

GUIDELINES TO SIT SPECIALIST REGISTRATION EXAMINATION AND REGISTER AS SPECIALIST PROFESSIONAL ENGINEER IN THE SPECIALISED BRANCH OF AMUSEMENT RIDE ENGINEERING

Introduction

1. A PE in mechanical engineering may apply to be registered as a specialist professional engineer in amusement ride 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 3 years (in aggregate) of such experience in amusement ride engineering, as may be acceptable to the Board, and obtained whilst practising as a registered professional engineer in Singapore; and
- (ii) he has sat for and passed a specialist registration examination on amusement ride engineering conducted by the Board; or

Set (B)

- (i) he has not less than 5 years (in aggregate) of such experience in marine engineering, rail engineering, pressure vessel engineering, lifting equipment engineering or in any field related to amusement ride 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 practicing as a registered professional engineer in Singapore; and
- (ii) he has sat for and passed a specialist registration examination on amusement ride engineering conducted by the Board.

Examination

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

Report

3. An application shall be accompanied by a report on practical experience that describes in particular the experience that the applicant has acquired in a) amusement ride engineering, or b) marine engineering, rail engineering, pressure vessel engineering, lifting equipment engineering or in any related field. 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 the original submitted. The report must be signed by the applicant himself/herself 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 and duration of practical experience in a) amusement ride engineering, or b) marine engineering, rail engineering, pressure vessel engineering, lifting equipment engineering or in any related field;
 - b) to assess the basic understanding, and scope and depth of the applicant's practical experience in a) amusement ride engineering, or b) marine engineering, rail engineering, pressure vessel engineering, lifting equipment engineering or in any related field, in particular, to establish the level of responsibility – ie, whether 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 & analysis, construction, and operation & maintenance in relation to a) amusement ride engineering, or b) marine engineering, rail engineering, pressure vessel engineering, lifting equipment engineering or in any related field.
7. An applicant is required to demonstrate that he has substantial practical experience and knowledge as to be competent in core areas of a) amusement ride engineering, or b) marine engineering, rail engineering, pressure vessel engineering, lifting equipment engineering or in any related field mentioned above. 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 amusement engineering, the Board may impose such conditions as it thinks fit.

Fees

9. The fees for an application to sit for the specialist registration examination in the branch of amusement ride engineering is \$450. The fees for an application to register as a specialist professional engineer in amusement ride engineering is \$300.

Submission

10. An application to sit for the specialist registration examination and register as specialist professional engineer in the branch of amusement ride engineering shall be submitted in person and made on prescribed forms issued by the Professional Engineers Board, Singapore. A copy must also be emailed to registrar@peb.gov.sg within a week from the date of the online application. **The submission will be only be accepted if all items listed in the application checklist are included and the soft copy received via email.** The application must be legibly written in ink or type-written.

SYLLABUS FOR SPECIALIST REGISTRATION EXAMINATION IN AMUSEMENT RIDE ENGINEERING

Amusement Ride Engineering Codes and Standards

Codes and Standards include but are not limited to the following Codes and Standards:

- ASTM Committee F24 on Amusement Rides and Devices
- BS EN 13814:2004 - Fairground and Amusement Park Machinery and Structures Safety

Machine Dynamics

- Kinematics
- Kinetics of machines
- Force Analysis of Mechanisms
- Balancing
- Rotational Forces Analysis
- Brake - types and uses

Welding/NDT

- Typical welding methods (eg SMAW, TIG)
- Welding Process knowledge
- Welding metallurgy
- Typical welding faults and its identification
- Welding codes
- General Principles of NDT
- Its uses and limitations
- In depth knowledge of various NDTs (MPI, DP, UT, RI, Eddy Current)

Metallurgy/Failure Modes

- Classification and engineering properties of typical steel types
- Heat Treatments
- Typical failures (fatigue, corrosion, stress corrosion, hydrogen embrittlement, creep)
- Material strength

Risk Assessments

- Principles of risk assessments
- RA Techniques (Failure Mode and Effect Analysis, What-if Analysis, RA Matrix)
- Understanding of Single Point Failures

Pressure Systems

- Pressure Vessels and piping designs
- Critical parameters in pressure systems (longitudinal and hoop stresses)
- Temperature effects on pressure systems
- Pipes and vessels materials
- Common failures

Control Systems

- Understanding of control systems
- Programmable Logic Controller
- System Control hardware (relays, transducers, interlocks)
- Trouble shooting control systems
- Testing of control systems

Electrical System

- Working knowledge of High Power Circuits
- Earthing methodologies
- Electrical Machines (motors, generators)
- Switches