IPWEA
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA

informs...
connects...
represents...
leads

Committee Secretary
Senate Education, Employment and Workplace Relations Committees
PO Box 6100
Parliament House
Canberra ACT 2600
Australia

Senate Inquiry into the shortage of engineering and related employment skills

Submission by

Institute of Public Works Engineering Australia National Office

LEVEL 12, 447 KENT STREET, SYDNEY NSW 2000

Further information:
Ross Moody, National Executive Officer
Institute of Public Works Engineering Australia
www.ipwea.org.au

1ST MARCH 2012

IPWEA
INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA

informs...
connects...
represents...
leads

SENATE INQUIRY INTO THE SHORTAGE OF ENGINEERING AND RELATED EMPLOYMENT SKILLS

Submission by the Institute of Public Works Engineering Australia (IPWEA) National Office

About IPWEA

The Institute of Public Works Engineering Australia (IPWEA) is a peak professional organisation providing member services and advocacy for those involved in and delivering public works and engineering services to the community. Our mission is to enhance the quality of life of Australian Communities through public works and services.

The organisation of IPWEA is a federation made up of a national body and six state divisions. The NSW State Division has made a separate submission to this Inquiry.

While being an independent professional body, the IPWEA is recognised as a Technical Society of Engineers Australia.

Introduction

"Civil Engineer" is currently listed on DEEWR's national skills shortage list and appears on Schedule 1 of the Skilled Occupation List for General Migration.

To date it has been left up to peak professional bodies, industry associations and various industry sectors to individually raise the status and awareness of the shortage of engineering skills in Australia. At the cost of its members, IPWEA developed strategies and produced guidelines, tools and templates for engineers to use to help them address the engineering skills shortage in the sector. However, a bottom up approach using an already under resourced and diminishing body of professionals will never be able to address an issue of such significance as the increasing shortage of engineering skills in Australia.

IPWEA considers this inquiry presents a unique opportunity to provide a focus on the importance of engineering skills to Australia and to provide government with some specific strategies to address engineering capabilities and the shortage of engineers.

Other submissions such as those provided by ANET, Austroads and the IPWEA (NSW) State Division have clearly established the extent of the shortage of engineering skills and the Federal Government already acknowledges Civil Engineering as an acute skills shortage area.

[ANET was formed by the Association of Professional Engineers, Scientists and Managers Australia (APESMA), Engineers Australia, The Association of Consulting Engineers Australia (ACEA), The Australian Council of Engineering Deans (ACED) and the Australian Academy of Technological Sciences and Engineering (ATSE). ANET was formed to create a national strategy for the development of Australia's current and future engineering workforce.]

IPWEA supports all of the recommendations of the ANET submission to this inquiry and its recommended strategies. Almost all apply to the local government sector.

However Local government must not be the forgotten sector in this Inquiry. This submission by the IPWEA National Office also addresses this aspect of the engineering skills shortage.

Local government must not be the forgotten sector in the Senate Inquiry into Engineering & Related Skills Shortage

At the 2006 Census, local government employed about 10 per cent (2,279) of the civil engineering workforce.

Local government engineers administer and supervise the design, construction and maintenance of roads and bridges, pedestrian and cycle facilities, regional airports, buildings, storm water drainage, recreational facilities, parks, waste disposal and water treatment schemes, traffic management, coastal protection facilities and more. This is no small task.

In 2009-10, local government owned and managed $187.3 billion of local roads and other fixed assets, including 80% (660,235 kilometres) of the nation's roads. It also managed $25.9 billion of buildings. In 2009, local government spent about $4.1 billion on constructing, maintaining and renewing its local road network. This is not sufficient to keep this network in a sound condition. There is currently an under spend of about $860 million per annum between what councils spend and what they need to spend to keep their local roads in a sound condition.

As part of reforms initiated by the Local Government and Planning Ministers' Council and funded under the Australian Government's Local Government Reform Fund, local government is making a major effort to improve its asset management, so that it manages its assets on an efficient planned life-cycle basis rather than on a reactive maintenance basis. If the reforms are implemented successfully they will help narrow the gap $860 million funding gap. In addition to other needs, the reforms are driving demand for a new type of civil engineer – the "asset manager" - who plans and funds local government assets on a life cycle basis.

