Can an Engineering Geologist get CPEng? – Geoffrey Farquhar

This question raises much debate amongst engineering geologists and geotechnical engineers. However much of the debate is possibly based on outdated concepts of the criteria to become a Chartered Professional Engineer (CPEng) in NZ and also on anecdotes of what happened to Joe Bloggs engineering geologist in years gone by. When the Chartered Professional Engineers Act was enacted in 2002, it ushered in a new era for professional registration. Thus what happened to engineering geologists under the old Engineers Registration Act of 1924 is no longer relevant.

In the eight years since the Chartered Professional Engineers Act has been in operation there have been refinements to the process of assessing applicants. Thus anecdotes of what happened to Joe Bloggs engineering geologist in the first few years of CPEng assessments should also be put aside. Although the application process has been refined, the CPEng competence standard has not changed.

The purpose of this article is to provide information to answer the question, "Can an engineering geologist become a Chartered Professional Engineer in NZ?" Information is provided at the end of this article to explain the CPEng competence standard and aspects of the CPEng application process. A comprehensive explanation of the CPEng application process is beyond the scope of this article.

This article concentrates on the relevance and applicability of CPEng to engineering geologists. It is timely to address this question as there is another article in this issue of Geomechanics News providing an international overview of the licensing of geologists. This article does not consider professional registration as either a geologist or an engineering geologist, rather it presents an option for engineering geologists in NZ to find a quality mark of competence and a 'NZ home'.

Why should I get CPEng? What are the advantages?

The CPEng quality mark offers registrants a number of benefits. These include:

- Enhanced career opportunities, as companies use CPEng as a quality standard for clients (e.g. in proposals and tender documents)
- The right to undertake certain work that is restricted by Government regulatory requirements
- Access to other work that may be restricted by local and regional authorities
- Marketing advantages deriving from inclusion on the CPEng Register and use of the CPEng postnominal
- Recognition in a professional body that does not require one to abandon the practice of engineering geology

At present there are no other professional registration opportunities in NZ for engineering geologists (excluding becoming a Chartered Geologist with the Geological Society of London) and there are considerable difficulties to the establishment of a New Zealand registration body.

Having looked at the advantages of CPEng it is important to clarify a few points:

1. A person is registered as a professional engineer, not a professional engineering geologist
The most important point for an engineering geologist to understand is that CPEng is about having attained competence as a professional engineer, not a professional geologist and not a professional engineering geologist. Some engineering geologists find this difficult to swallow.

2. There are engineering geologists in NZ at present who have CPEng
Despite rumours, engineering geologists with CPEng have not abandoned the faith, deserting geology to convert to engineering. Whether an engineering geologist calls him/herself an engineer or an engineering geologist after attaining CPEng is irrelevant.

3. Engineering geologists with CPEng work in engineering
Since CPEng is about registration as a professional engineer, an engineering geologist must demonstrate competence in engineering and not some other related field. Working in engineering as an engineering geologist is not sufficient on its own. One needs to demonstrate competence as a professional engineer.

4. CPEng is a competence based standard
The competence assessments conducted by IPENZ require applicants to provide sufficient evidence to demonstrate they...
are able to consistently apply knowledge, understanding and skills to the standard expected of a reasonable professional engineer. To understand whether an engineering geologist can attain CPEng it is necessary to understand the CPEng competence standard, details of which are given at the end of this article.

5. A Washington Accord engineering degree while important is not critical
Element 1 of the CPEng competence standard refers to having a Washington Accord degree or recognised equivalent qualification or having demonstrated equivalent knowledge. A Washington Accord degree in simple terms is an internationally accredited four-year engineering degree. Engineering geologists are unlikely to have a Washington Accord degree. However the CPEng standard states that one may have a recognised equivalent qualification. In my experience it is unlikely that an engineering geologist will have a recognised equivalent qualification. But the other alternative is “or has demonstrated equivalent knowledge”. An engineering geologist in NZ will typically have a science degree in engineering geology or geology. In order to assess the applicant’s equivalent knowledge the CPEng assessment will include a Knowledge Assessment where an applicant’s knowledge is assessed against that required for a Washington Accord degree. All of the applicant’s study and learning (secondary schooling, university study, on the job learning, continued professional development etc) is taken into consideration. Even if the applicant is not assessed as having met that standard, it does not necessarily prevent the applicant from attaining CPEng, but it tends to make it more difficult.

6. CPEng is registration as an engineer not as a geotechnical engineer
Every CPEng candidate is assessed in his or her practice area. Practice area is defined in regulations as:

(a) the area within which one has engineering knowledge and skills, and

(b) the nature of one’s professional engineering activities.

One’s practice area is a combination of both the area in which one holds specialised engineering knowledge and the nature of the activities one performs, and one or both of these may change over the course of one’s engineering life.

CPEng applicants are asked to provide their practice area description in the form of a succinct statement of the types of work that he/she is competent to carry out, having kept up to date with new engineering knowledge and techniques. The diversity of engineering knowledge and practice means that an engineer’s practice area is unique.

Assessment panels are required to assess whether the applicant’s practice area description is a reasonable summary of his/her practice area (based on the evidence presented) and then they will assess the applicant’s competence within that practice area.

Having described one’s practice area, one is then asked to select the practice field(s) with which one’s practice area most closely aligns. One’s practice area may partly lie within two or more practice fields, but IPENZ asks that the applicant selects no more than two practice fields when completing the application form. The practice field(s) is used to choose suitable accessors.

The seventeen practice fields are Aerospace, Bio, Building Services, Chemical, Civil, Electrical, Environmental, Fire, Geotechnical, Industrial, Information, Management, Mechanical, Mining, Petroleum, Structural and Transportation. These fields are the disciplines adopted by the APEC Engineer Agreement.

At the end of 2008 IPENZ stopped the use of practice fields after an engineer’s IPENZ post-nominal, e.g. one can no longer use MIPENZ(Geotechnical). There is still confusion amongst engineers about practice fields and the most common misconception is that one is registered for example as a Geotechnical Engineer, Civil Engineer etc. CPEng involves being registered as a currently competent engineer - not as a geotechnical engineer. The practice area description confirmed by the assessment panel during the assessment process is recorded on the assessment form which is held on file by IPENZ. The practice area description is not recorded on the register of Chartered Professional Engineers. Thus it is not available to the public or other engineers.

7. An engineering geologist will typically take longer than an engineer to get CPEng
This statement is a gross generalisation. Generally advice is given to engineers that a suitable time to apply for professional registration is about four to five years after graduation. As CPEng is a competence standard there is no specified minimum period for an engineer to gain the experience and skills to demonstrate competency at the required level. As a very general observation, an engineering geologist is likely to require a longer period than a BE-qualified engineer to gain the experience and skills necessary to demonstrate the required level of competence. It is important to get advice from a Chartered Professional Engineer familiar with the competency standard.

In summary, it is possible for an engineering geologist to become a Chartered Professional Engineer in NZ but the devil is in the detail as with most things in engineering. It is best to seek advice before embarking on the application process.
Information on CPEng Competency Standard and Aspects of the Application Process

1. IPENZ Quality Marks

There are three engineering occupational groups within the wider engineering profession: professional engineers, engineering technologists and engineering technicians. A general summary of the key attributes of each occupational group is provided in the following table.

