



Institute of  
Public Works  
Engineering  
Australia

# National Skills Shortage Project

## Guidelines & Templates

*The IPWEA National Skills Shortage Project was established to help address the severe skills shortage in local government and public works engineering.*

*The project has been funded through contributions from IPWEA National & State Divisions, and the National and State local government and public works engineering Foundations.*

*An important element of the project has been the development of guidelines and templates to provide the tools to assist persons working in the industry to address the skills shortage in their organisation.*

# National Skills Shortage Project

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# Guide to Retaining the Current Workforce

## *Discussion Paper*

*There is no 'quick fix' solution. Local Government organisations cannot just recruit more young qualified people as they are simply not available in sufficient numbers. The current resources boom is attracting skilled people into highly paid employment elsewhere. Employers, therefore, must look at several 'layers' of recruitment and retention, including young professionals, the existing workforce and those approaching, or at, retirement. This paper sets out to examine why the present situation exists and to propose ways to mitigate the impact of the engineering skills shortage.*

## **Executive Summary**

The current skills shortage issue within the public works engineering industry is widespread throughout the entire engineering profession in Australia, and affects all levels of the profession. The present resource industry, housing and consumer boom is likely to continue for the foreseeable future, ensuring that the current skills shortage will continue for some years to come.

The number of engineering graduates has fallen in recent years because of a fall in Government supported places for domestic engineering students at universities. The number of TAFE graduates has remained static. There are difficulties in employing migrant engineers to fill the skills gap, although there is a slight possibility that some international (on-shore and off-shore) Australian-trained graduates could be recruited.

Employers must become an "employer of choice" to attract young people. Employers must develop strategies to retain existing employees in the workforce, or to attract them back after a period of absence. Regional Australia has a particular set of difficulties, which must be addressed on a one-to-one basis.

Many Australians are working longer, and public works engineering employers must become aware of strategies to allow potential retirees a phased retirement. There are many possible avenues of part-time work available to retain the corporate knowledge and, in part, address the shortage of skills.

## **Introduction**

Every day the media carries at least one report or story on the subject of the skills shortage affecting almost every industry in our community. Some of the members of the Baby Boomer generation have already commenced retirement and, over the next ten or so years, the rate of retirement in that sector will increase. Australia faces an ageing population. The birth rate is declining and there are fewer young people entering the workforce. All these facts are well known.

IPWEA recognised that there was a growing skills shortage within the public works and local government areas and, in March 2005, the IPWEA National Board resolved to adopt a three level strategy and action plan aimed at attracting young people to a career in public works engineering.

One of the actions identified in the plan was to establish a national committee, to provide much needed input from industry practitioners, ensuring good representation from young people and rural and remote areas.

In May 2005, IPWEA convened a forum to review the Draft Plan. An amended plan was subsequently endorsed by the National Board and presented at a number of Forums.

In the months that followed, it became clear that addressing the shortage of young people was only part of the problem. It was recognised there is an urgent need to slow the rate of the increasing skills shortage not only by attracting young people but also by retaining the current workforce, particularly those approaching retirement. The loss of corporate knowledge within the workforce only compounds the problems created by the skills shortage.

The skills shortage is apparent at all levels of the technical workforce, senior engineer, engineer, technical officer and drafter alike.

## **What is a Skills Shortage?**

Over the past two decades, many local government organisations have downsized their engineering departments to such an extent that the position of the 'engineer' has much less status and profile in the



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community today than it did 20 years ago. As a consequence, the appeal of local government engineering as a career has lessened.

In a submission to the Senate Employment Workplace Relations & Education References Committee, in March 2003, *Engineers Australia*<sup>2</sup> defined 'skills shortage' as "*Skills shortages occur when there is a lack of adequately skilled individuals at current levels of pay, conditions of employment and geographic location. In other words, skills shortages exist when employers have difficulty filling, or are unable to fill, vacancies in recognised occupations and specialisations or common occupational groups*".

The paragraphs below will indicate that there is a decline in the number of graduate engineers entering the workforce, and there will be no improvement in the foreseeable future. It is necessary then to first review the problems surrounding engineering education. There are widespread reports, particularly from regional Australia, of the difficulty in attracting engineers and engineering technical personnel to fill positions in local government. We have a classic case of 'skills shortage' in our industry.

### Engineering Education

A significant amount of research has been conducted on the topic of educating and training tomorrow's engineers<sup>1</sup>.

There has been no increase in engineering training at the coalface - that is in domestic commencements at the undergraduate level - since the Coalition came to office in 1996. Since then there has been a squeeze on government-financed student places and a decline in student living allowances. Many students are extending their courses, which probably reflects the necessity for some to work part-time.

As far as engineering is concerned, there appears to have been a decline in commencements after a peak of 11,500 in 1997. In 2004, 10,727 domestic students commenced their university course. The Government may argue that in real terms, more places are now offered, but the growth is in overseas student onshore commencements. The number of domestic completions in engineering has fallen slightly to about 7,500 per year.

There is a common misapprehension about the number of engineering places offered at university. Many people seem unaware of the difference between domestic enrolments and overseas students (onshore and offshore). The previous Minister for Education, Science & Training, Brendan Nelson, has been quoted as saying that over the last nine years 135,000 additional places had been made available at universities. Much of this increase has been in the overseas student and postgraduate student areas, which does little to add to the size of the professional workforce in Australia.

The Government appears to believe that there is nothing to worry about in the above situation and are unaware, or will not admit, that Australia is one of the few Western countries where participation rates in higher education for domestic students have fallen in recent years.

### Expanding Domestic Economy

During the last few years a boom in the resource industry, housing market and consumer consumption has led to a dramatic expansion of the domestic economy. The demand for skilled labour (including engineers and engineering technicians) has increased in order to build the infrastructure needed to support such a boom. It comes as no surprise, therefore, that the shortage of engineers across most engineering disciplines has become apparent.

Engineering graduates who want work within the engineering industry have little trouble securing a worthwhile position, and at a starting salary often in the vicinity of \$60,000 or more. These high starting salaries are particularly apparent in States experiencing acute skills shortages due to the current resource boom. With the falling number of engineering commencements in recent years, and therefore the falling number of completions, the outlook is that the shortage of engineers will become more apparent over the next few years.

The skilled migration program has augmented the engineering workforce significantly, but not all migrant engineers have the training and experience relevant to Australian employer's needs immediately.



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For many migrants, language and communication difficulties are a barrier to obtaining immediate employment. The Department of Immigration & Indigenous Affairs does offer some incentives to Australian-trained overseas (onshore and offshore) graduates as these people are in a better position to offer skills that employers need.

However, Australia cannot rely on the skilled migration program as a long-term answer to the engineering skills shortage. The worldwide boom, particularly in China and India, will rapidly attract the available stock of international engineering graduates.

### Impact of the Resources Sector Boom

There have been frequent and widespread reports that there are critical skills shortages in local government organisations in regional Australia.

As the 'great Asian resource boom' continues, research by Hudson<sup>3</sup>, one of the world's leading recruitment, outsourcing and human resource consulting companies, shows that 61 per cent of employers in Australia's resource sector plan to boost staff in 2006.

Many of these workers work in remote locations in regional Australia that do not allow access to city/town facilities, infrastructure, services and activities. Frequently employers in those areas use the analogy that working and living on remote resource projects is akin to checking in at Club Med – excellent healthy food, golf courses, swimming pools, fully equipped gym, tennis and beach volleyball facilities, which forms part of the employee's package.

Local Government does not always have the completely isolated lifestyle described above, but many workers, who do not wish to work in metropolitan areas, are attracted to that way of life and the conditions of employment offered with a fly-in, fly-out regime. Such work demands long hours whilst on site, but in return offers excellent conditions and facilities, and guaranteed, uninterrupted time off at home.

In a time of a resource boom such as Australia is experiencing in 2005/6 (and projected to last at least another few years), all technical staff will be in short supply.

Local Government and Public Works organisations in regional areas will have to be 'creative' in the packages they offer to attract and retain technical personnel.

### What do we do about skills shortage ?

Public Works and Local Government employers must get smarter at being employers and become "employers of choice". They must not only attract new employees (both young and mid-career), but also retain existing employees.

Most individuals have a working life expectancy of over 40 years, and the objective for local government employers must be to provide meaningful, satisfying and productive work for the duration of that time.

In practice, many employees will change career paths. Some experienced employees will leave public works engineering, but could be attracted back at a later stage. Many employees facing retirement could, and should, be offered alternative types of employment within the public works area.

The Prime Minister has long said that he is committed to removing barriers to the participation of older workers in the workforce, and legislative changes (referred to below) allow this to happen. However, State Governments have various Industrial Relations laws that differ from State to State. There is tension between State legislation and Federal legislation, and these factors must be considered on an individual basis. Unfortunately, "one size does not fit all".

### Possible Strategies to Become an Employer of Choice

In an era when employees can pick and choose the type of work they do, and who they work for, it is important to remember that employers must become an "Employer of Choice" if they wish to attract the right people.

In the paragraphs that follow, a number of strategies to aid employment are listed, but in no particular order. Note that every local government organisation is different, and every situation will be different so, as previously stated, 'one size will not fit all'.



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The Eurobodalla Shire Council has an impressive track record of working towards being an employer of choice<sup>4</sup>. The Council was recognised for its work in training and succession planning by taking out the 2005 NSW Employer of the Year and the National Employer of the Year category in the Australian Training Awards.

The Council reviewed its entire engineering operation, identified areas of skills shortages and put in place an ambitious training program, particularly in partnership with the local TAFE College.

The result has been a better qualified staff and more people employed.

### Employee Priorities

To become an employer of choice requires, firstly, an understanding of what employees see as priorities. Some are listed below, but the list is not exhaustive:

- Concern about future retirement and savings plans
- Issues with care of elderly relatives
- Time to pursue personal interests
- Control over work environment, work schedules, performance review/rewards
- Balanced lifestyle – work/life priorities
- Corporate culture
- Potential salary – total benefit package – training/ advancement opportunities
- Competitive pay
- Mortgage problems, financial difficulties, HECS debt
- Expectation to hold down multiple jobs
- Need to be involved in organisation
- Flexitime
- Access to day care and help with children's education
- Health issues.

