COUNCIL OF ENGINEERS THAILAND

APEC Engineer

ASSESSMENT STATEMENT

June 2007

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COUNCIL OF ENGINEERS, THAILAND

ASSESSMENT STATEMENT

APEC ENGINEER REGISTER

INTRODUCTION

The monitoring committee had been appointed by the Council of Engineers to operate the APEC Engineer register in Thailand. The council recognizes as the committee member and operate professional institutions and associations to serve its mechanisms for assessment of engineers who are eligible to be placed on Thai APEC Engineer register.

The assessment statement provides fundamental information on the assessment mechanism used for admission to each class of professional practices for all engineering disciplines.

The disciplines to be considered for APEC Engineer register are:

- Civil
- Electrical
- Mechanical
- Industrial
- Mining

The other two disciplines are under approval of the ministerial regulations as:

- Chemical
- Environmental

PART A – MONITORING COMMITTEE

The monitoring committee is appointed by the Council of Engineers and operates under the Engineer Act B.E. 2542 (1999). The committee members are nominated from various professional institutions. The current monitoring committee have been appointed by the Council of Engineers since August 21st, 2006 for 3 years term.

1. Member of Council of Engineers (COE)

Mr.Rajatin	Syamananda	Chairman
Mr.Subin	Pinkayan	Advisor
Mr.Ruangsak	Vajarapong	Member
Mrs.Phulporn	Saengbangpla	Member
Mr.Prasit	Pittayapat	Member
Mr.Prasert	Tapaneeyangkoon	Member
Mr.Pisit	Puthipiroj	Member
Mr.Chairit	Satayaprasert	Member
Mr.Ekasit	Limsuwan	Member / Secreatary

2. Engineering Institute of Thailand (EIT)

Mrs. Araya	Pengniti	Member

3. Thai Construction Industry Association (TCI)

Mr.Nataporn	Promsuthi	Member

4. Federation of Thai Industries (FTI)

Mr.Chavalit	Nimlaor	Member

5. Consulting Engineers Association of Thailand (CEAT)

Mr.Wisit	Utisayapongsa	Member

and Asst.Executive Manager

Ms.Panadda	Boonkanjanapanich	Assistant Secretary

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Asst. Executive Manager

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PART B – ASSESSMENT MECHANISMS

Eligibility for admission to the APEC Engineer register is limited to engineers registered with one of the constituent members of the Council of Engineers (COE).

1. Engineering Education Accreditation

a. Accreditation of Engineering Programs

A graduate of an engineering program that has been accredited by the Board of Engineering Accreditation (BEA) is considered to have met the academic qualification requirement. The criteria and procedures for accreditation of engineering programs are provided in **Attachment A.**

A graduate of a foreign engineering program that is evaluated by the BEA and substantially equivalent to a BEA-accredited program is considered to have met the academic qualification requirement. The Council of Engineers must approve the substantial equivalent evaluation.

b. Alternative Assessment Mechanisms

Individuals who have not completed an accredited engineering program can meet the academic requirement through an examination program. Upon application to the Council of Engineers, an individual's academic qualifications will be assessed and a specific examination program assigned based on the Board of Engineering Qualification (BEQ). The programs are provided in **Attachment B.** Upon successful completion of the examination program, the candidate is deemed to have satisfied the academic qualification requirement.

c. Professional Practice Competency

Individuals who have completed the qualifications engineering program to meet the academic requirement or individuals who had passed an assigned examination based on the Board of Engineering Qualification (BEQ) are requested to prepare for the Professional Practice Competency.

A competency workshop is required, and the competency test must be taken right after completion of the workshop. The contents of the workshop are specified in 5 sections as:

1) Basic Engineering Skill
2) Code of Ethics
3) Public Safety
4) Environment
5) Engineering Laws

The candidates need to pass 60% of thus exam on each section.

2. Assessment for Independent Practice

The practice of engineering in Thailand is regulated by various legislative procedures at the national and provincial levels. The legislative body admits members to the profession and governs their practices.

In addition to the academic requirements for licenser described above, there are requirements for a supervised period of engineering experience, the ability to communicate effectively in the language of business of the jurisdiction, successful completion of a professional practice examination, validation of experience and ability through structured training programs.

a. Engineering Experience Requirement

All applicants are required to have a minimum of three years of acceptable engineering experience prior to registration. Acceptable engineering experience must include the application of theory and should provide exposure to experience in broad areas of practical experience, management, communication and the social implications of engineering. The engineering experience must be related to the jurisdiction process the Code of Ethics, the Code of Conducts, and the Code of Practices.

