

## **Mobility of Engineering Professionals — What have we achieved Globally**

**I'm going to talk about three main things strongly linked to the theme of this conference:**

1. The World Federation and its role in engineering education and training and societies needs
2. Life-long-learning or whole-of-career education and training and where we have got to — a sort of score card, and
3. What we need to do from now on

## **World Federation of Engineering Organisations (WFEO)**

Opening Slide 1 **The Engineering World**

### **Introduction**

**WFEO has about 80 national members covering about 16 million engineers. We facilitate our members' activities and their involvement in WFEO and we represent them at the global level, to agencies such as the UN and UNESCO, WTO, OECD, World Bank etc.**

### **WFEO's Vision is:**

**WFEO is the internationally recognized and chosen leader of the engineering profession.**

**WFEO cooperates with national and other international professional institutions as the lead profession in developing and applying engineering to constructively resolve international and national issues for the benefit of humanity.**

**Our Mission is paraphrased in Slide 2 .**

**Five of the nine activities in our mission are particularly related to mobility of engineering professionals for example:**

- 1. To represent the engineering profession internationally, ... to assist national agencies .... and address the most critical issues affecting nations of the world.**
- 2. To enhance the practice of engineering.**
- 3. To make engineering information available to countries of the world, facilitating communication of world's best ... to WFEO Members.**
- 4. To foster socio-economic security and sustainable development and poverty alleviation among all countries of the world, through the proper application of technology.**
- 5. To cooperate with Funding Agencies such as development banks**

## **Standing Committees — our STCs**

WFEO has ten standing committees that are the foundation of WFEO's technical activity, made possible by the involvement of technical experts from our various members.

The Standing Committee on Education in Engineering (CEIE) has a Working Group on The Mobility of Engineering Professionals.

## **The Mobility of Engineering Professionals**

WFEO is very interested in the Mobility of Professional engineers because we see it as part of our mission.

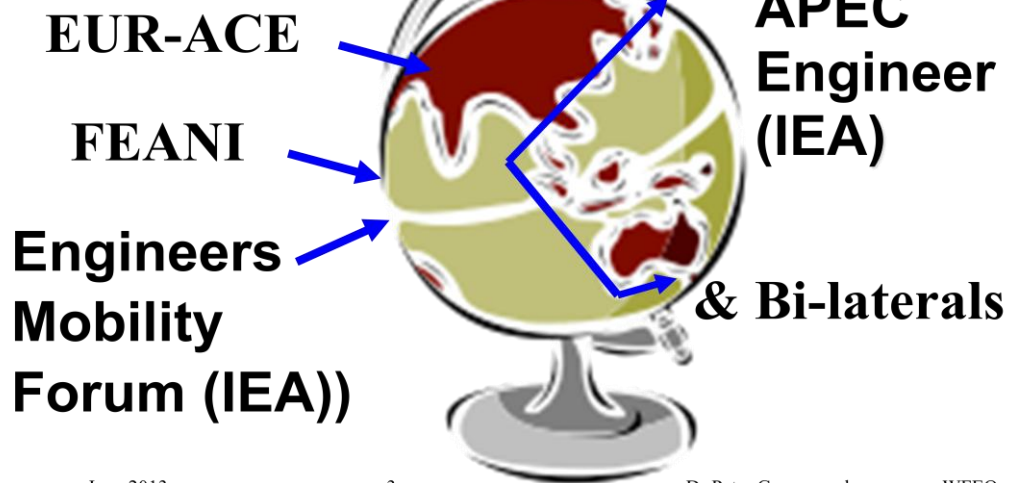
WFEO believes that as far as possible all engineers should have a recognised degree and be recognised by some accepted organisation as competent experienced engineers capable of independent practice.

To do this we have cooperation agreements with the International Engineering Alliance, Eur-Ace and FEANI, which is also a member of WFEO. These organisations have multi-lateral agreements, which are supplemented by bi-lateral agreements between individual nations.

Our partners are shown in Slide 3 .

## Global Activity

### Washington Accord (IEA)



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Dr Peter Greenwood

WFEO

We also have a policy on Mobility which shown in Slide 4.

