ENGINEERS
AUSTRALIA

The 2017-18 SOL

Additional Comments in Support of Retaining Engineering Occupations

November 2016

Public Affairs and Marketing
Engineers Australia
11 National Circuit, Barton ACT 2600
Tel: 02 6270 6555
Email: publicaffairs@engineersaustralia.org.au

www.engineersaustralia.org.au

Executive Summary

The objective for permanent skilled migration is to supplement the medium to long term capacity of Australian educational institutions to produce sufficient of the skills required by the economy. In recent years, there has been an unfortunate tendency to see this objective in terms of contemporary skill shortages which contradicts the character of the skilled occupation list. Our position is that the medium to long term basis for permanent skilled migration should be reinforced and our arguments are put forward in that light.

Conditions in the engineering labour market are no longer characterised by the rampart demand evident prior to 2012. The common perception was that this demand was primarily determined by the resources boom. This phenomenon certainly played a part, but resources related activity accounted for a minority of engineers; most engineers were employed throughout a wide range of industries, including the upsurge in infrastructure development at that time.

Against this background, it was inevitable that the ending of the resources boom would impact the demand for engineers. This impact has occurred at the same time as a slowdown in growth in the Australian economy and an abrupt slowdown in infrastructure development throughout Australia with the exception of NSW.

As a consequence, there has been a period of pronounced adjustment in the engineering labour marker marked by a rise in the unemployment rate in 2014, reduced labour force participation and the retirement of large numbers of older engineers. In 2015, unemployment fell indicating that the adjustment is in its last phases and may only continue for another year or so. Once adjustment is complete, Australia will have an engineering profession whose size is geared to present economic circumstances.

Throughout this adjustment the demand for engineers to be employed in engineering occupations, our measure of engineering capability, has remained high, averaging over four percent per year. Australia's skilled migration programs are geared to the selection of entry level engineers many of whom have not undertaken the professional formation after graduation necessary to become competent, practicing engineers. Inclusion of recognition for "work experience" in the points test is a step in the right direction but a long way short of the criteria that Engineers Australia expects to be satisfied by competent, practicing engineers. We recognise and understand that many skilled migrants who have engineering qualifications make valuable contributions to Australia in non-engineering pursuits. Our issue is that these contributions do not add to Australia's engineering capability.

It is Engineers Australia's view that the government's medium term innovation ambitions require an enlarged engineering capability, especially in new and emerging technologies. To achieve this result, in the first instance, Australian universities need to continue increasing graduate engineers. However, statistics show that recent growth in this area is coming to an end because insufficient high school students are studying foundation mathematics and

science subjects. Skilled migration is the means to backstop efforts to produce more Australian engineers.

Our argument is that dropping engineering occupations from the SOL at this stage will result in history repeating. To succeed, the government's planned innovation strategy requires a growing and robust engineering capability in the medium term. Short term reaction to the adjustment taking place in the engineering labour market is unnecessary and were engineering occupations removed from the SOL, this would establish the pre-conditions for a shortage of engineers to work as engineers just when they are needed.

1. Introduction

Engineers Australia is the representative body for the engineering profession in Australia. With over 100,000 members across Australia, we represent all disciplines and branches of engineering. Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Our interests cover the engineering team which comprises professional engineers (at least a four-year full time degree), engineering technologists (at least a three-year full time degree) and associate engineers (at least a two-year full time associate degree or advanced diploma). Like other professions, engineering requires a period of professional formation following the completion of formal educational qualifications. It is during this period of professional formation that engineers determine their area of specialist engineering practice. The importance of professional formation is not reflected in skilled migration procedures.

Engineers Australia welcomes the opportunity to comment on engineering occupations that should be included on the 2016-17 SOL. Engineers Australia believes that all engineering occupations that are currently on the SOL should be retained and this submission is prepared on that basis. The pro-forma on-line questionnaire unduly limits the interests of peak organisations like Engineers Australia in this regard.

