

# **WFEO**

## **Mobility of Engineering Professionals**

### **Information paper on mobility prepared for WFEO Standing Committee on Education and Training (CET)**

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## Summary

WFEO in its pre-eminent position in the engineering profession has a key role to play in the formation and assessment of engineers around the world. Representing its members to major international agencies, it is ideally placed to facilitate exchanges between:

1. the organisations that set the engineering-education standards for accreditation and the assessment of professional competence
2. the employers of engineers and users of engineering products and services and
3. other organisations affected by the quality and number of professional engineers.

WFEO members need to understand the standards (quality marks) and the assessment (benchmarking) of engineers, which is not easy. But it is necessary in order to establish a WFEO policy and determine WFEO's best role.

This paper is about what engineering mobility means. It goes on to talk about what sort of position WFEO might adopt taking account of its opportunities, responsibilities and resources. The action taken by the Committee on Education and Training (CET) is listed and the importance to other standing committees is introduced.

Acting as a central information source and facilitator between international organisations, WFEO would be a major contributor to accreditation and mobility and take a significant step towards achieving its goals.

### 1. What is engineering mobility?

The phrases engineering mobility or the mobility of engineers are not well understood. Engineering mobility has tended to be regarded as engineers moving around the world getting involved in engineering tasks. We are really talking about international benchmarking which helps engineers change employment, change country of residence and access restricted work in new jurisdictions. Benchmarking also lowers an employer's risk in hiring engineers.

During the last decade permanent migration has increased as a result of the global skills shortage. Migration mobility can be regarded as a sub-set of engineering mobility; so much of what I am going to say applies to both. I will talk about engineering mobility first and then make some specific remarks about migration.

Engineering mobility describes the movement of engineers providing engineering services and making engineering products around the world. The engineers are usually working in a different jurisdiction to the one in which they were qualified and acquired professional standing. Not all of this work is regulated but the standards I am talking about are just as desirable in non-regulated engineering work.

Engineering mobility involves mutual recognition of standards by regulatory authorities in different countries, that:

1. can lead to the regulation and registration of engineers

2. enables engineers to practice in restricted areas of engineering outside their own countries and
3. enables governments and users of engineering products and services to have confidence in engineers coming into their country
4. facilitates the migration of engineers.

These arrangements may be bi-lateral or multi-lateral and are a form of quality control. Good engineering education and training underpins the mobility of engineering professionals. Engineers operating international accreditation and mobility systems think that, numerically, migration mobility may have overtaken traditional regulated mobility. Statistics are very difficult to obtain because migrant engineers may do regulated or non-regulated engineering work.

WFEO has an interest in all aspects of engineering mobility but migration mobility is particularly important to WFEO members and its stakeholder agencies. I will say more about this further in this paper.

WFEO has to have a role in fostering and helping this important global activity.

## **2. Why?**

WFEO urgently needs a formal position on engineering mobility to inform its members and their engineers, to achieve its goals and as part of its activities representing the profession to world bodies.

WFEO has a key role to play facilitating links and relationships between accreditation and mobility organisations and key international stakeholders. WFEO can also promote cooperation and harmonisation between new and emerging bodies to maximise the benefits and opportunities of mobility and help to alleviate any disadvantage.

Mobility affects all our member organisations and particular standing committees such as Education and Training, Capacity Building and Anti-Corruption.

WFEO can make a major contribution by:

1. collecting, sharing and displaying information and ideas
2. offering a “shop window” for members (and individual engineers) about what is available to them in their region and circumstances
3. networking with key stakeholders
4. brokering good relationships among accreditation and mobility organizations and encouraging good practice among WFEO members
5. facilitating member involvement in mentoring and training
6. offering templates for Codes of Ethics and Practice and perhaps engineers’ Attributes.

## **3. The main reasons for acquiring professional engineering standing.**

1. to become registered and capable of doing particular engineering work, which is often covered by legislation. The main reasons for regulation via registration are

where the engineering work affects public safety or where the recipient of the engineering work has little or no engineering knowledge. The latter reason is common to many professions and is sometimes called Asymmetry of Knowledge — the client knows much less than the professional and needs protection.

