and it is transforming the skills needs of the Rail industry. The use of Big Data enables transport systems to accurately analyse information from the network, to improve real-time operations, decision-making, threat detection, and productivity. It will also be used to optimise the network, by identifying points of preventative maintenance before infrastructure is damaged and improve safety control systems.¹⁷ Innovations such as Remote Diagnostics and Advisory System (RDAS) are already assisting rail operators to view their asset in real-time and predict faults with an accuracy rate of 85 per cent.¹⁸ Insightful interpretation of data can produce actionable intelligence and help organisations transition to a proactive maintenance regime.

With the availability of a large volume of data from sensors and devices across the rail network, there is a need to recognise patterns and retrieve useful information. Rail operators need to be able to interpret and analyse data meaningfully. Smart Rail Route Map has specifically highlighted data management and data analytics as the skills required for the workforce.¹⁹ A national survey across Australia confirms that Big Data analytics is one of the top three digital skills²⁰ in demand. Industry experts and participants at the AIS national Industry Skills Forums also emphasized the need for data analytics skills for their current and future workforce. Preparing the workforce for these technological changes in rail network systems will be vital to maintaining high operating standards, reliability, and customer satisfaction.

DIGITAL LITERACY IS ESSENTIAL

Digital transformation has completely revamped every aspect of Australian society and workforce. New technologies and devices are widely used in the workplace, creating digitally-enabled environments that affect numerous occupations. Digital literacy and Information Communication

18

Technology (ICT) skills are required to respond and adapt to the fast pace of implementation of these technologies. Digital literacy is defined as having practical skills in using technology to access, manage, manipulate, and create information as well as the skills to critically analyse, interpret and apply the information to relevant situations. Digital literacy also encompasses more technical skills in programming and coding, data analytics, technology design, system analysis, and presenting and managing content on the web to develop and manage applications.^{21 22}

Advancements in Artificial Intelligence, computer technology, automation, the Internet of Things, cloud computing, big data, customer-service platforms and social media are generating a massive volume of data and information, offering a range of benefits such as improved customer service and operational efficiency. The Rail industry has emphasised the significance of big data analytics and digital literacy as the required skills in the near future.²³ In line with the Australian Government's National Innovation and Science Agenda,²⁴ training and upskilling in digital literacy will help drive economic prosperity.

Data is the driver of improved customer service which is offered through digital platforms. Data specialists can provide organisations with insights into customer and consumer behaviour. Organisations can use the data and insights that have been sourced from digital services and platforms to tailor customer relationship processes. Programming skills will be pivotal as they are required in the design, construction and delivery of educational materials via digital platforms that enable interaction with customers. Customers are also increasingly demanding digitalised services, allowing them to directly communicate with service providers via smart devices and social media channels. The design and build of these digitalised service systems and their usability for customers will be critical in order to maintain and improve customer satisfaction.²⁵ Benefitting from digital literacy will also require a digitally competent workforce with a range of skills, from basic ICT skills to specialist skills, to manipulate and interpret data in a meaningful manner and deploy technologies more effectively.

In a recent survey, employers prioritised digital technology training development for managers (33%) followed by technicians/trades workers and professionals at 18 and 16 per cent respectively.

²⁶ Digital skills have been ranked as the second highest-priority skills needs with 64 per cent of IRCs listing them in their skills forecasts.²⁷



Participants at the AIS national Industry Skills Forums also emphasised digital literacy as a highly significant skill in demand.

Australia is very well positioned to be a leader in the digital economy. This will be enhanced through continued planning and investment in educational programs to train and upskill the existing and future workforce in digital literacy.

ARTIFICIAL INTELLIGENCE, AUGMENTED AND VIRTUAL REALITY

Artificial Intelligence (AI) technology will yield great opportunities and improve safety. AI will use an array of cameras around the train to constantly monitor the environment and analyse the data that is being fed into it. This technology will provide enhanced information in all weather and lighting conditions. It can enhance drivers' situational awareness during inclement weather conditions or driver's fatigue.²⁸

Along with other industries, the Rail industry is using simulation technologies, including



Augmented (AR) and Virtual Reality (VR) systems, to develop and design new infrastructure and provide simulation-based rail control operations training. These methods can deliver high quality and safe practice for new workers in the industry without the expense or liability of incurring damages.²⁹ This will enable the Rail industry of Australia to ensure best practices are employed and maintain relevance with the international community.³⁰

SAFETY IS A NATIONAL PRIORITY

Safety in the Rail industry is of paramount importance as the industry moves millions of people daily. Harmonising rail safety standards and developing effective national standards and codes of practice are key focus areas to improve industry's safety and efficiency.³¹ The Office of the National Rail Safety Regulator (ONRSR) has deemed safety of workers and vehicles a key priority in their 2016-17 annual report.³² ONRSR is also undertaking a project to make informed safety decisions based on risk-based regulatory intelligence and data to improve compliance and mitigate risks.³³

Safety of critical communications and systems will continue to be high priority as the industry embraces technology. The Australian Government has recently invested \$50 million to make the national rail network safer by replacing on-track signalling with Global Positioning System (GPS) and wireless technologies. These new systems will enable real-time tracking of trains on the network, improve operational flexibility, safety, and reliability.³⁴ The Smart Rail Route Map also considers safety as a key area of focus.³⁵

The rise of automation and technology has also presented new safety risks for workers. Training in awareness of these risks and mitigation strategies are vital for safe operations and work efficiency.

INDUSTRY-SPECIFIC CYBER SECURITY IS REQUIRED

The growing pace of new innovations and technologies is accompanied with increasing exposure to cyber security threats. Cyberattacks are a common risk to many industries including the Rail sector. According to a research report, 95 per cent of Chief Information Officers believe that cyberattacks will increase and impact



organisations in the next three years.³⁶ Australia has also been identified as the nation most under cyberattack threats in the Asia-Pacific region with 80 per cent of companies reporting a total of 5,000 threats a day,³⁷ incurring a cost of \$29 billion per annum to Australian businesses.³⁸ Over two thirds (69 per cent) of Australian businesses report experiencing cyber fatigue against cyber threats.³⁹

Awareness of the nature of cyber security threats and skills to detect, report and resolve the issues remain a challenge. Under the Notifiable Data Breaches (NDB) scheme, established in early 2018, organisations that suffer a data breach causing serious harm to individuals are required to alert the Office of the Australian Information Commissioner (OAIC). They must also inform the affected customers/clients whose confidential data is breached.⁴⁰ This, in turn, could entail financial and/or reputational loss if a breach occurs due to lack of proper cyber security skills and procedures. About 66 per cent of Australian CEOs regard cyber security capabilities among the top three most important workforce capabilities to foster.⁴¹ This was supported at the AIS national Industry Skills Forums where the vast majority of participants considered cyber security to be a highly significant issue to their organisations.

The unique nature of the Rail industry and technologies such as Big Data, automation, digital sensors, remote operations, etc., can expose the industry to growing cyber security risks. Disruptions caused by cyberattacks or compromised systems can have severe repercussions including damage to infrastructure.