### Employer Issues

- One size no longer fits all
- Flexibility is the key
- Ask employees for suggestions
  - ◊ What keeps employees there

- ◊ Evaluate what the organisation offers as 'important', 'needs improvement', and 'not important'
- ◊ What issues, if addressed, would enhance retention
- ◊ Top three things about working for your organisation
- ◊ What could organisation do to improve the work-world for employees
- ◊ Summarise and feed back the results
- ◊ Identify and prioritise what it is possible to change
- ◊ Begin the process again

- Consistency in the quality of management decisions
- Enhancement of productivity and efficiency
- Ensure employees have skills and knowledge needed
- Maintain an ethical and distinctive work culture.

### Some Specific Techniques for Retention

- Focus on continued professional development, training and qualification
- Focus on pay and conditions – add benefits
- Flexible work times (possible 9 day fortnight)
- Sabbaticals
- Job sharing
- Rotational assignments
- Virtual office (i.e. work from home sometimes)
- Real acceptance of non-work priorities
- Create a pool of contingent workers (to reduce perception of multiple job syndrome) – see "older workers at retirement" in "Life Begins at Retirement"
- Financial support for education (CPD)
- Assistance with child/elderly relative needs
- "Raffle" two tickets to choice of show, or pay for dinner for two once a month
- Reward excellence with shopping voucher or family outing, etc
- Ask individual employee what can be done to make job more rewarding, etc
- Increase attention paid to new employees (maybe provide a mentor).



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### Some Issues for Consideration in Regional Areas

Some issues for consideration to remain competitive in regional areas (and, if considered appropriate, in metropolitan areas too) could be:

#### 1. Health

Over the last decade, there has been a growing emphasis on health and diet issues. The types of recreational facilities available at remote fly-in, fly-out locations were unheard of in mine sites 15 years ago. Now they are commonplace. Some considerations (at no cost to the employee) could be:

- Offer regular health checks
- Focus on men's health issues
- Offer free flu injections, (and free nicotine patches for those wishing to give up smoking)
- Canteen to offer healthy lunches (and other meals?) at a subsidised rate
- Provision of recreational lifestyle programs to improve personal fitness
- Well equipped gym facilities
- Implement strict safety campaign – not just lip service.

A creative health and diet campaign can provide employees with advice to become fitter, healthier and better able to cope with life's challenges. The workforce will be inspired, motivated and happy.

#### 2. Leave Issues

- Extended leave to care for family member
- Maternity and paternity leave
- Carer's leave
- Leave without pay
- Occasional paid travel to place of recruitment.

#### 3. Part-time Work

Some employees may wish to work part-time for a variety of reasons. Part-time work could be encouraged, or an employee may wish to 'job-share' with another worker. There are various reasons why employees may wish to alter their work patterns, and the following list is not exclusive :

- Reached financial security and no longer need to work full-time
- Care of aged or sick relative
- Care of young family
- Increased family time
- Study
- Travel
- Lifestyle option.

### Total Rewards

One way of examining the employer's ability to retain the employee is to look at the total package. Direct remuneration is just one component, and employees (particularly Generation X and Y employees) look increasingly for job satisfaction, work surroundings, etc, rather than just money.

Below are just some ideas for assessing total rewards.

<p><b>DIRECT COMPENSATION</b></p> <ul style="list-style-type: none"> <li>Base pay</li> <li>Bonus, incentive &amp; recognition pay</li> </ul>
<p><b>INDIRECT FINANCIAL BENEFIT</b></p> <ul style="list-style-type: none"> <li>Superannuation (retirement savings)</li> <li>Medical insurance</li> <li>Life insurance</li> <li>Education assistance (employee &amp; children)</li> <li>Paid time off</li> </ul>
<p><b>OPPORTUNITIES TO GROW</b></p> <ul style="list-style-type: none"> <li>Promotion</li> <li>Job evolution</li> <li>New equipment &amp; technology</li> <li>CPD, training and qualifications</li> <li>Addressing changing issues</li> </ul>
<p><b>WORK SURROUNDINGS</b></p> <ul style="list-style-type: none"> <li>Attractive office space</li> <li>Pleasant co-workers</li> <li>Interesting and satisfying work</li> <li>Recognition and respect</li> <li>Encouragement &amp; congeniality</li> </ul>



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### Life Begins at Retirement !

At retirement, there are considerations beyond the obvious financial ones, such as how to keep busy and how to stay fit. There are dynamics in relationships and personal situations that come into play in most people's lives.

There are three stages to retirement, the 'active stage', the 'slow down' stage and, finally, the 'dependent stage'. During the first (active) stage, retirement could mean any of the following to an individual :

- Perceived loss of freedom and independence
- Perceived loss of identity when work ends
- Loss of weekends/vacations – all the days become the same
- Perceived as a second chance without distractions of work
- May result in late life crisis (beginning of the end)
- May result in return to work.

There is a trend in some organisations to hire older workers and many companies are developing such policies. Older employees are often seen as loyal, productive, efficient and less likely to switch jobs.

Older workers at retirement can be flexible (e.g. phone rings at 8.20am with a request to work today because a regular worker has reported sick, and retiree can be at work in 20 minutes time). See "pool of contingent workers" under "Retention Techniques".

Many individuals at retirement realise that their superannuation savings are not sufficient to allow them to live the lifestyle of choice, and therefore return to the workforce through economic need.

### Phased Retirement Through Part-time Work

The Federal Government is committed to removing barriers to the participation of older workers in the workforce<sup>5</sup>. The Workplace Relations Act 1996 provides considerable scope to develop working arrangements which assist older workers to remain in, or re-enter, the workforce.

The Act includes a range of provisions intended to prevent and eliminate discrimination on a number of grounds, including age. It also removes the mandatory age of retirement provisions, in most cases.

The Age Discrimination Act 2004 makes age discrimination unlawful in a number of areas of public life (subject to various exemptions) including work.

Regular part-time work, or working reduced hours, are part of a range of flexible working options, which could be negotiated to assist older workers balance their professional and personal lives. Such workers would, of course, receive proportional pay and conditions when compared to full-time workers.

Some older workers may wish to lower their classification level as a transition towards retirement. Some employees may wish to scale down certain responsibilities (such as managerial) and utilise their knowledge and skills in other ways, such as through mentoring.

### References:

1. Monash University -People and Place (Vol13, no.4. 2005)
2. Engineers Australia – Current and Future Skills Needs (March 2003)
3. Profession and Lifestyle – Issue No 10, 2006
4. Tackling the Skills Shortage – A Bottom Up Approach. Warren Sharpe, Eurobodalla Shire Council Flexible Working Arrangements for Older Workers – Commonwealth of Australia, 2003 (<http://www.apsc.gov.au/publications03/maturedewr.htm>)



# Guide to Work Experience for Undergraduate Students

## Step-by-Step

Decide that your organisation will offer work experience to either a University student or a TAFE student.

Seek appropriate authority from the CEO to establish the position(s).  
Draft a position description (see Appendix 2)  
Place item in the annual budget to employ work experience student(s).

Contact the Department of Civil Engineering at all the universities in your area or State to find out how their students obtain work experience.  
Suggest either the Head of Department or the Civil Departmental Secretary.

Contact TAFE Colleges to find out how their students obtain work experience.

Decide broad parameters for the type of work you are going to give the student .  
(See Appendix 1 for some ideas.)

Prepare and place notice about applying for work experience on notice boards. Such a notice should include following information :

- Name of your organisation and address, and place of employment, if applicable.
- Wording such as "Work Experience Opportunity".
- Type of student, i.e. "Completed Second Year Civil Engineering". Dates to commence/end. (Discuss with university/TAFE to ensure dates do not overlap with semester or exam time)
- Words such as "Salary to be Negotiated". Do not include money figure on notice, as that will be dependent on number of years study completed and number/type of units passed.
- Name and phone number for further information.
- How to submit application – i.e. closing date, in writing or email, etc.

Appoint someone to assess applications and conduct interviews of short listed students.

Encourage the student to join IPWEA as a student member.

Appoint a supervisor. (The supervisor must be aware of the Council's expectations, the university/TAFE requirements and the needs of the student.)

Appoint a mentor. (Please note the mentor should not be the same person as the supervisor.) See *"Guide to Mentoring"*.



# Guide to Work Experience for Undergraduate Students

## (Exposure to Professional Engineering Practice)

### Introduction

To be eligible for graduation with an engineering degree, undergraduates are required to be exposed to professional engineering practice for a period of not less than twelve weeks or 480 equivalent hours. This requirement has long been called simply "Work Experience" and it will be referred to as that throughout this document.

The requirement for undergraduates to obtain work experience is placed by *Engineers Australia* (EA), formerly The Institution of Engineers, Australia. EA is the professional engineering body that accredits all engineering courses, at all Australian universities, as being academically suitable for professional recognition.

Refer to EA's website for more information. [www.engineersaustralia.org.au](http://www.engineersaustralia.org.au) An extract from EA's Accreditation Criteria Guidelines (Document GO2) is reprinted at the end of this document.

### Background

It is widely recognised that there was no real substitute for first-hand experience in an engineering-practice environment outside the university (or TAFE college). In past years, the ideal experience would be gained within an organisation that employed professional engineers (i.e. generally trained to university level and eligible for membership of EA) under whose supervision the undergraduate would work. One or more summer vacations arranged in this way would fulfil the 'work experience' requirement.

EA has recognised that the above fulfilment cannot always be obtained, not least of the reasons being that employers are not always willing to take on unqualified people just for work experience. They have, therefore, suggested a 'mix' of activities and exposure that will contribute to a good insight into professional engineering. Notwithstanding, a substantial component of vacation work in an "Engineering Environment" is still required.

An "Engineering Environment" is considered to be representative of a work environment where the undergraduate is provided with access to, and support from, professional engineers. The organisation's

functions will provide exposure to structured engineering processes in terms of design, research, manufacture, fabrication, construction, installation, commissioning, operations, maintenance, management, procurement or finance.

### Guidance for Employers

It will be necessary to plan ahead to employ one or more work experience students. The cost of this must be included in the annual budget.

It is preferable for the duration of work experience to be long enough for the student to understand not just individual tasks, but how the process of engineering fits into local government and, further, into society.

In order to keep an undergraduate productive over the period of work experience, the following suggestions are made:

**Planning at the beginning.** Set clear expectations and a defined work scope together with any council procedures relevant to the undergraduate. Normal engineering planning will foster a mutually beneficial work experience. The undergraduate could possibly be used to assist in developing this work scope.