The engineering experience must be made in Thailand or in a Thai environment for at least two years. The Council of Engineers recognizes the structured training programs for each engineering disciplines in accordance with the Engineering Institute recommendation.

b. Validation of Experience

There must be at least one reference from a practicing professional engineer or a senior engineer who is familiar with details of the candidate's work for the experience claimed. The immediate or direct supervisor of the candidate's present and past employers are the most suitable referees. For larger projects or multiple engineering works, referees should provide information regarding the candidate's technical competence in the application of engineering principles and theory, ability to communicate, ability to work on a team, ability to exercise professional judgment, and whether the candidate is of good character and reputed as demonstrated through personal attributes such as integrity and responsibility. A typical referee form and the basic requirements for profession practical experience are shown in **Attachment C.**

c. Professional Practice Examination

All candidates for registration are required to successfully complete an examination to confirm that they have sufficient knowledge of the ethical considerations and obligations that accompany the privileges of professional status, as well as the legal concepts relevant to being professional engineers.

The Board of Professional Practice Qualification (BPQ) conducts the assessment mechanism for independent practice. The detailed description of the range of knowledge that should be examined are provided in **Attachment D.** A supplementary report and interview are in co-operated in the assessment process.

3. APEC Engineer Assessment

a. Seven Years Experience After Graduation

Refer to the professional registration; the candidate will have met three years of this experience requirement. The candidate will be asked to submit a report verifying experience describing the level of responsibility and the significance of the engineering work. The report must demonstrate that the individual has engaged in professional practice which exercises their engineering knowledge, skills, experience and judgment, and reflects the significant influence on the technical direction of engineering projects.

b. Two Years of Responsibility in Charge of Significant Engineering Work

A significant engineering experience must represent an application of knowledge in a particular discipline that goes beyond standard solutions found in manuals or practice and the work has been done in an environment where the engineer has full autonomy and responsibility. The quality of work must demonstrate a complete

synthesis capability to fully appreciate the various interactions of their discipline. The quality of work must also be a significant part of the total engineering project.

c. Professional Development

Since engineers are bound by the Code of Ethics to practice only in areas in which they are competent, then they are responsible to keep themselves informed to maintain their competence with advanced knowledge or technology to provide opportunities for them.

Professional development of their subordinates, there are various means of professional development such as technology transfer and continuing education through conferences, seminars, workshops, short courses etc.

d. In Compliance with the Code of Conduct

All professional engineers must abide themselves according the Code of Conduct as stated in professional engineers are provided in **Attachment E.**

4. Audit of APEC Engineer

APEC Engineer will be required to renew their registration on an annual basis. Each renewal documents must be submitted with a current Curriculum Vitae and records of continuing professional development according to the above requirement.

PART C- ENGINEERING DISCIPLINES

The engineering disciplines recognized for the APEC Engineer register will be 7 disciplines as:

1. Civil
2. Mechanical
3. Electrical
4. Industrial
5. Mining

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6. Chemical *
7. Environmental

Remark * Required Ministerial Regulation approval.

Other engineering disciplines than shown above, may be categorized as sub-disciplines for example:

1. Civil

- Structural Engineering
- Geotechnical Engineering
- Highway / Transportation Engineering
- Water Resources Engineering
- Construction Engineering
- Survey Engineering

2. Mechanical

- Air Condition / Refrigeration
- Machine Design / Pressure Vessel
- Power Plant / Boiler / Pump / Fan
- Automotive / Gas Turbine / Internal Combusion Engine

3. Electrical

- Power
- Power Plant
- Power Distribution
- Sub-station
- Electronics / Telecommunication

4. Industrial

- Manufacture Process
- Harzardous Control

5. Mining

- Mining
- Metallurgy

6. Chemical

- Chemical Engineering
- Unit Operation

7. Environmental

- Water Supply
- Waste Water Treatment
- Solid Waste Management
- Air / Noise Pollution

