

## **Diaphragm Wall Works**

In giving this approval of plans, I hereby impose the following conditions under item 6 in section 17(1) of the Buildings Ordinance (BO):

- (a) Sampling and testing of steel reinforcing bars should be carried out in accordance with CS2:2012. Testing should be carried out by a laboratory\* accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for the particular test concerned. Test results<sup>@</sup> should be submitted within 60 days of the delivery of the steel reinforcing bars to the site<sup>^</sup>. The test reports should be appended with a statement signed by the registered structural engineer (RSE) to confirm the following:
  - (i) All steel reinforcing bars used for the construction and the test specimens covered by the test reports are in accordance with the types and grades of steel shown in the approved plans.
  - (ii) Sampling and testing of steel reinforcing bars used have been carried out in accordance with CS2:2012.
  - (iii) The acceptance criteria appropriate to each type and grade of steel reinforcing bars used have been complied with.
  - (iv) All steel reinforcing bars tests have been carried out by a laboratory\* accredited under the HOKLAS.
- (b) Sampling of concrete and compression testing of concrete test cubes should be carried out in accordance with the methods specified in CS1:2010. Testing should be carried out by a laboratory\* accredited under the HOKLAS for the particular test concerned. Test results<sup>@</sup> should be submitted within 21 days after testing. The test reports should be appended with a summary which contains information on locations of concerned structural elements, concrete grades and dates of cast. The summary should also include previous summary information of concrete cube test reports in chronological order. The test reports should also be appended with a statement signed by the RSE to confirm the following:
  - (i) All concrete used for the construction and concrete cubes covered by the test reports are in accordance with the concrete grades shown in the approved plans.
  - (ii) Concrete cube sizes, rates of sampling fresh concrete for testing and acceptance criteria for compressive strength set out in clause 10.3.4.2 of the Code of Practice (CoP) for Structural Use of Concrete 2013 have been complied with.
  - (iii) All concrete cube tests have been carried out by a laboratory\* accredited under the HOKLAS and in accordance with the methods specified in CS1:2010.
- (c) Concrete should be obtained from concrete suppliers certified under the Quality Scheme for the Production and Supply of Concrete except for those

exceptional projects permitted under clause 11.7.1 of the CoP for Structural Use of Concrete 2013 where documents should be submitted by the RSE at least one week prior to commencement of works to prove that the concrete supplier is operating under an approved quality system.

2. The following conditions in respect of qualified supervision of works are imposed under item 6 in section 17(1) of the BO:

- (a) Qualified site supervision of the reinforced concrete works, including sampling of concrete and steel reinforcing bars and making and curing of test cubes, by experienced and competent persons as defined in 2(b) and 2(c), should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.
- (b) The RSE should assign a quality control supervisor to supervise the works, determine the necessary frequency of inspection by the quality control supervisor which should not be less than once a week, and devise inspection check lists. The minimum qualifications and experience of the quality control supervisor is to be the same as the technically competent person (TCP) of grade T3 under the RSE's stream, as stipulated in the CoP for Site Supervision 2009.
- (c) The registered general building contractor (RGBC)/registered specialist contractor (RSC) should assign a quality control co-ordinator to provide full time on site supervision of the works and devise inspection check lists. The minimum qualifications and experience of the quality control co-ordinator is to be the same as the TCP of grade T1 under the RGBC's/RSC's stream, as stipulated in the CoP for Site Supervision 2009.
- (d) The names and qualifications of the supervisory personnel representing the RSE and the RGBC/RSC respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept on site for inspection by representatives of the Buildings Department (BD).

3. Where steel reinforcing bar (rebar) products such as cut and bent rebars, reinforcement cages and the like are fabricated off-site in a prefabrication yard, the following conditions in respect of qualified supervision of off-site rebar prefabrication works (referred hereafter as "Prefabrication Works"<sup>+</sup>) are imposed under item 6 in section 17(1) of the BO:

- (a) Qualified site supervision of the Prefabrication Works<sup>+</sup>, including sampling of steel reinforcing bars, by experienced and competent persons as defined in 2(b) and 2(c), should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.
- (b) The names and qualifications of the supervisory personnel representing the RSE and the RGBC/RSC respectively should be recorded in an inspection log book. The date, time, items inspected and inspection results should be clearly recorded in the log book. The log book should be kept in the prefabrication yard and a copy of it should be kept on site for inspection by representatives of the BD.

4. Your attention is also drawn to the following conditions:
- (a) Site supervision of the diaphragm wall works by a team of supervisors shall be provided each by the authorized person, RSE, registered geotechnical engineer (RGE) and RGBC/RSC in accordance with the Technical Memorandum for Supervision Plans 2009 and the CoP for Site Supervision 2009 to ensure that the works are carried out in accordance with the approved plans and in such a manner as not to render inadequate the margin of safety of, or impair the stability of, or cause danger to any building, structure, land, street or services.
  - (b) The TCP T5 under the RGE's stream shall submit regular reports of his/her findings and recommendations to the RGE. The RGE shall formally submit these reports to the BD and copy them to the Geotechnical Engineering Office (GEO) at monthly intervals or more frequently.
  - (c) In addition to the TCPs T3 and T5 under the RGE's stream as required in paragraph 4(a) above, a Directorate Site Supervisor (DSS) shall be provided for the diaphragm wall works. The name of the DSS shall also be given in the site supervision plan. The DSS shall submit regular reports of his/her findings and recommendations to the RGE. The RGE shall formally submit these reports to the BD and copy them to the GEO at monthly intervals or more frequently.
5. Under regulation 10 of the Building (Administration) Regulations (B(A)R), one set of diaphragm wall record plans showing the actual penetration of each wall element relative to the existing ground and to the proposed excavation levels together with the Form BA14 stipulated in regulation 25 of the B(A)R to certify the completion of the diaphragm wall works are required to be submitted.
6. In connection with paragraph 4(a) above, details of site supervision of the diaphragm wall works shall be included in the supervision plan and submitted prior to or at the time of application for consent to the commencement of the diaphragm wall works.
7. All significant signs of distress and/or notable landslides during the construction works should be reported promptly to the BD and the GEO.
8. Where the ground settlement reaches or exceeds the trigger value of the "Alarm Level" defined in the monitoring scheme, the Chief Highway Engineer/Research and Development, Highways Department (Attention: Land Surveyor/Geographic Information System, telephone number: 2762 3498, fax number: 2714 5290, email: lsgis.rnd@hyd.gov.hk) should be notified promptly together with the relevant details of the monitoring.
- \* A Directory of Accredited Laboratories in Hong Kong is obtainable from the Hong Kong Accreditation Service (HKAS) Executive, Innovation and Technology Commission.
- A laboratory's accreditation for an individual test or calibration may be granted, modified or withdrawn at any time. Up-to-date information on accredited laboratories and their scopes of accreditation are available on the internet at the HKAS website at <http://www.itc.gov.hk/hkas/>.

- @ The test carried out by an accredited laboratory should be within its scope of accreditation. To ensure this, test results should be reported on a HOKLAS Endorsed Certificate or equivalent Certificate/Report issued from other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with the HOKLAS.
- ^ The 'site' refers to the prefabrication yard for cases covered by paragraph 3 above.
- + Prefabrication Works refer to the fabrication works of steel rebar products, such as cut and bent rebars, reinforcement cages and the like, covered by this approval of plans carried out in the prefabrication yard.