

**2004 Municipal Engineering Foundation Victoria  
Overseas Study Tour**

**Recruitment and Retention of Engineers  
In  
Local Government**

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## EXECUTIVE SUMMARY

In Australia today it has become harder to attract and retain engineers in local government. In 2004 the recruitment and retention of engineers in United States is similar to Australia. The United States had not begun to consider an industry wide emphasis in improving recruitment local government. Therefore it is difficult to transfer a successful model approach from the USA to Australia. The United States of America diversity in Local Government is similar to Australia. The different Counties and Cities are independent organisations and although the services may be similar their cultures are different.

The County of Sarasota was an organisation since the early 1990's that has been addressing the need to improve the in house engineering expertise. Sarasota have developed this through an organisational Professional Engineer Development Program (PEDP). The PEDP at Sarasota involves

- Engineers meeting four core competencies
- Formal training
- On the job training with rotation through the organisation
- Engineers becoming qualified (Licensed)
- Non Competitive Promotion
- Active Recruitment through the Universities

The success of Sarasota PEDP program can be measured in the number of experienced engineers in the organisation. Sarasota has 33 engineers when there use to be seven and 12 of the original 14 engineers that began the PEDP Program are still working with Sarasota.

The recommendation is Australia follow a similar approach to Sarasota but on an industry wide level.

The four tier approach is recommended

1. Secondary Schools:
  - A recruitment package for schools on local government engineering
  - Council's forming links with local schools and offering work experience
  - Female engineers being seen at schools
2. University
  - IPWEA to raise the profile of local government engineering at universities
  - Local Councils offering work experience and sandwich student places
3. Industry
  - Provide profession development programs to engineers in Councils
  - Improve the salaries of engineers
4. Profession
  - IPWEA to separate from LGPRO for engineering to be recognised again
  - Improve Salaries
  - Raise the profile of female local government engineers

## INTRODUCTION

This report is aimed at addressing one of the most pressing issues facing local government in Australia. Local Government has been failing to attract and retain professional engineers. This is creating a current skill shortage that is set to expand considerably in the future. Unfortunately the lack of professionals attracted to Local government is not unique to engineering or even the local government industry. It is an Australian problem and even a western world problem. This means the solution developed by the local government profession will need to aim at performing better than other industries and professions. The supply and demand of professional employees to service modern economies is impacted by the greater world's economy and national governments.

- Only recently Malcolm Edey, Assistant Governor(Economic) of The Reserve Bank of Australia has highlighted this issue in his talk to AIG on the 3 March 2005

*“The severity of the current skills shortage is captured by some of the business surveys which report the difficulty of finding suitable labour now is as high as it's been in the last two decades (Graph 13). The surveys also provide evidence that, for many businesses, shortages of labour have become a bigger constraint than traditional concerns about demand and sales”.*

- Australia's leading engineering professional associations has also recognised the skill shortage. The Chief Executive of the Institute of Engineers, Peter Taylor, stated while speaking at the “Recruitment, Training and Retention for the Engineering Sector: addressing the skills shortage conference in Melbourne on 1 March 2005

*in five years time the number of engineering graduates from our universities will be the same as a decade ago. In comparison with other countries, Australia has a low rate of entry into and graduation from engineering and the number of engineering graduates has remained static at about 5000 students per year.*

*“The static numbers of engineering graduates also masks the true erosion rate where we have international students accounting for 1000 of the graduating engineers each year, most of whom return to their countries of origin soon after graduation.*

*“The growing impact for Australia of the shortage of professional engineers and engineering technologists and technicians is a problem that needs immediate support from many sectors.*

- The Chief Executive of Australia Professional Engineers, Scientists, Managers Association, John Vines wrote in the Financial Review on the 1 March 2005.

