Recent Development at the International Engineering Alliance and within Asia

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Summary

The International Engineering Alliance aims to promote mobility of the profession via accords and agreements among members' economies. This harmonization effort enables mutual recognition of accredited educational programs, as well creates the framework for the establishment of a standard of competence for professional engineering and engineering technologists. As of now there are six agreements – three in education and three in professional competence standards. In recent years, the IEA has embarked upon the path aiming to meet the challenges of a changing landscape in education and professional competence. This brief paper aims to highlight some of recent development in IEA and particularly within the Washington Accord with an emphasis in Asia.

1. Introduction

The International Engineering Alliance (IEA) comprises of accreditation activities involving both engineering education and engineering professional competency[1]. The effort in engineering education comprises of agreements among various constituents and commenced in 1989. This was in response to the worldwide need to improve mobility of engineers by mutual recognition of qualifications and competence. Assurance of the qualification of an engineer or technologist to perform professional service in another land, or at home, can best be measured through his or her educational training, especially for a person who has entered the profession recently. On the other hand, activities involving professional competence within IEA serve to establish a set of qualifications beyond that of educational experience. These aspects of IEA form two key pillars of the Alliance to enable seamless assessment of the engineering training and professional competence.

Figure 1 illustrates the structure of the IEA. The three educational accords and three professional competence agreements form the core of all IEA activities. The Washington Accord serves the educational formation of engineers. The Sydney Accord provides the framework for engineering technologists. The Dublin Accord serves the engineering

technicians. The three accords operate separately in activities and decision making but with a strong coherence since they are similar in purpose and benefit much from each other's experience. The competence recognition consists of International Professional Engineers Agreement (IPEA), formally the Engineers Mobility Forum, serves the professional engineers. The APEC Engineers Agreement is open to any of the national professional engineering organisations from the 21 countries belonging to the Asia Pacific Economic Cooperation Agreement. APEC Engineers Agreement is therefore a regional agreement whereas the other Accords and Agreements are intended to be able to have worldwide coverage. The International Engineering Technologists Agreement, formerly the Engineering Technologists Mobility Forum, serves the engineering technologists community.

2. Recent Development in the International Engineering Alliance

As the IEA education agreement for engineers, the Washington Accord, turns 25 next year, the IEA has been re-examining its mission to ensure that its vision and activities are of sufficient scope to address future needs of engineering education and the profession as a whole. The newly adopted vision of IEA provides a sharper focus in alignment to its mission:

> *to develop and maintain authoritative, independent international standards for engineering education and competence and promote their wider recognition and adoption.*

This statement clearly states the focus is the continuous commitment to place international standard for engineering education and competence as the centrepiece of IEA's vision, which has not changed since its inception. What has changed, however, is the approval of the revised Graduate Attributes[2] in 2009 in response to global engineering need. The Graduate Attributes serves as a foundation for educational course design, accreditation and international benchmarking, as well as developing competencies for professional engineers, engineering technologists and engineering technicians. Currently, effort is being made to implement the exemplars of engineering education and competence standards among the accord signatories. All current signatories should complete this task before 2019.

The accreditation and competence standards and systems are regularly monitored among member countries to ensure consistency. This monitoring process includes a substantial component of on-site visit which has been conducted independently by each accord and agreement. One recent development is to commence monitoring of an organization belonging to multiple accords and/or agreements within a single site visit by a panel with experience in these multiple accords/agreements. One key motivation of this combined visit is to cut cost. Suitable stipulations are in place to safeguard effectiveness of the visit

without sacrificing the standard. This effort seems to best serve the combination involving Washington Accord and Sydney Accord, Washington Accord and International Professional Engineers Agreement, or Sydney Accord and Dublin Accord. The determining factor of what combination would be most beneficial depends largely on the involving of the organization to be monitored within the accords and agreements.

3. Recent Development in the Washington Accord

The Washington Accord was commenced in 1989 as an agreement among founding signatories to provide an agreement for mutual recognition of accredited educational programs for engineers. This agreement was based on substantial equivalent of accreditation criteria and procedures. In its current form, the criteria – the Graduate Attributes – is based on outcomes of graduate entering the profession and serves as a framework for signatories covering a vast diversity of international cultures and background to benchmark their educational program against. With this framework, each signatory then formulate its own set of standard applicable to the setting of the programs it serves. Prior to discussing recent development of the Accord, perhaps, it is instructive to provide a brief historical development.