<table>
<thead>
<tr>
<th>Engineering Role</th>
<th>National Current Competence Register</th>
<th>Chartered Professional Engineer (CPEng)</th>
<th>Certified Engineering Technologist (ETPract)</th>
<th>Certified Engineering Technician (CertETn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Engineer</td>
<td>Registrants are reassessed every five years</td>
<td>Chartered Professional Engineers Act 2002 created the only statutory-backed register for professional engineers in New Zealand</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering Technologist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capable of dealing with broadly defined engineering problems and activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering Technician</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capable of dealing with well-defined engineering problems and activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering Technologist Mobility Forum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. CPEng Competence Standard

The competence standard sets the entry standard for engineers seeking formal peer recognition as a competent professional engineer by undertaking an IPENZ competence assessment. The competence standard below sets the standard for Initial Registration as a Chartered Professional Engineer, and the standard for entry into the class of Professional Member with IPENZ Engineers New Zealand and informs entry into the International Register for Professional Engineers (IntPE).

What is a Competence standard?
A competence standard is an indication of an expected level of performance. The competence assessments conducted by IPENZ require applicants to provide sufficient evidence to demonstrate they are able to consistently apply knowledge, understanding and skills to the standard expected of a reasonable professional engineer.

**Chartered Professional Engineer Act 2002**

The Chartered Professional Engineers of NZ Rules (No 2) 2002 and amendments specify the minimum standard for registration, and the standard is summarised below.

**12 elements**: These represent broad areas of professional engineering performance. Taken holistically, these elements make up the minimum standard for registration as outlined in the CPEng Rules.

**Performance indicators (bullet points under each element)**: These provide further detail as to the meaning of each element thereby enabling the applicant and assessors to have a clearer understanding of the performance required to demonstrate competency in each element. They are important indicators of competence but are not criteria that need to be met nor are they an exhaustive list.

**Definitions**: These provide a critical component of the standard and need to be considered carefully by applicants when they are preparing their portfolio of evidence to demonstrate they meet the competence standard.

**Performance assessed against each Element**

Those undertaking an assessment with IPENZ are expected to provide evidence of their current competence which demonstrates that they are able to meet all the elements of the standard. The Panel, however, considers the totality of the evidence supplied and makes an holistic assessment as to whether each applicant meets the IPENZ Competence Standard for Professional Engineers.

To meet the minimum standard a person must demonstrate that he/she is able to practice competently in his/her practice area to the standard expected of a reasonable professional engineer.

The extent to which the person is able to perform each of the following numbered elements in his/her practice area must be taken into account in assessing whether or not he/she meets the overall standard.

**Element 1: Comprehend, and apply knowledge of, accepted principles underpinning widely applied good practice for professional engineering**

- Has a Washington Accord degree or recognised equivalent qualification or has demonstrated equivalent knowledge and is able to:
  - Identify, comprehend and apply appropriate engineering knowledge
  - Work from first principles to make reliable predictions of outcomes
  - Seek advice, where necessary, to supplement own knowledge and experience
  - Read literature, comprehend, evaluate and apply new knowledge

**Element 2: Comprehend, and apply knowledge of, accepted principles underpinning good practice for professional engineering that is specific to the jurisdiction in which he/she practices (For CPEng assessment this relates to the jurisdiction of NZ)**

- Demonstrates an awareness of legal requirements and regulatory issues within the jurisdictions in which he/she practices (i.e. in NZ)
- Demonstrates an awareness of and applies appropriately the special engineering requirements operating within the jurisdictions in which he/she practices (i.e. in NZ)

**Element 3: Define, investigate and analyse complex engineering problems in accordance with good practice for professional engineering**

- Identifies and defines the scope of the problem
- Investigates and analyses relevant information using quantitative and qualitative techniques
- Tests analysis for correctness of results
- Conducts any necessary research and reaches substantiated conclusions

**Element 4: Design or develop solutions to complex engineering problems in accordance with good practice for professional engineering.**

- Identifies needs, requirements, constraints and performance criteria
- Develops concepts and recommendations that were tested against engineering principles
- Consults with stakeholders
- Evaluates options and selects solution that best matched needs, requirements and criteria
- Plans and implements effective, efficient and practical systems or solutions
- Evaluates outcomes

**Element 5: Be responsible for making decisions on part or all of one or more complex engineering activities**

- Takes accountability for his/her outputs and for those for whom he/she is responsible
- Accepts responsibility for his/her engineering activities

**Element 6: Manage part or all of one or more complex engineering activities in accordance with good engineering management practice**

- Plans, schedules and organises projects to deliver specified outcomes
- Applies appropriate quality assurance techniques
• Manages resources, including personnel, finance and physical resources
• Manages conflicting demands and expectations

**Element 7: Identify, assess and manage engineering risk**
• Identifies risks
• Develops risk management policies, procedures and protocols to manage safety and hazards
• Manages risks through ‘elimination, minimisation and avoidance’ techniques

**Element 8: Conduct engineering activities to an ethical standard at least equivalent to the relevant code of ethical conduct**
• Demonstrates understanding of IPENZ and/or CPEng codes of ethics
• Behaves in accordance with the relevant code of ethics even in difficult circumstances (includes demonstrating an awareness of limits of capability; acting with integrity and honesty and demonstrating self management)

**Element 9: Recognise the reasonably foreseeable social, cultural and environmental effects of professional engineering activities generally**
• Considers and, where needed, takes into account health and safety compliance issues and impact(s) on those affected by engineering activities
• Considers and takes into account possible social, cultural and environmental impacts and consults where appropriate
• Considers Treaty of Waitangi implications and consults accordingly
• Recognises impact and long-term effects of engineering activities on the environment
• Recognises foreseeable effects and where practicable seeks to reduce adverse effects

**Element 10: Communicate clearly with other engineers and others that he or she is likely to deal with in the course of his or her professional engineering activities**
• Uses oral and written communication to meet the needs and expectations of his/her audience
• Communicates using a range of media suitable to the audience and context
• Treats people with respect
• Develops empathy and uses active listening skills when communicating with others
• Operates effectively as a team member

**Element 11: Maintain the currency of his or her professional engineering knowledge and skills**
• Demonstrates a commitment to extending and developing knowledge and skills
• Participates in education, training, mentoring or other programmes contributing to his/her professional development
• Adapts and updates knowledge base in the course of professional practice
• Demonstrates collaborative involvement with professional engineers (i.e. NZ engineers for CPEng assessments)

**Element 12: Exercise sound professional engineering judgement**
• Demonstrates the ability to identify alternative options
• Demonstrates the ability to choose between options and justify decisions
• Peers recognise his/her ability to exercise sound professional engineering judgement

**Definitions:**

**i Practice Area, quoting the CPEng Rules:**
practice area means an engineer’s area of practice, as determined by:
(a) the area within which he or she has engineering knowledge and skills; and
(b) the nature of his or her professional engineering activities.
The practice area is a combination of both the area in which the engineer holds specialised engineering knowledge and the nature of the activities performed, and one or both of these may change over the course of professional life. The competence of the applicant will be assessed in his/her current area of engineering practice.