**Break up the work.** Assign the undergraduate to a range of different aspects within the organisation, even for only a couple of half days per week. The undergraduate will gain valuable experience seeing fully how an engineering department or organisation works, plus exposure to the 'engineering culture'. This could be achieved by spending time with an engineer during various aspects of their work through Design, Validation, Maintenance, Procurement, Sales, Drawing Office, Tradesman Offsider, Scheduling, Site Inspections and Quality Systems. Administrative aspects such as Human Resources and Accounts should also be considered.

### Reporting

The university will require evidence of satisfactory completion of a student's vacation work experience as it is a mandatory requirement of all accredited engineering courses. Some universities formalise their requirement by issuing the student with a Logbook in which all exposure to professional engineering practice is recorded.



## Guide to Work Experience

The logbook will contain the following details:

- Date and range of work experience
- Organisation name (engineering department and location, etc)
- List of all major jobs/activities performed
- Validation (see below)
- Number of (weighted) hours worked
- Endorsement by supervising engineer, and company stamp.

It can be argued that the undergraduate's professional experience as an engineer begins with vacation employment. Many professional engineers keep a regular record of their career progression to facilitate updating of their *curricula vitae*.

The vacation employment is the first episode in their professional career and may be used when preparing the Practice report when they eventually apply for Chartered Professional Engineer status with EA.

Undergraduates should be encouraged to keep a daily journal. It does not have to be highly detailed, but should have sufficient information to remind both student and supervisor of significant events, tasks and activities undertaken. There is no prescribed format for the journal (i.e. narrative, headings/columns, topic notes etc).

Undergraduates should take note of the following in particular:

- Personal contribution and responsibilities
- Problems faced
- Solutions found
- Engineering judgments made (and why)
- Impact of solutions and judgements generated
- Reflections on how practical experience links with engineering theory
- Discussions with practising professional engineers, and their opinions
- Copies of relevant documents such as payslips, timesheets, memos, etc.

### Validation of Report

On completion of the vacation work experience period, the undergraduate will be expected to write a one page report giving a brief overview of the work experience and summarising what has been learned. This is in

addition to the entries into the logbook and the journal.

The undergraduate will ask his/her supervisor to sign the logbook and journal and to verify on the one page report that it is a true record of work carried out and achieved. The undergraduate will then hand the one page report to the university for noting in the student's file.

The whole purpose of the procedure set out above is to place the onus of reporting onto the undergraduate and to minimise the amount of work the supervisor is asked to do.

### Payment and Insurance

There are no set guidelines for payment during work experience. Some organisations refer to their relevant Award and make salary payments accordingly, while others do not offer any payment. However, as a guideline, a figure of 0.8 of a first-year graduate's salary for an undergraduate entering their final year would be average. This figure of 0.8 would be reduced by 0.2 for each year earlier the work experience is sought and gained.

Most universities cover their undergraduates for worker's compensation insurance for *approved vacation work experience*. The employing organisation should check with the university to confirm coverage. The universities do not normally carry any other type of insurance product for the undergraduates.

### Follow Up

Once a student is employed for work experience, every effort should be made to encourage him/her to join IPWEA as a student member. The mentor should keep in contact once the student has returned to university and offer encouragement to apply for a position within local government engineering.

### Conclusion

Providing work experience for undergraduates is a significant opportunity to expose students to a career in local government/public works engineering. It will not, of course, guarantee that graduates will seek to commence a career in this field, but it does provide the industry with a profile in the undergraduate population, a profile that does not currently exist.



## Guide to Work Experience Engineers Australia Accreditation Criteria Guidelines (Document G02)

### *"3.2.5 Exposure to Professional Practice*

*Exposure to professional engineering practice is a key element in differentiating a professional engineering degree from an applied science degree. Although the status of Chartered Professional Engineer requires a substantial period of experiential formation in industry after graduation, it is clearly unsatisfactory for the student's perceptions of engineering to develop, over the first four critical years, in complete isolation from the realities of practice. There is obvious benefit in ensuring that at least an element of professional formation is interwoven with the academic curriculum, to provide a balanced perspective and relate academic preparation to career expectations.*

*Professional practice exposure must be considered as an integral learning activity within the educational design process and make a significant and deliberate contribution to the delivery of educational outcomes. The objectives associated with each major episode of exposure need to be clearly understood by all constituencies and documented as a formal learning activity within a designated academic unit. There must be defined contributions from these activities to the specific learning outcomes of academic units and in turn to the educational outcomes of the program as a whole.*

*There should be a formalised tracking, monitoring and assessment of the learning outcomes associated with professional practice exposure. This may for example be through a journal or portfolio system where students record and self-analyse experiences against learning outcome targets or capability profiles.*

*Professional engineering practice exposure must include some of the following:*

- \*use of staff with industry experience, and industry visits and inspections*
- \*practical experience in an engineering environment outside the teaching establishment,*
- \*mandatory exposure to lectures on professional ethics and conduct, and use of guest presenters,*
- \*an industry based final year project,*
- \*industry research for feasibility studies,*
- \*study of industry policies, processes, practices and benchmarks,*

- \*interviewing engineering professionals,*
- \*industry based investigatory assignments,*
- \*direct industry input of data and advice to problem solving, projects and evaluation tasks,*
- \*electronic links with practising professionals, and*
- \*case studies.*

*It is considered that there is no real substitute for first-hand experience in an engineering-practice environment, outside the educational institution. Engineers Australia strongly advocates that all engineering schools include a minimum of 12 weeks of such experience as a requirement for the granting of qualifications, in addition to the other elements suggested, and make strenuous effort to assist all students to gain placements of suitable quality. However it is recognised that this may not always be possible.*

*The requirement for accreditation is that programs incorporate a mix of the above elements, and others \* perhaps offering a variety of opportunities to different students \* to a total that can reasonably be seen as equivalent to at least 12 weeks of full time exposure to professional practice in terms of the learning outcomes provided. In the same way as for other modes of learning, submitted documentation must explain how the various dimensions of professional practice exposure contribute to the overall educational design.*

*Where practice exposure is incorporated within the four-year equivalent curriculum, it must embody assessable requirements comparable with other curriculum elements that attract similar credit.*

*Where it consists of work experience in industry, not otherwise formally assessed, it should be counted in addition to the four-year academic requirement.*



## Guide to Work Experience

### Appendix 1 - Practical Work Examples

#### Practical Examples of Work That Can Be Offered

"We have used him on hydraulic and structural design work and also some investigations. I have mentored him mainly by giving him examples of my past work. Also, he has been able to learn some relatively simple software such as Hec-Ras on the job".

"Our office employs a different trainee learning and doing engineering drafting work. They have been very helpful in carrying high loads and in doing the simpler work, finishing off design work done by our paraprofessional civil designers".

"Our City Council recently engaged two 3<sup>rd</sup> year students for their 3 month break to undertake footpath asset data collection. This work involved the students physically inspecting our footpath network for potential hazards. The students had to measure, categorise and log the hazards on mobile computers. The information was then downloaded daily and at the end of the exercise the students had to present the data back to Council's engineers, thus giving the responsibility of data management and reporting to the students".

"The student had completed 1<sup>st</sup> year in civil engineering. He was employed on a project to capture data on our road signs, and test them for retro reflectivity".

"They effectively operate as engineering technicians with responsibilities expanding as experience grows. Survey, design and project supervision is the norm".

"I have employed PhD students on project work – it's a great option and 1/5 the cost of consultants. Examples are dredging investigations for recreational lakes, traffic studies, environmental assessments and options reports on community facilities. This is usually via a direct payment to the university. Downside is it may take 2 years to complete".

"Survey and road and drainage design (rural and urban) – both gravel and sealed roads. Undertaking investigations/inspections of simple traffic engineering problems. Also traffic studies and council infrastructure such as traffic signs, automated traffic counters etc".

"Undertaking survey and design jobs such as driveways, footpaths, kerb and guttering works – incorporates using survey equipment, design in CAD software, estimating costs based on standard fees and charges, review of environmental factors and setting out/markings on-site for construction".

"Document preparation for sending out tenders, traffic committee meetings, rolling works programs etc; also maintaining Council databases".

"My first was drafting with some basic road alignment and pavement design, the second was undertaking a land contour survey which was subsequently used for land subdivision purposes and the civil work attached thereto".

"Two months on drainage strategies, analysing catchments, determining pipe upgrades and costs of these works and summarising in report format. One month assisting subdivision engineer. Assessing small building licence applications for engineering requirements (drainage/road safety), site inspections and prepared drawing database of plans in storage. During the three months student was also exposed to some small design projects and road safety queries, team meetings etc".

#### TAFE STUDENTS

"With regard to TAFE students – we have two new employees who are both completing the last six months of their Diploma in Civil Engineering. They have been appointed into full time positions, with allowance of 8 hours paid study time, and flexible working arrangements on other days to suit hours at TAFE. They are employed at two levels below the position, which will go to full level when the Diploma is completed".

IPWEA gratefully acknowledges assistance from Logan City Council, Perth City Council, Richmond Valley Council, City of Gosnells, Randwick City Council, Latrobe City Council, Toowoomba City Council and the Shire of Coolgardie.



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## Guide to Work Experience Appendix 2 - Position Description Forms

### Position Description Forms - Example 1

Position Title: Student – Engineering Services (Temporary) Position  
Date:  
Position No:  
Department: Engineering Services  
Branch: Design & Survey  
Supervisor: Senior Engineer Design  
Classification:  
Award: *State* Local Government Officers' Award -  
Award Allowances: As per Award  
Agreement: ..... City Council Enterprise Bargaining Agreement

### Objective of the Position

The objective of this position is to complete minor projects as required, and to gain experience in investigations, design, project management, construction and maintenance, asset management, operations and other activities associated with the provision of engineering services in local government.

### Primary Delegations & Responsibilities

This position reports to Branch Managers or Technical Supervisors as delegated in the Engineering Services Department. It has no supervisory responsibilities.

### Education/Qualifications

1. Currently undertaking studies at Graduate level for a degree in Engineering, Science, Environmental Management or associated field. *The number of years of study completed, or type of units passed (eg structures, hydraulics etc) may be stipulated.*

### Knowledge, Skills & Abilities

1. Skills in use of computers and awareness of current technology in these systems.
2. Ability to set and achieve results through self-organisation.
3. Basic oral and written communication skills.
4. Developing professional interests in the provision of engineering services in local government.