2. to do any work requiring an engineer in those countries where the title “engineer” in legally protected.
3. to use it in an immigration application for which an internationally recognised degree may be a pre-requisite for engineering work.
4. when individual engineers want the personal satisfaction of knowing they have achieved a certain standard. They also avoid having to assert their competence or having to justify it with each new employer or client.
5. companies want to measure their engineers in an independent system.
6. governments and companies can satisfy themselves that companies have the appropriate intellectual capital and human resources to complete engineering projects.
7. development and funding agencies can satisfy themselves that the engineering-human-resource risk of funding engineering projects is acceptable.
8. professional standing includes a commitment to practice ethically and competently.

I have placed Migration at No. 3 because of its recently increased importance. I make no judgement about the origin or destination of migrant engineers but the topic is clearly of importance to WFEO and its members and stakeholders. The topic also has economic as well as engineering and other ramifications

#### **4. What is needed to become mobile?**

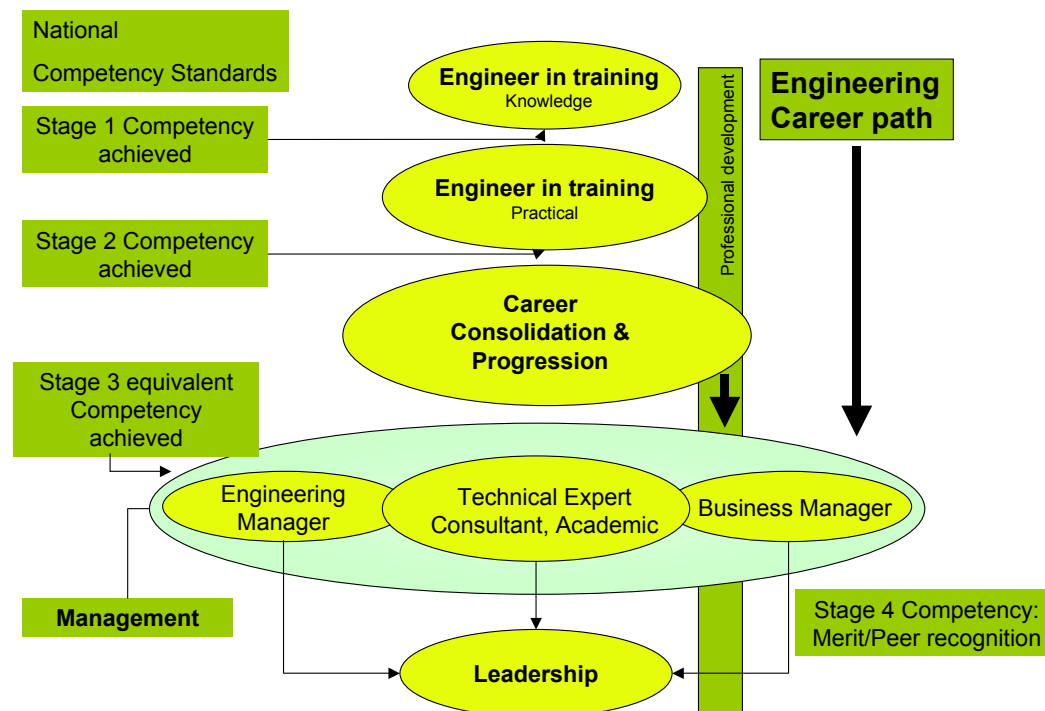
Engineers demonstrate that they have reached the professional level by being assessed by a recognised authority. Within their own country this usually done by:

1. the government — called simply “Regulation”
2. their national engineering organisation — called “Self-regulation” or
3. by the government and the national engineering organisation together — called “Co-regulation”.

The outcome involves some form of individual recognition for the engineer such as post-nominals and a public register that can be consulted by clients, employers and other interested parties.

Similar arrangements are available internationally through agreements between governments or national engineering organisations. Quality control of courses, training and experience is applied through these arrangements. I describe international agreements in Section 5.

Figure 1 below gives an example of the process of assessment and recognition in early career. It also shows stages in mid-career and later.



**Figure 1. An example of career development and assessment in 4 stages**

To work internationally in a regulated environment engineers need a:

1. recognised degree
2. period of formation and training
3. demonstrated competence as a mature and independent practitioner
4. commitment to work ethically
5. commitment to maintain the competencies required in their area of practice and
6. commitment not to work outside their area of expertise.

A good engineering education can be acquired in a number of ways, but the most common route is by graduating from an accredited engineering degree course.

