

## **ADMISSION AND REGISTRATION MECHANISMS IN MALAYSIA**

### **1. Registration as Professional Engineer with BEM**

To be eligible for professional registration, an engineer must first have to be registered as a Graduate Engineer upon graduation with an accredited engineering degree as provided in the Registration of Engineers Act which governs the practice of engineering in Malaysia.

### **2. Graduate Engineer Registration**

In accordance with the provisions in the Registration of Engineers Act, Malaysia, any person who wants to take up employment as an engineer must be registered as a Graduate Engineer with BEM. BEM recognises the experience gained by an engineering graduate only after he has registered as a Graduate Engineer. As such, it is prudent for an engineering graduate to register as a Graduate Engineer at the very beginning of his engineering career.

A copy of the Registration of Engineers Act could be obtained from the website of BEM at [www.bem.org.my](http://www.bem.org.my).

The recognised academic qualification for registration as a Graduate Engineer with BEM includes the following:

- a) An engineering degree accredited/recognised by BEM available in an approved list maintained by BEM or;
- b) Pass in Part I & Part II of the Engineering Council Examination of United Kingdom or;
- c) Pass in Part I & Part II of the IEM/BEM Graduate Examination in any particular branch.

### **3. Admission as Corporate Member of the IEM**

Under the Constitution of The Institution of Engineers Malaysia, the applicant must satisfy the Council of the Institution that he has attained such standard as set by the Council to testify to his proficiency as a professional engineer, and that he is worthy of election in accordance to the Bylaws and Regulations of the Institution. Any applicant desirous of being a member of the Institution shall be proposed and seconded. The proposed form shall be signed by not less than two (2) Corporate members of whom at least one (1) shall be a Fellow of the Institution or a member of not less than 10 years standing in the Institution. The applicant must also indicate that he had undergone the Institution training scheme drawn up to provide practical training of young graduates entering the profession of engineering and to ensure that such training confirms to the election of Corporate members. Applicant is expected to obtain his practical experience in planning design, execution or management of such works as stipulated and relevant for the profession of an engineer. The applicant can apply to sit for the Institution's Professional interview after having undergone at least three years of relevant work experience, either through the IEM Log Book Training Scheme or working under the guidance of a Corporate Member of IEM and a P.Eng of the same discipline.

Other training scheme(s) bearing similar provisions as the Institution training scheme may be accepted as its equivalent. However prior approval of the Institution is required for such scheme to be accepted.

Information on the IEM Professional Interview and the Training Scheme is available at the IEM website at [www.iem.org.my](http://www.iem.org.my)

The professional interview so conducted by IEM requires the appointment of 2 Professional Interviewers. The Principal Interviewers should be a Corporate Member of IEM (MIEM) for at least 5 years whereas the second interviewer for at least 3 years. The professional interviewers will review the practical work experience gained by the applicant and will assess his/her competency during the interview. The applicant must be able to show that he can apply in practice, the theory of at least one of the branches of engineering science, and he must be ready to answer questions related to his work experience basically based on knowledge of engineering processes, management, and understanding of investigation, planning, design, construction, manufacture, operation, maintenances and research. The applicant must have acquired an understanding of the fundamental processes of research, investigation, planning, analysis, design and construction wherever relevant by actually taking part in contributing to these processes in connection with an engineering research or project, whether or not it is brought to conclusion or fruition.

Acceptable engineering experience will have to include design as well as sufficient site exposure. The applicant will then have to write two essays to demonstrate his/her technical capabilities as well as an understanding of the professional conduct.

The applicant is eligible for independent practice and having a valid practising certificate. The applicant should have completed an engineering degree programme which is accredited and/or assessed to be substantially equivalent to a recognised engineering degree programme accredited by the Engineering Accreditation Council. All applicants must agree to be bound by the Code of Professional Conduct and Ethics of both the IEM and BEM.

#### **4. Admission as IEM Graduate Member**

A graduate member of the Institution must be a person who in respect of his age, his educational attainment and his practical training complies with the requirement of the Bylaws and Regulations. His degree must be accredited by the EAC.

A graduate of an accredited engineering programme of EAC whether locally or overseas is considered to have met the academic qualification requirement. EAC evaluates local engineering programme. Accreditation of overseas engineering degree programme is based on the signatories to Washington Accord. For those not listed in the Accord, recognition is on case to case basis. Any applicant or graduate who have not completed or failed to satisfy the requirement of the EAC accredited programme may also reinforced his basic degree with a Master degree in course work taken from a recognised and accredited university. The reinforced Master degree must be in the same/related discipline or branch of engineering as the basic degree.

#### **5. Registration Requirement and Attainment of Work Experience**

All applicants are required to have a minimum of 3 years of acceptable engineering experience prior to being registered as Professional Engineer or elected as Corporate

member of the IEM. Acceptable engineering experience not only include what was mentioned in item 4 above but also include the application of theory and should provide exposure to or experience in the following broad areas; management, communication and the social implications of engineering.