**ii Complex engineering activities**
Complex engineering activities means engineering activities or projects that have some or all of the following characteristics:
• Involve the use of diverse resources (and, for this purpose, resources includes people, money, equipment, materials and technologies);
• Require resolution of critical problems arising from interactions between wide ranging technical, engineering and other issues;
• Have significant consequences in a range of contexts;
• Involve the use of new materials, techniques, or processes or the use of existing materials, techniques, or processes in innovative ways.
Complex engineering problems

Complex engineering problems have some or all of the following characteristics:

- Involve wide-ranging or conflicting technical, engineering, and other issues;
- Have no obvious solution and require originality in analysis;
- Involve infrequently encountered issues;
- Are outside problems encompassed by standards and codes of practice for professional engineering;
- Involve diverse groups of stakeholders with widely varying needs;
- Have significant consequences in a range of contexts;
- Cannot be resolved without in-depth engineering knowledge.

Knowledge Specific to Local Jurisdictions

Applicants will need to provide evidence that, within the jurisdictions in which they work, they:

(a) Understand the general principles behind applicable codes of practice;
(b) Have demonstrated a capacity to ensure such principles are applied safely and efficiently; and
(c) Are aware of the special requirements operating within the host jurisdiction.

Methods of Analysis

The techniques used in quantitative analysis will vary depending on the field of engineering practice however they include computer, mathematical or reliability modelling, statistics, and the use of planning tools.

Design and Development

Design and development are a conceptual processes used to bring together innovation, aesthetics and functionality to plan and create an artefact, product, process, component or system to solve a complex engineering problem. The design or development process may develop the shape, size and selection of material and components for engineering products/outcomes. Design and development also include engineering planning, an example of which is the process of locating facilities and items of engineering construction taking into account all the factors affecting their relationship and their inter-relationships with the external environment.

Responsibility for Making Decisions for Complex Engineering Activities

Applicants may be taken to have been responsible for making decisions for complex engineering activities when they have:

- Planned, designed, co-ordinated and executed a (small) project; or
- Undertaken part of a larger project based on an understanding of the whole project; or

Washington Accord Degree

Element 1 refers to having a Washington Accord degree or recognised equivalent qualification or having demonstrated equivalent knowledge. A Washington Accord degree in simple terms is an internationally accredited four-year engineering degree. There are thirteen countries who are signatories to the Washington Accord. The countries are NZ, Australia, Canada, Chinese Taipei, Hong Kong China, Japan, Ireland, Korea, Malaysia, Singapore, South Africa, United Kingdom, United States of America. The Washington Accord is an agreement between the bodies responsible for accrediting professional engineering degree programs in each of the signatory countries. It recognizes the substantial equivalency of programs accredited by those bodies, and recommends that graduates of accredited programs in any of the signatory countries be recognized by the other countries as having met the academic requirements for entry to the practice of engineering. The Washington Accord covers professional engineering undergraduate degrees. Engineering technology and postgraduate-level programs are not covered by the Accord. Not all engineering degrees in those countries are accredited. Accreditation is for each degree, not each university nor each country. The Washington Accord sets a benchmark against which engineering degrees are measured.

Not all engineering degrees in NZ are Washington Accord, and those accredited are listed on the IPENZ website.

Knowledge Assessment

The Knowledge Assessment is primarily intended for assessing CPEng applicants who do not have a formal Washington Accord qualification (or recognised equivalent) to assess whether or not they have knowledge equivalent to the level required for a Washington Accord degree. Successful completion of a Knowledge Assessment is not a qualification, and thus is no substitute for a Washington Accord (or equivalent) degree for entry to the international registers.

The IPENZ Knowledge Assessment involves appointment of a specialist assessor to the assessment panel. The assessment panel has the ability to determine how it wishes to conduct the Knowledge Assessment – whether all or some panel members participate in the Knowledge Assessment, whether this is done at the start of the process or partway through or whether the Knowledge Assessment is an exam or done as an interactive assessment.

The process most commonly used for a Knowledge Assessment is:
a. Once IPENZ identifies applicants who need a Knowledge Assessment, a knowledge assessor is appointed to the assessment panel. The knowledge assessor is someone with a background in both engineering education and professional engineering in industry.
b. The knowledge assessor reads your paperwork to become familiar with your application.
c. You are then contacted by the knowledge assessor, usually first by telephone and then by email. This assessor introduces him/herself to you and requests the following if it has not already been provided with your initial application (for example on the self assessment (CA03) form, and by way of extra documentation)

**Review of Study and learning**
- Transcripts and grades for papers studied at school/college/polytechnic/university in all areas (not just engineering)
- a few words on post-school papers/units taken to describe the subject material (more than is provided in a transcript)
- a note on any major topics studied, either by formal learning, CPD and other learning in or outside of work
- notes on what you consider to be the key new developments and critical issues in your practice field.

**Modelling and Application**
- brief notes on the key mathematical, physical or conceptual models that you have used to predict engineering outcomes
- a list of the tools (especially software tools) you have used for analysis, simulation, visualisation, synthesis, design
- brief notes on your views of the accuracy and limitations of these tools and how you know they give reliable, usable results

**Handling Information, Experimental Methods**
- a list of laboratory procedures that you are familiar with
- brief notes on: the sources of research information that you use at work; your methods for drawing conclusions; some experiments that you have designed/conducted including your assessment of experimental error; any construction and test of components/sub-systems that you have carried out.

d. Once the information requested in (c) has been supplied, a meeting is normally arranged between the candidate and the knowledge assessor. Where possible, this has been face-to-face at the candidate's workplace, but in some cases it has been carried out by telephone.

e. During this meeting, the assessor discusses with the candidate the following:
- The extent of the candidate's knowledge across a broad spectrum of mathematics, engineering and management topics.
- Competence Assessment Reference Guide.
- The process for developing solutions or design used by the candidate.
- Modelling and application examples supplied by the candidate
- Application of research by the candidate.

f. After the meeting the assessor documents the assessment findings and provides a report to the other panel members.
g. The whole panel reviews all the evidence – the material supplied by the candidate, the Knowledge Assessment report, the Interactive Assessment and the written assessment - before making recommendations to the IPENZ Competence Assessment Board.

Experience to-date has shown that the majority of Knowledge Assessment applicants have university qualifications, but in non-engineering disciplines. These include architecture, chemistry, geography, geology, management, mathematics, physics, science and surveying. In reality, it is not the profile that is important; it is the candidates' quest for knowledge and the way in which they apply it.

5. **Registration Term**
Registration is gained by demonstrating competence, which is re-assessed for currency at intervals not exceeding five years. NZ is one of the few countries in the world to have a system of re-assessing competence at regular intervals rather than granting lifetime registration or relying on CPD for continued registration.

