General Specification for Civil Engineering Works

2006 Edition

AMENDMENT NO. 1/2017

VOLUME 1

SECTION 1 GENERAL

(a) Clause 1.55 **Replace the title of the clause with the following:**

Progress photographs and record photographs

Replace the clause with the following:

(1) The Contractor shall take progress photographs at monthly intervals or at an interval agreed by the Engineer, to show the progress of the Works or state of materials and workmanship during the course of the Contract. Progress photographs, including aerial and underwater photographs, shall be taken from the same vantage points on various sections of the Works or at locations instructed by the Engineer. Information for each of the photographs, including the date, time, location and description of the subject recorded shall be provided by the Contractor.

(2) Record photographs shall be taken before commencement of the Works at adjoining properties or amenities and at locations instructed by the Engineer. Other record photographs shall be taken when instructed by the Engineer.

(3) General requirements of the photographs include:

(a) The photograph should include something to indicate the scale of the subject when this is not readily apparent.

(b) The photographs shall be colour digital with image resolution of minimum 10 megapixels.

(c) The digital photographs shall be in JPEG format and stored in a CD-ROM or DVD and shall be submitted to the Engineer within a time limit as agreed by the Engineer.

(d) If instructed by the Engineer, the Contractor shall submit one authenticated copy of selected photographs for record. The authenticated copy shall be a colour print of the selected photographs with the size up to A4 each as specified by the Engineer and with a minimum resolution of 300 dots per inch. The selected photographs shall be authenticated by the Contractor and the Engineer by signing and dating on the colour print.

(4) The Employer shall have the copyright of all progress and record photographs.

APPENDIX 1.1 - STANDARDS

(b) Appendix 1.1 **Delete the following standard:**

BS 6657:2002	Assessment of inadvertent initiation of bridge wire electro-explosive devices by radio-frequency radiation Guide

Add the following standard:

PD CLC/TR 50426:2004	Assessment of inadvertent initiation of bridge wire electro-explosive devices by radio-frequency radiation. Guide

SECTION 6 EARTHWORKS

BLASTING TRIALS

(c) **Delete this section (i.e. from Clauses 6.25 to 6.29).**

BLASTING

(d) Clause 6.30 **Replace the clause with the following:**

Blasting operations, including the supply, transport and storage of explosives, on site manufacture of explosives, and the use of explosives including preparing, placing and firing a charge, handling misfires, and destroying or disposing surplus/unused explosives, as well as related preventive, protective, monitoring and contingency measures, shall be in accordance with the conditions and restrictions imposed by the Commissioner of Mines. The Contractor shall make all arrangements with and obtain all licences and permits from the Commissioner of Mines in connection with blasting operations.

(e) Clause 6.31 **Replace the title of the clause with the following:**

Recording vibrations and air-overpressures due to blasting

Replace the sub-clauses with the following:

(1) Measurements of vibrations and air-overpressures shall be taken at locations as stated in the conditions of the blasting permit/licence and at any other locations stated in the Contract or instructed by the Engineer at all times when blasting is carried out. Arrangements for installing instruments and taking measurements both inside and outside the Site shall be made by the Contractor. Records of vibration/air-overpressure measurements, in a format to be agreed by the Engineer, shall be kept by the Contractor on the site and a copy of the records shall be provided to the Engineer.

(2) Blasting monitoring equipment shall have adequate sensitivity and a measurement range commensurate with that required for monitoring affected sensitive receivers. The number, type and specification of all blasting monitoring equipment shall be agreed with the Engineer prior to commencing blasting.

(3) Vibrations due to blasting shall be measured in terms of particle velocity and vibrational amplitude for all of the three amplitude orthogonal axes. Unless stipulated otherwise as the controlling criterion for a structure being monitored and/or instructed by the Engineer, the peak particle velocity and the peak vibrational amplitude shall be taken as the maximum values recorded for any one of the three orthogonal axes during the blast vibration history. The peak particle acceleration shall also be calculated and reported.

(4) Unless otherwise stated in the Contract or agreed by the Engineer, instrumentation used for monitoring vibrations shall record the full time history of the blast event in terms of peak particle velocity and vibration amplitude over a frequency of 2-250 Hz in three mutually perpendicular directions.

(5) Unless otherwise stated in the Contract or agreed by the Engineer, the instrumentation used to monitor air-overpressure shall record the absolute maximum pressure level in dBL and shall be able to reproduce the signal for the full duration of the blast event. The frequency range of the measurement equipment must also cover the frequency from at least 2 Hz to 250 Hz.