6. **Maintenance of Continuing Professional Development**

The Board of Engineers Malaysia has established the need to also collect Continuing Professional Development (CPD) Programme with the objective to ensure lifelong learning and to provide a framework through which professional engineers could maintain a record of systematic documentation and maintenance to improve and broadened his knowledge and skill development of personal qualities for execution of professional and technical duties throughout the engineers' working life. All professional engineers who are registered with the Board of Engineers Malaysia would need to maintain a required number of CPD agreed upon at 50 hours per year and 150 hours collected over a period of three years in order to renew an annual practicing certificate. Details of the BEM CPD Policy is enclosed as **Attachment A**.

7. **Code of Professional Conduct and Ethics**

All professional engineers registered with Board of Engineers, Malaysia and The Institution of Engineers Malaysia be bound by the Registration of Engineers Act 1967 (Revised 2015) and the Code of Professional Conduct and IEM Regulations on Professional Conduct could be referred in **Attachment B**

## **PART C - DISCIPLINES OF ENGINEERING**

### **General Requirement**

The engineering disciplines recognised for the purpose of membership of IEM are listed as :

Civil  
Structural  
Geotechnical  
Electrical  
Electronic  
Mechanical  
Chemical  
Environmental  
Aerospace  
Aeronautical  
Agriculture  
Building Services

A point to note is this list may be expanded when the need arises. An applicant can be registered in one or more disciplines provided he meets the necessary requirement in each and every one of the discipline he is to be registered.

### **2. Area of Practice and Scope of Education Programme**

The area of practice and the scope of education programme that the applicant must comply are listed in the IEM PI Guidelines – revised 2015 attached as per **Attachment C**.

## PART D - REFERENCES

All document can be view at the website of both Board of Engineers Malaysia and The Institution of Engineers, Malaysia

- i) Registration of Engineers Act 1967 (Revised 2002) Act 1158  
[http://www.bem.org.my/v3/act\\_2002.html](http://www.bem.org.my/v3/act_2002.html)  
[http://www.bem.org.my/v3/regulations\\_2003.html](http://www.bem.org.my/v3/regulations_2003.html)
- ii) Constitution and Bylaws of The Institution of Engineers, Malaysia (inclusive of amendments up to March 2013)  
[http://www.myiem.org.my/content/constitution\\_and\\_bylaws-47.aspx](http://www.myiem.org.my/content/constitution_and_bylaws-47.aspx)
- iii) Booklet on Functions and Role of the Board of Engineers, Malaysia (LJM 000 16/95) <http://www.bem.org.my/v3/aboutus.html>
- vi) Application for admission/transfer to the Grade of Graduate Member of The Institution of Engineers , Malaysia  
<http://www.myiem.org.my/content/application-62.aspx>
- v) Booklet on Requirements and Procedures for Registration as Graduate Engineers (LJM 00017/95)  
[http://www.bem.org.my/v3/app\\_graduate.html](http://www.bem.org.my/v3/app_graduate.html)
- vi) Booklet on Accredited Qualifications for Registration as Graduate Engineers (LJM 00018/95)  
[http://www.eac.org.my/web/list\\_accredited.html](http://www.eac.org.my/web/list_accredited.html)
- vii) Engineering Programme Accreditation Manual 2<sup>nd</sup> Edition  
[http://www.bem.org.my/v3/accreditation\\_manual.html](http://www.bem.org.my/v3/accreditation_manual.html)
- viii) Booklet on Engineering Qualification Assessment Procedures (LJM 000 19/95)  
[http://www.bem.org.my/v3/app\\_professional.html](http://www.bem.org.my/v3/app_professional.html)
- ix) Application for election/transfer to the Grade of Member of The Institution of Engineers Malaysia  
<http://www.myiem.org.my/content/application-62.aspx>
- x) Booklet on Route to Professional Engineer – Guidelines (LJM 00020/95)  
[http://www.bem.org.my/v3/app\\_professional.html](http://www.bem.org.my/v3/app_professional.html)
- xi) The IEM Professional Interview Guidelines  
[http://www.myiem.org.my/content/professional\\_interview-257.aspx](http://www.myiem.org.my/content/professional_interview-257.aspx)



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# **BOARD OF ENGINEERS MALAYSIA**

## **Continuing Professional Development Policy for Professional Engineers**

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## **1.0 INTRODUCTION**

Engineering provides an ever changing spectrum of challenges and opportunities. It is extremely vital that all engineers be committed to their own Continuing Professional Development (CPD) so that they could face these challenges and at the same time take advantage of opportunities that may arise.

Broadly speaking CPD includes activities that extends and/or updates the knowledge, skill or judgement and enables to:-

- Understand and apply advances in the arts and sciences of engineering,
- Face changes in career direction,
- Be more productive,
- Better serve the public

## **2.0 DEFINITION**

Continuing Professional Development is defined as systematic maintenance, improvement and broadening of knowledge and skill and development of personal qualities for execution of professional and technical duties throughout the engineers' working life.