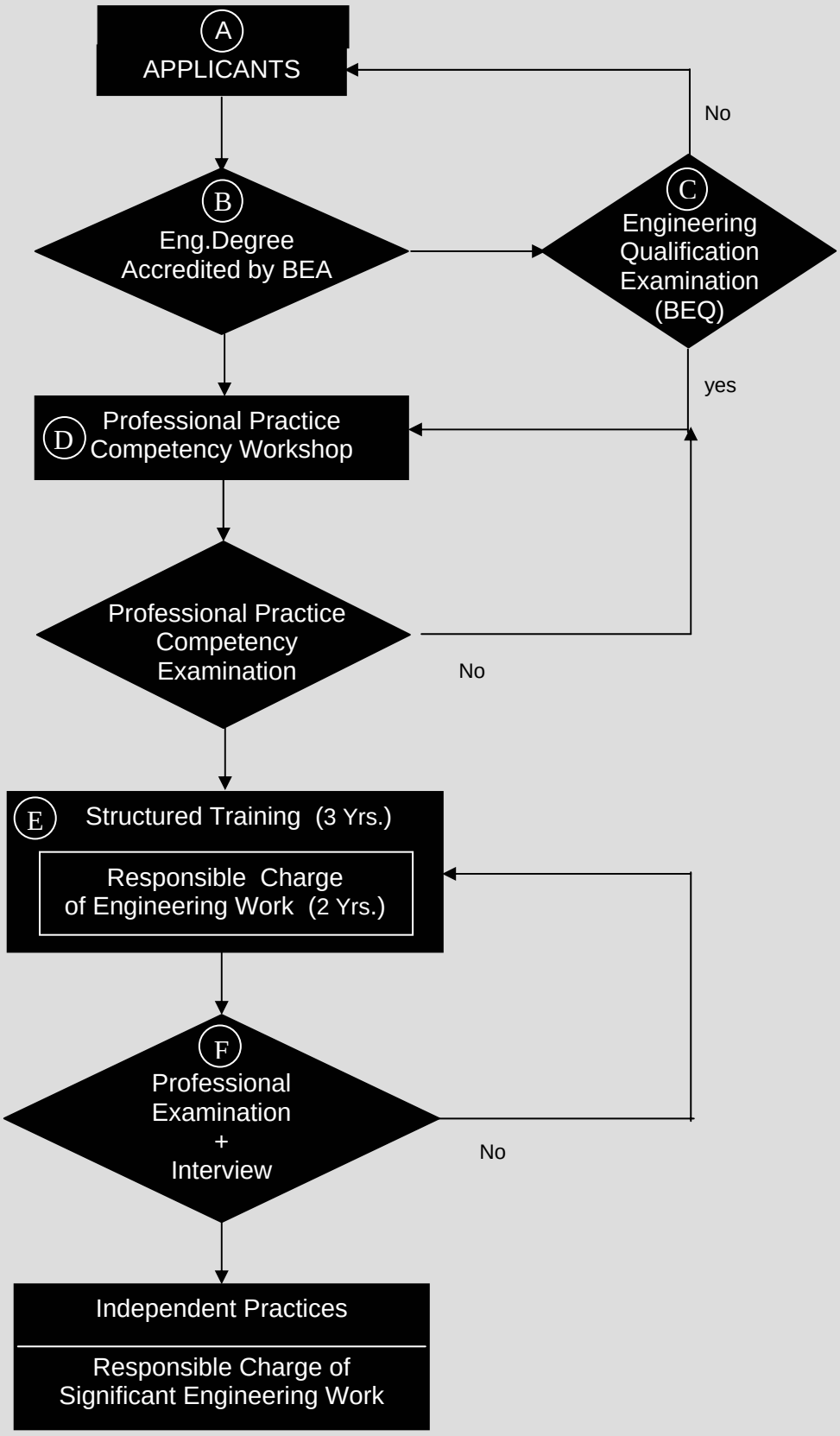

Fig 1. Flow Chart for Assessment Mechanism

APEC Engineer - MONITORING COMMITTEE

1. Member of Council of Engineers (COE)

Mr.Rajatin	Syamananda	Chairman
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Mr.Wisit	Utisayapongsa	Member

and Asst.Executive Manager

Ms.Panadda	Boonkanjanapanich	Assistant Secretary

ATTACHMENT A

Basic Requirements for Engineering Education Accreditation

Basic Requirements

Engineering graduates who are qualified to be registered for professional engineer must complete his engineering program from the academic institution of which the Council of Engineers has accredited the program. Basic requirement for engineering accreditation can be categorized into 8 items as follow:

1. Engineering Program

A Bachelor's degree in engineering; Civil Engineering, Electrical Engineering, Mechanical Engineering, Industrial Engineering and Mining Engineering or other disciplines to be certified by the government decree, is considered as the minimum requirement for accreditation.

Structures of the engineering program are required to provide both theoretical and practical aspect to suits for the purpose of this accreditation. The details of engineering curriculum of the program to be accredited are required to provide at least as follow:

a. Courses in basic sciences, basic engineering and specific engineering would be as specified by the Council of Engineers.
b. Course work in general education, as natural sciences, social science and humanities must be conformed to the Ministry of Education regulation.
c. Specific engineering emphasis on engineering discipline to be provided accordance with the institution excellencies, are subjected to reflect the purpose of the Engineering Education Accreditation (EEA). The details accreditation in one main discipline, must take at least 4 sub disciplines for consideration.

2. Purpose

The purpose of the engineering program must assure and fulfill the knowledge in basic sciences, basic engineering and specific engineering including basic engineering skills, codes of ethics, public safety, environment and engineering laws as the basic engineering practices.

3. Student

Academic institutions are required to set up the process as strict rules for enrolment to achieve high standard for engineering graduates.

