



The Senate – Parliament of Australia

Submission – Inquiry into the Shortage of Engineering and Related Employment Skills

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1 Introduction

It has been well documented that Australia is now heading into the second phase of a protracted resources boom and as a result the employment market has become strained in many areas and clear skills shortages appearing in the professional engineering, project management and engineering trades areas [1].

Being a well recognised Executive Search company in the engineering and resources sectors, Gerard Daniels has been active in assisting many of its clients tackle this skills shortage through targeted executive search assignments or in the provision of project-based, overseas recruitment exercises.

Many of our major clients have conveyed their frustration at having to recruit at such high levels and have had to hire large recruitment teams to manage this critical (non-core) aspect of their business. One international engineering, procurement and construction management (EPCM) business advised that they had 975 vacancies in Australia alone in December 2011. A recent press article in the *Weekend West Australian* [2] advised that based on the current projects, WA needed an additional 8500 skilled employees in the engineering and construction sectors now and that in 2013 an additional 14,000 skilled employees, to service the known 89 resources and infrastructure projects in this state. Queensland is facing the same pressure as the number of resource and infrastructure projects increase in that state [3].

2 Terms of Reference

The Terms of Reference issued by the Standing Committee on Education, Employment and Workplace Relations had eight key focal points. Given our experience is primarily focused on the recruitment of executive and senior management positions within the resources and infrastructure sector, Gerard Daniels would like to present some commentary on, primarily, five of these key points:

- Our view of the skills shortage and impact/consequences on our (construction) clients (public and private) –addressing item (g);
- Some suggestions on options to address the skills shortage – addressing item (c);
- Strategies for development and retention of engineering skills in private and public sectors – addressing item (e);
- Opportunities for incentives to private sector through procurement processes – addressing item (f); and
- Possible implications for infrastructure delivery (and link to costs (time) and safety in this sector – addressing item (a).

Gerard Daniels is an international professional services group, with divisions in Executive Search and Board Consulting. The group was established in 1986.

Gerard Daniels serves the needs of Senior Executives and Boards in Australia and internationally. We act for some of the world's largest independent and publicly listed companies in markets in which we have specialist knowledge, specifically including the resources, engineering and infrastructure sectors.

Gerard Daniels is well placed to receive and collect both hard data and anecdotal information on the skills shortage in these sectors and its impact on our client's businesses and by extension the broader economy.

3 Consequences of the Skills Shortage in the Construction Sector for the Public Sector's Capacity to Effectively Procure and Manage Infrastructure Projects

3.1 Understanding the Needs in Construction Projects

3.1.1 Deliver value in the concept stages

New projects in the resources sector more frequently need to address the skills requirements and employment resourcing aspects for the design and construction phases and the operational phase of any new development quite early in the development cycle, often at the earlier concept stage.

Employee sourcing projects that look to attract both construction and operational personnel from regional centres across Australia are now well documented [2]. For example Newmont, HWE Mining (and many others) have put in place FIFO arrangements from regional centres in SA, Victoria and NSW for its mining projects in Western Australia and the NT.

Major infrastructure projects, which are often also regional in nature, must also consider the workforce planning aspects of the project as early as possible and the ability to fly in workers from different locations and house and feed them must now be part of the conceptual planning stages of all major projects. Another good example of innovative thinking in this area was at Chevron, where the Gorgon project team made a decision to lease and permanently moor a large accommodation barge offshore of Barrow Island [4] to meet the short-term workforce needs during construction and also comply with the environmental constraints for supply of housing on the island.

The public sector (across all levels of government) must be able to support these projects by supporting the planning and approvals process to facilitate the management of these large remote workforces, particularly during construction peaks. For example, a recent proposal for a 6000 man camp outside of Port Hedland has been turned down by the local Council without any real alternatives being proposed.

3.1.2 Risk Management

One of the major risks to all significant infrastructure projects is ensuring access to the relevant skills within the client, EPCM and contracting teams.

With more than A\$100 billion of resource and infrastructure projects on around the country, the project management teams across all of these sectors are being stretched very thin. Gerard Daniels has been active in the sourcing of high level project directors and project managers across this sector for many years. The quality of these individuals can often mean the difference between a successful project and cost overruns and late delivery of the project.

