IEET’s Mentoring of Myanmar in Engineering Accreditation System

Dr. Mandy Liu, Institute of Engineering Education Taiwan (IEET)

Dr. Liu is currently the Deputy Executive Director of the Accreditation Council and Office Director of Institute of Engineering Education Taiwan (IEET), an accreditation agency for engineering education. Her primary responsibilities are to oversee administration of accreditation and international activities of the Institute. Prior to her current position, Dr. Liu worked as a research associate for the Association of American Medical Colleges (AAMC) in Washington DC, USA, where she conducted research in the area of organization and management studies of medical schools. Dr. Liu received her doctorate in higher education policy and management from Claremont Graduate University in the USA.

Prof. Liang-Jenq Leu, Dept. of Civil Engineering, National Taiwan University

Dr. Liang-Jenq Leu is Professor and Chairman of the Department of Civil Engineering at the National Taiwan University. He is also serving as the President of the Chinese Institute of Civil and Hydraulic Engineering (CICHE), the President of the Chinese Society of Structural Engineering, Standing Director of the Board of the Taiwan Chinese Society for Earthquake Engineering, and Deputy Secretary General and Deputy Executive Director of the Accreditation Council of the Institute of Engineering Education Taiwan (IEET). He is the Subject Editor of the Journal of the Chinese Institute of Engineers (a SCI journal). Dr. Leu earned his Bachelor and Master’s degrees from the Department of Civil Engineering of National Taiwan University in 1987 and 1989, respectively. He joined the faculty of National Taiwan University shortly after receiving his PhD from Cornell University in 1994. His area of research includes optimal design of structures, structural health monitoring, earthquake resistant design, and simulation of architectural physics for green buildings.

Prof. Charlie Than, Myanmar Engineering Council

Graduated from Rangoon Institute of Technology in Mechanical Engineering at 1975. Completed the PG Certificate Course in Naval Architecture from University of Newcastle upon Tyne in 1990. Study in Marine Engineering Department of Defense Service Technological Academy for Master and Doctorate Program and completed in 2008. Start the career as Senior Engineer in Inland Water Transport in 1975 and transfer to Myanmar Maritime University in 2001. Start the career as academia in 2001 as Pro-Rector of Myanmar Maritime University. Finally come as President of this University and retired in 2013. Later government appoint in the Myanmar Engineering Council for Quality Assurance of the Technical Universities. At present I am Vice President of Myanmar Engineering Society for contribution to our Society.
IEET’s Mentoring of Myanmar in Engineering Accreditation System

Mandy Liu¹, Institute of Engineering Education Taiwan (IEET), Liang-Jenq Leu², Department of Civil Engineering, National Taiwan University, and Charlie Than³, Myanmar Engineering Council

¹Deputy Executive Director, Accreditation Council, IEET, 7F, No.554, Linsen North Rd., Zhongshan District, Taipei 10453, Taiwan (mandyliu@ieet.org.tw)
²Professor and Chairman, Department of Civil Engineering, National Taiwan University; President, Chinese Institute of Civil and Hydraulic Engineering; President, Chinese Society of Structural Engineering; Deputy Secretary General and Deputy Executive Director of the Accreditation Council, IEET (ljleu@ntu.edu.tw)
³Chairman, Quality Assurance of the Technical Universities, Myanmar Engineering Council; Vice President, Myanmar Engineering Society

ABSTRACT: Institute of Engineering Education Taiwan (IEET), the accreditation agency for engineering and technological education in Taiwan, is a signatory of the Washington, Sydney, and Seoul accords. It was invited to be a mentor for Myanmar Engineering Society (MES) in its development of engineering education accreditation system in 2013. During the past three years, IEET has helped the Myanmar, eventually the Myanmar Engineering Council (MEngC), develop engineering education accreditation system. In October 2015, MEngC launched its very first accreditation review at eight programs in the Yangon Technological University (YTU), which is the flagship engineering institution in Myanmar. This historical event marked the country’s yet another milestone toward internationalization of higher education. This paper is to record the process and outcomes of the mentoring.

IEET became signatory of the Washington Accord in 2007, Seoul Accord in 2009, and Sydney Accord in 2014, respectively. Over the past twelve years, IEET has accredited over 500 programs in 83 universities in Taiwan. It became the country’s leading accreditation agency in engineering and technological education. All accredited programs are waived from the Ministry of Education’s evaluation. Since the outset, IEET has been promoting outcomes-based education in Taiwan. Specifically, the agency has been paying much attention to the program’s training of students’ graduate attributes through Capstone Course in recent years. Although Capstone Course is not something new to many programs, only few programs have linked the assessment of the course with attainment of graduate attributes. Now through the requirement of the IEET accreditation criteria, all programs must have Capstone Course and must use the assessment of the Course to show compliance with the IEET’s requirements of graduate attributes.

