



# Process Manufacturing, Recreational Vehicles and Laboratory Industry Reference Committee (IRC)

**PMC Manufactured Mineral Products Training Package**  
IRC Skills Forecast and Proposed Schedule of Work 2017-2021

June 2017

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*Prepared on behalf of the Process Manufacturing, Recreational Vehicles and Laboratory IRC for the Australian Industry and Skills Committee (AISC)*



## **IRC Skills Forecast and Proposed Schedule of Work 2017-2021**

This IRC Skills Forecast and Proposed Schedule of work 2017-2021 has been produced with the assistance of funding provided by the Commonwealth Government through the Department of Education and Training.

IBSA also acknowledges the September 2016 Four Year Work Plan, produced by Manufacturing Skills Australia (MSA), on which this version is based.

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## Executive Summary

The Manufactured Mineral Products Industry Skills Forecast and Proposed Schedule of Work, links the sector trends, workforce skill priorities and training plan to effectively meet the future skill needs of this sector in transition by:

- providing an understanding of the industry including its primary activities, its size and sub sectors, type and location of employers, and opportunities and challenges (*Sector Overview*);
- outlining the critical workforce challenges and opportunities (*Employment*);
- forecasting future skills priorities by describing trends in workplace and job design (*Skills Outlook*); and
- proposing and prioritising training product development and review activities (*Training Product Review Plan*).

This June 2017 update to the Manufactured Mineral Products Industry Skills Forecast and Proposed Schedule of Work augments the earlier work plan submitted in September 2016 with an executive summary, incorporation of updated priorities for training product development and review following recent consultations with the Process Manufacturing, Recreational Vehicles and Laboratory Industry Reference Committee and State Training Authorities.

### What is the manufactured mineral products industry?

The manufactured mineral products industry uses minerals sourced from the extractive industries, such as quarrying, to produce a range of products used by other downstream industries. It has close links to the construction industry with all of its principal products used in that sector. Its products are also used in most other industries including building, food and beverage, heavy industry and landscaping.

Enterprises are generally micro or small along with some very large, well-known companies including CSR Limited, Boral Limited and James Hardie Industries. Enterprises are distributed across Australia aligning somewhat with the population distribution.

While there are no general licensing issues, licensing arrangements are consistent with relevant legislation and regulations applying in each State and Territory.

### Critical workforce challenges and opportunities

Workforce challenges faced by the manufactured mineral products industry include:

- ageing workforce – the industry will need to source new workers as existing workers retire;
- new workers will need sound foundation skills to underpin their training and work roles;
- low enrolment in PMC Manufactured Mineral Products qualifications raises concerns about the supply pool available to replace the ageing workforce. Enrolments have been decreasing since 2012. Only nine registered training organisations have had scope to deliver PMC qualifications in recent years;
- low activity in PMC qualifications raises concerns about the relevance of the current PMC Training Package to industry;
- economic volatility and downturn/transition from construction to processing in the resources sector, with a subsequent reduction in the amount of industrial products required, may make the manufactured mineral products industry less viable and less attractive to potential job seekers; and

- overseas products may be cheaper but may not conform to Australian standards – the challenge is to continue to provide and promote products that meet standards when price is a major influence.

The introduction and expansion of automation and robotics is both a challenge and an opportunity. It may decrease employment levels and increase the level and technical nature of skills required in the industry.

Other opportunities, which also benefit from a higher skilled and more technical workforce, include:

- introduction of advanced manufacturing processes, nanotechnology and creation and usage of advanced materials; and
- creation of sustainable and environmentally friendly “green” products to meet consumer demand.

## Forecasting skills priorities

The skills priorities have been informed by international and national trends and stakeholder feedback.

Industry access to international design and construction ideas, new technologies and processes, automation, new designs, new advanced and composite materials and consumer demand for environmentally sustainable products have implications for the higher level and technical skills required in the future manufactured mineral products industry.

Requirements for automation and robotics skills are expected to increase as sectors including brickmaking and glass blowing become more automated.

Mobile batch plant technology has been influencing the concrete industry and may become more prevalent as major infrastructure projects proceed and may require changes in skill requirements and job design.

## Training Package priorities

The Training Package Review Plan 2017-18 to 2020-21 was developed by the IRC with support from IBSA Manufacturing based on identified industry trends. This plan lists the priorities over the next four years, the rationale for these priorities, and the proposed scope and timeframes for these activities.

