



ENGINEERS  
AUSTRALIA

## Forum - An Investment in Australia's Future: why the mathematical science matter

*National Strategic Review of Mathematical Sciences Research in Australia  
Shine Dome Canberra  
9am-4pm, Wednesday 7 February 2007*

Closing Remarks from Engineers Australia presented by Ms Kate Hurford, Associate Director Public Policy, International and National Policy Directorate.

[www.engineersaustralia.org.au](http://www.engineersaustralia.org.au)

Thank you for the opportunity to provide some closing comments and to outline some of the key issues facing engineering education and the engineering industry in Australia.

### **Who we are**

Engineers Australia is the peak body for engineering practitioners in Australia representing all disciplines and branches of engineering, including information technology. We have over 80,000 members Australia wide making us the largest and most diverse engineering association in Australia.

Today I want to quickly comment on the balance of science and engineering degrees in Australia, the high standard of engineering degrees and the capabilities of graduates, the closure of engineering schools and the need to attract and support more students into engineering careers.

### **Science and engineering balance**

I will start with the balance of science and engineering education. Engineers Australia has found that there is an increasing trend in, particularly in government circles, to use the word “science” as an all-inclusive term for “science, engineering and technology”.

This is a problem because when data is grouped in this way, it paints an inaccurate picture that there is a healthy growth in the numbers of science and engineering graduates in Australia.

As others have already outlined, around 20% of new graduates in Australia receive science and engineering degrees, which is slightly lower than the OECD average. However, when the data are split into science and engineering, a different picture begins to emerge. While around 12% of new graduates in Australia are awarded science degrees, engineering graduates account for only 8% of total graduations in Australia.

In comparison with other countries, Australia has a low rate of entry into and graduation from engineering. Internationally, the number of engineering graduates per million lags many other OECD countries including Singapore, Korea and Japan, Finland, Norway, Germany as well as Ireland, Switzerland, the United Kingdom and France – just to name a few.

The almost static graduation of approximately 7000 domestic students from engineering degrees each year, for over the past 10 years, means that any recent growth in Australia's science and engineering graduates has come from increased science enrolments alone.

These data all point to the balance between engineering and science being out of alignment which may be playing a role to further compound skills shortages in the engineering sector.

### **Mathematics in engineering courses**

I would also like to take this opportunity to comment on Finding 3 of the Strategic Review which states that engineering courses no longer include a strong mathematics component. Engineers Australia believes that this comment is unsupported.

Engineers Australia accredits all Australian engineering courses which are then internationally benchmarked through the Washington Accord.

This accreditation system works hard to ensure that graduates meet the requirements of industry. However, it needs to be stressed that even after 4 years of study, a university graduate from an engineering course is not yet "fully formed". They still require around four years of mentored workplace experience before they are capable of practicing independently and are eligible for registration on the National Professional Engineers Register or membership of Engineers Australia at the Chartered Professional Engineer level. A university degree is only the first building block of the lifelong learning that is required to gain and maintain engineering expertise.

The key issue for the engineering profession therefore is not the quality of engineering education in universities. It is instead the need to increase the numbers of students with the ability and interest to enter engineering courses at university.

The findings of the Strategic Review are particularly important here because they provide a way forward to ensure that students have high levels of mathematics capability which is essential if they are to succeed in engineering courses at university.

### **Closure of engineering schools**

Attracting more students into engineering courses has become critically important. As the skills shortage continues to bite, Engineers Australia has become concerned that certain disciplines of engineering are in danger of disappearing from the Australian university landscape due to small student numbers and the high costs of delivering engineering courses.

In 2003 the University of Canberra closed its engineering school and from this year Flinders University in Adelaide is not enrolling any new students in computer, electronic and biomedical engineering.

The issue of how to support low demand, but nationally important, engineering courses needs to be seriously considered given the increasingly commercial environment of the Australian university sector.

Flinders University Council has highlighted that the courses, while highly regarded professionally, have not been attracting high enough student numbers to make the courses financially sustainable. At the time the University of Canberra closed its engineering school in 2003 similar reasons were cited.

Many of the smaller disciplines of engineering are in this situation. While industry needs only small numbers of graduates annually, the material costs of laboratory equipment and other facilities make offering these disciplines economically difficult.

Any closure of engineering courses at Australian universities runs contrary to the commitment of Australian governments, industry and the engineering profession to work together to deal with the national skill shortage of engineers, including the recent announcements of an additional 1,010 federally funded places in engineering.

In particular, it sends a message that undermines State and national efforts, including those by Engineers Australia, to increase the number of students entering engineering programs.

While industry values the skills and education of the engineers we are already graduating, the simple message is therefore “we need more engineering graduates”.

Australia needs more students who choose to study high-level school science, technology and mathematics subjects and who take this knowledge and continue into tertiary education in engineering. To foster this reality the recommendations that we have heard today will need to be put into place.

Engineers Australia welcomes the work done by the Strategic Review to help pave a way forward.

Thankyou for your time