*The engineering sector in Australia is facing major challenges and unparalleled opportunities. The challenges include a declining interest amongst school-leavers in pursuing engineering as a career and the reduced availability of undergraduate and postgraduate engineering courses. This is happening at the same time that investment in engineering infrastructure in Australia and Internationally is the highest it has been for many decades. ....*

*The industry also needs to do its bit to turn around the looming crisis. Firms should be offering cadetships and opportunities to retrain or to take time out for overseas placements. Employers need to provide more flexibility and family-friendly environments to retain skilled employees, in particular women engineers. And most of all, we need to look at wages and remuneration for engineers. In particular, engineers with 10 -15 years experience are not being rewarded in a way that ensures we keep people in the profession.*

Every peak engineering industry body recognises the engineering skills shortage being experienced by not only local government but by the country. All this reinforces the observed problems being experienced by local government engineering managers. There are attempts by the local government associations to bridge the problem.

- The Municipal Association of Victoria is has a graduate recruitment program. Then Council's at a local level are beginning to understand the need to recruit and develop engineers. The problem is now there is little interest from graduate engineers to become municipal engineers.
- The Institute of Public Works Engineering Australia (IPWEA) has released a strategy and action plan to address the skills shortage. "IPWEA National Executive Officer, Ross Moody, said the strategy aims to attract young people back into the industry and Local Government. The strategy looks at the root causes of the problem which include:
  - Deprofessionalism and increased use of technicians to fill in what was previously the role of the professional engineer.
  - Outsourcing of traditional public works programs and a focus on the bottom line.
  - A lowering of community awareness of the roles and responsibilities of public works professionals.
  - Reduced student intake because of careers of excitement in other areas."

The development of this report has drawn on a study of USA practices in local government in September 2004. The engineering skill shortage phenomena being experienced in Australia is a problem being experienced by the United States. The United States is similar to Australia where many of the Councils have different approaches.

### **United States Skilled Workforce Shortage**

There are predictions that the United States will suffer from a skilled work force shortage by up to 20 million. The skilled workforce shortage and aging workforce is being experienced by individual Cities and Counties. The enormity of this current and increasing problem was not a big emphasis at the American Public Works Conference in 2004 at Atlanta. Some education sessions at the conference did directly address this problem but it was not a big theme at the congress. This may reflect that the peak organisation had not started to address the issue on industry wide basis or it may reflect the pressing issues facing public infrastructure in United States are diverse. As big as the problem of not having skilled people to service the industry, is the problem of the infrastructure being sustainable over the long term and the continuing need to improve and expand the service provision.

### **2004 APWA International Public Works Congress and Exposition**

#### **Sarasota Council**

Sarasota Council presented a paper at the American Public Works Congress in 2004. The paper was title “Finding and Developing Your Future Employees”.

Sarasota is a large County in Florida with a population of 325,000 which has nearly doubled from the late 70’s. The County was experiencing real problems in servicing the rapidly growing population. In the late 80’s and early 90’s the County also experienced severe flooding with over 200 homes flooded in 1992. This event heighten the emphasis on the needs of infrastructure to service the large expanding community and the need for professional engineers to deliver the communities infrastructure needs.

Therefore the Transportation Director, Dr John C Goodknight PE PhD, in 1991

- *Recognised the County needed additional staffing and professionalism to provide service to citizens*
- *Emphasis on developing internal organisational growth and development.*