The items identified as critical and proposed for inclusion as a priority for the 2017-2018 schedule of work is to develop a case for change.

## Administrative Information

**Name of Industry Reference Committee (IRC):** Process Manufacturing, Recreational Vehicles and Laboratory IRC

**Name of Skills Service Organisation (SSO):** Innovation & Business Skills Australia (IBSA Manufacturing)

## Sector Overview

### Manufactured mineral products - Snapshot of the industry

The Australian manufactured mineral products industry includes a diverse range of areas which use minerals sourced from the extractive industries, such as quarrying. These minerals are used to produce a range of products which are used by other downstream industries, such as building and construction, food and beverage, heavy industry, automotive and landscaping.

The major hubs for the manufactured mineral products industry are located in New South Wales, Queensland and Victoria. The major players in the industry are:

- Boral Limited
- CSR Limited.

There are six qualifications in the PMC Manufactured Mineral Products Training Package ranging from Certificate II to Graduate Certificate level.

- PMC20116 Certificate II in Manufactured Mineral Products
- PMC30116 Certificate III in Manufactured Mineral Products
- PMC40116 Certificate IV in Manufactured Mineral Products
- PMC50116 Diploma of Manufactured Mineral Products
- PMC60116 Advanced Diploma of Manufactured Mineral Products
- PMC70116 Vocational Graduate Certificate in Refractories Engineering

Businesses in this industry are covered in Subdivision 20 Non-Metallic Mineral Product manufacturing and includes the following classes:

- Class 2010 Glass and Glass Product Manufacturing
- Class 2021 Clay Brick Manufacturing
- Class 2029 Other Ceramic Product Manufacturing
- Class 2031 Cement and Lime Manufacturing
- Class 2032 Plaster Product Manufacturing
- Class 2033 Ready-Mixed Concrete Manufacturing
- Class 2034 Concrete Product Manufacturing
- Class 2090 Other Non-Metallic Mineral Product Manufacturing<sup>1</sup>

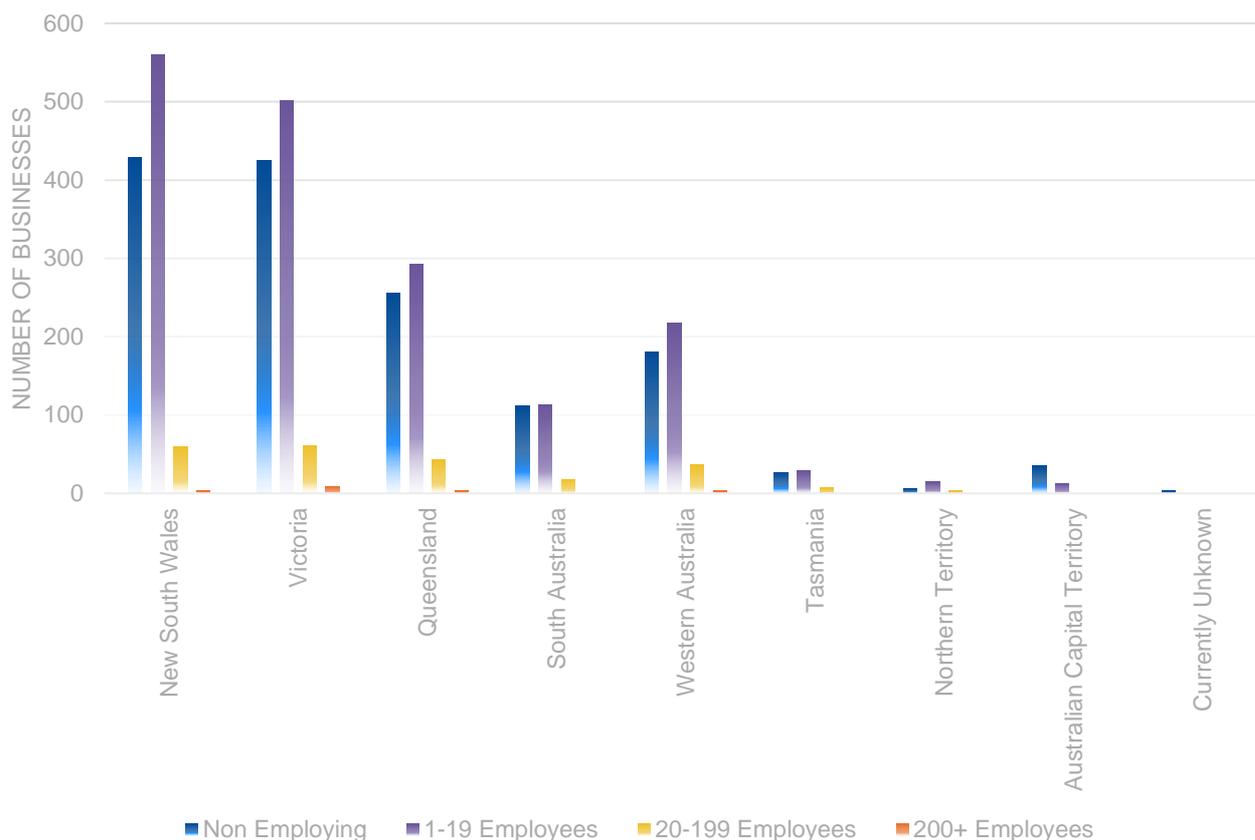
<sup>1</sup> Australian Bureau of Statistics, Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 (Revision 1) <http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/A77D93484DC49D63CA25712300056842?opendocument>