6. **International Registers**
The IntPE(NZ) register meets the requirements of two international agreements - the APEC Engineer agreement (14 APEC Economies) and Engineers Mobility Forum agreement (16 signatories), and lists professional engineers meeting the IntPE(NZ) competence standard (which is the same as that for CPEng and MIPENZ) and the additional specific qualification and work experience (non-competence) requirements. These are that registrants must hold a Washington Accord accredited qualification; have two years responsible engineering experience and seven years post-graduation professional engineering experience. IntPE(NZ) registrants must undertake on-going assessments at intervals not exceeding 5 years to remain on the register, hence IntPE(NZ) registrants are regarded as being ‘currently competent’. It is most unlikely that an engineering geologist will be eligible for IntPE (NZ) unless he/she has a Washington Accord degree.
7. Detailed information on CPEng Competency Standard and Application Process

For detailed information refer to:

IPENZ can also be contacted for further information. Applicants who have trained and worked mainly overseas should seek further information.

Geoffrey Farquhar FIPENZ, MICE, CEng(UK), CPEng, IntPE(NZ)
AECOM New Zealand Limited, Auckland
Member New Zealand Geotechnical Society
Member of IPENZ’s Competency Assessment Board

Logan Underground Construction Ltd

Logan Underground Construction Ltd is an Auckland based civil construction contractor with a reputation for innovation and a strong work ethic.

Our commitment to quality coupled with wide experience has made us a preferred service supplier for many of our clients including engineers, developers and local authorities. Since 1998 our focus has been on horizontal drilling for drainage. Pipe sizes of 110mm to 560mm OD and distances up to 160m have been completed to date and with capacity to spare, longer or larger pipes are within our capability.

LUC has amassed considerable experience drilling inclined perforated drains (40mm to 160mm dia) and column drains for groundwater control in landslip prevention/remediation. Our versatile drill rigs and support equipment enable us to establish and drill virtually anywhere.

We are dedicated to providing a professional service to our clients and completing their projects to a high standard.

Contact us for an obligation free quotation or advice at the design stage of your project.

Bruce Logan BE (Civil)
Mob 021 449 341
E-mail blogan@orcon.net.nz

A 100% down to earth Kiwi Company
Issues in Professional Licensure for Geologists

Editor’s Note: Following on from Geoffrey Farquhar’s article on CPEng registration for engineering geologists is the often discussed question of professional licensure for geologists. This article – a reprint from a recent AEG News issue – looks at existing regulatory models for geologists around the world and asks if self-regulation would work in the US? NZGS Chairman Philip Robins and IAEG President Fred Barnes both provided information for this article and, while the question of US self-regulation is not directly relevant in NZ, it provides a very good summary of credentialing terminology and various licensing models used around the world – useful information for a discussion of this topic in NZ. The author’s opinions are not necessarily those of the Association of Environmental & Engineering Geologists, the NZGS, any other organization or entity.

Licensure Administration Models: Would Self-Regulation Work for Geology Licensure in the United States?

By: Robert E. Tepel, PG & AEG Past President

Introduction and Summary
Scope, Nomenclature, and Societal Trust
This article explores design professional licensure models from around the world, with emphasis on geology and engineering, and attention to self-regulation characteristics. Surprisingly, there is an example of a self-regulating design professional licensure board in the United States. Notes: The nomenclature of credentialing is explained in a text box. I use the term “state” to refer to a state in the United States, or in a general sense to refer to a sovereign government such as a Canadian province, a country, or one or more states in the United States, as the context demands. Government-imposed regulation of the design professions is rare outside of the countries discussed here. I welcome additional information from readers.

Some societies trust the professions more than others, and they grant a high degree of self-regulation. Based on this review of regulatory models around the world, it appears that the level of societal trust in the integrity of the professions as to self-regulation is low in the United States and high in Western European and British Commonwealth countries. Hence (with one exception) the heavy hands of the state place a chokehold on the autonomy of professional licensure boards in the United States. That is the system we grew up with, so it seems normal. The prevalent American licensure model suffers from the seemingly constant attack or risk of attack in the political arena, from arbitrary budget restrictions, and from stifling bureaucratic administrative policies. So, let’s step outside the box of our national boundaries see what is “normal” elsewhere in the world, and ask if that “normal” would work in the USA. Would the public benefit (even indirectly) if our state legislatures adopted a self-regulatory licensure model? And just how far can self-regulation go and still function in the public interest?

Regulatory Models
The way that professions are regulated varies according to the cultural norms of each country or group of countries. CLEAR (2006 a, b, c, d) provides extensive descriptions of occupational practice laws in Canada, Mexico, the United Kingdom, and the United States, respectively. For convenience here, I generalize regulatory methods into three models: The Government Agency Model, the Semi-Privatized Self-Regulatory Model, and the Voluntary Self-Regulatory Model. (In some contexts, the term “self-governing” is used instead of “self-regulatory”). Some distinguishing characteristics of the three models are described below.

Distinguishing Characteristics of the Regulatory Models
Regulatory Autonomy and Appointment Process
In the Government Agency Model (prevalent in the United States) licensure boards have little autonomy. Board members may self-nominate by independently applying to the appointing authority, or they may apply for appointment in response to an announcement or request by their professional association. The board is staffed by state employees and licensure law administration is fully integrated into the state agency system. These boards are referred to here as integrated boards within the Government Agency Model. Geology licensure boards in Kansas, North Carolina, and Oregon are housed in the state bureaucracy and staffed by state employees, but enjoy certain elements of independence. Using the term applied in Oregon, I characterize these boards as semi-independent boards within the Government Agency Model.

In the Semi-Privatized Self-Regulatory Model, almost complete autonomy is granted by the state to a self-regulatory organization (SRO) created by statute. SRO board members might come to office through a statutory nomination system that involves the professional associations, or some or all may be self-nominated or appointed by political leaders. The SRO, which may be nominally a part of government, is responsible for its own financing, staffing, administration, and governance.
In the Voluntary Self-Regulatory Model, a professional association or institute credentials its members and regulates their practice through a Code of Ethics. The members of the organization’s Board of Directors are elected by the general or credentialed membership. That board may be the board that hears complaints, or complaint resolution may be delegated to an appointed panel. The association or institute is authorized to exist by the state but does not have any of the sovereign powers of the state to regulate the profession.

**Examinations**

A principal distinguishing characteristic of the Government Agency Model is the requirement for a written examination on the technical subject matter of the profession. The requirement for a written examination, prepared under third party professional control (psychometricians) is, I suggest, symptomatic of the skepticism about the *bona fides* of the institution of professionalism and professional organizations prevalent in American society and government. (However, research in progress indicates that at least one of the early state engineering licensure boards in the United States prepared and graded its own written examinations on its own volition).

In the Semi-Privatized Self-Regulatory Model, a written examination on the technical subject matter of the profession is used in the United States. In Canada, the written examination covers only applicable practice law and ethics.

**Exemptions**

In the United States, the Government Agency Model is characterized by a variety of exemptions from licensure – not all are present in all state laws. The exemption for subordinates is ubiquitous. It is necessary so that beginning level professionals can practice under the charge of a licensed professional. The industry exemption is ubiquitous, but is not necessary. It allows geologists employed in a company, the primary business of which is not the offering of geological services to the public, to be unlicensed as long as their work is purely internal to the company. The industry exemption is not found in the Semi-Privatized Self-Regulatory model prevalent in Canada. It also appears to be lacking in the Government Agency Model of geologic practice regulation in the Republic of the Philippines. Other common exemptions are for academics, research geologists, government geologists, military personnel, and natural resource (economic) geologists. These are found in particular cases in licensure under either the government agency or semi-privatized model.

