

GEO Technical Guidance Note No. 41 (TGN 41)
Amendments to British Standards References in Technical Guidance Documents for Migration to Eurocodes

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1. **SCOPE**

- 1.1 This Technical Guidance Note (TGN) promulgates amendments to the British Standards (BS) references adopted in the technical guidance documents mentioned in Section 3 of this TGN.
- 1.2 Any feedback on this TGN should be directed to Chief Geotechnical Engineer/Standards & Testing of the GEO.

2. **TECHNICAL POLICY**

- 2.1 The technical recommendations promulgated in this TGN were agreed by GEO Geotechnical Control Conference (GCC) on 10 February 2014.
- 2.2 The effective date for mandatory adoption of this TGN would be 1 January 2015.

3. **RELATED DOCUMENTS**

(Note: Only the technical guidance documents that require amendments are included. The BS, Eurocodes and other reference documents cited in the amended technical guidance documents are not included here for brevity.)

- 3.1 GCO (1984). *Geotechnical Manual for Slopes (Second Edition)*. Geotechnical Control Office, Hong Kong, 302 p. (Reprinted in 2011).
- 3.2 GCO (1987). *Guide to Site Investigation (Geoguide 2)*. Geotechnical Control Office, Hong Kong, 359 p. (Reprinted in 2000).
- 3.3 GCO (1988). *Guide to Rock and Soil Descriptions (Geoguide 3)*. Geotechnical Control Office, Hong Kong, 186 p. (Reprinted in 2000).
- 3.4 GCO (1989). *Model Specification for Prestressed Ground Anchors (Geospec 1)*. Geotechnical Control Office, Hong Kong, 164 p. (Reprinted in 1997).
- 3.5 GCO (1990). *Review of Design Methods for Excavations (GCO Publication No. 1/90)*. Geotechnical Control Office, Hong Kong, 187 p. (Reprinted in 2003).
- 3.6 GEO (1992). *Guide to Cavern Engineering (Geoguide 4)*. Geotechnical Engineering Office, Hong Kong, 148 p. (Reprinted in 1998).

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- 3.7 GEO (1993a). *Guide to Retaining Wall Design (Geoguide 1) (Second Edition)*. Geotechnical Engineering Office, Hong Kong, 258 p. (Reprinted in 2000).
- 3.8 GEO (1993b). *Review of Granular and Geotextile Filter (GEO Publication No. 1/93)*. Geotechnical Engineering Office, Hong Kong, 141 p.
- 3.9 GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.
- 3.10 GEO (2002). *Guide to Reinforced Fill Structure and Slope Design (Geoguide 6)*. Geotechnical Engineering Office, Hong Kong, 236 p.
- 3.11 GEO (2006). *Foundation Design and Construction (GEO Publication No. 1/2006)*. Geotechnical Engineering Office, Hong Kong, 376 p.
- 3.12 GEO (2007). *Engineering Geological Practice in Hong Kong (GEO Publication No. 1/2007)*. Geotechnical Engineering Office, Hong Kong, 278 p.
- 3.13 GEO (2008). *Guide to Soil Nail Design and Construction (Geoguide 7)*. Geotechnical Engineering Office, Hong Kong, 97 p.
- 3.14 GEO (2009a). *Prescriptive Measures for Man-made Slopes and Retaining Walls (GEO Publication No. 1/2009)*. Geotechnical Engineering Office, Hong Kong, 76 p.
- 3.15 GEO (2009b). *Geotechnical Risk Management for Tunnel Works (GEO Technical Guidance Notes No. 25) (Issue No. 2, Revision A)*. Geotechnical Engineering Office, Hong Kong, 10 p.

4. **DEFINITIONS**

- 4.1 Nil.

5. **BACKGROUND**

- 5.1 Geotechnical design standards and good practice promulgated in the technical guidance documents have been developed with specific reference to local ground conditions, and practice. The technical guidance documents do not follow the Eurocodes but make reference to various national codes or standards (e.g. BS) and technical documents for supplementary guidance.

