

BEM

OUTCOME-BASED

PROFESSIONAL ASSESSMENT

EXAMINATION

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Professional Assessment Examination*

Date:
26th July 2022
Venue: Zoom



Outline of Presentation

BEM OUTCOME-BASED PROFESSIONAL ASSESSMENT EXAMINATION (PAE)

Introduction

Differences between current PAE and outcome-based PAE

Outcome-based PAE in line with existing BEM Regulations

Competence areas and elements

Revised interview process



INTRODUCTION



International Benchmarking

PAE underwent a review in line with the **global move** in the international engineering community towards an **outcome-based competence assessment** for international recognition and cross-border mobility.

With this assessment method, the **Outcome-based PAE** would be **on par with international best practices.**

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



REASONS FOR INTRODUCTION OF THE PEPC

- The big majority of engineers, including Professional Engineers, are employed in Contracting, Maintenance, Employees of Consultants, Government, Academia, Sales, etc.
- Only a small fraction wish to be a 'Submitting Person' in engineering consultancy, a PEPC, legally being responsible for the plans and documents submitted to authorities.
- The activities of PEPC acting as 'Submitting Person' → has a direct and critical impact on public safety and interest. They would need to be examined on their competency.
- The PEPC category has to sit for a PCE – Professional Competency Examination – to secure the submitting license called a Practicing Certificate.

PE & PEPC : “Two-tier registration” system

- **Previously (prior to 2015 Amendments), a PE is entitled to submit plans & documents**
 - The PAE was designed for this role.
- **A PE who is not intending to be ‘submitting person’ & need not sit for this Professional Competency Exam.**
 - **hence the assessment criteria for PAE needs to change to allow for this change in role.**
 - **but can still retain their professional status and the title of “Ir.” .**

**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”.**



**DIFFERENCES
BETWEEN
CURRENT PAE
AND
OUTCOME-BASED PAE**



DIFFERENCES BETWEEN CURRENT AND OUTCOME-BASED PAE

| Current PAE | Outcome-Based PAE |
|---|--|
| Out-of-date in that it was developed more than twenty years back mainly from the perspective of consulting engineers. | Bench-marked to current international best practices for professional engineering assessment. |
| Practicing engineers not in consulting line find it difficult to meet the requirements for D1 (Design) and D2 (Site) experiences. | Open-up to all engineering professions with the open definition of design and development of solution to engineering problems as in Competence Elements B1, B2 and B3. |
| It emphasizes length of time such as in D1, D2, D3 (Management), D4 (Other works) and D5 (teaching/ postgraduate studies). | It emphasizes competence covering five (5) Competence Areas A, B, C, D, E – i.e. it is competence-based. |

DIFFERENCES BETWEEN CURRENT AND OUTCOME-BASED PAE

Current PAE

It does not prescribe the need for evidence on competence; hence the necessity and difficulty for Examiners to search through the application form and reports to get or guess needed but hidden information.

It requires the Examiners to judge subjectively by questioning whether the working experience is satisfactory based on whatever information that could be elicited from the application form and reports – more judgmental and subjective.

Outcome-Based PAE

It asks the applicants to provide evidence on required competence to be used as a basis for assessment – i.e. it is evidence-based. The evidence is in the form of narratives of the work experiences which demonstrate attainment of competence.

It has assessment rubrics and threshold statement guides to help Examiners to match the evidence provided by Applicants to the most appropriate competence level -- more objective and less judgmental.

Removal of Time-based Requirements

The following minimum requirements for design and site experience which are **time-based are no longer required.**

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

| 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 |

Removal of Time-based Requirements

- BEM amended the policy on 9.4.2019 to omit the requirements of specific time spent on office design & site / field experience requirements for graduate engineers applying for the PAE since the 2015 Amendments.
- The Amendments has resulted in a landscape change with the introduction of the so called “two-tier” system where public safety safeguard for UBBL submissions (or similar) are no longer at PE level, but at PCE level (with the rigour and strictness it deserves).
- The requirement was introduced more than 40 years ago when the PE was introduced mainly for UBBL submission purposes, hence it was appropriate more for engineers in consultancy firms. Engineering in Malaysia has since expanded beyond traditional construction, to cover energy, manufacturing, plant, etc.
- Practicing engineers not in the consulting line find it difficult to meet the requirements. Hence those in the oil & gas industry, government (JKR, JPS, etc.), factories & plants, contractors, developers, etc. are generally left out not being able to apply.

Removal of Time-based Requirements

- Other areas of experience apart from consultancy can include manufacturing, construction, commissioning, maintenance, teaching, research and project management.
- This has ensured that engineers working in these various areas become eligible to apply for the PAE.
- With BEM opening up to the other areas of industry, the old requirement has become inappropriate.
- “Design” and “site work” been replaced with Competence Area B with three Elements which comprehensively cover all aspects of engineering application.
 - ✓ “Design” has now been replaced with “development of ...solutions...” (B1-2)
 - ✓ “Site work” has now become “Implementation of ... solutions...” (B3).

| Competency Element | Competency Area B: PRACTICAL APPLICATION OF ENGINEERING: |
|--------------------|---|
| B1 | Review and/or identification of project requirements, problems, opportunities and/or engineering techniques. |
| B2 | Investigations, analysis, design and development of engineering solutions. |
| B3 | Implementation of design solutions or other engineering tasks, and evaluating their effectiveness |

BEM CURRENT PAE

Allocate
2 weeks

1. Preparation of documents for submission :

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

2. Examination by two examiners

a) Interview (30 minutes – 1 hour)

- i. Questions relating to the two submitted reports
- ii. What, why, engineering concepts, decisions made, etc.

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.