4. Faculty Member

Faculty member who involve in academic role for teaching in discipline are required to hold at least a Master's degree in the discipline. Moreover, they must have engineering and teaching experiences with broad vision to create academic atmosphere, and education pattern for engineering students. They are also required to competence in the main subject and capable to give eligible advice to the students at their prospective.

a. Full - Time Lecturer

Each program is required to have at least 3 full-time lecturers who are responsible for the program supervision and teaching the student at most effective. They are required to teach engineering courses and to conduct some research work at proper proportion.

b. Lecturer

The proportion of lecturers (excluding part-time lecturers) to total students would not be more than 1:20.

c. Assistant Lecturer

Each practical subject is required to have at least 2 assistant lecturers who have hold at least a high-ranking diploma. A Master degree student can be counted as an assistant lecturer if at least one full time assistant lecturer has been assigned.

5. Classroom/ Laboratory / Equipment

It is appropriate to provide modern and sufficient classrooms, laboratory and equipment at proper fractions to achieve an academic atmosphere, to bring about interaction between lecturers and students, and to develop the engineering activities as set.

a. Classroom, laboratory or engineering workshop must be provided at suitable size, modern model and sufficient equipment.
b. Informative resources such as the library needs to up-to-dated with adequate amount of journals or papers and texts to support the programs, and to contribute some knowledge to the students. It should provided an information technology networks that students can search for any other information or data.
c. Adequate information technology equipment such as computer system must be provided for each discipline to the most sufficient.

6. Management / Budget

Academic institution must provide sufficient educational resources at appropriate amount for maintenance and management of equipment and laboratory for engineering program to compatible with the institution's objective.

7. Quality Assurance

The academic institutions are required to set up the quality system to assure the graduate. They are required to provide the quality assurance system for each engineering program that are supposed to be certified by the responsible ministry in charge.

8. Accreditation Procedure

a. **Self-study Report** The academic institution that apply for an engineering educational accreditation, are required to prepare information and report to the Board of Engineering Accreditation (BEA). The report consists of details conforming to the requirement of the Council of Engineers.

b. **Accredited Procedure** After academic institution have submitted the Self-study Report to the board for evaluation, the sub-committee must be appointed to review the report and evaluate the program. They may give some advices at proper adjustment or correction prior to the sub-committee appointment to provide technical visit of the institution. The sub-committee will propose and give some recommendation to the institution for correction to satisfy the requirement. In final stage the sub-committee would make recommendation to the Council of Engineers for approval.