## **3.0 OBJECTIVES**

The objective of CPD for Professional Engineer is the maintenance of technical knowledge and skill (i.e. competency) to do a job. At the same time to require all engineers to stay abreast of new engineering development in their field and changes in codes and regulations.

## **4.0 POLICY STATEMENT**

In order to achieve the above objectives, the Board of Engineers Malaysia (BEM) has developed a policy on CPD as follows:

- The CPD requirement will apply to all Professional Engineers.
- The CPD shall be an average of 50 hours per year over a three year period

## CPD Policy for Professional Engineers

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- The Professional Engineer may apply to BEM for (partial/total) exemption of CPD requirement.
- Formal recognition of CPD will be provided by BEM. CPD activities will be carried out by BEM or other reputable organizations authorised by BEM
- The BEM will promote continuing education opportunities.
- The BEM will promote and endorse CPD courses offered by professional institutions, educational institutions, employers and industry.
- The BEM will encourage employers and industry in the promotion and support of CPD for their employees.
- The BEM will administer a CPD audit system – up to 10% of practising Professional Engineers will be randomly audited each year.

### 5.0 TYPES OF CPD ACTIVITIES

The activity to qualify as CPD must be related to the career as a professional engineer. For many engineers CPD will include management, finance, law, economics, foreign languages and others in which the professional engineer carry out his business.

Functions that are routinely performed as part of the employment are not normally claimable – for instance university lecturers/consultants cannot claim under "Presentation and Papers" the lectures/reports they present as part of their employment.

The CPD programme for Professional Engineers will comprise six major groups of activities:

- a) Formal Education and Training Activities
- b) Informal Learning Activities
- c) Conference and Meeting
- d) Presentation and Papers
- e) Service activities
- f) Industry Involvement (for academicians)



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## CPD Policy for Professional Engineers

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If a Professional Engineer believes that he is undertaking other types of CPD that comply with the general definition in Section 2.0; he should make a submission for that to be recognized.

### **a) Formal Education and Training Activities (time weighted factor = 2)**

These include formal face-to-face education, distance education, short courses, and formal on-the-job training. They will almost always include time spent in preparation and/or follow-up and most will involve assessment.

A special case relates to the undertaking of the entire course work for a higher degree or post graduate diploma, either by the face-to-face or distance mode. Such completion will cover the CPD requirements for the rolling three-year period containing the course.

For formal face-to-face education the time claimed can include the actual hours of lectures attended and/or research undertaken. For distance learning, the simplest approach is to estimate the equivalent number of hours of formal face-to-face education that would have been involved if this mode had been utilised instead of the distance mode.

Short courses are defined as involving presenters who are external to the workplace. They include courses at tertiary institutions that are not taken for award purposes.

### **b) Informal Learning Activities (various time weighted factors)**

Informal learning activities include on-the-job learning, that takes place because of workplace requirements, and private study where you can exercise complete discretion. On-the-job learning requirements usually arise when you undertake a new project and identify areas where you need to extend your competency base. Private study is an opportunity for you to direct the way in which your professional career develops.

Typical of these activities are the reading of books, journals, manuals, etc and familiarisation with the operation of technological aids, computer programs, equipment, etc.

In both cases any activity claimed must be substantiated that it contributes to the development of your career as a professional engineer. A time weighted factor of 1 applies to the on-the-job learning while a factor of 0.5 applies to private study. In both cases, the maximum number of weighted hours that one can claim is 20 hours for each year.

**c) Conference and Meeting  
(time weighted factor = 1)**

These include all conferences, symposiums, visits and meetings conducted by Board of Engineers Malaysia and professional institutions to provide information. Those conducted by other acknowledged experts and organizations can also be claimed provided that the content relates to the development of your professional career.

The hours claimed should be for the interactive time spent when one attended such conferences, symposiums, seminars, inspections and meetings.

**d) Presentation and Papers  
(various time weighted factors)**

The preparation of material for courses, conferences, seminars and symposiums can be claimed if these activities contribute to the advancement of the engineering related competencies of others. A time weighting factor of 10 should be applied to the actual duration of the presentation, subject to a maximum of 30 hours per year.

**e) Service activities  
(time weighted factor = 1)**

Service to the profession may be considered particularly where it contributes to the continuing professional development of others. This includes contributions as a member of a course accreditation team, participation in CPD audits, review of technical papers prior to publication, and the technical aspects of work undertaken for the Boards and Committees of other professional institutions, including national committees and technical societies. CPD allowable under this heading is limited to 30 hours in any one year.