### Additional Position Requirements

1. Possession of a current "C" Class driver's licence.

### Duties of the Position

1. Under delegated direction from Branch Managers or Technical Supervisors perform various duties to assist Engineering Services Department Branches maintain a high level of service to their customers.
2. Carry out specified technical research and provide advice and support for problem solving in matters pertaining to Engineering Services Department Branch activities.
3. Maintain effective communications with personnel of Engineering Services Department Branches and other Council Departments to provide an open and free flow of information.
4. Other duties within the ambit of the Award classification as may be required by the Branch Manager.



## Guide to Work Experience Appendix 2 - Position Description Forms

### Position Description Forms - Example 1 (Continued)

#### Key Selection Criteria

Please address each of the following Key Selection Criteria:

1. Demonstrated customer service skills with the ability to provide accurate and timely advice in a helpful manner.
2. Developing knowledge of the application of workplace health and safety principles and a commitment to the principles of anti-discrimination and equal opportunity in the workplace.
3. Developing aptitude for work in local government engineering.

#### General Terms of Appointment

1. All employees are required to participate in Continuous Improvement Process.
2. It is a requirement of all staff to uphold the Council's equal opportunities policy, and to ensure that the intention and spirit of that policy is followed in their work, including the work of others for whom they are responsible.
3. All employees at Toowoomba City Council must give full support to health and safety legislation. We seek from every employee active co-operation with those responsible for the effective planning, organisation and monitoring of our health and safety.
4. All employees at Toowoomba City Council must agree to act within the requirements of Council's policies.
5. All employees are bound to act in accordance with the Local Government Act 1993 and the provisions of Council's Code of Conduct.
6. Council's values for serving the community are: responsive customer service; integrity and impartiality; openness and accountability; and equity.
7. The values which govern the conduct of management and employees are: loyalty, respect and trust; corporate teamwork; excellence and best practice; open, fair, accountable and efficient work practices; and staff development.
8. All employees are to be mindful and report all instances of environmental harm, which may be caused or discovered in carrying out their duties. Employees working on an Environmentally Relevant Activity Site are bound by the provisions of the Integrated Environmental Management System.

-----  
SIGNATURE OF MANAGER

-----/-----/-----  
DATE

-----  
SIGNATURE OF APPOINTEE

-----/-----/-----  
DATE



Institute of  
Public Works  
Engineering  
Australia

## Guide to Work Experience Appendix 2 - Position Description Forms

### Position Description Forms - Example 2

<b>POSITION TITLE:</b> Vacation Engineer		<b>POSITION HOLDER'S NAME:</b> Vacant	
<b>REPORTS TO:</b>		<b>DIRECTORATE:</b>	
<b>AWARD/AGREEMENT:</b>	<b>CLASSIFICATION OF POSITION:</b> Level 2	<b>CUSTOMERS (internal &amp; external):</b> Employees, Public, Govt. Depts.	
<b>EXPENDITURE &amp; REVENUE \$:</b> Nil		<b>NUMBER OF EMPLOYEES SUPERVISED BY THIS POSITION:</b> Nil	

<b>KEY FOCUS OF THE TEAM</b>  <i>To be filled in</i>	<b>KEY FOCUS OF THIS POSITION</b>  Supports the provision of an efficient, well-informed and effective engineering service for the City.
--	--

ORGANISATIONAL STRUCTURE		
<b>SUPERVISOR</b>		
		Nil

ATTRIBUTES (SKILLS AND KNOWLEDGE) REQUIRED FOR THE POSITION	CONTEXT TO WHICH SKILLS AND KNOWLEDGE APPLIES
Well developed verbal and written communication skills	Liaises with staff and customers Assist in producing written correspondence and response to queries
Well developed analytical and problem solving skills	Ability to assist in problem solving Ability to provide assistance in completing tasks
Ability to undertake tasks thoroughly, accurately and timely with varied supervision	Works in a busy environment Assists in a number of projects at one time
Ability to work both individually and as part of a team	Works on tasks independently Works as part of the Technical Service Team
Computer skills	Works with all Microsoft packages Data entry and typing skills



## Guide to Work Experience Appendix 2 - Position Description Forms

### Position Description Forms - Example 2 (Continued)

<p><b>QUALIFICATIONS REQUIRED TO UNDERTAKE THE POSITION:</b></p> <p>Progress towards Civil Engineering Degree or similar Current 'C' Class Drivers Licence</p>	<p><b>PHYSICAL &amp; ENVIRONMENTAL DEMANDS OF THE POSITION:</b></p> <p>Ability to work in a sitting position on a VDU Noise levels low</p>
--	--

KEY AREAS OF RESPONSIBILITY	DEMONSTRATED COMPETENCIES
1. Adding value and completing position responsibilities	Ensures verbal and written communication provided to the customer is correct, factual, timely, customer focused and in accordance with the relevant Acts, Legislation, Bylaws, standards and guidelines and to receive training and guidance in these areas. Ensures Supervisor is aware of difficult or sensitive issues Plans, organises and responsible for quality of own work.
2. Achieving customer focused service	Work and behaviour adds value to the business of the City within area of responsibility. Makes recommendations to the Manager/Supervisor on improvements to ensure an effective, accurate service is given to the customer. Information received from the customer is given due consideration within existing processes prior to a decision being made.
3. Working with external and internal policies, systems, processes and equipment	Works with established procedures, processes, systems and equipment. Works in a manner, which is consistent with legislation affecting current tasks including EEO, Safety and Health.
4. Communication and Relationships	Manages conflict and differences and contributes to the resolution of problems to maintain an effective working environment. Demonstrate commitment to working both individually and as part of the Team to achieve the strategic goals for the City. Contributes ideas and information.
5. Learning and Growth	Uses feedback to develop skills, behaviours and attitudes. Learns and applies new competencies to keep up to date on the job. Receives training in aspects of Local Government Engineering Issues.
6. Finance	Ensures work is undertaken in a manner, which is consistent with the budget and resources allocation.

### SIGNATURES

EMPLOYEE	_____	DATE
SUPERVISOR	_____	DATE
DIRECTOR	_____	DATE

IPWEA gratefully acknowledges the assistance provided by Toowoomba City Council and Gosnells City Council in providing examples of position description forms for vacation student employment.



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# Guide to Work Experience for Secondary School Students

## (Exposure to Professional Engineering Practice)

### Introduction

The vast majority of secondary schools in Australia encourage their students to seek some form of work experience.

This is normally a one week activity in Year 10. Occasionally students will carry out their work experience for one day a week over a number of weeks. School student work experience is unpaid and the school covers all insurance and liability aspects.

Secondary school students have to make decisions in Year 10 about their future careers. These decisions enable them to make a choice about which subjects to study for their school leaving certificate examinations as well as a possible future career path.

Work experience is an *introduction* into the work force, or a *taste* of what a future career in a specific area might be like. This short period is not designed to train the student, or to teach the student any particular engineering skills.

### How to Employ a Secondary School Student

Most schools will approach Council to see if students can be placed. This is an excellent opportunity to promote local government engineering, and may result in an employee at some time in the future. At worst, it will give your department excellent publicity in the local community.

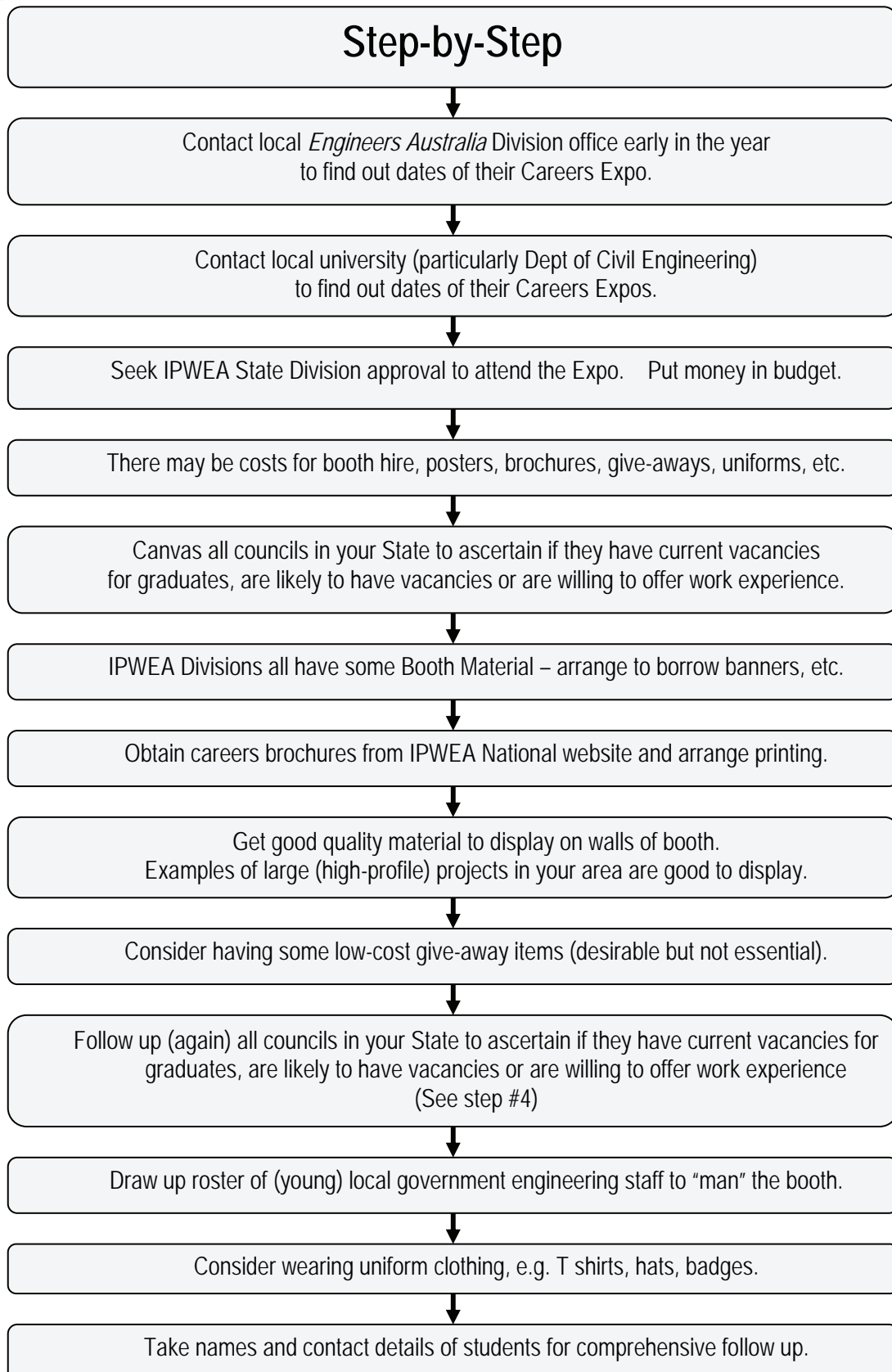
Because the school work experience student is not paid, there is no need to make financial provision in the budget. The student comes to observe rather than learn specific skills, and therefore should be afforded such opportunities in an understudy role.