Engineering Education Accreditation Procedure

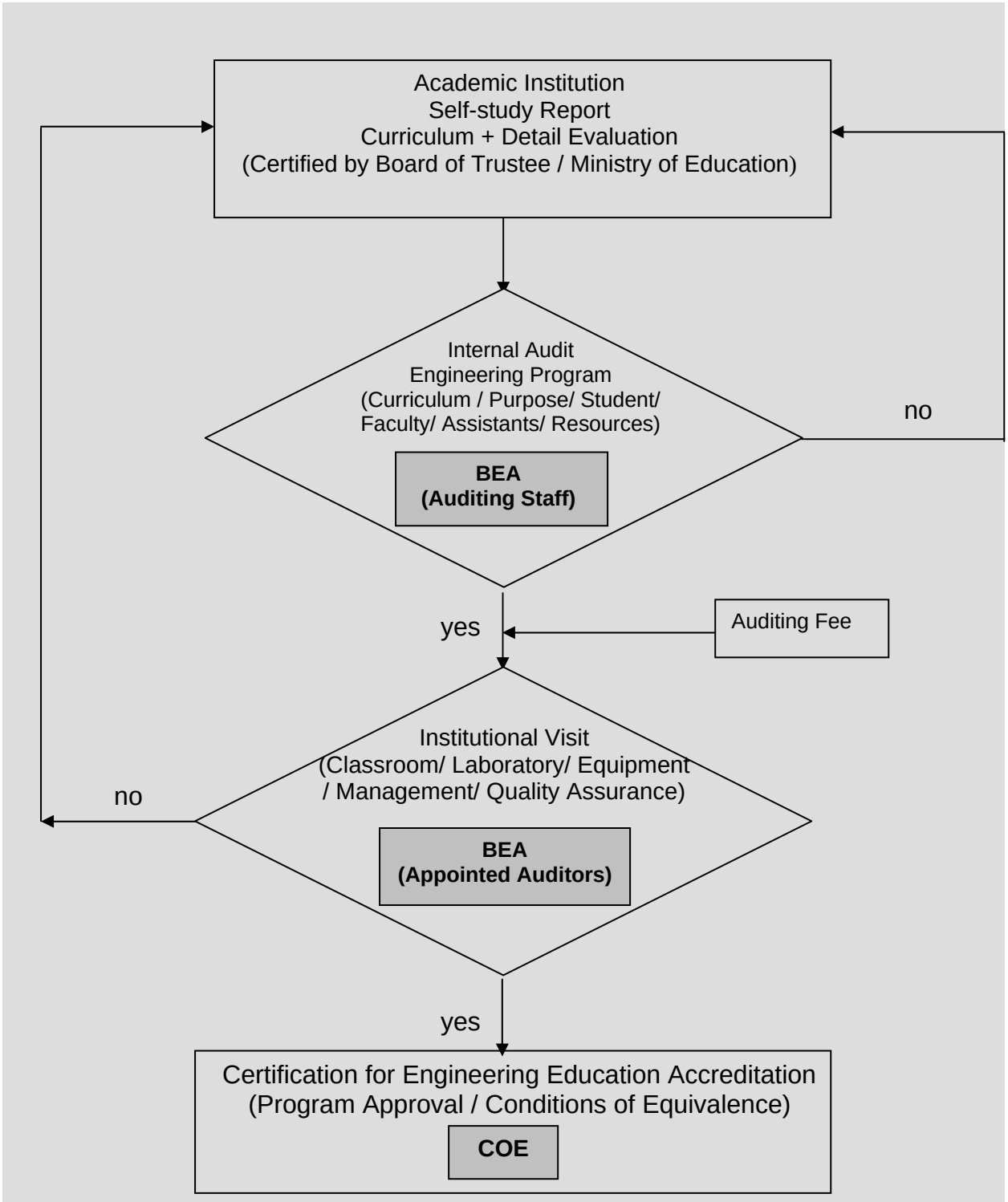


Fig 2. Flow Chart for Engineering Education Accreditation

ATTACHMENT B

Specification of Engineering Examination

- The engineering examination is required only when the graduates have completed the engineering programs, which are not accredited by the Board of Engineering Accreditation (BEA).

- The coverage of the engineering examination would concern the Basic Engineering for all discipline and the Specific Engineering as separated for each engineering disciplines.

- The engineering examination have been scheduled for 2 times annually; in June and December.

- The requirement for the examination would cover all subjects in Basic Engineering and only one subject in Specific Engineering.

- The passing grade is 60% of the two sections.

Discipline	Basic Engineering	Specific Engineering
1. Civil Engineering	1. Engineering Mathematics 2. Engineering Material 3. Engineering Mechanics 4. Engineering Drawing	1) Structural Analysis 2) Structural Design (R.C.Design/Steel Design) 3) Soil Mechanics
2. Mechanical Engineering	1. Engineering Mathematics 2. Engineering Material 3. Engineering Mechanics 4. Engineering Drawing	1) Mechine Design / Mechanical Design 2) Air Conditioning Refrigeration 3) Power Plant Engineering

Discipline	Basic Engineering	Specific Engineering
3. Electrical Engineering	1. Engineering Mathematics 2. Engineering Material 3. Engineering Mechanics 4. Engineering Drawing	**Power** 1) Electric Circuits 2) Electrical System Design 3) Electric Power System Analysis **Telecommunication** 1) Electric Circuits 2) Communication Network and Transmission Lines 3) Principles of Communications
4. Industrial Engineering	1. Engineering Mathematics 2. Engineering Material 3. Engineering Mechanics 4. Engineering Drawing	1) Industrial Work Study 2) Production Planning and Control 3) Quality Control
5. Mining Engineering	1. Engineering Mathematics 2. Engineering Material 3. Engineering Mechanics 4. Engineering Drawing	**Mining** 1) Surface Mining and Design / Mining Engineering I 2) Underground Mining & Design / Mining Engineering II 3) Mineral Process Engineering I / Natural Gas Engineering **Metallurgy** 1) Chemical Metallurgy 2) Mechanical Metallurgy /Well Logging Metal Forming

Discipline	Basic Engineering	Specific Engineering
6. Chemical Engineering	1. Engineering Mathematics 2. Engineering Material 3. Engineering Mechanics 4. Engineering Drawing	1) Chemical Eng. Plant Design 2) Unit Operation 3) Chemical Engineering Principles and Calculations
7. Environmental Engineering	1. Engineering Mathematics 2. Engineering Material 3. Engineering Mechanics 4. Engineering Drawing	1) Water Supply Engineering 2) Wastewater Treatment 3) Air Pollution Control 4) Noise Control 5) Environmental System & Management

ATTACHMENT C

Application Form and Engineering Experience Requirement

1. Introduction

The Engineering Act. B.E.2542 (1999) has established the Council of Engineers for Professional Engineering Register and to encourage the engineering profession to improve their quality of engineering services to satisfy the public safety, environmental condition, juristic action on engineering profession and satisfy by the Code of Ethics.

