Rail Operations and Maintenance Roles

Top 10 Role Analysis Working Paper

National Transport Commission | February 2025

Contents

Glossary

Term	Definition
Australasian Railway Association (ARA)	Peak body representing the rail sector in Australia and New Zealand.
National Transport Commission (NTC)	Public agency responsible for national transport policy and reform.
Input-Output (I-O)	Economic model analysing the relationships between industries, showing how output from one industry is an input for another.
Input-Output Industry Group (IOIG)	Groupings of industries used in I-O analysis to measure economic impacts.
I-O Multipliers	Factors that estimate the total economic impact of an industry's output on the broader economy.
I-O Direct Effects	Immediate economic effects of an industry's production activities.
I-O First Round Effects	Initial indirect economic impacts, such as industries supplying inputs to the production process.
I-O Industrial Support Effects	Broader ripple effects across industries from the initial production activities.
FTE	Full-Time Equivalent, a measure of workforce size that standardises hours worked to full-time positions.
ANZSIC	Australian and New Zealand Standard Industrial Classification, used for classifying industries.
ANZSIC Division (1-digit)	Broadest level of ANZSIC classification, covering major industry sectors.
ANZSIC Sub-Division (2-digit)	More specific grouping within a division.
ANZSIC Group (3-digit)	Further breakdown of industries within a subdivision.
ANZSIC Class (4-digit)	Most detailed industry classification within ANZSIC.
ANZSCO	Australian and New Zealand Standard Classification of Occupations, used for classifying occupations.
ANZSCO Major Group (1-digit)	Broadest level of ANZSCO classification, covering major occupational groups.
ANZSCO Sub-Major Group (2-digit)	Further breakdown within major groups.
ANZSCO Minor Group (3-digit)	Intermediate grouping within sub-major groups.
ANZSCO Unit Group (4-digit)	More specific classification within a minor group.

ANZSCO Occupation (6-digit)	Most detailed level of occupational classification within ANZSCO.
Total Rail Workforce	All workers directly or indirectly involved in rail industry operations.
Rail O&M Workforce	Workers involved in the operations and maintenance of rail systems.
Work in Rail (WIR)	Online platform offering information about careers and roles within the rail industry.
Work in Rail Categories	Groupings of job roles within the rail industry used in the WIR platform.
Work in Rail Roles	Specific job positions within the WIR categories.
REMSMART Portal	Online platform providing remuneration data and job function information for the rail industry.
REMSMART Job Function	Broad grouping of job roles with similar functions on the REMSMART platform.
REMSMART Job Family Title	Title representing a group of roles with similar characteristics on the REMSMART platform.
REMSMART Job Title	Specific title for individual roles within the REMSMART job families.
Rail Industry Worker Program (RIW)	National competency management program for rail workers in Australia.
RIW National Matrices	Standardised competency frameworks used in the RIW program to define roles and requirements.
RIW Role Names	Specific job titles recognised within the RIW system.

Executive Summary

Problem Definition: The rail sector in Australia is facing challenges in aligning workforce roles and competencies across various operators, leading to inconsistencies in role titles, skills requirements, and a lack of labour mobility. This misalignment, particularly for key operational and maintenance roles, hinders workforce productivity and makes it difficult to address skills shortages effectively.

What We're Trying to Solve: This work aims to create a more cohesive and efficient rail workforce by harmonising role titles and competencies across operators. By addressing the misalignment between industry naming conventions and national classification systems, we can improve labour mobility, productivity, and workforce planning. Additionally, this effort will help the rail industry better identify and respond to skills shortages, ensuring long-term sector sustainability.

Key Findings:

- A general misalignment exists between industry role titles and the ANZSCO classifications used for workforce planning, making it difficult to identify skills gaps
- The RIW program has achieved some level of harmonisation for roles with significant rail safety components, such as plant operators, but other operational roles (e.g., Train Driver, Railways Assistant, Train Controller) and maintenance activities performed outside the rail corridor remain inconsistent across operators
- Consultation with the rail industry and unions will be essential to advancing the harmonisation process, particularly for roles not covered by the RIW program
- While new rail-specific occupations are being added as part of the 2024 ANZSCO review, there remains a disconnect between actual tasks performed in key rail roles and the closest ANZSCO occupations
- There is an opportunity to leverage the RIW program's existing framework for harmonising naming conventions and competencies across the sector, which could improve labour mobility and productivity

Key Recommendations:

1. **Harmonisation Framework**: Use the approach from the RIW program to create national matrices for key operational and maintenance roles, ensuring mutual naming conventions and competencies that support labour mobility.
2. **Consultation Process**: Engage with the ARA, NTC, rail operators, and unions to ensure buy-in for harmonisation efforts. For roles outside the RIW database, a separate consultation process is needed to establish common naming conventions, tasks, and skill levels.
3. **Rail Safety National Law Considerations (RSNL):** Ensure harmonisation efforts align with rail safety national law, while allowing operators the flexibility to add specific local competencies without

deterring workforce mobility.

4. **Improved Data Representation**: Improve alignment between rail roles and ANZSCO classifications to enhance workforce planning, skills shortage identification, and inclusion on national skills lists.

Introduction

1.1 Background

Advancing national rail interoperability has been prioritised by the National Cabinet, with the National

Transport Commission (NTC) tasked with developing and implementing the National Rail Action Plan. Created in collaboration with industry and government, this plan addresses key challenges facing the rail sector, including skills and labour shortages, interoperability, and the need for common standards.

In recent years, the rail industry has made significant strides in understanding current and future skills demand. However, progress has been hindered by inconsistent and insufficiently detailed data due to several factors:

- The Australian and New Zealand Standard Classification of Occupations (ANZSCO), which is used by the Australian Bureau of Statistics (ABS) to break down official labour market data, is outdated and does not reflect technological advancements or the emergence of new roles, particularly in the ICT, Digital, Telecommunications, and Engineering sectors.
- Rail-specific classifications within the ANZSCO system are inadequate, making it difficult to accurately capture the specialised skills and expertise required in the rail sector and to have these skills recognised on the National Skills Priority List.
- Rail operators and maintainers often use their own role titles and competency frameworks leading to inconsistencies in skills required to undertake comparable roles and hindering labour mobility.

Efforts are underway to address these challenges. A major review of ANZSCO is in progress to update occupational classifications to better reflect the modern labour market. Additionally, the National Transport Commission (NTC) is collaborating with the Australasian Railway Association (ARA), the broader rail industry, the education sector, and Industry Skills Australia— the Jobs and Skills Council for the transport and logistics industries—to harmonise training requirements and naming conventions for rail roles.

1.2 Scope of analysis

The scope of this analysis focuses on the rail operations and maintenance (O&M) workforce across Australia, aiming to identify the key roles and their most frequently used naming conventions. The goal is to establish a common set of standardised descriptors that can be adopted industry wide. This harmonisation will support improved workforce interoperability by enabling clearer communication across rail operators, enhancing workforce mobility, and ensuring consistency in job classifications and competency management. Standardised role descriptors will also streamline training, certification, and recruitment processes, contributing to more efficient operations and workforce development across the rail sector.

1.3 Data coverage

For this analysis, we have utilised a combination of official Australian Bureau of Statistics (ABS) industry and occupation data, alongside data from the Australasian Railway Association's (ARA) Rail Industry Worker (RIW) Program and REMSMART platform. The RIW Program is a national competency framework that identifies valid role titles held by RIW cardholders, primarily covering roles with a rail safety requirement. While most role titles are specific to individual rail networks, the ARA is working with rail operators to harmonise role titles and competencies across the industry. RIW cardholders include employees from rail operators, contractors, manufacturers, and a variety of suppliers.

REMSMART is a remuneration benchmarking platform that collects detailed data from participating members, including headcount figures for a common set of roles. Participating members encompass passenger and freight operators, contractors, manufacturers, and suppliers.

To enable the role compositions from the different datasets to be compared, they were mapped both to the ANZSCO classification system and to the 80 key job titles identified by the rail industry which are detailed on the Work in Rail (WIR) website.

Methodology

2.1 Summary of approach

To identify the key roles in rail O&M activities, we began by estimating the overall size of the workforce using official industry statistics and then refined this estimate using industry data to focus on the subset of the workforce dedicated to rail O&M activities. Initially, we applied official statistics on occupational composition by industry (ANZSCO) to establish a preliminary workforce breakdown. This was further refined using data from RIW and REMSMART to more accurately reflect the composition of the rail O&M workforce.

This section describes the scope of analysis to identity the top roles in the rail O&M workforce.

2.2 Data sources

To identify the top roles, we draw on multiple datasets based on their respective strengths and limitations, while being careful not to double-count workers from multiple sources. We achieve this by deriving a fixed total workforce count, then by estimating the proportions for different industry groups and their role composition.