---

**THE NOMENCLATURE OF CREDENTIALING**

The nomenclature of credentialing terms varies around the world. In the United States, the National Organization for Competency Assurance (NOCA, 2006) provides authoritative definitions of credentialing terms. Working definitions of key terms, in the context of world-wide usage as to geologic practice, and slightly modifying or extending the definitions of NOCA (2006) are provided here.

**Credentialing** is an umbrella term defined in part by NOCA as “the process by which an entity, authorized or qualified to do so, grants formal recognition to, or records the recognition status of individuals, organizations, institutions, programs, processes, services, or products that meet predetermined and standardized criteria.”

**Licensure** is a government-operated public or government-sanctioned semi-private regulation of a profession. People become licensed by establishing their qualifications to practice by way of education, experience, and passing a written examination that covers the substantive technical subject matter of the profession. Some licensure examinations may also cover knowledge of applicable laws and regulations governing practice and (or) relevant ethical criteria, either within a single exam or as a supplemental exam. (Registration is an outmoded term for licensure, still in use in some jurisdictions).

**Certification** is an attestation of a persons qualifications offered by an occupational or professional association. Some certifications are based on the same three qualifiers as licensure; others either do not have a written examination or they use an examination limited to certain aspects professional practice, such as knowledge of applicable laws and codes of ethics. Important, this last type of examination does not cover the substantive technical subject matter of the profession.

**Chartering** is a form of credentialing not defined by NOCA because the term is used only outside the United States. Chartering is similar to certification, but it is offered only by professional associations authorized to do so by law. The term chartering (e.g., chartered geologist) is used in some British Commonwealth countries. In the examples I have seen, chartering parallels certification in that it is based on peer review of qualifications. It may have an examination component similar to that of some certification programs, but as with certification, the exam is concerned with knowledge of applicable law and codes of ethics, not technical subject matter. Certification and chartering may take on some of the attributes of licensure if they are endorsed, recognized, or required by government.
Public Members
In the United States (Government Agency Model), twenty-four of the thirty boards that license geologists have at least one public member (see Tepel, 2009b, table A-1), and the Delaware engineering practice law (Semi-Privatized Self-Regulating Model) specifies three members who are not necessarily engineers (see www.dape.org). In Canada (Semi-Privatized Self-Regulatory Model) nearly all jurisdictional associations have at least one public (lay) member on their governing boards. Public members appear to be missing from the consumer opt-in (Voluntary Self-Regulatory Model) boards discussed here and in Tepel (2008 and 2009a).

Discussion: Self-Regulation Examples — Voluntary and Statutory
The concept that voluntary self-regulation of a profession can well and fully serve the public interest is a chimera because self-regulation without the authority of the state behind it is not effective in protecting and asserting the public interest in the practice of the profession (see Tepel, 2006, 2008, 2009a). Voluntary self-regulatory organizations that also promote the profession and the interests of their members are in a mission conflict situation: which mission has priority, protecting the public or promoting the interests of their members?

To be effective, the SRO must be a creature of the legislature (or other government authority) and, at some level, be accountable to it and thus under its control in some ultimate sense. Why is this so? A state will grant some of its sovereign powers to the self-regulatory organization only if those powers are subject to recall, and the self-regulatory organization needs those powers from the state to function in the public interest in the name of the state, and needs the protection of the state's umbrella to shield it from legal challenges and liability.

The principal examples of effective semi-privatized SROs are those that regulate the design professions in Canadian provinces, and, in the United States, the Delaware Association of Professional Engineers (DAPE), which is based on the Canadian model.

The Voluntary Self-Regulation Model is essentially a consumer opt-in regulatory model. In this model, the consumer (whether individual, corporate, or governmental) may optionally require that certain employees or providers of professional services hold the title controlled by the organization. European organizations that offer voluntary self-regulation of the profession of geology are the European Federation of Geologists, the Geological Society of London, and The Institute of Geologists of Ireland. In Australia, the Australian Institute of Geoscientists and the Australasian Institute of Mining and Metallurgy have voluntary self-regulation programs. In the United States, the American Institute of Professional Geologists offers voluntary certification as a form of self-regulation.

Discussion: Advantages of Semi-Privatized Self-Regulation
Billingsley (1995) provides a rationale for moving from government agency regulation to semi-privatized self-regulation in engineering licensure. Similar reasoning would apply to geologic practice. The lower level of socio-political trust (or higher level of skepticism) in the United States works against granting licensed professions more self-regulation than is provided by the existing Government Agency Model. Nonetheless, the Semi-Privatized Self-Regulatory Model has been implemented in one case (Delaware), so it is doable. On a practical basis, semi-privatized self-regulation holds some attractions:

- It moves licensure operations off center stage in the theater of politics,
- It moves the cost of licensure operations off the state budget,
- It reduces the number of government employees involved in administering licensure,
- The semi-privatized SRO controls its own staffing and salaries, and hires and fires its own employees,
- The semi-privatized SRO has plenary control of its funds; they cannot be clawed back at whim by the legislative or administrative branches, and
- The SRO has the powers and responsibilities of a non-profit corporation. For example, it may rent, lease, buy, and sell real and personal property, or borrow, loan, or invest money.

The big question is: could the semi-privatized self-regulatory model work for geology licensure in the United States?

The answer could be yes. The primary driver toward semi-privatized self-regulation might be the state budget crisis found in almost every state. By removing licensure operations from the state budget, the budget can be reduced. Yes, the costs of licensure programs are trivial in the big picture, and yes, the costs of licensure programs are zero-sum in the state's budget because boards are self-supporting, but privatization does take the cost of licensure programs off-budget. Politicians desperately need something to crow about, and eliminating some of those pesky licensure boards is a bulls-eye for them. Geologists in states with boards that license only geoscientists could be in the best strategic position to explore the possibilities. The task of developing a business plan for self-regulation of the profession is left to interested readers. Note: It is not yet clear that self-regulation significantly reduces the cost of operating a licensure program.

Political allies in a shift to semi-privatization would be those who want to reduce the size of government and its budget, and those who think that geology licensure is not necessary or marginally necessary to protect the public.
The profession may benefit from a change to a self-regulatory model if the administration of licensure by the state is inefficient and provides slow service to the licensees and applicants, and costs more than necessary, or does not function aggressively to protect the public. (Anecdotally, dissatisfaction in the engineering community with the administrative and enforcement performance of the Florida engineering licensure board drove the change to require outsourcing of the board’s administrative and investigative functions to a state-created single-purpose nonprofit corporation. And, anecdotally, licensee satisfaction has increased and service to the public has improved as a result.)

The state budget benefits if licensure is semi-privatized, and the profession might benefit, but does the public? The public could benefit if the present board in a state has an insufficient enforcement program and the self-regulating board that replaces it does better. The public could also benefit if the self-regulating board can invoke better consumer outreach and complaint administration programs than the state board.

The following sections provide a detailed exploration of the regulation of design professions around the world. We geologists might find an example to adapt and adopt.