In the light of such serious safety risks, it is imperative to have a tailored cyber security training program not only to inform the workforce of the nature and examples of the Rail industry cyberattacks, but also give them the skills and competencies to be able to resolve them. Businesses need to continue to raise awareness about the issue, have proper procedures in place and deploy the right technologies to help identify, block or remediate against any malicious attacks. Investing in skills and capabilities through educational programs is key to understanding cyber security and being protected from cyber threats.



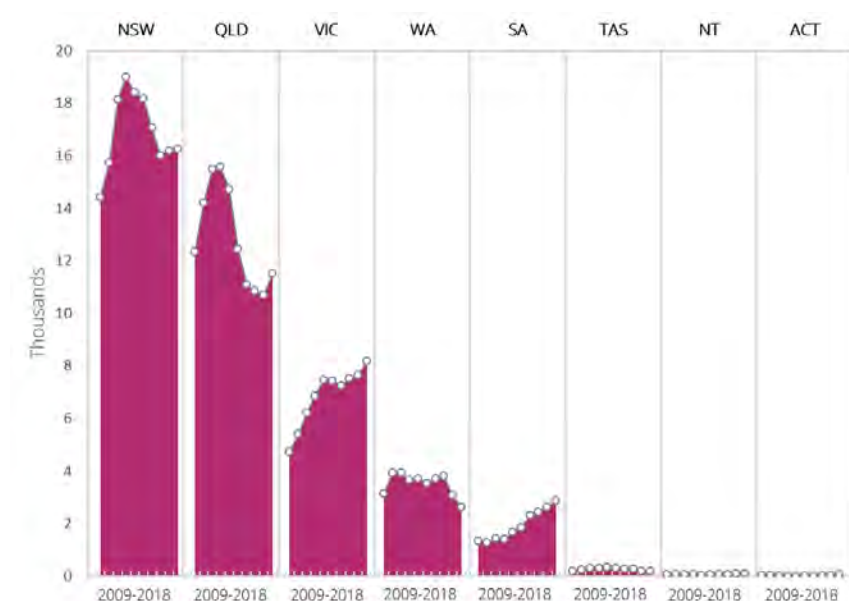
IMPROVED CUSTOMER SERVICE IN A DIGITALLY TRANSFORMED INDUSTRY

The Rail industry is heavily dependent on ensuring safety and reliability in their daily operations to maintain public confidence. New technology will help the industry meet the demand to increase performance, deliver rail services on-time, and improve productivity and the overall customer experience. Customer service in an ever-increasing online environment is identified as a key focus area in the Smart Rail Route Map.⁴² Implementation of new technologies, automation, and Big Data will have significant knock-on effects on customer-centric operations. The industry will need to plan and prepare the workforce for an ever-increasing demand for services by engaging with customers and maintaining clear and well-defined communication strategies in the new digital and technological age. Having the right skills to understand and meet these expectations is key to improved and efficient operations.

EMPLOYMENT AND SKILLS OUTLOOK

EMPLOYMENT DEMOGRAPHICS

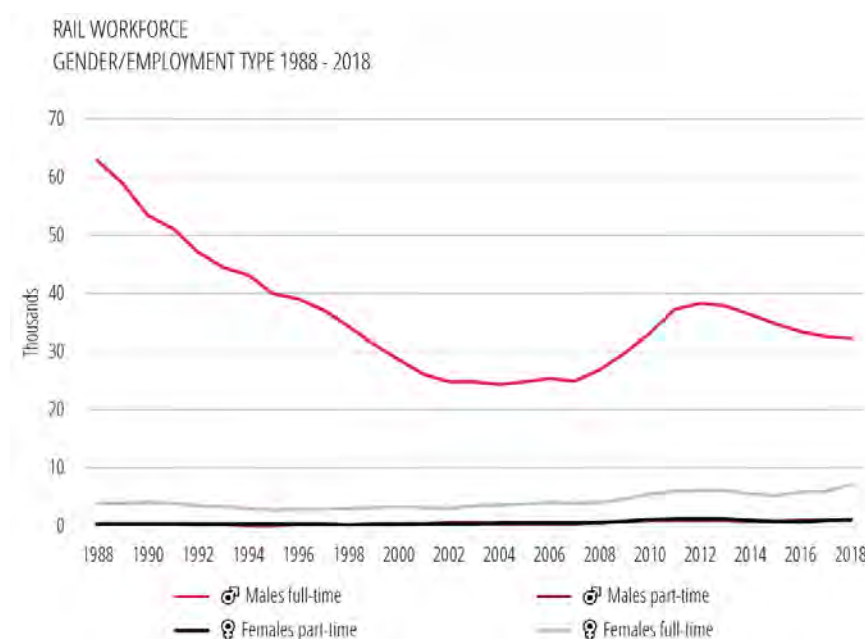
The following charts provide an overview of the Rail workforce at a glance. These include workforce by State/Territory, gender-composition by employment type, and the projected employment for the next five years.



RAIL INDUSTRY WORKFORCE BY STATE/ TERRITORY (2009 – 2018)

The Rail workforce in Victoria has increased by 72.8% since 2009 and the South Australian workforce has more than doubled (115%). The mining States of Queensland and Western Australia have seen significant declines in their Rail workforce particularly since 2012, falling 25.9% and 33.4% from peak.

Source: Australian Bureau Statistics (2017)
6291.0.55.003 - Labour Force, Australia, Detailed.
Australian Government.



GENDER BY EMPLOYMENT TYPE

Not only has the number of females in the Rail industry more than doubled in the last 30 years (151.7%), the rate at which females are entering the Rail industry is also increasing, from an annualised growth rate of 3.2% over 30 years to 7.9% in the last ten years.

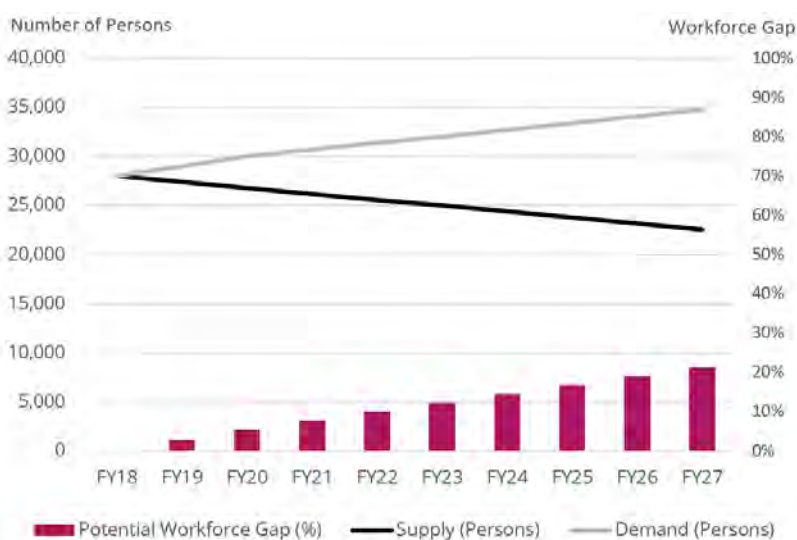
Source: Australian Bureau Statistics (2017)
6291.0.55.003 - Labour Force, Australia, Detailed.
Australian Government.