The data sources used for this exercise and their strengths/limitations are outlined in the table below:

Table 1 Potential data sources for estimating workforce composition

Data source	Strengths	Limitations
Census 2021	• Most comprehensive coverage of rail sector employment by occupation and industry. • Separate splits available for the passenger transport, freight transport, and rolling stock manufacturing and repairs industries.	• Limited rail-specific roles under the ANZSCO classification system (as at Census 2021). • Limited disaggregation by seniority resulting in lower levels of management being classified under the activities they manage.
ABS Input-Output data	• Can provide estimates of broader rail sector activity and employment through supply chain analysis. • Can be linked to the Census data to provide estimates of the broader rail sector role composition. • No passenger/freight rail split.	• I-O multipliers have well known limitations which can lead to them significantly overstating the economy-wide impacts. • If linked to Census data, assumes industry's employment composition for rail operation and maintenance activities is the same as its overall composition.
REMSMART data	• Detailed coverage of workforce composition for participating organisations. • Good disaggregation of rail-specific roles by seniority. • Includes contractors and suppliers/manufacturers.	• Provides coverage for only a small proportion of the rail industry. • For covered roles, includes the non-rail workforce of major iron ore producers which skews the composition for the freight industry.
RIW data	• Provides excellent coverage of roles with a rail-safety focus. • Detailed breakdown of roles including seniority. • Includes contractors and manufacturers/suppliers.	• Covers all roles held by cardholders, so not directly comparable with Census or REMSMART role data. • Lack of role title harmonisation across networks makes it difficult to accurately map individual roles to equivalent ANZSCO 6-digit roles and Work in Rail role titles.

2.3 Estimating total workforce size and industry composition

The size of the total rail workforce and the portion involved in Operations and Maintenance (O&M) activities were estimated using data from the Australian Bureau of Statistics (ABS) National Input-Output (I-O) Tables. This approach mirrors the method used in the ARA's 2020 Value of Rail study, which estimated a rail workforce in 2019 of 165,420 workers (in full-time equivalent terms, FTE).

I-O Tables show how different industries in the economy are connected, detailing how one industry buys from or supplies to others. I-O multipliers are used to estimate how much extra economic activity and employment are generated in related industries when one industry grows. These are called indirect effects.

Among the 114 industries covered in the I-O Tables, five core industries were identified as making significant contributions to the rail sector:

- Rail Transport
- Railway Rolling Stock Manufacturing
- Heavy and Civil Engineering Construction
- Rental and Hiring Services (excluding Real Estate)
- Transport Support Services and Storage

All activities in the Rail Transport and Railway Rolling Stock Manufacturing industries directly support the rail industry. However, only part of the activities in the other three industries relate to rail. The size of these contributions, and the associated jobs, were estimated based on how much each of these industries interacts with the Rail Transport and Rolling Stock Manufacturing industries in the I-O Tables.

To narrow the focus to rail O&M, we adjusted the employment and economic contributions from Heavy and Civil Engineering Construction and Railway Rolling Stock Manufacturing to only include the maintenance-related work directly tied to rail.[1] I-O multipliers were then applied to estimate how many indirect jobs are created in industries that supply goods and services to the rail sector.

Table 2 shows direct employment (initial effects) in the five core industries involved in rail O&M and the indirect employment created by these activities. The indirect employment includes employment in industries supplying intermediate inputs to the core industries (first round effects), as well as employment generated from the flow of these intermediate input purchases throughout the economy (industrial support effects).

In 2023/24, the rail workforce was estimated at 154,212 full-time equivalents (FTEs), with 127,959 FTEs focused on rail O&M. This comprised 60,975 FTEs directly engaged in rail O&M across the five identified industries, and 66,984 FTEs in industries required to support these activity levels.

Table 2: Estimated Total and O&M Rail Workforce

Rail Industry I-O Industry Groups	Total Rail Workforce			O&M Rail Workforce		
	Direct FTEs	Indirect FTEs	Total FTEs	Direct FTEs	Indirect FTEs	Total FTEs
Heavy and Civil Engineering Construction	4,786	10,448	15,235	782	1,707	2,489
Rental and Hiring Services (except Real Estate)	431	454	885	431	454	885
Transport Support Services and Storage	1,780	2,557	4,337	1,780	2,557	4,337
Rail Transport	55,200	57,183	112,383	55,200	57,183	112,383
Railway Rolling Stock Manufacturing	7,562	13,811	21,373	2,783	5,083	7,865
Total Rail Workforce Contribution	69,758	84,454	154,212	60,975	66,984	127,959

Source: ABS National Input-Output Tables, 2020-21; ABS Labour Force, Australia, Detailed; Hadron Group Analysis

[1] The share of rail maintenance in Heavy and Civil Engineering Construction was sourced from the ARA Australian Rail Market Outlook, 2022, and the share of maintenance in Railway Rolling Stock Manufacturing was sourced from IBIS World Railway Equipment Manufacturing and Repairs in Australia (2024-2029)

The main industry classification used by the Australia Bureau of Statistics (ABS) is the Australian and New Zealand Industry Classification (ANZSIC). ANZSIC has four classification levels, ranging from broadest to most detailed: Division (1-digit), Subdivision (2-digit), Group (3-digit), and Class (4-digit). It includes 19 Divisions, 86 Subdivisions, 214 Groups, and 506 Classes.

There are however only 114 separate industry groups identified in the I-O tables. The level of disaggregation in the I-O tables reflects a combination of the industry's size, its economic importance, the availability of detailed data, and the distinctiveness of its interactions within the broader economy. Industries within a 1-digit ANZSIC division that show significant variation in these aspects are often broken down further to the 2-digit or 3-digit levels.

Table 3 illustrates the breakdown of the estimated O&M workforce by industry at the ANZSIC 1-digit level.

Table 3 ANZISC 1-digit industry contributions to Rail O&M Workforce, 2023/24

ANZSIC 1-Digit Industry	O&M Workforce FTEs	% of Total O&M Workforce
Transport, Postal & Warehousing	66,250	51.8%
Manufacturing	12,211	9.5%
Construction	11,647	9.1%
Administrative & Support Services	9,145	7.1%
Professional, Scientific & Technical Services	7,397	5.8%
Rental, Hiring & Real Estate Services	4,022	3.1%
Financial & Insurance Services	3,550	2.8%
Wholesale Trade	3,127	2.4%
Retail Trade	2,287	1.8%
Other Services	1,810	1.4%
Accommodation & Food Services	1,689	1.3%
Electricity, Gas, Water & Waste Services	1,229	1.0%
Public Administration & Safety	1,144	0.9%
Information Media & Telecommunications	952	0.7%
Agriculture, Forestry & Fishing	514	0.4%
Mining	413	0.3%
Arts & Recreation Services	326	0.3%
Education & Training	182	0.1%
Health Care & Social Assistance	66	0.1%
All Industries	**127,959**	**100.0%**

Source: Hadron Group Analysis of ABS data

The Top 5 industries account for 83.3% of the total rail O&M workforce. Over half of this workforce is employed in **Transport, Postal & Warehousing**, with Rail Transport contributing the largest sub-sector (85.6%), followed by Transport Support Services and Storage (7.5%) and Road Transport (5.4%).

Manufacturing is the second largest employer, led by Railway Rolling Stock Manufacturing and Repair Services (49.2%) and Structural Metal Product Manufacturing (18.5%). A wide variety of other manufacturing activities also support the rail O&M supply chain, reflecting its diverse infrastructure and service needs.

Construction is the third largest employer, with 77.0% of its contribution coming from Construction Services, 13.4% from Heavy and Civil Engineering Construction and the remaining 9.6% coming from Building Construction.

The fourth-largest contributor is **Administrative & Support Services**, where 79.6% of employment is in the Employment, Travel Agency, and Other Administrative Services, and the other 20.4% is in Building Cleaning, Pest Control, and Other Support Services.

Rounding out the Top 5 is **Professional, Scientific & Technical Services**, where Computer Systems Design and Related Services— the only sub-sector identified separately in the I-O tables—accounts for 12.5% of this division's rail O&M workforce.

2.4 Applying industry-wide occupation data

To extend the analysis, the role shares by industry from the 2021 Census were applied to the rail O&M workforce estimates at the most detailed ANZSIC level available through the I-O tables. This provided a breakdown of the workforce by role.

The Census uses the Australian and New Zealand Standard Classification of Occupations (ANZSCO), which has five levels of classification: Major Group (1-digit), Sub-Major Group (2-digit), Minor Group (3-digit), Unit Group (4-digit), and Occupation (6-digit). The 2021 Census, based on the 2013 ANZSCO release, identified 1,023 individual 6-digit occupations.

