



WHY AND HOW TO BECOME A PROFESSIONAL ENGINEER

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Member of WG on PAE



Workshop 2: 23rd August 2023



Dubai 3,
MATRADE Exhibition & Convention Centre





Outline of Presentation

Introduction & Background

Graduate Engineer Registration

Practical Experience

Routes to PAE

Qualities of a Registered Professional





Becoming a PE in Malaysia:

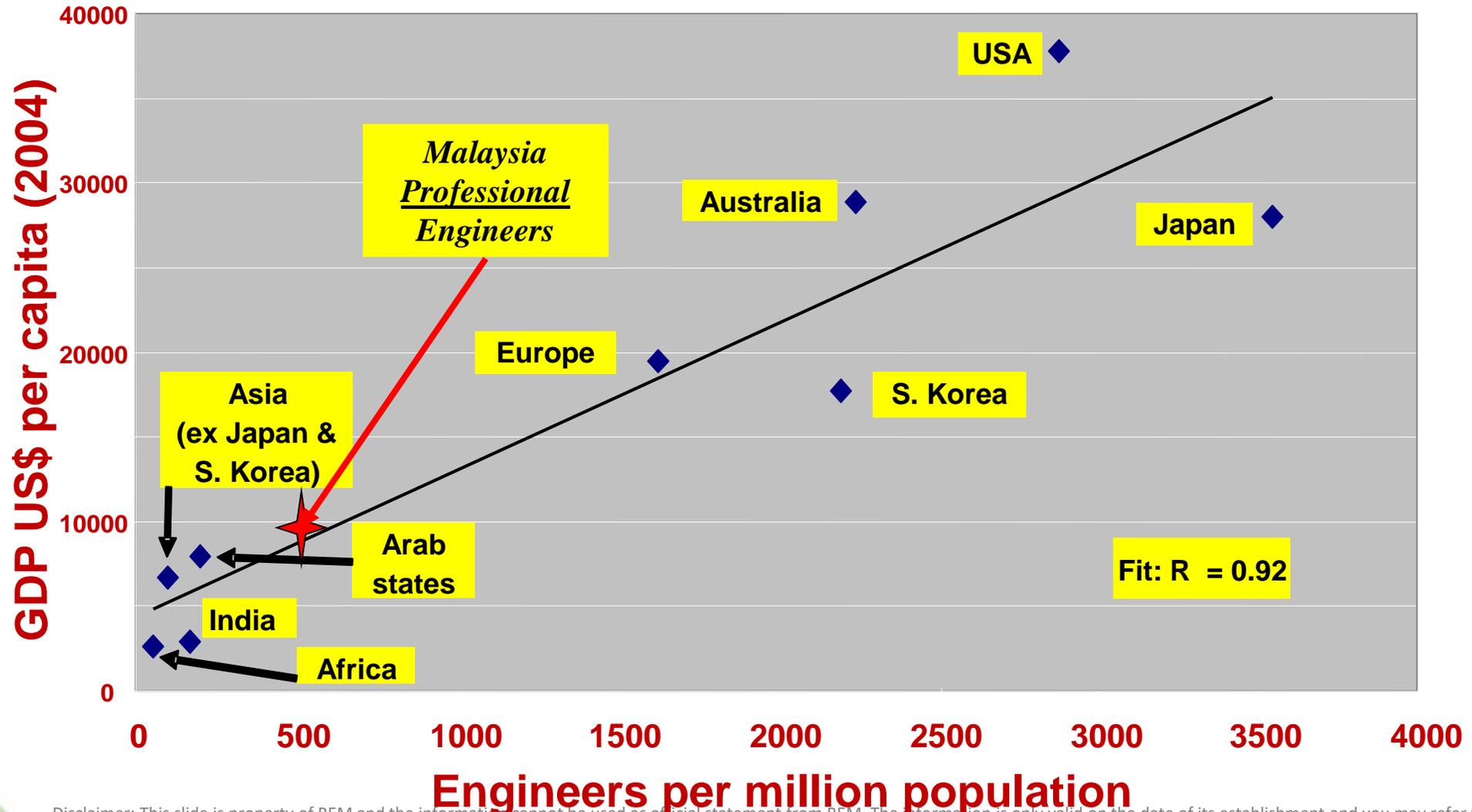


**Important,
because engineers are
pre-requisite for
National Development**



Why are Engineers Important?

Engineers and GDP





Malaysia needs more engineering professionals for national development



www.shutterstock.com - 1024231666

Engineer-Population ratios



	Population	Number of Registered Engineers	Engineer-Population ratio
Malaysia	32 million	180,000	1:178
Japan	126 million	2.5 million <small>(Stats Bureau Japan 2000)</small>	1:50
Germany	82 million	1,000,000	1:82
United Kingdom	60 million	425,000	1:141

Data includes both engineers & engineering technologists



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Board Of Engineers Malaysia

www.bem.org.my/web/guest/home

English Bahasa Malaysia

Search...