Our experience is that many of the talented individuals in this sector are coming close to retirement age and that there is a significant lack of requisite skills and experience in the next generational group coming through this sector. In addition, the head-hunting and recruitment process often results in the talent from one group being poached for another group, for example a quality project manager within a contractor may get poached to join an EPCM or client team (where the remuneration may be higher), leaving the contractor then to source externally or promote internally (often to someone much less experienced).

Given the disparity in remuneration, retaining quality project managers within the public sector is probably the highest risk to the successful delivery of public infrastructure projects [5].

3.1.3 Engineering, Procurement, Construction and Standards (the emergence of overseas Value Engineering Centres)

It has also been well documented that many companies are now seeking to procure engineering work from other firms overseas in countries where the hourly rate for engineers is well below that paid here in Australia.

Many companies have set-up their own “value engineering” centres [6] to help reduce the overall cost for design of major projects and to offset the difficulty of securing skilled engineering talent locally. Even across Australia, the larger firms are moving the work to other offices where the level of activity may not be as high or migrating under-utilized engineers within their business to the busier offices (in WA or Qld) to bolster their engineering teams.

In-house design centres generally have adequate processes for controlling the design standards but when this is out-sourced the ability to dictate (and monitor) design to Australian or other relevant international standards becomes a major challenge. This has been a significant issue with the emergence of China as a design centre as well as a source of cheap materials and fabrication. The various issues affecting the Sino Iron project [7], which has been sourced almost completely out of China, are a good case in point, as this is now some 2 years behind schedule and over \$2.5 billion over budget.

The public sector must recognise this trend in industry and ensure the appropriate controls are in place through the procurement and execution phases so that quality is maintained at all stages of the development of these infrastructure projects. Providing additional inspectors (usually located overseas) and translators to the project management teams is essential and must be costed into the project. These individuals, if not already in the organisation, then also need to be sourced, which is another challenge to this sector.

Another major trend in the major projects sector is to design major resource or infrastructure projects in a modular fashion which allows for the construction of major elements overseas, in some instances to reduce cost, but also to gain access to available workforces [8]. Choosing this option will introduce new challenges in the design, construction, inspection phases and also in logistics as some of these modules can be greater than 1000 tonnes.

3.1.4 Sustainable Operations

Because of the remote locations for many of these new resource and infrastructure projects, the role of the public sector has become more important in directing the decisions around sustainability and how best to grow and support regional communities such that more of the employed workforce can become residential rather than relying on fly-in/fly-out. These decisions have impact for local infrastructure and social support services and need to be considered well ahead of (or at the worst, in parallel to) the project planning phases for all major resource and infrastructure projects.

Regional communities such as Karratha, Port Hedland, Mt Newman, Emerald, Chinchilla, Gladstone, Kununurra, Gove, Port Lincoln, Whyalla, Portland, La Trobe Valley, Newcastle, Orange, Hunter Valley and Ravensthorpe have all been through different parts of the development and growth cycle. In recent times there has been much reported criticism of the negative effect FIFO workforces on regional communities, in Australia and overseas [9].

The skills shortage is being addressed by many companies through direct engagement with the local communities and creating opportunities for local businesses and indigenous populations to benefit from dedicated training and development programmes that allow for younger people to apply for university scholarships or apprenticeships. Rio Tinto and Fortescue Metals Group are

good examples of companies finding success in these areas. Older people also are getting the chance to learn new skills that benefit the individual and the company.

Cooperation on, and support of, these programmes should remain a key element of public sector policy.

3.2 Implications for the Public Sector Management of these Projects

3.2.1 Does Government Have the Skills and Talent?

It has also been the experience of Gerard Daniels that many of our clients have become frustrated by the sub-standard levels of skills, knowledge and process management within the public sector, which is contributing to long delays in the processing of applications and granting of approvals for many resource or infrastructure project developments [10].

The significant difference in the remuneration levels between the public and private sectors has seen the migration of many highly talented individuals from the public sector (and semi-government corporations) into the private sector [5]. Having worked on several recruitment exercises for the public sector this disconnect does introduce a heavy sourcing bias toward candidates that are either retired from the private sector or have only ever worked in the public sector.

An individual who has only ever worked in the public sector, will often be high quality but may not have the same depth (or breadth) of industry knowledge as someone recruited from the private sector. Candidates who are post-retirement do not offer any security or longevity in the role. The most effective use of these more senior individuals would be to put them directly into project management mentoring programmes so up-and-coming project managers within the public sector get the benefit of this experience.