Sarasota developed an action plan with the

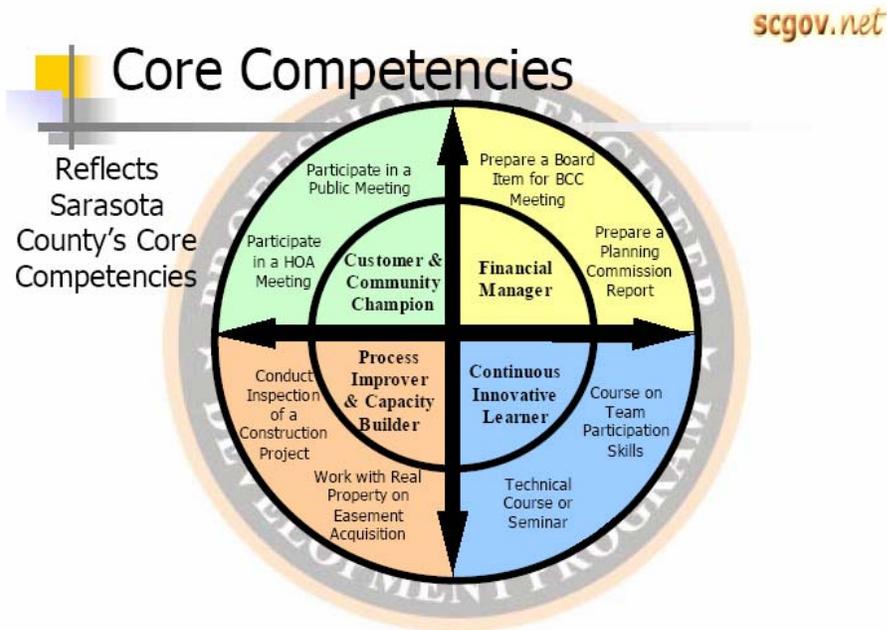
***Objective:*** *Create an organization where the leadership and talent for sustainability would be from internal staff rather than relying on external factors. Focusing on Licensure through Education and Experience.*

The success of the program is measured in the number of registered professional engineers employed by the County. Since 1990 the number of professional engineers has doubled.

Year	Professional Engineers	% of County Workforce
1990	7	2.9
2002	33	6.3

To meet the objectives of the Sarasota County, the Professional Engineer Development Program (PEDP) was developed. The PEDP recognised four Core Competencies:

1. Customer and Community Champion
2. Financial Manager
3. Process Improver and Capacity Builder
4. Continuous Innovative Learner



Each of the competencies requires the engineer to undertake a number of activities to meet the competencies. The core competencies must be signed off by a director to be achieved. At the end of a two year of employment the engineers must have completed 9 of the 12 tasks and 3 of the 5 courses to receive a pay increase and promotion. The pay increase and promotion is non competitive providing the core competencies are met.

### Formal Training

There is formal and “on the job” training required. The formal training is offered through the human resources department and requires course in writing, presentation, customer service and team participation and also the participation in technical seminars.

### Rotation Program

Engineers are rotated through the County. The aim is to develop the technical skills like project management, design, permitting and construction as well as the people skills like, networking, interagency communication and technical expertise. The rotations are:

- Stormwater Management
- Drainage Operations
- Transport Planning
- Traffic Operations
- Transportation Planning
- Stormwater
- Road and Bridge
- Road Program

The incentive for the engineer to undertake the program is not just professional development but guaranteed non competitive promotion. This includes

#### Engineer Trainee

- 6 month merit increase for first 18 months

#### Senior Engineer

- Non – Competitive Promotion
- Merit increase if requirements are met

#### Professional Engineer

- Non – Competitive Promotion & merit increases
- Must pass Professional Engineer exam (PE)
- Must complete all Program Requirements

The success of the program has been the ability to retain their professional engineers. Twelve of the fourteen engineers who first started on the program are still with Sarasota County.

### Recruitment:

Sarasota also has a policy of employing the best graduates. They have a large investment in the recruitment of the best engineers. They have formed partnerships with the universities and gone onto campus to recruit the engineers. This has ensured the quality of the engineers entering their program. They pitch for the high quality graduates and attract them with the program.

### *Victorian Experience*

The Victorian experience has been the reverse to Sarasota since 1990. The need for a municipal ticket was abandoned. Victoria went through amalgamation and compulsory competitive tendering where investment in retaining and training

local government engineers was in decline. This has now evolved into the shortage of senior engineers and the loss of attraction of local government to graduates in the industry. The development of engineers in local government like Sarasota is required, where the engineering profession as a whole will recognise the value of the engineer. Engineers Australia is the organisation that formally recognises engineering qualifications and skills through chartered membership.