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- e - Payment**
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 - BEM Online Services Statistics

www.bem.org.my/web/guest/services

3:20 PM 5/11/2018

BEM website:
<http://www.bem.org.my/web/guest/home>



Act 138

**Governs the Engineering Profession,
Practice & Services**

**REGISTRATION OF
ENGINEERS ACT 1967
(REA 1967)**



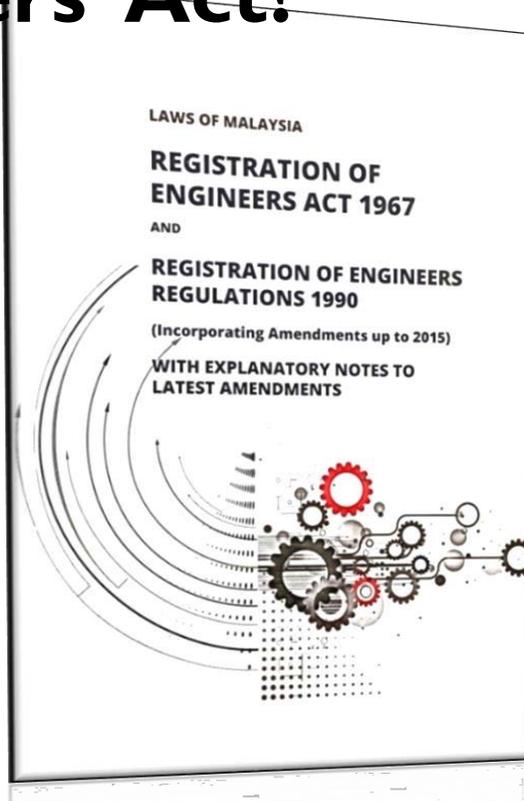
What is the purpose of the Engineers' Act?

To **protect the public** by legislative control so that the practice of engineering, which has a bearing on public safety, health and welfare, can only be carried out by licensed professional engineers.



To **create a regulatory body** with mandate to carry out licensing of professional engineers and regulation of the profession

To **set regulations** pertaining to the practice of engineering; qualifications for licensing; and code of professional conduct for registered engineers;





Under the laws of Malaysia

**Any person who wishes to provide
professional engineering services
must be registered with BEM.**



Section 2. Interpretation

"professional engineering services" means engineering services and advice in connection with any feasibility study, planning, survey, design, construction, commissioning, operation, maintenance and management of **engineering works** or projects and includes any other engineering services approved by the Board;

“Engineering works”

means all works which include any publicly or privately owned public utilities, buildings, machines, equipment, processes, works or projects that requires the application of engineering principles and data;





The 2015 amendments to the REA is:

Primarily Driven by the Government's
Commitments in International Trade.....



Legal Implication:

Registration of Engineers Act - 2015 Amendments

Need to harmonise with Revised Role of the PE:

BEM now Registers 5 Categories of Registered Persons : (new

in red)

1. Accredited Checker

“Two-tier registration” system

2. Professional Engineer with Practising Certificate

3. Professional Engineer

4. Graduate Engineer

5. Engineering Technologist

6. Inspector of Works



BOARD OF ENGINEERS

Concept of 2-Tier Registration

1st tier of registration

Professional
Engineer

2nd tier of registration

Professional
Engineer
with
Practicing
Certificate

**“Licence” to submit,
must sit for
Professional Competency
Examination**





**IN THE CONTEXT OF THE NEW “2-TIER” LANDSCAPE,
THERE IS DIFFERENCE IN FOCUS
BETWEEN ASSESSMENTS FOR P.E. & P.E.P.C.**

PE : THE PROFESSIONAL ASSESSMENT EXAMINATION (PAE) in a nutshell:

“...tests a candidate
on what he “knows” from his area of training & experience,
and NOT from areas he did not go through.”

