

## **Quality Control and Supervision of Precast Concrete Construction**

### **Introduction**

In recent years, the use of precast concrete in private building developments in Hong Kong has increased. To ensure that the precast concrete elements are of good quality, proper supervision and adequate quality control are necessary during the production, erection and inspection processes of the concrete elements. This practice note sets out the requirements for the quality control and supervision of key precast concrete elements not fabricated on the building site. The requirements stipulated in this practice note do not apply to minor elements such as non-structural precast concrete block work, architectural features and planters.

### **Duties of the Authorized Person, Registered Structural Engineer and Registered Contractor**

2. The Authorized Person (AP), Registered Structural Engineer (RSE) and Registered Contractor (RC) have the responsibilities under the Buildings Ordinance (BO) to ensure that the precast concrete works comply with the provisions and standards of the BO and the approved plans. In accordance with Section 4(3)(a) of the BO and Regulation 37 of the Building (Administration) Regulations (B(A)R), adequate supervision has to be provided by the AP and RSE for the carrying out of the precast concrete works, whereas the RC has to provide continuous supervision, as required under Section 9(5)(a) and 9(6)(a) of the BO and Regulation 41 of the B(A)R, for the carrying out of such works.

### **Quality Assurance**

3. Under item 6 in Section 17(1) of the BO, I shall impose the condition, when giving approval of plans, that precast concrete elements should be manufactured by a factory with ISO 9000 quality assurance certification.

4. Under Regulation 10 of the B(A)R, I shall require a copy of the Quality Assurance Scheme of the manufacturer to be submitted prior to the application for consent to the commencement of the works. Such submission should be appended with a statement signed by the RSE to confirm that the scheme has adequate provisions in ensuring the quality of production complying with the provisions of the BO and the approved plans.

5. The Quality Assurance Scheme should cover the following items:

- (a) Quality control tests of materials;
- (b) Calibration of laboratory equipment for quality control tests;

/(c) .....

- (c) Efficiency and proper operation of equipment at the casting yard;
- (d) Production process;
- (e) Testing procedures and requirements;
- (f) Frequency and extent of inspection by in-house staff and independent parties; and
- (g) Frequency and extent of audit by in-house staff and independent parties.

### **Qualified Supervision**

6. Under item 6 in Section 17(1) of the BO, I shall also impose the condition, when giving approval of plans, that qualified supervision should be provided by the RSE and the RC for the fabrication, erection and examination of precast concrete elements.

7. The RSE should assign a structural quality control supervisor to supervise the precast concrete production works. The RSE should determine the necessary frequency of supervision, which should be no less than once a week. The minimum qualifications and experience of the quality control supervisor are to be the same as grade T3 technically competent person (TCP) under the RSE's stream, as stipulated in the Code of Practice for Site Supervision.

8. The RC should assign a quality control co-ordinator to provide continuous supervision of the precast concrete production works in the factory. The minimum qualifications and experience of the quality control co-ordinator are to be the same as grade T3 TCP under the RC's stream, as stipulated in the Code of Practice for Site Supervision.

9. The names and qualifications of the supervisory personnel assigned by the RSE and RC respectively should be recorded in an inspection log book. The details of precast concrete production, inspection, auditing and testing should be recorded in the log book by the supervisory personnel. The log book should be kept in the factory and a copy of it should be kept at the building site office and, when required, produced to officers of the Buildings Department for inspection.

10. In addition, the RSE and the Authorized Signatory (AS) of the RC should inspect and carry out audit checks to the factory at least once every month. The AS should submit the audit report to the RSE for endorsement and onward submission to the Buildings Department together with his/her own audit report for record purpose.

11. For good practices in the design, construction and quality control of precast concrete works, reference should be made to the recommendations and guidelines given in the Code of Practice for Precast Concrete Construction issued by the Buildings Department.

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**Separate Registered Structural Engineer**

12. For precast concrete elements not affecting the stability of the parent structure, such as the precast concrete façade or staircase, a separate RSE may be appointed to prepare the design and to supervise the production and erection of such precast concrete elements. In such situation, the specified Forms BA4 and BA5 notifying the appointment of a separate RSE and the scope of works for which he/she is responsible are required to be submitted together with the plans for approval. The project RSE shall also notify the Building Authority in writing that he/she is fully aware of the appointment of a separate RSE and the demarcation of responsibilities. Upon completion of the precast concrete construction works, the separate RSE so appointed is required to certify the satisfactory completion of the works in accordance with Regulation 25(3) of the B(A)R.

13. The separate RSE's submission should be accompanied by an assessment report prepared by him/her giving an account of the effect of the proposed precast concrete works on the parent structure. The assessment report shall be appended with a statement of the project RSE to confirm that he/she is fully aware of the connection details and their effects on the parent structure.

14. The separate RSE shall be responsible for the supervision of the production and erection of the precast concrete elements, including the connection between the precast concrete elements and the parent structure, i.e. ties, anchor plates, cast-in embeds etc., except in the event where such associated works have been installed in the parent structure prior to his/her appointment. For such cases, the structural details and layout of the pre-installed parts should be given in the superstructure plans submitted for approval by the project RSE who shall then be responsible for the supervision of the installation of such parts. The separate RSE should refer to the pre-installed connection details when designing the precast concrete elements and should co-ordinate with the project RSE for any necessary amendment if different connection details are to be used.

15. The separate RSE shall ensure that the conditions and requirements of the quality assurance and qualified supervision as stipulated in paragraphs 3 to 5 and 6 to 10 above respectively are complied with. He/she shall also be responsible for the submission of the documents required in paragraph 4 above.

16. A similar practice note is issued to registered contractors.



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