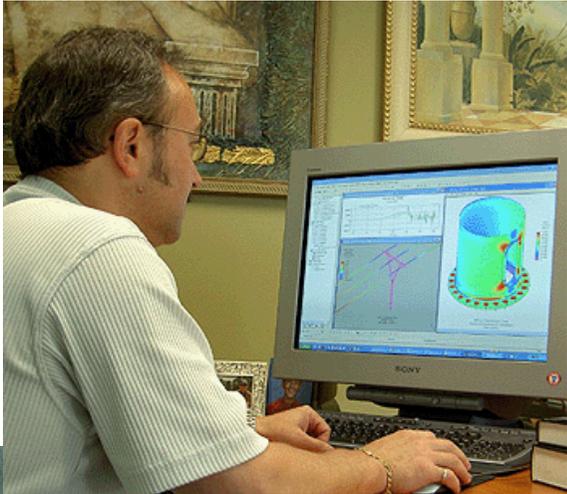


Quality Assurance in Professional Education

Dr. Yasuyuki Aoshima

Engineer

They are people who don't wish a problem away, but start doing something to solve it!



Engineering is the most advanced field in the quality assurance in professional education.

In Western countries, historically, professional societies such as an institution of professional engineers or a council of engineers have been conducting the accreditation of education to ensure that younger generation have acquired required ability and knowledge when they have graduated from the engineering study program.

In those countries, only graduates from accredited programs are eligible to be professional engineers.

Institutional Accreditation >>> compulsory by law

Program Accreditation >>> optional

International Engineering Alliance

<http://www.ieagreements.org/>

Educational Accords

Washington
Accord

Sydney
Accord

Dublin
Accord

*Professional
Engineers*

*Engineering
Technologists*

*Engineering
Technicians*

Competence Recognition/ Mobility Agreements

International
Professional
Engineers
Agreement

International
Engineering
Technologist
Agreement

Agreement for
International
Engineering
Technicians

APEC
Engineers

*Professional
Engineers*

*Engineering
Technologists*

*Engineering
Technicians*

*Professional
Engineers
(Regional
Agreement)*

3 Educational Accords of IEA

The Washington Accord signed in 1989 was the first - it recognizes substantial equivalence in the accreditation of qualifications in professional engineering, normally of four years duration.

The Sydney Accord commenced in 2001 and recognizes substantial equivalence in the accreditation of qualifications in engineering technology, normally of three years duration.

The Dublin Accord is an agreement for substantial equivalence in the accreditation of tertiary qualifications in technician engineering, normally of two years duration. It commenced in 2002.

Washington Accord

- Established in 1989 by 6 accreditation bodies for engineering education in Australia, Canada, UK, Ireland, New Zealand and USA
- Accreditation bodies (of WA signatories) accredit educational programs with “similar” criteria
- Recognizes substantial equivalency of accredited programs under the Accord
- Continuous discussion for accreditation principle

Washington Accord membership

Accreditation bodies	Provisional status	Signatory
6 Founding Members*		1989
HKIE (Hong Kong)	No system at that time	1995
ECSA (South Africa)	1994	1999
JABEE (Japan)	2001	2005
IES (Singapore)	2003	2006
BEM (Malaysia)	2003	2009
ASIIN (Germany)	2003 but was removed in 2013	
ABEEK (RP Korea)	2005	2007
IEET (Chinese Taipei)	2005	2007
AEER (Russia)	2007	2012
NBA (India)	2007	2014
IESL (Sri Lank)	2007	2014
MUDEK (Turkey)	2010	2011
PEC (Pakistan)	2010	
COE (Thailand)	Submitted in 2010 but was differed	
BAETE (Bangladesh)	2011	
CAST (PR China)	2013	2016
PTC (The Philippines)	2013	
ICACIT (Peru)	2014	
CFIA (Costa Rica)	2015	
CACEI (Mexico)	2016	
(Indonesia)	Preparation	
(Chile)	Preparation	
(Poland)	Preparation	

3 Professional Tracks in IEA

The roles of 3 professional tracks are defined by their distinctive competencies and their level of responsibility to the public.

- Engineers are professionals, who solve complex engineering problems
- Engineering technologists are professionals, who solve broadly-defined engineering problems.
- Engineering technicians are professionals, who solve well-defined problems.