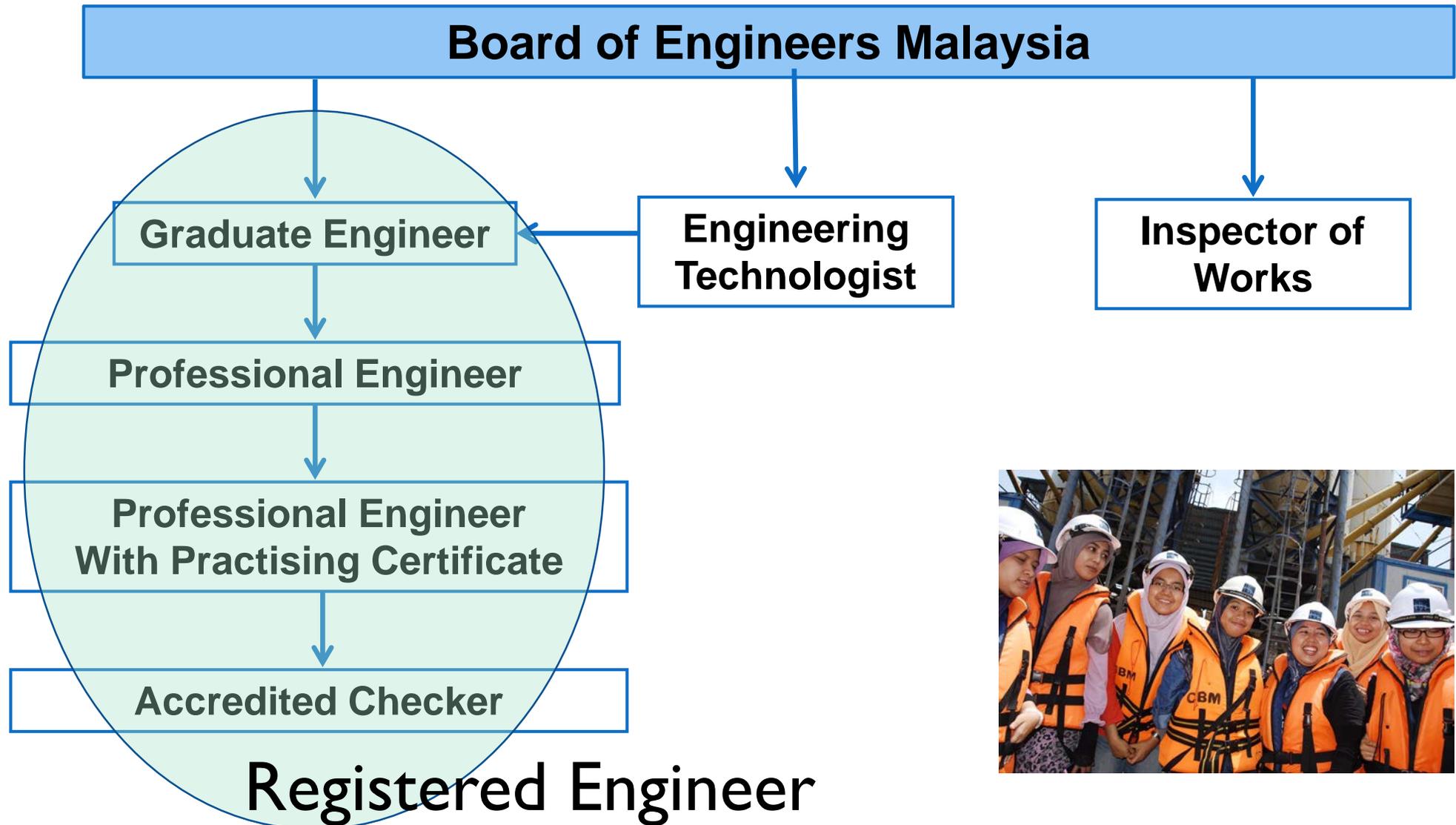
PEPC: THE PROFESSIONAL COMPETENCY EXAMINATION (PCE)

The PCE in a nutshell...

“...tests a candidate
on what he ought to know”.



REGISTERED PERSONS





Interpretation:

“registered Person” – means a registered Engineer, Engineering Technologist or Inspector of Works.

“registered Engineer” – means a Graduate Engineer, Professional Engineer, Professional Engineer with Practising Certificate or Accredited Checker.





Why you should register

Section 24(h) – PENALTY

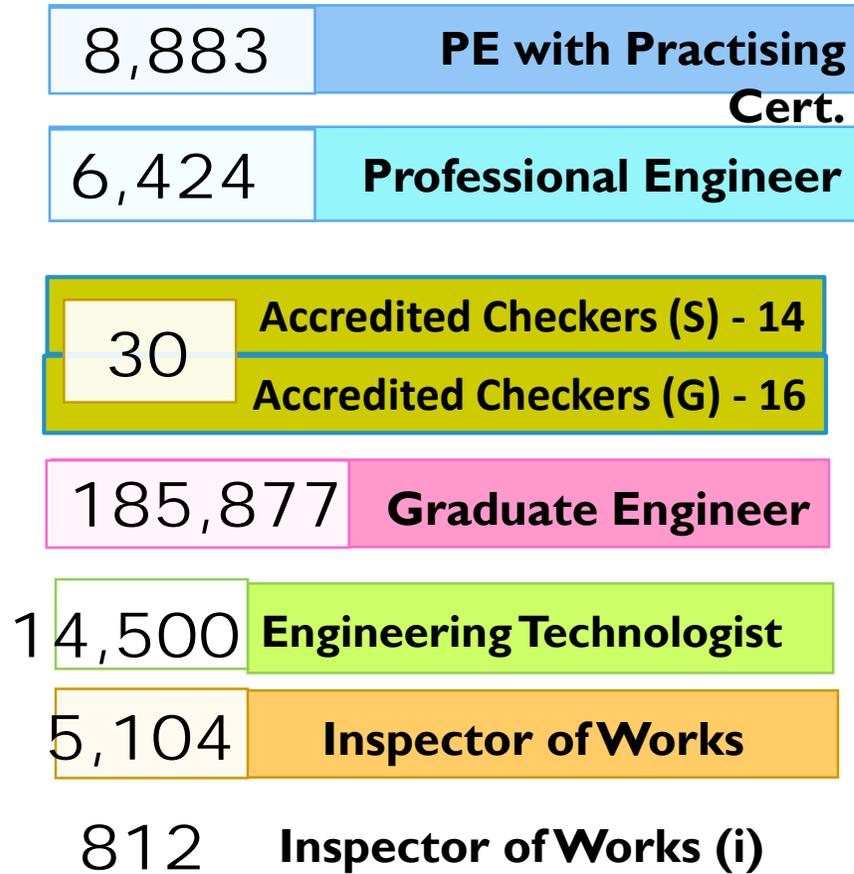
“Any person, sole proprietorship, partnership or body corporate who contravenes section 7 or 8, or subsection 7A(1), 24A(1) or 24B(5) shall be guilty of an offence and shall, on conviction, be liable to a fine not exceeding fifty thousand ringgit, or to imprisonment for a term not exceeding three years, or to both”