Due to the political situation, higher education in Myanmar has gone through a period of uncertainty and instability. However, as the political and economical situations changed in recent years, the country works hard to catch up with its international peers. MES is one of the most active engines in the country to move and elevate level and quality of
engineering education. It joins members in the Federation of Engineering Institutions of Asia and the Pacific (FEIAP) to seek recognition of engineering degree holders from Myanmar. Chinese Institute of Engineers (CIE) is a member of the FEIAP but does not oversee accreditation of engineering education in Taiwan. CIE asked IEET’s support to help mentoring MES in the development of engineering education accreditation system in Myanmar. Starting from 2013, IEET delegates have visited Myanmar many times to introduce the engineering education accreditation system to universities and members of MES. Moreover, IEET delegates also provide training workshops to the MES members. When the country finally adopted Professional Engineering Act and recognized accreditation of engineering education as the requirement for engineer licensing, MEngC was thus formed to develop and execute engineering education accreditation. Through several years of working together with IEET, MEngC has published accreditation criteria and policies and launched accreditation visit to YTU. Universities in Myanmar are also showing interest in accreditation now, a departure from years ago when many had doubts in accreditation. IEET hopes that the accreditation of engineering education could serve as a catalyst for the advancement of engineering education in Myanmar.

INTRODUCTION

Institute of Engineering Education Taiwan (IEET), the accreditation agency for engineering and technological education in Taiwan, is a signatory of the Washington, Sydney, and Seoul accords. It was invited to be a mentor for Myanmar Engineering Society (MES) in its development of engineering education accreditation system in 2012. During the past three years, IEET has helped Myanmar, eventually the Myanmar Engineering Council (MEngC), to develop engineering education accreditation system. In October 2015, MEngC launched its very first accreditation review at eight programs in the Yangon Technological University (YTU), which is the flagship engineering institution in Myanmar. This historical event marked the country’s yet another milestone toward internationalization of higher education. This paper records the process and outcomes of the mentoring.

ENGINEERING EDUCATION IN MYANMAR

Historical Review on Myanmar Educational Movements

Engineering Education was first introduced with the establishment of Rangoon Institute of Technology (RIT), which was formerly set up as the faculty of Engineering under Rangoon University in 1924, during British Colonial period (Than 2015). At first, the lecturers and instructors were from India, which is also the colonial country under Britain. Thus, at that time, both the education system and engineering education system were mainly based on British system. Then, Myanmar engineers were sent to foreign countries such as Europe and the United States of America to be able to manage programs
in engineering education in Myanmar. Therefore, the engineering education system of Myanmar started to change from British system to US System but it was not as strong yet. However, an inconsistency between education systems had arisen since then.

After gaining independence in 1948, most of the scholars were sent to technological universities in the United States of America. When they came back, the engineering education system was changed from the British system to the US system.

Since the caretaker government gained power in 1957, the scholars were sent to East European countries such as Russia, Yugoslavia, Czechoslovakia, East Germany and Hungary. Those scholars tried to change the engineering education of Myanmar according to the education system of Eastern Europe. At present times, the university laws in practice are still based on the East European education laws. Despite the changes of system over the ages, RIT, a leading institute in engineering education in Myanmar, still uses the education system based on the US Education system.

**Development of Engineering Education in Myanmar**

There were five significant phases in the development of engineering education in the country, namely:

- Phase 1: from 1924 to 1940 (beginning of World War II);
- Phase 2: from 1946 to 1961;
- Phase 3: from 1961 to 1988;
- Phase 4: from 1988 to 2010; and
- Phase 5: from 2010 to present.

**First Phase (1924 - 1940)**

In the first phase, there was a Department or Faculty of Engineering under the University of Rangoon, which gave civil engineering, mechanical engineering and electrical engineering courses at College of Engineering which later became RIT.

**Second Phase (1946 – 1961)**

The system at that time was in such a way that the students had to take common courses in the first 2 years and branched out into different disciplines of choice, starting from the 3rd year. The total contact hours of learning for engineering students were about 30 hours per week and 6 years of undergraduate course after matriculation. The medium of teaching was mainly English. In addition to the lectures, laboratory work and drawing, all the students had to take workshop trainings in carpentry, blacksmith, welding, and in machine shop.