## Business numbers and size

The distribution of businesses in this industry closely aligns with the national population distribution. New South Wales and Victoria account for nearly two thirds of all businesses. At the end of June 2015, 93% of businesses were micro and small businesses, reflecting the fragmented nature of the industry.<sup>2</sup>

*Note: Businesses have been classified according to the number of employees.*

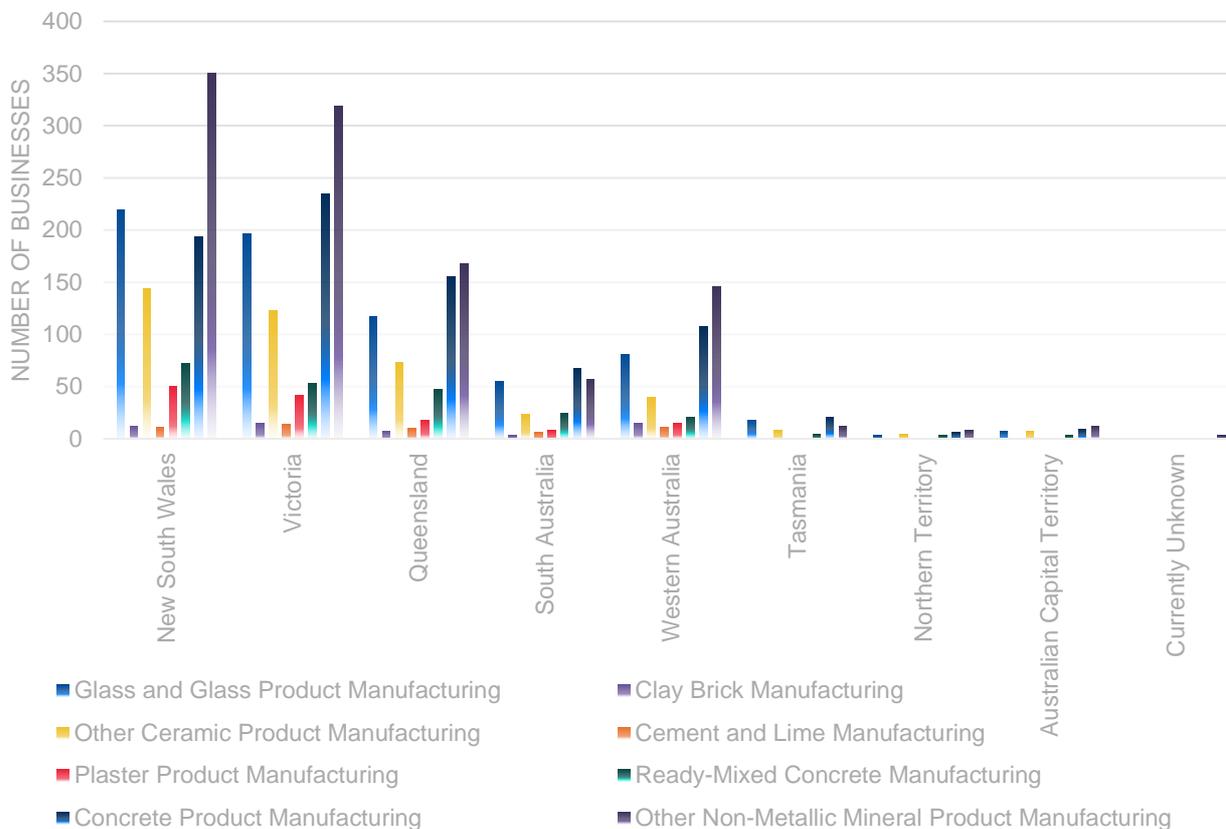
### Manufactured mineral products, Australia Business numbers by state and employment size, June 2015



