

## GUEST EDITORIAL

# POSTGRADUATE EDUCATION OF GEOTECHNICAL ENGINEERS

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I was very pleased to be invited to contribute this Guest Editorial. It comes at an exciting and challenging time, both for me personally, and for engineers and teachers in the geotechnical profession throughout Australia.

There have been a number of initiatives in recent months in connection with the education of engineers, particularly at postgraduate level. A key element of the planned Co-operative Research Centres, which are discussed further below, will be postgraduate research training. This is intended to redress the current paucity of scientists and technologists educated to Masters or PhD level. A parallel move has come from the Institution of Engineers, with the proposed requirements for Continuing Education of graduate engineers. This initiative, although it appears to undervalue the longer term role of higher degrees, clearly acknowledges the insufficiency of even a four year Bachelor degree in today's specialist and changing engineering world.

Somewhat at odds with the perceived needs for postgraduate training referred to above, the Institution has also recently introduced a requirement for a minimum quantity of 'management' topics within undergraduate degree courses. Initially, the interpretation of management topics is to be relatively broad, including any elements of a course that address communication and design skills. However, there appears to be a background trend towards explicit management courses, such as those more usually encountered in postgraduate MBA courses. These courses would be feasible in a five year engineering course, such as the double degrees in Engineering and Management or Commerce that are currently available, but would inevitably dilute the technical content of standard four year degrees.

Rather than stipulating a minimum level of management content in undergraduate engineering courses, the Institution of Engineers should judge individual courses on the overall quality of the graduates produced. Courses that produce highly skilled technical engineers who, if they so wish, may proceed to higher level specialist education, should not be penalised in the interests of uniform mediocrity.

Continuing education is essential for engineers, both to acquire formal management skills and to update technical skills. Higher degrees should play a major role in this area. In Europe and the North American continent, a Masters or PhD degree is considered essential in order to specialise in geotechnical work. The Australian Geomechanics Society should be lobbying for a similar standard. In the past, potential postgraduate students have been deterred by the lack of support from government, in terms of the level of scholarships, and from industry, in terms of salary levels that reflect the additional training. The situation is now changing. Recent increases in

the value of postgraduate scholarships, and the introduction of industry-linked awards, have improved the terms under which higher degrees may be earned. The industry should now seize this opportunity to encourage graduates of 2 - 5 years experience to return to university for further specialist education.

The Federal Government has recently launched a scheme for Commonwealth funded Co-operative Research Centres. The principal goal of these centres, which will concentrate on science and engineering, is to provide further links between industry and research groups. Particular emphasis has been placed on postgraduate training through higher degrees, with direct involvement of postgraduate students in industry.

It is interesting to contrast the role of geotechnical specialists in two key industries in Australia - offshore engineering and mining. This issue of Australian Geomechanics contains Dr Khorshid's E.H.Davis Lecture, which describes the geotechnical experience on the North West Shelf. The early design for the North Rankin 'A' foundations was dominated by European and American consultants. The need for remedial treatment of the foundations initiated a major programme of research on calcareous soils throughout the world, but with a high percentage of that research being carried out in Australia. As a result, world expertise on calcareous soils now rests in Australia and foundation design for the subsequent Goodwyn platform was performed primarily by Australian engineers. The programme of research underwrote many PhD theses and there is now an appropriate pool of specialists within the industry.

By contrast, the mining industry has a woefully low presence of geotechnical engineers. In Western Australia, a large percentage of gold mines are designed with no specialist geotechnical input and suffer accordingly from high rates of failure. There has also been a recent spate of failures of open-pit slopes. The financial consequences of these failures dwarf the remedial measures of North Rankin. There is an urgent need for a major re-assessment of geotechnical design in the mining industry, and for an increased level of postgraduate research training.

To summarise, geotechnical engineers have a major role to play in Australian society, particularly in the development of natural resources. As a body that has close connections with the Institution of Engineers, the Australian Geomechanics Society should lobby for increased training of geotechnical engineers. We should resist any reduction of technical content at the undergraduate level, and push for greater recognition of higher degrees in the realm of continuing education.