When applying the 2021 Census industry compositions, some roles—such as Plumber (General), Recruitment Consultant, and Storeperson—became overrepresented in the rail O&M context. This occurred because the composition shares used were overall averages for the industry, which may differ from the shares required for rail O&M. For example, in the Construction Services subdivision, Building Installation Services and Building Completion Services account for 65% of overall employment. However, aside from Electrical Services, most of the industry classes under these groups play only a minor part in rail O&M. On the other hand, the classes within the smaller groups such as Land Development and Site Preparation Services (handling earthmoving), Building Structure Services (including Concrete and Structural-Steel Erection Services), and Other Construction Services (like Landscape Construction and Machinery Hire with Operators) are expected to play a more significant role.

To correct this imbalance, we manually adjusted the workforce compositions for the following 2-digit industry subdivisions: Construction Services, Transport Support Services, Road Transport, and Administrative Services. These four subdivisions represent 40% of the estimated rail O&M indirect employment.

To do this, we adjusted the employment shares of the 4-digit industry classes within these 2-digit industry subdivisions, as provided by the Census data, to better reflect their relevance to rail O&M. While the Census data provides breakdowns at the 4-digit industry level, the I-O mappings are only available at the 2-digit level for these sectors. This adjustment created a rail O&M-specific role composition, which we then applied to the rail O&M workforce estimates for those subdivisions.

For all other industry levels, the ANZSCO compositions at the most detailed ANZSIC level available through the I-O tables were used. These were considered sufficiently accurate to reflect the workforce relevant to rail O&M without skewing the occupation rankings.

A broader challenge comes from including not only workers directly involved in the five core industries and those in industries supplying intermediate inputs, but also workers from the broader supply chain. These broader supply chain effects reflect the flow of intermediate input purchases throughout the economy, which risks inflating the rail O&M workforce estimates with more ubiquitous roles—such as corporate, sales, and administrative positions—thereby reducing the usefulness of the analysis in identifying key rail O&M roles.

To address this, we limited the further analysis to workers directly employed in rail O&M activities or in the production of intermediate inputs supplied to the five core rail O&M industries. This approach also aligns with the REMSMART and RIW data, which only include workers directly employed in rail O&M or in businesses supplying intermediate inputs to these industries. Additionally, we excluded employment generated as first round effects from Rail Transport to Rail Transport and from Railway Rolling Stock Manufacturing to Railway Rolling Stock Manufacturing to avoid double counting and over-inflating key roles like Train Driver.

This adjusted rail O&M workforce accounts for 91,265 FTEs (initial effects + first round effects) out of the total estimated 127,959 FTEs (direct effects + first round effects + industrial support effects).

2.5 Initial top 20 role analysis

Table 4 shows the Top 20 occupations at the 6-digit ANZSCO level for the adjusted rail O&M workforce, while Table 5 presents the corresponding Top 20 Work in Rail (WIR) roles.

Table 4 Initial top 20 ANZSCO 6-Digit Occupations

ANZSCO 6-Digit Occupations	FTEs	% of Total O&M Workforce
Train Driver	11,459	12.6%
Electrician (General)	3,821	4.2%
Railways Assistant	3,528	3.9%
Fitter (General)	2,627	2.9%
Railway Track Worker	2,454	2.7%
Ticket Seller	2,074	2.3%
Truck Driver (General)	1,828	2.0%
Program or Project Administrator	1,589	1.7%
General Clerk	1,350	1.5%
Train Controller	1,239	1.4%
Supply and Distribution Manager	1,216	1.3%
Despatching and Receiving Clerk	1,215	1.3%
Storeperson	1,106	1.2%
Railway Signal Operator	1,077	1.2%
Railway Station Manager	1,041	1.1%
Construction Project Manager	991	1.1%
Electrical Engineer	964	1.1%
Forklift Driver	890	1.0%
Accountant (General)	883	1.0%
Commercial Cleaner	876.8	1.0%
Sub-Total (Top 20 Occupations)	42,229	46.3%

Source: Hadron Group Analysis of ABS data

Table 5 Initial Top 20 Work in Rail Roles

Work in Rail Roles	FTEs	% of Total O&M Workforce
Train Driver	11,459	12.6%
Customer Service	8,620	9.4%
Trades Assistant	5,809	6.4%
Administration	5,342	5.9%
Plant Operator	4,978	5.5%
Logistics	4,035	4.4%
Electrical Technician	3,978	4.4%
Fitter	2,962	3.2%
Accounting	2,703	3.0%
Project Manager	2,655	2.9%
Human Resources	2,474	2.7%
Train Controller	2,317	2.5%
Sales	2,258	2.5%
Storeperson	2,252	2.5%
Project Planner	1,930	2.1%
Plant Maintainer	1,427	1.6%
Communications	1,315	1.4%
Business Development	1,301	1.4%
Health and Safety Adviser	1,281	1.4%
Civil Engineer	1,266	1.4%
Sub-Total (Top 20 Roles)	70,361	77.1%

Source: Hadron Group Analysis of ABS data

The Top 20 WIR roles cover a larger portion of the rail O&M workforce (75.8%) compared to the Top 20 ANZSCO occupations (46.1%). Since there are more rail-specific roles in the Work in Rail (WIR) system than in the ANZSCO system, a single ANZSCO code may correspond to multiple WIR roles. For example, the ANZSCO code for Railway Track Worker is mapped to several WIR roles, such as Trades Assistant, Protection Officer, Handsignaller, Lookout, and Track Inspector.

Conversely, with 1,023 ANZSCO occupations and only 80 WIR roles, many non-rail-specific WIR roles (e.g., Administration) are mapped to multiple ANZSCO occupations. This creates broader groupings for non-rail-specific roles and more granular mapping for rail-specific positions.

Both Top 20 lists feature the main rail operation roles. The Work in Rail (WIR) role of Customer Service covers the ANZSCO occupations of Railways Assistant, Ticket Seller, and Railway Station Manager. Similarly, the Train Controller role in WIR encompasses both the ANZSCO Train Controller and Railway Signal Operator occupations. Notably, Train Driver ranks top in both lists.

Logistics-related roles also feature prominently in both lists. The WIR Logistics role covers the ANZSCO Despatching and Receiving Clerk and Supply and Distribution Manager occupations, while the WIR Storeperson role aligns with the ANZSCO Storeperson and Forklift Driver occupations.

The ANZSCO Electrician (General) occupation and WIR Electrical Technician roles have comparable coverage and both rank in the Top 10 in their respective lists. The same applies to the ANZSCO Fitter (General) occupation and WIR Fitter role.

The main difference between the two lists is that WIR's broader role mapping captures a wider variety of administrative, managerial, and support occupations, which leads to their higher rankings. Additionally, WIR consolidates many ANZSCO technician occupations into the broader Trades Assistant role and various plant operation occupations into the Plant Operator role, whereas ANZSCO's Top 20 list includes only the Railway Track Worker occupation which is classified under ANZSCO as a labourer but also covers tasks related to installing and repairing signalling equipment.

2.6 Use of industry

The manual adjustments made to the occupation compositions for the Construction Services, Transport Support Services, Road Transport, and Administrative Services industry subdivisions have led to a more accurate representation of the rail O&M workforce composition. This is evident as all Top 20 ANZSCO occupations now map to the 80 Work in Rail roles. However, limitations remain. While the adjusted shares of industry classes may better reflect the rail sector, the composition of roles within these classes may still be misaligned.

For example, the manual adjustment to the Administrative Services subdivision involved increasing the share of the Labour Supply Services industry class. Yet, Labour Supply Services provides contract labour to a range of industries, not exclusively rail, which could skew the results.

Additionally, there are challenges with assumptions around direct employment in sectors such as Rolling Stock Manufacturing and Repairs and Heavy and Civil Engineering Construction. The role composition for workers involved in rail O&M is likely to differ from the overall averages of these industries, which include broader manufacturing and construction activities. Therefore, while improvements have been made, the accuracy of role compositions in these key industries may still be limited.

To refine the combined I-O and Census analysis, we have used data from two industry sources – the Rail Industry Worker (RIW) program and the REMSMART remuneration portal. To enable comparison with the I-O and Census analysis, roles defined in REMSMART and Rail Industry Worker were also matched to the Census 2021 ANZSCO 6-digit occupations and to the WIR roles.

