VSC Victorian Skills Commissioner

Skills Demand Snapshot

Victoria's Rail Manufacturing Sector

February 2020

This document provides a snapshot of skills demand for the rail manufacturing sector in Victoria. For the purposes of this snapshot, the rail manufacturing sector is defined as businesses mainly engaged in manufacture or maintenance of rolling stock, such as trains and trams.

VICTORIA
State Government

Prepared by the Office of the Victorian Skills Commissioner for the Minister for Training and Skills, the Hon, Gayle Tierney MP.

Contents

Foreword

This document provides a snapshot of skills demand for the rail manufacturing sector in Victoria. For the purposes of this snapshot, the rail manufacturing sector is defined as businesses mainly engaged in manufacture or maintenance of rolling stock, such as trains and trams. This profile provides a genuine understanding of the current and future (1-3 year horizon) skills and training requirements of the sector.

The success of this work relied on insights from experienced employers within this sector to provide a sector-wide view of skill requirements and workforce challenges. A total of nine people across six employers, spanning a range of services and market segments, were engaged across two separate meetings to develop this skills profile. At both meetings, insights from public data on the rail manufacturing sector were presented and validated with participants.

The meetings provided the opportunity for rail manufacturing employers to input their view of priorities and requirements from the VET system in addressing sector skills issues. This profile can be used by TAFE and training providers to better understand the rail manufacturing sector's priorities in terms of occupation and skill demand to ensure the supply side responds appropriately to VET opportunities.

The Victorian VET system aims to deliver 'real training for real jobs' by providing up to date training for new challenges in the sector. This report is part of a series of sector profiles which will be developed by the Office of the Victorian Skills Commissioner (OVSC). The set of skills demand snapshots will complement the regional skills demand profiles to provide a richer picture of the skills needs of Victorian employers. Insights from consultations will inform Government in terms of where they should be allocating taxpayers money to sectors which value accredited training. A collaborative effort between government, employers and training providers is required to address these challenges.

This profile represents a summary of the views of consulted employers and sector representatives on the current and future needs of the rail manufacturing sector. As such, the OVSC has prepared the report with care and diligence, based on information provided through consultations. Information in the profile has not subsequently been independently verified or audited. Publications on skills in the rail sector, such as the Australasian Railway Association Skills Capability Study, have also been used as inputs in preparation of this profile.

This profile can be used by TAFE and training providers to better understand the rail manufacturing sector's priorities in terms of occupation and skill demand to ensure the supply side responds appropriately to VET opportunities.

Acknowledgements

The OVSC would like to acknowledge the time, contribution and insights of participating employers in supporting this process. The findings in this report would not be possible without their shared knowledge, openness, generosity, expertise and commitment.

Table 1: Participating Employers

Member	Organisation
Lorena Abellas	Alstom
Franck Raveau	Alstom
Jason Hajinakitas	Bombardier
Peter Moschou	Downer EDI
Josh Milne	Downer EDI
Raphael Ferreira	Hitachi Rail
John Mann	Hitachi Rail
Bill Robinson	Siemens
Darren Dredge	UGL Unipart

Summary

Victoria's rail manufacturing sector

Approximately **2000-2500 workers** directly employed in the sector

Stable workforce over the past 10 years

$3.6 billion planned investment in new rolling stock between 2015 and 2025

At least 50 per cent local content required in new builds

Workforce in place to meet existing pipeline

Increased use of **data and technology**

Career pathways and training

Salary: $100k – $200k

Management Track

Project, operations or production manager

Experience: 8+ years

Salary: $70k – $120k

Professional Track

Supply chain, procurement, safety or quality professional

Experience: 6+ years

Salary: $70k – $120k

Expert Track

Testing and commissioning technician (manufacturing) or mobile technician (maintenance)

Experience: 6+ years

Validated common career and training pathways

Salary: $60k – $90k

Team Leader

Experience: 4 + years

Key skills: People management, time management, organisation skills, mechanical fitting technical knowledge

Requirements: tickets (e.g. access to rail corridor, forklift, cranes, dogging, rigging, shunting)

ON THE JOB TRAINING

Certificate IV in Engineering is an option for supplementary post trade education

Salary: $35k – $60k

Mechanical Fitter

Experience: 0-4 + years

Key skills: tool usage, understanding of schematics, pneumatics and math

Requirements: tickets (e.g. access to rail corridor, forklift, cranes, dogging, rigging, shunting)

Recommended Training Pathway

Enrol in: Certificate III in Engineering - Mechanical Trade

Salary: $60k – $90k

Team Leader

Experience: 4 + years

Key skills: People management, time management, organisation skills, electrical fitting technical knowledge

Requirements: tickets (e.g. access to rail corridor, forklift, cranes, dogging, rigging, shunting)

ON THE JOB TRAINING

Certificate IV in Engineering is an option for supplementary post trade education

Salary: $35k – $60k

Electrical Fitter

Experience: 0-4 + years

Key skills: running, bending and connecting cable, understanding of schematics, pneumatics and stored energy

Requirements: tickets (e.g. access to rail corridor, forklift, cranes, dogging, rigging, shunting)

Recommended Training Pathway

Enrol in: Certificate III in Electrical Fitting **OR** Certificate III in Engineering - Electrical / Electronic Trade

Other VET courses

Certificate III in Electrotechnology Electrician

licensed electrician pathway. Employers find it difficult to provide the breadth of experience required for this apprenticeship in rail manufacturing.