The Hidden Cost of Diminishing Engineering Skills

A problem to date is that the cost of reduced engineering skills has been a hidden cost to local government and unfortunately no one will ever know the real extent of those costs. There is one thing can be certain is that is the hidden costs will get greater as less engineering skills are available.

Without high level engineering skills the cost of new projects goes up through every stage – scoping, design & documentation, purchase cost, contract management, construction and ongoing maintenance. Without the knowledge of how to optimise the timing of maintenance of assets, prepare cost effective asset plans, knowing the most cost effective maintenance techniques the cost of maintenance will rise. In local government it is now acknowledged that asset management plans are the key to long-term financial plans, which is paramount to financial sustainability. Engineering skills are paramount in preparing infrastructure asset management plans.

For local government, ***having the capability to maintain infrastructure*** is just as important as being able to deliver new infrastructure to the community.

The other side of the skills shortage coin is risk, and an increasing lack of engineering capacity is placing greater demand on scarce resources, increasing the likelihood of engineering failure. When it comes to infrastructure, the consequences can be catastrophic.

The engineering skills shortage is made worse for local government which must compete with the booming mining sector and the private civil construction sector for engineering skills and worse again for country and remote councils. Councils simply cannot compete with private sector salaries.

It is vital to implement measures to ensure engineering best practice in the delivery and maintenance of infrastructure to in turn ensure that the public is receiving value for money and not being put at risk.

As stated in the ANET submission *"Enhanced public sector capacity would also assist the private sector by allowing them to deal with informed purchasers, thereby minimising delays, adversarial relationships and cost overruns".*

The need for Part Time, Sandwich and Distance Education Tertiary Courses

There needs to be options for engineers to study and work at the same time. This message came out strongly from IPWEA members when asked to provide input into the submission to this Inquiry. There is a need to bring back flexibility into the study program whereby a student is employed and can combine work and study. This could be achieved through part time, sandwich and broader distance education study options. This is particularly important to produce and retain engineers in remote and regional areas of Australia. At the same time there is a need to ensure strong links between universities and industry. Industry and peak professional body representation on the curriculum boards for each university is essential.

More flexible study options would be attractive for several groups of potential engineers:

- those who have many years of hands-on engineering experience and who are keen to upgrade to engineer status but are unable to return to study full-time or on-campus,
- those who prefer to study part-time while working in a related field and
- "Career changers" wishing to enter engineering.

What Local Government Specific Actions Are Needed?

Elected members in local government have an important part to play in addressing the engineering skills crisis. IPWEA is working through its key role in the Australian Centre of Excellence in Local Government (ACELG) in developing a Local Government Workforce Development Strategy. Local government is a fragmented sector and requires over arching drivers, legislative or otherwise to facilitate a nationally consistent approach to this critical issue. It will take much more than a professional body driven workforce development strategy to address the engineering skills shortage.

Recommendations

In respect of the ANET submission we add the following supplementary recommendations:

1. **Bearing in mind the responsibility of local government for so much of the public infrastructure in Australia, it must have baseline engineering competence and capacity for more than just Federal Government funded projects.**
2. **Local government also needs to ensure it is an informed purchaser of infrastructure and contract manager but what will be the imperative for this to happen. It is recommended the ANET proposed Office of The Engineer needs to work with State and Local government as well as Australian government to ensure that they are all informed purchasers in the procurement process, and have the appropriate range of engineering skills internally to receive value for investment from their purchasing decisions.**

3. **The proposed dedicated Engineering Advisory Council as an Industry Skills Council (ISC) for the engineering profession needs to have strong local government engineering representation through the IPWEA. (Note: IPWEA is already represented on the local government Industry Skills Council of Government Skills Australia).**
4. **Baseline requirements in procurement for Commonwealth funded projects by providing a portal through which procurement methods are assessed on a project-by-project basis could also be applied to local government.**
5. **Greater flexibility is provided in engineering education through the availability of part time, sandwich and broader distance education study options.**

In addition to the strategic recommendations to supplement the ANET submission, IPWEA is proposing specific actions for some immediate projects that can deliver both short and long term benefits.