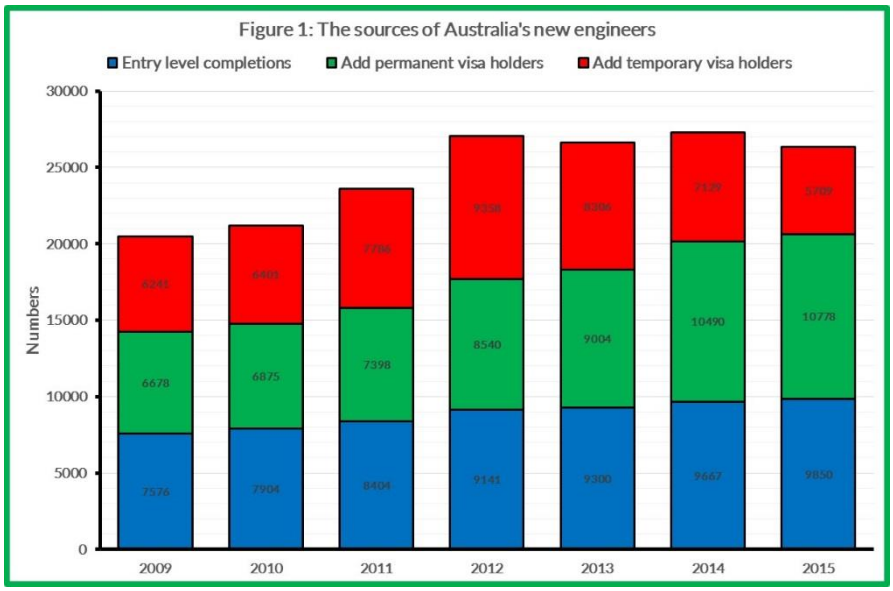
We note that the objective for permanent skilled migration is to supplement the medium to long term capacity of Australian educational institutions to produce sufficient of the skills required by the economy. In recent years, there has been an unfortunate tendency to see this objective in terms of contemporary skill shortages which contradicts the character of the skilled occupation list. Our position is that the medium to long term basis for permanent skilled migration should be reinforced and our arguments are put forward in that light.

2. Current Conditions in Engineering Labour Market

2.1 Sources for Australia's New Engineers

Building Australia's engineering capability is about much more than the number of people with engineering qualifications. It is about entry level engineering education, acquiring the skills and competence for engineering practice, retaining experienced and competent engineers in the engineering profession and the development of diversity in the profession through skilled migration and increasing the number of women recruited to the profession.

The potential stock of engineers increases when new graduates complete entry level engineering qualifications and when new migrant engineers arrive in Australia. Conversely, the potential stock decreases when older engineers retire, when younger ones leave the labour force to undertake family responsibilities or full time education and some engineers unfortunately die. The most serious weakness in our statistics relates to losses from the stock of engineers, but good statistics are available for entry level education completions and on skilled migration.



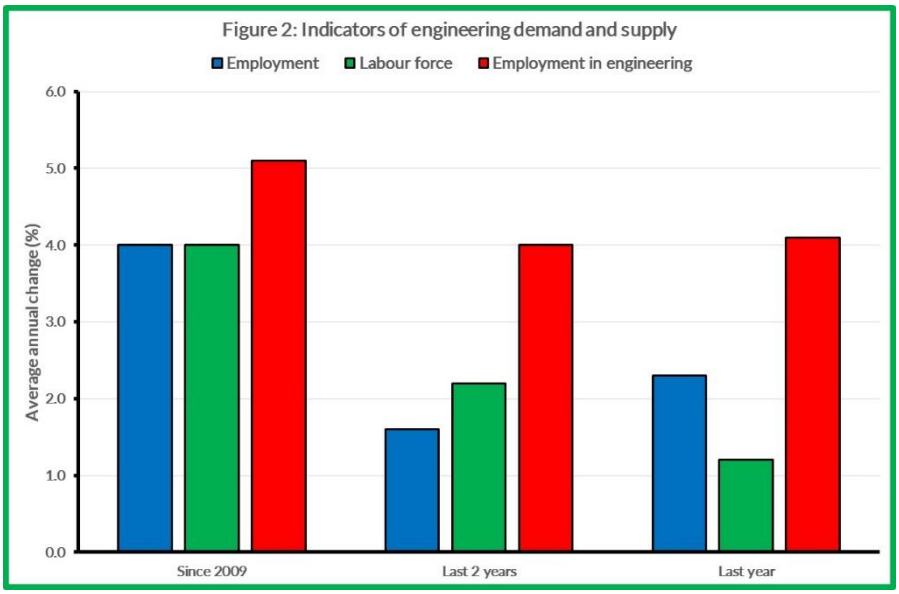
The blue bars in Figure 1 illustrate the rising trend in completion of engineering qualifications by Australians from 2009 to 2015. There was a clear, but slow upwards trend so that by 2015 completions for the three elements of the engineering team had grown to 9,850. This upwards trend is highly likely to end soon. Both acceptances of places in university engineering courses and commencements in these courses began to fall in 2013 and, as this reversal works its way through normal course durations, completions will begin to fall. This situation is remarkably similar to the early 2000's when engineering completions trended downwards through to about 2006 contributing substantially to shortages of engineers at the time.