Take the student along to meetings, to site inspections or even let him/her loose on a drawing board. Try to allocate the student to different sections or departments each day to observe the different functions that are undertaken by local government engineering.

The student does not have to be supervised. Ensure the student remains at the workplace, is in the company of an employee and is safe at all times.



# Guide to Careers Expos





# Guide to Careers Expos

*Attending a Careers Expo provides Local Government Engineering with a significant amount of publicity and an opportunity to attract young people into the profession. This guide is for expos aimed at university/TAFE students – not school students.*

## Introduction

This Guide is provided as a check list for involvement in Careers Expos, which are highly recommended to provide visibility for public works engineering as a career option for engineering students.

In some States, *Engineers Australia* organises an annual careers expo. It is timed to take place at the beginning of the first semester of the year and at a time before employers have had an opportunity to recruit graduates. It is primarily aimed at final year university and TAFE students.

Local IPWEA Divisions should contact the local EA Division to find out the date, and who is organising the event. If possible, obtain a booth or a stand, or whatever is available.

Other careers expos may be less targeted in terms of the audience, but will nevertheless provide an opportunity to make public works engineering visible.

## Graduate Expectations

At present there is a critical skills shortage in most aspects of engineering and companies are competing to obtain the services of graduates from both TAFE and university.

Students are far more discerning now than in previous years. They are much more interested in working for a company or organisation, which offers challenging and interesting work, than obtaining a "career path". The lure of going to a company that offers a Professional Development Program is also attractive to graduands.

## Do's & Don't's

- Do have attractive bright coloured posters
- Do have IPWEA careers brochures
- Do have some low cost give-aways, such as an IPWEA pen or something with IPWEA's name on it
- Do have literature about local government engineering
- Do have some details of actual (large, well known)

projects currently underway

- Do have knowledge of work experience opportunities available
- Do have information about job/career opportunities available
- Do have at least two, preferably three people manning the booth
- Do try to get both young women and men manning the booth
- Do have booth signage which states "Public Works Engineering"
- Do record the names and contact details of students for follow-up
- Do have some IPWEA student membership application forms
- Do try to have a small but high round table with high stools to enable intimate discussion
- Don't have old, out of date posters or information
- Don't be surprised if graduates from other booths ask questions about changing jobs into local government engineering
- Don't go over the top with cost of give-aways. It is not important.

## Booth Setup

All expos will be different, so the set up will vary accordingly.

The following describes the 2006 WA Careers Expo that attracted 65 company booths and about 800 students. It ran from 9am to 1pm on a Saturday, and was very busy throughout. The booth was a standard 3x2m exhibition booth, open on one side. The booth was decorated with the large IPWEA cloth banner, which was effective. Several other IPWEA laminated posters and logos were displayed. Two large posters were displayed showing current projects being undertaken by the City of Perth, and these made interesting discussion points when the question "What do LG Engineers do" was asked?

A large oblong table was on one side of the booth, displaying the brochures and other IPWEA literature. We had two chairs, which were not used as we simply had no time. It would have been beneficial to have had a small, high, round table with two high stools to have provided an intimate 'interview place' to swap details with students.

# Guide to Cadetship

## Purpose & Explanation

### Introduction

During the last decade, many Local Government and Public Works organisations have experienced increasing difficulty in recruiting properly trained and qualified staff to fill engineering positions in the workforce. IPWEA has developed a strategic plan to address the growing skills shortage. One element of the plan is the re-introduction of a Cadetship program.

### Explanation

A large number of academically qualified school leavers enter the tertiary system (TAFE and University) each year, seeking a technical qualification in engineering drafting or professional engineering.

During their time at the tertiary institution, they are subjected to many offers of employment. This is often a time of financial difficulty, with more than 90% of students needing to find part-time work (frequently in fast food outlets, etc) in order to sustain themselves during their course of study. University graduates will also emerge with a large HECS debt that usually takes some years to repay.

Final year university students are much sought after by industry and many are offered employment prior to graduation. Students themselves have become increasingly selective and discerning about the organisations they wish to work for. In many cases, students see an employer of choice as one who offers the student some financial assistance through university and guaranteed meaningful work experience, and as one who offers the graduate a pathway to professional recognition and job satisfaction.

TAFE students normally commence their studies doing a Certificate III course (six months) or a Diploma course (1 year). Those that pass their Diploma may continue into an Advanced Diploma (1 additional year of study).

In practice, the vast majority of students will find part-time engineering employment either at the end of their Certificate III or about half way through their Diploma. This may be looked on by the employer as a type of Cadetship, and will be discussed in detail in the *Guide to Cadetships for TAFE Students*.

### Cadetship Programs

Organisations can secure a degree of loyalty from students by means of a cadetship. This is where a student can belong to an organisation during their period of study in return for agreeing to work for a specified time upon successful completion.

An organisation could offer to pay tuition fees (HECS) and some type of retainer during part, or all, of the course of study. In addition, organisations usually also offer paid work experience during vacation times. In return, the graduate will be bonded to the organisation for an agreed period of time.

Cadetship programs may be offered for full-time or part-time students. In the latter case, the student would be required to work for the organisation in return for award wages.

Cadetship programs can be initiated at any time prior to, or during, a student's course of study. The bond issue will be a legally binding matter and should be properly processed using the organisation's solicitors.

### When to Engage a Cadet

The national average attrition rate for university students studying for an engineering degree is about 40%, and about 22% in the first year. The TAFE system experiences an even higher attrition rate. The reason for the high drop out in the first year is that students frequently realise that:

- Engineering is not for them
- Course is too difficult
- Decision to follow an engineering discipline different from initial choice
- Family/financial problems.

For the reasons given above, only a few cadetships are awarded to students early in their studies. Organisations normally wait to see academic records on completion of either the first or second year of study for university students or on completion of the Certificate III for TAFE students.

At this time, a student has a better idea of his/her future career direction.



## Guide to Cadetship

### Part-time Versus Full-time Cadetships

There is a difference between the demands of university and TAFE. BEng students will normally be required to spend at least 20 contact hours a week at university for full time study. TAFE students can complete their Diploma or Advanced Diploma courses with only two or three days a week at TAFE.

- Most university students want to complete their degree in minimum time
- TAFE students can work part-time while continuing to study
- Financial pressure means students may have to work - thus the need to go part-time
- Students with commitments (spouse/child etc) usually are part-time because they are also the bread-winner.

### Cadetships Versus Scholarships

This paper, together with the *Guide to Cadetships for University Students* and the *Guide to Cadetships for TAFE Students*, has canvassed the nature of Cadetships in some detail. Many advantages accrue to the student from a cadetship, namely secure income throughout the course, guaranteed payment of tuition,

HECS (i.e. no debt), guaranteed work experience and guaranteed employment on completion of the course. The disadvantage to the cadet is that he/she may be bonded to the organisation for up to four years after finishing the course, or face a potentially large financial penalty for early termination. The advantage to the organisation is that they have a stable workforce.

Many young people do not wish to be tied to an employer for a finite period of time, and no matter how attractive a Cadetship may appear, will not take it up. In order to entice young people, many organisations now offer scholarships. There are various forms of scholarship, but they normally have three basic components: fixed money value for one or two years: guaranteed paid work experience: non-binding offer of employment at completion of course.

Scholarships are popular with students because they provide money and work experience but no commitment. The organisation has to take a chance that the graduate will "do the right thing" and repay the organisation's generosity by working for them for a number of years. Anecdotal evidence suggests that less than 50% of students repay the organisation by accepting the offer of work.

### Possible Cost for Full Time Cadet

In the example opposite, a school-leaver (18 years of age on 1<sup>st</sup> January 2006) has been engaged on a cadetship to commence a four year engineering degree.

*(The author acknowledges the assistance of Main Roads Western Australia in the preparation of this table.)*

Year	Item	Cost	Total
1st	40 weeks sustenance allowance	\$286.93/fortnight	\$5738.60
	12 weeks work experience	\$815.66/fortnight	\$4893.96
	Superannuation and on-costs (say 20%)		\$978.80
	HECS		\$5200.00
	<b>Total (approx)</b>		<b>\$16811</b>
Year	Item	Cost	Total
2nd	40 weeks sustenance allowance	\$330.28/fortnight	\$6605.60
	12 weeks work experience	\$944.13/fortnight	\$5664.78
	Superannuation and on-costs (say 20%)		\$1132.95
	HECS		\$5500.00
	<b>Total (approx)</b>		<b>\$18903</b>
Year	Item	Cost	Total
3rd	40 weeks sustenance allowance	\$371.28/fortnight	\$7425.60
	12 weeks work experience	\$1060.22/fortnight	\$6361.32
	Superannuation and on-costs (say 20%)		\$1272.26
	HECS		\$5800.00
	<b>Total (approx)</b>		<b>\$20859</b>
Year	Item	Cost	Total
4th	40 weeks sustenance allowance	\$407.42/fortnight	\$8148.40
	12 weeks work experience	\$1164.68/fortnight	\$6988.08
	Superannuation and on-costs (say 20%)		\$1397.62
	HECS		\$6100.00
	<b>Total (approx)</b>		<b>\$22634</b>
<b>Total Cost of Cadetship</b>		<b>Approx</b>	<b>\$79207</b>

# Guide to Cadetships for TAFE Students

## Step-by-Step

*This document should be read in conjunction with the  
"Guide to Cadetships – Purpose & Explanation" document.*

Once you decide to offer a Cadetship, ensure there is sufficient money in the budget.  
This will be a recurring expenditure.

Contact the TAFE Colleges in your State and discuss the proposed cadetship  
with the Head of Civil Engineering. The TAFE College can assist in identifying  
if there is a student from your area, or any other specific type of student you would prefer.