(6) The accuracy of seismographs for vibration monitoring and the equipment for air-overpressure monitoring shall be checked at regular intervals, as per the manufacturer's recommendations, and agreed by the Engineer, and a copy of relevant calibration certificates issued by the manufacturer or an authorized calibration laboratory shall be submitted to the Engineer.

(f) Clause 6.32 **Add** "*surface*" **to the title of the clause before** "*blasting*".

Replace the clause with the following:

Before each blast is carried out, all vegetation, overburden and soft or loose material shall be removed to expose the rock that is to be blasted, in order to assess the suitability of the proposed blast design and related safety measures.

(g) Clause 6.34 **Replace the clause with the following:**

Explosives and detonators shall not be stored on the Site unless in a temporary site magazine (Mode A store) approved by the Commissioner of Mines. All explosives and detonators left over after charging in a blast must be disposed of, in accordance with a disposal method approved by the Commissioner of Mines.

(h) Clause 6.35 **Replace the first sentence with** "Unless permitted by the Commissioner of Mines and the Engineer, blasting shall not be carried out at the following times:"

Replace sub-clause (c) with "When a Hong Kong Observatory thunderstorm warning is in force, and"

Replace sub-clause (d) with "When strong wind signal or storm signal No. 3 or higher is hoisted."

(i) Clause 6.36

Replace the clause with the following:

(1) Unless otherwise permitted by the Commissioner of Mines, sufficient protective measures shall be available on site, prior to the issue of a Blasting Permit and subject to the satisfaction of the Commissioner of Mines, to prevent the projection of flying fragments of materials (flyrock) resulting from blasting.

(2) Unless permitted by the Commissioner of Mines, surface charges shall not be used.

(3) Unless otherwise permitted by the Commissioner of Mines, dry, angular crushed rock of 10 mm diameter shall be used for stemming and decking between charges in a blast hole

(4) Unless permitted by the Commissioner of Mines, electric detonators shall not be used within 60 m of overhead power lines. The use of electric detonators in the vicinity of static or mobile radio transmitters shall comply with PD CLC/TR 50426.

(5) Unless otherwise permitted by the Commissioner of Mines, delay blasting with millisecond delays shall be used for all blasting, except as stated in Clause 6.37(6).

(6) Unless permitted by the Director of Water Supplies or his delegate and the Engineer, blasting shall not be carried out within a distance of:

(a) 50 m on plan from any water retaining structure of Water Supplies Department;

(b) 6 m on plan from water mains or other water supply structures or installations;

(c) 60 m on plan from the centre line of any waterworks tunnel; and

(d) 100 m on plan from the centre line of any submarine pipeline.

(7) Unless permitted by the Engineer, the vibrations at structures, installations, slopes and land due to blasting measured in terms of peak particle velocity and/or peak vibrational amplitude shall not exceed the values stipulated in the Contract and those submitted to the Commissioner of Mines in support of the application for a Blasting Permit. If additional or different requirements are identified during the course of the Contract, the Contractor shall seek agreement from the relevant owners of the structures, installations, slopes and land, regulatory authorities, maintenance authorities and/or the Engineer on such requirements and adhere to the agreed requirements.

(8) Unless more stringent values are stipulated in the Contract or identified during the course of the Contract, or other appropriate values are

permitted by the Engineer, the vibrations at structures and installations as referred to in sub-clause (7) of this Clause shall not exceed the values stated in Table 6.2.

(9) Unless permitted by the Engineer, the air-overpressure level measured shall not exceed the values stipulated in the Contract and those submitted to the Commissioner of Mines in support of the application for a Blasting Permit. If additional and different requirements are identified during the course of the Contract, the Contractor shall seek agreement from the regulatory authorities, maintenance authorities and/or the Engineer on such requirements and adhere to the agreed requirements.

(j) Table 6.2

Replace the first cell of the last column with "Peak vibrational amplitude (mm)".

(k) Clause 6.37

Delete sub-clauses (5) and (6).

Replace the numbering of sub-clause (7) with sub-clause (5).

Add a new sub-clause (6) as follows:

(6) Unless otherwise stated in the Contract, the Contractor shall propose and agree with the Engineer all particulars of pre-splitting, including but not limited to the length of explosives loaded in the blast holes, the detonating sequence and delays, the blast hole diameter and spacing, the hole inclination relative to the final surface.

Quality Management & Standards Unit
Civil Engineering and Development Department
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