Following graduation engineers must learn to apply their academic knowledge in an engineering setting. A graduate development program in an engineering company is often the best way to do this. A recognised program will cover a suitable range of documented training and reports, leading to formal assessment of professional standing. A structured program is also the quickest and the most efficient path to professional standing.

Engineers who have been successfully assessed by a recognised body to be competent and capable of independent practice may call themselves a professional engineer and use a post nominal such as P Eng. — sometimes referred to as a quality mark.

In the engineering profession, with few exceptions, engineering graduates are not professional engineers. They are people with an engineering degree who may be working towards professional standing. They are unlikely to be recognised in legislation or by regulators as competent professional engineers.

Engineers who have not been formally assessed may still be competent. However, they are likely to have to demonstrate that competence whenever the matter is raised formally.

Governments assessing migration applicants are finding recognised qualifications and quality marks very useful. For example, in New Zealand a Washington Accord degree is an immigration requirement for entry with maximum job points.

## **5. Who is involved in creating and assessing standards internationally**

### ***Accreditation***

The International Engineering Alliance (IEA) globally and the European Federation of National Engineering Associations (FEANI), with the European Network for Accreditation of Engineering Education (ENAE), which is the body responsible for operating the Accreditation of European Engineering Programs (EUR-ACE) Framework in Europe and neighbouring countries are the major organisations leading the way on accreditation and mobility at the moment. These are examples of multi-lateral agreements. Both IEA and FEANI have been involved for many years.

The present measure of an internationally acceptable qualification for engineers is the standard set by IEA's Washington Accord (WA) accredited degree. European Education Ministers will fully implement the Bologna Declaration about university degrees, including engineering, by 2010. Good signs of cooperation between ENAE and the IEA education accords are welcomed.

A group of non-EU members have also expressed interest in joining the EU degree accreditation process.

A number of other, regional, organisations have an emerging interest in accreditation. Some are moving towards a system that will produce degrees to the Washington Accord standard.

Other countries are also discussing the possibility of a different standard, which is sufficient to meet regional requirements. Some of the bigger countries with perhaps a thousand universities are mindful of the difficulty of achieving general quality control. They may start with a proportion of their universities and decide later how far they will extend the process.

The Pan American Federation of Engineering Associations (UPARDI) and the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) are moving into the field of accreditation.

The Washington Accord has rules to allow a signatory to accredit a neighbouring country's engineering courses under special circumstances. The rules apply to a country that has only a small number of universities and is unlikely to be able to establish an accreditation system for many years. A university that can demonstrate the international standing of its engineering courses may be accredited by the Washington Accord signatory and the courses listed on the signatory's website as being of Washington Accord standard.

This arrangement is of particular interest to WFEO and its stakeholders. The arrangement should not be confused with mentoring help given by Washington Accord signatories to countries working towards becoming a signatory themselves.

IEA also has accords for Engineering Technologists and Engineering Technicians.

### ***Mobility***

The arrangements for mobility present a similar picture. The Engineers Mobility Forum (EMF), which is a non-government arrangement, and the Organisation for Asia Pacific Economic Cooperation (APEC) Engineer forum is part of the IEA. The member governments of APEC back the APEC Engineer.

IEA also has forum for Engineering Technologists

In Europe FEANI operates its own European Register (EurIng). Within the EU the competent authorities of the Member States administer the legal mobility arrangements.

It is worth noting that the main thrust of accreditation and mobility movements is to produce engineers to work internationally. Little if any evidence is available, but those involved think that only about 20% of engineering work internationally requires registered engineers. Data will be sought in the WFEO mobility project to get a better understanding of the proportion.

Details of the organisations I have mentioned can be obtained from their websites, listed in the bibliography.

Multi-lateral recognition agreements don't yet permit complete freedom of mobility. Reliance on bi-lateral mutual recognition agreements will therefore remain for a number of years until the special requirements of individual countries are minimised or removed. Mutual recognition agreements also help engineers seeking non-regulated engineering work even in a regulated environment.

## **6. Who is affected beyond the profession and related Standing Technical Committees?**

A number of international agencies and organisations have an interest in the mobility of engineers.

These include the United Nations, UNESCO, the World Trade Organisation (WTO), Development Banks, Transparency International, and all levels of government, which might register engineers or use engineering services.