Source: ABS, Counts of Australian Businesses, June 2015

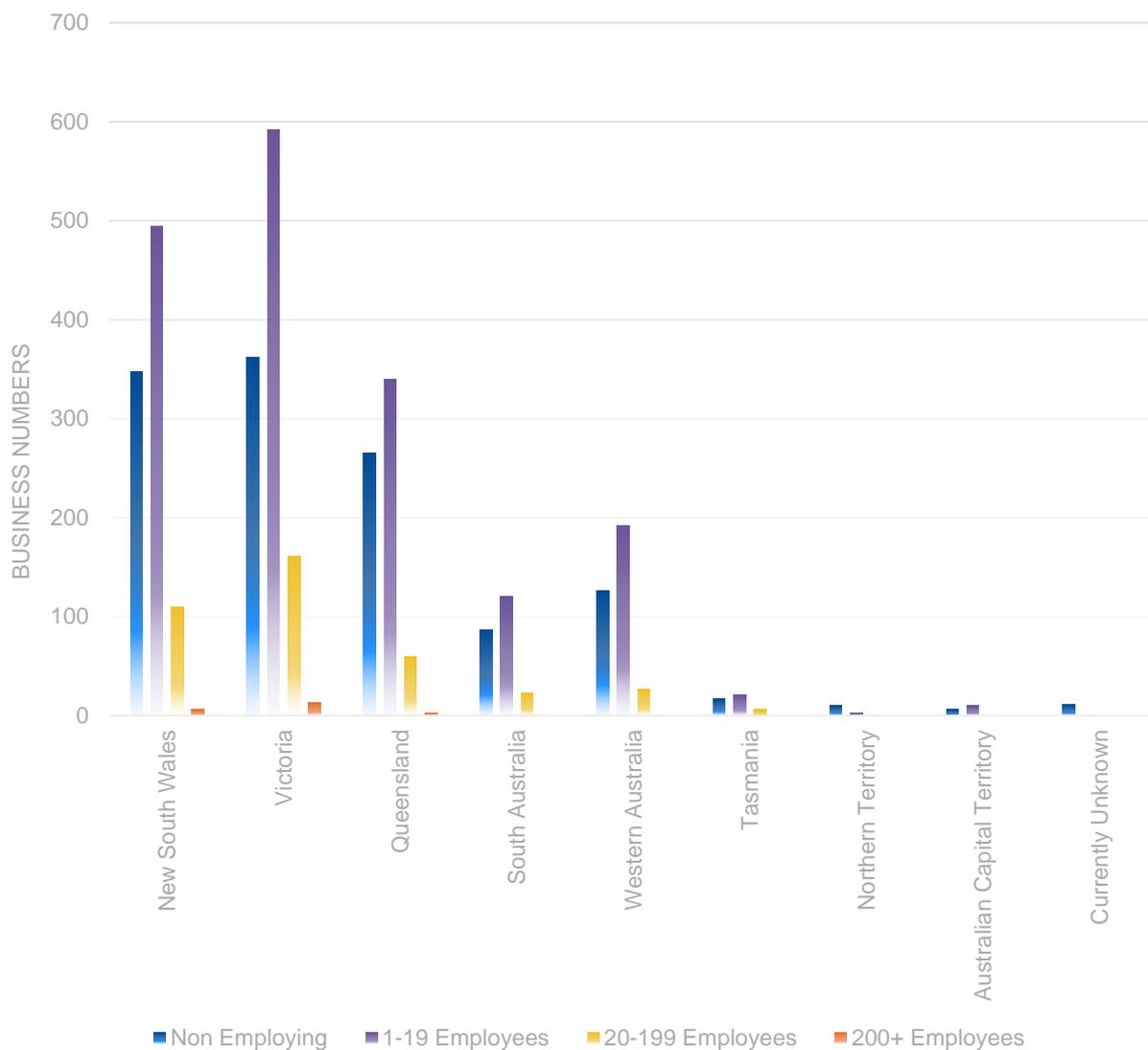
<sup>2</sup> Australian Bureau of Statistics, 2016, Counts of Australian Businesses, including entries and exits, 2014-15

