Queensland Transport and Logistics Workforce

Current and Future Trends Report

November 2018

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Purpose and approach

Report purpose

The purpose of this report is to identify the key current and emerging trends that are impacting the transport and logistics industry workforce across Queensland.

This project has been undertaken in recognition of the need to support the Queensland transport and logistics industry in the face of significant change.

The Gross Value Added (GVA) to the Queensland economy by the transport, postal and warehousing industry is $15.3 billion as of June 2017. This represents 5.3 per cent of the total value across all industries[1].

While there is strong understanding that the workforce is integral to service delivery, transformational changes are occurring across the industry in economic outlook, consumer behaviour and, most notably, in emerging technologies.

This analysis provides a point in time analysis based on publicly available information and data as at April 2018.

Report structure

In acknowledgement of key differences across sectors within the transport and logistics industry, analysis has been provided across the following five transport sectors:

- Aviation
- Logistics and Warehousing
- Maritime and Ports
- Rail
- Road Transport.

The analysis focuses on current and emerging trends, workforce analysis informed by quantitative historical data and an understanding of the Queensland context.

Approach and key sources

The information in this report is based on analysis, which combines the following key sources:

- Workforce industry data sourced from the 2011 and 2016 Australian Bureau of Statistics (ABS) Census allowing analysis of areas of growth and decline by occupation and sector; analysis of age and gender profile; analysis of workforce distribution; and analysis of employment type, all for the Queensland transport and logistics workforce.

  This data was sourced using the ABS Table Builder tool.

Definitions of the occupations included are provided in Appendix A.

- Published reports including workforce reports by government, industry associations and other key reputable sources. Analysis has been limited to published reports less than five years old, with a focus on the Queensland labour market where possible.

- Stakeholder feedback from focus groups held with key industry representatives across the transport sectors. Feedback was sought on key workforce challenges and opportunities faced by the sector both now and those expected over a five to ten year horizon.

- Transport and Logistics Workforce Advisory Committee input which will ensure the validity and reliability of the information gathered, specific to the Queensland context, including the impact of key economic, consumer, environmental, political and demographic changes expected to impact on the workforce

including, for example, capital expansions across the transport network.

Project context

This report will be used to identify the workforce opportunities and challenges that need to be addressed in the *Queensland Transport and Logistics Workforce Strategy and Action Plan 2018–2023*.

As with other key strategic documents, it is anticipated that progress against the *Queensland Transport and Logistics Workforce Strategy and Action Plan 2018–2023* will be monitored over time.

An overview of this project strategy suite is provided below.

Queensland Transport and Logistics Workforce Current and Future Trends Report November 2018

Queensland Transport and Logistics Workforce Strategy and Action Plan 2018–2023

Progress reporting on actions from *Queensland Transport and Logistics Workforce Strategy and Action Plan 2018–2023*

General trends

The transport and logistics workforce is critical to the success of Queensland's economy. It not only assists in the movement of Queenslanders to work and beyond, but also plays a critical role in the supply chain, moving goods from production to sale and supports the delivery of our exports to other states and countries.

Key trends

While this report is focused on trends and factors impacting the workforces of each specific sector, there are some common trends to all five sectors. They include:

An ageing workforce

While it is more pronounced in some sectors than in others (particularly rail and road transport), the workforce across the transport and logistics industry is ageing. In Queensland, the average age of workers in the industry in 2016 was 45.4 years, increasing from 44.8 in 2011[2].

With a large proportion of workers nearing retirement age and a lack of new entrants, the industry faces a real possibility of losing skills without replacement.

A predominantly male workforce

In addition to ageing, the transport and logistics workforce is predominantly male, with the female employee participation ranging from 40 per cent (in aviation) to 18 per cent (in rail) at an Australian level[3, 4].

At a whole of Queensland level, women represent just 15.3 per cent of the transport and logistics workforce[1]. As workforce models have become more flexible, progress has been made. However, the female population remains a significantly untapped source of labour to fill the skills shortages being faced in key occupations across the industry.

A lack of coordinated training efforts

There is growing competition within the sectors for skilled workers, with some larger operators, as well as international competitors, able to offer attractive salaries and other incentives to claim the most highly skilled. This has created a culture where operators provide limited investment for workforce training and development, particularly for new recruits, for fear of losing their investment[5].

The attractiveness of the industry

A number of sectors in the transport and logistics industry are finding it difficult to be seen as an attractive career option for the younger generation, creating an even greater reliance on an ageing workforce. Many sectors struggle to be attractive due to perceptions of: fatigue; long working hours; the industry being old-fashioned, traditional and manual; and few roles for those with skills in emerging information technology fields[5].

Increasing automation

Automation and other technological changes are emerging and are expected to significantly impact on the workforce. While automation may reduce the need for some occupations, it will also require the development of new specialist skills to operate, manage and maintain the machines.

Workforce analytics

Size of the workforce

The transport and logistics industry workforce in Queensland consists of approximately 74,000 employees across the state.

The workforce has grown by 3.7 per cent from 2011 to 2016. The largest growth sectors were the logistics sector (42.5 per cent growth) and the aviation sector (11.5 per cent growth).

The size of the workforce across other transport sectors including rail and road transport and maritime and ports all declined between 2011 and 2016.

Workforce composition

The largest sector in terms of workforce size is the road transport sector at 45 per cent of the industry. This can be seen in Figure 1 below.

The logistics sector workforce is the second largest (23 per cent), followed by aviation (13 per cent). The maritime and ports workforce is the smallest as a proportion of the industry, representing only 4 per cent.

Workforce demographics

The average age of the transport and logistics industry workforce is 45.4 years as of 2016. This has increased since 2011 when the average age was 44.8 years.

Women represent 15.3 per cent of the total transport and logistics industry workforce. This has increased from only 14.7 per cent of the workforce in 2011.
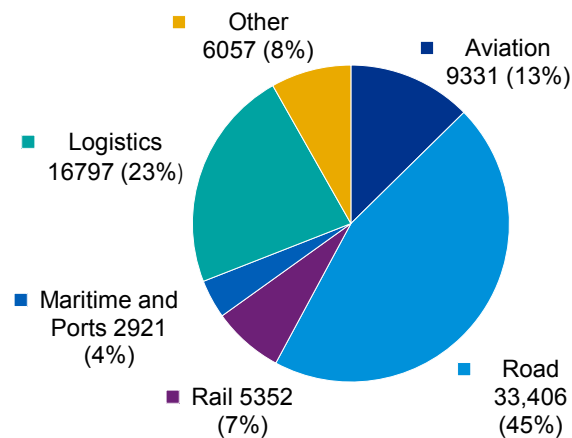
Geographical distribution of the workforce

The majority of the transport and logistics workforce (71 per cent) is located within South-East Queensland (SEQ). This is shown in Figure 2 below.

The aviation and logistics sectors have the greatest proportion of their workforce located within SEQ at 80 per cent. The rail sector and the maritime and ports sector have the greatest proportion of the workforce located outside of SEQ, both at 49 per cent.

The transport and logistics workforce in all regions other than SEQ declined between 2011 and 2016.

Figure 1 - Sector Breakdown of the Queensland Transport and Logistics Workforce

- Other 6057 (8%)
- Aviation 9331 (13%)
- Logistics 16797 (23%)
- Maritime and Ports 2921 (4%)
- Rail 5352 (7%)
- Road 33,406 (45%)

Source: Analysis of 2016 ABS Census.

Figure 2 - Geographical Distribution of the Queensland Transport and Logistics Workforce

- 2704 (4%)
- 887 (1%)
- 3191 (4%)
- 3201 (4%)
- 3496 (5%)
- 3601 (5%)
- 4137 (6%)
- 50,867 (71%)
- SEQ
- Cairns
- Darling Downs - Toowoomba
- Fitzroy
- Mackay
- Townsville
- Wide Bay
- Queensland Outback
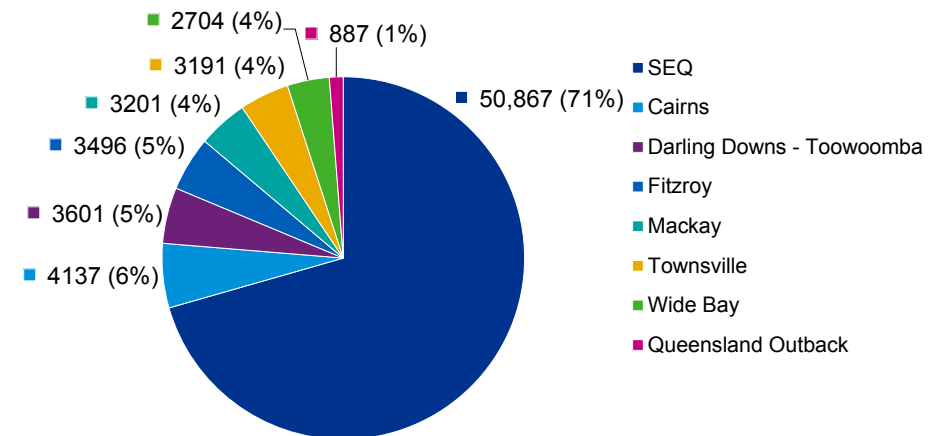
Source: Analysis of 2016 ABS Census.

Snapshot of workforce

A changing workforce

Headcount (chart)

- Aviation
- Road
- Rail
- Maritime and Ports
- Logistics

■ 2011 ■ 2016

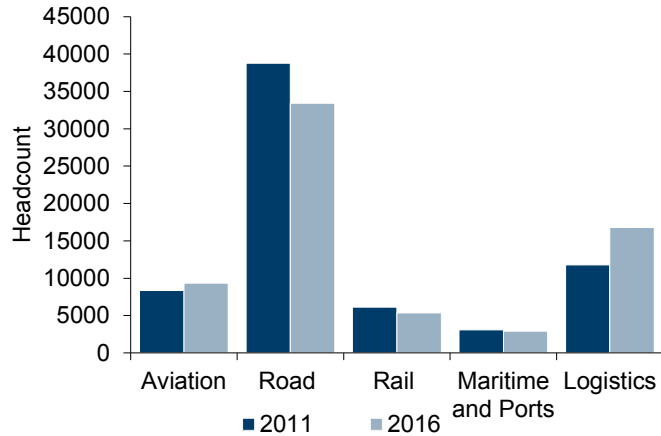| Growth	Headcount
1. Storepersons (Logistics)	+1455
2. Automobile Drivers (Road)	+954
3. Delivery Drivers (Road/Logistics)	+547
4. Forklift Drivers (Road/Logistics)	+446
5. Bus Drivers (Road)	+401

Decline	Headcount
1. Truck Drivers (Road)	-1878
2. Mail Sorters (Logistics)	-315
3. Train Drivers (Rail)	-234
4. Ticket Salespersons (Aviation/Rail)	-195
5. Stationary Plant Operators (Rail)	-151

% of women in workforce by sector in 2016

Aviation	Logistics	Maritime and Ports	Rail	Road
33.2%	21.8 %	13.0%	13.7 %	8.0 %
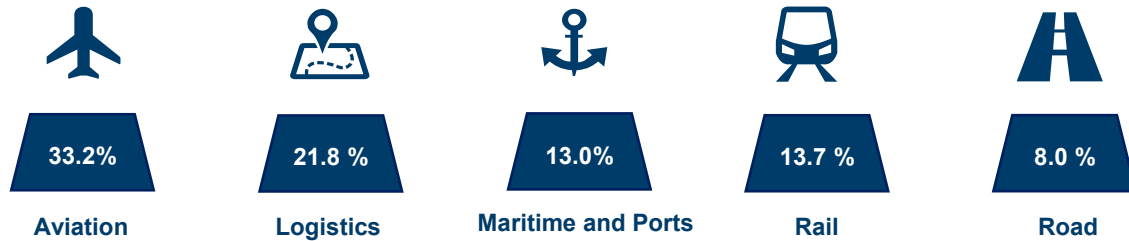
Average age

2011: 44.8 years   **2016:** 45.4 years

Highest (2016)
Road: 47.8 years

Lowest (2016)
Aviation: 41.3 years

% of workforce aged 55+ in 2016

2011: 25.0 %
2016: 27.8 %

% of 55+ by sector in 2016
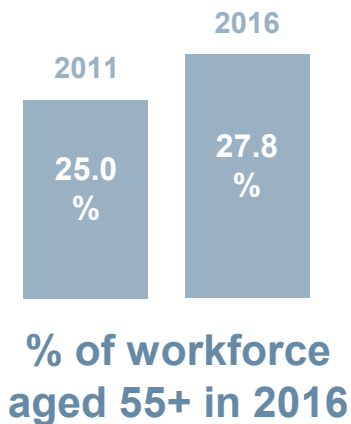
Sector	%
Logistics	22.5%
Maritime and Ports	24.5%
Rail	26.3%
Road	34.2%
Aviation	15.5%
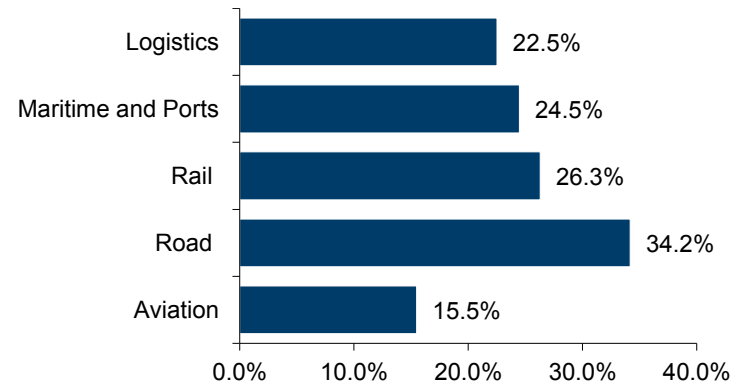
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Aviation

The aviation sector is characterised by strong growth, both in the freight and the passenger markets. There is competition for labour across both the domestic and international markets, with a workforce that requires a more national in-transit workforce, supported by a local on-the-ground crew at airport locations. Growth in service demand has led to skills shortages, with demand for labour intensified by attractive remuneration from international aviation employers.

The workforce growth is primarily isolated to major cities, while regional airlines have suffered a workforce decline as the Australian resources boom has come to an end which was reliant on a fly-in-fly-out workforce.

Key trends across the aviation workforce include:

1. Growth across the sector
2. Workforce 'poaching'
3. Barriers to training and development
4. Workforce composition
5. Skills shortages in ground crew and baggage handlers
6. A decline in demand for regional aviation.

Trends impacting the aviation workforce

"International passenger traffic into Australia has been rising steadily for the past seven years, with the last month-on-month decrease in traffic recorded in March 2011, according to BITRE."

- *Australian Financial Review, 2018*

A growing sector

Strong growth in the aviation sector is being led primarily by high demand for international air travel. Overseas trips by Australians nearly doubled between 2006 and 2017 and this trend is likely to continue in the future, with a growing number of foreign-born Australian residents travelling to visit family members[1, 2]. Outside of the domestic market, the strength in international travel is being fuelled by increasing demand from emerging countries, particularly in the Asia-Pacific region where an emerging middle class is expected to make up 66 per cent of the world's middle class population by 2030[2].

All of Australia's four major airports (Brisbane, Melbourne, Perth and Sydney) reported profit growth in the most recent financial year. All four also had growth in international passenger volumes, while all but Perth had growth in domestic passenger volumes[3]. In addition to passenger flights, aviation's share of freight is growing in line with increasing time-sensitive international delivery[16]. Speed is needed for the delivery of online shopping, with Australia Post signing a deal with Qantas in 2016 to add a Boeing 737 freighter in addition to six domestic freighters to its fleet to provide capacity for this increased demand[5]. International freight through Australian airports grew 4.8 per cent from 2016 to 2017[6]. Internationally, passenger aviation revenues are expected to grow by 9.2 per cent from 2017 to 2018, while cargo revenues are expected to be up by 8.6 per cent[7]. Domestically, air travel through Australia's major cities is expected to double by 2030[8]. This growth will not only necessitate an increase in the domestic aviation workforce but increase international competition for Australian workers.

Workforce 'poaching'

The 'poaching' of skilled aviation employees (particularly pilots and engineers) is of increasing concern to the sector. Australian aviation workers are being attracted abroad by competitive salaries up to triple the salary available in Australia[9, 10].

Part of the challenge in maintaining a sustainable labour market for pilots in Australia is that international carriers are able to offer both higher salaries and larger planes. Returning to Australia, to either regional or domestic carriers, would likely mean returning to a demotion[10].

This international competition for pilots has had an acute impact on regional aviation, with airlines forced to cancel flights.

This has prompted airlines to look to the Australian Government to relax visa restrictions to encourage foreign pilots into Australia by being added to the Temporary Skills Shortage Visa Program list[11]. This means foreign pilots will be able to work in Australia for up to two years[12]. However, this is seen as a stopgap measure and it is likely that more will be required to fill this growing gap in the workforce[12, 4].

Despite requirements for foreign pilots to convert their licences to

Australian licences by passing a Civil Aviation Safety Authority exam, many pilots have raised concerns about the safety of allowing them to fly Australian commercial airlines[12, 13].

While traditionally airlines have recruited experienced pilots through lateral hiring, they are increasingly moving towards cadetship style training programs. Key examples are Virgin Australia's Pilot Cadetship program launched in 2012 and Qantas recently announcing the Qantas Group Pilot Academy, to be launched in 2019, through which it hopes to train up to 500 pilots per year[14, 15].

In addition to international poaching, conversations with industry revealed that regional airlines face their pilots being poached by larger domestic carriers.

Barriers to training
While Australian pilots have a strong reputation for quality and safety, the training time, cost and regulatory framework in Australia make it less attractive for employers to train pilots, especially given the competitive

labour market and large number of international carriers[12,16,27].