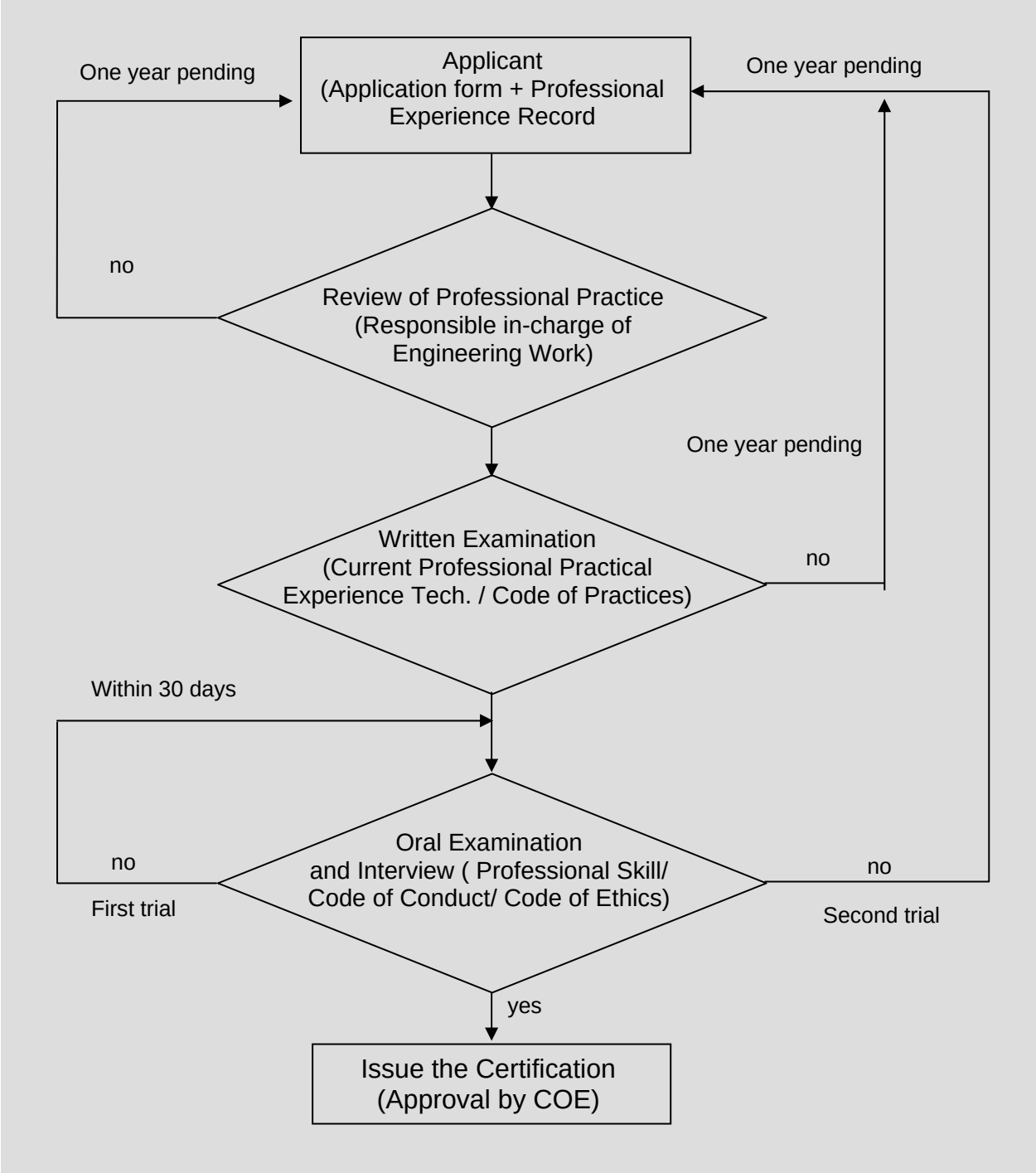
- **Principal Concept**
  - To be compatible with advanced technology.
  - To provide high standard of Engineering Education.
  - To achieve skill in engineering practices.
  - To improve quality of engineering services.
  - To obtain continuing professional development.

- **The Competency**
  - To obtain engineering experience from each responsibility in charge with application of theory.
  - Skill in using the Code of Ethics/ Conducts/ Practices with exposure of practical condition.
  - To exercise the practical experiences in management communication and social implementation.
  - To gain engineering experience with relating to the jurisdiction process.

- **Profession Development**
  - Development through Structural Training Program specified by the Engineering Institution.
  - The Code of Practices as drafted and developed the academic institution and profession institution.
  - The Code of Conducts to satisfied the Code of practices and Code of Ethics and under the suspicions of engineering law.
  - To cumulate practical experience in specific areas to become profession expertise.

- **Application Procedure**
  - Submitted the application form via e-mail, by mails or by person.
  - Amount of engineering work must be conformed with the Code of Conduct
  - The Written examination to be arranged 3 times per year
  - The Oral Examination will be commenced only as the written examination has passed.