### **Developing the Talent From Within – John F Luthy, Futuies Corporation**

John Luthy's paper at the American Works Congress 2004 "Developing the Talent Within" addressed some of the issues facing local government.

The salient questions from an industry wide prospective John's paper questioned was "why would anyone want to join or remain with your organisation". As an organisation the following points were identified

- Be proactive....develop your organisation
- Tell your 'story' – what IS your story??
- Link with local high schools and universities
- Begin offering internships, field trips and summer jobs

#### *Victorian Experience*

The above points can be considered as an industry wide perspective. As an industry, local government in Victoria needs to build the capability of the industry through the development of engineers. As an industry we need to sell the real benefits of municipal engineering as a career. The "story" has been lost in the last 15 years. Previously engineering to the general public was the local government "City or Shire Engineer" (Or a train driver). As the title has disappeared the understanding of local government engineering has disappeared. The branding of municipal engineering in schools and universities needs to be redeveloped.

Local government is competing for the limited number of graduate engineers. As the large companies have invested in links with the universities over many years to gain first access to the quality graduates, local government needs to establish these links. This requires being proactive in recruitment and going to the universities rather than waiting for the graduates come to the individual Councils through advertisements.

Councils already at a local level are already offering vacation employment. The Over 30% of the organisations in the "2005 Undergraduate Vacation Employment Handbook" released by the Victorian Engineers Australia, are local councils across Victoria.

John Luffy's Paper also identified that the older workforce may not retire and need to keep working, This was a repeated at the conference by Peggy Pound in her paper "Different Generations and How They Interact". To overcome the skills shortage the use of older engineers remaining in the workforce will become critical. This will require

flexibility in working hours and management, as semi retirement may be a preferable option.

### **Female Engineers in the USA**

A notable observable difference between the United States and Victoria is the higher percentage of female senior public works engineers in the system. In Victoria there is a low percentage of female engineers in local government and an even lower percentage as senior managers in the engineering field. The United States had an observable significantly higher representation of female engineers. It becomes obvious that Australian Local Government Engineering is at greater risk of being unable to fill the skills shortage when the workforce is only drawn from the male half of the population.

Female engineers in the United States were not aware of the comparatively high number of women in public works engineering. The females chose through career choices to become engineers without direct intervention aimed at females. It appears they were just more aware and exposed to engineering as a career choice. Engineers and managers in the United States are not perceived by the community as a male profession. The public exposure is more balanced between males and females hence may generate an understanding that it is a career option for females.

### **Public Works in California**

The tour through California and visiting a number of cities in California highlighted that America experience in the job market and the local cities directions to overcome the deficiencies parallel Victoria. The local Councils and Counties are independent entities and have not taken any coordinated approach to filling vacancies

#### **City of Campbell**

Population:	40,000
No Employees:	200eft

The City Public works area have identified there may be a deficiency in the engineering employment market. The City has no identified strategy to recruit engineers and develop them. They are reliant on the employment market that there will be engineers available when required. This approach has worked in the past. There is an acknowledgement that in the future it may become more difficult as the market shrinks. The extra element for the City of Campbell is the housing market is so high in the area, that on a engineering salary it is difficult to buy into the area. Therefore the workforce may become removed from the area.

**City of Santa Cruz**

Population: 56,000

No Employees: 200eft

The City Public Works area are not experiencing shortages of engineers as the City has been through financial constraints on the budget. They have however employment conditions that are friendly that may attract and retain engineers. The City offers

- Competitive pay conditions
- Training to professionally develop engineers
- Offer placements for engineering gazettes
- Conditions like leave without pay to attract engineers back to the City after extended breaks.

The City of Santa Cruz will face in the future when they start employing engineers again the lack of affordable housing for engineers as disincentive to attract engineers.

