

## **GUIDELINES FOR APPLICATION FOR REGISTRATION AS SPECIALIST PROFESSIONAL ENGINEER IN PROTECTIVE SECURITY ENGINEERING**

### **Introduction**

1. A PE in civil or mechanical engineering may apply to be registered as a specialist professional engineer in protective security engineering if he has a valid practicing certificate and meets one of the following sets of conditions as specified in the Fourth Schedule of the PE Rules as follows:

#### Set (A)

- (i) he has not less than 4 years (in aggregate) of such experience in protective security engineering (whether in Singapore or elsewhere) as may be acceptable to the Board, of which at least 3 years of that experience was obtained whilst practising as a registered professional engineer in Singapore; and
- (ii) he has a post-graduate engineering degree (such as M.Sc. or Ph.D.) majoring in protective security engineering as may be acceptable to the Board.

#### Set (B)

- (i) he has not less than 5 years (in aggregate) of such experience in protective security engineering (whether in Singapore or elsewhere) as may be acceptable to the Board, of which at least 3 years of that experience was obtained whilst practising as a registered professional engineer in Singapore;
- (ii) he has successfully completed a training course in protective security engineering specified by the Board; and
- (iii) he has passed a specialist registration examination on protective security engineering conducted by the Board.

#### Set (C)

- (i) he has submitted his application within 12 months starting on 15 January 2018; and
- (ii) he has, since obtaining any of the qualifications mentioned in section 15(1) of the Act, acquired at least 10 years of relevant practical experience in engineering as may be acceptable to the Board, and at least 5 years of such experience relates to protective security engineering.

### **Examination**

2. One of the requirements as mentioned in para 1 above is that a Set B applicant must sit for and pass a specialist registration examination on protective security engineering conducted by the Board. The specialist registration examination on protective security engineering conducted by the Board is an oral examination and will be conducted together with the professional interview for registration as specialist PE in protective security engineering in a single session. The syllabus for the examination is as specified in Annex A below.

### **Report**

3. An application shall be accompanied by summary of professional engineering experience along with a report on practical experience that describes in particular the experience that the applicant has acquired in protective security engineering. It should include the tasks that the applicant has been involved in, the levels of his responsibilities, the identification of special engineering problems encountered and the demonstration of the use of engineering knowledge, experience and judgment to resolve them etc. The Report shall be about 2,000 words and must not be a mere inventory of work done.

4. The report shall be typewritten and 5 copies shall be submitted (i.e. 1 original and 4 photocopies). The report must be signed by the applicant and verified by his/her employers or any registered professional engineer in Singapore. Verification by an employer should be accompanied by a stamp with name, designation and name of company. Verification by a professional engineer should be accompanied by the professional engineer's stamp.

### **Interview**

5. The Board would require the applicant to undergo an interview. The interview would cover the following:
  - a) to determine the type or and duration of practical experience in protective security engineering;
  - b) to assess the basic understanding, and scope and depth of the applicant's practical experience in protective security engineering, in particular, to establish the level of responsibility – i.e. the applicant's nature of work is at subordinate level or at the level of making technical decisions and to establish whether his experience is sufficient to enable him to act and take technical decisions independently.
6. The applicant could be queried on his involvement in one or more phases of a project such as planning, design and analysis, construction, and operation & maintenance in relation to protective security engineering.
7. An applicant is required to demonstrate that he has substantial practical experience and knowledge as to be competent in core areas of protective security engineering. In addition, the conduct, attitude and professionalism that the applicant displays during the interview would also be considered.
8. When registering a professional engineer in the specialised branch of protective security engineering, the Board may impose such conditions as it thinks fit.

### **Fees**

9. The fees for an application by a Set (B) applicant to sit for the specialist registration examination in the branch of protective security engineering is \$450. The fees for an application by a Set (A) or Set (B) or Set (C) applicant to register as a specialist professional engineer in protective security engineering is \$300.

### **Submission**

10. An application to sit for the specialist registration examination and/or register as specialist professional engineer in the branch of protective security engineering shall be submitted in person and made on prescribed forms issued by the Professional Engineers Board, Singapore. The application must be legibly written in ink or type-written and 5 copies shall be submitted.

**SYLLABUS FOR SPECIALIST REGISTRATION EXAMINATION IN PROTECTIVE SECURITY ENGINEERING**

- **Structural response to blast, ballistic and impact loads**
  - Introduction to structural dynamics
  - Structural response to blast
  - Response to non-ideal loads – Energy solutions
  - Equivalent systems including resistance functions
  - Elasto-plastic stress wave propagation
  - Ballistic performance of materials of construction
  - Introduction to principles of impact
  - Human response to blast loading
  - Dynamic realm response and dynamic realm computing exercise
  - Impact analysis and techniques of impact modelling
  - Structural response software
  - Protective structural design and testing
  
- **Blast loading**
  - Air blast from high explosive and nuclear devices
  - Blast wave interactions
  - Internal detonations
  - Non-ideal explosions
  - Scaling and modelling
  - Underwater explosions
  - Shock tubes and blast tunnels
  - Measurement of blast waves in air

**Damage assessment, repair and demolition**

- Introduction to damage assessment, repair and demolition
- Response to fire
- Assessment of fire damage
- Damage assessment
- Progressive collapse phenomena and mitigation approaches
- Assessment of blast & impact damage
- NDT methods
- NDT of concrete
- Bridge demolition

- Explosives demolition
- Repair and strengthening of steel, timber and masonry structures
- Repair and strengthening of concrete structures

**Structures to resist the effects of accidental explosions**

- Design concepts in widely accepted manuals and guidelines, e.g. TM5-1300, Unified Facilities Criteria
- Blast, fragments and shock loads
- Principles of dynamic analysis
- Reinforced concrete design
- Protective design approaches
- Structural steel design
- Special considerations in explosive facility design