RAIL WORKFORCE GAPS - OPERATIONS AND MAINTENANCE (2018 – 2027)

Operations and maintenance workforce demand is anticipated to rise strongly over the coming decade, reflecting the needs of maintaining existing ageing rail assets, strong growth in demand for rail services (both passenger and freight), as well as strong growth in investment in new assets. Overall, maintenance and operations workforce demand is forecast to rise from just around 28,000 persons in FY18 to around 35,000 persons by FY27. Meanwhile, ageing of the existing workforce is likely to see approximately 5,600 workers leave the industry over the coming decade. The total workforce gap for operations and maintenance (demand less supply) is expected to rise to 12,300 persons by FY27.

Source: Australasian Railway Association Skills Capability Study: Skills Crisis, A Critical Call



EXPLANATORY NOTES

Labour Force Data

Outside of Census years, the size of an industry's workforce is established by the Australian Bureau of Statistics using the Labour Force survey. This dataset provides a 30-year view of the industry where, like the Census, industry is assigned at the discretion of the individual respondent. Given that the survey is sample-based, it should also be understood that the smaller the industry being measured, the larger the margin of error.

The scope of the Labour Force survey is limited to the civilian population of Australia and therefore members of permanent defence forces are excluded from the survey.

IBISWorld Data

IBISWorld data is comprised from a variety of economic, demographic, government and company data, including the Australian Bureau of Statistics.

RAIL INDUSTRY SKILL SHORTAGES

On behalf of the Rail IRC, AIS conducted an online survey for stakeholders, between 11 September 2018 and 14 January 2019. The IRC sought feedback on the current skill shortages and the reasons for the shortages, as perceived by industry stakeholders.

RAIL SKILL SHORTAGES

Nearly 94 per cent of employers reported experiencing a skills shortage in the last 12 months. The occupations reported as being in shortage were:

- 1** ENGINEERS
- 2** EDUCATORS, TRAINERS AND ASSESSORS
- 3** SIGNALLING TECHNICIANS
- 4** TRAIN DRIVERS
- 5** TRACK WORKERS

REASONS FOR SHORTAGE

Employers identified the following reasons for the shortage with the most frequent response listed first

- 1** AGEING WORKFORCE / CURRENT STAFF RETIRING
- 2** COMPETITION FROM OTHER ORGANISATIONS
- 3** COST/TIME TO ACHIEVE THE REQUIRED QUALIFICATION
- 4** WAGES / SALARIES CONSIDERED TOO LOW
- 5** UNATTRACTIVE JOB / POOR INDUSTRY IMAGE

***NEW COMPUTER SYSTEMS ARE BEING DEVELOPED
AND MORE AND MORE SENSORS ARE BEING
EMBEDDED INTO RAIL ASSETS TO COLLECT DATA
AND ENABLE REMOTE CONDITION MONITORING OF
ASSETS AND OPERATION OF TRAINS.***

PRIORITY SKILLS

The priority skills of the Rail industry are drawn from stakeholder responses to the Rail IRC Skills Forecast survey conducted between 11 September 2018 and 14 January 2019.

SKILL CATEGORY

In order of priority to the industry, the following skills were identified from the survey as the most important for the Rail workforce within the next three to five years.

- 1** SAFETY
- 2** TRACK VEHICLE OPERATIONS
- 3** MAINTENANCE/SERVICING
- 4** SIGNALLING
- 5** DIGITAL

GENERIC SKILLS

The Generic Skills listed are provided to AIS by the Department of Education and Training. Within the survey, the IRC asked stakeholders to rank these skills in order of importance to the industry. Ranking of the 12 generic workforce skills in order of importance to the Rail industry are as follows.

- 1** DESIGN MINDSET / THINKING CRITICALLY / SYSTEM THINKING / SOLVING PROBLEMS
- 2** LEARNING AGILITY / INFORMATION LITERACY / INTELLECTUAL AUTONOMY AND SELF-MANAGEMENT
- 3** MANAGERIAL / LEADERSHIP
- 4** TECHNOLOGY
- 5** COMMUNICATION / VIRTUAL COLLABORATION / SOCIAL INTELLIGENCE
- 6** SCIENCE, TECHNOLOGY, ENGINEERING, MATHEMATICS (STEM)
- 7** LANGUAGE, LITERACY AND NUMERACY (LLN)
- 8** DATA ANALYSIS
- 9** CUSTOMER SERVICE / MARKETING
- 10** FINANCIAL
- 11** ENVIRONMENTAL AND SUSTAINABILITY
- 12** ENTREPRENEURIAL

WORKFORCE SUPPLY SIDE CHALLENGES AND OPPORTUNITIES

ATTRACTION OF YOUNG RECRUITS AND AGEING WORKFORCE

Attracting and retaining young recruits remains a challenge for the industry. The current employment rate for those aged under 30 is approximately 11 per cent,⁴³ which has the potential to negatively impact the industry. The image of the industry presents challenges in recruiting for professional skills. There remains a low tech, and male dominated image of the industry amongst younger people. The Rail industry needs to enhance its attractiveness through working with education providers to create greater awareness of rail as a skills destination, whilst also improving its image in the minds of the younger generation entering apprenticeships and cadetships. Indeed, investing in new technologies (such as autonomous trains and Metros) is a strong positive initiative for the industry in terms of modernising its brand and making it more attractive to future workers.^{44 45}

The importance of attraction and recruitment strategies, promoting career pathways, and development of more dynamic 'starter' roles for trainees, apprentices and cadets that allow them to have a more diverse experience of the industry⁴⁶ needs to be constantly encouraged. New recruits may be unaware of the variety of roles available with the rail industry. Awareness of diversity in skills development can help retain the workforce for longer. It is now recognised that both public and private sectors can play a greater role in fostering industry skills through defined pathways. Consequently, there remains a need to develop clear pathways so that a local rail skills workforce can develop alongside the rollout of new infrastructure.⁴⁷ It is also deemed necessary to ensure that training provision is fit-for-purpose, while reducing barriers to transferability of skills and qualifications. Deficiency in uniform standards and systems presents a challenge to transferring skills within Australia or when trying to bring skills in from other industries.⁴⁸

The ageing workforce is a further barrier to meeting the growing demand. A recent report from Australasian Railway Association (ARA) indicates that over 20 per cent of the existing

workforce will retire by 2028, adding substantially to existing workforce gaps across the industry.⁴⁹ As 53 per cent of the current Rail workforce are aged over 45, the challenges presented by an ageing workforce are likely to persist long-term within the industry.⁵⁰ Workforce ageing and retirements will place further strain on some workforce gaps, most notably among machinery operators, including train drivers.⁵¹ With a large percentage of employees approaching retirement age,⁵² the skills challenge is further intensified by the need to not only meet growing demand, but also to replace skills lost to an ageing workforce.⁵³ Another challenge is compliance with the National Standards for Health Assessment of Rail Safety Workers which requires periodic medical assessment of workers above 50 years of age (every five years) and those above 60 years (every year), incurring expensive costs on the industry.⁵⁴



GENDER DIVERSITY AND CASUALISATION REMAIN A CHALLENGE

Female participation in the Rail industry has been improving steadily, from approximately five per cent of employees in 1984 to 20 per cent in 2017.⁵⁵ Diversity in the workplace can contribute to innovation, creativity, and improve the overall organisational and industry outcomes. The majority of female workers perform customer service roles and only a minority hold technical positions. To address this, the Australasian Railway Association has established a Women in Rail Advisory Committee with a vision of achieving a diverse, sustainable and empowered workforce through planning and implementing career pathways and programs focusing on gender diversity.⁵⁶

In an increasingly technologically-oriented world, the rail industry faces strong competition for technical skills, and will need new strategies to attract these skills into an industry still perceived as old and male dominated. The new technologies provide an opportunity to increase the diversity of the rail workforce.⁵⁷ Casualisation has also

increased from approximately one per cent to 5 per cent over the past three decades.⁵⁸ Strategies to attract, recruit, and retain diverse cohorts of workers for the Rail industry will be necessary to ensure a sustainable and economically viable industry for the future.