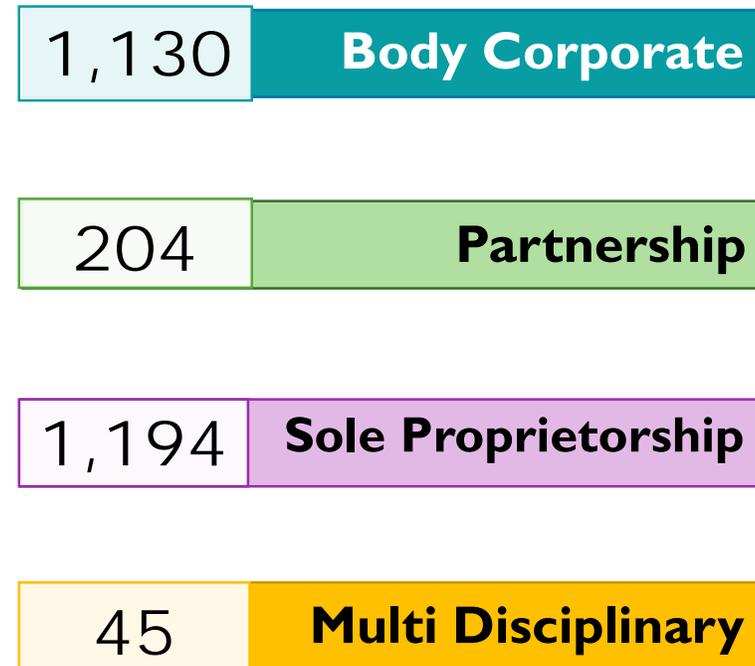
statistics as at May 2023



Registered Persons

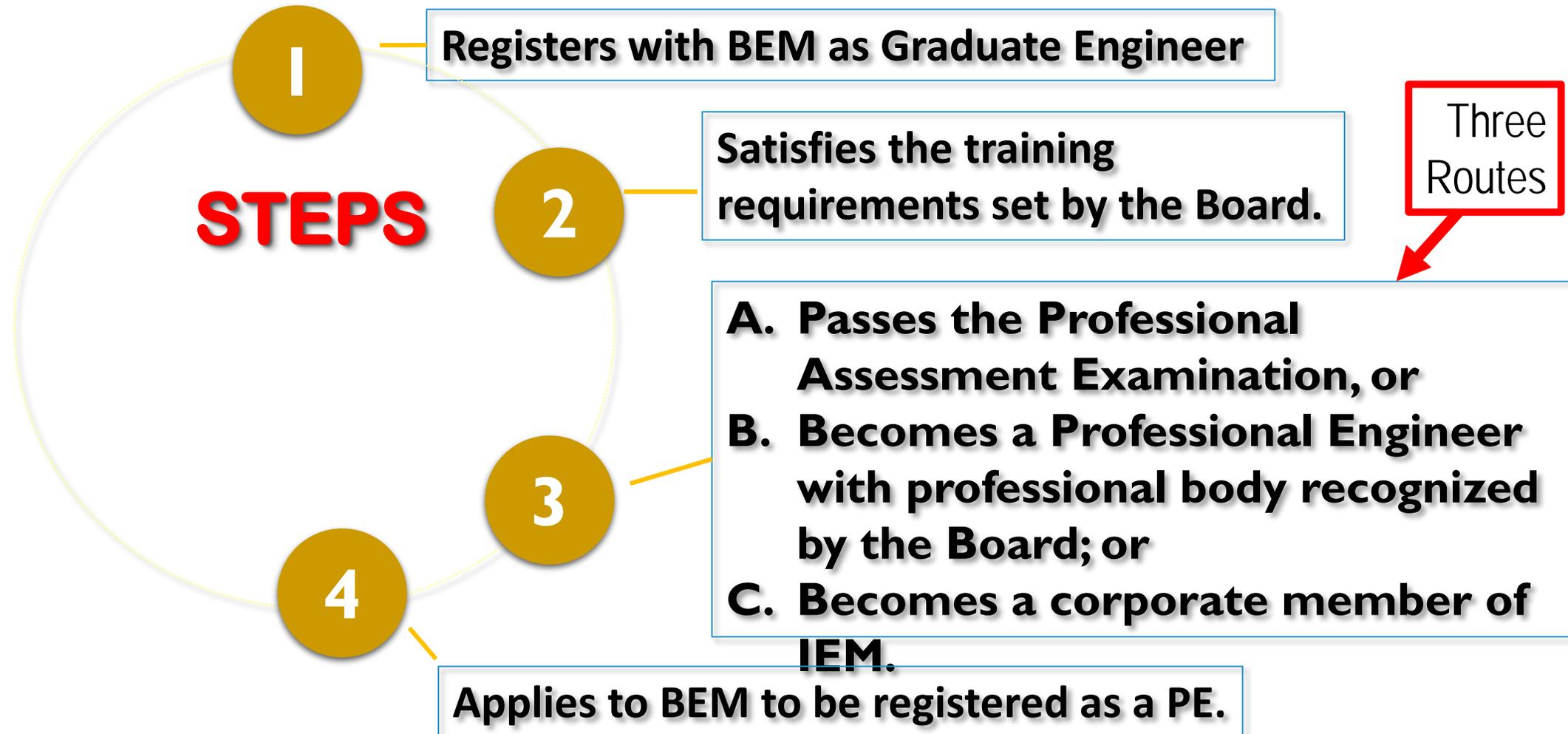


Engineering Consultancy Practices





ROUTE TO BECOME A PROFESSIONAL ENGINEER





STEP



GRADUATE ENGINEER REGISTRATION





QUALIFICATIONS ACCEPTED

For Graduate Engineers:

- A **4-year engineering degree** from a Malaysian university which has been accredited by the Engineering Accreditation Council (EAC) of BEM
- An accredited 4-year engineering degree from an overseas professional body which is a **signatory to the Washington Accord (WA)**.
- BEM-Pre EAC list (including UK 3 years qualification until 2000)
- Licensed Aircraft Engineer with Category C
- Marine Engineer with CoC Class 1 (1st or Chief Engineer)





- 4 years or more JPA-BEM's recognised engineering qualifications (Russia/France CTI)
- 4 years Monbusho recognised engineering degrees from Japan (based on intake until June 2009)
- FEANI Index or list (EEED) (4 or 5 years Diplome Ing/FH or 3+2 qualifications in a related discipline)





WASHINGTON ACCORD

SIGNATORIES

- **Korea** - Represented by Accreditation Board for Engineering Education of Korea (ABEEK) (2007)
- **Russia** - Represented by Association for Engineering Education of Russia (AEER) (2012)
- **Malaysia** - Represented by Board of Engineers Malaysia (BEM) (2009)
- **China** - Represented by China Association for Science and Technology (CAST) (2016)
- **South Africa** - Represented by Engineering Council South Africa (ECSA) (1999)
- **New Zealand** - Represented by Engineering New Zealand (EngNZ) (1989)
- **Australia** - Represented by Engineers Australia (EA) (1989)
- **Canada** - Represented by Engineers Canada (EC) (1989)