IPWEA PROPOSALS

Addressing demand

For some time but without success the IPWEA has been seeking support for what we have called our 'New Ways of Working Project'. The purpose of this project is to investigate ways to reduce the demand side of the engineering skills shortages equation for engineering and technical staff and "free up" professionals time to do more engineering and make better use of available technical engineering skills. Without pre-empting the outcomes of any study one of the most obvious actions is the up-skilling of support staff to take the non-technical work away from engineering technical staff. At the same time this could be developed as providing a pathway to engineering through the VET sector.

Two proposals have been identified.

I. Up-skilling of the administrative officer role

This proposal involves developing a Certificate level course to up-skill administrative staff to be able to take the non-technical work away from engineering technical staff. It would involve pilot groups of engineering staff to identify those tasks that could be delegated to non technical staff and then matching this with the competencies needed by non technical staff. It is envisaged the outcome could be a Certificate III or IV course "Engineering Support Officer"

II. Diploma in Public Works Engineering

This is a new initiative that has identified the need for specific skills associated with engineering work in local government not delivered through University courses or the TAFE system. The IPWEA WA Division already has a VET accredited Diploma in Public Works that could potentially be available nationally. In addition to filling a skills gap, the Diploma in Public Works Engineering would offer a career path into engineering in local government.

These proposals are consistent with, but an extension of, the ANET recommendation to revitalise the paraprofessional qualification, with qualifications at the Advanced Diploma or Associate Degree level. Importantly, this approach could serve to ease the burden on the local government pool of professional engineers, through the sharing of tasks, the relief of administrative burden and the provision of necessary support in the discharge of their duties.

At the Local Government Industry Advisory Committee (ISC) of Government Skills Australia, meeting held on 10 February 2012, support was given to this project being funded by GSA.

The Senate Inquiry is requested to support the request for funding for this project to be included in the list of projects for funding in 2012/13.

Support for Undergraduates Part Time Work Experience

Local government competes for civil engineers with the building and construction and resources industries and with state and federal governments. While local government offers a stable employment base for civil engineers, the construction and resources sector is more volatile, but offers better remuneration, particularly for more senior engineers.

Contracting out of work has diminished the opportunities for undergraduates and new graduates to gain work experience early in their careers. Few cadetships are now offered in local government for reasons of cost, but also because of poaching of newly trained cadet engineers.

Many undergraduates are undertaking part-time work in association during their university studies to bolster their incomes, but much of this work is in casual unskilled positions. What IPWEA is proposing is that undergraduates have greater opportunity to do meaningful work that will bolster their career prospects and have them work-ready to meet the needs of a booming resource driven economy.

IPWEA believes that a program to provide work experience for every domestic civil engineer undergraduate, through vacation work and part-time work in councils would ease the shortage of civil engineers, improve the work preparedness of graduates **and importantly** could halve the 40% gap between commencements and completions of civil engineering graduates. Engineering has a high drop out rate at university. This proposal could significantly address this loss of potential engineers coming into the profession.

Local government is uniquely placed to deliver this program because of the geographical presence of its 565 councils in regions close to students' university or home. Local government also has a coterie of civil engineers close to retirement who could act as mentors and pass on their knowledge to new graduates.

Local government would be seeking to introduce undergraduates to the sector and retain most of these graduates for work in the sector. However given the strong demand for competent civil engineers in the resources, construction, electricity and water and state and federal government, it is likely that upon graduation, many would readily also seek work in the other sectors, adding additional engineers into the overall market. Nevertheless, IPWEA would seek to provide a post-graduation placement service for graduates that complete their work experience with councils.

IPWEA would co-ordinate the **Undergraduates Part Time Work Experience** program on behalf of the sector in partnership with state local government associations and the universities, but would need federal funding support.

The cost to provide vacation and part-time employment to up to 8,000 undergraduate civil engineers over 4 years at $200 per student over 100 working days pa (with the council passing on at least $150 of this per day to the student) is estimated at up to $160 million over the 4 years. Assuming half the students take up the offer, the cost would be $80 million. Local government would meet 10% of this cost, consistent with its 10% share of the civil engineering workforce and in recognition of the value of work done by the undergraduates.

IPWEA seeks support from the Senate Inquiry to establish a funded national program for the provision of Part Time Work Experience for Engineering Undergraduates at an estimated program cost of $72 million in federal funding support for the remaining costs.