After 1962, the Faculty of Engineering became an independent Institute, called Burma Institute of Technology (BIT), with its own Rector, under the Directorate of Higher Education, Ministry of Education. BIT was changed into RIT after about a year. The reason for the change was that the Ministry of Education planned to open more institutes of technology in other parts of the country at a later date. RIT had its own Administrative
Council and Senate, chaired by the Rector to give policy directions related to respective administrative and academic matters. However, higher Administrative Council and Senate chaired by the Minister of Education were also established which had final say on administrative and academic matters of all the institutes under the Ministry of Education. In order to upgrade the teaching and improve the engineering education, the teaching staff were sent abroad to different countries according to the international aid that was received at that time. During this period, agricultural engineering and automobile engineering disciplines were branched out under mechanical engineering department; petroleum engineering discipline under mining engineering was also formed, and two separate streams called power and electrical communications [later renamed electronics engineering] were established under electrical engineering department. In the late 1960s the total number of students was about 4,000 and the total number of teaching staff was about 200. Therefore, the student/teaching staff ratio was as before about 20:1. The laboratory and workshop facilities were stretched to the limits by this time as additional and up to date equipment could not be acquired due to shortage of funds.

1988 to Present (Fourth Phase and Fifth Phase)

In 1988, throughout the period of the military government, many technological universities and colleges emerged. During this era, Chinese government provided the scholarship programs for higher education institutes in Myanmar. At that time, the developed countries emphasized on outcomes-based education by assessing and accrediting the standard of education system to ensure the further development of the country. Hence, the international agreements, such as Bologna Process and Washington Accords, for accreditation of education systems were developed through six original signing countries. While in Myanmar, due to the lack of access to engineering education accreditation and laws regarding the engineering profession to protect the public property, the quality of the engineering education was a decline resulting in the public criticism. Thus, later in 2009, with the political changes in Myanmar, in order to overcome that problem, and with the help of the Federation of Engineering Institutions of Asia and the Pacific (FEIAP), the professionals attempted to establish accreditation procedures for engineering education through Myanmar Engineering Society (MES). Later, Myanmar higher education system put an effort to change into the outcomes-based education system by approaching the Bologna Process (BP). Engineering education in Myanmar, however, has been benchmarked with the requirements of the Washington Accord.

FEDERATION OF ENGINEERING INSTITUTIONS OF ASIA AND THE PACIFIC (FEIAP)

The Federation of Engineering Institutions of South-East Asia and the Pacific (FEISEAP) was an international non-profit professional organization founded on July 6, 1978 (FEIAP 2016). It was established following an exploratory meeting convened and organized by The Engineering Institute of Thailand under The King’s Patronage with the
support of the United Nations Educational Scientific and Cultural Organization (UNESCO) on July 03, 1978 in Chiang Mai, Thailand. Being an independent umbrella organization for the engineering institutions in the South-East Asia and the Pacific region, FEISEAP held objectives to encourage the application of technical progress to economic and social advancement throughout the world; to advance engineering as a profession in the interest of all people; and to foster peace throughout the world. The Constitution, as adopted unanimously by the Special General Assembly of the Federation held in Hanoi, Vietnam, on June 2, 2008, incorporated a change of its name to the Federation of Engineering Institutions of Asia and the Pacific (FEIAP).

As of now, there are 18 organizations within FEIAP, representing economies of Australia, China, Chinese Taipei, Hong Kong, India, Indonesia, Japan, Malaysia, Mauritius, Myanmar, Papua New Guinea, the Philippines, Singapore, South Korea, Thailand, Pakistan, Peru, and Timor Leste, respectively. The engineer institution of each of the economies, such as the Chinese Institute of Engineers (CIE) in Chinese Taipei, is its a member of the FEIAP.

FEIAP Engineering Education Guidelines

FEIAP established the Working Group on Engineering Education and the first working group meeting was held in October 2009 in Taipei. The Working Group was charged to draft a set of guidelines to help members that have not yet had engineering education accreditation system to establish one. The objective was to help those economies uplifting quality of engineering education through accreditation system in the respective economies so that they are able to join the international agreement on professional engineers, such as the APEC Engineers. The ultimate goal was of course the mobility of professional engineers among the FEIAP members. The Working Group was chaired by Chinese Taipei, and Dr. John Li of CIE served as the chairman. Since CIE is a member of FEIAP but not the engineering education accreditation agency in Taiwan, Prof. Jia-Yush Yen, Secretary General of IEET, the accreditation agency in Taiwan, was invited to serve as the Co-Chair.