- **Ireland** - Represented by Engineers Ireland (EI) (1989)





- **Hong Kong China** - Represented by [The Hong Kong Institution of Engineers \(HKIE\) \(1995\)](#)
- **Chinese Taipei** - Represented by [Institute of Engineering Education Taiwan \(IEET\) \(2007\)](#)
- **Singapore** - Represented by [Institution of Engineers Singapore \(IES\) \(2006\)](#)
- **Sri Lanka** - Represented by [Institution of Engineers Sri Lanka \(IESL\) \(2014\)](#)
- **Japan** - Represented by [JABEE \(2005\)](#)
- **India** - Represented by [National Board of Accreditation \(NBA\) \(2014\)](#)
- **United States** - Represented by [Accreditation Board for Engineering and Technology \(ABET\) \(1989\)](#)
- **Turkey** - Represented by [Association for Evaluation and Accreditation of Engineering Programs \(MÜDEK\) \(2011\)](#)
- **United Kingdom** - Represented by [Engineering Council United Kingdom \(ECUK\) \(1989\)](#)





- **Costa Rica** - Represented by [Colegio Federado de Ingenieros y de Arquitectos de Costa Rica \(CFIA\) \(2020\)](#)
- **Mexico** - Represented by [Consejo de Acreditación de la Enseñanza de la Ingeniería \(CACEI\) \(2022\)](#)
- **Pakistan** - Represented by [Pakistan Engineering Council \(PEC\) \(2017\)](#)
- **Peru** - Represented by [Instituto de Calidad y Acreditacion de Programas de Computacion, Ingenieria y Tecnologia \(ICACIT\) \(2018\)](#)
- **Indonesia** - Represented by [Persatuan Insinyur Indonesia \(PII\) \(2022\)](#)





Section 5(3):

For every registered person,
the Board will assign

“the **branch or branches of engineering**
in which he or it is qualified to practice;
and particulars of any ***conditions or restrictions***
imposed by the Board”.