BEM OUTCOME-BASED PAE



BEM **OUTCOME-BASED** PAE

Allocate
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

- i. Questions relating to the two submitted docs ..& the presentation
- ii. What, why, engineering concepts, decisions made, etc.

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

i.

Essay (i)
Removed

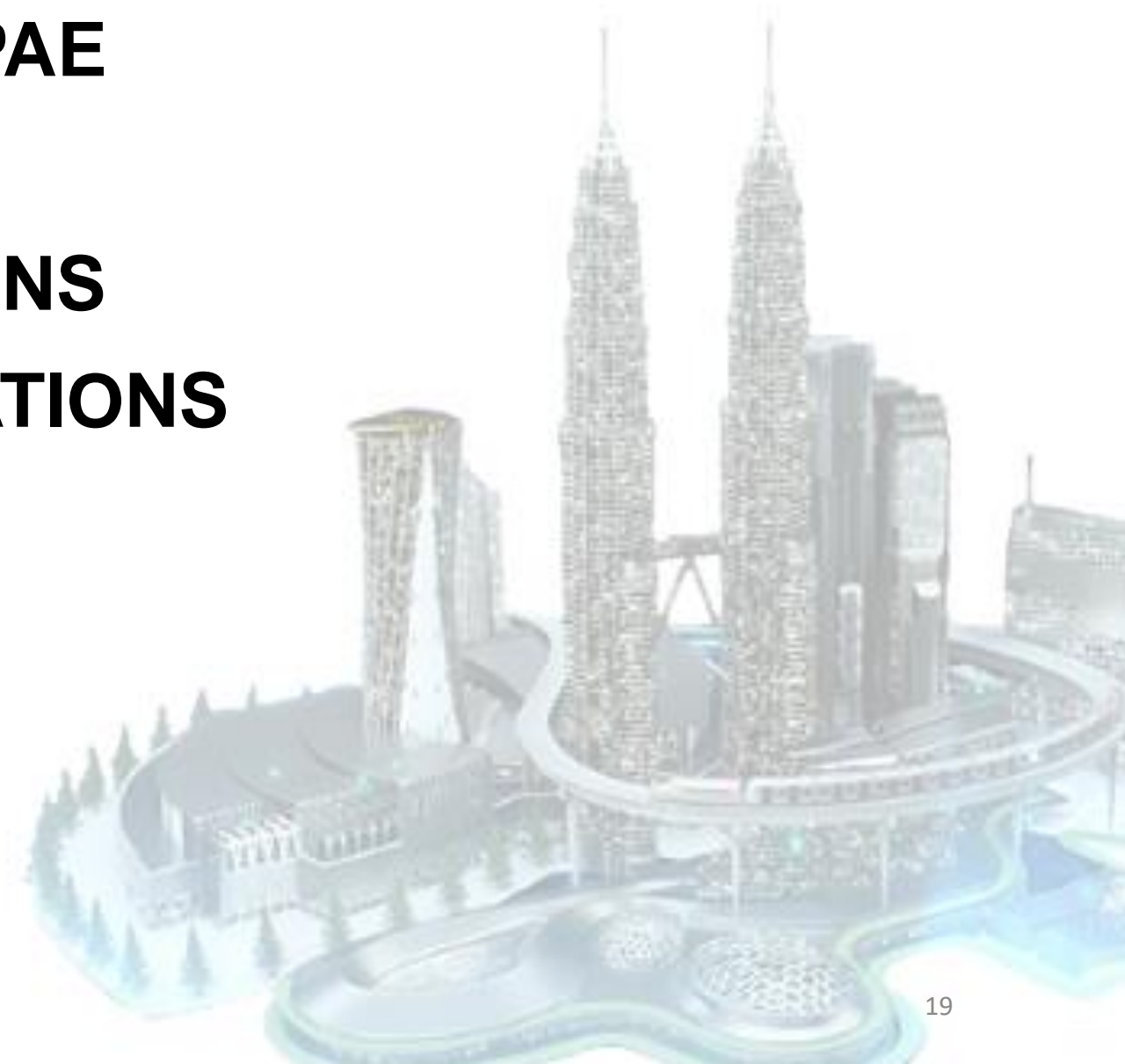
ii.

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

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



OUTCOME-BASED PAE IN LINE WITH EXISTING PROVISIONS OF THE ACT & REGULATIONS



| <p>EXISTING REGULATIONS (REGULATION 38)</p> | <p>OUTCOME-BASED PAE</p> |
|--|---|
| <p>The Professional Assessment Examination that a Graduate Engineer has to pass under section 10(2)(i)(b) of the Act in order to be entitled to be registered as a Professional Engineer shall consist of –</p> | |
| <p>(a) a professional interview conducted by not less than two examiners appointed by the Board;</p> | <p>(a) A professional interview conducted by not less than two senior examiners appointed by the Board, where the candidate has to do a presentation on a technical project</p> |

**EXISTING REGULATIONS
(REGULATION 38)**

(b) a written paper on any relevant subject related to the practical experience which he has obtained;

OUTCOME-BASED PAE

(b) Candidate to prepare and submit a *competency report* together with his application form detailing his practical experience in accordance to *competence categories A, B, C & D*.
(The PAE measures the outcome of practical training and development for independent practice. The competency profiles written by the candidate are used as evidence for assessment of competencies attained.)

| EXISTING REGULATIONS (REGULATION 38) | OUTCOME-BASED PAE |
|---|--|
| (c) a written paper on his understanding of the Code of Professional Conduct; and | (c) A sit-in written examination detailing the candidate's understanding of the Code of Professional Conduct and professionalism in line with competence category E. |
| (d) any other examination, written or otherwise, to be determined by the Board. | (d) A sit-in written examination on candidate's technical competency, for "border-line cases where he is unable to justify his competence satisfactorily during the presentation and interview. This shall be decided by the examiners for "border-line" cases at the end of the interview. |



COMPETENCE AREAS AND THEIR COMPETENCE ELEMENTS



PERSONAL COMPETENCE STATEMENTS

What do we mean by competence?