SOFT SKILLS ARE INTEGRAL FOR THE FUTURE

Today's workplace has fundamentally changed over the past decade and will continue to be transformed due to the advent of new technologies. In addition to technical and digital skills, soft skills will be equally important. Non-technical skills such as teamwork, problem-solving, and creativity are integral to the successful adoption and implementation of disruptive technologies.⁵⁹ Creativity and problem-solving skills will help individuals to explore new technologies and deploy them effectively in the workplace. The World Economic Forum has also indicated that critical thinking, leadership, and emotional intelligence will be in demand.⁶⁰ Industry experts and participants at the AIS national Industry Skills Forums also emphasized the significance of soft skills as well as lifelong learning in order to have a



workforce prepared for the future. Having an agile and resilient workforce, which is ready to adapt to changes, is essential.

INFRASTRUCTURE PROJECTS CALL FOR NEW SKILLS AND WORKERS

Demands from increased rail freight tasks and population growth are forecast to put significant strain on the current infrastructure of the Rail industry. Commodity exports (largely dependent on rail systems) are expected to increase by two-thirds by 2030, while the national population is forecast to increase from 23 to 30 million over the same time.⁶¹ This indicates the demand for new rail infrastructure and maintenance will be ongoing.

To ensure rail networks can run services efficiently into the future, Australian Federal, State and Territory governments have committed over \$100 billion for new rail infrastructure projects and upgrades to 2030.⁶² This will require a substantial recruitment of workers experienced in large-scale infrastructure projects. The Rail industry has already expressed concerns in recruiting workers who have varying skill capabilities to work on current and future infrastructure projects.⁶³ This is largely attributed to the temporary nature of projects in various locations within or between State/Territories. Peak demand at the national level is anticipated to be in the mid-2020s, especially for specialised roles such as train controllers and railway signal operators.⁶⁴

The Rail industry in Australia is already experiencing skills shortages as investment grows in new rail infrastructure and rollingstock and operations expand, with the number of train drivers, controllers, track workers, signalling engineers and technicians, maintenance workers, electrical technicians and tunnellers not keeping up with growing demand. The maintenance and operations workforce demand is forecast to rise from around 28,000 in 2018 to around 35,000 workers by 2027.⁶⁵ The workforce roles will need to evolve and transition into operations. Workforce plans and strategies to address these issues will be required to ensure projects are delivered safely, on time and to an excellent standard.

QUALIFIED TRAINERS AND ASSESSORS ARE IN DEMAND

From a future skills perspective, the industry is also suffering a chronic shortage of trainers and assessors.⁶⁶ There is a growing demand for trainers and assessors who have a comprehensive understanding of systems and e-learning development capability, as well as the ability to deliver high quality training within an Augmented or Virtual Reality (AR/VR) learning environment.

These new tools can reduce the training costs while providing hands-on training in the rail environment. Enhancing productivity and learning outcomes through virtual training will require trainers that can harness the potential of this technology and facilitate effective skills transfer to the rail operating environment.

Attracting experienced trainers is an ongoing challenge for the Rail industry, as the remuneration and other benefits for those working as drivers, or as operational staff, are often more favourable than for training and development staff. Strategies to incentivise experienced trainers and assessors to upskill new recruits would be beneficial to the industry long-term.

QUALIFICATION UPTAKE AND SKILLS

Rail safety requirements are set out in Rail Safety National Law and associated Rail Safety National Law Regulations which direct enterprises to use the Australian Qualification Framework (VET) system where possible. Many rail network operators align learning and development systems and training courses directly to job role requirements. Track maintenance workers will also need to be aware of basic hazards and electrical safety issues while working on rail corridors. Ongoing training and upskilling in this area are essential requirements for track maintenance workers.

STAKEHOLDER CONSULTATION

An extensive consultation process has been undertaken in the development of the Skills Forecast and Proposed Schedule of Work.

Among many issues and sensitivities raised throughout the consultation process, the top three key themes that emerged were:

Major increases in infrastructure spending highlights skill shortages

The major impact identified affecting the Rail Industry was a lack of certificated qualified workers in a variety of roles as indicated in the Skills Capability Study report by ARA. From train drivers and project managers to staff who can remotely operate autonomous trains. Future major projects include rail infrastructure upgrades to cater for new high-capacity trains, tunnelling for new underground railways and supervisors/

High voltage DC renewable energy device installation

Renewable sources of power generation have the potential to significantly augment and in the longer term supplant electricity generating systems. A need for skills and knowledge in high voltage direct current (HVDC) renewable energy device installation was identified. This type of installation is specific to the Rail industry to utilise unused energy from rail movements and the environment in which operations occur.

The rate of technological improvement and efficiency gains is rapidly evolving in the renewable energy sector. These technological improvements, combined with greater awareness of the environmental imperatives and the spread of government programs and funding favourable to clean energy, are behind the accelerating development and installation rate of HVDC renewable energy devices.

Stakeholders involved in the consultation process

13

IRC Members (see listed earlier in the Skills Forecast)

1068

AIS Rail specific components of the TLI Transport and Logistics Training Package subscribers

8

State Training Authorities

managers for project implementation. Upskilling staff is a continuous process and rail organisations have to utilise workforce agility to find solutions. Discussions included using planned progression strategies and utilising employees near retirement to convert to trainers.

Remote operations and autonomous rail

The Rail Industry is already embracing remotely operated and autonomous rail vehicles but there is still opportunity to embrace it further. Some of the benefits identified by using remotely operated equipment is the need for higher level workers with programming skills. This will also help with balancing gender numbers as more females are likely to take up employment in data centres where remuneration and working conditions are better as opposed to remote worksites. This will lead to employees located in remote locations requiring less skills as the control centre operators will advise them on maintenance issues and instruct the remote worker on what to do.

AIS Industry Skills Forum, Rail Industry breakout sessions were attended by representatives/s from the following organisations;

- ▶ Australian Industry Group
- ▶ Engineering Education Australia
- ▶ Genesee & Wyoming Australia
- ▶ Hiller Parry Pty Ltd
- ▶ Metro Trains
- ▶ NSW TrainLink
- ▶ Public Transport Authority
- ▶ Railtrain Pty Ltd
- ▶ Roy Hill
- ▶ Sydney Metro
- ▶ Sydney Trains
- ▶ TasRail
- ▶ TT Line
- ▶ V/Line

2018 INDUSTRY SKILLS FORUMS



AIS facilitated a series of Industry Skills Forums across the country between September and November 2018. Respected journalist and author Kerry O'Brien moderated the events across all States and Territories that attracted over 1100 people, with an additional audience watching the Melbourne event that was live streamed online.