For each industry group, we then considered the most appropriate source of data for estimating the role composition. The following table sets out the data source that was selected and the rationale:

Table 6 Selected data sources for estimating industry level composition

Industry level	Data source	Rationale for selecting dataset
Rail Passenger Transport / Rail Freight Transport	REMSMART data and ABS Census	The REMSMART data offers strong coverage of passenger rail operators and their workforces, providing a more detailed breakdown of rail-specific roles compared to the Census. The REMSMART data reports employment coverage for participating organisations across a set of roles deemed relevant to the rail industry. However, the inclusion of major iron ore producers—where rail O&M activities make up only a small portion of their total operations—leads to a role composition that is not representative of typical freight operations. As a result, the Census composition has been used to better reflect the workforce in this segment of the rail transport industry.
Rollingstock Manufacturing & Repairs	REMSMART data	The REMSMART data provides good coverage of manufacturing companies and their workforces and rail-specific roles.
Heavy and Civil Engineering Construction	REMSMART data	The REMSMART data provides good coverage of contractor companies and their workforces and rail-specific roles.
Rental and Hiring Services (except Real Estate)	ABS Census	These workers are not captured in REMSMART or RIW, so ABS Census data is used.
Construction Services	RIW data	Construction Services workers will primarily be employed around the track and will be RIW cardholders. The role composition for rail will be notably different to rest of construction services industry, so rail specific data is preferred.
Transport Support Services and Storage	ABS Census	These workers are not well captured by the RIW system and are only partially reflected in the REMSMART data. As a result, the adjusted ABS Census data is used to provide a more accurate representation of their roles within the workforce.
Road Transport	ABS Census	RIW data captures a portion of this workforce, particularly where there is an interface with the rail corridor. However, it does not account for the broader role of the Road Transport industry in directly and indirectly supporting rail O&M. As such, the adjusted ABS Census data is used to provide a more comprehensive view of this workforce.
Employment, Travel Agency and Other Administrative Services	RIW data and ABS Census data	RIW data is utilised for *Community & Personal Service Workers*, *Labourers*, and *Technicians & Trades*, as these roles are well captured within the RIW system. For the remaining 1-digit ANZSCO codes, ABS Census data is used to ensure a more complete representation of the workforce.
Other Industries	ABS Census data	This encompasses a wide range of industries, each contributing only a small portion to the rail O&M workforce. These industries include varied roles that are unlikely to be accurately captured by the RIW or REMSMART data. The ABS Census data is considered sufficiently accurate to represent the workforce relevant to rail O&M without distorting the occupation rankings.

Source: Hadron Group analysis

Analysis findings

3.1 Refined top 10 roles

Our analysis has used multiple data sources, tailored to different industry groups, to estimate the composition and total number of roles either directly involved in rail O&M activities or employed in businesses supply the intermediate inputs required to support rail O&M activities. This accounts for 91,265 FTEs out of the total 127,959 FTEs estimated for the total rail O&M workforce.

Table 7 shows the estimated counts and proportion of the overall rail O&M workforce represented the Top 10 WIR roles:

Table 7 Refined Top 10 WIR Roles

#	WIR role	Estimated proportion	Estimated count
1	Train Driver	12,614	13.8%
2	Customer Service	5,973	6.5%
3	Plant Operator	5,453	6.0%
4	Plant Maintainer	4,969	5.4%
5	Administration	4,061	4.4%
6	Logistics	3,608	4.0%
7	Trades Assistant	3,224	3.5%
8	Accounting	3,078	3.4%
9	Project Manager	2,831	3.1%
10	Electrical Technician	2,710	3.0%
	Total	**48,522**	**53.2%**

Source: Hadron Group analysis

We find that train drivers are the most common WIR role, at an estimated proportion of 13.8% of rail O&M, with over 12,600 FTEs. This is followed by customer services and plant operator roles, at 6.5% and 6.0% of the industry respectively.

The top 10 roles make up over 50% of the rail O&M sector as a whole, totalling 53.0% or approximately 48,500 roles.

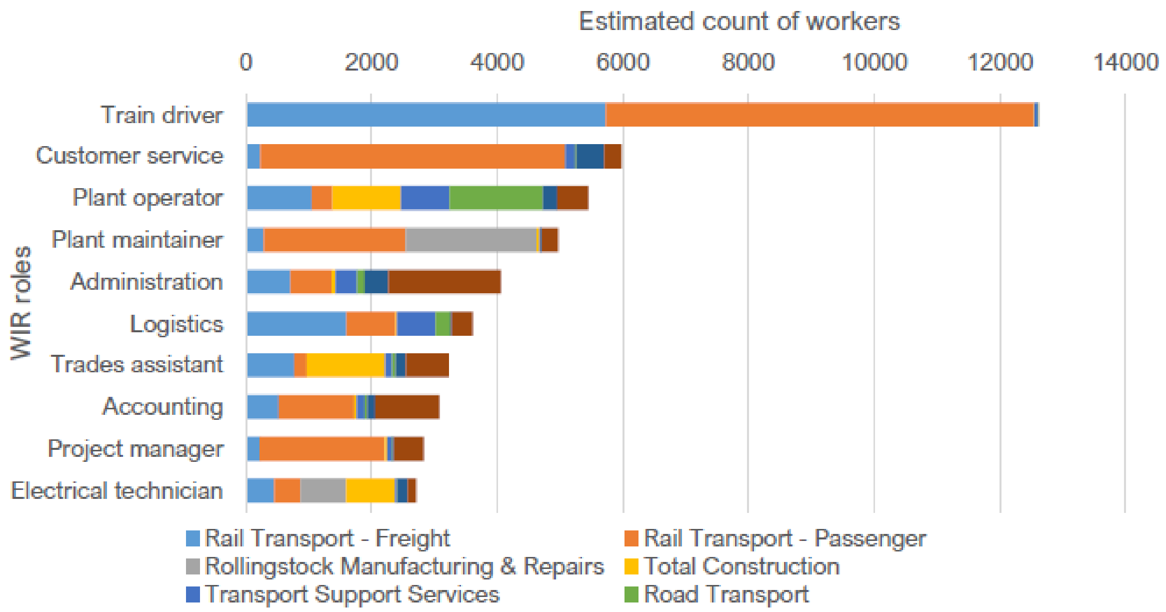
The table above does exclude ‘n/a’ roles from REMSMART, RIW and ABS Census data that were not able to be mapped to the WIR role categorisations. There were a total of 6,457 of these instances (or 7.1% of the total workforce) identified. These are likely to represent a wide range of roles which are not relevant to the rail industry and therefore not captured within the WIR roles. They are unlikely to impact on the top 10 roles that have been identified above but have been retained in the calculations to improve the accuracy of the estimated counts.

Comparing Table 7 with the initial I-O and Census estimates in Table 5, refining the role compositions using industry data led to an increase in Plant Maintainer and Project Manager roles, better reflecting their importance in delivering maintenance activities. While the rankings have shifted, the overall Top 10 roles remain largely the same, with the only change being the replacement of the Fitter role by the Plant Maintainer role. This consistency is expected, as these roles encompass key rail operation functions as well as general corporate responsibilities critical to both freight and passenger rail sectors.

3.2 Composition of roles by industry and occupation

Using the industry group analysis, we can also see the top 10 WIR roles by the industry groups they are estimated to work in. This is shown in the following figure:

Figure 1 Refined top 10 WIR roles by industry



Source: Hadron Group analysis
Note: Excludes 'n/a' mapped roles.

As expected, the passenger sector emphasises customer service roles alongside train drivers, while the freight sector primarily focuses on logistics, supported by the transport support services and road transport industries. Maintenance activities are reinforced by the rolling stock manufacturing and repairs, construction services, and labour supply sectors, which provide tradespeople, plant operators, and maintainers.

3.3 Refined WIR roles by category

The analysis can also be used to understand the composition of the rail operations and maintenance sector by WIR role categories (as specified on the WIR website). These are shown in the following table:

Table 8 Refined WIR role category splits

WIR role category	Estimated proportion	Estimated FTEs
Corporate	17.4%	15,896
Engineering	5.6%	5,091
Logistics	6.7%	6,122
Operations and Facilities Management	27.6%	25,229
Project Management	5.8%	5,287
Quality, Health and Safety	2.4%	2,184
Sustainability	0.4%	406
Telecommunications, IT and Digital	3.8%	3,488
Trades	23.1%	21,106
N/A	7.1%	6,457

Source: Hadron Group analysis

Operations and **Facilities Management** and **Trades** are the categories with the highest estimated proportion of FTEs, together making up approximately 50% of the rail O&M workforce.

3.4 Refined top 20 ANZSCO 6-digit occupations

While the broad RIW mappings resulting in a shuffling or rankings, refining the role compositions using industry data has had a more pronounced effect on the top 6-Digit ANZSCO occupations. In addition to the elevation of *Security Officer*, *Construction Project Manager*, and *Maintenance Planner* into the Top 10, refining the role compositions with industry data has also increased the representation of professionals and trades in the overall Top 20. Roles such as *Civil Engineer*, *Telecommunications Technician*, *Occupational Health and Safety Adviser*, and *Mechanical Engineer* now feature more prominently. This reflects a more accurate portrayal of the diverse skill sets required to support rail O&M activities, particularly in project management, safety, and technical expertise.