Professional competence is the **ability to carry out a task to an effective standard**, of which the achievement requires the combination of **knowledge, understanding, skills, values, as well as professional attitudes**. It means being able to perform a specific task **correctly, safely, effectively and consistently**.

What characteristics are we looking for?

Professional Engineers are characterized by their **ability to develop appropriate solutions to engineering problems**, using new or existing technologies, **through innovation, creativity and change**.

They might develop and apply **new technologies**, promote **advanced designs and design methods**, introduce new and more **efficient production techniques**, marketing and construction concepts, or pioneer new engineering services and management methods.

Professional Engineers are variously engaged in **technical and commercial leadership** and possess **effective interpersonal skills**. They must also demonstrate **professional commitment**.

You have to prepare **three major documents** for submission:

1. Application Form

- includes career history/experience.

2. Training & Experience Report

– A self testimony of competence attained by candidate

3. Powerpoint presentation of selected technical work

- Maximum eight slides

To be submitted later, but not later than two days before interview.

1. Application Form - includes career history/experience

When filling up the **Application form**, you are required to (a) describe concisely each job task or project work you have personally performed; (b) indicate the size and complexity of the job task or project work; and (c) specify the role you have played in the job task or project work as follows:

1. **Participating role** (participate and learn in the job task or project work)
(Candidate has minimum involvement but does not have sufficient evidence)
2. **Contributing role** (gain better experience and contribute to the job task or project work)
(Candidate has moderate involvement and sufficient evidence to show his exposure)
3. **Leading role** (lead the job task or project work and account for the outcome)
(Candidate has substantial involvement and is able to strongly indicate his exposure)

Against each job task or project work described in the application form, just put in the role you played in terms of 1, 2, or 3 under the related competence elements (A, B, C, D, E). This is to enable the PAE assessors to know all the job tasks or project works that are related to each and every competence element.

2. Training & Experience Report

Self testimony of competence gained

Four competence areas will be self-reported:

A. KNOWLEDGE AND UNDERSTANDING OF ENGINEERING

B. PRACTICAL APPLICATION OF ENGINEERING

C. MANAGEMENT AND LEADERSHIP

D. COMMUNICATION AND INTERPERSONAL SKILLS

The four areas above will be assessed during the **oral interview**

A fifth competence area:

E. ETHICAL & PROFESSIONAL CONDUCT

will be assessed by a *sit-in written examination*

Training & Experience Report

Fill up this form

TRAINING & EXPERIENCE REPORT
BASED-ON-COMPETENCE-GAINED

Name: _____

Branch of registration: _____

Graduate Registration number: _____

How should you use this section?

The four areas of Competence, A, B, C and D, must be demonstrated in order to practice professionally. They are subdivided further into thirteen (13) Competency Elements, i.e. A(1-3), B(1-3), C(1-3) and D(1-3).

For each of the Competency Elements, you are required to explain in a narrative your work experiences as evidence which has contributed to the competency.

These narratives will be the evidence used for demonstration by you and as the basis for assessment by examiners during the Professional Assessment Examination (PAE).

Please ensure the narrative, or evidence, for each of the Competency Element has around 300-500 words depending on the amount and variety of your experience.

What are the levels of competency expected?

While a Professional Engineer is expected to be able to demonstrate his/her competence in all of the areas listed, the depth and extent will vary with the nature and requirements of his/her experience.

Hence you are expected to demonstrate a degree of competence in each area at a level which is consistent with your actual specific role/s. You may have a higher level of competence in some areas than others, and possibly the levels may be quite limited in certain areas.

However, you need to demonstrate an understanding of, and familiarity with, the key aspects of competence in all areas as a minimum requirement while demonstrating higher levels of competence in those areas which are critical to your role. Overall, you need to demonstrate an appropriate balance of competencies.

What constitute evidence of your competencies?

Evidence that need to be demonstrated are narratives of your work experiences and proficiencies which has contributed to the competency as you engaged in various engineering activities and/or encountered engineering problems in your career.

The given examples of activities to demonstrate Competency Element, listed in the template which follows, are examples of evidence that demonstrate the specific competency. They provide guidance to help identify those appropriate for the particular Competency Element.

They are included as examples only, since the most appropriate activities will vary with each individual role. The list is not exhaustive and other types of activities might be valid.

Normally, there is no necessity to refer to all of your activities for evidence in each area of competence. If you have had many roles, select those which are most relevant and best illustrate the Competency Element. Examples from two or several projects or tasks should usually be appropriate, being very specific in the descriptions of each.

The objective is to convince the interviewers such that, before you walk into the interview, they already think you are indeed "PE material" and all they have to do is confirm your competence.

How should you do the write-up?

You need to do the write-up in this template carefully and concisely, highlighting your key role and responsibilities (not merely a job description) and achievements as evidence for each Competency Element.

Some example points that you can elaborate as evidence are:-

- > Explanation of the context and justifications in which you made decisions.
- > Benefits of presenting technical information for review by others.
- > Explanation of investigation results; and how you ensured the quality of the data used.
- > Justification on choice of techniques, software, etc that guided your technical decisions.
- > Description of how you reached to particular outcome.
- > Technological changes which affected your methods or decisions.