### **WFEO POLICY ON MOBILITY**

**WFEO believes in generic attributes for graduate and competent engineers ...**

**Recognises the role of the world's accreditation and mobility organisations ...and**

**Pledges to support their activities to maintain ... qualifications and professional standards.**

**WFEO will encourage the recognition of graduate attributes and professional competencies for engineers by the United Nations, governments and**

**Other international agencies involved in the provision of engineering goods and services.**

**WFEO will provide a source of information for all stakeholders in the competent, ethical practice of engineering and**

**Facilitate exchanges between people and organisations involved in engineering activity.**

## **There are two key outcomes from the policy:**

1. WFEO will cooperate with international and regional agencies involved in accreditation and assessment by showcasing their activities and facilitating our members' involvement, and
2. WFEO will publicise the work of our cooperating agencies in our representation role through our contacts with other global organisations.

The policy is based on a position paper and a more recent information paper which can be down loaded from our website.

These documents were prepared by the CEIE Working Group.

We also have a Model Code of Ethics, which was prepared by the STC on Anti-Corruption (CAC).

In our future work we will encourage and facilitate our national members in Africa, the Middle East and Southern South America in their efforts to participate in international or regional accreditation and assessment activities.

## **Registration or Certification**

WFEO, among others, thinks that only about 20% of engineering work around the world is done by engineers needing registration or some sort of certification.

The other 80% may not be in a position to benefit from the attributes and competencies of the formal system.

However, there are a number of other reasons why engineers, employers and governments may be interested in engineers having a recognised professional

standing. There are 12 reasons in the WFEO paper, mentioned above. Most of the reasons are different to the need to be regulated but are very important to individuals, employers of engineers and the providers of engineering products and services. Slides 6 & 7

**List of reasons why engineers want to achieve recognised professional standing, nationally or internationally Slide 6**

1. To become registered and capable of doing particular engineering work, which is often covered by legislation.
2. To do any work requiring an engineer in those countries where the title “engineer” is legally protected.
3. To use it in an immigration application.
4. Individual engineers want the personal satisfaction of knowing they have achieved a certain standard.
5. Companies want to measure their engineers in an independent system.
6. Governments know companies have the intellectual capital and people to complete engineering projects.

Slide 7 continuation

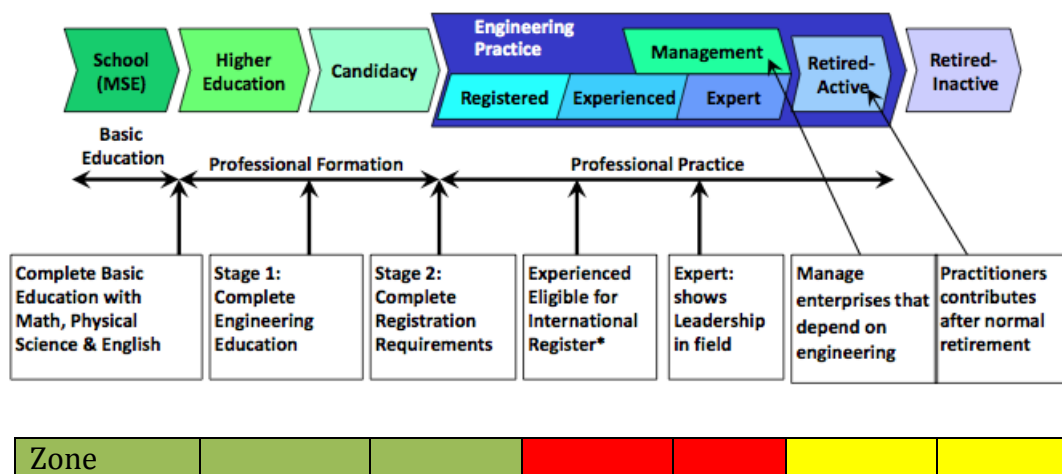
7. Development and funding agencies can satisfy themselves that the engineering-human-resource risk is acceptable.
8. Professional standing includes a commitment to practice ethically and competently.
9. Managers, banks and insurance companies want to reduce engineering risk.
10. Specific skills are identified more clearly than the engineer’s qualification title or main discipline.
11. To work in disaster relief.
12. Work in certain industries like nuclear power engineering that are becoming more regulated.