Discuss with TAFE the desirability/possibility of cadet studying part-time  
(thus working one or two days a week).

Consider advertising in the local press stating terms of the Cadetship, closing date for  
applications, etc. Consider advertising on TAFE notice boards.

Consider legal advice about the form of contract that should be drawn up,  
with particular attention to the bond conditions.

Arrange for assessment of applications and subsequent interviews.

Arrange for a suitable occasion to award the Cadetship.  
Invite family and close friends of cadet, CEO, Senior Staff, Mentor,  
future work colleagues (graduates), TAFE representatives, IPWEA representative, etc.

Appoint mentor and ensure mentor and Cadet are aware of the requirements of the mentor  
program. If necessary, send the mentor to a mentor training course.

Consider how payment will be made to the Cadet. It may be beneficial to make regular  
payments rather than one large annual payment.

Offer the Cadet Student Membership of IPWEA.

Plan ahead for when the cadet will do work experience with you.  
Plan projects that coincide with the cadet's interests. Consult with the cadet's lecturers at  
TAFE to determine if a "work" project can form part of the cadet's course.

# Guide to Cadetships for TAFE Students

## (Full-time & Part-time Study) (Local Government & Public Works)

### Introduction

The purpose of this document is to provide a framework for local government and public works organisations to offer Engineering Cadetships to students studying at TAFE. Such "Cadetships" have changed in nature in recent years, particularly due to the chronic skills shortage affecting para-professional engineering.

Normally three courses are offered at TAFE - Certificate III, Diploma and Advanced Diploma. There is also a Certificate IV course, which is a combination of the Certificate III and the Diploma course.

All the above courses are offered in Civil, Structural or Environmental engineering, but not all courses are available at all TAFE campuses. Some campuses offer evening classes to assist students working full-time, but not all.

The Certificate III course requires a student to have completed Year 11 and is one semester in duration. It teaches elementary drafting concepts.

The Certificate IV course also requires a student to have completed Year 11, but is one year in duration and is ideal for students employed in a traineeship capacity (i.e. 3 days at work and 2 days at TAFE). It is 1 year in duration and teaches basic drafting concepts. It gives about 6 months advanced standing to the Diploma course.

The Diploma course requires a student to have completed Year 12 or the Certificate III and is 1 year in duration. It teaches basic drafting. The Advanced Diploma is an additional year of study and teaches the full range of drafting techniques.

### Study & Work

In the current economic environment employers, both in local government/public works and in the private sector, are having great difficulty satisfying their demand for para-professionals in the civil engineering field. As a consequence, most look upon TAFE as a probable recruiting source and offer a range of employment options sometimes called "Cadetships".

Normally employers look at completion of the Certificate III, or completion of the first semester of the Diploma course, as the minimum qualification acceptable, and then offer part-time employment, or a cadetship.

The norm appears to be to allow up to two days a week on full pay to attend TAFE, while working as a junior drafter for the remaining time. This part-time work is viewed by TAFE as fulfilling the mandatory work experience unit (minimum 75 hours) required for each Diploma course. Some employers insist that cadets study in their own time as well.

It should be noted that the pool of students qualifying from the above courses is not large. The attrition rate is exceptionally high, due in part to the 'attack' from the trades where unskilled workers can attract significant wage rates that may be more attractive to some students than study at TAFE.

TAFE timetables may change each semester, so part-time cadets may need to re-negotiate their working days/hours twice yearly.

### Types of Cadetships

Refer to the *Guide to Cadetships - Purpose & Explanation* in conjunction with this document.

The more formal "Cadetship", which is still appropriate for university students, can be used for TAFE students, but will be less attractive to candidates in metropolitan areas. However, it may be a good model for Local Government in regional Australia.

In practice, most students at TAFE obtain some sort of technical employment after about one semester of successful study.

Employers will need to consider the following to "get in early" :

- Contact your local TAFE Engineering Department to discuss their student enrolment.
- Seek permission to attend TAFE to address students (suggest IPWEA sponsor a lunchtime gathering).



## Guide to Cadetships for TAFE Students

- Supply Engineering Department with notice advertising vacancy for Cadetship. This should be done as early as possible each semester to allow time for selection, etc. (Note comments on attrition rates above.)
- Offer part-time junior drafting work for about three days a week (provide supervision and mentor, etc). Wherever possible, include some project work, accompany engineer on-site, etc).
- Offer up to two days a week (paid) to attend TAFE. Encourage study in own time as well.
- Normally offer full-time employment during TAFE vacation times.
- Consider reimbursement of tuition fees, cost of books, etc on successful completion of unit/units.
- Provide salary/pay increments tied to academic achievement or qualification attainment.
- Some organisations may insist on repayment of the support payments made if the student leaves their employ within a stipulated time of qualifying.
- If student is undertaking Diploma study, encourage to them to continue to Advanced Diploma or Bachelor of Civil Engineering, etc.

*The author acknowledges the assistance received from officers at Challenger TAFE and Central TAFE (AMTC) in the preparation of this document.*



# Guide to Cadetships for University Students

## Step-by-Step

*This document should be read in conjunction with the  
"Guide to Cadetships – Purpose & Explanation" document.*

Once you decide to offer a Cadetship, ensure there is sufficient money in the budget.  
This will be a recurring expenditure.

Contact the Universities in your State and discuss the proposed cadetship with the  
Head of Civil Engineering. The University can assist in identifying  
if there is a student from your area, or any other specific type of student you would prefer.

Discuss with the University the desirability/possibility of cadet studying part-time  
(thus working one or two days a week).

Consider advertising in the local press stating terms of the Cadetship, closing date for  
applications, etc. Consider advertising on University notice boards.

Consider legal advice about the form of contract that should be drawn up,  
with particular attention to the bond conditions.

Arrange for assessment of applications and subsequent interviews.

Arrange for a suitable occasion to award the Cadetship.  
Invite family and close friends of cadet, CEO, Senior Staff, Mentor,  
future work colleagues (graduates), University representatives, IPWEA representative, etc.

Appoint mentor and ensure mentor and Cadet are aware of the requirements of the mentor  
program. If necessary, send the mentor to a mentor training course.

Consider how payment will be made to the Cadet. It may be beneficial to make  
regular payments rather than one large annual payment.

Offer the Cadet Student Membership of IPWEA.

Plan ahead for University vacation time when the cadet will do work experience with you.  
Plan projects that coincide with the cadet's interests.  
Consult with the cadet's lecturers at University to plan final year project.

# Guide to Cadetships for University Students

## (Full-time & Part-time Study) (Local Government & Public Works)

*Many public works organisations have experienced difficulty in attracting and recruiting young people. One possible way is through the re-introduction of a Cadetship program.*

### Introduction

The purpose of this document is to provide a framework for local government and public works organisations to offer Engineering Cadetships to students studying a Bachelor of Engineering degree.

Refer also to the *Guide to Cadetships* in conjunction with this document. At a later date, a skeleton document may be prepared outlining the type of contract (or agreement) that could be drawn up to offer/accept a cadetship.

Most Bachelor of Engineering courses in Civil, Structural and Environmental Engineering are four years in duration, but if the student elects to do a double degree, the course length is five years.

The vast majority of students elect to undertake full-time study, thereby completing the course in minimum time, but a few students take a lesser study load during some or all of their course to enable them to work part-time. A full-time study load will require the student to attend approximately 20-25 hours per week at the university, and at least an equal number of additional hours doing assignments, etc.

A very large percentage of students seek low paid casual (evening) work out of economic necessity. Because of the high study load demanded by the engineering course, and the students' casual work commitments, many fail units during their course and have to repeat them, adding to the length of time (and HECS debt) spent at university.

About 13,000 domestic students commence engineering degree studies each year, but less than 8,000 graduate<sup>1</sup>. The attrition rate is always much higher in the first year of study and declines as each year continues. Students entering their final year are well motivated and have a very high rate of success.

In their annual salary survey Engineers Australia stated 'Across the majority of states, Civil Engineers are reported to be the most sought after'<sup>2</sup>. There is also

widespread anecdotal evidence of the skills shortage for civil engineers and the difficulty in attracting new graduates into the local government engineering profession.

One of the tools to attract young people into local government engineering is to offer a cadetship.

### How a Cadetship Works

If a local government organisation decides it wants to secure the services of a graduate engineer sometime in the future, then a cadetship might provide a good opportunity.

First, you will need to advertise with the university of your choice. Then, carefully select the right candidate.

The local government organisation will be expected to pay the Cadet's HECS fees and a weekly amount called a 'sustenance allowance'. In some cases a 'living away from home' allowance may also be payable. In addition, the organisation will offer paid work experience during the long university vacation and appoint a mentor for the cadet.

On successful completion of the engineering degree course, the organisation will expect the cadet to work for them as a graduate engineer under the terms and conditions of a bond. The bond is a legal contract between the organisation and the cadet, and it would be best to get this drawn up by the organisation's legal representative. The bond document will lay out all terms and conditions of the cadetship and cover such areas as leave entitlements, resignation by the cadet, academic failure by the cadet, etc.

### Benefits for Regional Australia

Students living in regional Australia face particular financial difficulties in attending university in metropolitan areas. The cost of living away from home is not insignificant. Cadetships offered to rural students, even in their first year at university, can be very beneficial and are one way of retaining young people in the area of their upbringing.

It is known that at least one university actively encourages cadetships for indigenous students.



## Guide to Cadetships for University Students

### When to Commence a Cadetship

In the introduction, attention was drawn to the large number of students who withdraw from engineering courses. The national average attrition rate is over 22% in the first year and somewhat less than half that during the remaining three years.

The cost of providing a cadetship is not inconsiderable – about \$20,000 per year (see the figures in the *Guide to Cadetships* information sheet). Many organisations look at the overall cost and, after taking into consideration the average attrition rate, offer cadetships only in the final one or two years of a student's course.

There are benefits for both sides in waiting to offer a cadetship until later in the course :

#### *For the employer*

- Student is aware of interests and possible career direction after second or third year of study
- Better prospect of engaging a student with good chance of qualifying
- Less costly if granted in fourth year.

#### *For the student*

- Much better idea of desired career direction
- Bond length not so long (much more attractive to Generation Y students)
- Financial security at the most critical time of the course.