Further guidance when writing-up:-

- > Focus on your individual achievements, not what the team did. Try as much as possible to use phrases such as "I designed", "I negotiated", "I led a construction team", "I participated in", "I implemented", "I achieved", etc.
- > Use terms which can be understood by a non-specialist in your field. Avoid using jargon and unnecessary or unexplained abbreviations.
- > Indicate the size and complexity of the projects or tasks for which you had direct or partial responsibility; for example, numbers of people supervised, the value in financial terms of the activity.

Your write-up will be the main reference during the interview, therefore it is in your own interest to present your work clearly.

----- Page Break -----

| COMPETENCY AREAS & ELEMENTS | |
|-----------------------------|--|
| Competency Element | <p>Competency Area A:</p> <p>KNOWLEDGE AND UNDERSTANDING OF ENGINEERING</p> <p>Comprehension of advanced engineering knowledge of the widely-applied principles underpinning good practice</p> |
| A1 | <p>Broadening personal knowledge, understanding and technical skills in applicant's own and/or allied fields of specialisation</p> <p>Examples of activities as evidence to demonstrate this competency:-</p> <ul style="list-style-type: none"> •-> Formal training or post-graduate study related to your role •-> Learning and/or developing new engineering knowledge in a different industry or role •-> Learning current and/or emerging technology and technical best practice in your area •-> Developing a broader and deeper knowledge base through research and experimentation •-> Learning and developing new engineering techniques and theories in the workplace |
| A2 | <p>Broadening personal knowledge and experience in relation to products or services engaged by an organisation, possibly with a view to improvement</p> <p>Examples of activities as evidence to demonstrate this competency:-</p> <ul style="list-style-type: none"> •-> Carrying out technical research and development •-> Learning, analysing and/or developing solutions involving complex, non-standard, multidisciplinary or safety-critical problems •-> Learning and/or developing new applications, designs, processes or systems based on new, established or evolving technology •-> Learning, developing and/or evaluating continuous improvement systems •-> Identify constraints and exploit opportunities for development and transfer of technology |

TRAINING & EXPERIENCE REPORT

BASED ON COMPETENCE GAINED

How should you use this section?

- The four **Competency Areas**, A, B, C and D, must be demonstrated in order to practice professionally. These are subdivided further into thirteen (13) **Competency Elements**, i.e. A(1-3), B(1-3), C(1-4) and D(1-3).
- For each of the Competency Elements, you are required to **explain in a narrative your work experiences** as evidence which has contributed to the competency element.
- These narratives will be the evidence used for demonstration by you and as the basis for assessment by examiners during the interview.

COMPETENCY AREAS (4)

&

COMPETENCY ELEMENTS (13)

COMPETENCY AREAS & ELEMENTS

| Competency Element | Competency Area A: KNOWLEDGE AND UNDERSTANDING OF ENGINEERING |
|--------------------|--|
| A1 | Broadening personal knowledge, understanding and technical skills in applicant's own and/or allied fields of specialisation. |
| A2 | Broadening personal knowledge and experience in relation to products or services engaged by applicant, possibly with a view to improvement. |
| A3 | Learning, comprehension and application of relevant engineering codes, standards, specifications and/or guidelines, especially those appropriate to local context, requirements, and application. |

| Competency Element | Competency Area B: PRACTICAL APPLICATION OF ENGINEERING: |
|--------------------|---|
| B1 | Review and/or identification of project requirements, problems, opportunities and/or engineering techniques. |
| B2 | Investigations, analysis, design and development of engineering solutions. |
| B3 | Implementation of design solutions or other engineering tasks, and evaluating their effectiveness |

| Competency Element | Competency Area C: MANAGEMENT AND LEADERSHIP |
|--------------------|---|
| C1 | Planning to enable effective implementation of projects or engineering tasks. |
| C2 | Managing budget, people and other resources for an engineering task or project. |
| C3 | Leadership of teams in the workplace, developing and assisting colleagues to meet changing technical and managerial needs. |
| C4 | Promotion of continuous quality improvement and best practices |

| Competency Element | Competency Area D: COMMUNICATION AND INTERPERSONAL SKILLS |
|--------------------|---|
| D1 | Effective communication in the National Language and/or English Language with others, at all levels. |
| D2 | Effective presentation and discussion of proposals, justifications and conclusions. |
| D3 | Personal and social skills, with awareness of diversity and inclusion issues. |

How should you do the write-up?

- You need to do the write-up in this template carefully and concisely, highlighting your **key role and responsibilities** (not merely a job description), and **achievements**, as evidence for each Competency Element.
- The length of the narratives, or evidence, should be around **300 - 500 words for each of the Competency Elements**, depending on the amount and variety of your experience.

What constitute evidence of your competencies?

- Evidence that need to be demonstrated are **narratives of your work experiences and proficiencies which has contributed to the competency** as you engaged in various engineering activities, and/or as you encountered engineering problems in your career.
- Normally there is **no necessity to refer to all** of your activities for evidence in each area of competence. If you have had many roles, select those which are most relevant and best illustrate the Competency Element. Examples from two or several projects or tasks would usually be appropriate, being very specific in the descriptions of each.
- The objective is to convince the interviewers such that, before you walk into the interview, they already think you are indeed “PE material” and all they have to do is confirm your competence.

What is meant by EVIDENCE?

- Evidence refer to narratives of your work experiences and proficiencies which has contributed to the competency as you engaged in various engineering activities and/or encountered engineering problems in your career. They are self-testimonies of competences gained by the candidate.
- For the purpose of the PAE report, evidence does not normally refer to records, documents or objects, although the candidate may wish to include these as supporting materials in the form of softcopy appendices or loose items brought during the interview.

What are the levels of competency expected?