Figure 1 illustrates graphically the development of the Washington Accord over the course of its past 24-year history. At its inception, 1989, the founding signatories (6 total) include United States, Canada, United Kingdom, Ireland, Australia and New Zealand. In the following ten years (1990-1999), Hong Kong and South Africa became signatories. It is noteworthy that Hong Kong – now Hong Kong, China, since 1997 – became the first Asian member of the Accord. In the following ten years (2000-2009), Japan, Singapore, Korea, Chinese Taipei (or Taiwan) and Malaysia joined as full signatories. It is significant that these fives signatories are all Asian economies and substantially expanded the Accord's breath in experience and knowledge of worldwide engineering education. Not including Japan, these five additions to the Accord together account for the majority of the economies in Asia. It was also a time of learning to appreciate each other's values and differences. In the subsequent four years (2010-2013), Turkey and Russia joined the Accord. Currently, provisional signatories (6 total) striving to become full signatory status include Bangladesh, China, India, Pakistan, Philippines and Sri Lanka (listed alphabetically). Together, these countries form an even more diversity in engineering education programs.

India, admitted as provisional signatory in 2007, has one of the largest engineering educational programs in the world. With approximately 1.5 million engineering graduates per year, it is likely to be more than China and the United States combined. The two-tier system currently in place provides some differentiation of programs. Tier 1 is mainly

composed on the IITs and the national universities. And it is this tier that will likely be submitted for consideration of mutual recognition within the Washington Accord.

China and Philippines recently joined the Accord as provisional signatories in June 2013. China as the world's second largest economy commenced pilot accreditation of engineering programs in 1994. After roughly 19 years of effort, China was successful in its endeavour of provisional status. With 4.52 million of four-year engineering students and 1.2 million engineering graduates per year, China has the potential to be major player in mobility of engineers worldwide. Total of 31 engineering disciplines demonstrates the breath of its educational programs. Philippines also had a long history of local accreditation, since 1957. Total of 583 higher educational institutions are offering more than 1600 engineering programs. Approximately 35,000 students graduate from engineering programs in 2011.

It is noteworthy that all countries associated with the Washington Accord have embraced outcomes-based accreditation criteria, which is the foundational element of the Graduate Attributes. Some of these countries have recently modified their criteria to embrace the outcomes-based approach enabling the Washington Accord to have the potential to serve graduates of accredited programs.

Does accreditation of educational programs really matter? Accreditation of engineering educational programs serves to provide quality assurance framework as foundational basis to practice the profession. Furthermore, with the effort of IEA, this framework can be fine-tuned, if needed, to ensure students will attain suitable outcomes for his/her future career. With the role of accreditation clear in mind, supporting evidence of the actual value of accreditation would be highly desirable, especially in this age of cost-conscientiousness. Effort is being commenced towards this end. This may involve substantial gathering of information to supporting various accreditation criteria. It is somewhat early to report concrete progress at this stage. However, results of this substantial endeavour should be invaluable and may even shed light on further fine-tuning of accreditation criteria and/or procedures, or might even on uncharted areas of the quality assurance exercise.

4. Concluding Remarks

The global need of mobility of engineers has shaped the IEA to serve as an international platform in promoting accreditation of engineering educational programs and professional competence. For over twenty years, this mission has guided IEA in formulation of the outcomes-based Graduate Attributes, substantially equivalent accreditation procedures and professional competence standards. Started in 1989 with western countries, the Washington Accord has seen steady growth over its almost 25-year history. Currently, the Accord

consists of 15 signatories and 6 provisional signatories covering many major countries worldwide, including essentially all major economies from Asia. This has no doubt aid in fostering the goal of mobility of engineers globally.

Challenges lie ahead for the Washington Accord. Countries with a large number of engineering students, e.g. India and China, seeking signatory statue will be a good learning experience to the Accord in handling vast diversity in engineering educational systems while upholding the standard. The review panel must be experienced to make a quality judgement with some understanding of the cultural context. Fortunately, the Accord is not new to this challenge benefiting from the experience of handling applications from Asian countries from 2000 to 2009. Taken together, experience in assessment of accreditation organizations globally, continuous fine-tuning of the Graduate Attributes to meet future demand for the engineering training and the profession, and many other areas of its operation should ensure effectiveness of the Washington Accord in the near future.

5. Acknowledgement

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References

1. The International Engineering Alliance website: http://www.ieagreements.org/
2. The Graduate Attributes and Professional Competencies – Version 3, 21 June 2013, http://www.ieagreements.com/GradProfiles.cfm

