Global Mobility for Engineering Professionals

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The Issue from the Consulting Perspective

Let me start by talking about the needs of the consulting engineering industry in Canada and in the rest of the world. In addition to being the President of FIDIC (the International Federation of Consulting Engineers) I should also point out that the company I work for, Golder Associates, has more than 6000 staff with permanent operations in 24 countries and project level activities in a typical year in at least 50 others so I have had reasonable exposure to the industry in a variety of countries.

In Canada more than 88,000 people earn their livelihood directly in the business of consulting engineering. The gross revenues of consulting engineering firms that are members of the Canadian national association (ACEC – Association of Canadian Engineering Companies) contribute in excess of $13.8 billion to the Canadian economy annually. Most firms are privately owned enterprises, operating at the community level and employing fewer than 25 people. The industry also includes large integrated firms offering a wide range of professional and business services. Golder Associates, with about 3000 staff in Canada is one of the largest 5 firms in the country.

In Canada the industry is booming (national average revenue growth 13.6%) although there are signs that in at least Ontario and Quebec the demand may have reached a plateau. The industry's clients have significant amounts of project work to be carried out and this in turn has lead to rapid growth in the industry for almost a decade (over 10 years the staff levels are up 44%). Salaries are escalating rapidly and there is an acute shortage of graduates in many areas of the country to feed the need for staff. On a broader basis than the consulting industry, in a recent Conference Board of Canada report "Compensation Planning Outlook 2008", 26% of respondent firms indicated that engineering jobs were most difficult to fill and to retain.

Conclusion: Improving the global mobility of engineers would be a significant contribution to the consulting engineering industry in Canada in its current situation.

The Requirement for Registration

Some portion of this need requires professionally registered engineers, some simply requires appropriately trained engineers as not all of the work that the industry carries out requires professional registration. In broad terms, any project output going to construction requires documents and drawings signed by registered engineers, items going to regulatory bodies preferably would be signed by registered engineers but it is not

always required, and work on studies and other activities usually does not require signature by a registered professional.

There is also an age/experience cutoff on the demand for registered professionals. Our company uses a level system first promulgated by PEO (Professional Engineers Ontario) in which level 1 and 2 are engineer in training levels and level 3 is the first level of fully qualified staff. Generally, for our business, the lack of suitable registration would first become a problem at the onset of level 4 – about 8 years after graduation – the first level at which we expect that all of our engineers have the capability of signing and sealing appropriate documents. Although we might promote an engineer to level 4 who does not have this capability, there would have to be exceptional circumstances for us to do so because that person's role could not be effectively carried out without registration and the company would have to devote extra resources to completing projects with such an individual.

This implies that to qualify for employment as an engineer working in a department that produced documents for construction or for regulatory approvals, our company could hire a non-registered engineer up to about the age of 30 but that the subsequent career of that individual would be stifled by any inability to become registered thereafter.

As can be seen, the proportion of registered engineers required in the company is difficult to assess because it is dependent on the nature of the work that the firms carry out and the age and experience distribution of the staff.

Conclusion: The registration or licensing process is a key part of the consulting engineering industry in this country and any attempt to improve global mobility for engineering professionals needs to include an effective registration process for professionals trained outside the country.

Attraction of Registration for the Firm

Aside from the ultimate requirement for registration, from the industry perspective, in a perfect world all engineers employed by a company would be registered because that would provide the company with the maximum amount of flexibility in carrying out its work. It also would provide the company with a degree of certainty about the capabilities of new hires.

There are three key issues that are addressed by registration

- certification of technical knowledge (at least at the point of final graduation from the engineering school in question)
- knowledge of industry ethics, laws, regulations, and
- certification of some level of practical experience in applied engineering.

It is appropriate to ask how a company would address these issues in the absence of registration, because there may be clues in the answer to this question about how global mobility could be achieved.

Of the three, uncertainty in the level of practice is the easiest to deal with because the process of following up with references is straightforward. In addition, no new employee should be left to operate entirely on his/her own in the early days of joining a company in our industry. It should be said however that when the company is desperate to deal with a huge workload, errors can occur and persist longer than would otherwise be the case so the omission of an appropriate background check could be very expensive for a company in terms of rework required on efforts that were not up to standard. In the absence of an appropriate quality control procedure the consequences could of course be much worse.

Conclusion: The previous experience component could be dealt with by having a detailed signed statement of previous experience of duration 4 years as per Canadian requirements attested to by the engineering supervisor under whom the experience was received. This would be backed up by 6 months experience under a PEng in the employing company if the original supervisor was not himself a registered professional engineer in the country of origin.

The knowledge of law, ethics and regulation is a critical component of registration and any engineer hired by a consulting firm in this country is expected to be knowledgeable in this subject before being allowed to sign documents or act in an independent business capacity on behalf of the company. This should be learned in Canada and subject to satisfactory examination performance (the professional practice examination) in exactly the same manner as a Canadian graduate engineer earns this knowledge and capability. To facilitate this training for an immigrant it should be offered in the form of a part time course perhaps carried out through weekend or evening study with total duration including examination of no more than one calendar year.

Conclusion: Standards of business practice and law vary enormously around the world so it is important that an immigrant engineer learn local practice in exactly the same way that local graduates learn it.

The most difficult of the conditions of registration is the issue of a comprehensive and comparable training in the engineering sciences. There are a large number of excellent engineering schools around the world – but unfortunately there are also a number of very poor ones, and the product of the latter is a very poorly equipped engineer. Agreements such as the Washington Accord try to give parity to countries which have the same sort of accreditation process for their engineering schools that we have in Canada, but there are a very large number of countries that do not follow such a process. In that event the standard approach to registration is to write examinations in the various subjects required

for an engineering education and the process is very time consuming and deters many who came to Canada from another country from getting their registration.

In the event that a consulting firm hired an individual who did not have Canadian registration, they would be placed in a group managed by a registered P Eng and given assignments of increasing complexity to demonstrate to the group leader that they had the necessary expertise to function within the group. The assignments would depend on the nature of the project work that the group was carrying out but it would not take very long to determine whether the individual had the necessary technical skills – in effect it would be a sort of on the job assessment/examination.

There are two problems with this approach – firstly it involves more comprehensive checking of work output than would otherwise be necessary, and secondly the project execution would be slowed down (would cost more) and there would be a higher risk of expensive rework. In addition the engineer under surveillance would have to operate at a lower level and probably at a lower pay scale than their experience might otherwise suggest. In addition, even after demonstrating capability in a particular type of work, there would be no guarantee that equal competence could be expected in another associated area of expertise.

Conclusion: In reviewing this situation there only appears to be three longer term solutions to the problem of accreditation of education: -

1. *the current process of examination*
2. *a very limited (narrow) form of PEng in those areas in which the candidate has demonstrated competence to a supervisory PEng or*
3. *the EIEAP (Engineering International – Educational Assessment Program) extended into the international arena. While the EIEAP represents a significant forward step in speeding up and customizing the educational component of engineering registration, its files and experience over time could become a significant resource in their own right to an international forum for carrying out the same type of service on a multicountry-multidirectional basis. The information on educational institutions would also be invaluable for private industry and in particular the consulting industry in trying to assess applications for employment.*

Conclusions

This review relates the process of professional registration in Canada to the requirements of the consulting industry in this country and suggests ways in which the process might be streamlined. The opinions expressed are solely those of the author