



Strengthening Capacity to Develop Skills to Meet Economic Challenges 12th APEC Women Leader's Network Meeting, Port Douglas, 24-27 June 2007

Strengthening Capacity for Women Engineers

The skills shortage of Engineers is one of the most important issues facing industry and will become one of the stumbling blocks to meet future economic challenges. Engineers, in particular, have the requisite skills to address the technical and technological issues. Electrical engineers are vital to the power industry, mechanical engineers are needed to address transport issues, civil engineers are needed to design sustainable infrastructure and transportation systems, chemical engineers are required to develop solutions for chemical and petrochemical industries and mining engineers can solve the problems of the mining and minerals processing industries, to name a few examples. The demand for engineering skills is unprecedented as countries like China and India continue their rapid economic development. Surveys by Engineers Australia indicate a current shortfall of 20% of demand and this is expected to increase as more engineers retire (Engineers Australia 2006).

Engineers Australia recognizes the urgent need to increase the number of engineers – regardless of gender – with programs that explain engineering as a career and what it has to offer. For example, programs like EngQuest for children in primary schools and Science and Engineering Challenge for secondary schools introduce students to engineering as a career. In particular, women in engineering have developed a national program – GIRLTALK (Engineers Australia YoWIE 2007) which is specifically designed to address the interests of girls and the factors that attract them to engineering.

One of these is socially responsible careers; that is the careers that make a contribution to society or improve the environment. This is the reason many girls are attracted to bio-medical engineering and environmental engineering. Also many girls are not aware that engineering is not all hard hats and big spanners. It is a very creative profession which uses analytical skills and provides opportunity for adventure, challenge and travel.

A number of inquiries into engineering education (Beder, 1989) and the participation of women in science and technology (Women In SET, 1995) had been prompted by a perceived crisis with declining enrolments and a continuing lack of diversity in the profession. These inquiries reported that there needs to be a broadening of the curriculum to include the political, social and environmental implications of engineering. The far-reaching National Review of Engineering Education published its Report, '*Changing the Culture*', in 1996 (Engineering Education Task Force 1996). A key recommendation of this report was that universities needed to address the traditional engineering culture to attract and retain a greater diversity of talented students. In the late 1990's, the consensus amongst engineering educators was that the priority areas were: a modernized curriculum, substituting more contextual and interdisciplinary problem-oriented subjects to relieve an overload of specialized technical content with a short half-life; more

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emphasis on academic literacy and skills for 'life-long learning', and smaller classes and more student-centred teaching commensurate with these shifts. Many girls also need support for mathematics, because this is a subject often not taught at the advanced level in girls' schools. Once at university women tend to perform very well academically consistently winning a majority of prizes and medals.

Post-university, the situation continues to be difficult. The science and technology sectors as a whole continues to use unsustainable work practices and cultures that persistently leads to the talents of women being wasted. In the UK, more than 70% of qualified women are not working in their specialist fields, leading to a skills and innovation gap (UK SET Women Resource 2007).

There is a similar picture in Australia with approximately 60% of women engineers leaving the profession after 10 years (Engineers Australia 2002) and similar high proportions leaving the science and information technology fields (APESMA 2007). The challenge is not only to attract women to engineering but to retain those already in the profession to solve the pressing problems ahead.

Recognising that women engineers like all women professionals need support and appropriate policies for their roles as mothers and to take time off to raise children is an important aspect for the retention of women engineers. However, today men too have expressed an interest in parental leave and greater participation in parenting. Flexible hours that permit family time are becoming more important to both men and women. Jobs that permit such flexibility are becoming increasingly attractive. Engineering as a profession needs to adjust the thinking in its policy development and consider these areas as critical to the retention of all engineers. Another factor is the male dominated culture that tends to be insensitive to women.

Young engineers in the profession are also demanding time off for family or travel or pursue other interests while maintaining their professional standing which facilitates a return to work. Many other professions have begun to address this issue as it is more cost-effective for the economy to encourage a return to the profession than to train young people from the ground up.

Engineers Australia recognizes the need to address the critical shortage of engineers by developing policies that retain women engineers. 2007 has been designated the Year of Women in Engineering to celebrate and recognize the achievements of women Engineers in Australia. This is a national program with a full-time resource allocated to delivering the campaign. A project manager works with the Women in Engineering National Committee and has engaged with Government and industry to promote the role of women engineers in the workplace and their contribution to the engineering team.

In addition, the year has provided valuable networking opportunities for women engineers who are often isolated in the workplace where they continue to be a minority. Ongoing programs will include policies and programs to support and enhance women in engineering and other non-traditional roles. An example is the publication of the book – "Engineering A Better Workplace" (Engineers Australia WIENC 2007), to handle diversity issues. This publication has evolved from research by women engineers and is unique in Australia, if not the world.

In 2008, Engineers Australia intends to continue the work of attracting and retaining engineers by ongoing development of policies and strategies in partnership with other professional associations, industry and government.

Building capacity therefore starts with education at primary school, reinforcement in secondary school and providing information on career choices, supporting engineers at work and, for women, facilitating their return to work when they have children. This will encourage all engineering professionals to achieve their fullest potential to enable our economies to meet the economic and other challenges ahead.

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