

REQUIREMENTS FOR REGISTRATION AS A PROFESSIONAL ENGINEER WITH THE PROFESSIONAL ENGINEERS BOARD SINGAPORE

Requirements

1 The Professional Engineers Board will register a candidate as a professional engineer if he/she meets the following requirements:

- i) Educational qualification – any one who:
 - a) holds a Degree of Bachelor of Engineering from the National University of Singapore, the Nanyang Technological University or the University of Singapore;
 - b) holds any other degree, diploma or qualification listed in the Professional Engineers (Approved Qualifications) Notification; or
 - c) satisfies the Board that he is otherwise qualified by having proper and recognized training in engineering and who passes an examination (Confirmatory Examination) prescribed by the Board.

- ii) Postgraduate practical work experience - sufficient, relevant practical experience after obtaining the approved qualifications, as follows:
 - a) practical experience in engineering work at a professional level in Singapore for a continuous period of more than two years and has passed such professional practice examination (Professional Practice Examination) as prescribed by the Board;
 - b) practical experience in engineering work for more than 5 years, which shall include prescribed practical experience in engineering work at a professional level in Singapore for more than two years comprising a continuous period of at least 12 months gained within the 5 years immediately preceding the date of his application for registration: or
 - c) practical experience in engineering work at professional level of more than 10 years which is recognized by the Board.

For applicants with experience that comes under paragraphs 2(a) or 2(b) above, the type of relevant practical experience should be as follows:

- a) where the person seeks to be registered in the civil or structural engineering discipline, the practical experience shall be obtained:
 - i) during a period of more than 12 months in a design office of the Government or an organization approved by the Board and whilst under the supervision of a registered professional engineer who has in force a practising certificate; and
 - ii) during a period of more than 12 months in supervisory work at a project site or engineering investigation work

- whilst under the supervision of a registered professional engineer who has in force a practising certificate;
- b) where the person seeks to be registered in the mechanical engineering discipline, the practical experience shall be practical experience in mechanical engineering work obtained during a period of more than two years in a mechanical workshop or organization approved by the Board and whilst under the supervision of a registered professional engineer who has in force a practising certificate;
 - c) where the person seeks to be registered in the electrical engineering discipline, the practical experience shall be practical experience in electrical engineering work obtained during a period of more than two years in an electrical organization approved by the Board and whilst under the supervision of a registered professional engineer who has in force a practising certificate;
 - d) where the person seeks to be registered in other branches of engineering and for engineers engaged in full-time teaching or research work, such relevant practical experience as may be acceptable to the Board obtained during a period of more than two years whilst under the supervision of a registered professional engineer who has in force a practising certificate.

Application for Registration

- 2 Application shall be made in Form PEB1 which is available on the Board's web site at <http://www.peb.gov.sg>.
- 3 An application for registration shall be accompanied by a fee of \$300.00 which comprises a non-refundable registration fee of \$150.00 and \$150.00 for certificate of registration.

Guide for Applicants

- 4 The Board shall appoint Interviewers for the purpose of ascertaining and reporting on the practical experience in engineering of any person applying for registration under the provisions of Part IV Section 15 of the Act. The Board shall prescribe the nature of such interviews with special reference to the applicant's ability to plan, design and supervise the construction and operation of engineering work which shall ensure safety of life and safeguarding of public health or property.
- 5 An applicant for consideration of registration under the Professional Engineers Act Part IV Section 15 shall in addition to having obtained the approved academic qualifications have to satisfy the Board as to the nature and duration of his practical engineering experience, his character and reputation as well as the ability to carry out the duties of a professional engineer effectively.

- 6 An applicant for consideration under Part IV Section 15 of the Professional Engineers Act shall submit a comprehensive Report of professional engineering training and experience (in quadruplicate) as detailed herewith:
 - (a) The Report shall fully describe the professional engineering training and experience since graduation. The Report which shall be about 2,000 words must be typewritten. It must not be a mere inventory of work prepared and executed but must describe the tasks on which an applicant has been employed, whether in investigation, planning, design, construction, manufacture or research.
 - (b) The Report shall include detailed accounts of projects and their costs carried out in chronological sequence and the applicant's degree of responsibility and precise position occupied. He shall enlarge on any special problems encountered, and on areas which he has specialized or obtained exceptionally good experience.