Table 9 Refined top 20 ANZSCO 6-Digit occupations

ANZSCO 6-Digit Occupations	FTEs	% of Total O&M Workforce
Train Driver	12,615	13.8%
Railways Assistant	4,763	5.2%
Railway Track Worker	3,481	3.8%
Fitter (General)	3,408	3.7%
Electrician (General)	2,576	2.8%
Security Officer	2,206	2.4%
Construction Project Manager	1,976	2.2%
Truck Driver (General)	1,686	1.8%
Maintenance Planner	1,685	1.8%
Train Controller	1,633	1.8%
Supply and Distribution Manager	1,603	1.8%
Technicians and Trades Workers nfd	1,541	1.7%
Telecommunications Technician	1,418	1.6%
Civil Engineer	1,355	1.5%
Program or Project Administrator	1,307	1.4%
Electrical Engineer	1,165	1.3%
General Clerk	1,156	1.3%
Occupational Health and Safety Adviser	1,048	1.1%
Mechanical Engineer	1,037	1.1%
Accountant (General)	921	1.0%
Sub-Total (Top 20 Occupations)	48,581	53.2%

Source: Hadron Group analysis

3.5 Summary of analysis findings

The rail O&M role analysis reveals a diverse workforce encompassing operations, technical trades, administration, and professional services. While operational roles remain dominant, the use of industry data to refine the role compositions highlights the importance of a wide range of technical, managerial, and support roles, underscoring the multidisciplinary nature of rail O&M. This refinement offers a more accurate portrayal of the industry's workforce, ensuring that both core rail operation and maintenance functions, as well as broader corporate roles, are effectively represented.

How can this be used to harmonize roles?

The findings from the previous section show a general alignment between the WIR title rankings and ANZSCO 6-digit occupations. However, using either system as the basis for role harmonisation poses significant challenges.

Some WIR roles are too broad, combining distinct skills and experience levels. For example, operating an excavator, crane, and rail track vehicle involves different competencies, yet these are all grouped under the same title—Plant Operator. Additionally, only the Project Manager role reflects seniority, making it difficult to capture the full range of skills and responsibilities across various positions.

On the other hand, while ANZSCO 6-digit occupations are more specific—and new rail-specific occupations are being introduced as part of the 2024 review—a gap remains between the tasks performed in key rail roles and their closest corresponding ANZSCO occupations.

The REMSMART database provides broad coverage of roles but cannot be used for harmonisation because participants are required to categorise their workforce using a predefined set of role titles. In contrast, the RIW Program database includes role titles assigned by different network operators and, to a lesser extent, employers. In certain areas, such as plant operators, significant harmonisation has already been achieved through the RIW National Matrices.

For roles with a strong rail safety component, the RIW data offers comprehensive coverage of the titles used. This allows for the creation of a shortlist of harmonised titles that the industry can adopt, ensuring alignment with specific roles.

The RIW Program database is suitable for identifying widely used naming titles for the following occupations from the draft 2024 ANZSCO classification:

- Civil Engineer
- Rail Engineer
- Electrical Engineer
- Rail Signalling Engineer
- CT Network and Systems Engineer
- Electrician (General)
- Electrical Fitter
- Electrical Distribution Trades Worker
- Railway Track Worker
- Rail Protection Officer
- Construction Project Manager

For roles without a significant rail safety component, the RIW data offers limited coverage. This includes operational roles such as *Train Driver, Railways Assistant, Train Controller, and Revenue Protection Officer,* as well as maintenance activities performed outside the rail corridor, which span multiple WIR roles and ANZSCO occupations.

To address this, we conducted a review of the most common naming conventions used by rail operators and manufacturers/suppliers and matched these to the corresponding WIR roles and ANZSCO occupations.

Tables 10 to 20 present the most frequently used titles for the occupations matched to the RIW data, along with the title held by the largest number of RIW cardholders. Each table lists a range of roles, with the titles reflecting those most commonly associated with each role. The share of each title indicates its relevance for harmonisation, rather than serving as a comparison between roles in the table.

Tables 21 and 22 present the titles identified through a desktop scan of industry usage for the operational roles mentioned earlier, as well as for *Rollingstock Maintenance Engineer*, *Technician*, and *Planner* roles.

Table 10 – RIW signalling engineer roles with ANZSCO and WIR correspondences

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Signal Design Engineer	40.6%	Signalling Engineer	Electrical Engineering Technician	Electrical Engineering Technician
Senior Signal Design Engineer	9.3%	Signalling Engineer	Electrical Engineer	Rail Signalling Engineer
Signal Principles Design Engineer	6.0%	Signalling Engineer	Electrical Engineer	Rail Signalling Engineer
(Signal) Test Engineer	17.0%	Signalling Engineer	Electrician (General)	Electrical Fitter
Senior Test Engineer	4.1%	Signalling Engineer	Electrical Engineer	Rail Signalling Engineer
(Signal) Principles Test Engineer	5.3%	Signalling Engineer	Electrical Engineer	Rail Signalling Engineer
(Signal) Tester in Charge	3.1%	Signalling Engineer	Electrical Engineer	Rail Signalling Engineer
Signal Engineer (Construction / Maintenance)	6.7%	Signalling Engineer	Electrical Engineer	Rail Signalling Engineer
Senior Signal Engineer	2.1%	Signalling Engineer	Electrical Engineer	Rail Signalling Engineer
SME / Verifier / Assessor	5.1%	Signalling Engineer	Electrical Engineer	Rail Signalling Engineer
Signal Project Engineer	0.7%	Project Engineer	Electrical Engineer	Rail Signalling Engineer

Table 11 – RIW signalling technician roles with ANZSCO and WIR correspondences

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Signal Assistant Designer	17.5%	Signalling Engineer	Electrical Engineering Technician	Electrical Engineering Technician
Signal Designer	20.2%	Signalling Engineer	Electrical Engineering Technician	Electrical Engineering Technician
CADD Operator	2.6%	Draftsperson	Electrical Engineering Draftsperson	Electrical Engineering Draftsperson
Signal Assistant Tester	18.5%	Signalling Engineer	Electrician (General)	Electrical Fitter
Signal Tester	19.0%	Signalling Engineer	Electrician (General)	Electrical Fitter
Signal Assistant Constructor	1.0%	Signalling Engineer	Railway Track Worker	Electrical Fitter
Signal Constructor	6.7%	Signalling Engineer	Railway Track Worker	Electrical Fitter
Signal Electrician (Maintainer)	12.9%	Signalling Technician	Electrician (General)	Electrical Fitter
Signal Technician (Maintenance / Construction)	1.7%	Signalling Technician	Electrician (General)	Electrical Fitter
Total	100.0%			

Table 12 – RIW control system and communications engineer roles with ANZSCO and WIR correspondences

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Control Systems (& Comms) Engineer	45%	Signalling Engineer	Electronics Engineer	Rail Signalling Engineer
ETCS Design Engineer	21%	Signalling Engineer	Electronics Engineer	Rail Signalling Engineer
Telecommunications Design Engineer	4%	Signalling Engineer	Telecommunications Engineer	Rail Signalling Engineer
Telecommunications Engineer	16%	Signalling Engineer	Telecommunications Engineer	Rail Signalling Engineer
Operational / Rail Systems Designer	3%	Systems Engineer	Computer Network and Systems Engineer	ICT Network and Systems Engineer
Operational / Rail Systems Engineer	3%	Systems Engineer	Computer Network and Systems Engineer	ICT Network and Systems Engineer
Systems Engineering & Safety Assurance (SESA)	8%	Systems Engineer	Computer Network and Systems Engineer / Other Engineering Professionals nec	ICT Network and Systems Engineer / Industrial Engineer
Total	100%			

Table 13 – RIW control system and communications technician roles with ANZSCO and WIR correspondences

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Telecommunications Technician	5%	Signalling Technician	Telecommunications Technical Officer or Technologist	Electrical Fitter
Control Systems & Comms Assistant Technician	28%	Signalling Technician	Electronic Engineering Technician	Electrical Fitter
Control Systems & Comms Technician / Technical Officer	68%	Signalling Technician	Electronic Engineering Technician	Electrical Fitter
Total	100.0%			

Table 14 – RIW electrical engineer roles with ANZSCO and WIR correspondences

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Designer / Design Engineer (Overhead Lines)	22.0%	Electrical Engineer	Electrical Engineer	Electrical Engineer
Design Engineer (Power Systems / Substations)	35.1%	Electrical Engineer	Electrical Engineer	Electrical Engineer
Approver / Checker / Verifier (Overhead Lines)	17.3%	Electrical Engineer	Electrical Engineer	Electrical Engineer
Approver / Checker / Verifier (Power Systems / Substations)	25.6%	Electrical Engineer	Electrical Engineer	Electrical Engineer
Total	100%			