Attendees represented small, medium and large businesses (both employers and employees), education providers (from high school, the Vocational Education and Training sector and University), unions, State/Territory and Federal Department officials and peak bodies.

The Industry Skills Forums were set up as the central platform in AIS' intelligence gathering activity for 2018 allowing AIS to



identify industry skills needs, now and into the future.

The purpose of the forums was twofold:

To provide participants with the opportunity to directly shape the skills and workforce priorities across a broad range of Australia's industries; and

To provide AIS with the opportunity to capture data and intelligence for the 2019 Skills Forecasts.

Each forum consisted of two Panel discussions, facilitated by Kerry O'Brien. The panels were made up of Industry Leaders and focused on the current challenges facing our industries. Panel One discussed "Industry Leadership - new thinking about jobs and careers". This was followed by Panel Two discussing "Future Skilling our people in an age of digital transformation".

Following the panel sessions, attendees participated in industry-specific breakout sessions, facilitated by AIS Industry Managers. This provided participants with the opportunity to talk about the issues affecting their industry. The discussions kicked off with looking at the impact of new technologies and then focused on the barriers and opportunities to recruiting skilled employees and the emerging skill needs for each industry.



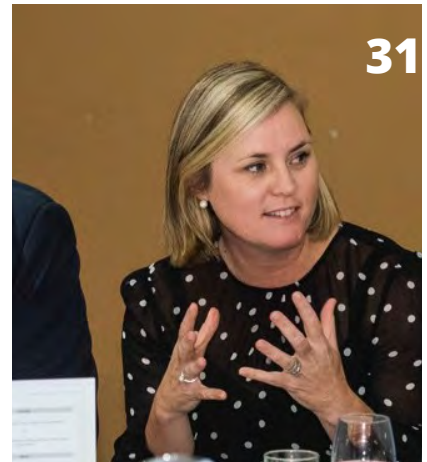
INDUSTRY LEADERS' DINNERS

Industry leaders across AIS' 11 industries met to discuss the high-level workforce and skills issues at a series of Industry Leaders' Dinners hosted by AIS on the evening preceding each 2018 Industry Skills Forum. Attendees from around the country included leaders from Industry, Government, the education sector, and relevant unions. AIS was delighted that the Minister for Jobs and Industrial Relations and Minister for Women, the Hon Kelly O'Dwyer was able to attend the Melbourne dinner.

The dinner meeting discussions were facilitated by Kerry O'Brien and the clear message from attendees was that they provided an excellent opportunity to bring together multiple industries to discuss common workforce development challenges and opportunities.



Many attendees from both the Industry Skills Forums and the Industry Leaders' Dinners commented on the opportunity that the events provided to engage with industry directly on workforce issues. Kerry O'Brien summarised the sentiment very well when wrapping up the final forum in Adelaide, noting that at every forum around the country, significant issues and ideas were raised about the pathway that we need to take as a nation. He noted that it is critical that these issues have been discussed at this level with the key players and the challenge for AIS now is twofold. The first is to formulate policy advice to take back to government. The second is to continue the conversation.



REFERENCES

- 1 Australian Railway Association (2017) A National Rail Industry Plan for the Benefit of Australia. Canberra, ACT.
- 2 Australasian Railway Association. (2017). A National Rail Industry Plan for The Benefit of Australia. Canberra, ACT.
- 3 Imove. (2018). Australian Logistics Council Supply Chain Technology Report. Retrieved from <https://imovecrc.com/news-articles/freight-and-logistics/alc-supply-chain-technology-summit-report/>
- 4 Deloitte Access Economic. (2017). Value of Rail: The Contribution of Rail in Australia.
- 5 Probert, O. (2018). \$880m to Upgrade Sydney Signalling. Retrieved from <https://www.railexpress.com.au/880m-to-upgrade-sydney-signalling/>
- 6 Sydney Metro. (2018). Historic Moment as Sydney's New Metro Train Crosses Windsor Road. Retrieved from <https://www.sydneymetro.info/article/historic-moment-sydney%E2%80%99s-new-metro-train-crosses-windsor-road>
- 7 Rio Tinto. (2018). Rio Tinto Achieves First Delivery of Iron Ore with World's Largest Robot. Retrieved from https://www.riotinto.com/media/media-releases-237_25824.aspx
- 8 Chapman, S. (2018). "Rio Tinto to Double Autonomous Fleet by 2019." Logistics Magazine. Retrieved from <https://logisticsmagazine.com.au/rio-tinto-to-double-autonomous-fleet-by-2019/>
- 9 Chester, D. (MP), and Canavan, M. (MP). (2017). \$12 Million Boost for Positioning Technology in Australia. Australian Government.
- 10 Australasian Railway Association. (2018). Smart Rail Route Map.
- 11 Australasian Railway Association. (2018). Australasian Railway Association Skills Capability Study: Skills Crisis, A Critical Call.
- 12 ARC Advisory Group. (2017). Remote Condition Monitoring: A boost for Rail Asset Management. Retrieved from <https://www.arcweb.com/blog/remote-condition-monitoring-boost-rail-asset-management>.
- 13 Australasian Railway Association. (2018). Australasian Railway Association Skills Capability Study: Skills Crisis, A Critical Call.
- 14 Institute of Railway Technology. (2016). Advancing the Railway Industry Through Technology.
- 15 Varghese, S. (2017). Huawei Looking to Boost Intelligent Transport. IT Wire.
- 16 Australasian Railway Association. (2017). Rail Platforms for the Future 2017-2035.
- 17 Department of Infrastructure and Regional Development. (2016). Trends – Transport and Australia's Development to 2040 and Beyond. Australian Government.
- 18 Siemens. (2015). Local Ingenuity Creates Smart Rail Technology. Retrieved from <https://corporate.siemens.com.au/en/home/news-centre/press-releases/local-ingenuity-creates-smart-rail-technology.html>
- 19 Australasian Railway Association. (2018). Smart Rail Route Map.
- 20 Ai Group. (2018). Skilling: A National Imperative.
- 21 Western Sydney University. (2017). Digital Literacy. Retrieved from https://www.westernsydney.edu.au/_data/assets/pdf_file/0009/1105398/eBook_-_Digital_Literacy.pdf
- 22 McPherson, S. (2017). Digital Literacy: "What is it and How Important is it in the Future of Work?" Foundation of Young Australians. Retrieved from <https://www.fya.org.au/2017/06/29/digital-literacy-important-future-work/>
- 23 Australasian Railway Association. (2018). Australasian Railway Association Skills Capability Study: Skills Crisis, A Critical Call.
- 24 Australian Government. (2015). National Innovation and Science Agenda.
- 25 Energy Networks Australia and CSIRO. (2017). Future Workforce Skilling.
- 26 Ai Group. (2018). Skilling a National Priority.
- 27 Australian Industry and Skills Committee. (2018). Digital Skills. Retrieved from <https://nationalindustryinsights.aisc.net.au/national/digital-skills>
- 28 Rail Express. (2018). Putting the AI in Rail: The Technology that Gives Drivers a Pair of Super Eyes, (Issue 4).
- 29 Australian Trade and Investment Commission. (2016). Rail Education and Training. Australian Government.
- 30 Australian Railway Association. (2017). A National Rail Industry Plan for the Benefit of Australia. Canberra, ACT.
- 31 The Senate Report. (2017). The Rural and Regional Affairs and Transport Reference Committee Australian Rail Industry.
- 32 Office of the National Rail Safety Regulator. (2017). Rail Safety Report 2016-2017.
- 33 Ibid.
- 34 Chester, D. (MP) and Fullerton, J. (2017). Modern Rail Technology to Advance Safety on Trans Australia Railway. Australian Government
- 35 Australasian Railway Association. (2018). Smart Rail Route Map.
- 36 Gartner. (2018). Mastering the New Business Executive Job of the CIO: Insights from the 2018 CIO Agenda Report.
- 37 CISCO. (2018). CISCO 2018 Asia Pacific Security Capabilities Benchmark Studies: Regional Breach Readiness.
- 38 Microsoft. (2018). "Direct Costs Associated with Cybersecurity Incidents Costs Australian Businesses \$29 Billion Per Annum". Retrieved from <https://news.microsoft.com/en-au/features/direct-costs-associated-with-cybersecurity-incidents-costs-australian-businesses-29-billion-per-annum/>
- 39 CISCO. (2018). CISCO 2018 Asia Pacific Security Capabilities Benchmark Studies: Regional Breach Readiness.