**AMERICAN LICENSURE BOARDS**

**Introduction**

Key characteristics of American geologist licensure boards were analyzed in Tepel (2009b). Summarizing, geologist licensure acts have two basic scopes: 1) acts that license only earth scientists, whether single-discipline or multi-discipline, and 2), multi-discipline design professional licensure acts that license geologists and related design professionals. Except as described below, American geology licensure boards are fully integrated into the state agency administrative system (integrated boards, as the term is used here).

**Semi-Independent Boards**

In the licensure of geologists in Kansas and North Carolina, and the licensure of geologists and engineers in Oregon, the programs incorporate some elements of independence, but remain too closely tied to the state to be classified as self-regulating programs. In Kansas and North Carolina, geology licensure board autonomy is indicated by the general budget-setting independence of the licensure boards.

In Oregon, geology licensure and engineering licensure follow the same pattern as other “semi-independent boards” established by the legislature in ORS 182.456 through 182.472. The principal features of the Oregon process that move in the direction of self-regulation are 1) the board’s budget must be adopted under specific guidance, but the budget “is not subject to review and approval by the Assembly (ORS 182.462); however there is a provision for financial review by the Secretary of State (ORS 182.464, 2) the board may select and appoint and administrator, and fix the qualifications and compensation of the administrator, ...(and) the administrator may employ persons as the board determines for carrying out the business and responsibilities of the board (ORS 182.468), and 3) all monies received are continuously appropriated to the board and the board is responsible investing the monies and managing them (ORS 182. 470).” Through several reporting requirements, the board remains a creature of the legislature and under its control.

**Administrative Outsourcing**

In Oregon, a step toward board independence allows semi-independent licensure boards to “contract with any state agency” for administrative services (ORS 182.460 (3)).

Florida represents a special case in licensure program reform. In Florida, engineering licensure is administered by a hybrid system. According to Schwartz (1998) a 1997 “law ’privatizes’ the administrative, investigative, and prosecution duties related to the Board of Professional Engineers. To accomplish this, the law creates the Florida Engineering Management Corporation (FEMC), which will assume the responsibility for contracting out the aforementioned duties (presently handled by board and department staff).

“Activities such as processing applications, administering examinations, issuing and renewing licenses, handling complaints, investigations, prosecutions, and inspections will be assigned to the new private corporation. The Florida Engineering Board retains all rule-making and license issuing authority, as well as all final decision-making authority for disciplinary penalties. The seven member FEMC will be composed of licensed engineers, with three members appointed by the Secretary of the Department of Business and Professional Regulation, and four members appointed by the Board.”

The outsourcing process mandated by law in Florida is a change in the way that the licensure law is administered and not a move toward self-regulation. While many of the administrative duties formerly performed by a unit of state government are now performed by a legislatively-created non-profit corporation, the licensure board is still present and seated in a state agency and retains quasi-judicial, licensing, and rule-making authority. Legislative oversight is maintained through reporting requirements. (See Florida Engineers Management Corporation at http://www.fbpe.org/)
SELF-REGULATORY MODELS IN THE UNITED STATES AND CANADA

Introduction
Self-regulatory models are available in two flavors: voluntary self-regulation and semi-privatized self-regulation.

Voluntary Self-Regulation — United States
The efficacy of American voluntary earth science-related certification programs, including that of the American Institute of Professional Geologists (AIPG), was evaluated in Tepel (2006 for AIPG, 2008 and 2009a for all programs). Summarizing, voluntary certification by professional associations is sometimes presented as an effective form of self-regulation of a profession. Because the certification is voluntary, the percent of potential certificants who become certified is low. Discipline by credentialing professional associations does not rise to desirable levels of transparency and effectiveness because a) non-members (non-certificants) cannot be disciplined, b) certificants can in some cases avoid discipline by resigning (or not renewing) membership, c) avenues of restitution to the consumer are minimal or non-existent, and d) names of disciplined members are not generally disclosed or published. In my opinion these drawbacks mean that voluntary credentialing cannot adequately assert and protect the public interest in the practice of the profession of geology.

Semi-Privatized Self-Regulation — United States
Delaware
There is no example of legislatively decreed self-regulation of geology in the United States, but Delaware licenses engineers in with an act that moved deeply into self-regulation (see www.dape.org). Schwartz (1998) remarks that “the state of Delaware…looked northward to the self-regulatory scheme utilized in the Canadian provinces to regulate the practice of engineering.”

According to Schwartz (1998), “Since 1972, the Delaware Association of Professional Engineers (DAPE), an association established by state statute, has regulated the practice of engineering in Delaware. DAPE was created by a statute enacted by the Delaware legislature (Delaware Professional Engineers' Act, Delaware Code, Title 24, Chapter 28). All professional engineers licensed under the laws of Delaware, and residing or having a place of business in the state, are "Members" of the DAPE.” Schwartz (1998) further notes that “Those most familiar with the Delaware experience characterize the system as one of almost total independence with the exception of the requirement of an Annual Report from the DAPE to the Governor. In addition, DAPE is totally self-supporting with all revenue being derived from licensure fees, examination fees, certificate of authorization fees and return on investments.” In my opinion, it is only in a distant sense that DAPE is subject to oversight from the state legislature that created it because the legislature can change the licensing law at will.

Semi-Privatized Self-Regulation — Canada
In Canada, regulation of the learned professions is implemented at the provincial level by self-regulatory organizations that are separate from professional associations. This system is described by Cleland and Lemay (2001) (see box, Canada has a long tradition of self-regulated professions).

In essence, the professions are trusted to regulate themselves under general orders from the provincial government. The Canadian system works well for five reasons: 1) the element of trust the public, through its government, has in the professions’ ability to self-regulate, 2) the authority and requirement set by statute upon the professional self-regulatory organizations to function in the public interest, 3) the separation of mission and leadership between the regulatory organizations and the professional associations, 4) strong support from the professional associations, and 5) ultimate oversight is exercised by the provincial governments.

CANADA HAS A LONG TRADITION OF SELF-REGULATED PROFESSIONS.
Contrary to the practice in most other countries, Canada enjoys a long tradition of self-regulated professions which flows from the Constitution Act 1867. Section 92(13) of the Act places professions within the jurisdiction of the provinces and territories, who in turn have delegated legal authority to certain professions to regulate themselves in the interest of the public.

In Canada, there are over forty regulated professions and occupations in the areas of medicine, nursing, dentistry, engineering, geoscience, architecture, chiropractic, technology, and veterinary medicine, among many others. Self regulation also confers the right to title. It is against the law for individuals to use the title professional engineer, or any variant of this title that could create the impression that they are licensed to practice engineering, unless they are registered members of one of the twelve provincial/territorial regulatory engineering associations/orde in Canada.

In the words of Chief Justice Beverley McLachlin et al., self regulation “constitute a tacit recognition by the legislature that the members of the profession are best qualified to determine the appropriate standards of professional competence and ethics required for the protection of the public.”

[From Cleland and Lemay, 2001. The embedded reference to McLachlin et al. is also listed in the References.]
GEOLOGIC PRACTICE REGULATORY MODELS IN OTHER COUNTRIES

European Countries — Government Regulation
The practice of geology is regulated at the national level in Spain and Greece, and also in Italy (Ruth Allington, email, 2010). Allington further indicates that some Eastern European or former Soviet Union countries likely regulate the practice of geology by national laws. According to Norbury (2004), in Italy a system of registration is administered by regional “Orders” of geologists, and “geologists must be a member of the Order to legally practice.” In Spain, (Norbury, 2004) “…the Official Association of Spanish Geologists (ICOG) registers all geologists. In order to practice the professional must be registered with the association.”