In addition, for pilots to become fully licenced, they must be assessed by other pilots with flight instructor ratings. These training pilots must undertake training additional to that required to obtain captain status and pass an examination to gain qualifications[17]. Industry has reported that a shortage of training pilots, primarily caused by the lower salary offering, is creating bottlenecks as first officers are unable to transition into the captain's seat.

For ground crews and airport employees, the high turnover rate means they are in a cycle of continuous training[2].

Workforce composition
The age, gender and occupational makeup of the sector present their own challenges and opportunities.

An increasing number of part-time workers in the aviation sector has seen the share of female employees increase to around 40 per cent[4]. This gives the aviation sector the highest proportion of female employees in the transport and logistics industry[4].

While the gender imbalances evident in other transport and logistics sectors are less pronounced in aviation, the 60-69 age bracket (who are nearing retirement) has more than doubled since 2006. The 50-59 bracket has grown more than 50 per cent and the 40-49 bracket has grown 25 per cent across the sector[4].

In terms of the composition of the workforce by occupation, air transport professionals are the largest group (this comprises pilots, air traffic controllers and flying instructors)[4]. Travel attendants and ticket salespersons (both customer-facing occupations) are the second and third largest groups respectively, while aircraft baggage handlers and airline ground crew is the fourth largest group[4].

Ground operations and aerodromes
The expansion of airports in major cities is driving continued growth in demand for ground operations staff[4].

Increasing adoption of automation and robotics in ground aerodrome operations will significantly

change the demand for some occupations and the role and functions they perform. However, many tasks have not yet been automated (including cargo loading and unloading).

These changes will necessitate the creation of new employment opportunities in equipment maintenance as well as customer-facing roles (like customer service and body-language expertise)[2].

Some roles, however, have been significantly less affected by changes in technology. These include baggage handlers, ground crew, load controllers and airport work safety officers. The high demand for employees in these roles is not being met by supply[4]. Moreover, these roles have high staff turnover, which is believed to be due to long hours, limited career opportunities and lower remunerations than other occupations across the sector[28]. This has been impacting aerodrome operations, with claims that workforce turnover is resulting in staff not undergoing sufficient security clearance procedures[28].

Regional aviation

The strong growth in the sector has not been universally felt with many small regional and remote airports impacted by a reduction in the fly-in-fly-out workforce used in the resources and mining industry, as well as a more general movement of populations away from regional areas towards larger towns and cities.

Increasing operational costs has meant airports are facing long-term deficits[16]. The number of regional airports offering regular public transport services has fallen, with Queensland and the Northern Territory hardest hit[16].

Many of Australia's regional airports are owned and operated by local councils who may not have the resources to maintain them[19]. The lack of resources may be contributing to the high costs of doing business at these airports[20]. These concerns have meant that many local councils have looked at privatising their airports[21]. Most recently, the Sunshine Coast Council signed a long-term lease agreement with Palisade Investment Partners who will take over operation of the Sunshine Coast Airport and provide the opportunity for the airport to expand to allow long-haul international flights[22].

The economic hardship faced by these airports puts the employment of regional aviation workers in jeopardy[18].

Despite the threat to existing employment, these airports face skill shortages with difficulties recruiting already skilled workers and accessing training for non-skilled workers[16].

The Royal Australian Air Force (RAAF)

It is understood that the RAAF develop their own pilots through in-house training and development and have a dedicated period of service to 'pay-back' this training and development investment.

Once trained, the RAAF pilot training is transferable to the commercial sector. Many pilots leave the Defence Force and later work for international and domestic airlines, with reports that RAAF pilots are being actively targeted by commercial airlines who are struggling to meet their recruitment need[29]. This means that any future growth in the demand for pilots by the RAAF in Queensland (for example, the construction of a Defence Support Centre at the RAAF Base Amberley, an $850 million investment over ten years which follows a $1 billion expansion project) would likely improve the size of the pilot labour market in Queensland over time[30,31].

The Queensland context

Labour market

The aviation labour market in Queensland is the second largest in Australia behind only New South Wales[4]. The state makes up 24.2 per cent of Australia's aviation workforce, despite being only 20 per cent of Australia's population[4].

The primary employers are both individual airports across the state who directly employ ground crew and air traffic controllers, as well as the airlines that employ pilots, travel attendants and ticket salespersons.

In Queensland key employers include the Brisbane Airport Corporation, Queensland Airports Limited, Qantas (and Jetstar), Virgin Australia, Alliance Airlines and Skytrans.

Census data shows the Queensland aviation workforce grew by 11.5 per cent between 2011 and 2016 and is likely driven by growth in passenger travel.

Brisbane airport passenger movements have grown by 2.7 per cent per annum over the ten years to 2017. Some regional airports have also experienced growth, with growth in demand at Cairns airport of 2.6 per cent per annum, and Gold Coast airport of 5.5 per cent per annum over the same ten year period[6].

Queensland has the most designated international airports in Australia

The dispersed State of Queensland is also one of the best connected in terms of designated international airports, with a total of eight[23]. These are in:

- Brisbane (major)
- Cairns (major)
- Gold Coast (restricted use)
- Townsville (restricted use)
- Rockhampton (alternate)
- Sunshine Coast (restricted use)
- Toowoomba (alternate)
- Horn Island (non-scheduled).

Four are located in the east corner, making it one of the best connected entry points to Australia on the eastern seaboard.

Wellcamp Airport

The Wellcamp airport in Toowoomba commenced services in 2014 and provides direct freight flights to growing markets in the Asia region through Cathay Pacific Cargo. This helps to connect Queensland's agriculture producing region in the Darling Downs directly to Asian markets[24].

The airport jointly opened an aviation school with the Airline Academy of Australia and University of Southern Queensland in 2015.

Qantas Dreamliner base

In August 2017, Qantas announced Brisbane as the base for its new 787 Dreamliners. Qantas will invest close to $1 billion into the project that will work to position Queensland as Australia's new gateway to the United States of America.

This will provide further job opportunities to Queenslanders from Qantas, with an expected 470 direct and indirect jobs in the first five years of operation[25].

Advancing Queensland Aerospace

The Queensland Government's Advance Queensland initiative is currently developing a roadmap for the state's aerospace industry. In 2014–15 the aerospace industry was estimated to generate a $1.3 billion in revenue, with $600 million going directly to the Queensland economy[26].

The industry is supported by the state's aircraft manufacturing and maintenance sector, which provides 4500 jobs across 344 enterprises. The development of the industry roadmap is expected to include a plan to invest in jobs for the future by opening new industry and research collaborations[26].

Workforce analytics

Size of the workforce

The Queensland aviation sector workforce grew by 11.5 per cent to 9331 employees from 2011 to 2016.

The occupations experiencing the most significant growth between 2011 and 2016 were inspectors and regulatory officers (72.5 per cent growth), other mobile plant operators (18.7 per cent), aircraft maintenance engineers (14.5 per cent growth), and air transport professionals (9 per cent growth).

The only occupation experiencing decline in the aviation sector was supply and logistics managers which fell from 200 to 159 employees over the five years to 2016.

Workforce composition

The composition of the aviation workforce shows that the "in-flight" workforce (air transport professionals and travel attendants) comprise approximately 50 per cent of the workforce, with the remaining workforce operating "on-the-ground."

The composition of the aviation workforce at the time of the 2016 Census is shown in Figure 3.

Air transport professionals represent the largest proportion of the aviation workforce at 28 per cent of the workforce. This occupation cluster includes both professional pilots, as well as supporting staff such as air traffic controllers and flight instructors.

Travel attendants represent 20 per cent of the aviation workforce. This occupation grew by 5 per cent from 2011 to 2016.

Aircraft maintenance engineers represent 12 per cent of the aviation workforce and grew by 14 per cent between 2011 and 2016.

Other mobile plant operators represent 13 per cent of the aviation workforce. This occupational cluster includes a number of occupations such as aircraft baggage handlers and airline ground crew.

Ticket salespersons represent 13 per cent of the aviation workforce. This occupation increased by 2 per cent within the aviation sector.

Figure 3 - Composition of Queensland Aviation Workforce
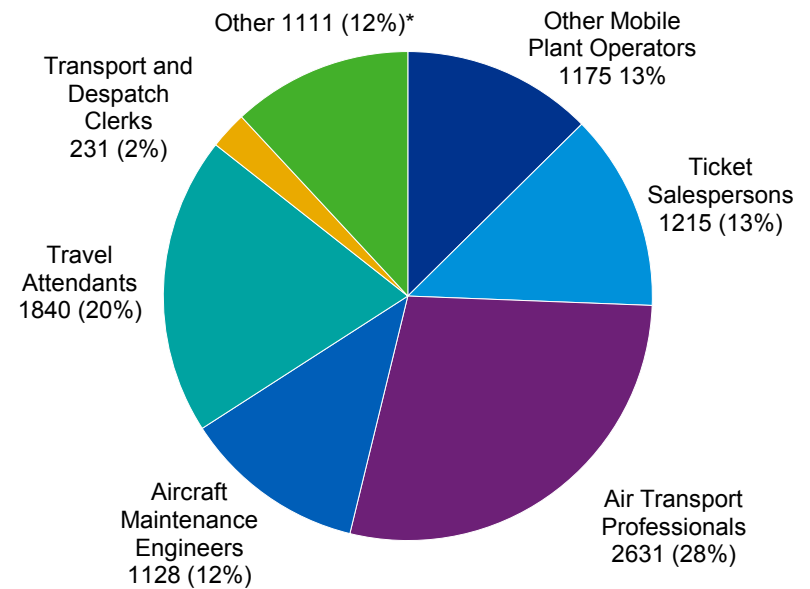
Source: Analysis of 2016 ABS Census.

*All occupations comprising of less than 1% of the total workforce under the Australian and New Zealand Standard Classification of Occupations (ANZSCO) classifications.
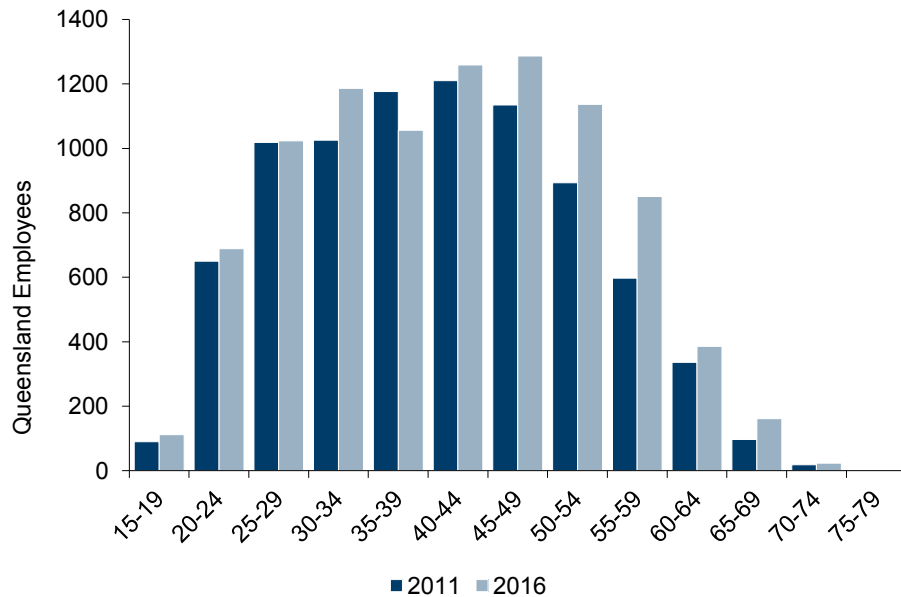
Workforce demographics-age

The average age in the aviation sector is 40.4 years. This is the youngest across the transport and logistics industry.

The average age of the aviation workforce increased by 1 year in the period from 2011 to 2016. This ageing profile can be seen in Figure 4 below.
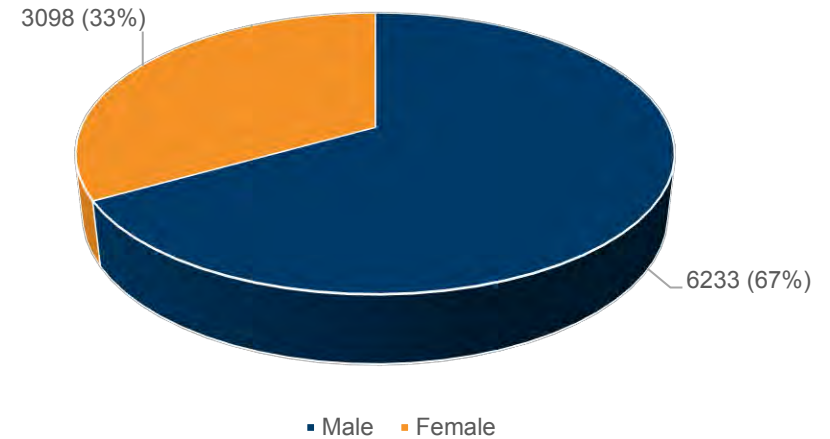
This shows that the most significant growth in age cohorts between 2011 and 2016 has occurred in the 45–49; 50–54; and 55–59 age brackets. This suggests that the ageing of the workforce will become a more pressing issue in around five years.

Figure 5 - Gender Profile of Queensland Aviation Sector

3098 (33%)

6233 (67%)

■ Male ■ Female

Source: Analysis of 2011 and 2016 ABS Census.

Figure 4 - Age Profile of Queensland Aviation Sector

Source: Analysis of 2011 and 2016 ABS Census.

Workforce demographics-gender

Women represent 33 per cent of the aviation sector in Queensland (40 per cent nationally), which is the highest across the transport and logistics industry. This is shown above in Figure 5.

This figure is heavily influenced by the high proportion of female travel attendants (78 per cent). Similarly, 77 per cent of ticket salespersons in the aviation sector are women.

These two occupations (travel attendant and ticket salesperson) represent 77 per cent of the total female aviation workforce.

Excluding these two occupations, women represent only 11.5 per cent of the aviation workforce. Women comprise less than 9 per cent of air transport professionals and less than 3 per cent of aircraft maintenance engineers.

Geographical distribution of the workforce

Eighty per cent of the aviation workforce in Queensland is based in SEQ as shown in Figure 6.
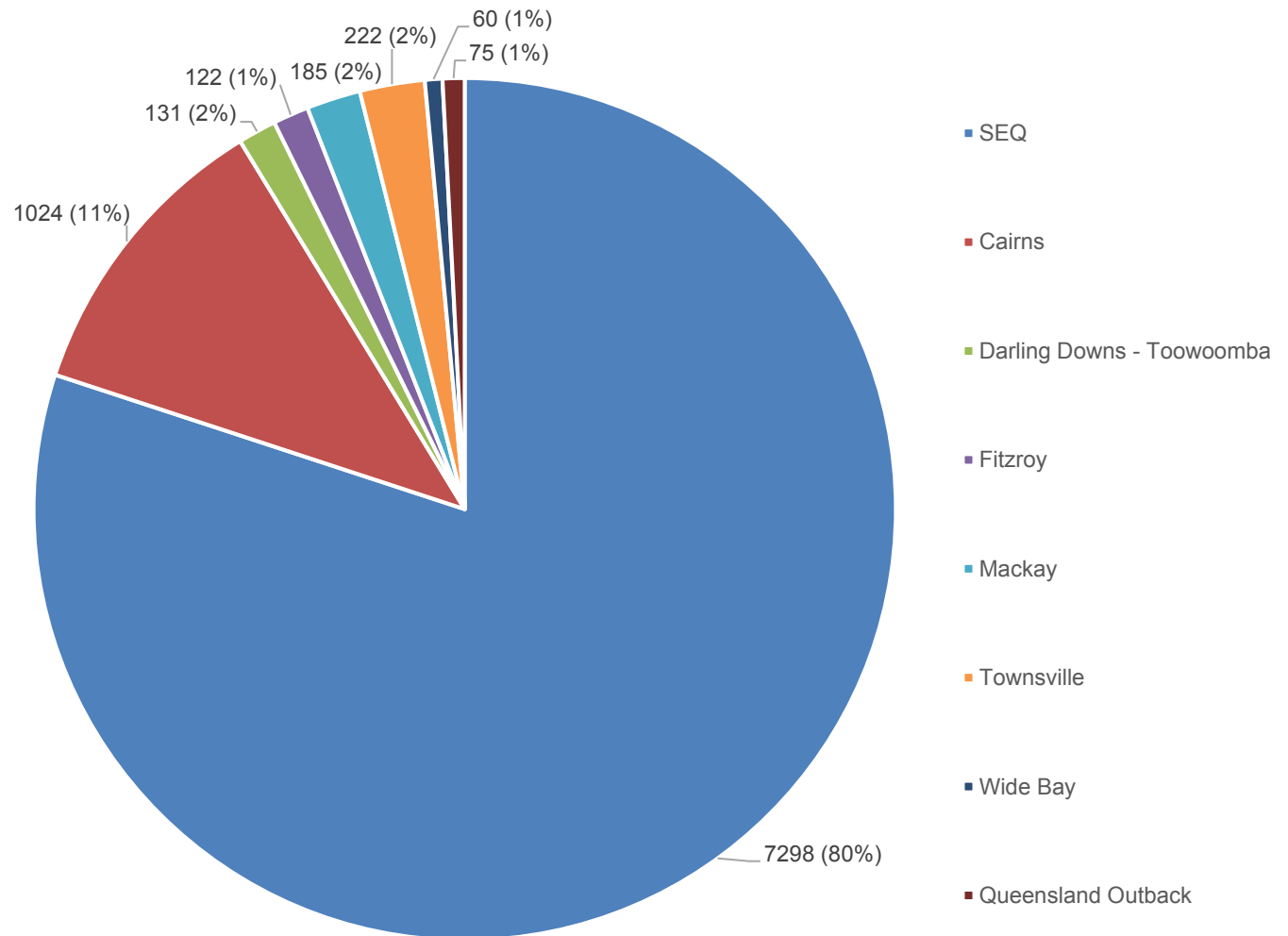
The aviation workforce within SEQ grew by 10.7 per cent between 2011 and 2016. All regions grew over this period except the 'Queensland Outback' statistical area, which declined by eight employees.