- While a Professional Engineer is expected to be able to demonstrate his/her competence in all of the areas listed, the **depth and extent will vary** with the nature and requirements of his/her experience.
- Hence you are expected to demonstrate a **degree of competence in each area at a level which is consistent with your actual specific role/s**. You may have a higher level of competence in some areas than others, and possibly the levels may be quite limited in certain areas.
- However, you need to demonstrate an **understanding of, and familiarity with, the key aspects of competence in all areas** as a minimum requirement while demonstrating higher levels of competence in those areas which are critical to your role.
- Overall, you need to demonstrate a **balance** of competencies that is appropriate for your role as a Professional Engineer.

EXAMPLES
For
NARRATIVES
OF
COMPETENCY ELEMENTS

General example elaborations that you can use for the narratives

- Explanation of the context and/or justifications in which you made decisions.
- Benefits of presenting technical information for review by others.
- Explanation of investigation results; and how you ensured the quality of the data used.
- Justification on choice of techniques, software, etc that guided your technical decisions.
- Description of how you reached to particular outcome.
- Technological changes which affected your methods or decisions.

EXAMPLES OF EVIDENCE

- **The given examples of activities for each Competency Element, also listed in the downloadable document template, are example evidence that demonstrate the specific competency element.**
- They provide guidance to help you identify those appropriate for your experience.
- They are intended as examples only, since the most appropriate activities will vary with each individual role. The list is not exhaustive and other types of activities might be valid.

EXAMPLES OF POINTS FOR THE WRITE-UP

| Competency Element | Competency Area A: KNOWLEDGE AND UNDERSTANDING OF ENGINEERING |
|--------------------|--|
| A1 | <p>Broadening personal knowledge, understanding and technical skills in applicant's own and/or allied fields of specialisation.</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none">• Formal training or post-graduate study related to your role• Learning and/or developing new engineering knowledge in a different industry or role• Learning current and/or emerging technology and technical best practice in your area• Developing a broader and deeper knowledge base through research and experimentation• Learning and developing new engineering techniques and theories in the workplace |
| A2 | <p>Broadening personal knowledge and experience in relation to products or services engaged by applicant, possibly with a view to improvement.</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none">• Carrying out technical research and development• Learning, analysing and/or developing solutions involving complex, non-standard, multidisciplinary or safety-critical problems• Learning and/or developing new applications, designs, processes or systems based on new, established or evolving technology• Learning, developing and/or evaluating continuous improvement systems• Identify constraints and exploit opportunities for development and transfer of technology |
| A3 | <p>Learning, comprehension and application of relevant engineering codes, standards, specifications and/or guidelines, especially those appropriate to local context, requirements, and application.</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none">• Understanding and applying the relevant codes and standards relevant to engaged projects• Development of codes, standards, specifications and/or guidelines• Localisation of international codes, standards, specifications and/or guidelines |

Competency Area B:

PRACTICAL APPLICATION OF ENGINEERING:

Application of appropriate theoretical and practical methods to the analysis, design and/or solution of engineering problems

Competency Element

B1

Review and/or identification of project requirements, problems, opportunities and/or engineering techniques.

Examples of activities as evidence to demonstrate this competency:

- Identifying/defining engineering problems or future needs in work place
- Reviewing/identifying technical improvements to services, products, processes or systems
- Preparing specifications, taking account of functional and other requirements
- Establishing user requirements for solution of engineering problems
- Reviewing specifications and tenders to identify technical issues and potential improvements
- Carrying out technical risk analysis and identifying mitigation measures
- Reviewing and selecting techniques to undertake engineering tasks.
- Exploring and assessing opportunities relating to new and emerging technologies

B2

Investigations, analysis, design and development of engineering solutions.

Examples of activities as evidence to demonstrate this competency:

- Selecting appropriate investigation and research methodologies needed to undertake engineering tasks
- Investigating a technical issue, identifying potential solutions and determining the factors needed to compare them
- Identifying and carrying out tests or trials, and analysing and evaluating the results
- Carrying out technical design, simulations, analysis or value engineering.
- Preparing, presenting and deciding on design recommendations, with appropriate analysis of risk, and taking account of cost, quality, safety, reliability, accessibility, appearance, fitness for purpose, security (including cyber security), intellectual property constraints and opportunities, and environmental impact

B3

Implementation of design solutions or other engineering tasks, and evaluating their effectiveness

Examples of activities as evidence to demonstrate this competency:

- Implementing solutions to engineering tasks.
This includes construction, fabrication, supervision and/or commissioning of projects in accordance to design and specifications. The implementation takes account of critical constraints, including due concern for safety, sustainability and disposal or decommissioning.
- Identifying lessons learned
- Ensuring that the implementation will result in the appropriate practical outcome
- Evaluating existing designs or processes and identifying faults or potential improvements including risk, safety and life cycle considerations
- Actively learning from feedback on results to improve future design solutions and contributing to accepted best practices