- 40 Office of Australian Information Commissioner. (n.d.). Notifiable Data Breaches Scheme.
- 41 KMPG. (2018). 2018 Global CEO Outlook: An Australian Perspective: A Year of Cautious Optimism, Digital Crusaders, and Concerns about Protectionism.
- 42 Australasian Railway Association. (2018). Smart Rail Route Map.
- 43 Australian Bureau of Statistics. (2017). 2016 Census – Employment, Income and Education. Australian Government.
- 44 Australasian Railway Association. (2018). Australasian Railway Association Skills Capability Study: Skills Crisis: A Call to Action.
- 45 Australasian Railway Association. (2017). Rail Workforce Development: Our People are Our Future.
- 46 Ibid.
- 47 Ibid.
- 48 Ibid.
- 49 Australasian Railway Association. (2018). Australasian Railway Association Skills Capability Study: Skills Crisis: A Call to Action.
- 50 Australian Bureau of Statistics. (2017). 2016 Census – Employment, Income and Education. Australian Government.
- 51 Australasian Railway Association. (2018). Australasian Railway Association Skills Capability Study: Skills Crisis: A Call to Action.
- 52 Australasian Railway Association. (2017). Rail Workforce Development: Our People are Our Future.
- 53 Australasian Railway Association. (2018). Australasian Railway Association Skills Capability Study: Skills Crisis: A Call to Action.
- 54 National Transport Commission. (2017). National Standard for Health Assessment of Rail Safety Workers.
- 55 Australian Bureau of Statistics. (2017). 6291.0.55.003 - Labour Force, Australia, Detailed. Australian Government.
- 56 Australasian Railway Association. (2017). Women in Rail Strategy. Australian Government.
- 57 Australasian Railway Association. (2018). Australasian Railway Association Skills Capability Study: Skills Crisis: A Call to Action.
- 58 Australian Bureau of Statistics. (2018). 6291.0.55.003 - Labour Force, Australia, Detailed, Quarterly (November). Australian Government.
- 59 National Centre for Vocational Education Research. (2018). The Fourth Industrial Revolution: The Implications of Technological Disruption for Australian VET.
- 60 World Economic Forum. (2018). The Future of Jobs Report 2018.
- 61 Department of Infrastructure and Regional Development. (2014). Trends, Infrastructure and Transport to 2030. Australian Government.
- 62 Australasian Railway Association. (2017). A National Rail Industry Plan for The Benefit of Australia.
- 63 Roads and Infrastructure Australia. (2018). "Building the Skills to Meet Rail Demand." Roadsonline. Retrieved from <http://roadsonline.com.au/building-the-rail-skills-to-meet-demand/>
- 64 Australasian Railway Association. (2018). Australasian Railway Association Skills Capability Study: Skills Crisis: A Call to Action.
- 65 Ibid.
- 66 Ibid.

PROPOSED SCHEDULE OF WORK

KEY DRIVERS

TRAIN AND NETWORK CONTROL OPERATIONS

Increasing demand for passenger and freight rail transport means more trains on existing rail networks. With over \$130 billion to be invested in rail infrastructure to enhance Australia's rail capacity and assist with easing congestions on Australian roads the number of rail movements on all rail networks is set to grow dramatically. The addition of autonomous and remotely operated trains onto a network where driver operated trains operate requires new skills for network controllers. The Rail industry is committed to adding autonomous and remotely operated rail vehicles which have the capacity to run closer together on the network. With rail vehicles running closer together, this leaves less time for action by network controllers to provide direction and make decisions regarding in the event of an incident.

NETWORK FAULT SUPPORT

Rail network operators have identified this development as an outcome of increasing demand for public and freight rail transport services. Increased rail network movements places greater stress on the network and potentially leads to an increase in network faults and system breakdowns, causing substantial delays or downtime of the rail network. Minimising delays on a rail network is critical to keeping not only the affected rail vehicle on schedule, but all other rail vehicles sharing the track network. Rail network design restricts detour opportunities, therefore the initial fault support that can be provided to get the rail vehicle moving again or removed from the rail corridor significantly impacts delivery times and profitability of rail operators. With the introduction of autonomous and remotely operated rail vehicles, additional skills are required for first line responders in providing network fault support.

TRANSPORT AND LOGISTICS PATHWAYS

The Rail industry offers a large variety of occupational streams that enable informed career decisions to be made by students and jobseekers. Industry has identified that a pathways program into the industry would assist in addressing workforce attraction and retention issues. Developing Rail specific vocational pathways for inclusion within allied Transport and Logistics qualifications will support the creation of additional job opportunities for the Rail industry.

PROPOSED RESPONSES

TRAIN AND NETWORK CONTROL OPERATIONS

The IRC has proposed a project to amalgamate the Rail Network Control and Tram/Light Rail Control qualifications into a single integrated network control qualification that includes multiple vocational pathways. It will provide the required skills for network controllers to work across both the rail and light rail sectors and providing increased skills transferability. The project will also review and develop the associated Units of Competency to ensure alignment with the existing skills gaps, particularly around the integration of autonomous and remotely operated rail vehicles into existing rail networks. The project will also develop up to two new Units of Competency that address the required skills and knowledge of network controllers working in this environment. The project will consider the use of imported Units of Competency for within the proposed new qualification and undertake broad consultation with state and territory rail operators and network owners to ensure that a range of network operating models are considered within the qualification outcome.

NETWORK FAULT SUPPORT

The IRC has proposed a project to assist in minimising downtime on rail networks. This requires the development of two new Units of Competency and a new Skill Set. Without these skills being provided the rail networks congestion, delays and cancellations will inevitably increase. Throughout the project, broad consultation within state and territory rail operators will be undertaken to ensure that all rail operators skill needs are covered.