2. Professional Practices Qualification Procedure



3. Details of Application Form

The application forms for professional engineer are as follow

Form 1 Details of 5 sections as

1. Name, surname
2. Present address
3. Present business address
4. Education
5. Level of practice, registration no.

Form 2 Professional Practice Record

Col.1 Job item
Col.2 Date/ month/ year of practice
Col.3 Job position / company or firm
Col.4 Project name / description of work

Form 3 Detail of professional practice In 2 years
(Addition sheets may be needed)

Col.1 Job item
Col.2 Company or firm / position
Col.3 Start/ finished
Col.4 Professional practice (in accordance to professional practice regulation)
Col.5 Duty / responsible charge / scope of work
Col.6 Outcome performance
Col.7 Direct supervision certification
Col.8 Remarks

4. Basic Requirement for Profession Practical Experience

Engineering practical experience for each engineering disciplines have been specified to meet the requirement as follow:

- Professional practical experience must be practiced in Thailand or Thai environment for at least 2 years
- Content of work must be compliance with the Code of Conduct for at least 2 projects of significant in-charge of engineering work.
- The practical experience would demonstrate the exercise towards engineering disciplinary skill, management, communication, social implication and the jurisdiction process

Form 1

No……

APPLICATION FORM FOR APEC ENGINEER -THAILAND

1. Name ..... Surname ..... Age ..... yrs. Nationality .....

2. Present address ..... Street .....
   Soi ..... Moo ..... District .....
   Province ..... Postcode .....
   Tel./ Fax ..... e – mail .....

3. Present business address ..... Street .....
   Soi ..... Moo ..... District .....
   Province ..... Postcode .....
   Tel./ Fax ..... e – mail .....

4. Education (Provision of Evidence)
   4.1 ..... Institute ..... Year .....
   4.2 ..... Institute ..... Year .....
   4.3 ..... Institute ..... Year .....
   4.4 ..... Institute ..... Year .....

5. Registration No. ..... Discipline .....
   Issued on ..... Expiration date .....

I, hereby, certify that the above information is correct.

Submission date .....

(Signature) ..... Applicant

Officer Only

Date Meeting……Result……

Profession Engineer……..Discipline……...

Date of Approval……..Expiration……...

Registration Fee Payment procedure @ 1,000 Baht

Book No. ……No. ……

Date……Amount……Baht. ……

……..Cashier Secretary General

PROFESSIONAL PRACTICE RECORD

Item no.	Date / Month / Year of Practice	Job Position / Company or Firm	Project Name / Description of Work

Note:

1. The applicant has to fill in the application form. Start from the license date until present.
2. Enclose 2 current photos size 25mm. (not older than one year) sign name on the back with application form and the table that present quantity and quality of Professional Engineer.

DETAIL OF PROFESSIONAL PRACTICE IN 2 YEARS

Name……**Registration No**……

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Item	Company or Firm /Position	Start and Finished	Professional Practice (in accordance to Professional Practice Regulation)	Duty / Responsible Charge / Scope of Work	Outcome Performance	Direct Supervision Certification	Remarks

ATTACHMENT D

Professional Practice Qualification

1. General

Engineering Experience is indicated in the record must be satisfied with the basic requirements for Profession Practical Experience and conforming to the Code of Conduct. The experiences must provide more details in the form provide the addition report in A4 – format or the logbook with certification by direct supervisor or senior registered engineers. The professional practice qualification must be conducted according to the Council of Engineers regulation as follow:

1) A sub-committee is appointed by the Council of Engineers to review engineering practical experiences of responsible in charge as amount of work description of engineering practice and the performance to satisfy the conduct, structured training and some additional conditions as specified by each discipline.

2) The applicants who have demonstrated their professional practical experience to satisfy the basic requirements are partially approved by the sub-committee to take the written examination, the detail specifications of the examination are shown in item 2. The passing grade for the examination is specified at 60% for each subjects.

3) The applicants who pass the written examination are required to have their oral examination in corporate with the interview. The details for oral examination are stated in the item 3. and only two trails are given for the examination.

2. Specification for Written Examination

The written examination for engineering practical experience have concerned the currently developed technology and the practical experience.

- Content the examinations are categoried into two groups of the subjects; basic requirement for the discipline, and specific engineering for the sub-discipline.

- The examinations have been scheduled for 3 times annually, April, August, and December respectively.

The basic requirement for discipline categories core subjects with compulsory where the specification engineering subjects are electives for each individual sub – discipline

Discipline	Core Subject	Elective Subject
Civil Engineering	1. Structural Analysis 2. Reinforced Concrete and Steel Design 3. Foundation Engineering	1) Structural Engineering 2) Geo-technical Engineering 3) Highway /Transportation Engineering 4) Water Resource Engineering 5) Construction Management 6) Survey Engineering 7) Environmental Engineering
Mechanical Engineering	1. Thermodynamics 2. Fluid Mechanics 3. Strength of Material 4. Static / Dynamics 5. Manufacturing	1) Air Conditioning+Refrigeration 2) Machine Design+Pressure Vessel 3) Power Plant+Boiler+Pump+Fan 4) Automotive+Gas turbines + Internal Combustion Engine (ICE)
Electrical Engineering	**Power** 1. Design Standard for Electric System. 2. Installation / Fabrication for Electric System. **Telecommunication** 1. Communication	**Power** 1) Code of Practice ; - Lightening Protection - Electro-Magnetic Protection - Fire Protection - Fire Alarm and Emergency Lighting 2) Power Plant 3) Substation equipment and Protective Relaying 4) Power Transmission and Distribution System **Telecommunication** 1) Electromagnetic Waves 2) Communication Electronics