| Competency Element | Competency Area C: MANAGEMENT AND LEADERSHIP Responsibility, management and leadership in relation to technical, commercial and financial matters. |
|--------------------|--|
| C1 | <p>Planning to enable effective implementation of projects or engineering tasks.</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none"> • Preparing budgets and associated work programmes for projects or tasks • Systematically reviewing the factors affecting the project implementation including safety, sustainability and disposal or decommissioning considerations • Carrying out a task or project risk assessment and identifying mitigation measures • Leading on preparing and agreeing implementation plans and method statements • Negotiating and agreeing arrangements with customers, colleagues, contractors and other stakeholders, including regulatory bodies • Ensuring that information flow is appropriate and effective |
| C2 | <p>Managing budget, people and other resources for an engineering task or project.</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none"> • Setting up appropriate management systems • Establishing and maintaining quality standards and budget within legal and statutory requirements • Organising/coordinating/directing work teams and project activities • Managing the balance between quality, cost and time • Scheduling, monitoring and control of work progress and costs , taking appropriate corrective actions when required • Interfacing effectively with customers, contractors and other stakeholders • Gather and evaluate feedback and recommend improvements. |
| C3 | <p>Leadership of teams in the workplace, developing and assisting colleagues to meet changing technical and managerial needs.</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none"> • Agreeing objectives and work plans with teams and individuals • Reinforcing team commitment to professional standards • Leading and supporting team and individual development • Assessing team and individual performance, and providing feedback • Seeking input from other teams or specialists where needed and managing the relationship • Providing specialist knowledge, guidance and input to engineering teams, engineers, customers, management and relevant stakeholders • Leading a research programme • Leading an undergraduate university programme • Developing and delivering a teaching module/course at Masters or PhD level |
| C4 | <p>Promotion of continuous quality improvement and best practices</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none"> • Promoting quality throughout the organisation as well as its customer and supplier networks • Developing and maintaining operations to meet accepted quality standards • Supporting or directing project evaluation and proposing recommendations for improvement • Implementing and sharing the results of lessons learned |

| | |
|---------------------------|---|
| Competency Element | <p>Competency Area D:</p> <h2>COMMUNICATION AND INTERPERSONAL SKILLS</h2> <p>Ability to work with others constructively, to explain ideas and proposals clearly and to discuss issues objectively and constructively</p> |
| D1 | <p>Effective communication in the National Language and/or English Language with others, at all levels.</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none"> • Preparing reports, specifications and other documentation on complex matters • Leading, chairing, contributing to and recording meetings and discussions • Exchanging information and providing advice to colleagues • Engaging or interacting with professional networks |
| D2 | <p>Effective presentation and discussion of proposals, justifications and conclusions.</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none"> • Contributing to scientific papers or articles as an author • Preparing and delivering presentations on substantive matters • Preparing and/or presenting bids, proposals, plans, studies, etc • Leading and sustaining debates with audiences • Feeding back results of discussion to improve proposals, papers, etc |
| D3 | <p>Personal and social skills, with awareness of diversity and inclusion issues.</p> <p>Examples of activities as evidence to demonstrate this competency:</p> <ul style="list-style-type: none"> • Knowing and managing own emotions, strengths and weaknesses • Being confident and flexible in dealing with new and changing interpersonal situations • Identifying, agreeing and working together towards collective goals • Creating, maintaining and enhancing productive working relationships • Resolving conflicts • Being supportive of the needs and concerns of others, especially where this relates to issues of diversity and inclusion |

Further guidance when writing-up :-

- Focus on your individual achievements, not what the team did.
- Try as much as possible to use phrases such as “I designed”, “I negotiated”, “I led a construction team”, “I participated”, “I implemented”, “I achieved”, etc.
- Use terms which can be understood by a non-specialist in your field. Avoid use of jargon and unnecessary or unexplained abbreviations.
- Indicate the size and complexity of the projects or tasks for which you have had direct or partial responsibility. For example, highlight numbers of people supervised, or the value in financial terms of the activity.

Your write-up of the Training & Experience Report will be evidence of your competencies.

It will become the main reference during the interview, therefore it is in your own interest to present your points clearly.



REVISED INTERVIEW PROCESS



Format of the Interview

is normally as follows:



- **Introductions**
 - **15 Minute Presentation from Candidate**
 - **45 Minute Q&A Session**
 - **Opportunity for final statement**
 - **Conclusion**
-
- The interview will be conducted in English
(or Bahasa Malaysia upon request by candidate).
 - After the interview, candidate will be required to write an essay relating his experience on Code of Conduct and professionalism

Presentation guideline

The 15 minute presentation at the start of the interview, provides you with the opportunity to explain **example/s of technical work** that you have led and/or contributed to.



The content of the presentation should be based on either:

- (i) A single piece of work or project that you consider best highlight your **competencies A and B** (*engineering knowledge & its application*),
or;
- (ii) Examples from your experience/s in your career that you consider best highlight your **competences A and B**.

Presentation guideline *(cont.)*

- You are not required to go into a deep technical description.
- It will be sufficient to just demonstrate the key points of your personal technical contribution to the work/project presented.
- The interviewers will explore this further during the main part of the interview.



*The preferred mode is PowerPoint presentation,
limited to **maximum of 8 slides**.*

*Presentation material should be sent by email to the assessors,
with a copy to the BEM's agent two days before the interview.*

Assessment

The purpose of the interview is to confirm that you have demonstrated the overall level of competence and commitment expected of a professional engineer.

The assessors will generally use the practical experience section of your application form as an agenda for the interview and will encourage you to talk about your experience, **drawing out evidence of competence** during the interview.█

The assessors will triangulate the evidence gained during the interview to the attainment of competence. They will give you the opportunity to expand on the information in your application and clarify any points.

Documents/Reports/Drawings presented should be certified by a PEng/PEPC.

FAILURE CASES

- If your oral presentation and the ensuing Q&A outcome is conclusively unsatisfactory to the assessors, **the PAE will result in failure.**
 - *For “border-line” cases, the assessors may subject you to a 1½ hour written examination on technical topics (technical essay) based on your experience. Failure in this technical essay will then result in failure in the interview.*
- Candidates who fail the Code of Conduct written paper, but have passed the oral interview part, will have the opportunity to repeat the paper at a later time.

CODE OF CONDUCT ESSAY

- Carried out after the oral interview
to assess attainment achieved in Competence Area E.

Competence Area E:

ETHICAL AND PROFESSIONAL CONDUCT.