Complex Engineering Problems

Complex engineering problems cannot be resolved without in-depth engineering knowledge. They may need multi-disciplinary approach. They involve wide-ranging or conflicting technical, engineering and other issues. They need appropriate consideration for public health and safety, cultural, societal, and environmental considerations. The complex problems may have several solutions or no solution.

IEA Graduate Attributes

1	Engineering knowledge
2	Problem Analysis
3	Design / Development of Solutions
4	Investigation
5	Modern Tool Usage
6	The Engineer and Society
7	Environment and Sustainability
8	Ethics
9	Individual and Team Work
10	Communication
11	Project Management and Finance
12	Life Long Learning

International frameworks for Accreditation of Professional Education

- Washington Accord (engineer)
- Seoul Accord (CS, IT)
- Canberra Accord (architect)
- Sydney Accord (engineering technologist)
- Dublin Accord (engineering technician)
- EUR-ACE (engineer)

Seoul Accord

Computing and IT related field is classified as a different category of profession from engineering.

The Seoul Accord was established in 2008 as a multi-lateral agreement among agencies responsible for accreditation or recognition of tertiary-level computing and IT-related qualifications.

ABEEK (Korea), ABET (USA), JABEE (Japan), Australian Computer Society, British Computer Society and Canadian Information Processing Society are the founding members. The first 3 are signatories of the Washington Accord and the last 3 are computer societies. The Hong Kong Institution of Engineers (HKIE) and the Institution of Engineering Education Taiwan (IEET), which are both signatories of the Washington Accord joined the Seoul Accord latter. Engineers Ireland, Institute of IT Professional New Zealand and The Philippine Information and Computing Accreditation Board are provisional members.

Canberra Accord

Architectural design and planning education is in another category. The duration of education is 5 years.

The Canberra Accord was founded in 2008 by seven accreditation/validation agencies in architectural education: The Australian Institute of Architects, Canadian Architectural Certification Board, National Board of Architectural Accreditation (China), Commonwealth Association of Architects (UK), Korea Architectural Accrediting Board, Nacional de Programas de Arquitectura y Disciplinas del Espacio Habitable (Mexico) and National Architecture Accrediting Board (USA). There are 4 provisional members from South Africa, Japan, Hong Kong, and Spain. Chinese Taipei applied for provisional status in 2016.

The Canberra Accord is intended to facilitate the portability of educational credentials between the countries whose accreditation/validation agencies signed the Accord. It does not address matters related to professional registration or licensure.

ENAAEE and EUR-ACE

European Network for Accreditation of Engineering Education (ENAAEE) is another framework (regional and based in Europe) of accreditation for engineering education. It was founded in 2006.

ENAAEE launched in 2007 EUR-ACE labelled program for engineering degree programs at First Cycle (Bachelor), Second Cycle (Master) and Second Cycle Integrated (Master) which have been accredited by accreditation agencies located in the European Higher Education Area.

These agencies have applied accreditation criteria and procedures in line with the EUR-ACE Framework Standards and Guidelines. Thus they have been authorized by ENAAEE to award the EUR-ACE Label to these programs.

Paradigm shift from input-based teaching to outcome-based learning

In the 2000's, ABET (USA) drastically changed its evaluation method from input base to outcome base. ABET triggered the world paradigm shift of engineering education from input-based teaching to outcome-based learning. The Washington Accord adopted OBE methods for evaluation.

The European Union has proposed an education shift to focus on outcomes, across the EU.

Study programs shall set up learning outcome, taking into consideration what students shall acquire rather than what professors wish to teach.

Engineering Design Education

Design abilities to develop solutions to societal needs by applying science, technology and information:

- Ability to identify a problem that is expected to be solved
- Ability to identify restricted conditions such as public welfare, environmental preservation, and cost which are expected to be considered
- Ability to logically identify, organize, and investigate the problem that is expected to be solved
- Ability to establish a plan to solve the problem considering the restrictions and by applying body of knowledge of mathematics, sciences and technology in each applicable field
- Ability to actually solve the problem in accordance with the plan that is established

Why accreditation?

- Purpose is the improvement of education
- International equivalency (there is no value unless the level of education is recognized at international level)
- Review by the third party (self-evaluation is not sufficient)
- Accountability to the society
- Enhance outcome-based education

Thank you for your attention