Certificate II in Engineering - Production Technology

traineeship that offers core education for mechanical fitters. Used by employers that can't offer range of experience for recommended training pathway.

Certificate III in Engineering - Fabrication Trade

common pathway for fabricators in rail manufacturing. Fabricator pathways are not a focus of this report as the number of fabricators in the sector is relatively low.

Note: the chart on the previous page shows core entry-level technical pathways in the rail manufacturing sector. Additional opportunities exist for people with expertise in welding, supply chain, procurement, quality, coach building, data, technology, engineering and other specialist roles.

Recommendations for VET system

- Explore an industry training consortium among large rail manufacturing and maintenance employers
- Explore bridging options for completion of the Certificate III in Electrotechnology Electrician in rail manufacturing. This should involve collaboration with large rail manufacturing and maintenance employers and could be considered as part of the industry training consortium.
- Assess demand and feasibility of a post-trade qualification for testing and commissioning technicians
- Engage with employers to address emerging requirements for technology and data in sector course offerings

1. Sector overview

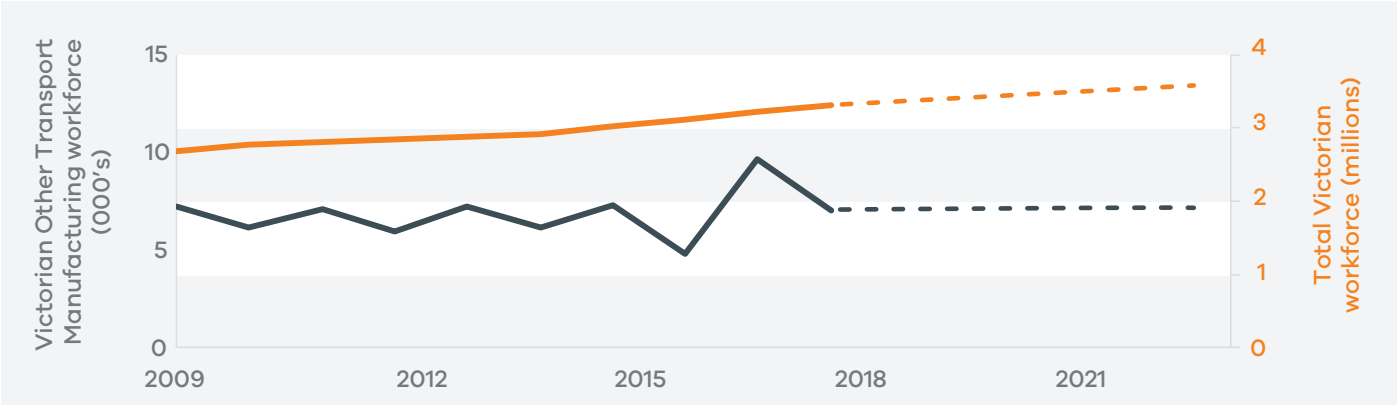
Rail manufacturing workforce numbers have been stable since 2009

The Victorian rail manufacturing sector is comprised of businesses engaged in the manufacture or maintenance of rolling stock, such as trains and trams. The rail manufacturing process involves design, sourcing materials, assembly, testing and delivery of rolling stock, while maintenance is the process of keeping rolling stock in good working order.

Over 1,000 metropolitan trains, trams and regional carriages are currently deployed by Metro, V/Line and Yarra Trams. This includes approximately 500 trams across nine classes, 226 six carriage metropolitan trains across three classes and over 370 V/Line passenger trains across five classes. The current value of rolling stock is estimated at around $4 billion. Furthermore, the Victorian Government's Rolling Stock Strategy indicates investment in rolling stock manufacturing and maintenance between 2015 and 2025 of over $3.6 billion[1,2]. Employers indicated that for every dollar spent on purchase of rolling stock, an additional two dollars is spent on maintenance of the vehicle over the course of its life. This investment supports employment of approximately 2,000 to 2,500 people in the sector.

Analysis of Victoria's other transport equipment manufacturing (which covers rail manufacturing amongst other sectors) indicates that while the size of this workforce size has fluctuated, the overall trend across the last 10 years has remained relatively stable (see Figure 1). It is not clear to what extent this is attributable to changes in the pipeline of work in rail manufacturing or in other sectors covered. However, consulted employers indicated that they had now finished recruitment for the current pipeline of work, with future recruitment focused on replacement.

Figure 1: Victorian other transport equipment manufacturing workforce growth since 2009



Source: ABS Labour Force Survey, 2019.

Note: the figures above are for the other transport equipment manufacturing industry, which includes rail manufacturing and related sectors like boatbuilding and maintenance and aircraft manufacturing and maintenance.

Most of the rail manufacturing workforce is employed by five or six large businesses

There are approximately 40 rolling stock manufacturing businesses in Victoria. This includes a small number of large organisations who lead manufacturing and maintenance projects, supported by small businesses such as subcontractors, professional service providers and component manufacturers[1].

Most of the workforce is employed by five or six large organisations, which have the capacity to tender for major government manufacturing and maintenance contracts. Three or four of these businesses hold current contracts in Victoria at any given time, while the others have previously held contracts and may look to re-enter the sector. The basic organisational structure of these larger rail manufacturing and maintenance businesses is outlined in Figure 2.