European Countries — Voluntary Self Regulation
The designation EurGeol is a voluntary title offered by the European Federation of Geologists (EFG). The EurGeol title is recognized or required in relation to the reporting of exploration results, mineral resources, and ore reserves in some reporting codes, but it has not been adopted as a general requirement for professional practice as a geologist in any country.

Recently, the brochure available on the EFG website (www.eurogeologists.de) lists Member National Associations representing 21 countries as full members of the EFG. Although the EFG has disciplinary procedures (reported for 2008 by Chaplow, 2009, p. 6), its objectives (as reported by Chaplow, 2009, p. 1) are focused on promoting the profession in Europe. “The aspiration of the EFG is that EurGeol will be a ‘passport’ for geologists to work in any European country. This is far from being achieved at present because of the differences between the legislative frameworks…” (Ruth Allington, email, 2009).

Geologists are voluntarily chartered in the United Kingdom by The Geological Society of London. The requirements to qualify for the Chartered Geologist title are essentially the same as the requirements to qualify for Fellow in the organization (see www.geolsoc.org.uk). There is no generally applicable or broadly based law, regulation, or code in the United Kingdom that requires the signature of a Chartered Geologist in specific instances. Norbury (2004) notes that “Market forces reign, and no qualifications are required to practice.”

Geologists are voluntarily credentialed in Ireland by the Institute of Geologists of Ireland (www.iigi.ie), which confers the title PGeo.

Australia
The Australasian Institute of Mining and Metallurgy (AusIMM, www.ausimm.com.au) offers chartering in several practice areas, including geology. The Australian Institute of Geoscientists (www.aig.org.au) offers certification as a Registered Professional Geoscientist (RPGeo). Both act as self-regulatory organizations, and both also promote the professions they represent. There are no statutory restrictions on geological practice in Australia, but the Australian Securities Exchange (www.asx.com.au) requires that reports concerning exploration results, mineral resources, and ore reserves be prepared in compliance the Joint Ore Reserves Committee (JORC) Code (www.jorc.org), which in turn requires that the reports are prepared by a “competent person,” e.g., a Chartered Geologist or Registered Professional Geoscientist.

New Zealand
Summarizing from information provided by Philip Robins (email, 2009), The Institute of Professional Engineers New Zealand (IPENZ) is authorized by an Act to charter its members. It both promotes and self-regulates the engineering profession. Geologists and engineering geologists may become members, but it charters only engineers. There is no general law or regulation requiring that charted persons be in responsible charge of all engineering work, but the Building Act of 2004 requires a CPEng for some specific tasks.

Republic of the Philippines
Republic Act No. 4209 regulates the practice of geology in the Philippines and provides for licensure in the Government Agency Model as the term is used here. In my reading of the Act, it does not include the common “industry exemption.”

CONCLUSIONS
The administration of the regulation of design profession practice takes different forms around the world. The general arrangement of the regulatory process, where implemented, varies according to the cultural norms of a country or group of countries as influenced by stakeholder groups. There are many variations on each regulatory theme. The principal differentiators of regulatory themes are

- The choice of regulation by
  a. a board housed in and supported by a government agency (either an integrated board or a semi-independent board),
  b. self-regulation by a quasi-independent authority created by the government (semi-privatized self-regulation), or
  c. voluntary self-regulation by a professional organization (consumer opt-in regulation),
- The level of autonomy formally granted to the regulatory authority by the government,
- The scope and intensity of governmental oversight.

CONCLUSIONS

The administration of the regulation of design profession practice takes different forms around the world. The general arrangement of the regulatory process, where implemented, varies according to the cultural norms of a country or group of countries as influenced by stakeholder groups. There are many variations on each regulatory theme. The principal differentiators of regulatory themes are

- The choice of regulation by
  a. a board housed in and supported by a government agency (either an integrated board or a semi-independent board),
  b. self-regulation by a quasi-independent authority created by the government (semi-privatized self-regulation), or
  c. voluntary self-regulation by a professional organization (consumer opt-in regulation),
- The level of autonomy formally granted to the regulatory authority by the government,
- The scope and intensity of governmental oversight.

The Australasian Institute of Mining and Metallurgy (AusIMM, www.ausimm.com.au) offers chartering in several practice areas, including geology. The Australian Institute of Geoscientists (www.aig.org.au) offers certification as a Registered Professional Geoscientist (RPGeo). Both act as self-regulatory organizations, and both also promote the professions they represent. There are no statutory restrictions on geological practice in Australia, but the Australian Securities Exchange (www.asx.com.au) requires that reports concerning exploration results, mineral resources, and ore reserves be prepared in compliance with the Joint Ore Reserves Committee (JORC) Code (www.jorc.org), which in turn requires that the reports are prepared by a “competent person,” e.g., a Chartered Geologist or Registered Professional Geoscientist.

New Zealand
Summarizing from information provided by Philip Robins (email, 2009), The Institute of Professional Engineers New Zealand (IPENZ) is authorized by an Act to charter its members. It both promotes and self-regulates the engineering profession. Geologists and engineering geologists may become members, but it charters only engineers. There is no general law or regulation requiring that charted persons be in responsible charge of all engineering work, but the Building Act of 2004 requires a CPEng for some specific tasks.

Republic of the Philippines
Republic Act No. 4209 regulates the practice of geology in the Philippines and provides for licensure in the Government Agency Model as the term is used here. In my reading of the Act, it does not include the common “industry exemption.”

CONCLUSIONS
The administration of the regulation of design profession practice takes different forms around the world. The general arrangement of the regulatory process, where implemented, varies according to the cultural norms of a country or group of countries as influenced by stakeholder groups. There are many variations on each regulatory theme. The principal differentiators of regulatory themes are

- The choice of regulation by
  a. a board housed in and supported by a government agency (either an integrated board or a semi-independent board),
  b. self-regulation by a quasi-independent authority created by the government (semi-privatized self-regulation), or
  c. voluntary self-regulation by a professional organization (consumer opt-in regulation),
- The level of autonomy formally granted to the regulatory authority by the government,
- The scope and intensity of governmental oversight.

CONCLUSIONS

The administration of the regulation of design profession practice takes different forms around the world. The general arrangement of the regulatory process, where implemented, varies according to the cultural norms of a country or group of countries as influenced by stakeholder groups. There are many variations on each regulatory theme. The principal differentiators of regulatory themes are

- The choice of regulation by
  a. a board housed in and supported by a government agency (either an integrated board or a semi-independent board),
  b. self-regulation by a quasi-independent authority created by the government (semi-privatized self-regulation), or
  c. voluntary self-regulation by a professional organization (consumer opt-in regulation),
- The level of autonomy formally granted to the regulatory authority by the government,
- The scope and intensity of governmental oversight.
and control exercised over the regulatory body,
- The exemptions from credentialing allowed for subordinates, academics, industry employees, government employees, and military personnel,
- The extent to which certain professional tasks or attestations/reports/documents are required by law, regulation, ordinance, or code to be performed by or under the responsible supervision of credentialed persons (licensees), and
- The use (or non-use) of written examinations on the technical subject matter of the profession being regulated, or on the law and code of ethics governing practice, as part of the credentialing process.