Discipline	Core Subject	Elective Subject
Mining Engineering	1. Mining Method / Physical Metallurgy 2. Mineral Dressing/ Chemical Metallurgy 3. Explosive and Blasting/ Mechanical Metallurgy	1) Mine Economics and Management / Engineering Economics 2) Mineral Processing Engineering/Metal Forming 3) Mine Safety and Environmental /Corrosion of Metals 4) Mine Plant Design / Extractive Metallurgy
Industrial Engineering	1. Safety 2. Design Standards and Code of Practices 3. Environment Engineering 4. Applied Statistics 5. Engineering Management	1) Industrial Work Study 2) Operation Research 3) Production Planning and Control 4) Quality Control 5) Industrial Plant Design 6) Safety Engineering 7) Maintenance Engineering 8) Engineering Economy
Chemical Engineering	1. Safety 2. Design Standards and Code of Practices 3. Environment Engineering 4. Applied Statistics 5. Engineering Management	1) Chemical Engineering Kinetics and Reactor Design 2) Chemical Engineering Principles and Calculations 3) Process Dynamics and Control 4) Unit Operations 5) Chemical Engineering Plant Design 6) Safety in Chemical Operations 7) Maintenance Engineering 8) Engineering Economy

Discipline	Core Subject	Elective Subject
Environmental Engineering	1. Environmental Engineering 2. Water Resource Engineering	1) Environmental Engineering 2) Water Resource Engineering 3) Wastewater Engineering 4) Hazardous Waste Engineering 5) Health Safety & Law 6) EIA 7) Building Sanitary

3. Specification for Oral Examination

The oral examination for engineering practical qualification is deemed to explore more details of responsible in-charge of the significant engineering work relates the actual performance of the practical experiences and the profession development. An individual interview will be incorporated with the examination. Content of the questions would be the courage of the following items.

- Responsible in charge of the engineering work
- Skill in engineering discipline toward the Code of Conducts and the Code of Practices.
- Practical experiences in solving problems in engineering work, management skill, communication skill and jurisdiction process.
- Professional development from practical experience toward the scheme of technology transfer for young engineer and the society.
- Emphasis on practical experience on conscious of public safety and the code of ethics.

ATTACHEMENT E

Rules about the Code of Conduct

The rules about the Code of Conduct are now under drafting process to replace the Ministerial Regulation No. 3 and No. 4 of the Professional Engineer Act. B.E. 2505. The principal contents are considered in the following items. They are subjected to change accordance with the final approval of the Council of Engineers.

1. Significant Engineering Work

- Consultancy
- Project Planning
- Design
- Construction Supervision
- Investigation
- Operation and Maintenance Supervision

2. Disciplines, Sub-disciplines and Expertise

Professional practice can be categorized in 3 levels of practices; discipline, sub-discipline and expertise. Current engineering practice can establish only the discipline and the sub-discipline; the expertise may be adjusted in accordance with the advances in engineering and technology.

Discipline	Sub-discipline
Civil Engineering	▪ Structural Engineering ▪ Geotechnical Engineering ▪ Highway / Transportation Engineering ▪ Water Resource Engineering ▪ Construction Engineering ▪ Survey Engineering ▪ Environmental Engineering

Discipline	Sub-discipline
Mechanical Engineering	▪ Air Condition / Refrigeration ▪ Machine Design / Pressure vessel ▪ Power Plant / Boiler / Pump / Fan ▪ Automotive / Gas Turbines / Internal Combustion Engine
Electrical Engineering	▪ Power - Fire Alarm / Emergency Light and Fire Safety. - Substation and Equipment - Transmission Line and Distribution System - Power Plant - Protective relaying ▪ Electronics and Telecommunication - Communication Network and Transmission Lines - Radio Wave Propagation - Antenna Engineering - Microwave Engineering
Industrial Engineering	▪ Manufacturing Process - Safety - Engineering Management - Statistics - Industrial Work Study ▪ Hazardous Control

Discipline	Sub-discipline
Mining Engineering	▪ Mining - Mining Method - Mining Dressing - Explosive and Blasting - Mineral Processing ▪ Metallurgy - Physical Metallurgy - Chemical Metallurgy - Mechanical Metallurgy - Corrosion of Metals
Chemical Engineering	▪ Chemical Engineering - Process Dynamics and Control - Chemical Engineering - Kinetics and Reactor Design ▪ Unit Operation
Environmental Engineering	▪ Water Supply ▪ Waste Water Treatment ▪ Solid Waste Management ▪ Air/Noise Pollution