**f) Industry Involvement (for academician)  
(time weighted factor = 1)**

Engineers employed in academic positions are expected to foster links with industry for the benefit of engineering education, research and practice. This requirement also ensures that they are exposed to developments in engineering practice outside their university. Industry involvement will normally be in the form of consulting services. However, where one has close ties with industry, he can include supervision of industry-sponsored research.

Supervision of design projects carried out for industry and field trips may also be counted if they have contributed to the above objectives.

**6.0 ADDITIONAL NOTES**

Continuing Professional Development is for all Professional Engineers and is to be on a voluntary basis for the first two(2) years and mandatory thereafter, in which, every practicing Professional Engineer must submit his CPD records together with his application for renewal of registration with the Board of Engineers Malaysia.

Continuing Professional Development records will be checked and verified against the requirements of this Continuing Professional Development policy and the supporting documentation provided. If further clarification is needed, this information will be asked either to be forwarded to BEM, or an interview may be arranged at a mutually convenient place and time.

This verification may take the form of a certificate, list of result, record of attendance, receipt of course payment, or a written verification from the Provider responsible for the Continuing Professional Development activity.

For those whose Continuing Professional Development records are found to fail the audit, recommendations will be made as to the corrective action necessary to prevent a recurrence. Should it appear that false claims have been submitted, action will be taken under the Board's Disciplinary Regulations as a serious breach of ethics could be involved. In cases of non-compliance the following actions may result in:

## CPD Policy for Professional Engineers

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- A Professional Engineer to agree to a specified course of Continuing Professional Development before renewal of registration as Professional Engineer .
- Suspension of registration as Professional Engineer until specified action have been completed.
- Eventual withdrawal of registration as Professional Engineer.
- BEM imposing any other conditions which BEM deems fit before renewal of registration is allowed.

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**BOARD OF ENGINEERS MALAYSIA**

**CIRCULAR NO. 3/2005**

**GUIDELINES  
for  
CODE OF PROFESSIONAL CONDUCT**

- 1.0 **A Registered Engineer shall at all times hold paramount the safety, health and welfare of the public.**
- 1.1 A Professional Engineer shall approve and sign only those engineering documents that he has prepared or prepared under his direct supervision.
- 1.2 A Professional Engineer shall certify satisfactory completion of a piece of work only if he has control over the supervision of the construction or installation of that work, and only if he is satisfied that the construction or installation has fulfilled the requirements of the engineering design and specifications.
- 1.3 A Registered Engineer shall not reveal facts, data or information without the prior consent of the client or employer except as authorized or required by law or when withholding of such information is contrary to the safety of the public.
- 1.4 A Registered Engineer having knowledge of any violation of this code and Local Authorities regulations shall report thereon to appropriate professional bodies and, when relevant, also to public authorities and cooperate with the proper authorities in furnishing such information or assistance as may be required.
- 1.5 When the professional advice of a Professional Engineer is overruled and amended contrary to his advice, the Professional Engineer shall, if the amendment may in his opinion give rise to situation that may endanger life and/or property, notify his employer or client and such other authority as may be appropriate and explain the consequences to be expected as a result of his advice being overruled and amended.

- 2.0 **A Registered Engineer shall undertake assignments only if he is qualified by education and experience in the specific technical fields in which he is involved.**
- 2.1 A Professional Engineer shall not affix his signature to any plan or document dealing with subject matter in which he lacks competence, nor to any plan or document not prepared under his direction and control.
- 2.2 A Professional Engineer shall not accept assignment and assume responsibility for coordination of an entire project and sign and stamp (P.E. stamp) the engineering documents for the entire project unless each technical segment of the project is signed and stamped personally by the qualified engineer who has prepared the respective segment of the project.
- 3.0 **A Registered Engineer shall issue public statements only in an objective and truthful manner.**
- 3.1 A Registered Engineer shall be objective and truthful in professional reports, statements and testimony. He shall include all relevant and pertinent information in such reports, statements, or testimony, which should bear the date indicating when it was current.
- 3.2 A Registered Engineer may express publicly only technical opinions that are founded upon his competence and knowledge of the facts in the subject matter.
- 3.3 A Registered Engineer shall not issue statement, criticism or argument on technical matter that is inspired or paid for by interested parties, unless he has prefaced his comments by explicitly identifying the interested parties on whose behalf he is speaking and by revealing the existence of any interest he may have in the matter.
- 4.0 **A Registered Engineer shall act for each employer or clients as faithful agent or trustee.**
- 4.1 A Registered Engineer shall disclose all known or potential conflicts of interest that could influence or appear to influence his judgement or the quality of his services.
- 4.2 A Registered Engineer shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties.
- 4.3 A Registered Engineer shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which he is responsible.
- 4.4 A Registered Engineer as advisor or director of a company or an agency shall not participate in decision with respect to particular services solicited or provided by him or his organization.