The Mackay aviation workforce grew by 29 per cent (54 employees). The Darling Downs – Toowoomba region's workforce grew by 38 per cent (50 employees). This increase is likely related to the commencement of services at the Wellcamp Airport in 2014.

Key changes in the geographical distribution of the workforce between 2011 and 2016 include:

- The number of air transport professionals in the Mackay region grew by 22 per cent.

- Occupational growth in aircraft maintenance engineers was 9 per cent. Of this, 47 per cent occurred outside of SEQ.

Figure 6 - Geographical Distribution of the Aviation Workforce

Legend:
- SEQ
- Cairns
- Darling Downs - Toowoomba
- Fitzroy
- Mackay
- Townsville
- Wide Bay
- Queensland Outback

Data labels: 7298 (80%), 1024 (11%), 131 (2%), 122 (1%), 185 (2%), 222 (2%), 60 (1%), 75 (1%)
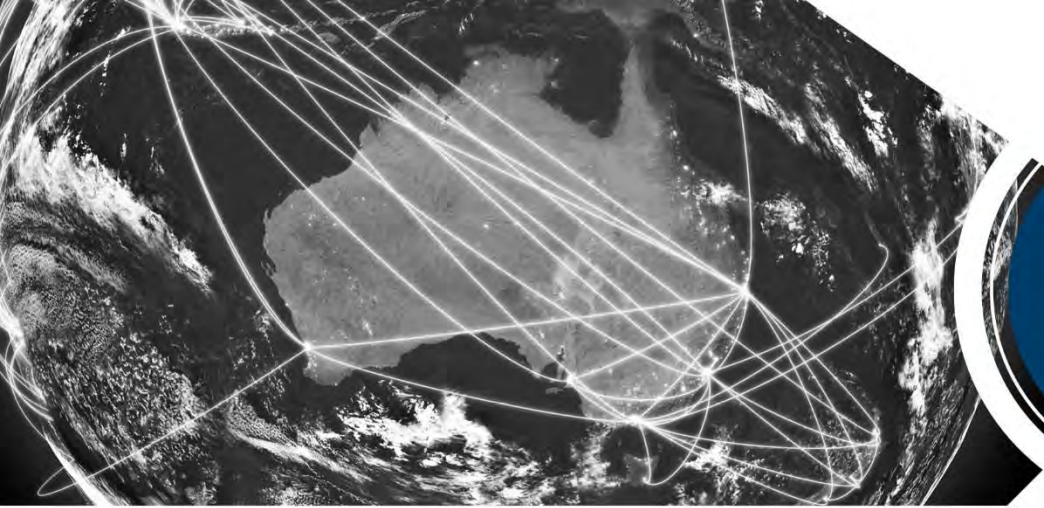
Source: Analysis of 2011 and 2016 ABS Census.

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Logistics

Out of the five transport and logistics sectors, logistics has been the most significantly impacted by recent and emerging technological change, influenced by major advancements including: advanced robotics; automation; wearable technology; Big Data and the Internet of Things. These advancements are in response to supply chain improvements, customer expectations and globalisation.

Key trends impacting the logistics workforce include:

1. A growing sector
2. Changing skills requirements
3. Technological change and automation
4. Customer centric approaches
5. Workforce retention.

Trends impacting the logistics workforce

"…companies require their workforce to be agile and responsive to meet the skills demands created by new technologies, automation and other innovations as they evolve."

- *Australian Industry Standards, 2017*

A growing sector

Strong growth in the logistics and warehousing sector is being driven by a number of factors including changing customer expectations around the speed of delivery for goods and services, a number of global entrants into the Australian market, and growth in consumer demand in areas such as online shopping.

The implications of this growth have been felt across the whole workforce, but storepersons, forklift drivers and delivery drivers are some of the occupations where there has been significant growth[1]. Industry stakeholders have reported that where skilled forklift drivers are unavailable in the labour market, they often recruit employees without this licence and provide this training in-house[2].

Changing skill requirements

Growth in the sector, as well as the significant adoption of new technologies, means that the re-training and upskilling of existing workers is, and will continue to be, necessary.

While traditionally, the bulk of the logistics workforce has been employed in manual, 'blue collar' occupations like delivery driving and warehouse work such as order picking, automation and other new technologies are changing the nature of these jobs[2].

The workforce of the future will need to be skilled in the operation and maintenance of machines rather than undertaking sorting and stacking work themselves[3].

Warehouses are increasingly becoming specialised, turning their attention to particular products, supply chains, customers or distribution networks. In turn, this process is increasingly requiring the logistics workforce to become more specialised[3].

In addition to changes to traditional occupations, new occupations are being created[2]. Strong capabilities in digital literacy, data analytics and dashboards, and an ability to draw on real-time data to drive changes in decision making for business optimisation and efficiency, have already been taking on increasing importance.

At the same time, consumer customisation across the sector will require the workforce to extend their skill sets to better understand supply chain management capabilities, procurement trends, the manufacturing of products and the overall management of warehousing and internal and external distribution from start to finish.

This transformation will mean growing demand for a number of occupations. Consultation with industry revealed that middle management and data analytic skills are particularly needed.

Technological change and automation

Advancements in technology are strongly impacting the logistics sector. This influences the operational day-to-day tasks of employees, as well as business and strategic planning for the sector.

Trends are being created and formed swiftly with global distributors and companies such as Amazon, Rio Tinto and BHP, as well as local large organisations including Australia Post, who are shaping the future of the logistics sector and/or impacting on the supply chain. The digitalisation these organisations have pioneered is primarily focused on meeting

customer expectations and reducing costs by using technology to change the operating frameworks, streamline aspects of the supply chain and change current business models[4, 5].

In warehousing and logistics, significant reform is expected across the supply chain over the short term due to digital capability. Key changes expected include: larger warehouse footprints; reduced inventory, cycle time and costs enabled by real-time monitoring of inventory; real-time ordering enabled through technologies such as cloud, Big Data and the Internet of Things; advanced robotics in order picking; and autonomous vehicles used throughout large warehouses[10].

In the longer term, the logistics and warehousing sector may adopt emerging technologies including bionic enhancements and wearable technologies known as exoskeletons. Control towers are expected in the next few years which will combine software management solutions, the Internet of Things and Cloud technologies[11].

Some employers are upskilling their workforce given these expected changes in technology. An example is Queensland Health's logistics workforce, where capability uplift programs are being implemented to support staff with new systems.

Customer-centric approaches

The hyper-customisation of the industry is leading to new business models that conform to the needs of the market. Through the decentralisation of fulfilment hubs and the automation of supply chain and other aspects of the workforce, businesses are seeking to transform logistics, warehousing and supply chain models to better meet customer expectations.

Omni-channel logistics is also expected to change the sector. It is built around providing a consistent and coherent customer experience, ensuring that products are consistent from store, to online, to in hand[6].

These technological changes will drive a need for the workforce to be customer centric in order for the organisation to be competitive and responsive to market demands. An example is the role of a delivery driver as the key client point of contact with an organisation. This means these drivers will

increasingly need to develop a customer service skillset.

Workforce retention

Attracting and retaining young workers in the logistics sector has proven challenging. This may be due to perceived limited career pathways and the manual nature of the work.

Casualisation of the workforce has occurred as a result of employees seeking a higher rate of pay per hour (particularly the younger workforce), and from employers wanting flexibility. This has been important particularly as time expectations have become faster with consumers expecting delivery to their door[7]. In addition, young people are requesting casual arrangements, preferring a higher rate of pay to a salary package.

While high rates of turnover (above 100 per cent) are reported across the sector, it is also acknowledged that the impacts of this are felt unevenly and are often dependent on the degree of physical labour required in moving the goods and services. For example, companies dealing in heavy goods often use a younger workforce because of the degree of physical exertion

required, and as a result have a larger casual workforce and report higher turnover than those dealing in lighter, more agile goods. While there is a growing need for workers skilled in more technical occupations, the volume of demand is still higher in manual tasks (e.g. storepersons), with young people seeing these roles as a short term work option rather than a long term career.

Limited career advancement opportunities reinforce this view, as new skills (like information technology and supply chain management skills) are required at the manager level, skills which those beginning their careers in more manual tasks do not often possess[7]. For these reasons, industry is reporting significant difficulties in recruiting at a middle management level.

The Queensland context

Labour market

The logistics sector is often synonymous with the movement of goods and the transport industry more broadly. This can underplay the importance of the skills required to provide an efficient end-to-end supply chain service. The logistics sector in Queensland is growing significantly, increasing by 42 per cent in the period from 2011 to 2016. This represents an increase of 5013 jobs in the sector over the five year period.

This growth has been driven by the increase in key occupations within the logistics sector. The number of additional storepersons employed within the logistics sector between 2011 and 2016 increased by 1661, which represents 51 per cent of the current workforce for this occupation. Other notable growth occupations are forklift drivers, purchasing and supply logistics clerks, transport services managers and delivery drivers.

The primary employers within the logistics sector are freight transport firms who undertake logistics works in-house, as well as dedicated logistics firms such as freight forwarders (e.g. BCR, Powerhouse International and CT Freight) who do not directly move goods themselves.

Part of the challenge in workforce planning across logistics is that many large employers will undertake warehousing and logistics as part of their business but they do not operate as a sole logistics or warehousing provider. Key examples are food retailers including Coles and Woolworths, and general retailers such as Amazon.

Specialist roles

The growth in demand experienced in this sector has led to challenges in recruitment. This is being recognised in skills shortage data which suggests that logistics managers and forklift drivers were in shortage in 2017[2].

Online retail

Consumer trends have shown that increases in consumer confidence and trust regarding the online shopping experience is continuing to drive strong growth in ecommerce.

This has been a mixed blessing for the state's regional communities – providing them greater access to goods and services – while also hampering the performance of traditional brick and mortar retailers.

For the logistics sector in particular, this has significantly driven up the demand for intermediary services, such as postal, warehousing and distribution services throughout Queensland[8].

Amazon

The staged entry of online retail giant Amazon into the Australian retail market will generate new job opportunities in the Queensland logistics sector.

The United States online retailer has already been tipped to open a distribution site in SEQ, with Brisbane, Ipswich, Logan and Moreton Bay areas all potential locations for the site[9].

Workforce analytics

Size of the workforce

The Queensland logistics sector workforce grew by 42.5 per cent to 16,797 employees from 2011 to 2016, with the sector representing 23 per cent of the broader industry.

This high rate of growth is partially the result of individuals and businesses re-classifying themselves out of other sectors and into the logistics sector. For example, couriers and postal deliverers who were previously classified as 'road freight transport' are now recorded in the logistics workforce.

This means the growth rate for an occupation across all sectors may be lower than the growth rate within the sector.

The occupations experiencing the most significant growth in the logistics sector between 2011 and 2016 were storepersons (106 per cent), delivery drivers (134 per cent), purchasing and supply logistics clerks (96 per cent), and forklift drivers (65 per cent).

The only occupations in the logistics sector that declined were mail sorters by 17 per cent, and couriers and postal deliverers by 2 per cent across all sectors.

Workforce composition

The composition of the logistics workforce is split between two main segments; delivery (externally facing) and warehousing and coordination roles (internally facing).

The composition of the workforce for the Queensland logistics sector at the time of the 2016 Census is shown in Figure 7.

The largest occupation clusters in the logistics workforce are couriers and postal deliverers, who represent 38 per cent of the total logistics sector workforce.

Storepersons are the second largest group, representing 19 per cent of the logistics sector workforce in 2016.

Supply and distribution managers, who in 2016 represented 3 per cent of the Queensland logistics workforce, grew by 76 employees in the logistics sector.

Figure 7 - Workforce Composition of Queensland Logistics Sector
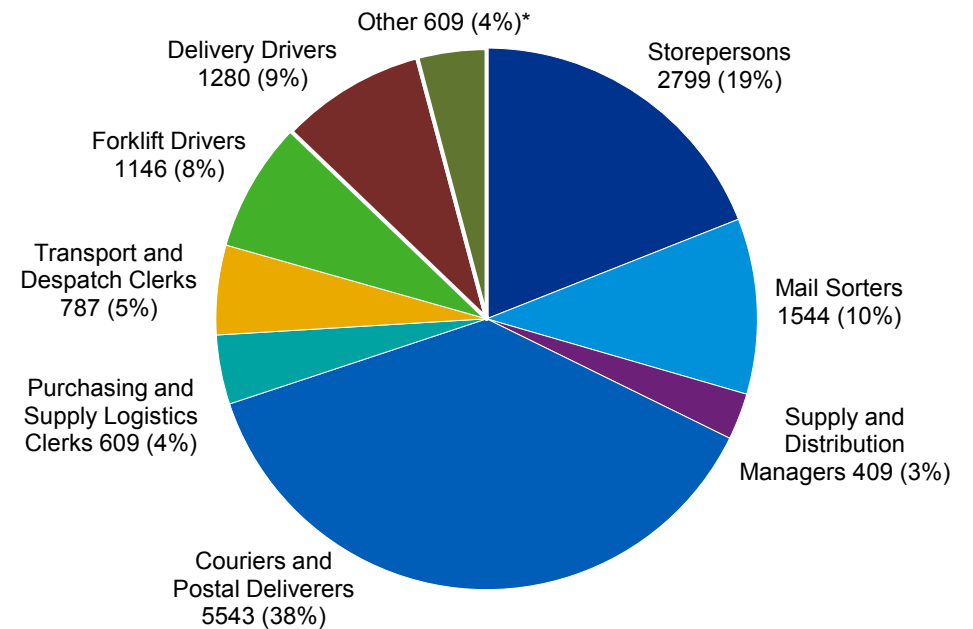
Source: Analysis of 2016 ABS Census.

All occupations comprising of less than 1% of the total workforce under the ANZSCO classifications.

Workforce demographics – age

The average age of the logistics industry declined marginally between 2011 and 2016 to 42.9 years, and was the only industry to experience this.
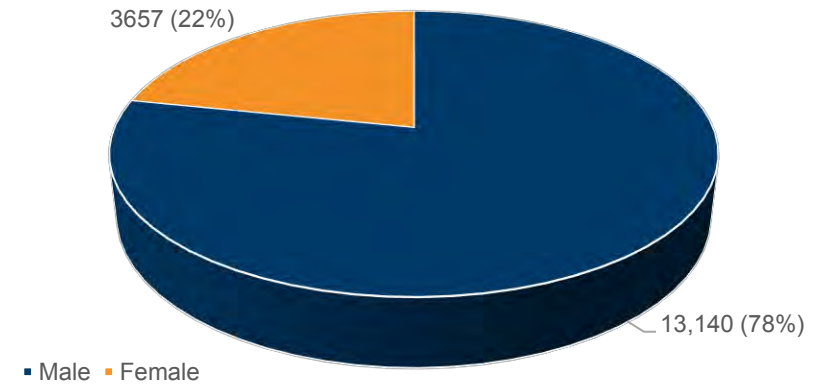
While the workforce increased in younger age brackets between 2011 and 2016 particularly the 20–24 and 25–19 year cohorts, it still has an ageing workforce that grew significantly in the 50–54, 55–59 and 60–64 age brackets.

Workforce demographics – gender

Women represented 21.8 per cent of the workforce in the Queensland logistics sector in 2016, which is the second highest across the transport and logistics industry.
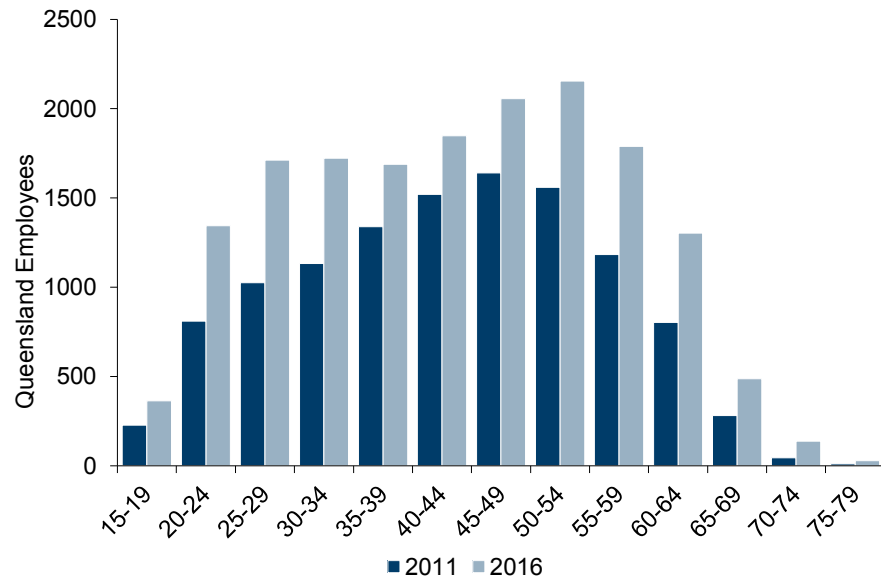
The main occupation areas of employment for women in the logistics sector were couriers and postal deliverers (34 per cent), and mail sorters (22 per cent).

Figure 9 - Gender Distribution of the Queensland Logistics Workforce

Source: Analysis of 2011 and 2016 ABS Census.

Despite this, women represented only 21 per cent of all couriers and postal deliverers, but the majority of mail sorters (53 per cent).

Forklift drivers represent 8 per cent of the logistics workforce, with women representing only 4.6 per cent of this occupation.

Purchasing and supply logistics clerks and transport and Despatch clerks collectively represent 3.6 and 4.7 per cent of the logistics workforce respectively, with women representing 31 per cent of these occupations.

Figure 8 - Age Distribution of the Queensland Logistics Workforce

Source: Analysis of 2011 and 2016 ABS Census.

Geographical distribution of the workforce

In Queensland, 80 per cent of the logistics workforce is located within SEQ.