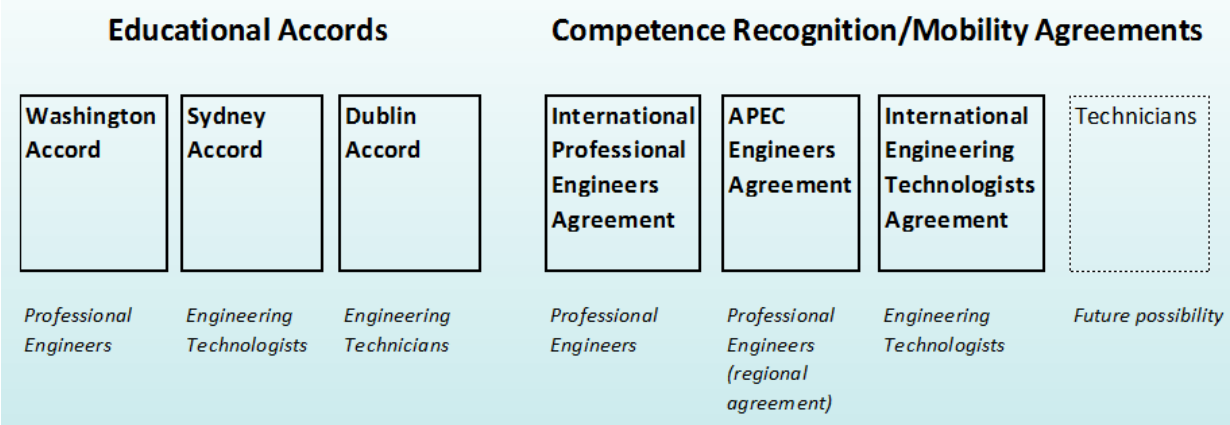

Figure 1. Structure of educational accords and professional competence agreements in the International Engineering Alliance. The three Accords and three Agreements form the core of all IEA activities.

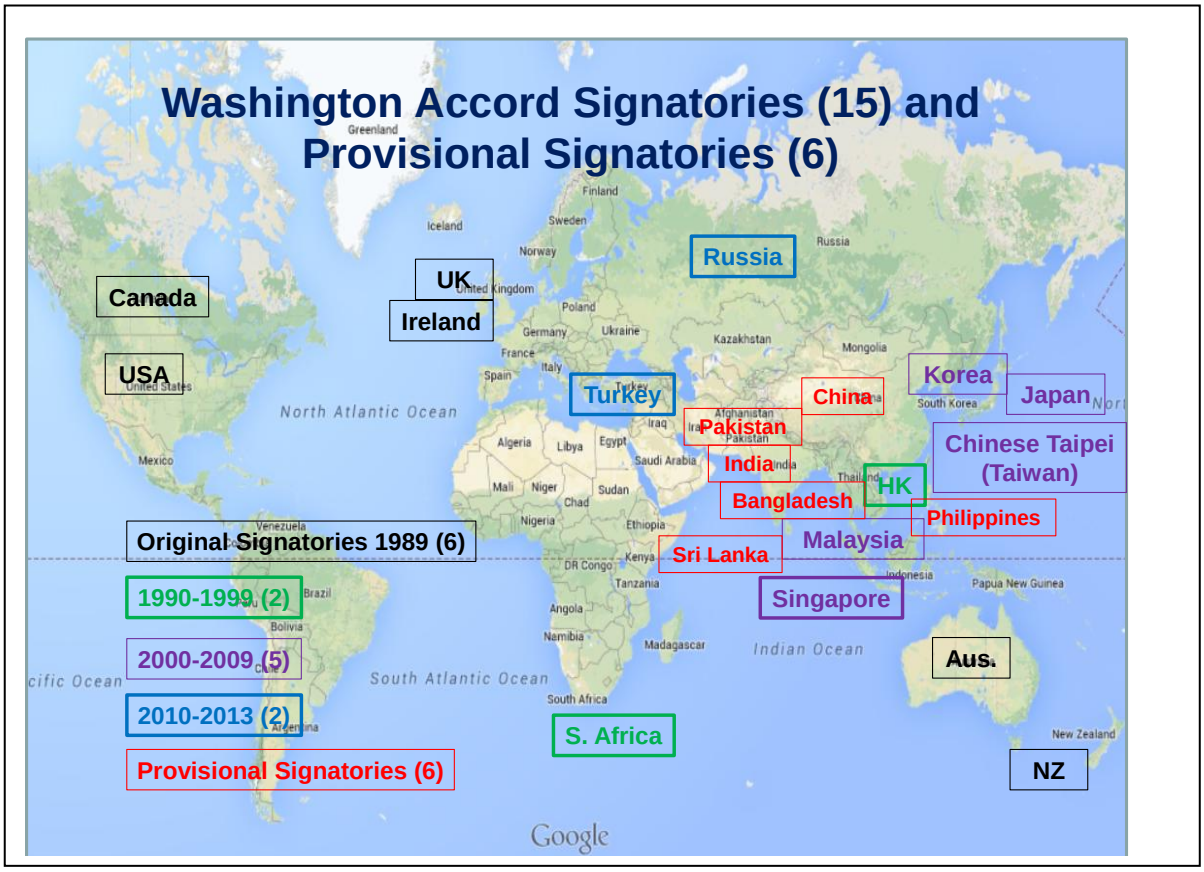

Figure 2. Historical entry of various economies admitted as signatories of the Washington Accord. The original six signatories (in black) were admitted in 1989. The next ten years (1990-1999) admitted two (in green). In the following ten years (2000-2009) five Asian signatories (in purple) joined the Accord. The next four years (2010-2013) accepted two more (in blue). Currently, six provisional signatories (in red) are seeking to advance to signatory status.