## Manufactured mineral products, Australia Business numbers by state and ANZSIC class



Source: Australian Bureau of Statistics, 2016, Counts of Australian Businesses, including entries and exits, 2014-15

## Polymer processing industry, Australia Businesses by state and number of employees June 2015



Source: ABS, Counts of Australian Businesses, 2016

The Other non-metallic products manufacturing sector recorded the greatest number of businesses at the end of June 2015. This sector covers the manufacturing of a diverse range of products including:

- Abrasives
- Acoustics tiles, etc.
- Carbon products
- Headstones and monuments (non-concrete)
- Insulation manufactured from glass or mineral wool.

Many of the major companies operating in this industry group are familiar names – such as Boral limited, CSR Limited and James Hardie Industries. However, the majority of companies are micro and small businesses.<sup>3</sup>

Over the past few years, various factors have influenced businesses manufacturing products in this sector. Some have experienced growth through the construction phase the resources industry while others have struggled with the downturn in the housing construction sector.

## Licensing, regulatory or industry standards

Regulations relevant to work in this industry will be in accordance with the relevant legislation applying in each State and Territory. This can include:

- occupational health and safety acts and regulations
- environmental protection acts and regulations
- dangerous goods regulations
- discrimination and equal opportunity legislation and regulations

Licensing may be required in some States for some units of competency. Check local regulations for details.

## Challenges and opportunities in the sector/sub-sector at the international/national/jurisdictional or regional level

The following potential challenges and opportunities have been identified as facing the manufactured mineral products industry through research for this work plan:

### Challenges:

- Downturn/transition of the resources sector
- Economic volatility
- Robotics and automation
- Foundation skills
- Supply of skills
- Apparent low uptake of qualifications
- Non-conforming products

### Opportunities:

- Australia's construction industry hotspots
- Advanced manufacturing/nanotechnology/advanced materials
- Creation of sustainable and environmentally friendly products

The IRC were advised that there was limited engagement with stakeholders in the development of this work plan. Feedback was provided by Registered Training Organisations from the private sector who provide fee for service training to the industry. They reported low levels of engagement with the Training Package and raised concerns about the relevance of current training products to the industry.

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<sup>3</sup> IBISWorld, 2015, various

This industry has close links to the construction industry in Australia, with all of its principle products used in that sector. As such, both sectors face many of the same challenges especially at this time of economic volatility. The transitioning of projects within the resources sector from the construction phase to the processing phase has resulted in significant cutbacks in the industrial products sector of the industry. At the same time, there hasn't been any significant growth in the housing construction sector which also impacts the profitability and skill needs of the industry. It also faces the challenge of non-conforming products coming in from overseas which undermines the integrity of the industry<sup>4</sup>. Cement compound board imported from China has been found to contain asbestos<sup>5</sup>, and the challenge for industry is to promote products that meet standards, when price is a major influence.

The infrastructure projects that were promised in 2013 by the incoming government have been slow to eventuate, much to the disappointment of the industry.

However, opportunities are being created by construction industry hotspots which are developing in some regions such as Melbourne CBD. Brisbane is expected to be the next 'hotspot' as investors look for value.<sup>6,7</sup> With the Gold Coast hosting the Commonwealth Games in 2018, significant infrastructure and refurbishment projects will arise which will put the east coast of Australia ahead of other areas in terms of construction activity.

Opportunities also exist in the development of new products and materials<sup>8</sup>. Many concrete producers in the ready-mix sector are already developing 'green concrete'<sup>9</sup>. Conscious consumers are driving the development of environmentally sustainable building products and businesses are increasingly looking to improve their 'green credentials'. This is also creating a challenge for the industry as many smaller businesses are struggling to meet consumer expectations.

Due to the age of the workforce, low foundation skills and current recruitment practices, particularly in the ready-mix concrete sector which tends to recruit batchers from its driver workforce, is compounding the challenge of meeting future skill needs.

The industry has a predominantly stable but ageing workforce. As a result, there has been little uptake of accredited training with most businesses training internally as needed.