BEM ENGINEERING BRANCHES & SUB-BRANCHES

MAIN BRANCH	CIVIL	MECHANICAL	ELECTRICAL	CHEMICAL

BEM ENGINEERING BRANCHES & SUB-BRANCHES

MAIN BRANCH	CIVIL	
1	Building	
2	Construction	
3	Environmental	
4	Geotechnical	
5	Mining	
6	Structural	
7	Transportation	
8		
9		
10		
11		
12		

BEM ENGINEERING BRANCHES & SUB-BRANCHES

	MECHANICAL	
	Aerospace	
	Agricultural	
	Automotive	
	Building Services	
	Manufacturing	
	Marine	
	Material	
	Mechatronic	
	Metallurgy	
	Mining	
	Naval Architecture	
	Nuclear	

BEM ENGINEERING BRANCHES & SUB-BRANCHES

	CHEMICAL
	Environmental
	Petroleum
	Process (Polymer, Pharmaceutical, Food)
	Nuclear

Why you should register soonest

- **BEM recognises the experience gained by an engineering graduate only after he has registered as a Graduate Engineer.**
- **Experience gained before that will not be considered.**
- **It is prudent to register as Graduate Engineer at the very beginning of an engineering career.**





Procedure for registration

Submit **Form A1** accompanied by:

- a non-refundable processing fee of RM 50.00
- Copy of degree certificate
- Copy of full official transcript
- Copy of IC/MyKad

**duly certified
by an active
Professional Engineer**





GRADUATE ENGINEER APPLICATION

Submission

MyBEM Online Reg. System
www.engineer.org.my



Processing fee of RM 50.00

Copy of degree scroll, full official transcript & IC/MyKad
(duly certified by an active PE)

Approval Stage

Approval within 1 – 4 months

**BEM
Application
Committee**

Output

Download, print & save e-certificate.





Upon approval, applicant will be issued a certificate of registration

The certificate will state his/her registration number and his/her branch of engineering in which he/her should be practising.



after approval as “GE”

STEP **2**



**PRACTICAL
EXPERIENCE**



practical experience



Regulation 22, Registration of Engineers Regulation 1990 (Revised 2015)

Obtained at least 3 years practical experience,
including:

- a) 2 years general training
- b) 1 year professional career development & training
 - *wide exposure on managerial & technical expertise*
- c) 1 year of the above must be obtained in Malaysia



At least one year of the training must be obtained in Malaysia under the ***supervision of a Professional Engineer (PEng)*** in the same branch of engineering.

If there is no PEng in the organization, the training undergone must be certified by the management of the organization on the company letterhead, and ***a support letter*** from a PEng known to the trainee must be attached.

Sample formats of the required letters are available at BEM





PRACTICAL/INDUSTRIAL TRAINING FOR ACADEMIC STAFF/STAFF IN RESEARCH INSTITUTIONS

- Practical training in industry/consulting firm/organisation under the *supervision of a PE/PEPC.*
- Training should be for a period of one year (*either continuous or in periods adding up to one year*). If carried out in periods, training need not be in the same organisation.
- Research carried out in collaboration with industry to address problems occurring in industry can be accepted provided industry issues a letter specifying details of the projects(s) and involvement of the staff.
- The staff should spend *considerable time on site at the industry.* Time should be recorded in a log sheet format.





- Supervising PE/PEPC ***should not be a staff of the same organisation*** as the staff undergoing the practical training.
- The supervising PE/PEPC should ***certify that the staff has carried out the training*** with details of the period the staff has spent on the training and the works carried out on the company letterhead
- If there is no PE/PEPC at the organisation where the training was carried out the certification letter must be signed by ***a senior officer of the organisation*** using company letterhead (refer to SAMPLE 1(ii)) and another ***letter of support signed by a PE/PEPC*** certifying the training carried out must be submitted (refer to SAMPLE 2).
- GE also may apply to participate in *the Mentor Programme of the Institution of Engineers of Malaysia (IEM)* to undergo training under supervision of PE/PEPC.



Requirement of Professional Engineer (PE/PEPC) to Supervise/Support Graduate Engineer (GE) undergoing practical training

- Any Professional Engineer (PE/PEPC) may supervise a Graduate Engineer (GE) *regardless of the number of years* registered with BEM.
- The PE/PEPC must be from *same branch (discipline) as the GE*
- If the PE/PEPC is from a minor branch or non related branch, the GE needs to *obtain approval from the Board.*