Table 15 – RIW electrical technician roles with ANZSCO and WIR correspondences

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Electrical Tradesperson	14.7%	Electrical Technician	Electrician (General)	Electrical Fitter
Electrical Apprentice / Apprentice Electrician	15.3%	Electrical Technician	Electrician (General)	Electrical Fitter
Electrician	66.8%	Electrical Technician	Electrician (General)	Electrical Fitter
Substations Electrician	2.6%	Electrical Technician	Electrician (General)	Electrical Fitter
(Distribution) Switching Operator	0.7%	Electrical Technician	Electrician (General)	Electrical Fitter
Total	100%			

Table 16 – RIW electrical distribution trades roles with ANZSCO and WIR correspondences

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Linesman / Lineworker (OHW / Traction / Overhead)	85.9%	Electrical Linesperson	Electrical Linesworker / Electrical Line Mechanic	Electrical Distribution Trades Worker
Overhead Worker (OHW) Apprentice	0.9%	Electrical Linesperson	Electrical Linesworker / Electrical Line Mechanic	Electrical Distribution Trades Worker
Overhead Worker (OHW) Labourer	5.2%	Electrical Linesperson	Electrical Linesworker / Electrical Line Mechanic	Electrical Distribution Trades Worker
Cable Jointer	8.0%	Electrical Linesperson	Technical Cable Jointer	Electrical Distribution Trades Worker
Total	100%			

Table 17 – RIW rail track worker roles with ANZSCO and WIR correspondence

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Ultrasonic Tester / Operator	2.6%	Machine Operator	Railway Track Worker	Railway Track Worker
Rail Adjuster	6.2%	Trades Assistant	Railway Track Worker	Railway Track Worker
Rail Labourer	52.6%	Trades Assistant	Railway Track Worker	Railway Track Worker
Track Constructor	0.4%	Trades Assistant	Railway Track Worker	Railway Track Worker
Track Maintainer	6.4%	Trades Assistant	Railway Track Worker	Railway Track Worker
Track Examiner	5.1%	Trades Assistant	Railway Track Worker	Inspectors and Regulatory Officers nec
Track Certifier	8.1%	Trades Assistant	Railway Track Worker	Inspectors and Regulatory Officers nec
Track Examiner & Certifier	5.4%	Trades Assistant	Railway Track Worker	Inspectors and Regulatory Officers nec
Rail Grinder	1.9%	Machine Operator	Railway Track Worker	Railway Track Worker
Rail Welder Aluminothermic	10.0%	Machine Operator	Railway Track Worker	Railway Track Worker
Rail Welder Electric	0.2%	Machine Operator	Railway Track Worker	Railway Track Worker
Rail Welder Flashbutt	1.1%	Machine Operator	Railway Track Worker	Railway Track Worker
Total	100%			

Table 18 – RIW safe working roles with ANZSCO and WIR correspondence

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Handsignaller	20.8%	Handsignaller	Railway Track Worker	Rail Protection Officer
Protection Officer	33.3%	Protection Officer	Railway Track Worker	Rail Protection Officer
Traffic Controller / Manage Rail Traffic	16.9%	Protection Officer	Railway Track Worker	Rail Protection Officer
Lookout	9.4%	Lookout	Railway Track Worker	Rail Protection Officer
Track Force Protection Coordinator	19.6%	Protection Officer	Railway Track Worker	Rail Protection Officer
Total	100%			

Table 19 – RIW rail track and civil engineer roles with ANZSCO and WIR correspondence

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Designer (Track)	3.8%	Civil Engineer	Civil Engineer	Rail Engineer
Designer (Track and Civil)	7.2%	Civil Engineer	Civil Engineer	Rail Engineer / Civil Engineer
Designer (Civil)	6.7%	Civil Engineer	Civil Engineer	Civil Engineer
Designer (Geotech)	3.7%	Civil Engineer	Civil Engineer	Civil Engineer
Designer (Structures)	16.8%	Civil Engineer	Civil Engineer	Civil Engineer
Approver / Verifier / Checker (Track)	4.2%	Civil Engineer	Civil Engineer	Rail Engineer
Approver / Verifier / Checker (Track and Civil)	8.5%	Civil Engineer	Civil Engineer	Rail Engineer / Civil Engineer
Approver / Verifier / Checker (Civil)	8.0%	Civil Engineer	Civil Engineer	Civil Engineer
Approver / Verifier / Checker (Geotech)	3.7%	Civil Engineer	Civil Engineer	Civil Engineer
Approver / Verifier / Checker (Structures)	25.2%	Civil Engineer	Civil Engineer	Civil Engineer
Engineering Structures Inspector / Certifier	1.7%	Civil Engineer	Civil Engineer	Civil Engineer
Civil Engineer	2.4%	Civil Engineer	Civil Engineer	Civil Engineer
Site Engineer	5.9%	Civil Engineer	Civil Engineer	Civil Engineer
Project Engineer	2.1%	Project Engineer	Civil Engineer	Civil Engineer
Total	100%			

Table 20 – RIW project management roles with ANZSCO and WIR correspondence

Common Role Titles	% Total	Work in Rail	ANZSCO 2022	Draft ANZSCO 2024
Project Director	2.4%	Project Manager	Construction Project Manager	Construction Project Manager
Project Director - Path 1	4.0%	Project Manager	Construction Project Manager	Construction Project Manager
Project Director - Path 2	1.8%	Project Manager	Construction Project Manager	Construction Project Manager
Project Manager	13.6%	Project Manager	Construction Project Manager	Construction Project Manager
Project Manager - Path 1	7.4%	Project Manager	Construction Project Manager	Construction Project Manager
Project Manager - Path 2	8.7%	Project Manager	Construction Project Manager	Construction Project Manager
Senior Project Manager - Path 1	3.6%	Project Manager	Construction Project Manager	Construction Project Manager
Senior Project Manager - Path 2	3.1%	Project Manager	Construction Project Manager	Construction Project Manager
Construction Manager (Civil / Rail / Signal)	6.2%	Project Manager	Construction Project Manager	Construction Project Manager
Superintendent / Site Manager	5.0%	Project Manager	Building Associate	Construction Site Supervisor
Foreman	2.8%	Project Manager	Building Associate	Construction Site Supervisor
(Site) Supervisor	23.7%	Project Manager	Building Associate	Construction Site Supervisor
Foreman / Supervisor	9.9%	Project Manager	Building Associate	Construction Site Supervisor
Supervisor / Team Leader	4.8%	Project Manager	N/A	Construction Site Supervisor
Leading Hand	3.0%	Trades Assistant	N/A	Leading Hand
Total	100%			

Table 21 – Commonly used titles for top 10 rail operations roles

Work in Rail	Common Role Titles	ANZSCO 2022	Draft ANZSCO 2024
Customer Service	Customer Service Attendant / Assistant	Railways Assistant	Railways Assistant
	Station Attendant / Assistant	Railways Assistant	Railways Assistant
	Platform Attendant / Assistant	Railways Assistant	Railways Assistant
	Customer Service Officer	Railways Assistant	Railways Assistant
	Station Customer Service Officer	Railways Assistant	Railways Assistant
	Passenger Service Assistant	Railways Assistant	Railways Assistant
Revenue Protection Officer	Revenue Protection Officer	Transport Operations Inspector	Transport Revenue Protection Officer
	Transport Officer	Transport Operations Inspector	Transport Revenue Protection Officer
	Authorised Officer	Transport Operations Inspector	Transport Revenue Protection Officer
	Transit Officer	Transport Operations Inspector	Transport Revenue Protection Officer
Security Officer	Transport Officer	Security Officer	Protective Services Officer
	Authorised Officer	Security Officer	Protective Services Officer
	Railway Patrol Officer	Security Officer	Protective Services Officer
	Transit Officer	Security Officer	Protective Services Officer
	Security Officer	Security Officer	Protective Services Officer
	Passenger Safety Officer	Security Officer	Protective Services Officer
Train Driver	Locomotive Driver	Train Driver	Freight Train Driver / Passenger Train Driver
	Locomotive Engineer	Train Driver	Freight Train Driver / Passenger Train Driver
	Freight Train Driver	Train Driver	Freight Train Driver
	Passenger Train Driver	Train Driver	Passenger Train Driver
	Train Operator	Train Driver	Freight Train Driver / Passenger Train Driver
	Shunter	Railway Signal Operator	Railway Shunter
Network Controller	Control system operator	Train Controller	Railway Network Controller
	Signals operator	Railway Signal Operator	Railway Signal Operator
	Area controller	Train Controller	Railway Network Controller
	Network controller	Train Controller	Railway Network Controller
	Train controller	Train Controller	Railway Network Controller