- 4.5 A Registered Engineer shall not solicit or accept a contract from a body or agency on which a principal or officer of his organization served as a member of that body or agency unless with knowledge and consent of that body or agency.
- 4.6 A Registered Engineer while acting in his professional capacity shall disclose in writing to his client of the fact if he is a director or member of or substantial share holder in or agent for any contracting or manufacturing company or firm or business or has any financial interest in any such company or firm or business, with which he deals on behalf of his client.
- 4.7 All professional advice shall be given in good faith.
- 5.0 **A Registered Engineer shall conduct himself honourably, responsibly, ethically and lawfully so as to enhance the honour, reputation and usefulness of the profession.**
- 5.1 A Registered Engineer shall not falsify his qualifications or permit misrepresentation of his or his associates' qualifications. He shall not misrepresent or exaggerate his responsibility in or for the subject matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint venturers, or past accomplishments.
- 5.2 A Registered Engineer shall not offer, give, solicit or receive, either directly or indirectly, any contribution to influence the award of a contract which may be reasonably construed as having the effect of intent to influencing the award of a contract. He shall not offer any gift or other valuable consideration in order to secure work. He shall not pay a commission, percentage or brokerage fee in order to secure work.
- 5.3 A Registered Engineer shall check with due diligence the accuracy of facts and data before he signs or endorses any statement or claim. He shall not sign on such documents unless, where necessary, qualifications on errors and inaccuracies have been made.
- 5.4 A Registered Engineer shall respond, within reasonable time, to communication from the Board or any other relevant authority on matter pertaining to his professional service.
- 5.5 A Registered Engineer shall not maliciously injure or attempt to maliciously injure whether directly or indirectly the professional reputation, prospect or business of another Engineer.
- 5.6 A Registered Engineer shall not directly or indirectly
- (1) supplant or attempt to supplant another Engineer;
  - (2) intervene or attempt to intervene in or in connection with engineering work of any kind which to his knowledge has already been entrusted to another Engineer; or

- (3) take over any work of another Engineer acting for the same client unless he has
- (i) obtained a letter of release from the other Engineer or obtain such letter through the client, provided that this requirement may be waived by the Board; or
  - (ii) been formally notified by the client that the services of that other Engineer have been terminated in accordance with the provisions of any contract entered into between that Engineer and the client; provided always that, in case of dispute over non-payment or quantum of any outstanding fees, the client shall request the Board to be the stakeholder under the provision of Section 4(1)(e)(ea)
- 5.7 Except with the prior approval of the Board, a Registered Engineer shall not be a director or executive of or substantial shareholder in or agent for any contracting or manufacturing company or firm or business related to building or engineering. If such approval is given, such Engineer shall not undertake any contract work wherein he is engaged as a consulting engineer in such project unless it is in respect of a "design and build" project.
- 5.8 A Registered Engineer shall not be a medium of payment made on his client's behalf unless he is so requested by his client nor shall he, in connection with work on which he is employed, place contracts or orders except with the authority of and on behalf of his client.
- 5.9 A Registered Engineer shall not
- (1) offer to make by way of commission or any other payment for the introduction of his professional employment; or
  - (2) except as permitted by the Board, advertise in any manner or form in connection with his profession.
- 5.10 A Professional Engineer in private practice shall not without the approval of the Board enter into professional partnership with any person other than a Professional Engineer in private practice, a Registered Architect, a Registered Quantity Surveyor or a licensed Land Surveyor.

Dated: 3 February 2005  
[BEM-241<sup>st</sup> Meeting / 28<sup>th</sup> June 2004]



**TAN SRI DATO' Ir. Hj. ZAINI BIN OMAR**  
President  
Board of Engineers Malaysia



**THE INSTITUTION OF ENGINEERS, MALAYSIA**  
**REGULATIONS ON PROFESSIONAL CONDUCT**

**NOTE:**

A Code of Professional Conduct designed to cover all eventualities must necessarily be written in general terms expressing broad ethical principles. Almost every case of doubt as to the proper course of action required to conform to the Code of Professional Conduct arises from a conflict between a member's personal interest and his duty to others.

Regulations issued by the Council to interpret the Code indicate the manner in which members are required to conduct themselves in a number of situations that are frequently encountered. In other situations, members are required to order their conduct in accordance with the principle that, in any conflict between a member's personal interest and fair and honest dealing with other members of the community, his duty to the community must prevail.

A. The following Regulations on Professional Conduct are made by the Council under Section IX of the Bylaws. In these regulations 'member' means a member of any grade referred to in Section II of the Bylaws, and 'employer' includes 'client'.