Of the examples of self-regulation presented here, licensure for engineers in Delaware, and licensure for engineers, geologists, and other design professionals in Canada, represents government-sanctioned regulation carried as far as reasonably possible into privatization, with the government retaining ultimate authority that links the self-regulatory body to the sovereign powers of the state and requires the self-regulatory organization to place the public interest foremost in all times and in all decisions.

In the United States, Delaware is the only state that has adopted semi-privatized self-regulation for a design profession, engineering. Small steps have been taken toward increasing licensure board autonomy for engineers in Oregon, and for geologists in Kansas, North Carolina, and Oregon. Although welcome, these steps are far from the semi-privatized self-regulation ideal.

It should again be emphasized that for semi-privatized self-regulation to work effectively in the public interest, the state must grant some of its police power to a single-purpose corporation, and must place a shield over the corporation by defending it against legal claims and suits through the office of the state Attorney-General. Without a commitment by the state to defend the self-regulatory corporation (and its directors, employees, and volunteers) against legal challenges, just as it defends all other regulatory boards, it would be very difficult to find qualified people to lead the self-regulatory organization or work for it. Without the duty and ability to exercise the sovereign power of the state, which is ultimately responsible for the well-being of its citizens, a self-regulating licensure board could not function effectively.

In the ultimate sense, the state must retain to right to control or terminate a self-regulatory board that it creates, and it must exercise some oversight of the board’s functioning to assure that the board is properly exercising the powers the state has granted it for the benefit of the public. Voluntary self-regulation (i.e., self-regulation by a professional organization with voluntary membership and without a state-imposed duty to regulate in the public interest) is not an effective mechanism to protect the public interest.

It is difficult to comprehend a compelling direct benefit to the public if design professional licensure were changed to a semi-privatized self-regulatory model in a state in the USA unless the system is sub-functional as a government agency operation. Equally, it is difficult to comprehend that the public would lose operational transparency or the opportunity to be heard or file a complaint, or receive less than satisfactory complaint resolution, by the adoption of a semi-privatized self-regulatory program consistent with the model described here. Benefits to the public and the profession could accrue from more efficient or more energetic administration of the licensure law under the semi-privatized plan. Efficiencies in board operations could be derived from less burdensome reporting than is typically required in a state bureaucracy, and of course from less time spent by the board members, staff, and volunteers in meeting legislative and administrative demands for compliance reporting, including sunset review reports. Thus, workload on the legislature and its staff, and the state administration, could also be reduced.

ACKNOWLEDGEMENTS

The following individuals kindly provided information, links, or perspectives from their respective positions: Ruth Allington, Board President, European Federation of Geologists; Fred Baynes, President, International Association for Engineering Geology and the Environment; Edmund Nickless, Executive Secretary of the Geological Society of London; Oliver Bonham, CEO of the Canadian Council of Professional Geoscientists; Felicity McGahan, Senior Coordinator, Marketing and Communications, The Australasian Institute of Mining and Metallurgy; and Philip Robins, Chair of the New Zealand Geotechnical Society. David M. Abbott, Jr., generously shared his world-wide knowledge of credentialing matters and offered helpful insights. Nonetheless, the author alone is responsible for any errors, misunderstandings, or other lacks in this article.

REFERENCES


Cleland, Noel, and Lemay, Marie, 2001, Canadian Council of Professional Engineers Brief on Bill C-11, Canadian Council of Professional Engineers, Ottawa, Canada, 16 p.

CLEAR [Council on Licensure, Enforcement, and Regulation], 2006a, Framework for Developing Consistent Descriptions of Regulatory Models -

Reprinted
This article was originally printed in AEG NEWS. March 2010 Vol.53, No1. AEG webpage www.aegweb.org. Permission to reprint this article from AEG and the author is much appreciated.
MEMBER’S PAST CONTRIBUTIONS


REGISTRATION OF ENGINEERING GEOLOGISTS

Dick Beetham, Cromwell

BACKGROUND

This issue has been around for many years now but was reactivated a few years ago, primarily by some Auckland based engineering geologists who were having trouble getting their reports accepted by local authorities, who required the reports to be certified by a Registered Engineer. At that stage some meetings of a sub-committee were held to talk through the issues and a low key approach was taken as it appeared that the Engineers Registration Act would be repealed and many changes were in the wind. The sub-committee felt that the time was ripe for Engineering Geologists to become affiliated with IPENZ, as IPENZ was proposing to formulate competency listings of which engineering geologists could be a separate listing. A questionnaire circulated in Geomechanics News elicited a fair response with the majority of respondents favouring affiliation of Engineering Geologists with IPENZ, should the option be available.

TRAINING

The requirements for training of a Professional Engineer are clearly set out by IPENZ (Handbook No. 2, 1990). There are basic academic and practical training requirements listed in this document, with a basic minimum requirement of engineering education to degree level (Appendix 1), and a list of acceptable degrees (Annex A). It is apparent that most Engineering Geologists do not meet these basic requirements of academic training.

Although Honours or MSc Engineering Geology graduates have academic qualifications equivalent to Engineers and therefore should be regarded as being of equal professional status, their basic academic training is in Geology and not Engineering. An Honours or MSc level Engineering Geology Graduate from N.Z. will typically have 3 years training in geology to achieve a BSc. After this the graduate Engineering Geologist will be required to take about eight papers, several of which will be in soil mechanics, rock mechanics and applied geology. The soil mechanics paper is identical to that taken by civil engineering undergraduates at second pro. level; while rock mechanics and engineering geology papers are equivalent to those taken by 2nd and 3rd pro. civil undergraduates. Thus an Engineering Geology graduate, in 4 years of study, undertakes approximately 3 papers which are equivalent to those taken in a 4 year civil engineering course. The engineering geology graduate has no training in design, an important basic requirement of the engineering curriculum.

Because of these basic differences in academic training, there is little likelihood that the IPENZ Council could recognise an MSc Engineering Geology graduate as having received an Engineering training equivalent to a BE or Bachelor of Technology (Massey). It follows that Engineering Geologists would be unable to qualify as engineering graduates as set out by IPENZ regulations and rules which are tied to the Engineers Registration Act (1924), and would be unable to become Registered Engineers, except perhaps by:-
(i) The mature candidate route to corporate membership (Annex C)

or

(ii) Assessment of engineers whose academic qualifications are in science (Annex D)

Other Options

If Engineering Geologists are unable to become Registered Engineers through their basic training, but they still wish to be affiliated to IPENZ, then there is the option of two IPENZ membership classes:

(1) Companion (Comp IPENZ)

or

(2) Associate (Assoc. IPENZ)

There remains the possibility that IPENZ will still formulate and publish lists of competence in the various fields of engineering. In this case they may be able to be persuaded, through the Geomechanics Society, to include a listing of "competent" Engineering Geologists. It may be that the Geomechanics Society will be required to take over the vetting role for deciding competence.