TRANSPORT AND LOGISTICS PATHWAYS

The IRC has proposed this project to encourage new entrants into the industry by identifying vocational opportunities available in the Rail industry. This requires the development of two new Units of Competency and incorporating them into an existing Transport and Logistics (TLI) qualification and amending the packaging and packaging rules of the qualification. Throughout the project, broad consultation within state and territory rail operators will be undertaken to ensure that all rail operators skill needs are covered.

PROPOSED SCHEDULE OF WORK

2019-20

Train and Network Control Operations – Review and development

Industry has requested the revision and amalgamation of the Rail Network Control and Tram/Light Rail Control qualifications. This will remove a superfluous qualification and provide vocational pathways that enhance the skills transfer of workers across the rail and light rail industries.

As the use of autonomous trains and other technologies become more commonplace, the associated operational roles will continue to evolve. Revision and development of qualifications and Units of Competency will be necessary for workers in front line control, train driving and network control. This will further support skills development in safe and efficient pre-journey, in-journey and post-journey autonomous train operation.

36

Network Fault Support – Review and development

The rail industry has recognised the development of skills for immediate support for fault assistance by network control operators in both rail and light rail. This will expediate the rectification of various faults, providing productivity gains and financial savings to the industry, and less inconvenience to commuters. Safety issues associated with network faults will also be addressed. This development will assist rail operators deal with the increased reliance on rail transport into the future.

Transport and Logistics Pathways - Review and development

Industry has requested addition of a stream for rail attraction to the Rail industry has been an ongoing issue. The rail industry offers a large variety of occupational streams that enable career advancement to individuals. Opportunities in both rail infrastructure and rail operations will be covered, making this qualification suitable as a school based structured workplace learning program. This work will develop employability and basic technical skills required by those commencing a career in the Rail industry.

2020-21

Train and Rail Vehicle Operations - Review and development

The IRC have proposed that the Certificate II in Shunting and Rail Track Vehicle Driving, Certificate III in Rail Driving, Terminal Train Driving and Certificate IV in Train Driving qualifications will be reviewed to address the identified skills and knowledge gaps identified. The proposed revision will update and align the qualifications with the new and emerging technologies including the pre- and post-operational requirements of a train driver in preparing an autonomous or remotely operated trains for their journey. It will also include the driver contingency skill requirements for taking over an autonomous or remotely operated train in the event of a malfunction.

Rail Yard Coordination

The Rail IRC have proposed a review of the Certificate III in Rail Yard Coordination. The proposed revision will update and align the qualification with the new and emerging technologies including advances made in rail signalling and autonomous and remotely operated rail vehicles. It will also integrate the Certificate III in Rail Signalling (TLI32615) and delete this qualification from the national register upon completion of the review. This revision will also provide greater transferability of skills between various sectors of the Industry.

2021-23

TLI (Rail) Transport and Logistics Training Package

There are no TLI (Rail) Transport and Logistics Training Package products currently identified for revision or development during this forecast period. TLI (Rail) Transport and Logistics Training Package qualifications, Skill Sets and Units of Competency that have not been subject to revision or development between 2019 and 2021, will be reviewed in this period. Where imported Units of Competency are identified as either deleted or superseded, the IRC may elect to revise the affected qualification(s) through the IRC Minor Change process.

2019-20 PROJECT DETAILS

TRAIN AND NETWORK CONTROL OPERATIONS

Description

This project will review and amalgamate the Certificate IV in Rail Network Control and Certificate IV in Tram/Light Rail Control qualifications. These qualifications provide the key skills and knowledge for Rail industry personal working in the network control sector of the industry. Train controllers are responsible for coordinating all operations on their allocated section of railway track and ensure various types of trains run safely and to schedule.

This project includes adding systems operation requirements for autonomous rail and light rail vehicles. One new qualification and the associated Units of Competency will be developed to ensure alignment with the specific requirements for the safe and effective control of all rail vehicles using rail networks.

Rationale

Autonomous and remotely operated rail vehicles are not only being used for passenger and freight but also track maintenance vehicles adding to congestion on the network. The closer running times of rail and autonomous/remotely operated rail vehicles now means controllers must manage substantially more rail vehicles in the same area of the network and some without direct human interaction. The addition of autonomous and remotely operated trains onto existing rails network where driver operated trains operate has triggered a demand for new skills for network controllers. The Rail industry has identified that there are a broader range of skills is required for network controllers to control remote and autonomous rail vehicles operating on a rail network.

The skills gaps identified by industry in the two existing qualifications will be addressed to ensure alignment with the specific network controller requirements at various operator levels. This will include autonomous and remotely operated rail vehicles systems set up, communicating with operational staff preparing the rail vehicle operation and monitoring and decommissioning autonomous and remotely operated rail vehicles.

Through merging the two qualifications and creating vocational streams identified by industry will enable skills transferability for workers across these sectors and remove a superfluous qualification from the National Register of VET.

This qualification is currently funded in;

- ▶ VIC

Ministers' Priorities Addressed

- ▶ The project has identified the removal of an obsolete and superfluous qualification from the National Register
- ▶ The project will ensure that more information is made available about rail operations training delivery to training providers
- ▶ The project will address the needs of individuals and industry and provide transferable Network Control skills for workers in the industry

38

- The project will support creation of Units of Competency that may be owned and used by multiple industry sectors
- The project is not developing any additional Skill Sets for the TLI (Rail) Transport and Logistics Training Package
- The project does not propose the incorporation of existing accredited course materials into the TLI (Rail) Transport and Logistics Training Package

Consultation Plan

AIS will:

- undertake consultation on the IRCs behalf with all State Training Authorities and other key national stakeholders
- seek public feedback and input into development of material through the project's duration
- communicate to enterprises, State/Territory Training authorities, State/Territory Industry Training Advisory Bodies, Peak Bodies, Registered Training Authorities (RTOs) and other interested parties, of the establishment of the project
- conduct initial consultation with stakeholders to identify and invite key representatives to establish the Technical Advisory Committee (TAC) and posting information about the project on the AIS website and newsletter
- conduct face to face consultation and engagement sessions as required
- conduct the TAC meetings to explain the process and gather comments/feedback
- communicate the process of drafting, identified Training Package materials (Qualifications/ Units of Competency/Skill Sets), verify and validate this material with stakeholders through email, the AIS website and the AIS newsletter for wider stakeholder involvement, throughout the review process
- continue communication on the project via the AIS website and newsletter.

Scope of Project

This project will amalgamate two existing qualifications into one new qualification with appropriate vocational streams as identified by industry. The associated Units of Competency will be revised to address skill and knowledge gaps that exist in the current qualifications. Where imported Units of Competency have been superseded or deleted, they will be updated to reflect current versions from the National Register.

The TLI (Rail) Transport and Logistics Training Package is planned to be reviewed and developed from September 2019, with a Case for Endorsement planned for submission by November 2020.

Training Package

- TLI (Rail) Transport and Logistics Training Package

Qualifications

Two existing qualifications require amalgamation and development:

- Certificate IV in Rail Network Control
- Certificate IV in Tram/Light Rail Control

Units of Competency

- 21 Units of Competency to be revised

Skill Sets

No Skill Sets are proposed for review or development.