- B. (1) A member shall at all times take care to ensure that his work and the products of his work constitute no avoidable danger of death or injury or ill health to any person.
- (2) A member shall take all reasonable steps to avoid waste of natural resources, damage of the environment, and wasteful damage or destruction of the products of human skill and industry.
- (3) A member shall take all reasonable steps to maintain and develop his professional competence by attention to new developments in science and engineering relevant to his field of professional activity and, if he is an employer, shall encourage his professional employees to do likewise.
- (4) A member shall not undertake responsibility as professional engineer which he does not believe himself competent to discharge.
- (5) A member shall accept personal responsibility for all work done by him or under his supervision or direction, and shall take all reasonable steps to ensure that persons working under his authority are competent to carry out the tasks assigned to them and that they accept personal responsibility for work done under the authority delegated to them.
- (6) A member called upon to give an opinion in his professional capacity shall, to the best of his ability, give an opinion that is objective and reliable.
- (7) A member whose professional advice is not accepted shall take all reasonable steps to ensure that the person overruling or neglecting his advice is aware of any danger which the member believes may result from overruling or neglect.
- (8) A member shall not make any public statement in his capacity as a professional engineer without ensuring that his qualification to make such a statement and any association he may have with any party which may benefit from his statement are made known to the person or persons to whom it is directed.

- (9) A member shall not, in self-laudatory language or in any manner derogatory to the dignity of the profession advertise or write articles for publication, nor shall he authorise any such advertisement or article to be written or published by any other person.
- (10) A member shall not recklessly or maliciously injure or attempt to injure, whether directly or indirectly, the professional reputation, prospects or business of another engineer.
- (11) A member shall inform his employer in writing of any conflict between his personal interest and faithful service to his employer.
- (12) A member shall not improperly disclose any information concerning the business of his employer or of any past employer.
- (13) A member shall not accept remuneration in connection with professional services rendered to his employer other than from his employer or with his employer's consent; nor shall he receive directly or indirectly any royalty, gratuity or commission on any article or process used in or for the purposes of the work in respect of which he is employed unless or until such royalty, gratuity or commission has been authorised in writing by his employer.
- (14) A member shall not improperly solicit work as an independent advise or consultant, either directly or by an agent, nor shall he pay any person, by commission or otherwise, for the introduction of such work.
- (15) A member acting as an independent adviser or consultant shall not be the medium of payment made on his employer's behalf unless so requested by his employer; nor shall he place contracts or orders in connection with work on which he is employed, except with the authority of and on behalf of his employer.

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### III. REQUIREMENTS FOR SPECIFIC DISCIPLINES

#### (A) CHEMICAL

##### TRAINING REQUIREMENTS

- a) A potential candidate is expected to have knowledge/ experience in areas related to the Chemical Engineering.
- b) The candidate is expected to possess and apply Chemical Engineering knowledge including but not limited to Transfer Processes, Unit Operations, Reaction Engineering, Thermodynamics, Control and Instrumentation and Process economics and Costing.

##### DESIGN EXPERIENCE

**The candidate is expected to have experience in the process and engineering design, fabrication requirements, material selection and erection requirements of process plant units which may include the preparation of process flow sheets showing heat and mass balances;**

##### **Field Experience**

The candidate is expected to have some experience in the start-up and commissioning and operation and/or testing and evaluation studies, trouble-shooting, performance enhancement and maintenance and planning coordination of chemical plants and items of equipment.

##### OFFICE/MANAGEMENT EXPERIENCE

The candidate is expected to have experience in the office or management of projects. This may be in the form of general engineering management which may include Marketing of Engineering Products and Services; Projects; Contracts; R&D; Quality; Technical Services; and Health, Safety and the Environmental aspects of Chemical Engineering Operations including related regulations and legislation control.

##### DOCUMENTATION REQUIREMENTS

The candidate is expected, where appropriate, to submit drawings and calculations for the design and selection, in whole or in part, or an item of work relating to Chemical or Process Engineering e.g. heat exchangers; absorption towers; distillation plant; liquor filters; gas dedusting equipment; plant layouts. A candidate may also submit notes or reports on performance test and feasibility studies.

## **(B) CIVIL**

### **TRAINING REQUIREMENTS**

- a) The candidate should have sufficient site experience expected of an engineer, who has spent a *minimum aggregate of twelve (12) months at site*.
- b) The candidate should have sufficient design office experience expected of an engineer, who has spent a *minimum aggregate of twelve (12) months* in the design office. The candidate should be able to demonstrate that he is thoroughly conversant with engineering design and he should have sufficient maturity to understand his own limitations. The candidate should also be able to indicate to the interviewers, his ability to develop himself further in his profession.
- c) A candidate should be able to demonstrate a high degree of proficiency in the analysis and detailing of structural elements. The candidate who is involved in civil engineering infrastructural works should have sufficient broad experience in earthworks, drainage, water reticulation, sewerage and road works. The candidate who has involved principally in large civil engineering works such as dam, water treatment must be able to demonstrate in depth knowledge in the particular field of works and at least understanding of the other areas. Design Coordination or Project Monitoring of the design or site works will not be considered.
- d) The candidate should show evidence of having adequate knowledge in the administration of construction contracts, tenders and legislation relevant to Civil Engineering profession in particular, and the construction industry in general such as Uniform Building Bylaws, Registration of Engineers Act, the Street Drainage and Building Act.