## WFEO also believes in Life long learning and Continuing Professional Development.

My first point by way of introduction is: Life-long-learning is critical to the success of the engineering sector and we as providers must continue to provide LLL and CPD throughout an engineer's career.

These points and LLL/CPD are vitally important to the mobility of professional engineers. The best illustration of this I am aware of — and the latest over the years — is shown in [Slide 5](#), courtesy of Hu Hanrahan, Chair of the Washington Accord.

### Engineering Practitioner Career



(Diagram courtesy of Prof. Huw Hanrahan, ECSA)

An interesting aspect of this slide, adapted from the original, is the place for active and inactive retired engineers.

Retired active engineers are a valuable, but often ignored, part of the work force when engineers are in short supply.



And, we forget inactive retired engineers at our peril. They are still interested in engineering, they still inspire young engineers and can come back to haunt us if we ignore them and make mistakes.

Active and inactive engineers are also valuable to WFEO and other learned societies — the profession — for their participation in governance and technical roles.

## Scorecard

So how do we as a profession score our performance on the whole-of-life scale for developing good engineers?

### Green Zone Now:

In the green zone, the performance is pretty good. Stage 1 has graduate attributes and two internationally recognised Accords (EUR-ACE and the Washington Accord) with moves by them to cooperate to remove differences. Their accreditation processes are not prescriptive, but participation does require a process that is:

**“substantially equivalent” to those of the other signatories and has been satisfactorily peer reviewed.**

Stage 2 is pretty well covered too. We have competencies, and two main internationally recognised agencies (with mutual recognition agreements), using the competencies to assess candidates for engineering registration (FEANI and the IEA). There are moves by the international agencies to cooperate on improvements and mutual recognition. As with international accreditation, the processes are based on “substantial equivalence” and peer review.

There is some assessment overlap related to International Registers, beyond Stage 2. It is also common with international registration to have bi-lateral agreements between jurisdictions to cater for special needs and requirements. There are a few regional and other initiatives in accreditation and assessment, including universities and regulatory approaches that most likely are “substantially equivalent” but which have yet to be peer assessed.

The international assessment of competency and ability to practice is well established. However, it is the first assessment of engineers after their education and training. It can therefore be considered as the assessment establishing the foundation of an engineer’s career, which might be in regulated or unregulated engineering work. In either case, it gives the engineers themselves a quality mark that they can carry during their careers provided they adhere to the CPD requirements and practice ethically and competently.

Some nations have competencies for specific areas of practice including academia, but they are not yet used widely and there are only a few examples of this.

Industry already has a role in the preparation of attributes and competencies, but there is room for a greater, more strategic and more structured contribution.

### **Green Zone Next:**

1. We need to encourage and help engineers working in the 80% unregulated area of engineering work.
2. We need more involvement and cooperation from the missing nations, and

3. We need to up-date the reasons for regulating, examine the work presently not regulated e.g. financial engineering and
4. We need to improve everyone's understanding of the meaning of regulation.

It is about:

- a. Public and work place safety and
- b. A level playing field in the delivery and receipt of engineering products and services (called Asymmetry of Knowledge). It is not about:
  - c. Restrictive trade practices or restraint of trade.
5. We need to consider whether, in codes of ethics for professional engineers or elsewhere, we should cover economic and environmental impacts. There may be more. And
6. We need to review the relationship between learned societies, universities and industry. Each part of the engineering sector must be involved in defining the future nature of engineering work, the qualifications and competencies needed and how to deliver training. We'll be lucky if the answers are right but at least they would give some conception of what might emerge.
7. When we have informed ourselves and reached some sort of consensus, we can make a start on informing governments and the general public. Do these two groups want detail they don't understand because engineers have lost their trust in what we do and the way that we do it?

### **Red Zone now:**

There are two main difficulties in the Red Zone. Firstly, the additional experience required to be on an international register probably only amounts to two years at the beginning of perhaps 40 years of professional practice. So it could be said to be part of Stage 2.