Together with Prof. Alan Bradley of Engineers Australia, Prof. Jia-Yush Yen and a team of researchers set out to draft the set of engineering education guidelines for FEIAP. After several revisions and consultations with the FEIAP General Assembly, the FEIAP Engineering Education Guidelines was officially presented in December 2010 with the approval of the FEIAP General Assembly in 2011. Since then, the Guidelines have been endorsed by UNESCO as well. Contents of the Guidelines include the following parts: Glossary of terms, Accreditation Criteria Template for the Accreditation of Engineering Education Programs, Accreditation System Model Framework, Mentoring System, Evaluation of Accreditation Agency, and Periodic Monitoring.

As the Guidelines published, FEIAP launched a series of efforts to mentor some of its members toward establishing the engineering education accreditation system. Papua New Guinea and Myanmar expressed interests in being mentored in FEIAP General Assembly in 2012. By 2013, the FEIAP General Assembly approved that Australia (Engineers Australia) and Singapore (Institute of Engineers Singapore) were assigned to mentor
Papua New Guinea, Malaysia (Institute of Engineers Malaysia) and Chinese Taipei (Chinese Institute of Engineers) were for Myanmar.

MENTORING EFFORTS OF IEET

Under the Ministry of Education’s support, Institute of Engineering Education Taiwan (IEET) was established in 2003 by a group of senior presidents and deans. It launched accreditation of engineering education system in 2004 and became the signatory of the Washington Accord in 2007, Seoul Accord in 2009, and Sydney Accord in 2014 respectively. Over the past twelve years, IEET has accredited over 500 programs in 83 universities in Taiwan. It is now the country’s leading accreditation agency in engineering and technological education. All accredited programs are waived from the Ministry of Education’s evaluation. Since the outset, IEET has been promoting outcomes-based education in Taiwan. Specifically, the agency has been paying much attention to the program’s training of students’ graduate attributes through Capstone Course in recent years.

Since 2009, CIE has secured Ministry of Education’s funding to facilitate the project of drafting the FEIAP Guidelines, and IEET became the de facto executing body because CIE is not the accreditation organization in Taiwan. When CIE was nominated as the mentor of Myanmar for accreditation system of engineering education under FEIAP, IEET was inevitably called again to help CIE in this endeavor. Under this project, IEET has invested a significant amount of time and human resources in helping FEIAP setting up the FEIAP Engineering Education Guidelines, and it also helped on the mentoring effort of MES in establishing the engineering education accreditation system.

The Ministry of Education played an important role in this endeavor because it provided CIE and IEET with millions-dollar financial support. FEIAP has not provided any financial support so far. Without the Ministry of Education’s funding, CIE and IEET were not able to sustain their efforts toward FEIAP goals. The funding of the Ministry allowed for a series of visits by IEET delegates to Myanmar in collecting information about Myanmar’s engineering education system, communicating with the local educators and engineers, visiting the universities, training of institutional representatives and potential program evaluators, etc.

From 2012 to 2013, IEET and Myanmar delegates exchanged seven visits. The first visit by delegates from IEM-Malaysia and IEET/CIE took place in July 2012 with the following purposes—

1. To set up an Engineering Accreditation Committee/Body (EAC) in Myanmar;
2. To have an Engineering Accreditation Manual;
3. To train Assessors for program accreditation;
4. To have one or two Universities to volunteer for the accreditation, so that the Manual and the System can be studied and reviewed.
During that first visit, the mentors visited Myanmar Maritime University (MMU), and met up with Rector, Pro-Rector, Head of Dept for Port & Harbor Engineering, and other Senate Members of MMU. Mentors were at the opinion that MMU has the potential to be accredited by EAC should the accreditation system is set up.

The second visit from FEIAP together with the team from CIE/IEET arrived Myanmar in May 2013. During that visit, formal visits were made to Myanmar Maritime University (MMU) and Yangon Technological University (YTU). The team had a fruitful discussion with the team at YTU led by the Chairman of Steering Committee for YTU and MTU (Mandalay Technological University), and Advisor for Ministry of Science and Technology. At the end of the visit, it was agreed that accreditation was now a must for quality assurance of engineering education and for mutual recognition of substantial equivalence throughout the region and the world and also suggested workshops for accreditation to have buy-in from stakeholders: policy makers, professional bodies, industry, academia and even students are needed.