Table 22 – Commonly used titles for top 10 maintenance roles

Work in Rail	Common Role Titles	ANZSCO 2022	ANZSCO 2024
Plant Maintainer	Mechanical Fitter	Fitter (General) / Fitter and Turner	Fitter (General) / Fitter and Turner
	Rolling Stock Technician (Mechanical)	Fitter (General) / Fitter and Turner	Fitter (General) / Fitter and Turner
	Rail Maintainer (Mechanical)	Fitter (General) / Fitter and Turner / Metal Fabricator	Fitter (General) / Fitter and Turner / Metal Fabricator
	Maintenance Technician (Mechanical)	Fitter (General) / Fitter and Turner / Metal Fabricator	Fitter (General) / Fitter and Turner / Metal Fabricator
	Reliability Technician (Mechanical)	Fitter (General) / Fitter and Turner / Metal Fabricator	Fitter (General) / Fitter and Turner / Metal Fabricator
Plant Maintainer	Electrical Fitter	Electrician (General)	Electrician (General) / Electrical Fitter
	Rolling Stock Technician (Electrical)	Electrician (General)	Electrician (General) / Electrical Fitter
	Rail Maintainer (Electrical)	Electrician (General)	Electrician (General) / Electrical Fitter
	Maintenance Technician (Electrical)	Electrician (General)	Electrician (General) / Electrical Fitter
	Reliability Technician (Electrical)	Electrician (General)	Electrician (General) / Electrical Fitter
Plant Maintainer	Maintenance Planner	Maintenance Planner	Maintenance Planner
	Maintenance Scheduler	Maintenance Planner	Maintenance Planner
	Rolling Stock Planner	Maintenance Planner	Maintenance Planner
Maintenance Engineer	Rolling Stock Engineer	Mechanical Engineer / Electrical Engineer / Systems Engineer	Rail Engineer
	Maintenance Engineer	Mechanical Engineer / Electrical Engineer / Systems Engineer	Rail Engineer
	Rolling Stock Reliability Engineer	Mechanical Engineer / Electrical Engineer / Systems Engineer	Rail Engineer

Next steps

1. **Industry Engagement and Consultation:**

   The first step is to consult to ensure alignment with the initiative's objectives. Engaging rail operators, unions, and other stakeholders is critical to refining the approach. This will involve using the RIW program's existing structure for roles within its database, while conducting separate discussions for those roles not currently covered.

2. **Developing National Role Matrices:**

   Building on the RIW framework, national role matrices should be developed, providing standard naming conventions and competencies for key operational and maintenance roles. These matrices should be designed to enhance labour mobility and productivity while allowing for specific local competencies as required by different operators.

3. **Broader Role Harmonisation:**

   For roles outside the RIW program, a tailored consultation process with operators will be needed. This process will focus on establishing common role titles, tasks, and skill levels, ensuring alignment with both the Work in Rail (WIR) and ANZSCO systems. This harmonisation will be key to improving data accuracy, facilitating better workforce planning, and supporting inclusion in national skills lists.

4. **Continuous Improvement and ANZSCO Alignment:**

   As role harmonisation progresses, ongoing efforts should be made to improve the representation of the rail workforce in the ANZSCO system. This will support long-term workforce planning and enhance the ability to address skills shortages. Additionally, these efforts will ensure that the rail workforce is accurately captured in national datasets, helping to inform future skills and workforce policies.

These steps will ensure that the harmonisation process is comprehensive and benefits the rail industry by improving workforce mobility, addressing skills shortages, and supporting the sector's growth and sustainability.

Appendix A: Modelling approach

Section 2.3 explains the method used to estimate the total rail operations and maintenance (O&M) workforce by leveraging the Australian Bureau of Statistics (ABS) National Input-Output (I-O) tables. This includes estimating the workforce employed in industries directly involved in rail O&M, as well as the indirect workforce that supports those activities. The five core rail O&M industries identified are:

- Rail Transport
- Railway Rolling Stock Manufacturing
- Heavy and Civil Engineering Construction
- Rental and Hiring Services (excluding Real Estate)
- Transport Support Services and Storage

I-O multipliers were applied to calculate the indirect workforce numbers.

Section 2.4 details the rationale for focusing the role composition analysis only on workers directly employed in rail O&M activities or in the production of intermediate inputs supplied to the five core industries. Workers in the broader supply chain were excluded from this analysis to maintain a clear and relevant focus on the rail O&M sector.

Section 2.5 then presents the composition of the rail O&M workforce, derived by applying industry role shares from the 2021 Census, using the most detailed industry-level data available through the I-O tables.

The following table identifies the Top 10 industries that contribute the largest shares to the rail O&M workforce. These industries collectively account for just under 90% of the workforce:

Input-Output Industry Group contributions to rail O&M workforce

Rank	Input-Output Industry Group (IOIG)	Employment (FTE)	% of Total Employment
1	Rail Transport	55,221	60.51%
2	Railway Rolling Stock Manufacturing	4,866	5.33%
3	Construction Services	4,726	5.18%
4	Transport Support Services and Storage	4,110	4.50%
5	Employment, Travel Agency and Other Administrative Services	3,338	3.66%
6	Road Transport	2,422	2.65%
7	Non-Residential Property Operators and Real Estate Services	1,585	1.74%
8	Wholesale Trade	1,499	1.64%
9	Structural Metal Product Manufacturing	1,489	1.63%
10	Heavy and Civil Engineering Construction	1,457	1.60%
	Top 10 IOIGs in O&M Workforce	80,714	88.4%
	Other IOIGs in O&M Workforce	10,550	11.6%
	Total O&M Workforce	91,265	100.00%

Source: ABS National Input-Output Tables, 2020-21; ABS Labour Force, Australia, Detailed; Hadron Group Analysis

Section 2.6 discusses the limitations of relying solely on industry-level data from the Census for analysing the rail O&M workforce. It proposes refining the analysis for specific industries by integrating data from the Australasian Railway Association's (ARA) Rail Industry Worker (RIW) Program and the REMSMART platform. These data sources offer more detailed and industry-specific insights that help address gaps in the Census data.

The table below (a repeat of Table 6) outlines the data sources chosen for this analysis and the rationale behind each selection:

Selected data sources for estimating industry level composition

Industry level	Data source	Rationale for selecting dataset
Rail Passenger Transport / Rail Freight Transport	REMSMART data and ABS Census	The REMSMART data offers strong coverage of passenger rail operators and their workforces, providing a more detailed breakdown of rail-specific roles compared to the Census. The REMSMART data reports employment coverage for participating organisations across a set of roles deemed relevant to the rail industry. However, the inclusion of major iron ore producers—where rail O&M activities make up only a small portion of their total operations—leads to a role composition that is not representative of typical freight operations. As a result, the Census composition has been used to better reflect the workforce in this segment of the rail transport industry.
Rollingstock Manufacturing & Repairs	REMSMART data	The REMSMART data provides good coverage of manufacturing companies and their workforces and rail-specific roles.
Heavy and Civil Engineering Construction	REMSMART data	The REMSMART data provides good coverage of contractor companies and their workforces and rail-specific roles.
Rental and Hiring Services (except Real Estate)	ABS Census	These workers are not captured in REMSMART or RIW, so ABS Census data is used.
Construction Services	RIW data	Construction Services workers will primarily be employed around the track and will be RIW cardholders. The role composition for rail will be notably different to rest of construction services industry, so rail specific data is preferred.
Transport Support Services and Storage	ABS Census	These workers are not well captured by the RIW system and are only partially reflected in the REMSMART data. As a result, the adjusted ABS Census data is used to provide a more accurate representation of their roles within the workforce.
Road Transport	ABS Census	RIW data captures a portion of this workforce, particularly where there is an interface with the rail corridor. However, it does not account for the broader role of the Road Transport industry in directly and indirectly supporting rail O&M. As such, the adjusted ABS Census data is used to provide a more comprehensive view of this workforce.
Employment, Travel Agency and Other Administrative Services	RIW data and ABS Census data	RIW data is utilised for *Community & Personal Service Workers*, *Labourers*, and *Technicians & Trades*, as these roles are well captured within the RIW system. For the remaining 1-digit ANZSCO codes, ABS Census data is used to ensure a more complete representation of the workforce.
Other Industries	ABS Census data	This encompasses a wide range of industries, each contributing only a small portion to the rail O&M workforce. These industries include varied roles that are unlikely to be accurately captured by the RIW or REMSMART data. The ABS Census data is considered sufficiently accurate to represent the workforce relevant to rail O&M without distorting the occupation rankings.

The following sub-sections step through the analysis completed for each industry group in estimating the composition of the workforce.

Rail Transport

Of the estimated 55,221 roles in Rail Transport, we estimated that 69% are for passenger rail and 31% are for freight rail. This was based on the Census splits for freight and passenger plus an uplift to account for additional freight employment relating to in-house transport which was estimated from the ABS Transport Satellite Accounts.