Some diagrams call “Professional Practice” Stage 3. It might even be divided further into Stages 4 and 5, which would cover the need for even greater engineering expertise and finally greater management expertise.

Secondly, the engineering practice stage is recognised mainly by engineers and employers doing the 20% of engineering work thought to require registration.

Only a small proportion of nations participate in the international multi-lateral agreements and the vast majority of engineers are not involved. That would include a significant proportion of the 16 million engineers alone represented WFEO National Members. Many of those engineers have no quality mark and would find it difficult to practice other than where they were assessed.

In addition, beyond the Registration category, the assessment processes do not yet include mid-career engineering or engineering-management competencies.

At this point in an engineer’s career, some are involved in advanced engineering work. They lead small specialist teams or manage projects of significant value.

Other engineers work as engineering middle managers and may also contribute to company management. The major proportion of engineers however will still be involved in mostly technical engineering work.

Higher degrees, advanced training and technically-orientated management degrees are all available to mid-career engineers. However there are no

corresponding competencies in the process so it may be that the advanced education and training is more suitable for the “Expert” rather than the “Experienced” category. The “Management” category deals with this by covering the later years of the “Experienced” category and the “Expert” category. Engineers involved at the highest levels may be involved in the biggest projects or activities in construction, manufacturing or research for example. In management they would be involved at the enterprise level and might require corporate governance training or qualifications.

### **Red Zone next**

Supposing that this is where some engineers start to exchange some engineering for some management in their work profile, new training and experience are needed. We need:

1. Recognition of the developing circumstances.
2. Appropriate attributes and competencies. Leading to different quality marks.
3. Appropriate CPD and assistance in maintaining competencies.
4. Industry inputs, more than ever, which should include sharing knowledge and experience with company Human Resource staff, preferably in a formal way.
5. New alliances with like organisations in other disciplines. And
6. To use this knowledge to anticipate changes in the nature of engineering work and the consequential changes in education and training.

### **Yellow Zone Now:**

The new, interesting part of this slide is the Yellow Zone for active and inactive retired engineers.

Why are retired active engineers a valuable paid addition to the work force when engineers are in short supply. At the end of their careers, their training and experience could include any aspect and level that I have discussed above.

Apart from doing engineering or engineering management work they are an invaluable source of mentors, again across the whole range of possible recipient engineers, particularly at senior levels. In fact they have been used as temporary replacements for senior staff, even CEOs, in certain circumstances. Many other examples are available, such as helping to get a start-up project off the ground.

Active and inactive retired engineers help WFEO and other learned societies in governance and technical roles. Some may want to do the same sort of work they did professionally but many are prepared to try new activities, given some modest training. They are also indispensable, and mostly unpaid contributors to the work of the accreditation and assessment agencies and the services that those agencies provide to their signatories.

### **Yellow Zone next:**

A lot of what I have said is breaking new ground as far as accreditation, registration and the work of learned societies are concerned. So we need to begin with:

1. Recognition of the situation
2. Consideration of how the engineering workforce and employers are affected and involved with what we might call Stages 3, 4 and 5
3. Flesh out the whole of career approach
4. Consider what education, training and experience might be needed

5. Consider how industry and employers can be involved, particularly training professionals within companies and
6. Offer mentoring and other training to facilitators.

**In Conclusion we must:**

1. Believe that cooperation is critical in the coming environment.
2. Bring key stakeholders together to share their knowledge and needs.
3. Start with past knowledge, experience and mistakes for what we need in the future.
4. Consider lifelong learning.
5. Regulate more appropriately.
6. Inform our “clients”.

WFEO In its belief that good professional engineers are vital to engineering activities and to society in general, looks forward to cooperating with like organizations to achieve these outcomes.

No matter how speedily we address these matters, we should have the big picture in front of us. Without the big picture, we may proceed from the little picture in the wrong direction.

## **WFEO's website**

**has the Mobility policy and 2 information papers in the CEIE archive.**

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[www.wfeo.net.org](http://www.wfeo.net.org) for policy, info paper and update

**Thank you**

Slide 9.