3.2.2 Attraction and Retention Challenges

As mentioned above, the difference in remuneration levels is a major negative in the important process of attracting quality candidates to public sector positions in project management. The key points of attraction in our experience are:

- (a) The projects are large scale and have a high public profile;
- (b) The government will often run PPP style projects giving some direct exposure to the private sector;
- (c) The public sector can offer security of tenure post-project. However, it is recognised that many public sector appointments are now fixed term contracts.

In our experience, there are very few factors that will positively influence the ability of the public sector to retain its key project management personnel. Private sector project management and engineering professionals can be rewarded with a series of short-term and long-term incentives or get involved in company share schemes. Only a few public sector jurisdictions in Australia (including the APS) offer performance based pay or remunerations systems [11].

Given the fundamental basis of roles within the public service is the opportunities provided for individuals to “give back to their communities” [12] it should be recognised that this may not be the same career driver for many high potential candidates in the broader community. However, when you are competing for the same limited resources in the engineering area as the private sector the right attraction strategies must be given further consideration as a public sector policy initiative.



4 Options to Address the Skills Shortage for Engineers (and related trades) and the Effectiveness and Efficiency of Relevant Policies, both Past and Present

4.1 Developing Our Own Talent – How good are we at producing the engineering and technical skills we really need?

It has been our experience that the Australian and State governments have been consistently out of synch in promoting the needs of Australian industry. Because of the three or four year lag in the production of a science or engineering graduate any programmes to promote these technical courses have typically come at a poor time for the sector.

When skills are in short supply governments will then react and endeavour to promote the sectors in need. Historically, by the time the graduates have come through the university process they have hit a market that is in recession and the skills they have acquired are no longer in demand.

Similarly, during recessions, the governments of the day have modified their funding models for many “industry critical courses” and as a result have redirected education funding into other non-technical courses and streams or highly specialised courses that are the flavour of the day. This creates a major reduction in the numbers of students enrolling in these courses and when the economic situation improves, the market does not have the numbers of graduates it needs.

As a policy matter this needs to be addressed and some recognition that technical careers and courses need to be promoted all the time, not just during “boom” cycles. The promotion of these career choices needs to start much earlier in the education cycle and again policies need to be addressed in these areas to encourage more interest in the technical and engineering disciplines at primary schools.

At the same time we have the trend identified recently by the Universities Australia report that Australian students are generally shunning the core subjects for engineering; the maths and science electives at high school [13]. More public policy work is clearly needed to reverse this worrying trend.

4.2 Move the Skills to Regions of Need – Barriers and Incentives

Within Australia there has been significant discussion about the two-speed economy [14]. The resource rich areas seem to be going well and have increased labour demands while other regions dominated by retail and manufacturing are suffering and may be letting people go.

There would appear to be a significant opportunity for governments to support a number of schemes and initiatives to support skills development and retraining of these newly unemployed people so that they can become attractive to the engineering and resources sector.

Governments could also provide assistance to help the resources or infrastructure based engineering companies to relocate these new employees to their places of employment either on a permanent basis or a subsidised or facilitated fly in/fly out arrangement, ie. help them get to a central transport hub from which the companies are already flying some rostered employees.

In our experience families with school aged children also experience major difficulties when relocating across Australia. The differences in the education curricula between the states can be stark and causes dislocations and disruptions to many school children. The harmonisation of the school systems to facilitate movement of workers and their families would be a very worthwhile policy initiative to support this sector [15].



4.3 Bring the Talent in from Overseas – Then What?

It has been a major aspect of our business that we are involved in the identification and recruitment of senior executives from overseas for employment here in Australia. These are often jobs for which there are very few eligible Australian candidates (ie. in the LNG sector, processing of platinum group metals etc); or in areas where there has been such growth and new project development that the requisite engineering and skilled trades talent in Australia has been spread so thin that additional skilled resources and managers are needed (such as in the iron ore mining sector).

As a matter of policy it has been recognised that during these recruitment processes the prime focus is on the candidate only. However there is often also a spouse or partner and/or older children, who also represent an opportunity to create additional skilled members of the Australian workforce. It is our suggestion that some discussion is required on how these new Australians can be encouraged into both fast-tracked language skills training (if required) and then given the option to enter into educational disciplines of high demand within the economy. Given that the typical 457 Visa is awarded over a time period long enough for the immigrant to consider applying for permanent residency, then this investment should be considered very worthwhile for the economy.