what is next



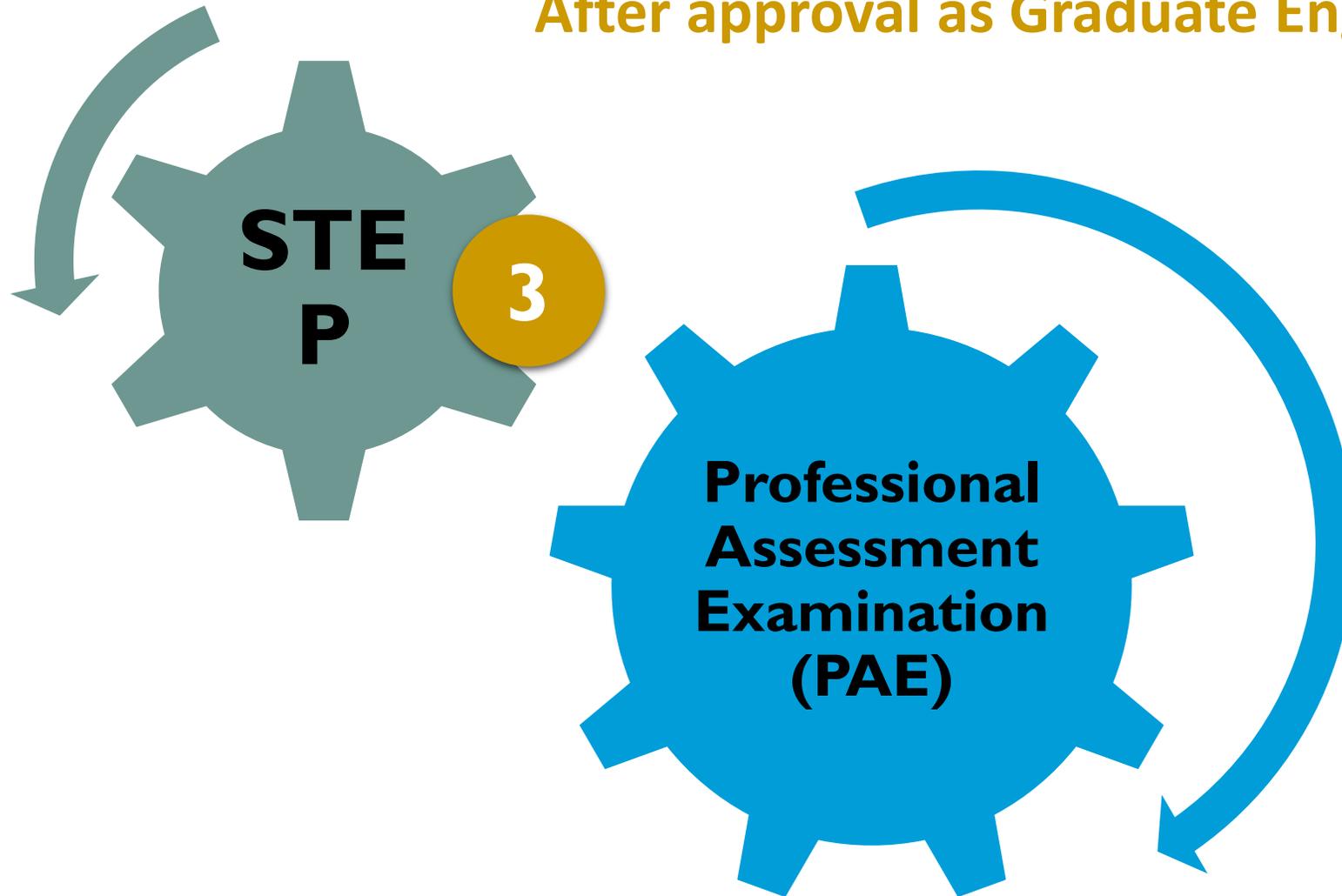
Upon satisfactory completion of practical experience,

a Graduate Engineer may apply to sit for a Professional Assessment Examination

before he/she could apply to be upgraded as a Professional Engineer.



After approval as Graduate Engineer





Pre-requisite to sit for the Professional Assessment Examination

- ***Registered as a Graduate Engineer with BEM***
- ***At least three years engineering experience (after registration as graduate engineer) in the branch of engineering specified at graduate registration inclusive of one year supervised practical training obtained in Malaysia***





Three Routes to become a Professional Engineer

A

BEM Route

Professional
Assessment
Examination
(PAE)

Via IEM or
MySET or
ACEM

B

International/
Others Route

Professional
Qualifications
equivalent to
PAE

- plus Code of
Conduct Exam

C

IEM Route

IEM
Professional
Interview
(PI)
*“Enhanced
process since
2014”*





Section 10.(2)(a)(ii - New sub-section Three routes to register as a Professional Engineer

(a) any person –

(i) who is registered as Graduate Engineer and has obtained the practical experience under paragraph (1)(b)

(ii) who –

(A) has passed a professional examination conducted by the Board;

(B) holds a professional qualification which the Board considers to be equivalent to the professional assessment examination conducted by the Board; or

(C) is a corporate member of the Institution of Engineers (Malaysia);

and

(iii) who has complied with all the requirements of the Board;



Route B (International) Professional Engineer from an approved overseas Professional Body

- i. The applicant needs to sit and pass the Code of Conduct Examination.
- ii. Applicant shall submit to BEM a certified latest qualification certificate issued by the overseas Regulatory/Professional Body.
- iii. The professional engineers status shall be checked that it is equivalent to BEM's professional assessment examination (PAE).
- iv. Meets the minimum 3 years practical experience as per Regulation 22(1)

Route C (IEM)



[Home](#)

[Technical Division](#)

[Directory](#)

[Membership](#)

[International](#)

[Publicatio](#)

i. The IEM Professional Interview (PI) is equivalent to BEM-PAE.

ii. Still needs one year industry experience

<https://www.myiem.org.my/content/professional-interview-801.aspx>

Professional Interview (PI)