### Part-time Study

Most students will wish to pursue their course of study at university as quickly as possible and, once a cadetship is offered, will opt for full-time study. There may, however, be some situations where a student will wish to study part-time. Universities place some conditions on part-time study and a course must be completed within a specified time of commencement. (International students are required to study full-time).

It is possible to offer a cadetship to part-time students, but each case needs to be treated differently. Frequently an agreed number of days/hours per week will be worked by the cadet, and the amount of sustenance allowance reduced, or cancelled

altogether. In such circumstances, it may be possible to waive the bond conditions.

### Cadetships Versus Scholarships

A scholarship is where an organisation gives an amount of money to a student each year. Normally few, if any, ties are made on the student.

Paid work experience is provided at the end of each year, and the student is offered guaranteed employment with the organisation upon graduation, but this is not a condition of the scholarship. Students see scholarships as much preferable to cadetships, particularly as the bond conditions do not apply.

For organisations, however, the cost is not as great (maybe less than 50% of the cost of a cadetship), but the risk that the graduate may look elsewhere for employment is high. Some companies report that they regularly offer scholarships, and have a high success rate in retaining the scholar in their workforce after graduation. It seems that the secret for those companies is the provision of interesting projects during work experience times and a mentor to keep in regular touch with the scholar.

### Conclusion

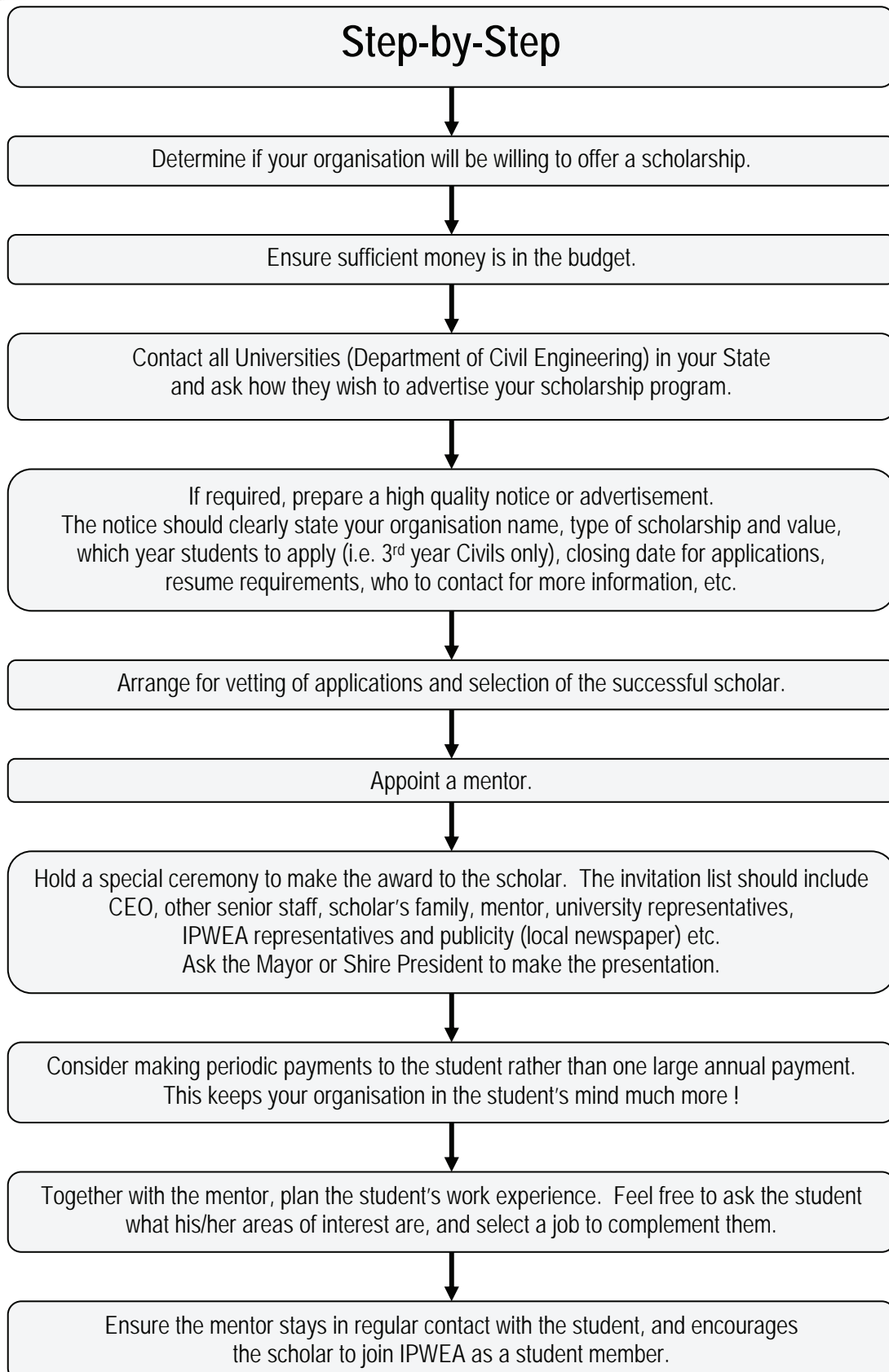
Cadetships are of immense value to the employer as they 'bond' the graduate to work for the organisation for a set time or an agreed number of years. In practice, many Generation Y young people do not wish to be tied to the terms and conditions imposed by a cadetship.

#### References

- 1 The Engineering Profession – A Statistical Overview (Fourth Edition, March 2006) - Engineers Australia
- 2 Engineers Australia Salary and Benefits Survey, Page 36 – published by Engineers Media, February 2006



# Guide to Scholarships



# Guide to Scholarships

## Introduction

Much anecdotal evidence exists that fewer young people are choosing local government engineering today than two or three decades ago. This is in part due to young graduates not being aware of the career opportunities offered by local government.

Several strategies may be used to attract students' attention to any organisation. Two of the best known are through cadetships (see separate papers), and through some form of scholarship. Most scholarships are awarded to university students, but can be awarded to TAFE students although they invariably work part-time during their course.

## Types of Scholarship

There is a large range of types of scholarships. However, most offer the student some form of monetary allowance and the probability of some form of work experience. Scholarships differ from cadetships in one key area – a scholarship does not bond the student to the organisation, although many organisations do guarantee a job to the student upon graduation.

At the 'large' end of the scale, an organisation will advertise for applicants to apply for scholarships. Normally scholarships are given for one or two years only, at the latter end of the student's course. The successful student will receive an annual allowance which may or may not cover HECS, books, computer, etc. Some travel and living expenses may be included. Sometimes the money is paid as an annual lump sum, or it can be paid by instalments.

A mentor is appointed to keep in touch with the student and to make arrangements for paid work experience during the long vacation. The mentor will arrange for a company induction and facilitate smooth integration into the (trainee) workforce. The mentor will keep in contact with the university and may suggest a company-specific final year project for the student to work on until final examination. The mentor will then liaise with the student to commence permanent employment.

At the other end of the spectrum, a small monetary payment can be given to assist students with their

studies. Some scholarships at this end of the spectrum are awarded to students who come from regional areas to assist with study in the metropolitan areas.

Some scholarships have been known to include an offer of paid part-time employment. When this happens, the arrangement is not dissimilar from a cadetship, the main difference being that no bond is enforced.

## Benefits of Scholarships

Students and parents alike appreciate scholarships. The monetary allowance greatly lifts the financial burden, and allows students to concentrate on their studies rather than having to find part-time employment just to make ends meet. The success rate of students receiving scholarships is high. Naturally only 'good' students are selected to receive scholarships, but with the burden of having to earn money lifted, they remain focused and frequently achieve better results.

Sponsoring organisations receive good publicity when they call for nominations, and again when the student's scholarship is announced. During the time of the scholarship, particularly if a good mentor has been appointed, the student will be a good ambassador for the organisation. If the student works on an organisation-sponsored final year project, more publicity will be achieved. Sometimes, such work can pay the cost of the scholarship.

The organisation has control over the selection process, and therefore knows the student who will come to do work experience. The student's progress can be monitored so the organisation knows exactly who will (hopefully) be their future employee.

## Conclusion

There are many types and variations of scholarships. Students appreciate them because they lift the financial burden, but do not tie the student into a fixed term employment contract at the end of their course. Scholarships offer the organisation visibility and publicity, and an opportunity to monitor the student throughout his/her student days.



# Guide to Mentoring

## Step-by-Step

*Mentoring is a two-way learning experience that helps to retain young people in the organisation, and enhances leadership and management skills amongst established personnel.*

Ensure that Council policy includes a commitment to providing mentors for all new young employees.

Ensure the CEO and all managers are fully committed to the mentoring program.

Write the duty of mentoring into the job description of would-be mentors. It is NOT just a tack-on job.

The mentor must not be the young person's line supervisor. The mentor does not necessarily have to be an engineer, but should be aware of technical matters and must be fully conversant with the culture of Council.

Consider the various types of mentoring and agree on the best type for your situation. If you decide to hire a professional mentor, you must ensure you have money in the budget.

Training for mentors is available. *Engineers Australia* divisions run mentoring courses as part of their Professional Development Program.

Mentors should be appointed for :

- Work Experience students (University and TAFE students only)
- Young people who have been awarded a scholarship, cadetship or traineeship
  - All new employees.

The length of time that a mentor should be active varies for each type of mentorship but, for work experience and scholarship students, the mentor should play an active role even when the students are back at their educational institutions. This will ensure that the student remains "connected" with Council. The mentor should be prepared to remain active with new employees for up to three years.

# Guide to Mentoring

## Origin of Mentoring

Mentoring derives its roots from Greek mythology. Odysseus set off for the Trojan War and left his son Telemachus in the care of his friend, Mentor. Mentor became an experienced and trusted advisor to the young Telemachus, thus setting up the first mentoring relationship.

## Mentoring as a Tool in Addressing the Skills Shortage

Mentoring is a valuable tool in retaining skilled people in any industry, with demonstrated benefits for those providing as well as those receiving mentoring. This guide explains mentoring, what is expected of the mentor and mentee, and the benefits to those involved and the organisation.

## What is Mentoring

Mentoring is where one individual provides support, encouragement and advice to another, based on their knowledge, life and experience relative to the mentoring theme. Mentoring often provides a two-way learning experience for both the mentor and the mentee, and can provide deep satisfaction and numerous benefits in many personal, career, organisational and developmental areas. Mentoring can be made available for all types of graduates, professional engineer, engineering technologist or engineering draftsman.