- 7 If as a result of the Report the applicant's application for Registration is deemed acceptable, he may be required:
 - (a) To submit drawings, calculations, and/or other documents (in quadruplicate) duly certified by his superior or employer (a Registered Professional Engineer).

These are to conform to one of the following alternatives:

 - (i) Working drawings, detailed design calculations relating to one or more of the applicant's own submitted drawings, and specifications. The applicant may submit any additional drawings not necessarily prepared by him to illustrate his experience in or upon engineering works; OR
 - (ii) Part of a feasibility study or a technical report for an engineering project, or a functional and economic comparison of designs for an engineering system; OR
 - (iii) A report incorporating research details and application of his research work in practice if possible. The report may be illustrated by drawings and must describe work actually carried out by the applicant.
 - (b) To write an essay on a subject or subjects selected by the Interviewers if it is considered necessary by the interviewers.

- 8 The applicant is required to attend an interview at an appointed place and time by a panel of Interviewers who are Professional Engineers appointed by the Board experienced in the same discipline as that of the applicant. The interview will generally be based on the applicant's Report of Experience and the drawings and calculations or documents submitted.

- 9 Generally the interview is to provide an assessment of the attributes gained by and required of the applicant to comply with Sections 15(2) and 15(4) of the Professional Engineers Act 1991. These attributes shall include:-

- (a) Design, workshop or other engineering experience, including technical, economic and administrative factors;
 - (b) Engineering and administrative experience;
 - (c) Ability to express his ideas.
- 10 The Registrar shall notify applicants who are required to attend the prescribed Interview of the time and place where such an interview shall be held.
- 11 The results of the Interview and approval of registration under the Professional Engineers Act will be notified individually by the Registrar through the post.

Guidance on documents to be submitted

- 12 In this guidance examples are given of the types of documents which applicants shall submit, under headings of currently recognised branches of engineering. Guidance concerning branches not listed here will be given on application to the Registrar.
- 13 The drawings and other documents shall be made in the ordinary course of the applicant's employment, and certified to this effect by the Professional Engineer under whom he has been working.

(a) **Drawing**

Drawings need not present a complete scheme, though of course an opportunity to design a complete work, even if a small one should never be refused. Designs for substantial temporary works incidental to construction and prepared in a site office can be accepted. The drawings shall be completed and properly dimensioned and annotated so as to show the applicant's intentions clearly and unmistakable, and satisfy the Interviewers that his conceptions and his development of the scheme are sound.

(b) **Calculations**

Calculations relating to one or more of the drawings must also be submitted and shall be of the form usually required for the design of that type of work, where this is not applicable, a report or notes explaining the considerations affecting the design and reasons for the methods adopted, shall be submitted.

14 Guidance on Specific Requirements for the Specialised Branches of Engineering is listed below:

(a) **CIVIL/STRUCTURAL ENGINEERING**

Drawings, specifications and calculations for the design of a work of civil or structural engineering constructions.

Notes or record of survey, site investigation, special specifications, cost estimate, etc, for the work submitted.

(i) **SOIL AND ROCK MECHANICS**

Drawings and calculations for the design of a project involving soil or rock mechanics, such as the stability and anticipated settlement of building; retaining walls, railway embankment, etc; and

Notes and records from site investigations; field and laboratory tests; trail sections, etc, for the purpose of the foregoing.

(ii) **HIGHWAY**

Drawings and calculations to show adequate knowledge of the practical application of the theory of civil engineering, eg, the design of bridges; retaining walls; earthworks; paving and drainage; and

Notes or records on highway capacity standards in relation to estimated traffic volumes; highway materials and pavement design; road location in urban or rural areas.

(iii) **PUBLIC HEALTH ENGINEERING**

Drawings and calculations for the design or works related to any branch of public health engineering eg, water supply treatment, sewerage and sewage treatment; land drainage and river improvement; refuse disposal plants; and

Notes or records of a field study for a public health engineering project

(iv) **TRANSPORTATION**

Drawings, diagrams and appropriate calculations to show adequate knowledge of the application of the principles of transportation engineering to practical problems and of the use of current techniques in the analysis and planning of transport systems; and

Note or records on the conduct of traffic surveys and estimation of future transport needs, and on any two items such as the following: Statistical analysis of data derived from traffic studies; economic factors in relation to a transportation scheme; the functional design of terminal facilities for road, rail or air transport; design and operation of traffic management schemes; the functional design of road or rail networks.