By the suggestion of the second visit in 2013, there were workshops organized by FEIAP that were holding in the following years of 2014 and 2015 which included the following items:

1. Presentation on the need for mobility of engineers, international recognition and benchmarking of engineering degrees, accreditation and quality assurance;
2. Training on outcome-based and competency-based engineering education;
3. Self-assessment and documentation by education providers;
4. Training of program evaluators.

There was a third visit in 2014 for the purpose of conducting the workshop on February 15th, 2014 to facilitate the “Engineer Mobility and FEIAP Engineering Education Guideline”. At that time, the Myanmar Engineering Council Law was already established in November 2013. Thus registration of engineers and accreditation of engineering programs were now to be done in Myanmar. Later on March 28th, 2015, IEET organized a workshop for the training of the engineering education evaluators of undergraduate programs to the Accreditation Committee members from Myanmar Engineering Council (MEngC). Not only that IEET delegates visited Myanmar for the purpose of promoting and training, CIE/IEET also provided funding for Myanmar delegates to come to Taiwan and observed IEET’s accreditation visit. In October 2014, a group of three observers came and observed IEET’s visit to Ming Chi University of Technology. Another observation happened in November of 2015, a group of four observers came and observed IEET’s accreditation visit to National Taiwan Ocean University. During those two observations, Myanmar delegates had the first-hand experience on how accreditation review was conducted, and IEET believed that the on-site observation played a key role in the success of Myanmar’s move to launch its own accreditation system (Liu 2015).

In October 2015, MEngC launched its very first accreditation review at eight programs in the YTU, which is the flagship engineering institution in Myanmar. This historical event marked the country’s further step toward internationalization of higher education. Those programs being reviewed were Chemical Engineering, Civil Engineering, Electrical Power, Electronic & IT, Mechanical Engineering, Metallurgy, Mining, and Textile
Engineering. IEET delegates observed the entire process of the accreditation visit and provided comments and suggestions throughout the entire visit. Since the first batch of graduates will not graduate in three years of time, MEngC granted “provisional accreditation” to these programs after successful reviews and awarded the certificate to the programs in early 2016. More reviews are to take place in the months ahead.

MEngC had a good start on its accreditation system for engineering programs. Although there is a lot of room for improvement, MEngC was able to pull together a set of accreditation system in a mere three-year of time indicated that the country and those who are involved have a high level of motivation and determination of moving the country forward to be benchmarked with the international community. IEET would continue to provide necessary assistance and support to MEngC should there is a need called for. As indicated above, the ultimate goal of MEngC is to achieve signatory status of the Washington Accord. IEET is sure that through a continuous support from the Myanmar government and the local engineering community, this goal will be achieved sooner than it seems.

REFLECTION

As IEET reflects on the past years mentoring Myanmar, the following points and issues are of significance:

1. Development of any accreditation system must consider and remain sensitive of the local education systems and needs, it is not possible and prudent to copy one system into another country without any modification.

2. Internationalization and mobility of engineers are of key purpose for upcoming countries in their development of the accreditation system. In the case of Myanmar, becoming a signatory of the Washington Accord serves as a motivation for Myanmar to develop such accreditation system and to be connected with the outside world.

3. The mentoring experience turns out to be a win-win situation for MEngC and IEET; MEngC was able to establish the accreditation system in a relatively short period and avoid many hurdles that IEET encountered; IEET has gained a lot of confidence on its system as a consequence.

4. Friendship and collegiality are valuable outcomes of the mentoring; both IEET and MEngC became good friends throughout the process, and there are opportunities for further exchanges to take place.

5. From the perspective of the international accords, such as the Washington Accord, more countries develop accreditation system that meets the Washington Accord requirements benefits the betterment of the world-wide engineering education and the engineer community.
CONCLUSION

The mentoring experience for IEET was quite rewarding. Even though FEIAP did not provide any financial support, IEET along with CIE were able to secure Ministry of Education’s funding from Taiwan for three years on this project. It is encouraging to see MEngC has launched its own accreditation system in a short time, and IEET hopes that in the years ahead, MEngC will gain sufficient confidence and tunes up its accreditation system to most suitable for the engineering education in Myanmar.

As a result of IEET’s mentoring of engineering education accreditation system, IEET was invited to mentor Myanmar Architectural Council (MAC) in setting up accreditation system for architectural education in Myanmar. This development was not expected early on, but it is by all means a very positive outcome between the collaboration between Taiwan and Myanmar.

REFERENCES

http://epaper.heeact.edu.tw/archive/2015/01/01/6289.aspx