[Home](#) / [Membership](#) / [Application](#) / [Member](#) / [Professional Interview \(PI\)](#)

Description

Requirements

- A candidate for election into this grade shall produce evidence to the satisfaction of the Council that he is worthy of election and
- That he has a graduate qualification as approved by the Council and
- Is a Graduate Engineer for a minimum period of three years
- Preferably the candidate must be working under the guidance of a Professional Engineer for a minimum of three years

[Professional Interview \(Outcome Based Competence Assessment\)](#)

In 2014, IEM embarked on enhancing the existing Professional Interview (PI) Process and Practice as part of periodic review to improve quality. The objectives include:

- Establishing a competency-based Professional Interview by benchmarking a well-established outcome-based competence standard.
- Developing rubrics with common yardsticks for rating PI Candidate in order to minimize subjectivity of assessment in both the oral interview and the written papers.
- Revising current PI process with related documentation to support the above-mentioned.



Which Route? A, B or C?

BEM-PAE

VS

Other recognised qualifications
(eg C.Eng., etc)

VS

IEM-PI





BEM-PAE (Route A):

- **Big changes since Aug 2022**
- **Outcome-based approach**





The New OUTCOME-BASED PAE





Why the word “OUTCOME”? -BASED PAE

Focus is on
“outcome” in the form of competencies
attained by candidate





**Structure of
The New
OUTCOME-BASED PAE
Compared with
old PAE**



Route A - BEM old PAE

Allocation

1. Preparation of documents for submission :

- a) **Career History (Experience) Report**
- b) **Project/Design Report**
- c) Relevant forms

2. **Examination by two examiners**

2 weeks
a) **Interview (30 minutes – 1 hour)**

b) **Essay writing (2 questions, 1.5 hrs each)**

- i. On candidate's training & experience, 2 questions to be given by interviewer after interview, candidate to select one of the 2.
- ii. On Code of ethics, 8 questions available on website, interviewer will select 2 of the 8 for candidate to choose one.

Route A - BEM **OUTCOME-BASED** PAE

Allocat

e

2

weeks

1. Preparation of documents for submission :

- a) Application Form (includes career history/experience write-up)
- b) ~~Project/Design Report~~ Training & Experience Report
- c) Relevant forms (Self Testimony of Competence)

2. Examination by two examiners

a) Interview (30 minutes – 1 hour)

15 minute powerpoint presentation of selected technical work/project

b) Essay writing (2 questions, 1.5 hrs each)

i.

Essay (i)

Removed

ii.

Essay (ii) on ethics - new format based on personal experience

- Written exam on Technical Competency if “border-line” failed Interview

Old PAE requires one of 4 different types of Technical Report

- 1) Design of an engineering work
– calculations & drawings.
- 2) A project report:
Feasibility study report, system design report, or
comprehensive report of a major engineering project.
- 3) A technical report for an engineering plant/system/works:
Installation report, operation report, or maintenance report.
- 4) An engineering research report (excluding Masters/PhD thesis)

Removal of Time-based Requirements

The following minimum requirements for design and site experience in the old PAE, which are time-based, **are no longer required.**

Engineering Branch and Related Sub Branches	Design Experience (Month)	Site Experience (Month)
Civil Engineering	12	12
Mechanical Engineering	6	12
Electrical Engineering	12	6
Electronic Engineering	6	12
Chemical Engineering	6	6
Other Branches of Engineering	6	6

The removal of this outdated time-based criteria is consistent with the outcome-based approach and international best practices, where none of the renowned international engineering bodies have this restriction.

Reasons to Become a Professional Engineer



There are really many reasons
but most will fall in four categories .

1. A legal necessity.
2. Improved employment security.
3. Better opportunities for advancement.
4. Personal satisfaction.





Becoming a PE in Malaysia: Benchmarked Against the World's Best





INTERNATIONAL ENGINEERING ALLIANCE

Seven
constituent
agreements

Washington Accord
Sydney Accord
Dublin Accord

International Professional Engineers Agreement
International Engineering Technologists Agreement
APEC Engineer Agreement
Agreement for International Engineering Technicians





Qualities of a Registered Professional Engineer

Competent, Intellectual, Mature,
Responsible & Ethical.

Able to analyse solve engineering problem.

Able to perform design works & do supervision

Assume responsibilities.

Must have the knowledge, both practical and
technical to practice in the field of engineering.





Qualities of a registered professional

Knowledge of codes / regulations related to that field of engineering

Able to anticipate of likely problem to be encountered

Able to provide services conforming to regulations, code of practice, best engineering practice in the best interest of the client



So, let's begin!

Afternoon Session:
**Preparation of Documentations
for Submission**





Q & A





THANK YOU



“Committed To Engineering Excellence”

BOARD OF ENGINEERS MALAYSIA

Tingkat 11 & 17, Blok F Ibu Pejabat JKR

Jalan Sultan Salahuddin, 50580 Kuala Lumpur

<http://www.bem.org.my>

enquiry@bem.org.my or complaint@bem.org.my.

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