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<sup>4</sup> ABC News, 2015, High- Manufacturers rise 'time bomb' warning prompts building safety audit in Melbourne CBD, <http://www.abc.net.au/news/2015-05-28/high-rise-time-bomb-warning-prompts-melbourne-safety-audit/6502808>

<sup>5</sup> Monthly, 2016. Interim Senate report shares concerns about asbestos imports. <http://www.manmonthly.com.au/news/interim-senate-report-shares-concerns-about-asbest>

<sup>6</sup> SBS News, 2016, Brisbane property market to shine in 2016, January 20, <http://www.sbs.com.au/news/article/2016/01/20/brisbane-property-market-shine-2016>

<sup>7</sup> Williams, S. 2016, The hottest high rise apartments coming to Queensland, Australian Financial Review, May 2, <http://www.afr.com/real-estate/residential/qld/the-hottest-highrise-apartments-coming-to-queensland-20160422-god73l>

<sup>8</sup> Cheng, L. 2016, \$3m funding boost for prefab housing research, ArchitectureAU, August 30, <http://architectureau.com/articles/3m-funding-boost-for-multi-storey-prefab-housing-research/>

<sup>9</sup> Hanson, 2016, Green Concrete, <http://www.hanson.com.au/Products/Concrete/Green-Concrete>

# Employment

## Employment outlook

The industry is stable for most sectors. With an ageing workforce, there will be a need to source new workers in the near future, especially when the construction industry begins to expand.

## Workforce supply-side challenges and opportunities

In the next few years, the retirement of the current workforce will be the biggest challenge for the industry. The industry will need to look to recruit new entrant workers from a diminishing pool of labour and then to re-engage with the training system. With only nine registered training organisations (RTOs) having the Training Package on scope and the TAFE systems in Western Australia<sup>10</sup> and New South Wales<sup>11</sup> currently undergoing restructure and amalgamation, access to training may be difficult. Boral Construction Materials is the only enterprise RTO with scope currently.

According to the majority of RTOs with PMC on scope, there has been little to no activity for a number of years. One RTO reported that all the work they do in this industry is fee-for-service and therefore does not show in training statistics. In 2014, there were only 81 enrolments through publicly funded institutions while Total VET Activity (TVA) data showed 248 enrolments. In 2015 TVA data showed that the number of enrolments had dropped to 73, all enrolled at private providers.<sup>12</sup> The Certificate IV, Diploma and Graduate Certificate level qualifications are not on scope at any RTO.

It has been recommended that the Training Package undergo a complete review as a matter of urgency, to ensure relevance to current industry work practices and future skill needs.

Note: Completion data has not been included as initial analysis of the data shows very low completion rates. This may be skewed by the fact that the enrolment in the public system is set up to capture only full qualification enrolments, even if the participant only intends to do a Unit of Competency or a Skill Set. The introduction of the Unique Student Identifier (USI) may provide data that will permit better identification on cohort outcomes and student pathways.

## Additional information

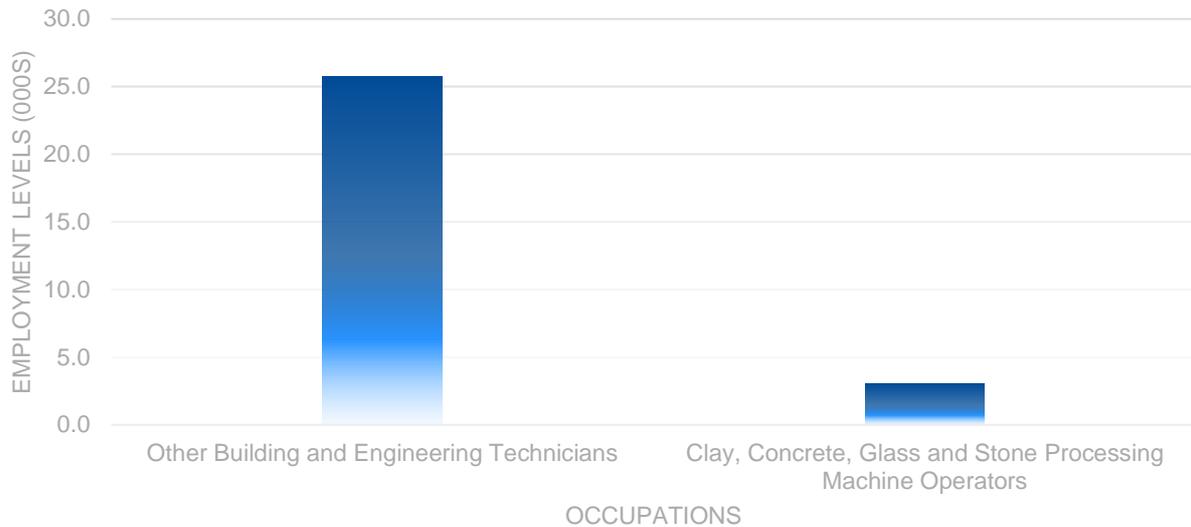
The following graphs have been supplied by the Department of Education and Training. The Department has sourced national occupation-related data from the Department of Employment and the Australian Bureau of Statistics to inform the work of the IRCs.