(v) **TOWN PLANNING**

Drawings and maps, written statement, and report of the survey in respect of the review of an approved Development Plan, or of a Comprehensive Development Plan and Development Control; and

Notes on factors governing the proposals for population densities, zoning, communications and basic layout

(v) **PERMANENT WAY**

Drawings and calculations for the detailed design of a major junction layout with a schedule of materials; details of timbering and programme for carrying out the work; and

Notes or records such as: the survey for setting out a layout; investigation into the strength or stability of tracks; assessment of permissible speeds.

Note: Design and construction experience in some other branch of civil engineering will be required in addition to the above described under "Permanent Way".

(vi) **HYDROLOGICAL**

Drawings and calculations and quantities for the design of an item of work relating to hydrology, eg, river gauging stations; lysimeters or percolation gauges; climatological station; test wells; and

Records of fieldwork in surface or ground water hydrology; statistical analysis of hydrological data leading to the evaluation of water resources, methods of flood and draught forecasting.

(b) **MECHANICAL ENGINEERING**

Where appropriate drawings; and calculations for the design of any item of work related to mechanical engineering, such as: machinery or machine parts; power-house or machine-shop equipment; factory or

workshop layouts; air-conditioning systems; fire-prevention systems; and

Notes or records on methods of machining; accuracy workmanship tolerances; testing properties of materials; performance of test on plant and machines, workshop organization.

(c) **MINING ENGINEERING**

Drawings and calculation relating to a mining or metallurgical project such as: shaft design winding or haulage system; design of underground or open pit workings; a major ventilation survey; items of metallurgical plant connected with crushing; ore dressings or extractive metallurgy; coal preparation plant; and

Notes or records on the operation or testing of mining or metallurgical plant and equipment; such as power loaders; high-speed tunneling equipment; pumping equipment; crushing and flotation equipment furnaces; electro-metallurgical and hydro-metallurgical plant.

(d) **PRODUCTION ENGINEERING**

Where appropriate the design, with drawings and calculations as appropriate, of an item of work related to production engineering, eg machine tool engineering; factory layout and materials handling; work analysis; manufacturing systems; and

Notes and records such as design for production; forming processes; quality and reliability; techniques of operational research; production cost analysis; human aspects.

(e) **AERONAUTICAL ENGINEERING**

Where appropriate drawings and calculations for the design of part of an aircraft or guided missile, or for the estimation of the performance of its engines or its structures; and

Notes or records, such as wind tunnel tests on models of air-craft or on parts thereof; flight trials; vibration and stiffness test; methods of construction and joining parts.

(f) **ELECTRICAL AND ELECTRONIC ENGINEERING**

Drawings and report supported by calculations and other relevant documents on the design and utilization of electric plant and equipment such as generating plant; power supply; light production and distribution; line communications; telegraphy and telephony systems; radio communications; physical and applied electronics; instrumentation and control; OR

- (i) Drawings, charts and calculations for the design, installation, construction or operation in whole or in part of an item of work related to electrical engineering, eg, generating plant, switch-gear, transformers, substations, transmission lines, power supply, traction, hydroelectric schemes, telecommunications, and other electronic equipment; AND
- (ii) Notes or records on operation, maintenance and/or testing of electrical plant and equipment or telecommunications equipment; generation, transmission and distribution of power; applications of electricity to transport industry, radio broadcasting and commercial and domestic premises and etc

Computer Programmers relating to an electrical engineering activity which requires the candidates understanding of physical relationship or such innovation to bring about a new design or a better mode of operation in the activity.

(g) **MARINE**

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

Notes or record, such as the operation or testing of one or more of the foregoing.

(h) **NAVAL ARCHITECTURE AND SHIPBUILDING**

Drawings and calculations for an item of work relating to: a design study for a modern ship; the launching of a large ship; a typical ship's stem, eg, oil fuel, ballast, fresh and salt water, ventilation and air-conditioning; cargo handling; and

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 shipbuilding.

(i) **CHEMICAL ENGINEERING**

Where appropriate drawing and calculations for the design, in whole or in part, of an item of work relating to chemical or process engineering, eg, heat exchangers; absorption towers; distillation plant; liquor filters; gas dedusting equipment; plant layout; and

Notes or records such as: the operation and/or testing of chemical plant and items of equipment; the preparation of process flow sheets showing heat and mass balance; maintenance and planning co-ordination; the economics assessment of alternative schemes; the instrumentation and automatic control of processes; the application of chemical engineering techniques.