NETWORK FAULT SUPPORT

Description

This project will develop a new Skill Set to address immediate network faults or breakdown support. This Skill Set will provide the necessary skills and knowledge enabling faster response times for faults or breakdown rectification, reducing rail vehicle downtime, and passenger or freight delays.

Rationale

Industry has identified there is a skills and knowledge gap for the relatively new role of 'Network Fault Support'. The need to keep downtime on the rail network to a minimum means there is a requirement to provide fault service support skills to those assisting as the first line of support to rail vehicles that have encountered a network fault or breakdown. With trains and trams running closer together to address the productivity needs of the rail industry, support staff have significant pressure to ensure this does not have a major knock on effect disrupting the entire network. This development will provide additional skills transfer opportunities for workers in the Rail industry.

Ministers' Priorities Addressed

- The project has not identified for the removal of any obsolete and superfluous qualifications from the National Register
- The project will ensure that more information is made available about rail operations training delivery to training providers
- The project will address the needs of individuals and industry and provide transferable skills from one occupation to another in the Rail industry
- The project will support creation of Units of Competency that can be owned and used by multiple industry sectors if required
- The project is developing a Skill Set for the TLI (Rail) Transport and Logistics Training Package

40

- ▶ The project does not propose the incorporation of existing accredited course materials into the TLI (Rail) Transport and Logistics Training Package

Consultation Plan

AIS will:

- ▶ undertake consultation on the IRCs behalf with all State Training Authorities and other key national stakeholders
- ▶ seek public feedback and input into development of material through the project's duration
- ▶ communicate to enterprises, State/Territory Training authorities, State/Territory Industry Training Advisory Bodies, Peak Bodies, Registered Training Authorities (RTOs) and other interested parties, of the establishment of the project
- ▶ conduct initial consultation with stakeholders to identify and invite key representatives to establish the Technical Advisory Committee (TAC) and posting information about the project on the AIS website and newsletter
- ▶ conduct face to face consultation and engagement sessions as required
- ▶ conduct TAC meetings to explain the process and gather comments/feedback
- ▶ communicate the process of drafting, identified Training Package materials (Qualifications/ Units of Competency/Skill Sets), verify and validate this material with stakeholders through email, the AIS website and the AIS newsletter for wider stakeholder involvement, throughout the review process
- ▶ continue communication on the project via the AIS website and newsletter.

Scope of Project

Develop a new Skill Set using native and imported Units of Competency from other training packages. The TLI (Rail) Transport and Logistics Training Package is planned to be reviewed and developed from September 2019, with a Case for Endorsement planned for submission by 30 November 2020.

Training Package

- ▶ TLI (Rail) Transport and Logistics Training Package

Qualifications

- ▶ Nil

Units of Competency

- ▶ Two new Units of Competency to be developed

Skill Sets

- ▶ One new Skill Set is proposed for development.

TRANSPORT AND LOGISTICS PATHWAYS

Description

The revision and development of this qualification will ensure provision of an entry pathway for Rail and Road Transport given the increase in intermodal hubs. The inclusion of Rail into this qualification negates the need to develop a new qualification specifically for Rail.

Rationale

It has been identified by the Rail industry there is a need for an entry level qualification that provides a wider range of opportunities for new entrants into the industry. Workforce attraction and retention is a major issue for the rail industry and the opportunity to provide a pathway entry point to potentially attract new entrants is needed by the Industry. It will provide an opportunity for new entrants to be exposed to a wider range of job roles and career paths offered by the industry. It will also provide the minimum base level entry requirements for new entrants across the various sectors of the rail industry. It will also provide a greater opportunity for new entrants to move to alternate sectors of the industry at entry level.

This qualification is currently funded in;

- VIC

Ministers' Priorities Addressed

- The project has not identified for the removal of any obsolete and superfluous qualifications from the National Register
- The project will ensure that more information is made available about rail operations training delivery to training providers
- The project will address the needs of individuals and industry and provide transferable skills from one occupation to another in the Rail industry
- The project will support creation of Units of Competency that can be owned and used by multiple industry sectors if required
- The project is not developing a Skill Set for the TLI (Rail) Transport and Logistics Training Package
- The project does not propose the incorporation of existing accredited course materials into the TLI (Rail) Transport and Logistics Training Package

Consultation Plan

AIS will:

- undertake consultation on the IRCs behalf with all State Training Authorities and other key national stakeholders
- seek public feedback and input into development of material through the project's duration
- communicate to enterprises, State/Territory Training authorities, State/Territory Industry Training Advisory Bodies, Peak Bodies, Registered Training Authorities (RTOs) and other interested parties, of the establishment of the project

42

- conduct initial consultation with stakeholders to identify and invite key representatives to establish the Technical Advisory Committee (TAC) and posting information about the project on the AIS website and newsletter
- conduct face to face consultation and engagement sessions as required
- conduct TAC meetings to explain the process and gather comments/feedback
- communicate the process of drafting, identified Training Package materials (Qualifications/ Units of Competency/Skill Sets), verify and validate this material with stakeholders through email, the AIS website and the AIS newsletter for wider stakeholder involvement, throughout the review process
- continue communication on the project via the AIS website and newsletter.

Scope of Project

The project is proposed to develop two new units of competency and incorporate a rail stream into the entry level qualification, including revising the associated Units of Competency and amending the qualification packaging rules. Employment pathways through similar qualifications will also be reviewed and updated as required.

The TLI (Rail) Transport and Logistics Training Package is planned to be reviewed and developed from September 2019, with a Case for Endorsement planned for submission by 30 November 2020.

Training Package

- TLI (Rail) Transport and Logistics Training Package

Qualifications

The following qualification requires revision:

- Certificate I in Transport and Logistics (Pathways)

Units of Competency

- Develop two new Units of Competency

Skill Sets

- No Skill Sets are proposed for development.



AUSTRALIAN INDUSTRY STANDARDS

Australian Industry Standards (AIS) provides high-quality, professional secretariat services to the Rail IRC in our role as a Skills Service Organisation. AIS provide services to eleven allocated IRCs which cover Aviation, Corrections, Gas, Electricity Supply (Generation and Transmission, Distribution and Rail), Electrotechnology, Maritime, Public Safety (including Police, Fire and Emergency Services, Defence), Rail, Transport and Logistics, and Water industries. AIS supports these important industry sectors using our in-house capability and capacity in technical writing, quality assurance, project management and industry engagement in the production of Training Packages.

AIS was established in early 2016, 20 years after its predecessor the Transport and Logistics Industry Skills Council (TLISC) was established in 1996. More information about AIS can be found at <http://www.australianindustrystandards.org.au>.

- We support industry growth and productivity through our modern innovative approach to establishing skills standards.
- We provide high-quality, professional secretariat services to help our allocated industry reference committees develop the skills that industry needs.
- We partner with industry to shape the workforce of the future.

CONTACT US



[instagram.com/ausindstds](https://www.instagram.com/ausindstds)



twitter.com/AusIndStds



www.linkedin.com/company/australian-industry-standards/

www.australianindustrystandards.org.au

enquiries@australianindustrystandards.org.au



AUSTRALIAN
INDUSTRY
STANDARDS