The rest of the market is comprised of smaller businesses, most of which have a turnover under $2 million and employ less than 20 people[3]. These businesses are hired by contract holders to provide services as required to fulfil discrete aspects of major projects. Smaller subcontracting and professional services firms provide labour or expertise in one or more of the components of the structure in Figure 2. Component manufacturers produce parts for rolling stock, such as bogies, air conditioning, and glass products, that are sold to the larger players for assembly.

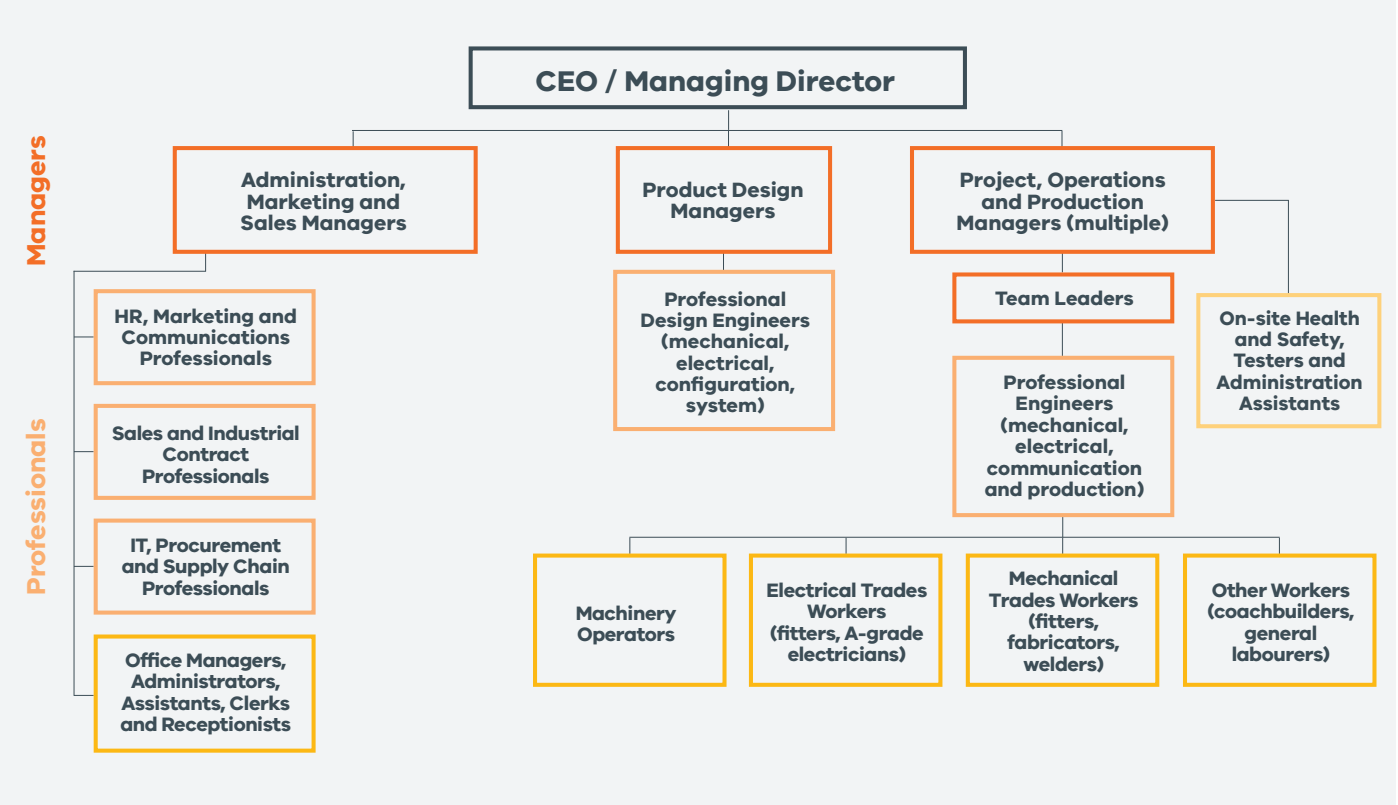
[1] Victorian Government, Victorian Rolling Stock Strategy, Trains, Trams, Jobs 2015-2025, 2015

[2] Department of Economic Development, Jobs, Transport and Resources, Advancing Victorian Manufacturing: A Blueprint for the Future, 2017

[3] ABS Counts of Australian Businesses, 2018

Projects in Victoria are generally commissioned by the state government and do not cross state boundaries. However, component parts are often sourced internationally and the bulk of research and development (R&D) is also undertaken offshore, with local R&D generally limited to bespoke customisation or track adjustment. Contract holders indicted that local content in recent rolling stock builds is typically around 60 per cent. A minimum of 50 per cent is required by state government policy for new rolling stock orders[1]. While a capable technical workforce is important in rail manufacturing, the labour-intensive assembly of components comprises only around 30 per cent of contract costs, with the remaining 70 per cent pertaining to sourcing of components.

Figure 2: Indicative rail manufacturing business organisational structure



Workforce composition is driven by individual project requirements

Workforce composition and skills required can vary between maintenance and the different stages of a manufacturing project. On average, approximately 70 per cent of the workforce are in blue collar roles, with up to 80 per cent of these mechanical and electrical fitters. Large rail manufacturing and maintenance businesses typically source their workforce from Victoria and hire on a full-time basis with work focussed on assembly of parts sourced from local or international suppliers.