### **DOCUMENTATION REQUIREMENTS**

On top of the above requirements, civil engineering candidates in specialized fields may submit their documents as follows:

#### **(B1) Highway & Transportation:**

- ◆ Drawings, calculations and quantities to show adequate knowledge of the practical of the theory of civil engineering design in relation to highway engineering, e.g. geometric design; interchange design; bridge design; retaining walls; earthworks; pavement; drainage; road furniture
- and
- ◆ Notes or records on highway capacity standards in relation to estimated traffic volumes in particular reference to interchange/junction layout; highway material and pavement design; road location in urban or rural areas.

## **(B2) Tunnelling and Underground Space:**

- ◆ Drawings and calculations for the detailed design tunnels involving soil and rock mechanics such as the stability and deformation of the tunnel and underground space structures, underground caverns, and cut & cover structures.

and

- ◆ Notes and records from site investigation; field and laboratory tests; trial sections, etc for the purpose of the foregoing

## **(B3) Water Resources:**

- ◆ River basin study, prefeasibility or feasibility study of water resources development, computer modelling or water resources system, flood and drought forecasting, etc.

or

- ◆ Drawings and calculations and quantities for the design of an item of work related to hydrology.

or

- ◆ Record of fieldwork in hydrology, surface and groundwater hydrology, and water resources evaluation.

## **(C) ELECTRICAL, ELECTRONICS AND COMMUNICATION**

### **(C1) Electrical**

#### **TRAINING REQUIREMENTS**

##### **a) GENERAL**

A candidate is expected to have knowledge and experience in the design, installation, operation and/or maintenance of electrical installation or system with a voltage of at least 400V, three phase and operating current of at least 300A. He is expected to have sound electrical engineering knowledge and the ability to use such knowledge to solve electrical engineering problems that can arise in the course of his work. He is expected to be familiar with rules and regulations relating to the electricity industry, particularly those affecting his work. The candidate is expected to have sufficient exposure to medium voltage (1kV up to 33 kV).

##### **b) DESIGN EXPERIENCE**

The candidate is expected to have some experience in design of electrical system, installation, plant or equipment, which may include alteration or modification works. He shall be familiar with basic design principles and shall have a working knowledge of electrical distribution, protection, safety and the rules and regulations that govern them for *a minimum of one year* covering the following areas.

- (i) Acts and regulations
- (ii) Technical standards and their optimal applications and good engineering practices
- (iii) Assessment of load characteristics (demands, power quality, EMC, earthing, etc) of electrical systems.
- (iv) Safety and health against electrical hazards – direct and in – direct or secondary.
- (v) Characteristics and particulars of low voltage and high voltage system up to 11 kV
- (vi) Protection and fault discriminations – electric shock, over current, arc flash and Short circuit.
- (vii) Design and/or specifying and sizing electrical systems / components optimally – effective efficient, maintainable and cost optimized.
- (viii) Electrical installations of buildings to MS IEC 60364 or equivalent standards)

c) **FIELD EXPERIENCE**

The candidate is expected to have some experience in the supervision, installation, operation or maintenance of an electrical system, installation, plant or equipment and is expected to have good working knowledge of such system, installation, plant or equipment and the rules and regulations governing their installation, operation or maintenance for a **minimum of six months** in the following areas.

- (i) Acts and regulations, technical standards
- (ii) Comply with safety and health practices
- (iii) Comply with electrical installations of buildings to MS IEC 60364 or equivalent standards, code of practices and good engineering practices
- (iv) Application of design experience to modification and upgrading works.)

d) **OFFICE/MANAGEMENT EXPERIENCE**

The candidate is expected to have some experience in the office or the management of projects/works. This may include feasibility studies, costing, budgeting, tendering, contract administration etc.

**DOCUMENTATION REQUIREMENT**

- a) Drawings, charts, calculations, citations, compliance with Acts and regulations, and applications of standards and design rules for the design, installation, construction or operation in whole or part of a system or an item of work related to electrical engineering, and
- b) Notes or records on the installation, testing, commissioning, operation and maintenance of the system, plant or equipment, or other related document(s).

## **(C2) Electronic and Communication**

### **TRAINING REQUIREMENTS**

- a) A potential candidate is expected to have experience in the areas such as Telecommunication, Broadcasting, Multimedia Communication, IT, Information Communication Technology (ICT), Computers (Software & Hardware), Information Systems, Avionics & Aeronautics (Electronics related), Electronic Component Manufacture, Building Automation, Biomedical, Microelectronics, Mechatronics

Note: Software development, field, system, computational and parametric studies, system configuration development and planning, and control & instrumentation covering electronics would fall under this category.

- b) The candidate is expected to have basic knowledge of Electrical power 400V.