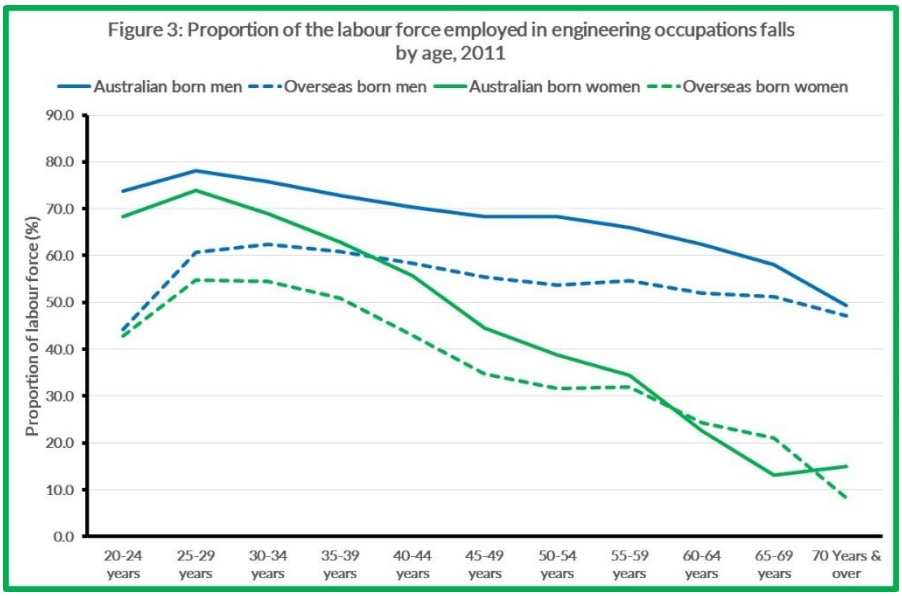
The key feature evident in Figure 1 is the large number of permanent and temporary skilled migrants that have entered the engineering labour force. Permanent migration of engineers has been higher than university education completions for domestic students since 2009. As well as permanent skilled migration, at any given time there are large numbers of temporary migrant engineers working in Australia on the Temporary Work (Skilled) visa (subclass 457). The

presence of temporary skilled migration is an indication of excess demand for engineers. Temporary migration is intended to operate as an automatic stabiliser and has fallen in recent years coinciding with the end of the resources boom and the downturn in urban infrastructure development by Australian governments. The fact that the number of temporary migrant engineers has remained so high indicates that despite major adjustment in the engineering labour market, there is a strong underlying demand for engineers.

2.1 The Demand for Engineers

Recent changes in the demand for engineers are illustrated in Figure 2. The statistics illustrated are from the ABS Survey of Education and Work (SEW) which includes educational attainment, a mandatory feature of the engineering profession. Figure 2 shows a substantial difference between movements in demand for "qualified engineers", that is, individuals who possess recognised engineering qualifications, and the demand for "qualified engineers to work in engineering occupations".





"Qualified engineers" satisfy demand in two areas; first, the demand for people with engineering qualifications to undertake general analytical and problem solving work and second, the demand for "qualified engineers" to undertake engineering work. A recent Grattan Institute report noted this feature of engineering qualifications and pointed out the graphic contrast between the employability of engineers and the employability of other skills.

In Figure 2 the two forms of demand for "qualified engineers" is illustrated by the difference between the blue and the red bars. The blue bars illustrate the demand for "qualified engineers" generally and the red bars illustrate the demand for "qualified engineers" in engineering occupations which has remained substantially higher despite the adjustment that has been occurring in the labour market.

This distinction is relevant to skilled migration because selection processes rely primarily on assessment of entry level qualifications. The inclusion of work experience in the points test falls significantly short of the criteria Engineers Australia applies to determine fully competent, practicing engineers. The red bars in Figure 2 are our measure of the demand for competent, practicing engineers and Figure 3 illustrates that current skilled migration arrangements effectively mean that two skilled migrants are required to fill one position in engineering.