For manufacturing projects, workforce composition is determined by the stage of the project as well as the engine-type of the rolling stock. In the design stage of a project the workforce is typically half blue-collar and half white-collar workers. As the project moves into manufacturing, the proportion of blue-collar workers increases to 70 per cent as rolling stock is worked through a production line and technical roles replace design roles. Each station on the production line is supervised by a team leader with at least four years' experience in the area. The technical skills required in manufacturing depend on the type of rolling stock, with electrical locomotives requiring electrical fitters and diesel locomotives using diesel mechanics. Testing and commissioning technicians are involved for part of the project and are typically engaged through contracts.

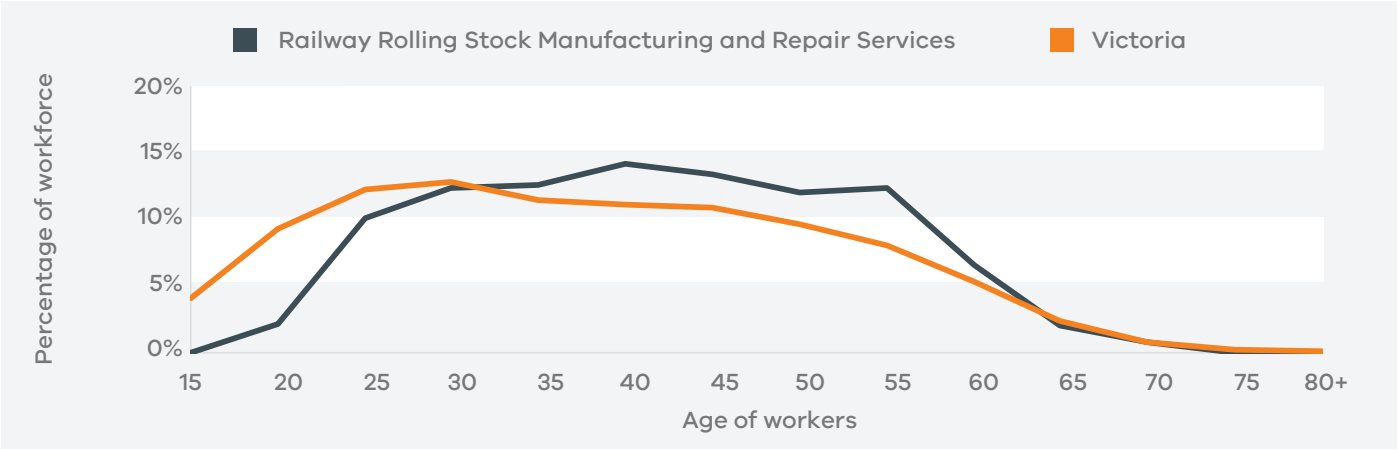
Maintenance work is usually carried out in shifts by individual teams of technical workers led by an experienced supervisor. The maintenance team structure usually reflects the sector workforce allocation of blue-collar and white-collar workers. Team leaders in both maintenance and manufacturing will generally report into a production manager that usually has a trade background. More experienced mechanical and electrical fitters can become mobile technicians, where they complete maintenance work across the rail network. These workers often provide first response in the case of breakdowns.

[1] Victorian Government, Victorian Rolling Stock Strategy, Trains, Trams, Jobs 2015-2025, 2015

The workforce is aging and geographically concentrated around manufacturing and maintenance facilities

The core of the Victorian rail manufacturing workforce are older than the Victorian average and are centred around rail manufacturing and maintenance facilities. Figure 3 shows the aging profile of the rail manufacturing workforce relative to the broader Victorian economy, with a median age bracket of 40 to 45 . As the workforce has generally specialised in a class of locomotive, the aging maintenance workforce for older fleets can be of concern. As newer fleets typically have a younger workforce profile, periodic replenishment combined with cross skilling of workers across classes by employers can mitigate this issue to some extent. However, several specific roles such as testing and commissioning technicians remain difficult to source new workers for. Although up to 38 per cent of store persons in rail manufacturing businesses are above 55 years, this reflects the tendency of fitters to move into this role later in their career as it is less physically demanding.

Figure 3: Victorian rail manufacturing age distribution



Source: ABS Census, 2016

Employers generally source their workforce from local areas, with limited movement of labour between states. As seen in Figure 4, manufacturing facilities are located at Newport, Ballarat, and Dandenong. Maintenance facilities are spread across two regional Victorian facilities and 10 Melbourne metropolitan facilities, including the recently completed Pakenham East depot. In addition, a light service facility is under construction in Calder Park. The location of the manufacturing facility being utilised can change with government contracts.

Figure 4: Geographical workforce distribution

Source: ABS Census, 2016

2. Sector outlook and workforce implications

Recommendations for the VET system:

1. Explore an industry training consortium among large rail manufacturing and maintenance employers

There is sufficient supply of entry level rail manufacturing workers

Victoria has an established pool of rail manufacturing workers who need a continued pipeline of work to maintain employment. Rail manufacturing employers generally find the workforce they need is available and qualified, with workers following contracts across employers. Technical workers mostly enter the sector via apprenticeships, although enrolment numbers are kept low due to strong retention of skilled workers and inconsistent pipelines of work. When required, other industries, states and countries serve as supplementary sources of labour for workforce gaps.