The sector grew by 48 per cent within SEQ over the period of 2011 to 2016. This high rate of growth is partially a result of occupations shifting from other sectors to logistics.

The growth in employment in SEQ represents 86 per cent of the total statewide growth in the sector.

There were no regions in which the logistics workforce declined over the five year period.

Growth in regional areas within specific occupations were minimal, with no occupation in the logistics sector growing in excess of 50 employees over the period of 2011 to 2016.

Figure 10 - Geographical Distribution of Queensland Logistics Workforce

- SEQ
- Cairns
- Darling Downs - Toowoomba
- Fitzroy
- Mackay
- Townsville
- Wide Bay
- Queensland Outback
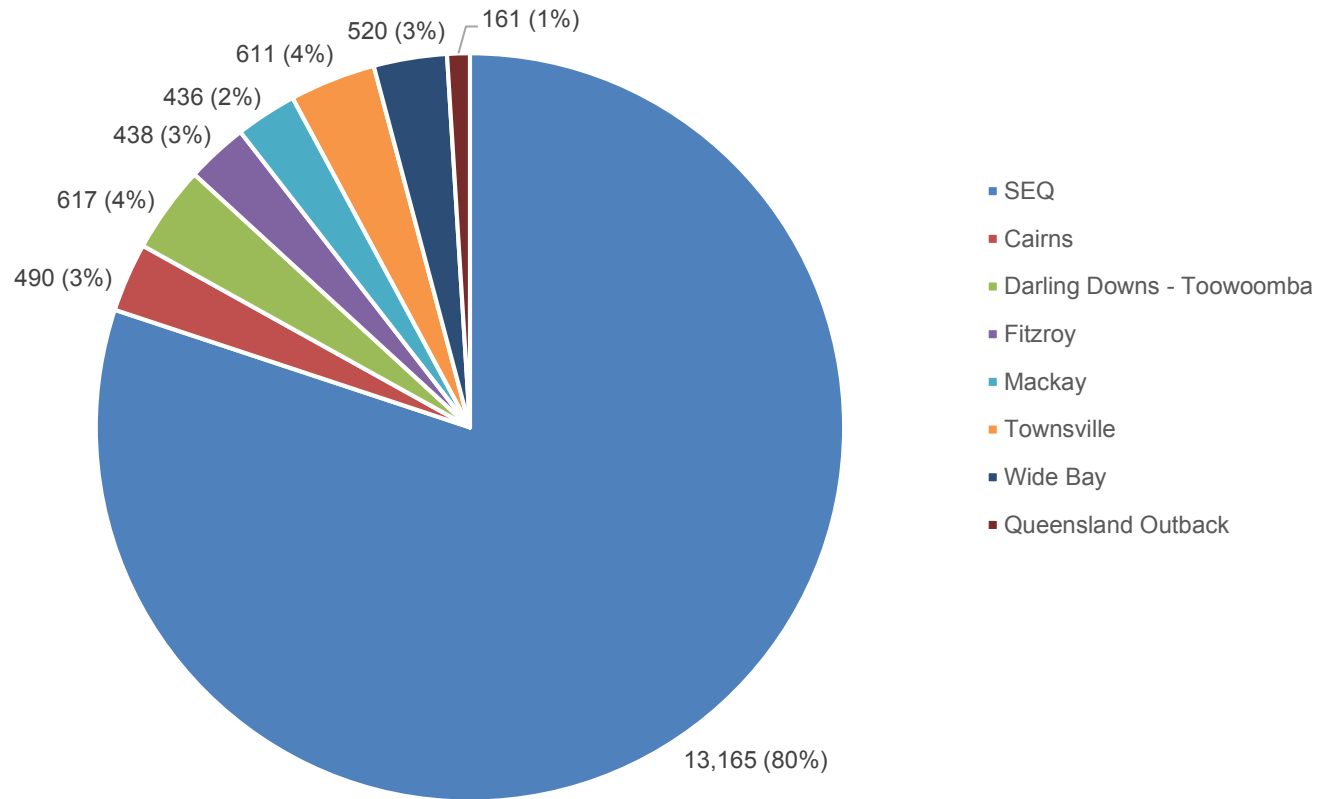
Source: Analysis of 2016 ABS Census.

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Maritime and Ports

Maritime and ports has one of the oldest workforces in the transport and logistics industry, struggling to attract younger workers due to a perception of being low-tech and old-fashioned (IHS, 2014).

Key trends in the maritime and ports workforce include:

1. Ageing workforce
2. Technological change
3. Skills shortages and competition
4. Lack of available training berths
5. A decline in resources freight but growth in cruises and containers.

Trends impacting the maritime and ports workforce

"To ensure the ongoing success of the [maritime] industry to the Australian economy… the workforce will need to be able to adjust to the new and emerging technological skill demands of the industry."

- *Maritime Industry Reference Committee*

Ageing workforce

While an ageing workforce is a theme common across all transport and logistics sectors, maritime and ports has one of the oldest workforces in the country, with nearly half of its employees 45 or older[1]. For example, a 2014 study found that the average age for harbour masters and stevedores is 50, compared with 45 for pilots.

The permanent and skilled stevedore workforce is predominantly older, while younger employees take casual and semi-casual roles[2].

Census data reveals the number of workers aged 60 and over in this sector grew more than 70 per cent over the last decade[1]. This trend not only defines the Australian sector, but the global maritime industry[3].

Attractiveness of the sector

The inability of the sector to recruit a younger generation of employees could be due to a perception of the sector as old-fashioned and low-tech[3].

A 2008 submission to a parliamentary inquiry into Coastal Shipping Policy and Regulation by Young Shipping Australia, an organisation which aims to represent young professionals in the maritime industry, wrote:

"The diminishing and ageing workforce coupled with the conservative nature of the industry requires a radical change in the mindset of current leaders to ensure…we make substantial improvements to the industry making it attractive to a workforce under the age of 30…an industry which is typically seen as male dominated and blue collar." [4]

This submission illustrates some key issues with the image of the sector from a recruitment perspective.

The number of workers in the sector under the age of 30 has fallen by 11.7 per cent over the past decade, suggesting that the sector still struggles with recruitment of a younger workforce[1].

Technological changes

Technological advances are beginning to change the way work is done in maritime and ports. Major future developments include the Satellite-Based Augmentation System, currently being trialled in a test project by Geoscience Australia for use in the Australasia region, which will deliver greatly improved accuracy, integrity and availability in satellite navigation[5].

The possibility of autonomous, crewless shipping is another important development. An agricultural company in Norway has collaborated with a technology company to create a crewless cargo ship. The technology will be built by the end of 2018 with full autonomous operations to begin by 2020[6].

British car manufacturer Rolls Royce has also signalled its intention to develop an unmanned commercial ship, expecting to have an operational vessel by 2020, with Rolls Royce manufactured autonomous ships to sail in international waters by 2025[7].

Locally, BHP Billiton has suggested that it would look to adopt autonomous vessels at some point in the future, with its Vice President of Freight saying in 2017:

"…autonomous vessels offer significant opportunities to improve safety… and provide better efficiency outcomes to the marine supply chain. Safe and efficient autonomous vessels carrying BHP cargo, powered by BHP gas, is our vision for the future of dry bulk shipping. We believe that future could manifest within a decade." [8]

Although wide usage of such ships is years away, the International Maritime Organisation's Maritime Safety Committee began discussions on legal changes which could make the use of autonomous ships in international waters a reality[9].

These changes will necessitate an injection of new skills into the sector's workforce. As part of the Maritime Industry Reference Committee (IRC) Skills Forecast survey, industry identified 'navigation/vessel handling' and 'automation' amongst its priority skills for the next three to five

years[1]. As vessels become remotely operated, it is expected that the workforce will increasingly be working in onshore operation centres rather than at sea[1].

Skills shortages and competition

Significant skills shortages exist in the maritime and ports sector, with 75 per cent of employers reported to be experiencing skills shortages in the most recent Maritime Labour Skills Shortage Survey conducted by Australian Industry Standards[1].

Skills where demand is not meeting supply are primarily domestic commercial vessel occupations, with deckhands in particular experiencing a significant decline since the 2011 Census[1]. While skills shortages have affected the entire maritime and ports sector, regional and remote ports have been hardest hit.

A combination of remote locations, a lack of essential infrastructure and the high cost of housing have made these ports an unattractive employment proposition[1].

More broadly, competition from other sectors is fuelling this skills

shortage, including fishing and aquaculture, tourism and patrol and rescue[1].

Some operators have been turning to skilled migrants to fill this skills gap, raising concerns about the career development paths available to Australian workers who could be trained[1]. Others have inflated salaries to attract workers to the detriment of less wealthy ports[2].

The larger shipping vessels in Australian waters are predominately international, and this combined with the ability to use international labour offers significant cost advantages over Australian flag ships. This is limiting employment opportunities for the Australian seafaring workforce.[25]

Lack of available training berths

The International Maritime Organisation's mandated sea time as part of the *Standards of Training, Certification and Watchkeeping,* means that access to training berths is vital for the training of seafarers[10]. To complete the Australian Seafarer Traineeship, individuals must

record nine months sea service in total[11].

This sea service has traditionally taken place on 'blue water' Australian flag state control vessels. However, the fleet of appropriate vessels is in decline, falling by almost 40 per cent from the mid-1980s to 2012[10]. Australia's 'blue water' fleet cannot meet the training demands of the sector[10].

A decline in resources freight but growth in cruises and containers

The end of the resources boom has seen a decline in freight traffic through Australian ports - particularly regional and remote ports[12]. The Australian maritime and ports industry is highly dependent on international freight, with domestic shipping making up just 10 per cent of total activity by volume and is, as such, significantly affected by international trends[13]. Compounding the problem, the peak of the boom saw the purchase of a number of megaships, which are now contributing to overcapacity in fleets[13].

However, the burgeoning cruise market is providing alternative employment opportunities for seafarers. Australia has the world's highest population penetration of cruise passengers with domestic cruising growing 23.4 per cent between 2015 and 2016[14].

Cruise visitors to Australia are expected to reach 2 million by 2020, with the trend towards shorter coastal cruises around Australian homeports expected to continue[15]. This is expected to necessitate infrastructure expansion at smaller ports which could provide a number of opportunities for port workers[15].

In addition, increases in container traffic are predicted, largely as a result of an uptake in container shipping, as emerging markets increase their consumer spending[1,3].

Australian exporters, in particular the agricultural industry, may benefit from recent changes to trade policy by the US. This is likely to increase the demand for sea freight as this sector is the third highest value commodity exporter group in sea freight [16,17].

The Queensland context

Labour market

The maritime and ports workforce in Queensland is the second largest in Australia behind only New South Wales[1].

Queensland has 20 ports along its coastline, ranging from small community ports to cruise terminals, major export facilities for coal, and an import export facility that caters for a capital city.

The main ports in Queensland are:

- Port of Brisbane
- Port of Gladstone
- Port of Townsville
- Port of Abbott Point
- Port of Mackay
- Port of Hay Point
- Port of Weipa
- Cairns Seaport.

Each of these ports has a throughput in excess of one million tonnes per annum[18].

In Queensland key employers include Port of Brisbane, North Queensland Bulk Ports Corporation, Port of Townsville, Gladstone Port Corporation and Ports North.

Despite its size, the workforce is in decline, with the Queensland workforce reducing by 5.5 per cent between 2011 and 2016.

This decline was focused almost solely within SEQ, which is home to 51 per cent of the sector's workforce. Employment in the maritime sector in SEQ declined by 19.4 per cent while the workforce in the rest of the state grew by 6 per cent over the same period.

This decline in the maritime and ports workforce aligns with declining throughput at the Port of Brisbane, particularly exports. In 2011 the volume of exports at the Port of Brisbane was 19 million tonnes, and the volume of imports was 17.8 million tonnes. This throughput declined to 13.9 million tonnes and 16.2 million tonnes respectively[18]. This represents a 27 per cent reduction in exports by volume from Brisbane within a four year period.

This decline in trade and subsequent employment may be associated with the closure of the BP refinery on Bulwer Island in 2015[19]. This closure was in response to the growth of larger refineries across the Asia-Pacific, and leaves only the Caltex Lytton Oil Refinery operating in Queensland.

This decline in the SEQ maritime workforce may also have been driven by an increased automation of port facilities. In 2014, the Port of Brisbane became the first port in Australia to fully implement automated handling equipment for stevedores[20].

Industry stakeholders report that the seafaring workforce in Australia is increasingly staffed by overseas workers. This aligns with national trends, with Australian seafarers having difficulty finding employment in the industry[21].

Industry stakeholders report that the small number of Australian flag ships undertaking domestic shipping limits the pipeline for Australian workers to gain appropriate experience.

Stakeholders indicated that the most common career pathway for Australian seafarers is to move overseas to gain the training required. This enables them to return to Australia later in their careers with greater experience.

Specialist roles

Occupations within the maritime and ports sector are not broadly considered to be in shortage. This may be partially due to the use of international labour for the seafaring workforce.

The Australian Industry Standards 2018 Skills Forecast recognises marine engine drivers, deckhands and managers as being in shortage for domestic commercial operations[1].

The Queensland port network

Queensland's coastline is home to an extensive network of 20 gazetted ports, including both small community ports, large world-class export terminals, cruise terminals, and city multi-cargo ports. Of these ports, 15 are trading ports. These ports are a critical nodal point connecting many of the state's most valuable supply chains to both domestic

and international markets – in particular growing Asian markets.

The efficiency of the trading ports determines the productivity of the state's maritime sector and impacts the performance of significant supply chains. In 2015–16, the Queensland ports network recorded a total throughput of 339 million tonnes, which represented an increase of 2.9 per cent over the previous year. Coal exports continue to be the largest traded commodity with over 220 million tonnes of coal exported during the same period (or 65 per cent of the total export)[18].

Major coal export ports

Queensland's two major coal export ports, Port of Gladstone and Port of Hay Point, both had throughputs of 116 million tonnes in 2015–16, accounting for over two thirds of total throughput for the period. Coal was the largest export commodity of both ports over the same period.

The Port of Gladstone Master Plan seeks to provide greater emphasis on ensuring that sustainability measures are met as the port continues to expand in line with the *Sustainable Ports*

Development Act 2015. The master plan provides transparency to the community and stakeholders alike and has engaged in extensive consultation.

The Port of Gladstone Priority Development Area will also link new precincts to better coordinate industry, research and commercial activities in the priority port development area[22,18].

Protections for the Great Barrier Reef

The Australian and Queensland Governments released the Reef 2050 Long-term Sustainability Plan in March 2015. The plan sets clear actions, targets, objectives and outcomes to drive and guide the management of the reef. The plan provides specific consideration for port and maritime activities within the Great Barrier Reef World Heritage Area (GBRWHA).

More recent regulatory changes surrounding the GBRWHA continue to impact shipping along Queensland's eastern coastline. This includes transhipment rules which restrict bulk transhipment in the GBRWHA to within port limits

outside the Great Barrier Reef Marine Park[23].

Cruise terminals

In October 2017, the Queensland Government welcomed construction of the $158 million Brisbane International Cruise Terminal at Luggage Point on the north side of the Brisbane River by the Port of Brisbane. This market-led proposal is expected to safeguard an existing 1250 jobs in the cruise industry and add an additional 49 operational jobs on average per year over the next 20 years[24].

Workforce analytics

Size of the workforce

The Queensland maritime and ports sector workforce declined by 5.5 per cent to 2921 employees from 2011 to 2016. This sector is the smallest in the transport and logistics industry representing only 4 per cent of the broader workforce.

The occupations experiencing the greatest decline between 2011 and 2016 were marine transport professionals, deck and fishing hands, and freight and furniture handlers.

Occupations experiencing growth were civil engineering professionals (17 additional), boat and ship builders (12 additional) and life scientists (13 additional).

Workforce composition

Marine transport professionals control and manage the operations of ships, boats and marine equipment, and represent 28 per cent of the maritime and ports sector workforce. This occupation declined by 11 per cent, or 104 employees to 836 in the maritime and ports sector.

Freight and furniture handlers move objects, freight, stock, and other materials between storage facilities and forms of transport. They represent 16 per cent of the maritime and ports sector workforce. This occupation declined by 9 per cent or 46 employees to 473 in the maritime and ports sector.

Deck and fishing hands represent 12 per cent of the maritime and ports sector workforce. This occupation declined by 20 per cent or 86 employees to 346 in the maritime and ports sector.

Transport and despatch clerks represent 9 per cent of the maritime workforce, and slightly declined by 10 employees between 2011 and 2016.

Figure 11 - Workforce Composition of the Queensland Maritime and Ports Workforce
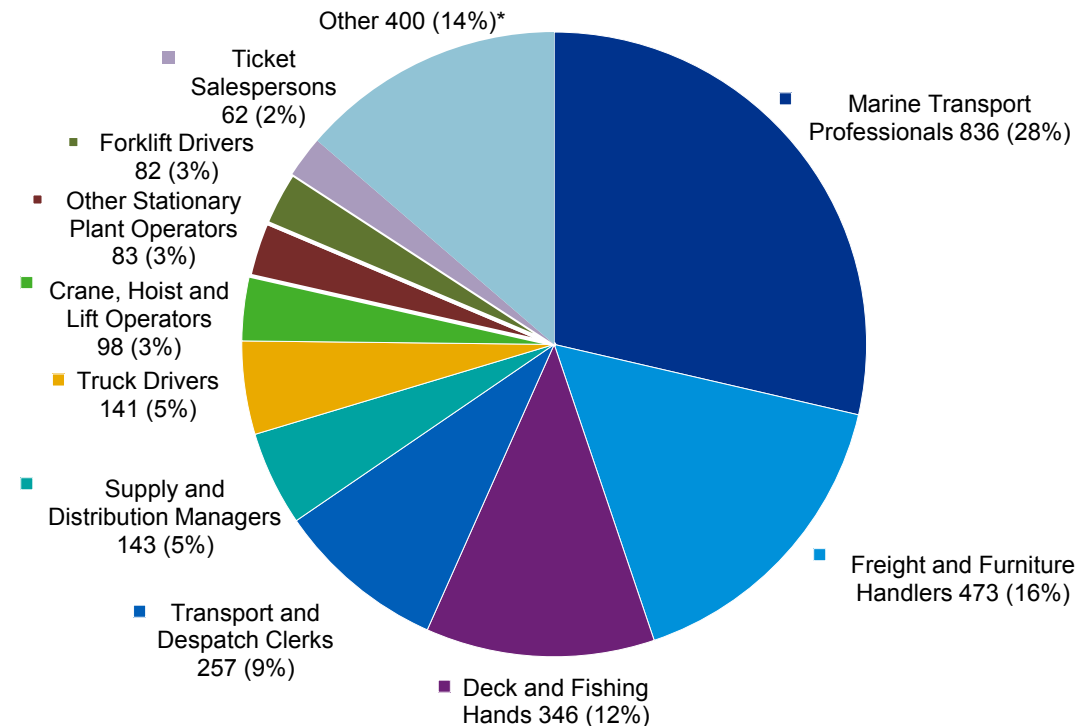
Source: Analysis of 2016 ABS Census.