<sup>10</sup> Department of Training and Workforce Development, 2016, Changes to TAFE in Western Australia, <http://www.dtwd.wa.gov.au/trainingproviders/training-sector-reform-project/Pages/changes-TAFE-WA.aspx>

<sup>11</sup> NSW TAFE Commission, 2016, A Vision for TAFE NSW, [https://www.tafensw.edu.au/\\_\\_data/assets/pdf\\_file/0016/22570/a-vision-for-tafe-nsw.pdf](https://www.tafensw.edu.au/__data/assets/pdf_file/0016/22570/a-vision-for-tafe-nsw.pdf)

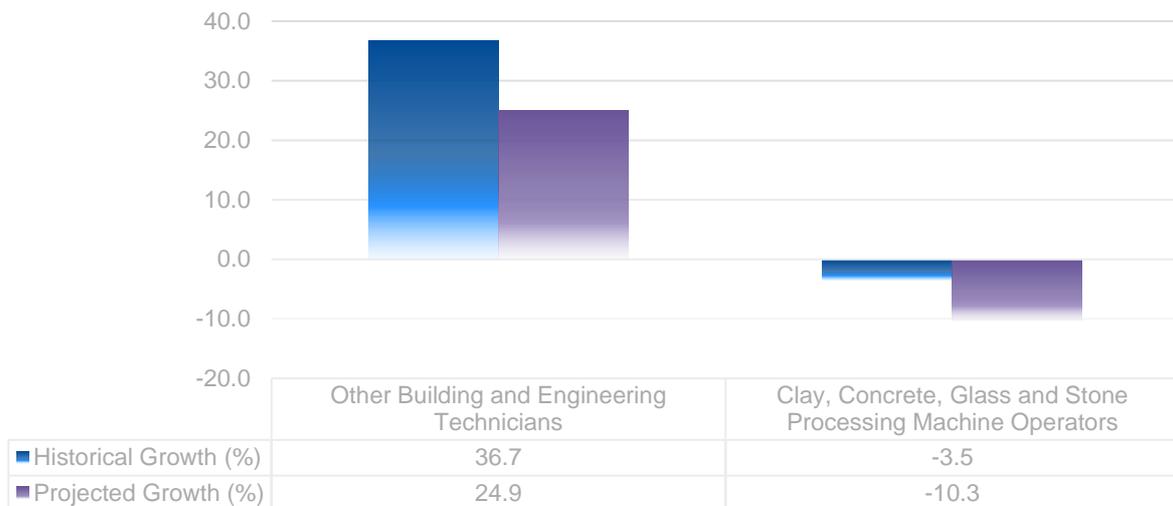
<sup>12</sup> NCVER, 2016, VOCSTATS database, accessed August 2016

## Key Occupations – Employment Levels (000s)<sup>13</sup>



Source: Australian Bureau of Statistics (ABS)

## Key Occupations – Historical and Projected Employment Growth (%)<sup>14</sup>



Source: Historical employment growth from the Australian Bureau of Statistics (ABS) and projected employment growth from the Department of Employment.

<sup>13</sup> Note: Occupations are at the four digit ANZSCO code. Employment levels are the five year annual average to 2015. Figures include all employed in the occupation across the economy, not just the relevant industry.

<sup>14</sup> Note: Occupations are at the four digit ANZSCO code. The historical employment is the five year growth rate to 2015 and the projected employment growth rate is the expected growth rate to 2019. Rates are based on figures that include all employed in the occupation across the economy, not just the relevant industry.