A large proportion of existing rail manufacturing and maintenance workers are qualified, experienced and don't need significant training. Also, at the sector level, rail manufacturing typically has a low turnover rate of skilled workers, particularly in niche roles like testing and commissioning technicians. However, employers reported higher turnover amongst electrical fitter apprentices with aspirations of becoming A-grade electricians and software and telecommunications engineers. Rail manufacturing alone does not provide the breadth of experience needed for workers to obtain an A-grade electrician license. This can lead to workers obtaining their A-grade license elsewhere should the opportunity arise. By rotating apprentices through other business units in the business it is possible to get a small number their A-grade electrician license through the Certificate III in Electrotechnology Electrician, though the repetitive nature of electrical work on rolling stock projects means this isn't widely applicable. Retention can also be poor for younger workers regardless of role, with part of this attributed to the geographical spread of facilities and generational differences, as more frequent career and employer changes have become the norm.

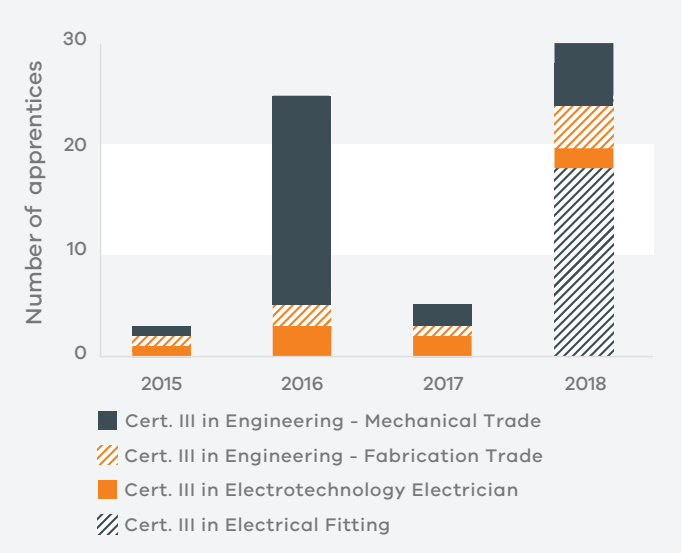
There is good retention at the sector level. The core of the Victorian rail manufacturing workforce are long-term workers that have been in the sector since before its privatisation in 1999. The nature of the industry can contribute to high workforce mobility between large businesses, as demand for workers depend on project requirements. Employers noted that as a result, workers place increasing value on certainty and job security, with incentives for short-term positions not as appealing as they once were. In response to this demand, large rail manufacturing businesses prefer to employ staff in full-time positions to improve retention.

Apprenticeships are the most common training pathway into the sector for entry level workers, however enrolment numbers are low and vary significantly, with an average of 10-20 per year (see Figure 5).

The inconsistent pattern of annual enrolments in Figure 5 is consistent with broader hiring patterns of employers in the sector. Contracts drive the pipeline of work, with most recruitment occurring at the start of a contract as employers build their workforce. Employers size their workforce to have a consistent pipeline of work over the contract life with additional recruitment after the first year focussed on replacement. This creates limited opportunities for new apprentices. Further, with the average life of a rail manufacturing project around five years, employers that don't have a build period that can span the four-year qualification can be reluctant to take on apprentices. Employers generally employ apprentices directly and receive good responses to job advertisements when hiring.

The contract nature of employment can have a secondary impact. Rail manufacturing projects operate on tight contract timelines, which can lead to a tendency to target experienced workers ahead of apprentices. Further, high mobility of workers among employers can disincentivise investment in staff development as the benefits may eventually be shared among competitors. It is not unusual for a rail manufacturing professional to have worked at three or four direct competitors at different stages of their career.

Figure 5: Rail manufacturing apprenticeship enrolments 2015 to 2018



Source: NCVER, Government funded students and courses, 2018

Note: large business that undertake rail manufacturing may also undertake other business activities. This can result in missing apprenticeship enrolment data as they may not be classified as rail manufacturers.

While apprenticeships are the most common pathway into rail manufacturing, new entrants can also be hired from industries with complementary skill requirements, such as manufacturing and aviation. Employers can also address gaps with interstate or overseas workers, although this is less likely for key entry level roles.

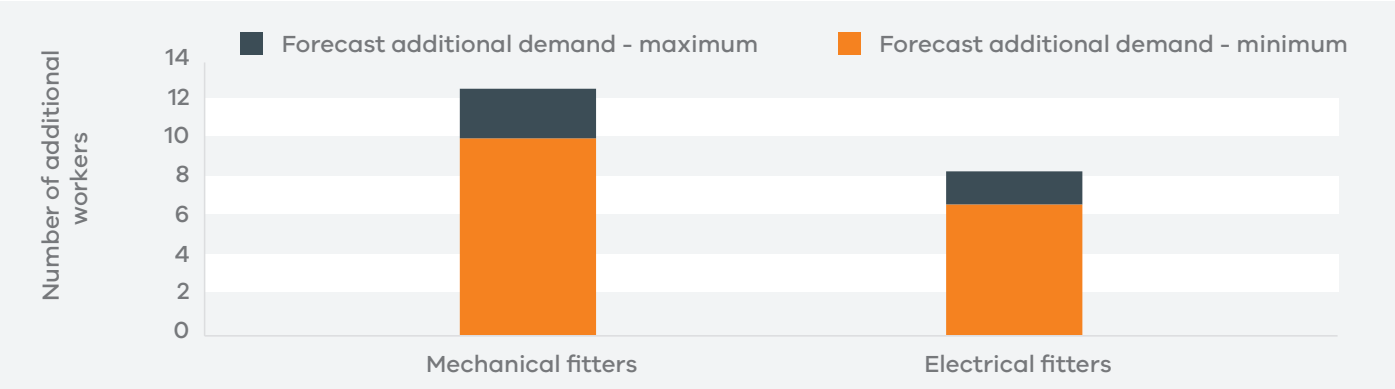
Testing and commissioning technicians are highly skilled workers and are difficult to source. These workers enter the role through prior trades experience rather than education pathways.