## Types of Mentoring

### *Formal Mentoring*

Formal mentoring is traditionally one of the most popular forms of mentoring. It is facilitated by a third party and often includes formal agreements between mentors and mentees. Most formal mentoring is conducted within the workplace. Usually there is a mentoring co-ordinator who matches mentees to mentors, organises their training and workshops, and generally oversees a structured mentor program.

### *Informal Mentoring*

Informal mentoring is where two people form a mentoring relationship without facilitation by a third party or the signing of formal agreements. This form of mentoring is usually fairly unstructured and often

begins spontaneously between colleagues or friends and evolves over time. It may however be initiated by a mentor or mentee seeking a mentoring relationship.

### *Small Group Mentoring*

Mentoring in small groups of up to four people can be quite effective in many situations. Usually small group mentoring occurs within the same organisation so there is a common interest between mentees and the mentor. Applying the small group mentoring format to mentees and mentors from different backgrounds can be rewarding for all participants, as it expands their general knowledge about the organisation.

### *Professional Mentors*

Professional mentors have substantial personal experience in local government, or the industry in which they are mentoring. Experienced engineers and technical staff nearing, or at, retirement age are ideal for this role. They use a combination of coaching and mentoring to achieve high levels of results with their clients (mentees). Unlike formal, informal or small group mentoring, which has traditionally been conducted free of charge (albeit at some expense to the local government authority or organisation facilitating the mentoring program), professional mentors charge for their services (the cost depending on the type of mentoring and the experience and reputation of the mentor).

## What is Best for Public Works

In practice, most public works organisations should use a combination of formal and informal mentoring. Seldom will the organisation be large enough to have a formal structure with a mentoring co-ordinator etc, but mentoring must form part of the organisation's culture, and be formally endorsed and supported by the CEO and all managers. A formal agreement between mentor and mentee is important, as is some sort of structured mentoring program. This can be worked out to suit each case and be tailored to suit both individuals' experience and needs.

It is possible that a shortage of suitable mentors in your organisation could mean that you seek the assistance of a recently retired engineer under the Professional Mentor format. This option may have other benefits for your organisation as it keeps the retired engineer active, and possibly available for other work.



## Guide to Mentoring

### Mentoring Versus Coaching

Coaching and mentoring are two different things, although both involve elements of the other. They are both a partnership between two people, whereby direction is clarified and support is provided to achieve goals.

Coaching encompasses elements of organisational psychology, management and personal training, as well as mentoring. Coaching approaches the achievement of goals in a much more structured and results-driven way. Coaching is for people who are willing to stretch themselves, to go beyond what they could achieve on their own, to make their goals a reality.

Coaching, like mentoring, can target many different personal issues and is broadly categorised into three main areas – executive, business and life or personal coaching (including career coaching). It's powerful approach will almost always guarantee results if the mentee is serious about achieving major goals.

Mentoring is ideal for the mentee looking for advice from somebody who has personal experience in the area or industry they wish to be mentored in. It's also perfect for getting support in achieving moderately hard goals, exploring a new industry, getting to know who's who in the industry, influential people, networking, or just having somebody who has already been through it all to bounce ideas off.

A combination of mentoring and coaching can be a very beneficial formula indeed, and can be used effectively for people who have the ambition and stamina to truly seek advancement with the organisation.

### Benefits of Mentoring

Studies of mentoring in practice indicate that the benefits of mentoring and being mentored can include :

#### *For Mentees*

- Increased confidence and self esteem
- Personal growth and support for achieving goals
- Advancement of knowledge, networking and communication skills
- Increased clarity in personal direction and development of ideas

- Development of skills to enable better career prospects and choices
- Gathering ideas and techniques for balancing work, life and family
- A learning opportunity, which will provide exposure to new ideas and ways of thinking.

#### *For Mentors*

- Development of management, leadership and communication skills
- A learning opportunity, which will provide exposure to new ideas and ways of thinking
- Helping develop and support the leaders of tomorrow
- Personal satisfaction in making a contribution through sharing ideas and experience
- Transferral of knowledge (corporate knowledge and history)
- Increased respect, prestige, confidence and self-esteem
- Contributing to a career development track record.

#### *For Organisations*

- Enhanced leadership, interpersonal and management skills of mentors
- Increase in employee motivation, work satisfaction, commitment and loyalty
- Increased ability to attract and retain excellent staff
- Increase in the employees' sense of being valued by the organisation, through the provision of career development and networking opportunities, and the recognition of individual contributions
- Retaining corporate knowledge and sharing organisational culture and values
- Establishing staff support networks during periods of organisational change and low staff morale
- Decrease in staff turnover
- Demonstration of commitment to Equal Employment Opportunity (EEO) and diversity issues in the workplace.

(Note that the level of benefits obtained depends on the quality of the mentoring relationship, and the commitment of each of the parties to making it work).

# Guide to Employing Engineers from Overseas

## Introduction

The growing skills shortage in Australia might mean that local government authorities will need to look at recruiting engineers from overseas to come to Australia. The Federal government has a number of recognised avenues to allow this.

## References

It is best to consult the official website rather than rely on printed material that may be out of date or contain errors.\*\*\* Initially, look at the following websites from the Department of Immigration and Multicultural Affairs (DIMA), and consult DIMA's publications.

- [www.immi.gov.au/employers-info/overseasworker.htm](http://www.immi.gov.au/employers-info/overseasworker.htm)
- [www.immi.gov.au/faq/work/work06.htm](http://www.immi.gov.au/faq/work/work06.htm)
- Migration Booklet 5 - *Employer Sponsored Migration*

## Frequently Asked Questions

Printed below are three frequently asked questions and the answers provided by DIMA.

### *How do I employ someone from overseas on a temporary basis ?*

The temporary residence program allows employers to overcome temporary skilled labour shortages by recruiting key personnel from overseas, for a period of up to four years. Many people enter Australia on a temporary basis, for a range of specialised purposes, under the temporary residence program. This may require sponsorship or nomination from the employer in Australia. In all cases, the programs are designed to allow overseas people to come to Australia for specific purposes, which will result in some benefit to the Australian community.

Visas are available under these arrangements for:

- Sponsorship by an Australian or overseas business - if your business is unable to meet its skills needs from within the Australian labour force, you can sponsor personnel from overseas on a temporary basis, to work in Australia for up to four years.
- Labour agreements - formal agreements

negotiated between the Australian Government, employers (including industry or employer associations) and other interested parties (for example, unions or professional associations).

- Regional headquarters agreements - for overseas companies that plan to establish their headquarters for the Asia-Pacific region in Australia.
- Service sellers - for representatives of overseas suppliers of services, who are negotiating, or entering into, agreements to supply their services in Australia.

If the employee you sponsored on a temporary visa leaves your business, you should immediately inform your nearest Business Centre and provide whatever details you have of your former employee's whereabouts.

### *What if a person applies for a position with my company and provides what appears to be a valid business long stay temporary residence visa ?*

If you were not the person's original sponsor, they will not have permission to work for you. You will need to contact your nearest Business Centre to apply for sponsor status. The person cannot start working for you until the application has been approved.

### *How do I employ someone from overseas on a permanent basis ?*

If your recruitment requirements calls for the employment of overseas personnel on a permanent basis, you may sponsor a skilled person from overseas under the following schemes :

- The Employer Nomination Scheme (ENS) has been developed for Australian employers to recruit permanent, highly-skilled staff from overseas, or from people temporarily in Australia, when these employers have been unable to fill a vacancy from within the Australian labour market or through their own training programs.
- The Regional Sponsored Migration Scheme (RSMS) is designed to help employers in regional, or low population growth, areas of Australia, who are unable to fill skilled vacancies from the Australian labour market.



## Guide to Employing Engineers from Overseas

- The Regional Sponsored Migration Scheme (RSMS) is designed to help employers in regional, or low population growth, areas of Australia, who are unable to fill skilled vacancies from the Australian labour market.
- Labour Agreements (LA) enable Australian employers to recruit a specified number of workers from overseas in response to identified or emerging labour market (or skills) shortages in the Australian labour market.
- Invest Australia Support Skills (IASS) program is designed to encourage international firms to choose Australia as a location for direct foreign

investment. It allows companies that make a significant investment in Australia to bring out essential key expatriate managerial and specialist employees from within the company group. (This program replaced Regional Headquarters agreements from 1 July 2002).

*\*\*\* The information contained in this document is correct as at June 2006. Please consult the latest advice from DIMA before employing an engineer from overseas.*



Institute of  
Public Works  
Engineering  
Australia

# Guide to EngQuest

## (An Activity for Engaging Primary School Students)

### What is EngQuest ?

EngQuest is an engineering, hands-on way for Primary School Students to achieve key learning outcomes in science, mathematics and technology.

Fun and interactive student projects combined with comprehensive resources and teacher support make EngQuest the perfect package for primary school teachers across Australia. Registration is free and there are some fantastic prizes on offer. All students receive a certificate of participation recognising their efforts.

In 2005, over 4,000 students, in 976 teams, from 286 schools participated in the program. The number of students undertaking the program will increase significantly in 2006 and beyond.

EngQuest is a program of Engineers Australia. It is supported by the Australian Government through a Science Connections Program Grant administered by the Department of Education, Science & Training.

### Support Staff

For the program to run successfully, primary school teachers will need to be supported by professional engineers. Engineers Australia frequently looks for people to assist, particularly in the suburbs and regional areas. This is an excellent opportunity for local government engineers to gain community exposure.

### More Information

Contact State offices of Engineers Australia or visit the website: [www.engquest.org.au](http://www.engquest.org.au).

### Student Projects

#### *Lower Primary*

As Junior Engineering Detectives, students will work in teams to investigate simple machines in their local community. Students will create a picture book demonstrating the use of these simple machines and then design and make a simple lever catapult to launch a marshmallow a distance of at least one metre.

#### *Middle Primary*

As Mechanical Engineers, students will work in teams to investigate pulley systems in their local community. Students will design and construct a pulley mechanism using recycled and household items, and develop a portfolio documenting the investigation, design and construction process.

#### *Upper Primary*

As Civil and Structural Engineers, students will work in teams to conduct an investigation of playgrounds in their school and local community. Students will then design and construct a sturdy playground model and develop a portfolio documenting the investigation, design and construction process.