2.2 Recent Adjustment in the Engineering Labour Market

Like the Australian economy, the engineering profession has experienced a roller-coaster ride over the past decade. The resources boom led to widespread shortages of engineers which in the pre-GFC period was exacerbated by substantial public sector infrastructure development in most states and territories. In late 2012, the demand for engineers began to collapse with vacancies falling for almost thirty successive months. The resources boom was over and so too was public sector infrastructure investment, leading to a major realignment of the engineering labour market.

How do we reconcile this observation with the continuation of skilled migration? There are several parts to the answer.

- The collapse in demand for engineers meant that temporary skilled migration moved into reverse as more and more employers did not renew contracts for temporary migrant engineers.
- The participation rate for engineers fell sharply as large numbers of older engineers retired from the labour force.
- The unemployment rate for engineers increased to 5.4% in 2014 compared to an average 3.7% over the previous five years, but fell back to 4.4% in 2015.
- Many engineers moved out of engineering into the general skilled labour force.
- As pointed out above, the demand for engineers to work in engineering occupations has remained high.
- Although permanent skilled migration has remained high, it adds less to engineering capability than it does to the number of "qualified engineers" moving into the general skills labour force.

Census statistics show that in 2011 73,931 engineers or 28% of the labour force were aged 50 or more years. Now some five years later, this group is aged 55 or more years. Similarly, 46,500 engineers were aged 55 or more years in 2011 and are now aged 60 and over years and 24,289 engineers were aged 60 or more years in 2011 and are now aged 65 or more years. Moving forward another five years to 2021, engineers aged 50 and over in 2011 will be aged 60 and over, indicating that further retirements are imminent.

The flexibility and adaptability of "qualified engineers" has enabled many to move into non-engineering work and this has assisted adjustment to present economic circumstances. Many

will not return to engineering and experience shows that the longer they are away the lower the probability of a return.

Adjustment in the engineering labour market is not yet concluded and is likely to continue in the short term. Certainly, within the time horizon for permanent migration, adjustment will be well and truly completed. There have been painful consequences for many engineers who have changed career directions, who have experienced geographic dislocation to continue engineering careers and who have retired when they expected to continue working. Never-the-less, adjustment has occurred and when concluded will leave Australia with an engineering labour force geared to a slow growth, commodities based economy.

2.3 History Repeating?

Australia is not yet an innovative economy and it has many challenges before it, including to

- Contribute to productivity growth by advancing technological progress in all industries throughout the Australian economy and by designing, constructing, operating and maintaining publicly accessible infrastructure that enables innovation and productivity created by others to thrive.
- To be at the forefront of medical technology to improve the speed and quality of medical diagnoses, to improve the quality and options for remedial treatments while simultaneously reducing costs and the application of nanotechnology, new materials and artificial intelligence to improve health and the quality of life of all Australians, not just the elderly.
- To enable Australia to meet its ambitious greenhouse reduction targets in the Paris agreement in the short time horizon available with minimum disruption to the normal functioning of society and the economy. Without engineers restructuring the electricity sector from fossil fuels to renewable and other zero or near zero technologies will not happen. Similarly, engineers will need to play pivotal roles in restructuring transport systems away from dependence on fossil fuels whether this is towards new modes of transport, improvements to the efficiency of existing ones or redesigning cities to reduce travel and improve amenity. Finally, the cheapest emissions reduction is through not using too much energy in the first place and engineers have strong comparative advantages when it comes to achieving energy efficiencies in buildings, in transport and in industry.
- Some climate change cannot be avoided because atmospheric emissions levels have already increased. Engineers can devise ways for communities and physical structures to better adapt to unavoidable changes so as to minimise the consequences and costs of climate change events.
- A growing population must be supported with a commensurate expansion of infrastructure, but much of our infrastructure is already old and under strain. New infrastructure is needed and engineers can ensure that the new technologies embodied in it can serve Australians productively well into the future, and that it is effectively managed using contemporary digital management and monitoring systems to derive maximum value from capital investments.
- Place a pivotal role in a revitalised manufacturing sector, driving innovation of benefit throughout the economy. Engineers have already embraced the change to a services based profession and are in a position to help other sectors to make similar changes and to utilise modern technologies to drive innovation and productivity so that Australia is globally competitive in a wide range of industrial products, commodities and services.

Education statistics show that commencements in engineering courses have fallen signalling that course completions will follow in due course. The engineering labour force has undergone substantial change. These circumstances suggest that there is a serious risk that Australia repeats the fall in engineering numbers experienced in the first half of the last decade. Against this background, Engineers Australia believes it is extremely unwise to remove engineering occupations from the SOL in the 2017-18 financial year.

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