The labour pool of suitable testing and commissioning technicians is limited by the experience required for the role and differences in regulations between states. Few employers beyond the network operators have the volume of work to maintain testing and commissioning technicians on staff. For this reason they are generally engaged through contracts.

Demand for the rail manufacturing workforce in Victoria is projected to remain stable to 2022

Technology advancements are leading to increased efficiency in rail manufacturing, however, the impact of productivity gains on workforce size are expected to be offset by increased investment, a backlog of maintenance work and growth in the total number of in-service rolling stock. Rail manufacturing workforce requirements are expected to remain stable over the next three years. For apprentices, however, consulted employers acknowledged the need for increased uptake in the sector, particularly in response to the aging workforce. In addition to the replacement of the current workforce due to turnover, it's anticipated that there will be demand for around 16 to 20 mechanical and electrical fitters by 2022 (see Figure 6).

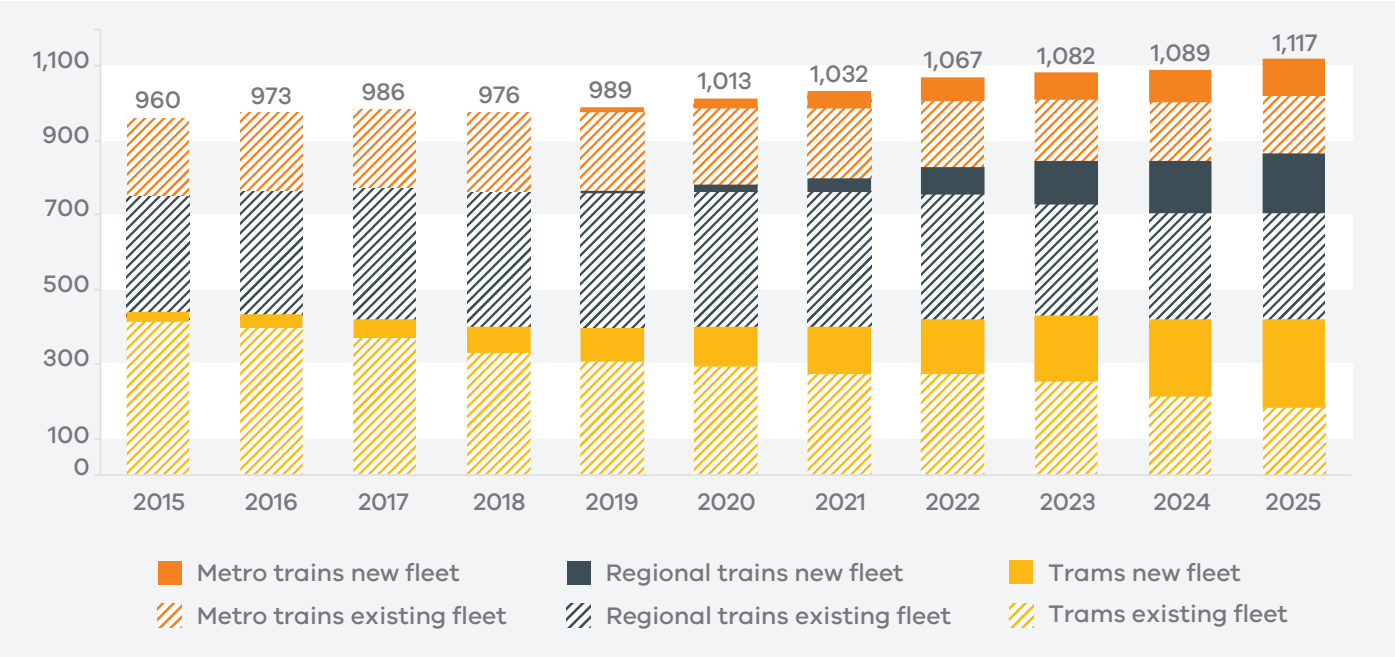
Figure 6: Estimated growth in demand for key roles over the next three years



Note: forecasts do not include replacement of the current workforce due to turnover. Minimum forecasts are based on a workforce size of 2,000. Maximum forecasts are based on a workforce size of 2,500.

The pipeline of work leading to the stable outlook includes 240 trams, 160 regional trains and 100 high capacity metro trains expected to be manufactured in Victoria in the 10 years to 2025 (see Figure 7), with the total number of in-service rolling stock expected to grow by 13 per cent between 2019 and 2025. This pipeline will provide job certainty to those employed to 2025. However, any increase in workforce has already occurred. Upcoming manufacturing projects in the planning stage include next generation trams and regional trains. As the fastest growing state in Australia, Victoria's population is projected to grow by 15-20 per cent to 2027, driving increased public transport utilisation and manufacturing and maintenance requirements [5].

Figure 7: Victoria's rolling stock manufacturing pipeline



Source: Victorian Government, Trains, Trams, Jobs 2015-2025 Victorian rolling stock strategy, 2015

[5] Population Projections, ABS, 2019

Employers seek specific skills for manufacturing and maintenance

Employers rely heavily on the skills of mechanical and electrical fitters to manufacture and maintain rolling stock. Technical workers in the sector, including mechanical and electrical fitters, require tickets to safely undertake certain activities. Beyond these occupations, there are some skills that are generally in demand across the sector.