**City of San Luis Obsipo**

Population: 44,000

No Employees: 200eft

The public works area in San Luis Obsipo has recognised that on a direct salary comparison that they can not compete with private enterprise. Therefore the city has made a conscious effort to provide a challenging career to engineers and provide engineers the ability to develop their work. The City has been successful in achieving a high retention rate.

**County of San Luis Obsipo**

Population: 245,000

No Employees: 183 in public works

The County has identified that the workforce is aging and there is limited interest from graduates in joining the County. Therefore the County is preparing for succession management. The County has developed a comprehensive program.

- They are addressing the salary parity between other organisations to make the County attractive
- They have adopted a policy of continuous improvement
- The have developed an employee university focussed on the non technical side and improving employee supervisory skills.
- They County has surveyed the employees on training needs and introduced courses to overcome shortages
- They have orientation program for new employees

The County has identified the coming skill shortage and concentrated on improving the skills and developing the current workforce and increased salaries to retain their engineers

## Victoria

### Past Attractions

Individual engineers joined local government for a multitude of reasons in the past. Many of the motivating factors have disappeared.

- Civil engineering in the private sector followed the cycles in the economy. When the economy down turned, the majority of jobs being offered were in the public sector including local government. Therefore there was an over supply of engineers and hence the attraction of quality engineers to local government was easier. The economy has been in growth for many years now and hence no over supply of engineers. Local government now has to offer more than just a “job” to attract engineers.
- In the past, engineering to the general public was civil engineering (buildings and bridges) and the City or the Shire Engineer were the most public face of engineering. Therefore it was a known career and provided a known status. The title of City or Shire Engineer has disappeared and the public face of engineering has disappeared behind the Chief Executive Officer and the corporate management structure. Therefore the career does not appear as obviously in front of parents and students. Local government now sells the message that it is “so much more than roads, rates and rubbish”. This has had the double effect when the need to market local government engineering as a career option, the subliminal marketing has disappeared.
- As the professionalism in local government engineering increases the old attractive employment conditions have eroded. Engineering’s accountability and demands meet and exceed the private enterprise and hence there is a perceived loss of working conditions like shorter working hours and job security.

For the most part Local government engineering as a career option for the student considering a career sits equally with other engineering fields and professions. In the past there may have been some incentives that made recruitment and retention easier.

### Hypothesis on Recruitment and Retention

There are two critical times where an individual chooses to become an engineer. Once an individual chooses to become an engineer, then they have the ongoing choice of remaining in the industry. The industry profile has an impact on the decisions to become and remain an engineer. Therefore a four tier approach has been recommended:

1. Secondary Schools
2. University
3. Industry
4. Profession

## 1. Secondary Schools

The students in the upper secondary schools are starting to search for possible careers that may interest them. The decisions they make will influence their future career choices and possible university course. Their knowledge of the workforce and engineering is generally low. Therefore the influences that help the students make the decisions would be assisted from parents, extended family, friends, school and career advisers as well as their likes, culture and community exposure. Therefore engineering as a profession needs to start actively providing assistance to increase the exposure of local government engineering.

1. The career advisers at school need a package on local government engineering. This is a responsibility of the Institute of Engineers and Institute of Public Works Engineers. The IPWEA are planning to address this issue in the "Strategy AYP". The defence force academy is an example that used to be very effective in generating more applicants than places through a successful school recruitment program.
2. Councils should be proactively offering the two week work experience for students where they can view the engineers role by following around engineers (not be left at the photocopy machine). The local Council can form relationships with local schools
3. Female students need to understand that engineering is an option. Therefore young female engineers need to visit schools and employees allow for this, as a long term investment in the industry. This is a broader industry program that the Institute of Public Works Engineers could coordinate.

## 2. University

At university the students have made their choice to become an engineer. Local government is then competing with the industry to attract the best graduates. Therefore local government needs as an industry to market the profession.