Further, the new, highly skilled engineering workforce entrants from overseas could also be encouraged through appropriate incentives to impart their knowledge to Australian students and future engineers etc. by becoming involved in part-time teaching or mentoring programmes at colleges and universities, or within the employer company. This broader, more holistic approach would enrich the engineering landscape for both the new entrant and the local talent.

4.4 Retain the Older Workforce – Mentoring

Another major aspect of the skills shortage is the exacerbation of this affect due to the retirement or impending retirement of many of the skilled managers and leaders [16, 17]. With the advent of the GFC many older engineers and managers have been impacted by severely reduced retirement savings and are putting off retirement for another few years, see Figure 1. We have had some candidates older than 70 presenting for job interviews.

This has created an opportunity for enterprises to put in place more heavily structured mentoring programmes than has typically be used by Australian companies. These programmes need to be actively supported by the government as it will achieve two outcomes:

- Keep talented people in the workforce longer, reducing impact on government pensions and other social security support systems; and
- Provide a mechanism for these valuable skills to be passed onto more junior employees and not be lost to the Australian economy.

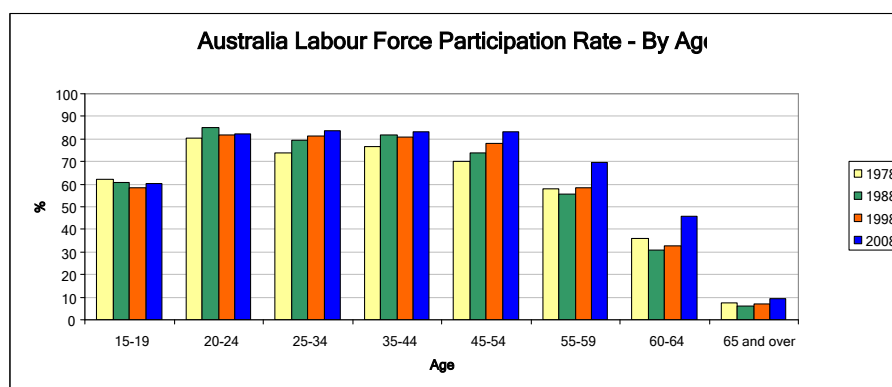


Figure 1: Summary of ABS data presented previously by Gerard Daniels [18], highlighting increasing participation of older workers over the last decade.



5 Effective Strategies to Develop and Retain Engineering Talent in the Private and Public Sectors through Industry Training and Development (at enterprise, project or whole-of-sector levels)

It is our experience that most, larger companies in the private sector have very well structured training and development programmes for their engineering staff, beginning with graduate recruitment and continuing right through an engineering career. However, with the current (and previous) skills shortages, these have often not been enough to retain any individual within an organisation. Companies like ours have been hired to specifically target and recruit well developed talent within other organisations on behalf of our clients.

The candidates most difficult to “poach” from their current employer are those who feel fully engaged with the corporate vision and strategy and are heavily aligned with the corporate culture (team and leadership) and feel that the company cares about them and their careers. This nurturing is rare but when done well is the best defence against loss of skills from the organisation. The remuneration is also important but does not always have to reside in the upper quartiles to be effective as long as the employee has the other “hygiene” factors also in place, such as training and development, workplace culture, work-life balance etc. Chevron is an excellent example. They position themselves between the 50th and 75th percentile for remuneration but work assiduously on the other employment elements as mentioned above but also including workspace ergonomics and monitored working hours. They have been very successful at retaining talent within the organisation [19]. Regular international transfers and structured leadership development are also a major component to this strategy.

In some instances we have found that specialist engineers have joined certain consultancies so that they may work with recognised national or international authorities or experts in their field. Again, if most of the other factors are also right then these employees can be very loyal and difficult to poach.

It is also our experience that these combinations of factors rarely exist in the public sector. Many high quality candidates we have interviewed have started their careers in the public sector but eventually left for private practice for higher financial returns (often coinciding with onset of starting families etc). More often than not, if certain recognised experts are working for the public sector then these individuals are often targeted for roles in the private sector (where the rewards and degree of engagement can be much higher). As found in a recent UK study [20] found the main reasons why public service professional employees leave included “...a sense of being overwhelmed by bureaucracy, paperwork and targets; insufficient resources, unmanageable workloads; a lack of autonomy; feeling undervalued by Government, managers and the public and perceptions that pay rates are unfair compared to others doing similar work.”