The International Federation of Consulting Engineers (FIDIC) is a worth a separate mention. Like WFEO, FIDIC has a major interest in the activities of the accreditation and mobility organisations and the promotion of their work. It is already cooperating with WFEO on Anti-Corruption and is likely to be an enthusiastic partner in the representation and information dissemination role being proposed.

## **7. What can WFEO do?**

WFEO can use its information systems and its channels of communication to provide information on mobility.



It could:

1. act as a single comprehensive information resource with contact details, on what its members and the accreditation and mobility organisations are doing on this topic regionally and globally.
2. offer a neutral forum for exchanges between different participants in accreditation and mobility practice and standards setting e.g. conferences, forums between providers of accreditation and mobility registers and users.
3. facilitate the provision of help (mentoring, training and possibly even document translations) needed by members wanting to develop their own engineers and ensure the quality of engineering services they require.
4. include mobility in its role of representing the profession to international agencies.
5. offer commentary on the skill levels needed in a generic sense as we do with the Code of Ethics.
6. help with maintaining standards affecting safety, professional practice and probity.
7. monitor changes over time.

With its limited financial and human resources — its weaknesses — WFEO must build on its strengths. These are largely its member network and its good relationships with international agencies. It would be a wasteful duplication if WFEO tried to get into the business of accreditation and assessment. It is unlikely that WFEO could find the necessary funds. WFEO could not expect to use the expertise of its members because that expertise would already be committed to the existing mobility organisations.

## **8. What CET is doing?**

1. The Committee for Education and Training has discussed the topic and put it on the committee's strategic list.
2. The educational and training aspect of mobility fits within CET's terms of reference and there is a clear need to develop a position and prepare advice for the Executive Council. A working group of CET members has been established. Additional members including those with knowledge of regional activities are being sought.
3. CET has adopted a future scenario, which includes mobility of engineers, and a paper on accreditation and mobility has been submitted for inclusion in the WFEO/UNESCO Engineering Report.
4. Presentations will be made at the UPARDI/CCB meeting and the Students' and Young Engineers' Forum, both at WEC 2008.
5. The Committee on Capacity Building has been invited to propose members for the CET working group and a similar invitation will be extended to the Committee on Anti-Corruption.
6. The plan is to seek information on involvement and needs from WFEO members so that information pages can be included on the WFEO website and a policy statement can be recommended.

7. Cooperation with accreditation and mobility organisations is being sought.

8. A draft WFEO accreditation and mobility policy is being prepared.

9. Web page format and content will be discussed in Brasilia.

As well as the reporting mentioned above a progress report will be made to the Executive Council in Brasilia in 2008 and the policy proposal discussed in time for the General Assembly in 2009.

## **9. Future Developments**

In the short term WFEO must concentrate on establishing its policy and the information process for its stakeholders.

The next step would be to help members, who want to establish accreditation systems and standards for mobility, to liaise with organisations that might work with them. Establishing their systems includes adapting to:

1. output based education and training
2. competency based assessment and
3. longer emerging course structures, e.g. 3 + 2 in Europe and elsewhere.

The step would also involve encouraging international agencies to, firstly, recognise the standards and mobility organisations and then work with them to assist WFEO member countries to meet their needs.

Developing countries may need particular help in arranging contracts and monitoring incoming professional engineers and the provision of engineering products and services including building infrastructure.

The present educational standards focus on first degrees and the level of competence needed for independent practice, mainly at the beginning of an engineer's career.

A third step might look at:

1. a whole-of-career approach to education and training (see Figure 1.)
2. education and competencies for senior engineers and
3. suitable arrangements for engineering managers.

There is a related global demand for engineering technologist and possibly engineering technicians. The paper uses engineers as an example but the paper also applies to technologists and technicians where appropriate systems are available.

## **10. Conclusions**

WFEO is vitally concerned with the qualifications and training of members of the profession to enable engineers to maximise their contribution to national and international engineering activities.

A WFEO contribution to the availability of competent engineers around the world and ensuring a proper understanding of the profession by non-engineering stakeholders would have a significant impact on achieving our goals.

Adopting a key central facilitation role and showcasing the work of long-standing and new accreditation and mobility organisations would make best use of WFEO's widespread but limited resources.

## **11. Bibliography and glossary**

WFEO/UNESCO Engineering Report —section on mobility

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## **12. Acknowledgements**

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