An IPWEA Resource

Whether or not funding is provided, these projects will not be progressed without an IPWEA resource (a person) to work on coordinating and engaging with University Students, building links between the students, IPWEA, engineers and the employers (Councils) to offer the jobs and mentor undergraduates.

IPWEA's business systems have the capacity to have an additional eMentoring facility implemented where we could link students/mentors. It is critical to have a sector wide approach from the engineers own networks in LG and IPWEA can provide the link.

IPWEA seeks funding of $200,000 per annum to engage a resource and provide funding support for implementation for a minimum 3 years to deliver these projects.

Recommendations

6. **Funding support is provided through Government Skills Australia to fund the IPWEA Pathway to Engineering Initiatives (as outlined above) to reduce the demand on engineering qualified staff in local government.**
7. **IPWEA seeks support from the Senate Inquiry to establish a funded national program for the provision of Part Time Work Experience for Engineering Undergraduates (at an estimated program cost of $72 million in federal funding support).**
8. **IPWEA seeks funding of $200,000 per annum to engage a resource, and provide funding support for implementation, for a minimum 3 years to work on coordinating and engaging with University Students, building links between the students, IPWEA, engineers and the employers (Councils) to connect employers, students and the jobs and to provide mentor of undergraduates.**

SUMMARY

The ANET and other submissions comprehensively address the extent of the engineering skills shortage. The IPWEA supports all of the recommendations and strategies within the ANET submission. The local government sector requires some additional strategies and these have been outlined those through the recommendations within this submission and that of the IPWEA (NSW) Division.

The need for government to be an informed purchaser applies just as much to local government which also needs the capacity to deliver and/or contract manage infrastructure delivery. The consequences to the local government sector of no action to address the engineering skills shortage will be costly and could become catastrophic.

There are options available to address the problem and these have been outlined in the ANET and IPWEA submissions. It is critical that drivers for change are provided at a national level to ensure the engineering skills shortage is reversed.

RECOMMENDATIONS

In respect of the ANET submission we add the following supplementary recommendations:

1. **Bearing in mind the responsibility of local government for so much of the public infrastructure in Australia, it must have baseline engineering competence and capacity for more than just Federal Government funded projects.**
2. **Local government also needs to ensure it is an informed purchaser of infrastructure and contract manager but what will be the imperative for this to happen. It is recommended the ANET proposed Office of The Engineer needs to work with State and Local government as well as Australian government to ensure that they are all informed purchasers in the procurement process, and have the appropriate range of engineering skills internally to receive value for investment from their purchasing decisions.**
3. **The proposed dedicated Engineering Advisory Council as an Industry Skills Council (ISC) for the engineering profession needs to have strong local government engineering representation through the IPWEA. (Note: IPWEA is already represented on the local government Industry Skills Council of Government Skills Australia).**
4. **Baseline requirements in procurement for Commonwealth funded projects by providing a portal through which procurement methods are assessed on a project-by-project basis could also be applied to local government.**
5. **Greater flexibility is provided in engineering education through the availability of part time, sandwich and broader distance education study options.**

Additionally IPWEA recommends the following initiatives to provide support for addressing the engineering skills shortage in Local Government:

6. **Funding support is provided through Government Skills Australia to fund the IPWEA Pathway to Engineering Initiatives (as outlined above) to reduce the demand on engineering qualified staff in local government.**
7. **IPWEA seeks support from the Senate Inquiry to establish a funded national program for the provision of Part Time Work Experience for Engineering Undergraduates (at an estimated program cost of $72 million in federal funding support).**
8. **IPWEA seeks funding of $200,000 per annum to engage a resource, and provide funding support for implementation, for a minimum 3 years to work on coordinating and engaging with University Students, building links between the students, IPWEA, engineers and the employers (Councils) to connect employers, students and the jobs and to provide mentor of undergraduates.**

IPWEA would be pleased to provide further information and/or address the Senate Inquiry on these proposals to address the engineering and related skills shortage.

For further information contact:

Ross Moody
National Executive Officer
Institute of Public Works Engineering Australia
Level 12, 447 Kent Street Sydney NSW 2000