Some truly innovative thinking is needed to reverse this affect and some long-held beliefs about “public service” will need to be challenged to ensure that the appropriate engineering talent is fostered and “nurtured” within the public sector. One such idea is to create “exchange programmes” or sabbaticals where recognised authorities or experts from the public and private sector get to change places for periods of up to several months to review and focus on the development of talent in each others organisation. International exchanges with (or secondments to) other recognised public sector authorities in other countries could also be a means of achieving higher levels of retention (as per the Chevron model, above). Stints with major international aid agencies should also be encouraged and supported as an avenue for development, training and to create opportunities to “make a difference.”

6 Opportunities to Provide Incentives to the Private Sector through the Procurement Process to undertake Skills Development

6.1 Integrated Procurement and Immigration Processes

In general, Gerard Daniels has limited interaction with organisations or governments in this area. We would add to this area of the discussion that given the above information and the number of companies actively developing and executing overseas recruitment campaigns [21], then this additional cost to the companies, which does bring a net benefit to the economy, should be recognised through government Procurement and Contractual stages of engagement. Some financial incentives, compensation or simple recognition given to those who are successful in this area should be considered.

6.2 Incentives for use of Australian Talent or Australian Recruitment Expertise

When specific executive search activity must be undertaken to secure the appropriate talent for the successful execution of a government contract or infrastructure project then again some recognition of these costs to the companies should be considered, perhaps in the form of a tax break, as a simple suggestion.

7 The Implications of the Shortage for Infrastructure Delivery in terms of Economic Development (cost, efficiency, safety and disputation)

Gerard Daniels does not have enough direct experience in this area to add any additional comments and is happy to leave this to other better qualified companies/contributors.

References

- 1 DEEWR Report, “Skills Shortages - Australia”, June 2011
- 2 K MacDonald. The Weekend West Australian, 7-8 January, 2012.
- 3 Energy Skills Queensland Workforce Planning, Edition No. 2, July 2009
- 4 K MacDonald, The West Australian, www.thewest.com.au , December 2011.
- 5 G O’Neill, M McIntosh and C Hall, “Public Sector Reforms and Public-Private Executive Labour Markets: Public Service for Private Reward”, RMIT School of Management, January 2006
- 6 D Cockshoot, Kvaerner, “Re-Engineering the Design Process for the Pharma Industry”, IPTOnline.com, Innovations in Pharmaceutical Technology, pp 124 – 129.
- 7 Kate Emery, The West Australian, www.thewest.com.au, January, 2012
- 8 Cranes Today, SNC Lavalin website, www.snclavalin.com 2010
- 9 K Storey, “Fly-in/Fly-out: Implications for Community Sustainability”, *Sustainability*, vol 2, pp1161-1181, 2010.
- 10 Industry Working Group Report, “Review of Approval Processes in Western Australia”, Department of Mines and Petroleum, April 2009.
- 11 Management Advisory Committee Report, “Performance Management in the Australian Public Service: A Strategic Framework”, APS, pp 38 – 44.
- 12 QPSW, “Attraction and Retention”, Information Paper 2, Office of Public Service Merit and Equity, 2006
- 13 Universities Australia Report, “STEM and Non-STEM First Year Students, January 2012.
- 14 Ai Group report (with Deloitte), National CEO Survey, “Business Prospects in 2011”, February 2011
- 15 Department of Premier and Cabinet, Victoria, “The Future of Schooling in Australia”, April 2007.
- 16 Ai Group report (with Deloitte), “Skills shortages: A High Risk Business”, July 2010.
- 17 Fisher, L., Agarwal, R. and Green, R., The Australian Industry Group and the University of Technology Sydney, *Management and Workforce Skills and Talent Report* prepared for the Victorian Department of Business and Innovation, 2011
- 18 P Howard and M McAnearney, “Effective Use of Recruitment Agencies in Managing the Skills Crisis: Part 1 – Understanding the Skills Shortage”, Materials Australia, 2008.
- 19 Global Strategic Workforce Development, Chevron Web Site, 2007, www.chevron.com/globalissues/corporateresponsibility/2007/globalstrategicworkforce/#
- 20 The Audit Commission, UK, “Recruitment and Retention”, 2002.
- 21 www.visabureau.com “Skilled Workers Targeted by Australian Employers, November 2011.