Table 2 shows the key skills identified by consulted employers for mechanical and electrical fitters. During manufacturing, mechanical fitters will use tools to fit panels and assemble rolling stock components such as windows and doors. Electrical fitters undertake repetitive work during the rail manufacturing process, as they run, bend and connect cable that typically does not contain any electrical current. Skill requirements are typically more complex for rolling stock maintenance, as diagnostic, fault finding and inspection skills are highly valued for both mechanical and electrical fitters.

Table 2: Key skills identified by employers

	Mechanical fitters	Electrical fitters
Manufacturing	• Tool use • Panel fitting • Basic math • Pneumatics • Basic schematics	• Running and connecting cable • Wire bending • Basic schematics
Maintenance	• Fault finding and inspection • Diagnostic ability • Tool use • Basic math • Pneumatics • Basic schematics	• Fault finding and inspection • Diagnostic ability • Electrical and pneumatic equipment • Identifying and removing stored energy • Basic schematics • Extracting electronic diagnostic information • Data interpretation • Condition monitoring

In addition to mechanical and electrical fitters, other common roles in rail manufacturing include coach builders and testing and commissioning technicians. Coach builders complete the finishing work in rail manufacturing, including spray painting, laminating and edge banding. Coach builders also need to be able to read and interpret workshop drawings, and often work with sheet metal and use tools like panel saws. Testing and commissioning technicians need at least six years industry experience, and should have advanced fault finding, inspecting and diagnostic skills. These workers need an understanding of quality principles and rolling stock electrical and mechanical systems.

Tickets are required to certify that rail manufacturing and maintenance workers can safely perform certain activities. A ticket is required for workers to access the rail corridor, with additional tickets potentially required for activities involving the operation of forklifts, cranes, elevated work platforms, confined spaces, dogging, rigging or shunting. Tickets are linked to regulatory requirements and have equal value for workers in mechanical and electrical fitting roles.

Technology and data are changing skill requirements in the sector

Increased use of technology and the extraction and interpretation of data are key trends, with implications on skill requirements in the rail manufacturing sector. Technology is also driving improvements in the maintenance of rolling stock, as condition monitoring and predictive and preventative maintenance become more common. This adoption of technology is altering the skill profile in existing roles, including mechanical and electrical fitters. Technology is also driving creation of new jobs in fields like data analytics. These roles are highly skilled and focused on setting up the systems to collect and interpret data for use by manufacturing and maintenance workers. Employers expect new technology to facilitate quicker and more informed decisions, but don't predict a significant impact to workforce numbers.

Sector specific technology is facilitating condition monitoring, predictive maintenance and preventative maintenance to improve reliability and reduce reactivity to failures. Through condition monitoring and predictive maintenance, including vibration analysis, businesses are scheduling maintenance based on asset condition. By contrast, preventative maintenance is used by employers to schedule maintenance based on asset usage, such as the number of times a door has opened. As the fault-finding process becomes more targeted, the rolling stock maintenance workforce will increasingly use computers to extract data from rolling stock and navigate screens of diagnostic information. Sector-specific innovations, like bi-mode locomotives, could also have workforce implications should they have uptake in Victoria. Bi-mode locomotives are being increasingly used internationally, and as they are powered by either electricity or an onboard diesel engine they can operate on both electrified or non-electrified track.

Technology is driving creation of new jobs in fields like data analytics. These roles are highly skilled and focused on setting up the systems to collect and interpret data for use by manufacturing and maintenance workers.

3. The role of training

Recommendations for the VET system:

4. Explore bridging options for completion of the Certificate III in Electrotechnology Electrician in rail manufacturing. This should involve collaboration with large rail manufacturing and maintenance employers and could be considered as part of the industry training consortium (recommendation 1).
5. Assess demand and feasibility of a post-trade qualification for testing and commissioning technicians
6. Engage with employers to address emerging requirements for technology and data in sector course offerings

Technical rail manufacturing workers typically enter the sector through apprenticeships

The nature of rolling stock manufacturing does not lend itself to continued engagement with the accredited training sector. Demand for training is greatest with the commencement of a new contract when businesses seek to build their workforce, with apprentices generally hired at this point. Once they have acquired this workforce the nature of contracts means there is little demand for new labour. Further, this workforce then provides the core of the maintenance teams for new stock. It is not uncommon for workers to spend a career building and then maintaining a specific class of asset. Some workforce renewal is required. However, the preference is to source qualified workers from other industries and provide rail specific training in house.

Consulted employers acknowledged the need for businesses in the sector to take on more apprentices, particularly in response to the aging workforce. Interaction with the accredited training sector is through the blue-collar workforce that generally start in apprenticeships. However, labourers are primarily trained on the job and won't hold a formal trade qualification, while coach builders come from a variety of backgrounds, including other industries and trades.

For entry level technical positions, such as mechanical fitters, electrical fitters and fabricators, the VET system will continue to play a key role for entry into the sector in line with new contracts. While completing their qualifications, apprentices and trainees will gain exposure to meaningful work, in part because tight timelines require everyone to contribute. This work includes manual work with tools and contributing across configuration and procurement. Larger employers have their own training resources and activities, including induction courses that introduce apprentices and new employees to the unique aspects of the project, organisation and sector.