**Personal commitment to ethical conduct,
professional standards, recognizing obligations to
society, the profession and the environment.**

CODE OF CONDUCT ESSAY

Instructions:

- You are required to demonstrate your competence in area E by writing an essay to share your **PERSONAL EXPERIENCE** covering the five Competency Elements in Area E.
 - *If you have not encountered significant personal experience for any of the five Competency Elements listed, you may demonstrate your understanding in those Elements by means of narrating hypothetical or other real life example cases not necessarily experienced by you.*
- You may write in either the English language or Bahasa Malaysia.

**Competence Area E
is subdivided further into
5 Competency Elements, E1 to E5.**



E1. Compliance with relevant codes of conduct and ethical principles.

Examples of activities as evidence to demonstrate this competency:

- *Understanding the ethical issues that you encounter in your role*
- *Demonstrating compliance with relevant codes of conduct/ethics*
- *Identifying aspects of the code which are particularly relevant to your role*
- *Handling problems of ethical or moral nature*
- *Upholding ethical principles as defined by your organisation or company, giving example/s.*

E2. Managing and applying safe systems of work.

Examples of activities as evidence to demonstrate this competency:

- *Identifying and taking responsibility for your own obligations and ensuring that others assume similar responsibility (for health, safety and welfare issues)*
- *Ensuring that systems satisfy health, safety and welfare requirements*
- *Developing and implementing (including evaluating and improving) appropriate hazard identification and risk management systems and culture*
- *Applying health and safety legislation, codes, guidelines and/or relevant company policies*

E3. Undertaking engineering activities consistent with principles of sustainable development with due care to the environment.

Examples of activities as evidence to demonstrate this competency:

- *Applying principles of sustainable development in your day-to-day work*
- *Acting responsibly, taking account of environmental, social and economic issues simultaneously*
- *Providing products and services which maintain and enhance the quality of the environment and community, and while meeting financial objectives*
- *Understanding and securing stakeholder involvement in sustainable development*
- *Minimising wastage and environmental impact while using resources efficiently and effectively.*

E4. Continuing professional development (CPD) to maintain and enhance competence in your own area of practice.

Examples of activities as evidence to demonstrate this competency:

- *Undertaking reviews of your own development needs*
- *Planning how to meet personal and organisational CPD objectives*
- *Carrying out planned and unplanned CPD activities such as training or attending courses & seminars*
- *Maintaining evidence of competence development*
- *Evaluating CPD outcomes against any plans made*
- *Assisting others with their own CPD*

E5. Understanding the legal matters pertaining to the engineering profession.

Examples of activities as evidence to demonstrate this competency:

- *Being aware of the Registration of Engineers Act, including attending seminars, workshops, etc*
- *Being aware of other laws and regulations relevant to your role (such as contract law, construction law, environmental law, health/safety law), including attending seminars, workshops, etc*
- *Ensuring compliance to relevant laws and regulations in your work involvement, giving examples*
- *Involved with work within relevant legislation and regulatory frameworks, including social and employment*

- **Time allocated for the essay writing covering all the 5 items above is 1½ hours**
- **If you fail the Code of Conduct paper, you will be allowed **another TWO attempts.****



OVERALL ASSESSOR'S GUIDELINES



ASSESSOR'S GUIDELINES

In assessing the Competence Attainment Level for each discrete competency element, the following threshold scores are used:

- Level 0 (0 point) – No evidence of competence
- Level 1 (1 point) – Little evidence of competence
- Level 2 (2 points) – Adequate evidence with shortfalls
- Level 3 (3 points) – Satisfactory level of evidence
- Level 4 (4 points) – Good level of evidence

EVIDENCE refer to facts/information available from the application documents and the interview to support assessment of the candidate's competence gained from his training.

ASSESSOR'S GUIDELINES *(cont.)*

The marks (points) allocated will be based on the **evidence as given by the candidate in the application form** as well as the **training & experience report**, and **verified during the interview**.

It should be measured mainly by taking into account:-

- (a) each job task or project work performed by the candidate;
- (b) the size and complexity of each job task or project work;
- (c) the role played by the candidate in each job task or project work; and
- (d) all job tasks or project works done by the candidate related to a discrete competence element.

SAMPLE ASSESSMENT FOR CATEGORY A

| PAE Interview – Part I (a) | | | | | | |
|--|------------------|---|----------|----------|----------|---------------|
| Competence Category A – Knowledge and Understanding | | | | | | |
| Assessment Element | Attainment Level | | | | | Justification |
| <p>A1 Candidate has maintained and extended personal knowledge, understanding and technical skills in own and allied fields of specialization.</p> | 0 | 1 | 2 | 3 | 4 | |
| <p>A2 Candidate has learnt and broadened personal knowledge and experience in the technology, products or services related to own specialization, preferably with a view to improvement.</p> | 0 | 1 | 2 | 3 | 4 | |
| <p>A3 Candidate has comprehended and applied knowledge and understanding of the relevant engineering codes, standards, specifications, applications, especially those appropriate to local context, requirements, and application.</p> | 0 | 1 | 2 | 3 | 4 | |
| Average Category A Score | | | | | | 3 |

Recommendation of a PASS in PAE Interview Part I (a) is conditioned on fulfilling all the following mandatory requirements:

a) An overall average of 2.5 or more; and

b) Each competence category minimum average score of 2.0.

| PAE Part I -- Interview Part I (b) -- 15-Min Presentation Rubrics and Rules | | | |
|--|---|-------------------------------|-----------------------------|
| Competence Category | | Assessment | Justifications and Comments |
| A | Knowledge and understanding of engineering within the context of the project or work presented | Satisfactory / Unsatisfactory | |
| B | Practical application of engineering in terms of design & development of solution within the context of the project or work presented | Satisfactory / Unsatisfactory | |
| Overall Assessment | | | Pass / Fail |

Marking Procedure and Passing Criteria

- For each of the competency categories A and B, mark the assessment as either Satisfactory or Unsatisfactory, based on the evidence demonstrated in the presentation.
- Provide brief justifications and/or comments for each assessment.

