

# **ENGINEERS AUSTRALIA** **NATIONAL GENERIC STAGE 1 COMPETENCY STANDARDS - 2011**

As the unified, national competency assessment authority for engineering practice in Australia, Engineers Australia maintains a competency based assessment system for determining fitness for practice at various career stages for Professional Engineers, Engineering Technologists and Engineering Associates. Competency Standards are published as a foundation reference for part of this assessment process. The Stage 1 Competency Standards covering the occupational categories of Professional Engineer, Engineering Technologist and Engineering Associate set out the generic competencies deemed to be essential for an individual to commence practice in the appropriate occupational category. The Standards cover knowledge, skills and engineering application abilities as well as professional skills, values and attitudes, and provide detailed indicators of attainment for each element of competency.

The Stage 1 Competency assessment system is used for the direct assessment of individuals seeking entry to Engineers Australia membership where base qualifications are not recognised under the appropriate Accord. The Stage 1 Competency Standard for the appropriate occupational category provides a benchmark for candidates preparing their Competency Demonstration Report in preparation for assessment.

The Standards, by definition, are also the generic template of targeted graduate outcomes for any engineering education program aimed at delivering graduates fit to commence practice in the associated occupational category. As such the Stage 1 Competency Standards underpin the learning design function undertaken by engineering educators in both the university and vocational sectors.

## **BACKGROUND**

Engineers Australia first documented National Generic Competency Standards for Professional Engineers in 1993. The development work was undertaken under contract from the Commonwealth Government to assist the assessment of migrants with engineering qualifications and experience, and the developers took advice from the education and industry sectors. The Standards covered both Stage 1 (entry level, professional engineering work undertaken under guidance) and Stage 2 (professional autonomy for normal engineering work within the scope of demonstrated competences) for Professional Engineers, and also scoped the corresponding Standards for Engineering Technologists and Engineering Associates.

These standards underwent significant review in 1998 and were republished in 1999 as the National Generic Competency Standards aimed primarily at the assessment of the mature engineer at the Stage 2 level.

In 1996 a national review of engineering education resulted in the report *Changing the Culture: Engineering Education into the Future*. This report focused strongly on defining appropriate outcome capabilities in graduate Professional Engineers and listed *generic attributes* that should be targeted for graduates in this occupational category, irrespective of engineering discipline.

In 1999 the Engineers Australia accreditation system for the assessment of programs in the Professional Engineer category was heavily reviewed by the Accreditation Board and new criteria for accreditation established. In line with directions being taken by other partner signatories to the Washington Accord, Engineers Australia for the first time refocused its accreditation criteria on the key input process and output measures that were seen to impact delivery of graduate outcomes.

In 2003 and 2004 a totally revised Stage 1 Competency Standard set was developed and published with a separate standard for each of the occupational categories of Professional Engineer, Engineering Technologist and Engineering Associate. These new competencies again focused uniquely on the key capabilities deemed to be essential for the commencement of practice in the appropriate occupational category. The new standards were built upon the ten generic competencies that had been originally set down for the Professional Engineer graduate.

In 2005, the Engineers Australia assessment team adopted the newly published Stage 1 Competency Standards as the benchmark reference for applicant preparation of Competency Demonstration reports and for the assessment process itself. These Standards defined 3 Units and 17 Elements of Competency in each occupational category.

At the same time, the accreditation system for assessment of engineering education programs in the Professional Engineer category was also revised to ensure that the accreditation criteria and guidelines were

compatible with the Stage 1 Competency Standard. The revised Accreditation Management System was published in 2004. Since that time companion Accreditation Management Systems have been published for programs in the Engineering Technologist and Engineering Associate categories. The elements of competency represent learning outcomes, and the indicators of attainment provided against each were useful to curriculum designers to ensure adequate coverage and assessment of their degree programs.

## **2009-2011 STAGE 1 COMPETENCY STANDARDS REVIEW PROJECT**

An Australian Learning and Teaching Council funded Review of Engineering Education undertaken by the Australian Council of Engineering Deans in collaboration with Engineers Australia and other stakeholders published its report - *Addressing the Quality and Supply of Engineering Graduates* in 2008. Recommendation 2 of the Review identified the need to review and update the Stage 1 Competency Standards from the viewpoint of setting knowledge, skills and attribute targets for graduate Professional Engineers, Engineering Technologists and Engineering Associates.

Key drivers for this recommendation had been the broad and detailed advice received from stakeholders in Australia as well as the evolution of graduate outcome expectations set by the international engineering community, and expressed by the Education Accords under the International Engineering Alliance (IEA). An additional key influence was the equivalent requirements that are associated with the 'EUR-ACE label', and which are used by the European Network for the Accreditation of Engineering Education in its framework standards for accreditation of engineering education programs in the European Higher Education sector.

A further ALTC-funded project was launched in 2008 to begin the review of the Stage 1 Competency Standards. The theme leaders foreshadowed wide consultation with engineering education leaders (including Associate Deans for Teaching & Learning), graduate employers, and representatives of Engineers Australia's Colleges and committees. The revision process also needed to take into account the Graduate Attributes Exemplar Profiles (IEA, 2009) adopted by the Washington, Sydney and Dublin Accords. The Standards, as revised, are intended to contain sufficient detail to assist curriculum developers to develop programs that equip graduates with the required outcomes, and they are also consistent with the Threshold Learning Outcomes (TLOs) developed by the ALTC Discipline Scholars in Engineering and ICT under the national ALTC Standards and Assessment project which was conducted in parallel, and in close consultation with the Competency Standard review. These TLOs are an aggregation of the outcomes specified by the elements of competency set down by Engineers Australia in its Stage 1 Competency Standard and by the Body of Knowledge definition for the Professional Engineer occupational category set by the Australian Computer Society.

The Competency Standard review project commenced systematic consultation with stakeholders in late 2008. Consultative forums were held from late 2008 through to October of 2010. Two workshops were held with the Associate Deans (Teaching and Learning) and key engineering educators drawn from across Australia. A one-day workshop in Melbourne involved senior industry engineers and engineering managers from more than 20 private and public sector enterprises from Victoria and interstate.

In parallel, input was sought from each of the eight discipline based College Boards of Engineers Australia and the National Committees of Engineering Technologists and Associates. In the first instance these consultations sought comment and/or position statements on the existing Engineers Australia Stage 1 Competency Standards. The workshop outcomes and written submissions were analysed and consolidated as input to the first draft revision of the Competency Standards. This draft was then distributed to all stakeholder groups and individuals for comment and widespread written feedback was received. A final consultation workshop was held in Melbourne in October of 2010 with representatives of all stakeholder groups invited. Further feedback from this workshop informed the final draft of the proposed Competency Standards.

This final draft was endorsed by the Accreditation Board of Engineers Australia and submitted to the Engineers Australia Council at its February 2011 meeting. Council adopted the new Competency Standards, subject to minor editorial changes that arose from discussion. The revised Stage 1 Competency Standard for each occupational category has now been published in final form. The revised Standards will provide the basis for assessment of Stage 1 Competency and an important new benchmark for curriculum design and program accreditation. Although the accreditation system will allow a transition period as university and vocational education institutions adapt graduate outcome specifications and learning design to track delivery of the new generic competencies, it is expected that any new programs developed from 2011 onwards will adopt the new Competency Standards as the foundation reference for an outcomes based educational design process.