As their careers progress, apprentices may have the option to progress into management, professional or technical roles. Outside the high-volume roles of mechanical and electrical fitters, there are limited entry level options for more niche roles like fabricators and coach builders. Sector training to support these roles is minimal as workers are often drawn from other industries such as caravan building having already gained experience in fabrication, carpentry, painting or sheet metal trades. Managers in rail manufacturing and maintenance come from a trade background, and there are several roles that apprentices can develop into as they gain sector experience. In rail manufacturing mechanical fitters and electrical fitters start working at stations on the production line, with high performers potentially progressing to team leader in four years.

The post-trade Certificate IV in Engineering can further support apprentices in their pathway to supervisory roles. From team manager of a station on the production line, there are management, professional and technical tracks available to apprentices. Management pathways include progression to project manager, operations manager or production manager, with these roles typically requiring upward of eight years' experience. The professional track includes several white-collar pathways in the sector, such as a move into supply chain, quality, safety or procurement functions. With the right skill set, entry into a professional role could happen shortly after completion of a qualification, though progression into management could take several more years. Through the technical track, high performing apprentices could progress into a testing and commissioning role once they have accumulated extensive experience and the right skillset for the role. Progression is based on experience rather than formal qualifications.

The management, professional and technical tracks are also applicable for the maintenance workforce. Once enough experience is gained at a maintenance facility, more experienced and capable maintainers may eventually go into the network as mobile technicians. In addition, there is the option for maintenance workers to develop into reliability engineers, as their knowledge of faults and issues is highly valued.

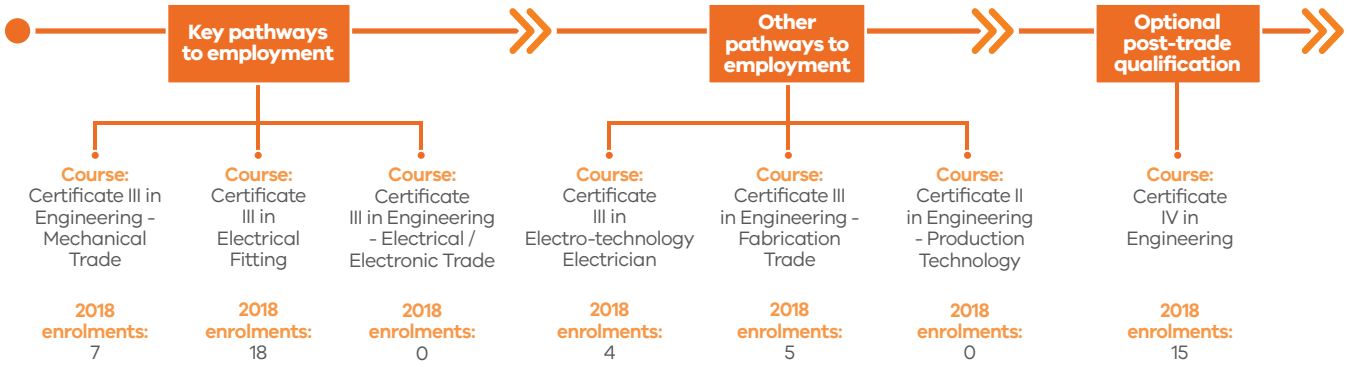
There are other pathways to employment through the VET system, although they play more niche roles in the rail manufacturing workforce. The pathway to becoming a fabricator in the rail manufacturing sector is through the Certificate III in Engineering - Fabrication Trade, and it is actively used in Victoria. There is no formal accredited training for coach builders, although potential pathways into the occupation include via Certificate III in Carpentry and Joinery, Certificate III in Engineering - Fabrication Trade or relevant experience.

Demand for training is greatest with the commencement of a new contract when businesses seek to build their workforce, with apprentices generally hired at this point.

Three qualifications are key pathways to employment for mechanical and electrical fitters in rail manufacturing

Employers indicated that there are three key pathways into the sector for mechanical and electrical fitters, although an additional alternative option exists for both occupations. There is an additional qualification offered for fabricators and a post-trade qualification that can accelerate a move into a supervisory role, as shown in Figure 8.

Figure 8: Rail manufacturing VET courses on the funded course list



Note: courses above are also commonly used for other sectors, such as construction, mining and manufacturing. Enrolment numbers shown are for rail manufacturing sector only.

The Certificate III in Electrical Fitting and Certificate III in Engineering – Electrical / Electronic Trade are used for electrical fitters, however, employers reported issues retaining apprentices through these pathways. Most rail manufacturing employers can provide mechanical fitters the required experience to progress apprentices through the Certificate III in Engineering - Mechanical Trade. The Certificate II in Engineering - Production Technology is also used for mechanical fitters by at least one employer, as they reported difficulty offering the breadth of experience to fulfil requirements beyond the Certificate II traineeship.

Collaboration between government, employers and training providers can improve training offerings in the sector

Employers reported no significant challenges in working with training providers. However, there are opportunities for training offerings to better meet the needs of the sector, including through improvement of mechanical and electrical fitter pathways and consideration of a post-trade pathway for testing and commissioning technicians.

Employers noted the need to improve the pathway option for electrical fitters given the difficulties they have finding and retaining electrical apprentices. Collaboration across the sector is needed to enable electrical fitters to achieve their A-grade in the sector. Options to achieve this include bridging or incorporating placements from other industries, such as construction. It is also suggested that all VET offerings incorporate emerging skills and technology.

As an occupation with an aging workforce that is particularly difficult to fill, employers noted that a post trade qualification could be developed for testing and commissioning technicians. Employers suggested that the course would need to cover an extensive amount of content given the complexity of the role.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