*All occupations comprising of less than 1% of the total workforce under the ANZSCO classifications.
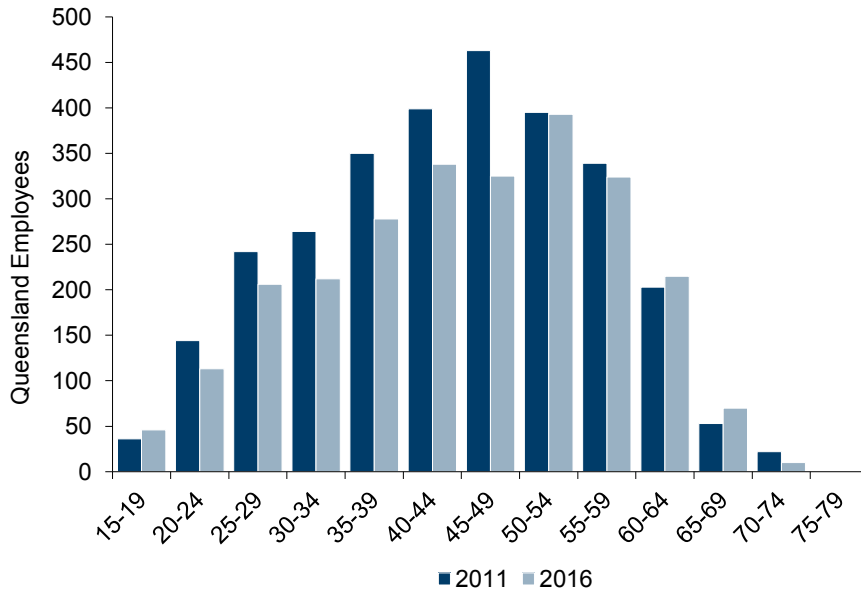
Workforce demographics - age

The average age in the maritime and ports sector in Queensland is 43.9 years. This is below the average of 45.4 for the broader transport and logistics industry.

The average age of the maritime and ports workforce increased by 0.7 years in the period from 2011 to 2016. This ageing profile can be seen in the Figure 12 below.

Transport and despatch clerks aged 20–29 decreased by 43 employees in the maritime and ports sector, while the occupation grew across the other age brackets. As this occupation represents 11 per cent of the sector workforce, this trend contributes to the ageing demographic.

Figure 13 - Gender Distribution of the Queensland Maritime and Ports Workforce

Source: Analysis of 2016 ABS Census.

Figure 12 - Age Distribution of the Queensland Maritime and Ports Workforce
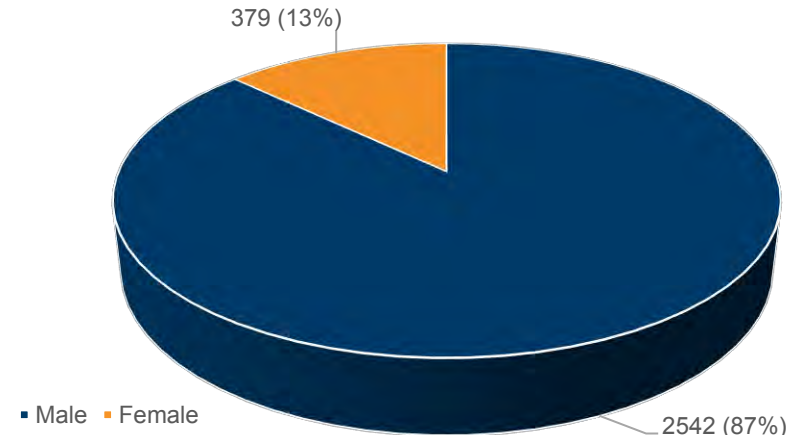
Source: Analysis of 2011 and 2016 ABS Census.

The total number of freight handlers decreased by 46, however the number of employees aged over 50 grew by 52. The number of employees aged between 25 and 39 declined by 84.

Workforce demographics – gender

Only 6.1 per cent of marine transport professionals are women. This occupation represents 28.6 per cent of the total maritime and ports sector workforce.

Only 1.5 per cent of the 473 freight handlers in the maritime and ports sector are women.

There are no female crane, hoist and lift operators, or other stationary plant operators in the maritime and ports sector. These two occupations combine to represent 6.2 per cent of the sectors total workforce.

In the maritime and ports sector, 36.5 per cent of transport and despatch clerks are female compared with only 30.8 per cent across the broader transport and logistics industry.

Geographical distribution of the workforce

Of the maritime and ports workforce in Queensland, 51 per cent is based in SEQ. While the sector declined across Queensland, this decline is focused within SEQ.

The maritime and ports workforce in SEQ declined by 19.4 per cent of the 2016 total. In contrast the workforce grew by 3.4 per cent across the rest of the state.

The largest regions of growth were Mackay which employed an additional 68 people in the sector between 2011 and 2016, and the Fitzroy region, which employed an additional 54.

The number of marine transport professionals declined by 104 employees in Queensland, 81 of which were from within SEQ.

The number of supply and distribution managers, and crane hoist and lift operators declined marginally in SEQ but increased in the rest of the state.

Figure 14 - Geographical Distribution of the Queensland Maritime and Ports Workforce
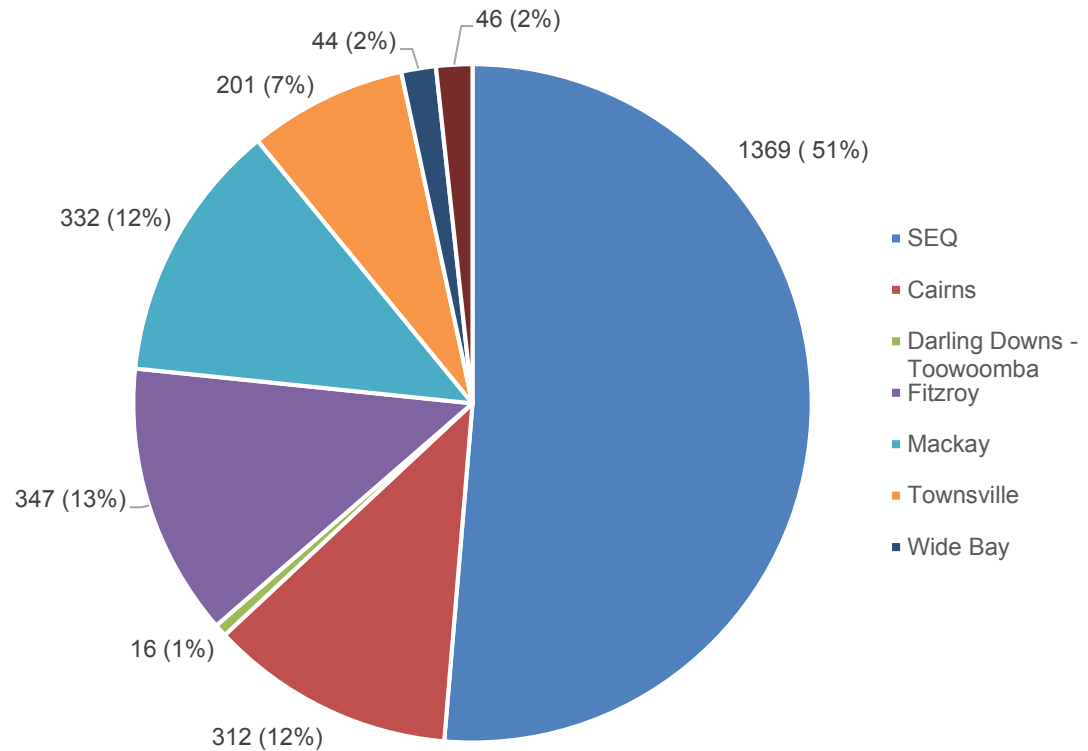
Source: Analysis of 2016 ABS Census.

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Rail

With a limited number of employers, rail in Australia faces challenges in providing a compelling employment proposition for a younger workforce. However, an ageing workforce means that a new generation of recruits are needed.

Key trends in the rail workforce include:

1. Skills shortage (particularly for train drivers)
2. An ageing workforce
3. Challenges in recruiting a younger workforce
4. Automation and technological change
5. In-house training challenges.

Trends impacting the rail workforce

"…the [rail] industry is facing a "siphon of knowledge" as tradespeople retire and are not replaced, and skills, knowledge and experience are not being passed on."

- *Australia's Rail Industry Parliamentary Inquiry, 2017*

Skills shortages

Train drivers are consistently in high demand and short supply[1, 2], with both New South Wales and Queensland having recently (and publicly) struggeld with train driver shortages.

In Queensland, the Citytrain service experienced an increase in train driver demand as a result of the introduction of new passenger lines and a greater frequency of services. Driver shortages occurred as a result of a need to train drivers in-house (with a training time of around 12 months), a shortage of trainers, a reliance on internal applicants, and a legacy of using overtime to meet service demand pressures.

These challenges are currently being addressed by Queensland Rail, which is aiming to hire 200 new train drivers to meet the recommendations of the Queensland Rail Train Crewing Practices Commission of Inquiry (Strachan Inquiry). At the same time, Sydney Trains faced the possibility of massive strike action as drivers complained of overwork[3].

Female participation

Increasing female participation has been suggested as a possible avenue to grow the labour pool, particularly for train drivers and railway track workers where it has been suggested the current lack of diversity may be acting as a detractor for new entrants into the workforce[4]. It is possible that increasing workforce flexibility in what has been a highly traditional workforce model will attract more women into this workforce.

Currently part-time female employees consist of more than half of the sector's total part-time workforce despite being less than 20 per cent of the total workforce[1]. This suggests that any plan to increase female participation rates in the workforce should be accompanied with strategies that support a culture of part-time employment.

An ageing workforce

The ageing workforce will be a significant concern across the rail sector over coming years, with the number of retirements predicted to steadily increase over time[5].

A further challenge with an ageing workforce is that retirement intentions are extremely difficult to predict, and are subject to a range of personal, social and economic factors. Further complicating planning for retirements, the average retirement age continues to be revised up over time, with 63.7 years the current industry average, compared with the Australian average of 61.5 years[6].

It is possible that strong loyalty to their employer, as well as the need to retain skills, has delayed the retirement of a number of employees. This older workforce sits in many of industry's senior positions[6].

These factors mean not only does the sector face the loss of a significant proportion of its skilled workforce in the next 10–20 years, but there is currently very little room for upward progression for younger employees at the beginning or middle-points of their careers[6].

This may be acting to dissuade young people from working in the sector as there are few internal career development opportunities.

A limited pool of employers and non-transferability of specialised skills means there are also few external development opportunities[7].

Working conditions and the attractiveness of the sector

In addition to the perceived lack of opportunity, key factors that may be contributing to the lack of attractiveness of rail occupations to a younger workforce include shift working and/or longer working hours and high rates of overtime[7]. This is possibly caused by shortages in key occupations like train drivers[3].

The 2017 Rail Labour Force Survey conducted by Australian Industry Standards showed remuneration and employment conditions to be one of the key reasons for the skills shortage in the sector[2].

The high levels of overtime in the rail sector and traditional (as opposed to flexible) employment models were called out in the Strachan Inquiry with a number of recommendations made for change in an effort to support ongoing workforce sustainability, particularly for Queensland Rail[8].

In addition, recent publicity around the strike action threatened by the Rail, Tram and Bus Union in New South Wales undoubtedly reinforced negative views of working conditions in the sector[9]. The sector will need to change its public image if it seeks to attract younger workers.

Workforce models

The rail workforce is typically permanent full-time employees who are male and ageing. While this has provided stability and longer tenure for rail employers, there have been recent initiatives by a number of employers to promote greater flexibility and diversity.

A key example is a move by Queensland freight operator Aurizon, which in 2017 made changes to its train crew operations to move away from traditional fixed labour models. This resulted in a reduction of around 185 permanent train crew, with the organisation focused on more flexible employment models that allow it to respond to fluctuations in service demand[10].

Overall, the sector is seeing increasing casualisation and flexibility in the workforce, which reduces pressures on full and part-time employees[1].

Automation and technological change

The introduction of driverless trains and automated systems in the rail industry, particularly internationally, are creating interest across Australia.

This interest extends across both freight and passenger rail. Rio Tinto has been working towards complete automation of its rail operations by the end of 2018, successfully completing its first fully autonomous journey in the Pilbara region in late 2017[11]. At the same time, driverless passenger trains have been piloted by the NSW Government on tracks at Rouse Hill in Sydney, to be rolled out on the Northwest Metro line in 2019[12].

The Australian Government's investment in Satellite Based Augmentation Systems, which will improve navigational accuracy in the rail sector, brings the possibility of autonomous rail in Australia closer[13].

A future with autonomous rail will require new workforce skills, including technological skills, remote operations skills, diagnostics, maintenance and communications skills[1].

Part of the challenge will also be that occupations which may not be required with autonomous trains, namely train drivers, are currently in workforce shortage and are being recruited. Careful transition planning will need to occur for that workforce to support ongoing career pathways where there has been significant employer investment.

In addition to automation, other technological changes are taking hold in the sector. One development of particular relevance to the workforce is the adoption of the European Train Control System (ETCS) by a number of operators around the country[1]. The ETCS allows trains to travel safely close together, increasing the capacity of rail networks[14]. This system will require a specialist skill set, both for implementation and for maintenance[1].

Training

The rail industry has tended to rely on government operators to train rail workers, which has restricted the pool of skilled labour available[6].

For these government operators, the need to train their own workers, especially drivers, means that immediate skills shortages cannot be easily filled with a casual and mobile workforce. This means early planning and a strong emphasis on training and development is essential to support the demands of the future labour pipeline.

Despite this, a 2017 parliamentary inquiry into the rail industry identified a steady decline in the provision of apprenticeships and other training opportunities in the sector[15].

At the same time, training and assessor skills are consistently identified in skills shortages surveys[1]. This is likely due to the uncompetitive remuneration on offer in these occupations, as skilled workers can often earn more as drivers or operational staff[1].

These deficiencies in training and the lack of a broad base of skilled workers to draw from have required shortened training times and recruitment of less-qualified staff into traineeships[16].

The Queensland context

Labour market

The rail labour market in Queensland has been dominated by two main providers, Queensland Rail (Citytrain and regional services) and Aurizon (which was created as a result of the privatisation of the narrow and standard gauge freight haulage in 2010).

However the rail labour market in Queensland is changing. For example in 2014 the BHP Mitsubishi Alliance were approved to use the Goonyella Coal Network for its 9 coal mines in the Bowen Basin.

In 2017, Aurizon announced its intention to sell its Queensland intermodal business and the Acacia Ridge intermodal terminal to Pacific National and Linfox. The Australian Competition and Consumer Commission (ACCC) raised concerns regarding this proposed acquisition on competition grounds in March 2018 [22].

The rail workforce is broadly comprised into occupations that are either considered 'Above Rail' such as train drivers, controllers and shunters, and 'Below Rail' including track workers, engineers and tradespeople.

For most rail occupations, increasing levels of unemployment in Queensland in the last few years combined with decreased demand for the workforce needed in the mining sector has led to a softening of the labour market particularly in regional communities. This has provided opportunities to better recruit skilled and unskilled labour in occupations including engineers, tradespersons, track workers and labourers.

However many of the occupations in the rail sector require specialist training (such as train drivers), which means that lateral hiring of skilled labour can be difficult given the small number of employers in Queensland. This leads to increased labour market competition for those specialist occupations.

Specialist roles

There are a number of specialist occupations which are typically trained in-house including train drivers, train guards, shunters and controllers. Each of these roles have varying training times from 25 weeks through to 52 weeks [8].

Other critical occupations for the rail industry due to the training pipeline are signals electrical engineers and signal electricians which require qualification as either an engineer or electrician, and additional signals qualifications (either Certificate IV or Masters) [17].

As there are a small number of Registered Training Organisations nationally who can provide this signals training, it also means that there is only a small qualified workforce pool in the wider community to draw from, and therefore the signals qualification is usually provided in-house.

Geographical distribution

For the majority of the rail freight services provided across Queensland, there is a widely dispersed workforce, which creates some barriers including professional isolation, limited career pathway opportunities, limited educational opportunities and a lack of critical mass of other staff for support, mentoring and collaboration. In addition, as the workforce is ageing, there are additional barriers to succession planning due to low staff numbers in some of the more remote locations.

At the same time, some employers are evaluating the financial viability of services in regional centres. A key example is Aurizon, which closed its Rockhampton rolling stock maintenance workshops resulting in employee redundancies for around 165 employees in 2017 and 2018 [10].