### **DESIGN EXPERIENCE**

The candidate is expected to have experience in the design of electronic and communication system which may include alteration or modification works for a ***minimum of six months***.

### **FIELD EXPERIENCE**

The candidate is expected to have some experience in the supervision, installation, operation or maintenance of an electronic/communication system and is expected to have knowledge of the rules and regulations governing their installation, operation or maintenance for a ***minimum of twelve months***.

### **OFFICE/MANAGEMENT EXPERIENCE**

The candidate is expected to have experience in the office or management of projects/works. This may include feasibility studies, costing, budgeting, tendering, contract administration etc.

### **DOCUMENTATION REQUIREMENTS**

- a) The candidate is expected to submit drawings, charts, calculations for the design, analysis, installation, testing, commissioning of an item of work.
- b) The candidate should include evidence showing experience in management. This may include project work such as operation, maintenance, testing of equipment or system related to the relevant field of work.

## **(D) MECHANICAL**

### **TRAINING REQUIREMENTS**

- a) A potential candidate is required to have experience in general mechanical engineering or relevant fields listed as **Appendix 1**.
- b) The candidate is expected to have sound knowledge of mechanical engineering practice. Evidence should be provided as in (a) and (b) below.

### **DESIGN EXPERIENCE**

The candidate is expected to have sufficient experience in the design of mechanical components, equipment or a system. The design may include alterations, addition or modifications to existing plant and equipment. The design experience shall be a **minimum of six months**.

### **FIELD EXPERIENCE**

*The candidate is expected to have sufficient workshop/site experience in the supervision, fabrication, installation, commissioning, operation and maintenance of mechanical engineering works and/or other related works and familiar with all regulations and codes governing safe practice. The field experience shall be a **minimum of one year**.*

### **OFFICE/MANAGEMENT EXPERIENCE**

The candidate is expected to have some experience in the office or the management of projects/works. This may include feasibility studies, costing, budgeting, tendering, contract administration etc.

**The candidate shall have not less than three years' experience in the above areas.**

### **DOCUMENTATION REQUIREMENTS**

- a) ***The candidate is expected to submit relevant drawings, calculations, charts, notes and records for the design, analysis, installation, testing and commissioning of an item of work in the relevant field of work for which the candidate was fully responsible.***
- b) The candidate should include evidence showing experience in management. This may include project work such as operation, maintenance, testing of equipment or system related to the field of work.



### **(D1) Aeronautical**

- a) Where appropriate, drawings and calculations for the design of part of an aircraft or guided missile, or the estimation of the performance of its engines or its structure, maintenance schedules for commercial airlines or the armed services;

and

- b) Notes or records, such as wind tunnel tests on models of aircraft or on parts thereof; flights trials; strength tests on wings or other components; vibration and stiffness tests; methods of construction and joining parts.

### **(D2) Industrial Engineering**

- a) Drawings, models and calculations to show adequate practical application of Industrial Engineering in the design of systems for:- material handling, work methods organisation and Ergonomic, Information Resources Management, Manufacturing Planning, Inventory Control and Quality Systems Documentations.

and

- b) Notes or records on the performance of above systems to help achieve strategic operational objectives, operational flexibility, cost reduction, added value or quality improvement.

### **(D3) Marine**

- a) Where appropriate, drawings and calculations for the design in whole or in part, of an item of work related to Marine engineering, such as: steam or internal combustion propulsion, or auxiliary machinery, such as electrical generating sets;

and

- b) Notes or records, such as operation or testing of one or more of the foregoing.

### **(D4) Naval Architecture and Shipbuilding**

- a) Drawing and calculations for an item of work relating to: a design study of a modern ship; the launching of a large ship; a typical ship's system, eg. oil fuel, ballast, fresh and salt water, ventilation and airconditioning; cargo handling.

and

- b) Notes or records such as: estimate of ship performance including model tests and propeller design; trials at sea; eg propulsive performance; sea keeping; vibration; planning, production and quality control applied to ship building.

## *APPENDIX 1 - MECHANICAL*

1. General mechanical engineering
2. Measuring and precision engineering
3. Agricultural machinery and equipment
4. Building services engineering
5. Material engineering
6. Facilities and plant engineering
7. Mechatronics and robotics
8. Automation and production
9. Industrial and manufacturing engineering
10. Aeronautical and aerospace
11. Marine and naval architecture
12. Mining and quarrying machinery and equipment
13. Welding and fabrication
14. Micro electromechanical systems
15. Acoustics and vibrations
16. Safety engineering
17. Energy engineering/management
18. Oil and gas engineering
19. Environmental engineering
  - thermal
  - sound
  - Internal air quality
20. Piping and pumping
21. Unfired and fired pressure vessels
22. Tribology and lubrication engineering
23. Fire engineering
24. Vertical/horizontal transport machinery
25. Air conditioning/ Heating and refrigeration
26. Biomedical engineering
27. Automotive engineering
28. Land Transportation