Passing of the 15-Min Presentation is conditioned upon fulfilling all the following mandatory requirements:

- ***Both competency categories A and B must be assessed as Satisfactory.***

Note (1)

Take note of the presentation skills and triangulate it with other related evidence in assessing competency category D.

Note (2)

If the Candidate fails the 15-min Presentation, he/she may be given another chance to demonstrate competence in technical presentation by way of writing a Technical Essay. However, this chance is only given provided the candidate passes PAE Interview Part I (a).

| PAE Part I -- Interview | | | | | | |
|--|-----------------|---|---|---|---|---------------------------|
| Part I (b) -- Technical Essay as an Alternative Assessment | | | | | | |
| Rubrics and Rules | | | | | | |
| Technical Knowledge and Application (T) | | | | | | |
| Assessment Element | Rated Threshold | | | | | Justifications |
| T1 -- Understand the scientific & engineering fundamentals of related discipline and own specialisation (Competence Element A1) | 0 | 1 | 2 | 3 | 4 | Average Category T Score: |
| T2 -- Apply the appropriate theoretical and practical methods to the analysis and solution of engineering problems (Competence Element B2) | 0 | 1 | 2 | 3 | 4 | |
| T3 – Apply the engineering knowledge related to local practices, codes, standards, specifications, materials, products, environments, etc. (Competence Element A3) | 0 | 1 | 2 | 3 | 4 | |
| Writing Proficiency (W) | | | | | | |
| Assessment Element | Rated Threshold | | | | | Justifications |
| W1 - Understand the question clearly and answer it with suitable technical contents and relevant examples (Competence Element D1) | 0 | 1 | 2 | 3 | 4 | Average Category W Score: |
| W2 - Present the answer concisely and coherently with proper heading and paragraphing (Competence Element D2) | 0 | 1 | 2 | 3 | 4 | |
| W3 - Present the answer legibly with acceptable grammar, lexicon, spelling, and punctuation (Competence Element D1) | 0 | 1 | 2 | 3 | 4 | |
| Overall Average Score = (T + W) / 2 | | | | | | Pass / Fail |

Assessment Rules of Technical Essay

(i) **Average Score of T** -- add up the rated scores of T1, T2 and T3, and divide it by 3. The average score should be rounded to one decimal.

(i) **Average Score of W** -- add up the rated scores of W1, W2 and W3, and divide it by 3. The average score should be rounded to one decimal.

Overall Average Score -- *add up the average scores of T and W, and divide it by 2. The average score should be rounded to one decimal.*

Recommendation of a Pass in Technical Essay is conditioned on fulfilling all the following requirements:

- ***An overall average of 2.5 or more; and***
- ***Average score of 2.0 or more for T and W respectively.***

Note –

- (1) Assessors are required to set two technical essay questions for the Candidate to choose one to answer;
- (2) The set questions should be relevant to the engineering branch and specialisation of the Candidate;
- (3) Each question should be set in such a manner that the Candidate can answer it in terms of T1, T2 and T3 so as to facilitate marking.

| PAE Part II -- Code of Conduct Essay Rubrics and Rules | | | | | | |
|--|------------------------|---|---|---|---|-----------------------|
| Assessment Element | Rated Threshold | | | | | Justifications |
| E1 -- Comply with the relevant codes of conduct | 0 | 1 | 2 | 3 | 4 | |
| E2 -- Manage and apply safe systems of work | 0 | 1 | 2 | 3 | 4 | |
| E3 -- Undertake engineering activities in a way that contributes to sustainable development | 0 | 1 | 2 | 3 | 4 | |
| E4 – Carry out CPD necessary to maintain and enhance competence in own area | 0 | 1 | 2 | 3 | 4 | |
| E5 -- Understand the legal matters of engineering profession and be able to communicate with legal personnel on these issues | 0 | 1 | 2 | 3 | 4 | |
| Average Score of Category E | | | | | | Pass / Fail |

Recommendation of a Pass in the Code of Conduct Essay is conditioned upon fulfilling all the following mandatory requirements:

- ***An average score of 2.5 or more; and***
- ***A rated score of 2.0 or more for each of the E1, E2, E3, E4 and E5 respectively.***

Assessment Rules and Procedure for Overall Recommendation

- The core of PAE is the Interview (Part I). If the Candidate fails the Interview, he will have to re-sit the entire PAE regardless of whether he passes or fails the Code of Conduct Essay (Part II).
- If the candidate passes the Interview but fails the Code of Conduct Essay, he will be required to re-sit only the Code of Conduct Essay.

Recommendation of a Pass in PAE is conditioned upon fulfilling all the following mandatory requirements:

- *A pass in Part I – the Interview; and*
- *A pass in Part II – the Code of Conduct Essay.*

OVERALL RECOMMENDATION (TICK ONLY ONE BOX)

Pass PAE via passing the Interview (Part I) and the Code of Conduct Essay (Part II)

Pass the Interview (Part I) only and has to re-sit the Code of Conduct Essay (Part II)

Fail the Interview and has to re-sit PAE.

THANK YOU



“Committed To Engineering Excellence”

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Acknowledgement:

BEM acknowledges the Engineering Council of the UK for their leading role in the development of outcome-based criteria for professional assessments of competences. A significant part of this presentation is adapted from publicly-accessible information and documentation from the EC-UK website, in particular The UK Standard for Professional Engineering Competence (UK-SPEC) 4th Ed.