The Queensland Rail network map shown overleaf demonstrates the vast reach of the network, and the span of geographic areas that the workforce must service.
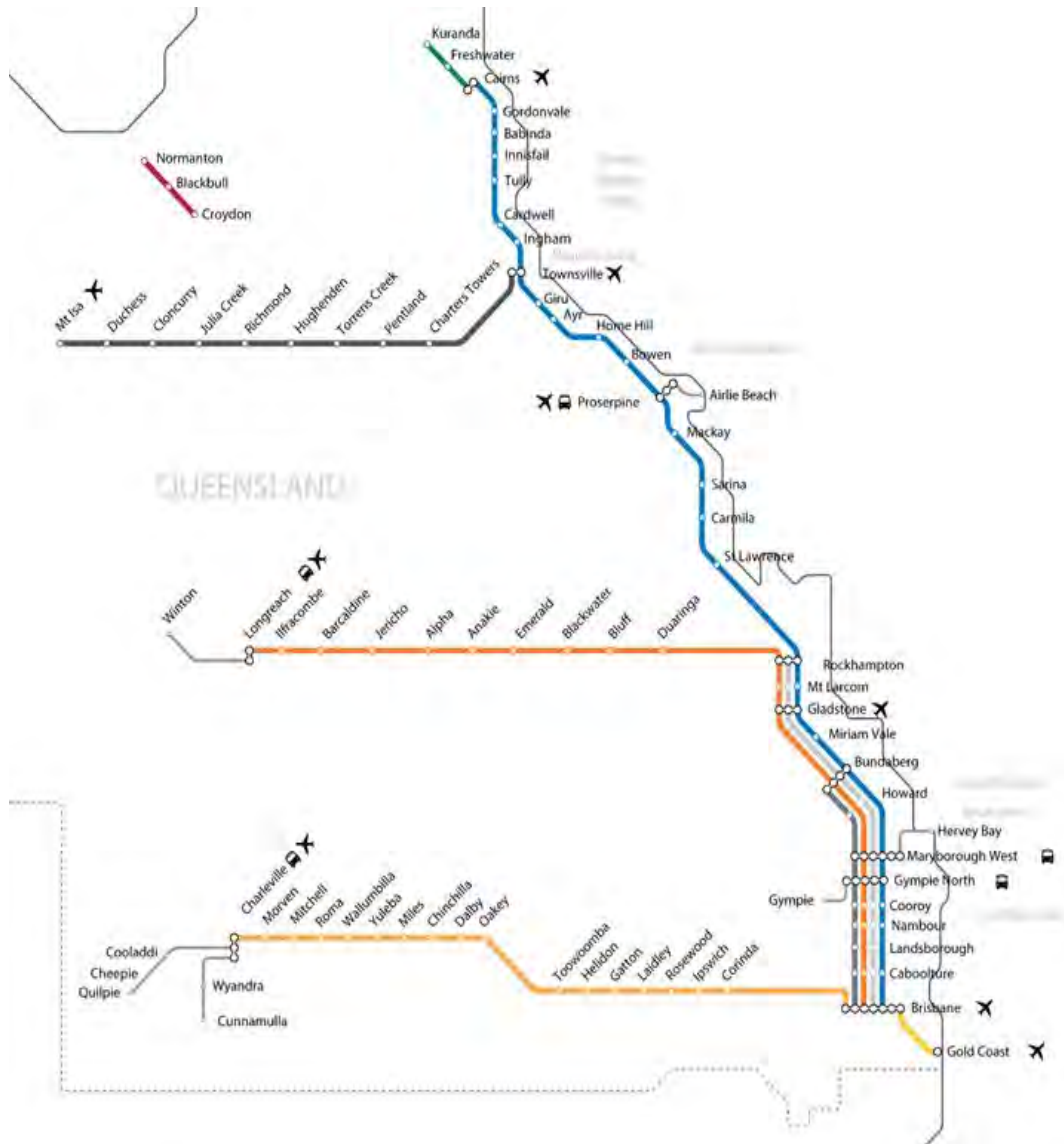
Figure 15 - Queensland Rail Network Map

Environmental impacts

The rail sector has been impacted by environmental events both in terms of its asset base across Queensland, as well as the demand for and cost of coal. Both of these have resulted in implications for Queensland's rail workforce.

In 2017, significant impacts were felt across the rail network in Queensland as a result of Cyclone Debbie (category four cyclone). For example, Aurizon noted this impacted 70 per cent of its asset base and that for the first time, all four networks in their Queensland Coal Network were closed simultaneously. The total impact to the business was estimated at $69 million for Below Rail and $20 million for Above Rail[10].

Aurizon, which provides the freight for coal, iron ore and other base metals, grains and livestock, are impacted by the price and demand for these markets, as well as government policies such as those regarding domestic production of coal in China[10]. The demand for rail freight has a direct impact on workforce demand.

Culture

The culture across rail employers in Queensland strongly supports the occupational health and safety of its workforce. In recent years employers have committed to improvements in its customer-centricity and service commitments, particularly on-time performance measures for passenger services.

This customer service focus is expected to continue to be a strong workforce focus in coming years as passenger rail networks keep pace with consumer demand, particularly in capital cities such as the Citytrain network in SEQ.

Inland Rail

The Australian Government is progressing the development of the Inland Rail, committing $9.3 billion to construct a 1700 km freight line between Melbourne and Brisbane. Early accommodation works have already commenced, and the first rail services are expected to commence in 2024–25[18].

The Inland Rail project is aimed at reducing transit times and increasing service reliability for freight movements between

Brisbane and Melbourne, as well as from regional centres such as the Darling Downs and West Moreton, to Brisbane[18]. When delivered, the additional connectivity of the freight rail network will present new opportunities for both the mining and agricultural sector to take advantage of the improved accessibility offered by the new supply chain.

This project has the potential to see uplift in freight volumes both through the realisation of new market opportunities, as well as from mode shift to the freight rail network. This will increase demand and associated employment for the rail transport sector, particularly train drivers, as well as supporting occupations such as stationary plant operators, and supply and distribution managers.

The current planned route for the Inland Rail project is to connect with the existing interstate line at Kagaru to service Acacia Ridge and Bromelton[19]. Current plans would see double-stacked trains broken up at Acacia Ridge, with single stacked wagons running to the port using the existing shared network[20].

The existing freight rail network in South East Queensland is constrained, and limited to operating during specific windows of opportunity given the priority afforded to passenger rail.

Gold Coast Light Rail

This network has recently been expanded to include Stage 2 – from Gold Coast University Hospital to Helensvale Station[21].

The network is likely to expand in the future, with an extension to Burleigh Heads endorsed by the Gold Coast City Council in 2016. A preliminary business case for Stage 3A was completed by Gold Coast City Council in December 2017[21]. Stage 3 is expected to deliver an additional 39 local jobs during the operation phase[21].

Workforce analytics

Size of the workforce

The Queensland rail sector workforce declined by 12.4 per cent to 5352 employees from 2011 to 2016. This represents 7.2 per cent of the total transport and logistics industry's workforce in 2016.

The largest areas of decline were in the occupations of train and tram drivers, as well as ticket salespersons.

Occupations that experienced growth were supply and distribution managers, which increased by 14 employees, and electrical engineers, which increased by 24 employees.

Workforce composition

Train and tram drivers represent 37 per cent of the rail transport workforce. This occupation declined by 12 per cent or 276 employees to a total of 1958 in the rail sector between 2011 and 2016.

Railway track workers represent 14 per cent of the rail transport workforce. This occupation declined by 11 per cent or 86 employees to a total of 730 in the

rail sector in the five years to 2016.

Other stationary plant workers represented 10 per cent of the rail transport workforce in 2016. This occupation declined by 17 per cent or 105 employees to a total of 618 in the rail sector between 2011 and 2016.

Occupational and environmental professionals declined by 72, which represents a 42 per cent decline in the rail sector between 2011 and 2016.

Figure 16 - Workforce Composition of Queensland's Rail workforce
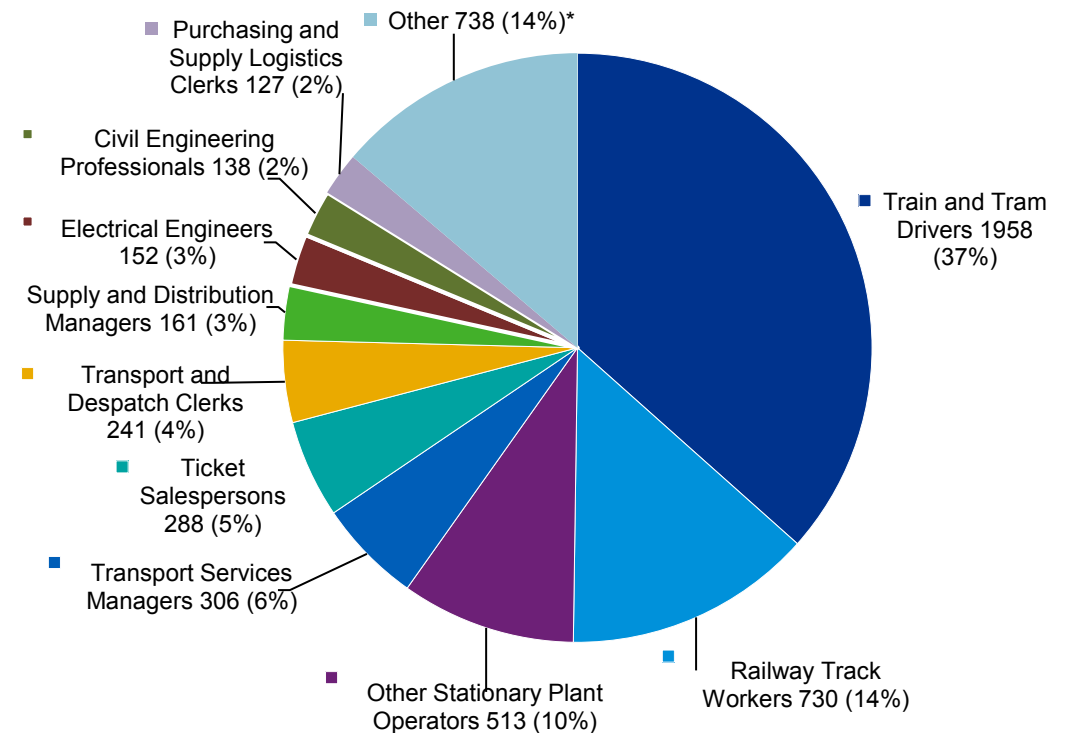
Source: Analysis of 2016 ABS Census.

*all occupations comprising of less than 1% of the total workforce under the ANZSCO classifications.

Workforce demographics – age

The average age in the rail sector is 45 years, increasing by 0.5 years in the period from 2011 to 2016. This is the second oldest sector in the transport and logistics industry. This ageing profile can be seen in Figure 17 below.

The significant decline in the 40-54 age brackets is largely due to train and tram drivers, which fell by 297, making up 43 per cent of the overall decline in these age brackets.

The number of train and tram drivers aged between 55–59 increased by 87 between 2011 and 2016.
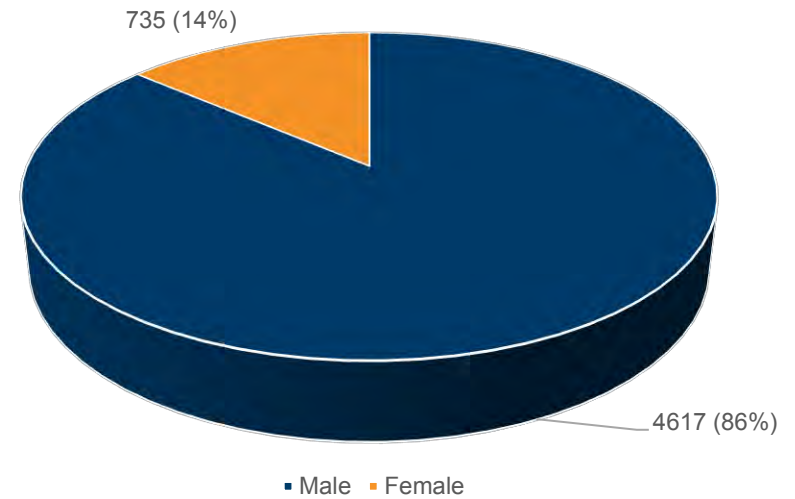
Similarly, the decline in railway track workers in the 40–54 age brackets is 99 of 101 in total. For workers 55 and above the number of railway track workers increased by 49.

Figure 17 - Age distribution of Queensland's rail workforce
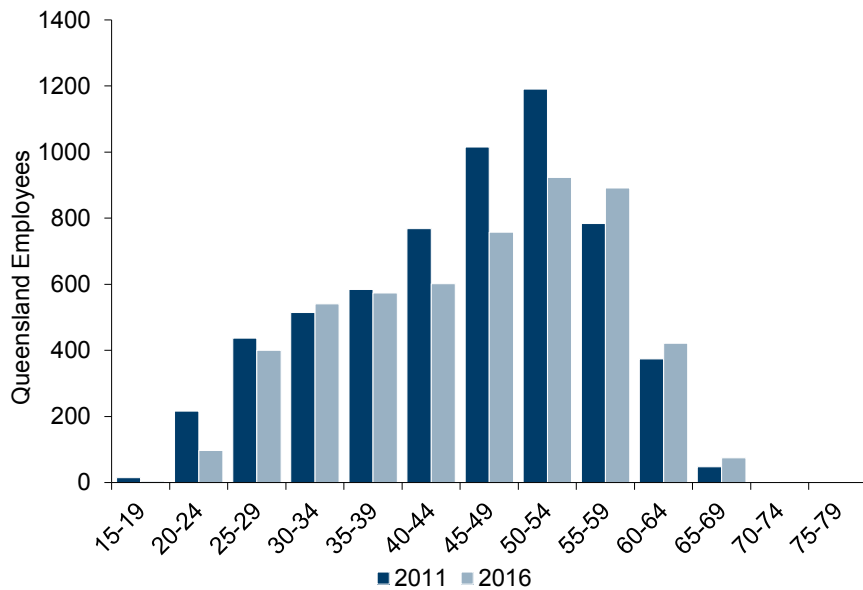
Source: Analysis of 2011 and 2016 ABS Census.

Figure 18 - Gender Distribution of Queensland's Rail workforce

Source: Analysis of 2016 ABS Census.

Workforce demographics – gender

Women represent 13.7 per cent of the workforce in the Queensland rail sector. The number of women employed in the sector grew by 19 per cent despite a decline in the total sector employment.

Females represent 9.5 per cent of train drivers in Queensland. This occupation represents 36.6 per cent of the total rail workforce.

Only 4.2 per cent of railway track workers are female.

In the rail transport sector, 11.6 per cent of the engineering professionals (excluding engineering managers) are female, however none of the 48 engineering managers are female.

Geographical distribution of the workforce

SEQ is the base for 51 per cent of the rail workforce in Queensland, with a significant regional presence across the Fitzroy and Mackay regions.

While the number of train drivers and railway track workers increased in SEQ, they declined by 301 and 148 respectively in regional Queensland.

Significant reductions in the regional workforce occurred in the Fitzroy, Mackay and Darling Downs – Toowoomba regions.

The largest decrease in workforce in SEQ between 2011 and 2016 was in ticket salespersons with a decline of 232 employees. This is likely due to the introduction of automated fare machines for the "*go* card", and in 2014 the agreement to use 7-Eleven convenience stores to sell, top-up and provide expiry change services for the "*go* card".

Figure 19 - Geographical Distribution of Queensland's Rail Workforce
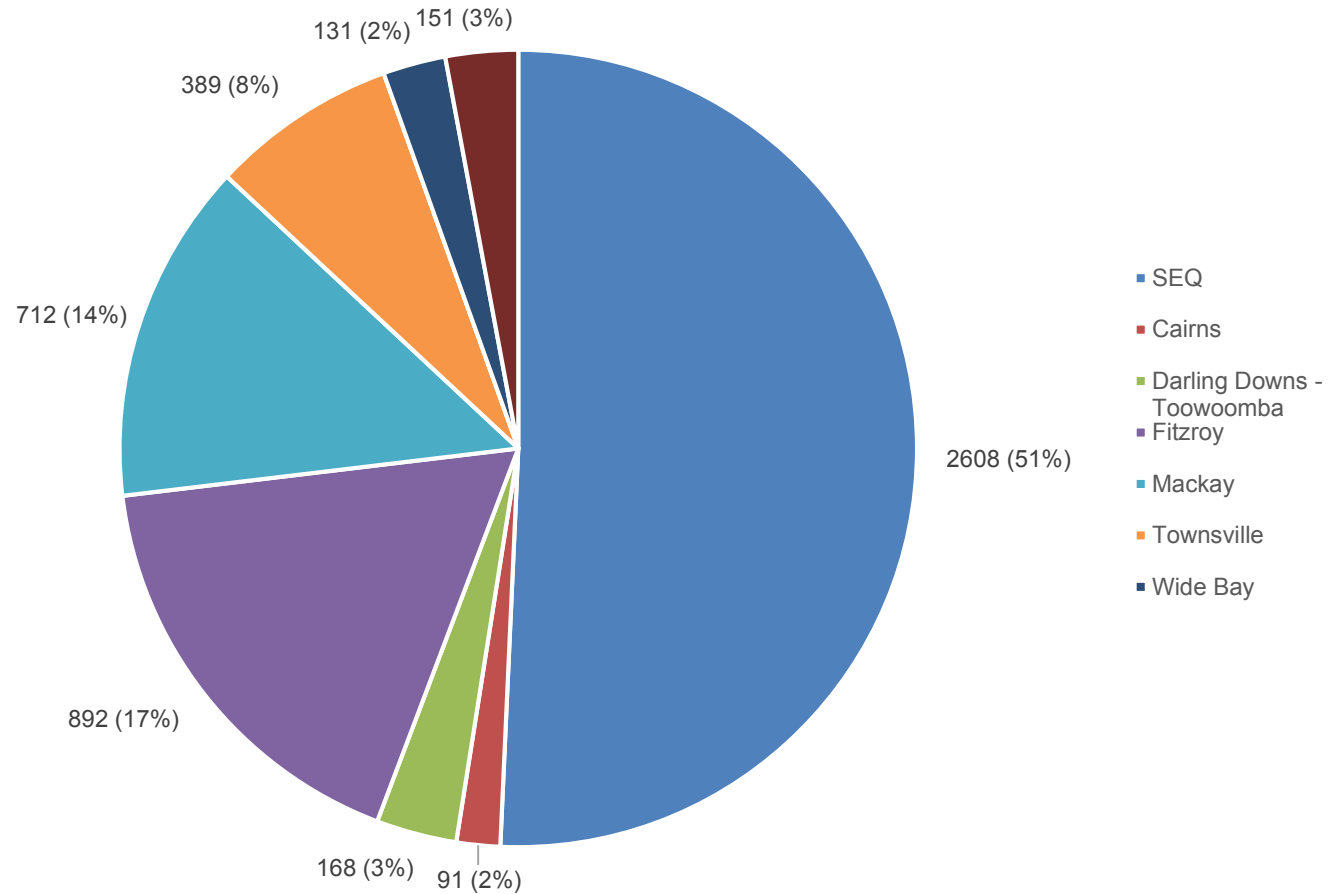
- SEQ
- Cairns
- Darling Downs - Toowoomba
- Fitzroy
- Mackay
- Townsville
- Wide Bay

Source: 2011 and 2016 ABS Census.