## IRC analysis

The Department have chosen five key occupations for analysing employment levels, as displayed in the two graphs above, presumably under the assumption that these occupations employ the greatest number of workers with qualifications from the PMC Training Package. While 'Clay, concrete, glass and Stone Processing Machine Operators' represent some, the other occupational class chosen 'Other Building and Engineering Technicians' is not accurate reflection of employment outcomes from this training package. A more comprehensive list can be found in the table below, created utilising data from the Department of Employment.<sup>15</sup>

Furthermore, analysing employment figures by averaging them out over a five year period does not give much scope for comment. Without seeing year on year changes, it can be difficult to comment on industry and economic influences that may cause fluctuations in employment.

Across all occupations the Department of Employment have projected a decrease in employment. Considering that stakeholders report a great number of those currently employed are due to retire in the next few years, we can expect the industry to be seeking new entrants and training.

Employment projections for occupations relevant to the PMC Training Package.

Occupation Code	Occupation	Employment level - November 2015 ('000)	Department of Employment Projections		
			Projected employment level - November 2020 ('000)	Projected employment growth - five years to November 2020 ('000)	Projected employment growth - five years to November 2020 (%)
3999	Other Miscellaneous Technicians and Trades Workers	18.6	17.6	-1.1	-5.7
7111	Clay, Concrete, Glass and Stone Processing Machine Operators	2.8	2.6	-0.3	-9.7
7129	Other Stationary Plant Operators	27.6	27.4	-0.2	-0.7
8399	Other Factory Process Workers	11.5	11.1	-0.3	-3.0

Source: Department of Employment, 2016 Employment Projections. Occupation projections.<sup>16</sup>

<sup>15</sup> Note: MSA used data containing projections to 2020.

<sup>16</sup> Department of Employment, 2016 Employment Projections. Occupation projections. <http://lmip.gov.au/default.aspx?LMIP/EmploymentProjections>

## Skills outlook

### International and national trends

In the next four to five years, the introduction of automation and robotics into some sectors will impact on the industry, such as brickmaking. The glass processing industry is already heavily automated and expects to become more so in the future.

With access to international design and construction ideas, consumers are demanding environmentally sustainable building products, advanced materials<sup>17</sup>, composite materials and new designs. New technologies and processes required to manufacture, supply and install these products will impact job design and skills required.

It is expected that national and international trends, and the implication for skill needs, will be explored further during the full review of the Training Package.

### Sector workforce skills

The five most important skills for the sector's workforce within the next three to five years.

Rank	Skill	How identified
1	Automation/robotics	Desktop research
2	Design	Desktop research
3	Environmental sustainability	Desktop research
4	Composites/advanced materials knowledge	Desktop research
5	Frontline management	Desktop research

<sup>17</sup> Eden Innovations, 2016, EdenCrete <http://www.edencrete.com/tech-details/>

## Generic workforce skills<sup>18</sup>

Ranked from 1 being the most important to 12 being the least important.

1	Technology
2	Design mindset / Thinking critically / System thinking / Solving problems
3	Environmental and Sustainability
4	Customer service / Marketing
5	Managerial / Leadership
6	Data analysis
7	Communication / Virtual collaboration / Social intelligence
8	LLN
9	STEM
10	Learning agility / Information literacy / Intellectual autonomy and self-management
11	Financial
12	Entrepreneurial

<sup>18</sup> Pre-populated table supplied by the Department of Education and Training

## Other skills-related insight for this sector

The introduction of mobile batching plant technology has been influencing the concrete industry. This technology is becoming more predominant due to the increase in major infrastructure projects, especially road construction. Stakeholders are not yet sure how this technology will impact workplace and job design. Currently, the operator qualifications within the Training Package are meeting the needs of the industry. Specialist engineering teams of fitters are being used to set up and break down the plants under the supervision of a specialist production manager from the industry.

## Training Product Review Plan – 2017-2021

In September 2016, the IRC identified a range of training product items that need to be considered in the Training Product Review Plan.

The IRC Skills Forecast and Proposed Schedule of Work 2017-18 to 2020-2021 table provided at the end of this document lists the priorities for the next four years. This table also provides the rationale for these priorities, the proposed scope and timeframes for these activities.

### Items identified as time critical and to be included in the priorities for 2017-18

The items identified as critical and proposed for inclusion as a priority for the 2017-2018 schedule of work is to develop a Case for Change.

## IRC Signoff

This work plan was agreed as the result of a properly constituted IRC decision and was approved by the IRC in June 2017.