

GUIDELINES FOR APPLICATION FOR REGISTRATION AS SPECIALIST PROFESSIONAL ENGINEER IN CRANE ENGINEERING

Introduction

1. A PE in mechanical engineering may apply to be registered as a specialist professional engineer in crane 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) the applicant is approved by the Commissioner for Workplace Safety and Health under section 33 of the Workplace Safety and Health Act as an authorised examiner for the purpose of carrying out any prescribed examination or test of any lifting machine that includes any crane, crab, winch, teagle, runway, transporter, piling frame or piling machine; and
- (ii) the application for registration as a specialist professional engineer is submitted before 18 January 2018.

Set (B)

- (i) the applicant has not less than 5 years (in aggregate) of such experience in crane engineering or in any field related to crane 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) the applicant has sat for and passed a specialist registration examination on crane engineering conducted by the Board.

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 crane engineering conducted by the Board. The specialist registration examination on crane engineering conducted by the Board is an oral examination and will be conducted together with the professional interview for registration as specialist PE in crane engineering in a single session. The syllabus for the examination is as specified in Annex A below.

Report

3. An application by a Set (B) applicant shall be accompanied by a report on practical experience that describes in particular the experience that the applicant has acquired in crane 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 5 copies shall be submitted (i.e. 1 original and 4 photostat copies). 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 a Set (B) applicant to undergo an interview. The interview would cover the following:
 - a) to determine the type and duration of practical experience in crane engineering or in any related field;
 - b) to assess the basic understanding, and scope and depth of the applicant's practical experience in crane engineering or in any related field, in particular, to establish the level of responsibility – i.e. 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 crane 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 crane 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 crane 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 crane engineering is \$450. The fees for an application by a Set (A) or Set (B) applicant to register as a specialist professional engineer in crane engineering is \$300.

Submission

10. An application to sit for the specialist registration examination and register as specialist professional engineer in the branch of crane 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 CRANE ENGINEERING

Workplace Safety and Health Legislations and Guidelines Related to Crane Engineering

1. Notification For Use Of Tower Cranes
2. Workplace Safety and Health Act
3. Workplace Safety and Health (Construction) Regulations
4. Workplace Safety and Health (General Provisions) Regulations
5. Workplace Safety and Health (Operation of Cranes) Regulations
6. Workplace Safety and Health (Risk Management) Regulations
7. Workplace Safety and Health (Ship building and Ship-repairing) Regulations
8. Workplace Safety and Health (Work at Height) Regulations

Codes and Standards Related to Crane Engineering

The applicant shall have an in-depth understanding of the relevant local and international codes and standards including but not limited to the following:

1. AS 1418.1- Crane, Hoist And Winches
2. BS EN 13001- Cranes
3. BS EN 14439 Cranes- Safety – Tower Cranes
4. BS 2573- Rules For The Design Of Cranes
5. BS 7121- Code Of Practice For Safe Use Of Cranes
6. Code of Practice on Safe Lifting Operations in the Workplaces
7. DIN 1055-4- Action On Structures – Part 4: Wind Loads
8. DIN 15018- Cranes – Steel Structures
9. ISO 2408- Steel Wire Rope For General Purposes
10. ISO 4302- Cranes – Wind Load Assessment
11. ISO 4308- Cranes And Lifting Appliances – Selection Of Wire Ropes
12. ISO 4310- Cranes- Test Code And Procedures
13. ISO 8686- Cranes – Design Principles For Loads And Load Combinations
14. ISO 9927- Cranes – Inspections
15. ISO 10245- Cranes - Limiting And Indicating Devices
16. ISO 10972- Cranes - Requirements For Mechanisms

17. SS 343: Specification For Lifting Gear
18. SS 497: Code Of Practice For Design, Safe Use And Maintenance Of Gantry Cranes, Overhead Travelling Cranes And Monorail Hoists
19. SS 536: Code Of Practice For The Safe Use Of Mobile Cranes
20. SS 550: Code Of Practice Against Lightning
21. SS 551: Code Of Practice For Earthing
22. SS 559: Code Of Practice For The Safe Use Of Tower Cranes
23. SS 567: Code Of Practice For The Factory Layout- Safety, Health And Welfare Considerations
24. SS 595: Singapore Standards For Steel Wire Ropes For Hoisting
25. SS 617: Code Of Practice For The Lifting Of Persons In Work Platforms Suspended From Cranes
26. SS CP 5: Code Of Practice For Electrical Installations

Other Relevant Areas in Crane Engineering

1. The applicant shall be familiar with lifting machines including the following:
 - a) derrick crane
 - b) fixed crane (which includes but not limited to overhead crane, semi-gantry crane, gantry crane, tower crane, pillar crane, portal crane, wall crane, mono-rail hoist)
 - c) mobile crane (which includes but not limited to truck mounted crane, crawler crane, wheel mounter crane, tractor crane, lorry loaders, mobile tower cranes, barge crane)
 - d) piling frame (which includes but not limited to bore piling machine, hammer/percussion piling machine, hydraulic piling machine)
 - e) other lifting machine (which includes but not limited to manual hoist, teagle, transporter, winch, air/ pneumatic, electric powered hoist, grip hoist)
 - f) lifting appliance
 - g) lifting gear
2. The applicant shall have an in-depth understanding of the design and working principles of the lifting machine and conversant with the essential parts of the lifting machine including:
 - a) safety devices
 - b) hydraulic system
 - c) slewing system
 - d) boom elevation system
 - e) boom telescopic system

- f) hoisting system
 - g) sheave and hook block
 - h) wire ropes
 - i) hoisting system
 - j) crane control system
 - k) outrigger system
 - l) anti-collision systems
3. The applicant shall be conversant with the testing and examination of lifting machine including visual examination, functional test and load test.

Welding and Non-Destructive Testing (NDT)

The applicant shall be knowledgeable in the following areas:

1. General principles of NDT
2. Typical welding methods
3. Welding process knowledge
4. Welding metallurgy
5. Typical welding faults and its identification
6. Welding codes (including ASME Codes, AWS Standards, API Standards)
7. Uses and limitations of various NDTs
8. In depth knowledge of various NDTs

Metallurgy and Damage Mechanism

The applicant shall be knowledgeable in the following areas:

1. Material strength and properties
2. Classification and engineering properties of metals, as well as composites
3. Various damage mechanisms
4. Heat treatment