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Road Transport

The road transport industry is facing increasing pressure to deliver with traffic congestion worsening and under ever tightening operating margins. These factors are bearing consequences for the road workforce.

Key trends impacting the road transport workforce include:

1. Skill shortages
2. An ageing workforce
3. Limited female participation
4. Driver fatigue in the trucking industry
5. Emerging transportation technologies
6. Road congestion and bottlenecks
7. Impact of consumer preferences.

Trends impacting the road transport workforce

"Our cities are vital economic engines - but unless action is taken, growing congestion threatens to cost Australians $53 billion by 2031"

- *Infrastructure Australia, 2016*

Emerging transportation technologies

Rapid advancements in emerging technologies and innovations present a number of challenges and opportunities for the road transport sector into the future.

While both in Australia and internationally there is significant discussion around the workforce implications of automation and driverless vehicles, there is a view by industry that this is still a number of years away from adoption[1].

Despite this view, South Australia introduced legislation to allow for driverless vehicles on its roads in 2015 and participated in some of the first driverless vehicle trials with Volvo in 2015[2].

Despite recent setbacks related to road safety concerns, Uber are progressing internationally with on road trials of autonomous technology[3]. This technology has the potential to provide cheap on-demand transport, potentially replacing low-frequency suburban bus services as feeder routes to rail stations and activity centres.

For the trucking industry, the widespread use of autonomous vehicles is currently only practical in dedicated transport corridors. The primary reason for this is the limitations on current technologies, with leading developers like Embark Trucks in the United States still relying on human drivers to navigate small cities and towns and to enter and exit motorways[4].

This infrastructure currently does not exist in Australia. Moreover, the use of autonomous trucks must be limited when these vehicles will be navigating urban environments and private, human-driven vehicles. While driverless cars are currently being trialled on Australian roads, their widespread deployment is still significantly in the future[5].

Over the coming years, rapid advancements in vehicle-to-vehicle technologies will improve the performance of the road network, enhancing the safety and productivity of road freight. While still a way off, this new vehicle technology is changing the skill requirements of workers in the industry including their digital literacy, decision-making and problem-solving capabilities[1].

Road congestion and bottlenecks

Australia's population is growing and so is the domestic freight task. This is increasing the competing demand for capacity on the road network, particularly in urban areas and along first and last mile connections.

Congestion on roads at peak times, particularly in the south east corner, impacts on both passenger and freight transport.

Growing congestion along key freight corridors is limiting freight productivity, increasing travel times and reducing travel reliability, particularly around transport hubs and port areas[6]. This not only impacts the workforce productivity of drivers, but also impacts on driver conditions including levels of concentration and fatigue[7].

Similar constraints on urban roads add delays to travel by public transport, particularly buses. This can make meeting the established timetable difficult for drivers and negatively impact user perception of public transport. At the same time, this is driving a need to promote more public transport use to reduce

road congestion, with programs like the Palaszczuk Government's recent Fairer Fares initiative showing government's commitment to changing travellers' habits.

Skills shortages

The overall heavy vehicle driver workforce declined between 2011 and 2016. Stakeholders continue to report a skills shortage for heavy vehicle drivers[1].

There are a number of reasons for this, primary among them is an ageing workforce (as drivers move into retirement, they are not being replaced by younger drivers), the reputation of the occupation, licensing requirements and the predominance of small to medium-sized enterprises (SMEs).

SMEs make up the majority of road freight businesses and are often owner-operated, which limits skills transfer when an owner-driver retires[8]. In addition, they face tight operating margins, meaning they are often unwilling or unable to invest heavily in training drivers, preferring to recruit an already qualified workforce[8].

While the instability of oil prices and heavy competition are putting cost pressures on these businesses,

increasing regulatory requirements are also a factor[8].

The level of regulation in the sector has increased in order to improve the safety of both drivers and other road users. Most notably, the amendments made to the Heavy Vehicle National Law in mid-2018 so that every party in the heavy vehicle supply chain has responsibilities to ensure the safety of their activities, whether or not they are actually operating heavy vehicles[9].

For drivers themselves, there are no regulatory conditions added to their employment apart from the correct driving licence and dangerous goods driver licence where applicable[8]. However, licences issued are highly specific to the type of vehicle to be operated, with five heavy vehicle licence classes in Queensland[10] and across Australia[11].

While a number of challenges in overcoming this shortage exist, it is possible that as mining operations continue to wind down across the country, a pool of skilled drivers will become available to the road transport sector, with 10,900 truck drivers currently employed in Australia's mines[11].

This may also reduce upwards pressure on wages which have been inflated in recent years due to demand for skilled workers from the mining sector[9].

With Australia's road freight task expected to nearly double from 2015 to 2030, developing strategies to fill this shortage will become critical[1].

In the passenger space, while bus drivers are not in shortage on the whole, SMEs can struggle to recruit younger workers. This is because they predominantly offer casual positions with highly variable working hours, for example school bus services and rail replacement services which are not in consistent demand.

Similar to truck drivers, bus drivers must have a heavy vehicle licence if they are driving a bus with more than 12 passengers, with the type of licence depending on size of the bus and all articulated bus drivers requiring a heavy rigid licence. This means the passenger task faces many of the same regulatory requirements as the freight task.

Bus drivers can be particularly challenged by loading requirements imposed by the National Heavy Vehicle Regulator as they are often

unable to control the loading of passengers so that weight distribution meets regulation.

An ageing workforce

While the average age of workers across the transport and logistics industry is 45, the average age of truck drivers is 47 and the average age of bus and coach drivers is 57[1].

With workers under 40 only growing by 10.2 per cent in the last ten years (compared with 17 per cent growth across the whole sector), there is a danger that skills shortages already faced will intensify, while new shortages will emerge[1].

Many in the road transport sector have reported difficulties in recruiting and retaining young people[1]. There are numerous possible contributing factors making this sector unappealing to younger generations.

Firstly, there is a lack of obvious career development opportunities with the perception that driving roles are jobs rather than professions or careers, which extends across both freight and passenger transport[7]. For an ambitious young generation, career pathways are often not understood[1].

The increasing use of sub-contracting and other semi-permanent work arrangements may also be contributing[1], while the important role owner-operators play in the freight sub-sector may be creating high barriers to entry for young people.

Lastly, there may be a view held by employers in the sector that young drivers are too expensive to hire, with additional insurance excesses that can be up to ten times that of older drivers[12].

For passenger transport businesses, the limited and variable hours available as well the lack of work in school holiday periods (for those who offer school bus services) means the target employment market is an older workforce, particularly those transitioning to retirement.

Limited female participation

Further narrowing the labour pool available to the sector is the significant gender imbalances present, with some occupations, for example truck drivers, having low numbers of female employees, and the sector as a whole having one of the lowest shares of female participants nationally at 20 per cent[1].

While other sectors have been improving gender balances (the aviation sector in particular has made significant gains), this statistic has remained fairly constant in this sector over the last 30 years[1].

This low level of female participation is due to a combination of factors. Firstly, there may be a perception that jobs in road transport are not 'female friendly' from a workforce culture perspective.

At a more practical level, some roles that are highly manual and involve heavy lifting and manoeuvring may be physically difficult for many females[1]. Additionally, roles that involve long periods spent away from home, like long-haul truck driving, may also be impractical or undesirable for women if they have family or caring responsibilities[1]. Technological changes that are reducing the manual component of some of these occupations, as well as improved flexibility, may improve female participation in road transport[1].

Moves to specifically target women have already been taken by the mining industry, with a mining services contractor awarded an exemption to enable them to advertise for female-only truck driving positions in 2013 to improve

the safety culture within the organisation[13]. Other mining companies have hired women with no prior experience in order to improve the culture and perception of the industry[14].

Other programs, like Pilbara Heavy Haulage Girls, are providing driving training programs specifically for women[15].

More broadly in Queensland, the *Women Take the Wheel* initiative is providing tools to help businesses in the transport and logistics industry increase female participation in their workforce. A number of these businesses have found success, with the Queensland Bus Industry Council (QBIC) reporting significant benefits in increasing their gender diversity, increasing their talent pool and improving workforce sustainability in an area that can experience workforce shortages.

Driver fatigue in the trucking industry

Fatigue management and driver safety has been a core focus and priority for the road freight industry[1]. However, while stringent regulation is imposed on the industry, fatigue remains a key concern for employees particularly for long distance freight[1]. Industry

stakeholders have reported that current regulation encourages employees to "drive to the book", taking their rests when they are not fatigued.

The Heavy Vehicle National Law, which commenced in 2014, puts in place standard hours of work and rest as well as two levels of fatigue management accreditation, and is supervised by the Fatigue Expert Reference Group[12]. However, a 2017 report conducted by Macquarie University, drawing on research conducted through face-to-face interviews with 160 drivers and an online survey of an additional 626, showed a high proportion were working outside of safe hours and were driving fatigued, with more than 10 per cent working more than 80 hours a week[16].

A number of drivers are remunerated on a productivity basis, that is a "per trip" or "by load" basis, rather than for time worked. Productivity-based payment schemes such as these are often associated with unsafe work practices, including longer hours of driving, fewer or shorter rest breaks, increased fatigue related driving, and greater propensity to speed[17].

While this issue was not identified as of concern in passenger

transport, there are a number of businesses offering long-haul services which also face these regulations.

Impact of consumer preferences

As highlighted in the logistics trends, changing consumer preferences are driving innovation and the development of omni-channel logistics solutions, which are required to meet the demand for more personalised, dynamic delivery options. This is changing the patterns of travel movements for freight and light commercial vehicles, and increasing interactions between commercial vehicles with private vehicles on the inner city road network.

As a result, there has been an increasing trend for drivers to also be seen as representatives of their organisations, requiring greater interaction with clients and customers. Accordingly, workers are increasingly required to have a broad range of skills such as problem solving, customer service, and interpersonal skills[18].

From a passenger transport perspective, while demand for bus travel has remained fairly steady, the rise of on-demand transport services like Uber has disrupted traditional taxi models[19]. The Queensland Government introduced personalised transport reform measures in October 2017 to legalise and provide a stronger regulatory framework on operators for safety purposes[20]. Despite this, there are approximately 3100 taxis operating in Queensland, while Uber has more than 10,000 drivers across the state[21, 22].

The Queensland context

Labour market

The road transport sector is the largest in workforce size across the Queensland transport and logistics industry, employing over 33,000 people.

The Queensland road transport sector workforce consists of a broad range of businesses and operators; from small company truck and delivery drivers, through to bus and taxi drivers, and larger fleet based services and associated support staff and management.

Despite low barriers to entry, pressures on profit margins for SMEs has resulted in a fall in new business establishment numbers over the past five years. A growing trend is consolidation with small operators merging to increase efficiency and improve profitability[23].

This sector is in decline, with the Queensland workforce reducing by over 5000 employees between 2011 and 2016. Approximately 80 per cent of the road sector's workforce is represented by three occupations; truck drivers, bus and coach drivers, and automobile drivers.

Much of the decline in this sector is a result of a reduction in the demand for and number of truck drivers by 11 per cent between 2011 and 2016. This trend was observed across the state, however the total number of truck drivers within South East Queensland only reduced by 7 per cent while the rate of decline was 17 per cent across the rest of the state.

This reduction is likely driven by the dual decline in regional populations and mining activity over the same period, both in terms of haulage and reduced freight demand in supporting industries such as fuel and construction.

Specialist roles

Occupations within the road freight transport sector are not broadly considered to be in shortage. Despite the decline in the number of truck drivers employed in Queensland, shortages can occur for specific occupations due to licencing and experience requirements for multi-combination vehicles, and an ageing workforce.

On the other hand, bus drivers are in growth, with difficulties attracting a younger workforce creating the potential for shortages.

Freight movement

The Port of Brisbane is a significant hub for freight movement within SEQ. The role of the road transport sector in moving freight to the port has increased significantly over the last decade. In 2006, approximately 13 per cent of containers were moved via rail into Brisbane, which declined to less than 3 per cent in 2018[24]. As the role of the rail freight network has waned, the road transport sector has had to fill the gap in demand for freight movement.

This shift, coupled with population growth in SEQ has resulted in a slower rate of decline across the road workforce.

Heavy vehicle regulation

Industry stakeholders reported that the complexity of regulatory arrangements, combined with enforcement and compliance (through fines and points) impacting on drivers wages, and possibly their income through suspension of their licence, have led to workforce attrition.

Employers reported that the introduction of electronic work diaries has presented a challenge for older drivers, with some retiring prematurely in part to avoid having to adopt to this new technology.

The fatigue regulatory challenge is more pronounced for smaller transport businesses who do not have the administrative workforce to support their drivers to the same degree as larger businesses. For example, it was noted that some larger businesses provide their drivers with information on when and where their stops need to occur to meet the regulatory requirements.

Monitoring driver hours over a rolling 14-day period was identified as a particular challenge. This was consistent across all companies regardless of size.

Investment landscape

There has been a notable shift in investment priorities for transport infrastructure in recent decades, away from large scale road infrastructure investments towards public transport infrastructure and services.

Examples include the Queensland Government's $5.4 billion commitment to construct the Cross River Rail project, and the Brisbane City Council's proposed Brisbane Metro project.

The Brisbane Metro will see a new fleet of 60 metro vehicles introduced to enable a turn up and go system along two high frequency lines. The introduction of the new metro vehicles will enable existing buses to be used to improve services along suburban routes[25].

Workforce analytics

Size of the workforce

The Queensland road transport workforce declined by 16 per cent to 33,406 employees from 2011 to 2016.

Of this decline, 78 per cent was in two occupations; truck drivers and couriers and postal deliverers.

This is in part reflective of the movement of these occupations, particularly couriers and postal deliverers from the road transport sector into the logistics sector.

Workforce composition

Truck drivers represent 45 per cent of the road transport workforce. This occupation declined by 11 per cent or 1878 employees across the entire transport and logistics industry to a total of 17,598 between 2011 and 2016. Within just the road transport sector, truck drivers declined by 14 per cent (2681) to 15,129.

Bus and coach drivers represent 18 per cent of the road transport workforce. This occupation grew by 5 per cent or 303 employees in the road transport sector to a total of 6020 between 2011 and 2016.

Automobile drivers (drivers providing passenger transport in cars) represent 12 per cent of the road transport workforce. While this occupation declined by 11 per cent or 511 employees within the road transport sector, it grew by 15 per cent across the entire transport and logistics industry.

Figure 20 - Workforce Composition of the Queensland Road Transport Workforce
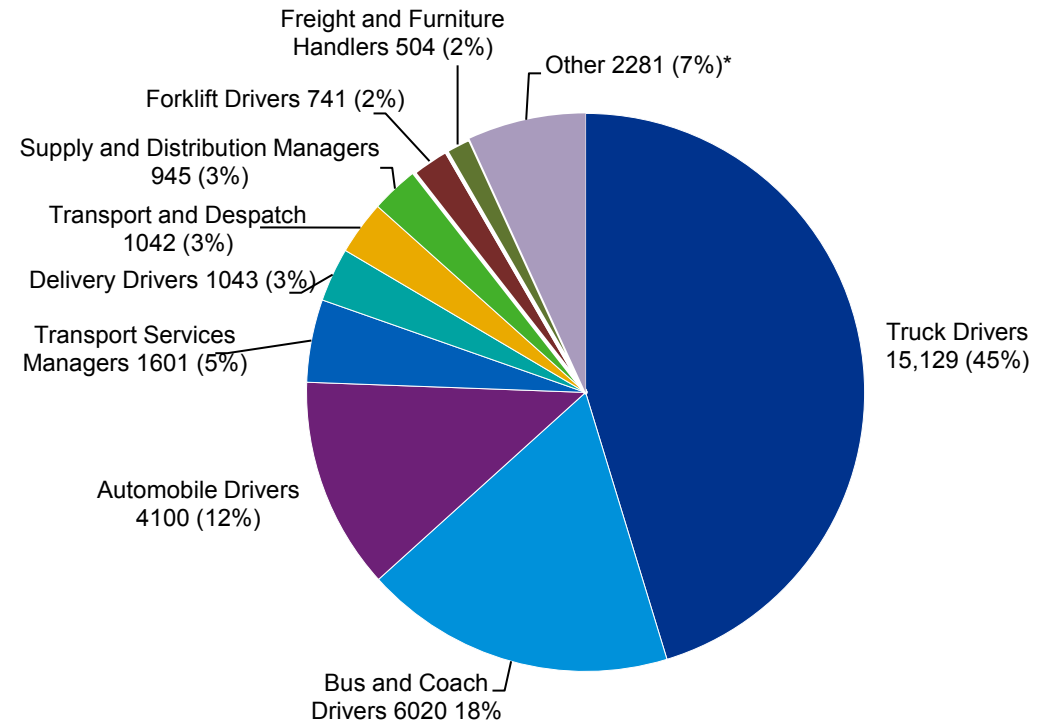
Source: 2011 and 2016 ABS Census.