Within Rail Transport – Freight, we therefore estimate a total of 17,418 roles and determine their composition by analysing ABS Census data of freight rail industries. An extract of the top 10 roles within this industry group is shown in the table below:

Rail transport freight – extract of top 10 roles within industry group

#	WIR role	Proportion of industry group
1	Train driver	32.9%
2	Logistics	9.2%
3	Plant operator	6.1%
4	Train controller	4.8%
5	Fitter	4.7%
6	trades assistant	4.4%
7	Administration	4.1%
8	Storeperson	3.3%
9	N/A	3.2%
10	Accounting	3.0%

Source: Hadron Group analysis of ABS Census data

Within **Rail Transport – Passenger**, we estimate a total of 37,803 roles and determine their composition by analysing the REMSMART data for rail passenger companies only. An extract of the top 10 roles within this industry group is shown in the table below:

Rail transport passenger – extract of top 10 roles within industry group

#	WIR role	Proportion of industry group
1	Train driver	18.0%
2	Customer service	12.8%
3	Plant maintainer	6.0%
4	Security officer	5.7%
5	Project manager	5.3%
6	N/A	4.3%
7	Signalling technician	3.8%
8	Human resources	3.6%
9	Train controller	3.4%
10	Accounting	3.2%

Source: Hadron Group analysis of REMSMART data

Rollingstock manufacturing & repairs

To determine the composition of the estimated 4,866 rollingstock manufacturing and repair roles composition, we analysed REMSMART data of manufacturers and suppliers, filtering only to those roles under the 'Maintenance' job family title. This resulted in the following role splits:

Rolling stock manufacturing & repairs – extract of top 10 roles within industry group

#	WIR role	Proportion of industry group
1	Plant maintainer	42.8%
2	Fitter	22.9%
3	Electrical technician	14.9%
4	Maintenance engineer	13.5%
5	Boilermaker	3.2%
6	N/A	2.8%

Source: Hadron Group analysis of REMSMART data

Heavy and civil construction

To determine the composition of the estimated 1,457 heavy and civil construction roles, we analysed REMSMART data of contractors but excluded roles that were project-based, to filter for maintenance activities.

An extract of the top 10 roles within this industry group is shown in the table below:

Construction – extract of top 10 roles within industry group

#	WIR role	Proportion of industry group
1	Civil engineer	26.2%
2	Environment adviser	9.3%
3	Project engineer	9.3%
4	Electrical engineer	5.3%
5	Health and safety adviser	4.9%
6	Design engineer	4.6%
7	Administration	4.0%
8	Mechanical engineer	3.9%
9	Accounting	2.9%
10	Human resources	2.9%

Source: Hadron Group analysis of REMSMART data

Construction services

To determine the composition of the estimated 4,726 construction services roles, we analysed RIW data of the following company types:

- Scaffolding
- Steel fixing
- Track maintenance
- Cranes/rigging
- Earthmoving contractor
- Electrical services

An extract of the top 10 roles within this industry group is shown in the table below:

Construction services – extract of top 10 roles within industry group

#	WIR role	Proportion of industry group
1	Trades assistant	26.3%
2	Plant operator	22.9%
3	Electrical technician	16.3%
4	Protection Officer	11.5%
5	Project designer	10.1%
6	Design engineer	2.7%
7	Civil engineer	1.8%
8	Handsignaller	1.2%
9	Storeperson	1.2%
10	Health and safety adviser	1.2%

Source: Hadron Group analysis of RIW data (excluding project-based roles)

Transport support services

To determine the composition of the estimated 4,110 transport support service roles, we analysed ABS Census data of transport support services, applying a 57% weighting for freight forwarding services.

An extract of the top 10 roles within this industry group is shown in the table below:

Transport support services – extract of top 10 roles within industry group

#	WIR role	Proportion of industry group
1	Plant operator	19.0%
2	Storeperson	17.5%
3	Logistics	14.8%
4	Administration	8.3%
5	N/A	7.8%
6	Customer service	3.7%
7	Accounting	3.1%
8	Sales	3.1%
9	Trades assistant	2.8%
10	Project planner	1.6%

Source: Source: Hadron Group analysis of ABS Census data

Road transport

To determine the composition of the estimated 2,422 road transport roles, we analysed ABS Census data of road transport with an 86% weighting for road freight transport.

An extract of the top 10 roles within this industry group is shown in the table below:

Road transport – extract of top 10 roles within industry group

#	WIR role	Proportion of industry group
1	Plant operator	61.3%
2	Logistics	9.9%
3	Administration	5.1%
4	Storeperson	3.8%
5	N/A	3.7%
6	Machine maintainer	2.4%
7	Trades assistant	2.0%
8	Tram driver	1.8%
9	Fitter	1.2%
10	Sales	0.9%

Source: Source: Hadron Group analysis of ABS Census data

Employment, travel agency and other administrative services

For the estimated 3,338 roles, we considered two different segments:

1. Labour hire companies for the following 1-digit ANZSCO codes that would be generally well-captured within the RIW data:

- Labourers
- Machinery Operators and Drivers
- Technicians and Trades Workers

2. Employment, Travel Agency and Other Administrative Services employment for the remaining 1-Digit ANZSCO codes through the ABS Census data.

Within the first segment, which contains the more relevant roles, we analyse the RIW data restricted to 'Labour hire' and 'Labour / plant hire' company types and non-project work. The top 10 role proportions within this segment are shown in the table below:

Labour supply services – RIW data segment – extract of top 10 roles

#	WIR role	Proportion within segment
1	Plant operator	34.6%
2	Trades assistant	23.7%
3	Electrical technician	23.4%
4	Plumber	8.2%
5	Lookout	2.5%
6	Protection Officer	2.0%
7	Storeperson	2.0%
8	Carpenter	0.9%
9	Fitter	0.8%
10	Sheet metal worker	0.6%

Source: Hadron Group analysis of RIW data

For the second segment, the ABS Census occupation composition for Employment, Travel Agency and Other Administrative Services and the remaining 1-digit codes were used. The top 10 role proportions within this segment are shown in the table below:

Employment, travel agency and other administrative services – ABS Census data segment – extract of top 10 roles

#	WIR role	Proportion within segment
1	N/A	22.2%
2	Human resources	18.5%
3	Customer service	16.7%
4	Administration	14.2%
5	Sales	5.8%
6	Accounting	4.6%
7	Communications	2.4%
8	Health and safety adviser	2.2%
9	Business development	1.8%
10	Project planner	1.2%

Source: Hadron Group analysis of ABS Census data

Other industries

A total of 15,124 roles were held in other industries. For these industries, the corresponding ANZSIC industry-level occupation splits were deemed sufficiently representative, as there was no reason to believe that the total occupations would not reflect those relevant to rail operations and maintenance or skew the resulting top 10 occupation list.

The three largest employing industries were Structural Metal Product Manufacturing, Non-Residential Property Operators and Real Estate, and Wholesale Trade, which together accounted for 30% of total roles. This was followed by Professional, Scientific and Technical Services; Retail Trade; Rental and Hiring Services (except Real Estate); Finance; and Building Cleaning, Pest Control and Other Support Services, which together accounted for an additional 30%.

As a result, the analysis identified a diverse range of roles, many of which are not covered by the WIR role titles. However, given the large number of individual roles, they are unlikely to influence the overall findings of the analysis.

Other industries – ABS census data – extract of top 10 roles

#	WIR role	Proportion of industry group
1	N/A	21.3%
2	Administration	11.9%
3	Sales	10.0%
4	Accounting	6.9%
5	Trades assistant	4.4%
6	Project manager	3.2%
7	Plant operator	3.0%
8	Storeperson	3.0%
9	Cleaner	3.0%
10	Logistics	1.9%

Source: Hadron Group analysis of ABS Census data

Limitations of the analysis

The analysis has been undertaken using public and private datasets accessed by Hadron Group, and in turn, relies on the accuracy and reliability of these datasets. Our methodology involved reviewing these datasets to consider their potential strengths and limitations so that the most appropriate sources could be used for each step in the analysis, and that these limitations could be minimised.

These limitations include the datasets covering somewhat different time periods. While we mitigate this by using a fixed total workforce size and the industry group composition approach, there may still be some differences due to these time differences. However, we do not expect there to be significant impacts on the top 10 role estimates due to this limitation.

The analysis also relies heavily on the mapping of these different data sources to the WIR roles. The 'n/a' category has been used where occupations in other datasets do not align with WIR roles, or where we cannot be confident in their mapping. Some WIR roles could also not be mapped to any of the datasets, which leads to estimates of zero workers in the final outputs. This is a limitation of the underlying datasets.

National Transport Commission

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