1. Local government Engineering need to recruit through the universities. Currently the Municipal Association of Victoria has a program operating to recruit professionals. The Municipalities need to start investing significantly in work experience and sandwich student placements. Anecdotally it appears that many engineers in local government are coming from previous work experience within the organisation.
2. The Institute of Public Works Engineers is planning to directly target engineering students and selling the profession through the "Strategy AYP". The large organisations already take the lead over local government by recruiting through the university. Therefore many of the highest quality graduates have been already recruited before local governments as individual organisations begin trying to recruit.

### 3. Industry

Council needs to develop engineers within organisations to develop and retain quality graduates.

1. The development of programs to rotate in the larger organisations and recognition of different skills in smaller organisations similar to the model Sarasota. The aim would be to have programs that help engineers to become recognised members of the institute of engineers. Therefore through working in local government they would meet the core engineering competencies. The Engineers Australia offer a program that recognises the development of engineers through the Professional Development Program (PDP).
2. Local government is in a competitive industry and to retain good staff in a tight employment market the equivalent remuneration needs to be offered. The fixing of engineers to the standard enterprise agreement means individual organisations have to justify the engineering salary against other professions in the organisation. If engineering wants to attract quality people and retain them, then the industry is required to offer competitive salaries.

### 4. Profession

1. In Australia the profession of local government engineering no longer has a profile. The loss of the title “Shire” and “City” engineer has reduced the understanding in the community. In an attempt by the local government industry to become “more than roads, rubbish and rates” there has been a loss in identity of the engineer. It is probably reflective of the importance of engineering in local government comparatively to the overall services offered by local government. It may be time for the Victorian IPEWA to separate from LG Pro and hence senior engineering to become recognised in its own right.
2. The Engineering profession suffers in attracting quality graduates due to the pay scales of a senior engineer. The “Marquee professions of law and medicine” provide higher salaries. Unfortunately their in an entrenched understanding of the price of the profession accepted by senior engineering managers and hence to increase salaries at the lower end, the higher end salaries and charge out rates must increase significantly. This is unlikely to happen until the market supply for engineers diminishes to a point where these costs can be claimed.

3. Local Government in Australia needs to create a public face of female engineers in the industry. Where in America female engineers are seen in the community and leading the engineering profession. American girls can then see the profession as a viable career. Australian girls can not see that role model, they may meet and see female doctors, architects and accountants but they will be lucky to meet a female local government engineer, let alone a manager. This probably reinforces an image of a “boring” profession being “*dry, mathematical and instructing rough blokes driving heavy machinery or holding stop go bats*”. This puts the industry at a severe disadvantage with a skilled shortage because half the population has no interest in local government engineering as a profession.

The Institute of Engineers Australia have been trying to increase the number of women in engineering for 15 years. This has not extended over into local government. Therefore we are faced with the public exposure of an engineer always being male and the industry is not seen as profession for women. Therefore the industry bodies need to generate a public female face. Female engineers and senior managers need to visit the universities and schools where their presence can have the greatest impact.

The APSMA have identified working conditions and expectations that are a further inhibitor for female engineers in local government.

**Foot Note:  
City of Casey Experience**

The City of Casey has developed a rotational program where engineers rotate through:

- Traffic Engineering
- Asset Management
- Construction and Maintenance Management
- Design

The rotation program is in its infancy but the benefits are already becoming evident. The recent advertisement for graduate engineers resulted in the best field of applicants received in a number of years. There were even applicants that had recently graduated from the private sector. The result was ability to recruit three quality graduates.

The next stage is to formalise the training and professional development for the engineers. The aim is through the rotation program the engineers will become corporate members of the Institute of Engineers. This will create further certainty for the engineers. The program should provide ultimately incentives to the engineers to remain at Casey, through further training and non competitive promotion. The City of Casey is joining the Engineers Australia Profession Development Program (PDP).

There are negatives to overcome in the program as well. The City of Casey does not employ engineers for training purposes but to assist in providing services for the community. The rotation of engineers every six months means a short term loss of skill in each area as a new engineer has to be retrained. This causes frustration and pressure for the different sections. In the long term however, the organisation will have stronger engineers.