*All occupations comprising of less than 1% of the total workforce under the ANZSCO classifications.
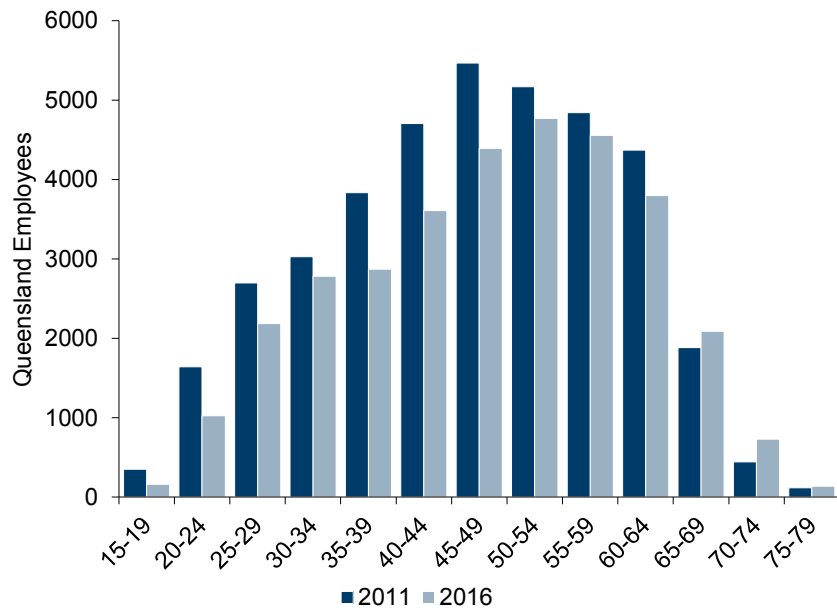
Workforce demographics - age

The average age in the road transport sector is 46.5 years. This is the oldest in the transport and logistics industry.

The average age of the road transport sector workforce increased by 1.4 years in the period from 2011 to 2016. This ageing profile can be seen in Figure 21 below. The only age groups experiencing growth between 2011 and 2016 were the 65–69 and 70–74 age cohorts. This is the only sector with a workforce in the 75–79 age bracket.
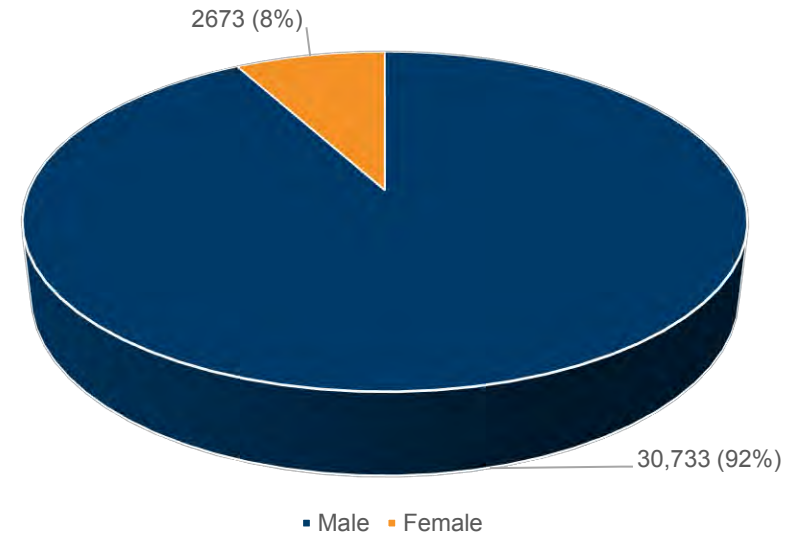
Across the transport and logistics industry, truck drivers younger than 50 declined by 2166. Between the ages of 35–49 there was a decline of 1722. Drivers older than 50 increased by 288.

Figure 22 - Gender Distribution of the Queensland Road Transport Workforce

2673 (8%)

30,733 (92%)

■ Male ■ Female

Figure 21 - Age Distribution of the Queensland Road Transport Workforce

■ 2011 ■ 2016

Source: Analysis of 2011 and 2016 ABS Census.

Workforce demographics - gender

Women represent 8 per cent of the workforce in the road transport sector in operational roles. This is the lowest in the transport and logistics industry, which averages 15.3 per cent across all sectors.

Only 2 per cent of truck drivers in Queensland are female. This is a key reason for the low proportion of women working in the road sector, as truck drivers represent 47 per cent of the total road transport sector workforce.

Excluding truck drivers, the proportion of women working in the road transport sector increased to 13 per cent.

In the road transport sector, 35 per cent of females are employed as bus drivers.
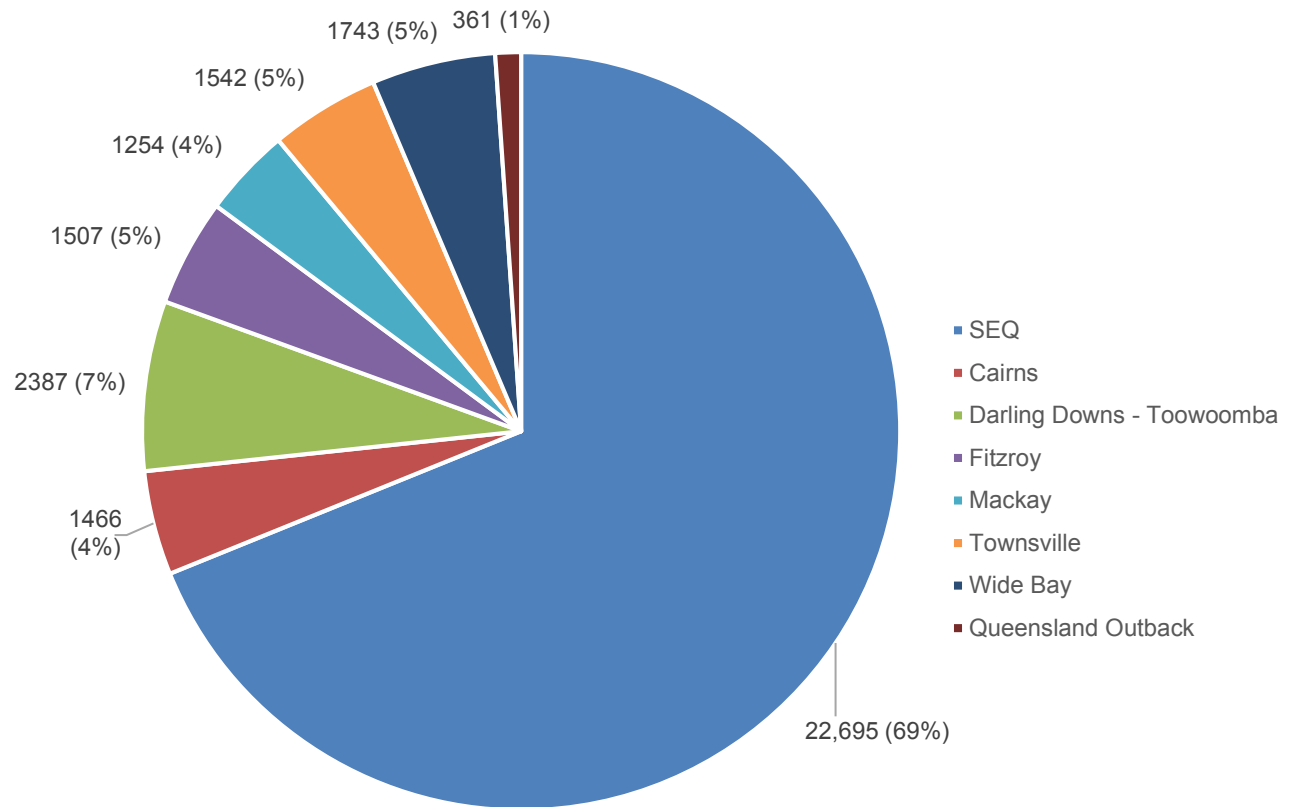
Geographical distribution of the workforce

The majority (69 per cent) of Queensland's road transport workforce is based in SEQ. Employment trends were broadly consistent across all transport and logistics sectors.

The largest regional centres are in the Darling Downs, reflecting the limited access to other transport modes (such as ports, aviation and rail) compared with the rest of Queensland.

The number of truck drivers outside SEQ declined by 1073 across the road transport sector. This represents 10 per cent of the decline in the entire transport and logistics industry workforce outside of SEQ as at the 2016 Census.

Figure 23 - Geospatial Distribution of the Queensland Road Transport Workforce

Legend:
- SEQ
- Cairns
- Darling Downs - Toowoomba
- Fitzroy
- Mackay
- Townsville
- Wide Bay
- Queensland Outback

Data labels:
- 1743 (5%)
- 361 (1%)
- 1542 (5%)
- 1254 (4%)
- 1507 (5%)
- 2387 (7%)
- 1466 (4%)
- 22,695 (69%)

Source: Analysis of 2016 ABS Census.

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Appendix A – ANZSCO Occupation List

Occupation Title	Description
Aircraft Maintenance Engineers	Aircraft Maintenance Engineers maintain and repair aircraft structures, and avionic and mechanical systems.
Air Transport Professionals	Air Transport Professionals fly and navigate aircraft, control and direct air traffic to ensure the safe and efficient operation of aircraft in flight and on the ground, and instruct students in flying aircraft.
Automobile Drivers	Automobile Drivers drive motor cars to transport passengers to destinations.
Automobile, Bus and Rail Drivers not further defined	Automobile, Bus and Rail Drivers drive cars, buses, coaches, trains and trams to transport passengers and freight.
Boat Builders and Shipwrights	Boat Builders and Shipwrights construct, fit out and repair boats and ships.
Bus and Coach Drivers	Bus and Coach Drivers drive buses and coaches to transport passengers over established and special routes.
Civil Engineering Professionals	Civil Engineering Professionals design, plan, organise and oversee the construction of civil engineering projects such as dams, bridges, pipelines, gas and water supply schemes, sewerage systems, roads, airports and other structures; analyse the likely behaviour of soil and rock when placed under pressure by proposed structures and design structural foundations; analyse the statistical properties of all types of structures and test the behaviour and durability of materials used in their construction; plan and develop transportation systems; and estimate and monitor the construction costs of projects.
Construction, Distribution and Production Managers (not further defined)	Construction, Distribution and Production Managers plan, organise, direct, control and coordinate building and construction, engineering, importing, exporting and wholesaling, manufacturing, production, supply and distribution activities within organisations.
Construction Managers	Construction Managers plan, organise, direct, control and coordinate the construction of civil engineering projects, buildings and dwellings, and the physical and human resources involved in building and construction.
Couriers and Postal Deliverers	Couriers and Postal Deliverers deliver small items such as documents, messages, mail and parcels.

Crane, Hoist and Lift Operators	Crane, Hoist and Lift Operators operate stationary and mobile cranes, hoists, lifts and winches to lift, move and place materials, equipment and people in areas such as building sites, factories, mines, sawmills, wharves and shipyards.
Deck and Fishing Hands	Deck and Fishing Hands maintain ships' equipment and structures, and catch fish, crustacea and molluscs.
Delivery Drivers	Delivery Drivers drive vans and cars to deliver goods.
Driving Instructors	Driving Instructors instruct individuals and groups in the theory and application of driving motor vehicles.
Electrical Engineers	Electrical Engineers design, develop and supervise the manufacture, installation, operation and maintenance of equipment, machines and systems for the generation, distribution, utilisation and control of electric power.
Engineering Managers	Engineering Managers plan, organise, direct, control and coordinate the engineering and technical operations of organisations.
Forklift Drivers	Forklift Drivers operate forklifts to move bulk materials, containers, crates, palletised goods, cartons and bales.
Freight and Furniture Handlers	Freight and Furniture Handlers load and unload trucks, containers and rail cars, and transfer cargo between ships and other forms of transport and storage facilities.
ICT Professionals not further defined	ICT Professionals perform analytical, conceptual and practical tasks which support the efficient and secure provision of information and communication technology (ICT) services to government, commercial and industrial organisations, and individuals.
Importers, Exporters and Wholesalers	Importers, Exporters and Wholesalers plan, organise, direct, control and coordinate the operations of importing, exporting and wholesaling establishments.
Inspectors and Regulatory Officers	Inspectors and Regulatory Officers administer and enforce government and corporate regulations and standards.
Life Scientists	Life Scientists examine the anatomy, physiology and biochemistry of humans, animals, plants and other living organisms to better understand how living organisms function and interact with each other and the environment in which they live.
Logistics Clerks not further defined	Logistics Clerks coordinate the purchasing, receipt, recording, monitoring, and distribution of goods and services, and the clearance and collection of imported cargo and shipment of cargo for export.
Mail sorters	Mail sorters receive, sort and Despatch mail in organisations and postal sorting centres.
Manufacturers	Manufacturers plan, organise, direct, control and coordinate the operations of small manufacturing establishments.

Marine Transport Professionals	Marine Transport Professionals control and manage the operations of ships, boats and marine equipment.
Miscellaneous Clerical and Administrative Workers not further defined	This unit group covers Clerical and Administrative Workers not elsewhere classified. It includes Production Assistants (Film, Television, Radio or Stage), Proof Readers, Radio Despatchers, Clinical Coders and Facilities Administrators.
Occupational and Environmental Health Professionals	Occupational and Environmental Health Professionals develop, implement and evaluate policies and programs to monitor environmental health and occupational health and safety and related legislation to ensure safe and healthy working conditions, and assist injured staff through the workers' compensation and rehabilitation process.
Other Engineering Professionals	This unit group covers Engineering Professionals not elsewhere classified. It includes Aeronautical Engineers, Agricultural Engineers, Biomedical Engineers, Engineering Technologists, Environmental Engineers and Naval Architects (Aus) / Marine Designers (NZ).
Other Miscellaneous Technicians and Trades Workers	This unit group covers Technicians and Trades Workers not elsewhere classified. It includes Divers, Interior Decorators, Optical Dispensers (Aus) / Dispensing Opticians (NZ), Optical Mechanics, Photographer's Assistants, Plastics Technicians, Wool Classers and Fire Protection Equipment Technicians.
Other Mobile Plant Operators	This unit group covers Mobile Plant Operators not elsewhere classified. It includes Aircraft Baggage Handlers and Airline Ground Crew, Linemarkers, Paving Plant Operators, Railway Track Plant Operators, Road Roller Operators and Streetsweeper Operators.
Other Stationary Plant Operators	This unit group covers Stationary Plant Operators not elsewhere classified. It includes Boiler or Engine Operators, Bulk Materials Handling Plant Operators, Cement Production Plant Operators, Concrete Batching Plant Operators, Concrete Pump Operators, Paper and Pulp Mill Operators, Railway Signal Operators, Train Controllers, Waste Water or Water Plant Operators and Weighbridge Operators.
Packers	Packers weigh, wrap, seal and label chocolate, fruit, vegetables, meat, seafood and other products.
Packers and Product Assemblers not further defined	Packers and Product Assemblers wrap and place items into containers and seal containers in preparation for Despatch to customers, and assemble components and subassemblies of products.
Primary Products Inspectors	Primary Products Inspectors inspect animals, plants and agricultural produce and facilities to ensure compliance with government and industry standards with respect to quality, health and licensing.
Production Managers	Production Managers plan, organise, direct, control and coordinate the production activities of forestry, manufacturing and mining organisations including physical and human resources.

Purchasing and Supply Logistics Clerks	Purchasing and Supply Logistics Clerks prepare and process orders for goods and services, monitor stock levels and supply sources and maintain stock and inventory levels, record and coordinate the flow of materials between departments, prepare production schedules, and administer and coordinate storage and distribution operations within organisations.
Railway Track Workers	Railway Track Workers lay and repair tracks for railways, tramways, quarries and mines, and install and repair signals and other equipment.
Recycling and Rubbish Collectors	Recycling and Rubbish Collectors collect household, commercial and industrial waste for recycling and disposal.
Road and Rail Drivers not further defined	Road and Rail Drivers drive cars, buses, coaches, trains, trams, vans and trucks to transport passengers and freight.
Storepersons	Storepersons receive, handle and Despatch goods in stores and warehouses.
Supply and Distribution Managers	Supply and Distribution Managers plan, organise, direct, control and coordinate the supply, storage and distribution of goods, products and services produced and used by organisations.
Ticket Salespersons	Ticket Salespersons sell tickets and make reservations for services such as travel and admission to sporting and entertainment venues, and collect fares on transport vehicles.
Train and Tram Drivers	Train and Tram Drivers drive trains and trams to transport passengers and freight on rail networks.
Transport and Despatch Clerks	Transport and Despatch Clerks verify and maintain records of incoming and outgoing goods, prepare goods for Despatch, arrange clearance and collection of imported cargo from customs and bond stores, and arrange shipment of cargo for export.
Transport Services Managers	Transport Services Managers organise and control the buying and selling of vehicles for rental agencies and coordinate the leasing of vehicles, the operations of railway stations, and the operations of enterprises that operate fleets of vehicles to transport goods and passengers.
Travel Attendants	Travel Attendants provide services for the safety and comfort of passengers in aircraft, ships and railway sleeping cars.
Truck Drivers	Truck Drivers drive heavy trucks, removal vans, tankers and tow trucks to transport bulky goods and liquids.
Vocational Education Teachers (Aus) / Polytechnic Teachers (NZ)	Vocational Education Teachers teach one or more subjects within a prescribed course of study at technical and further education (TAFE) institutes, polytechnics and other training institutes to tertiary students for vocational education and training purposes.