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- 5.2 For migration to Eurocodes, the BS references in the technical guidance documents as listed in Section 3 of this TGN have been reviewed. While some of these BS references are still current and valid, many have become obsolete. They have either been withdrawn and replaced by Eurocodes and UK National Annexes or superseded by more up-to-date versions. The obsolete BS references have been reviewed and amendments are proposed to align them with the latest standards and recommendations in the Eurocodes and UK National Annexes and relevant BS.
- 5.3 Opportunity is also taken to incorporate other minor amendments in the technical guidance documents that are found necessary since the publication or reprint of the documents.

6. TECHNICAL RECOMMENDATIONS

- 6.1 Amendments have been made to the following technical guidance documents. Details of the amendments are given in Annexes TGN 41 A1 to TGN 41 A15 of this TGN.

<u>Technical Guidance Documents</u>	<u>Annexes</u>
Geotechnical Manual for Slopes, Second Edition (1984) (Reprinted, 2011)	TGN 41 A1
Geoguide 1 - Guide to Retaining Wall Design, Second Edition (1993) (Reprinted, 2000)	TGN 41 A2
Geoguide 2 - Guide to Site Investigation (1987) (Reprinted, 2000)	TGN 41 A3
Geoguide 3 - Guide to Rock and Soil Descriptions (1988) (Reprinted, 2000)	TGN 41 A4
Geoguide 4 - Guide to Cavern Engineering (1992) (Reprinted, 1998)	TGN 41 A5
Geoguide 6 - Guide to Reinforced Fill Structure and Slope Design (2002)	TGN 41 A6
Geoguide 7 - Guide to Soil Nail Design and Construction (2008)	TGN 41 A7
GCO Publication No. 1/90 - Review of Design Methods for Excavations (1990) (Reprinted, 2003)	TGN 41 A8
GEO Publication No. 1/93 - Review of Granular and Geotextile Filters (1993)	TGN 41 A9
GEO Publication No. 1/2006 - Foundation Design and Construction (2006)	TGN 41 A10

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GEO Publication No. 1/2007 - Engineering Geological Practice in Hong Kong (2007)	TGN 41 A11
GEO Publication No. 1/2009 - Prescriptive Measures for Man-made Slopes and Retaining Walls	TGN 41 A12
GEO Technical Guidance Note No. 25 - Geotechnical Risk Management for Tunnel Works (Issue No. 2, Revision A) (2009)	TGN 41 A13
Geospec 1 - Model Specification for Prestressed Ground Anchors, Second Edition (1989) (Reprinted, 1997)	TGN 41 A14
Geospec 3 - Model Specification for Soil Testing (2001)	TGN 41 A15

7. ANNEXES

- 7.1 TGN 41 A1 - Amendments to Geotechnical Manual for Slopes (Second Edition)
- 7.2 TGN 41 A2 - Amendments to Geoguide 1: Guide to Retaining Wall Design (Second Edition)
- 7.3 TGN 41 A3 - Amendments to Geoguide 2: Guide to Site Investigation
- 7.4 TGN 41 A4 - Amendments to Geoguide 3: Guide to Rock and Soil Descriptions
- 7.5 TGN 41 A5 - Amendments to Geoguide 4: Guide to Cavern Engineering
- 7.6 TGN 41 A6 - Amendments to Geoguide 6: Guide to Reinforced Fill Structure and Slope Design
- 7.7 TGN 41 A7 - Amendments to Geoguide 7: Guide to Soil Nail Design and Construction
- 7.8 TGN 41 A8 - Amendments to GCO Publication No. 1/90: Review of Design Methods for Excavations
- 7.9 TGN 41 A9 - Amendments to GEO Publication No. 1/93: Review of Granular and Geotextile Filters
- 7.10 TGN 41 A10 - Amendments to GEO Publication No. 1/2006: Foundation Design and Construction
- 7.11 TGN 41 A11 - Amendments to GEO Publication No. 1/2007: Engineering Geological Practice in Hong Kong
- 7.12 TGN 41 A12 - Amendments to GEO Publication No. 1/2009: Prescriptive Measures for Man-made Slopes and Retaining Walls
- 7.13 TGN 41 A13 - Amendments to GEO Technical Guidance Notes No. 25 - Geotechnical Risk Management for Tunnel Works

**Geotechnical Engineering Office, Civil Engineering and Development Department
The Government of the Hong Kong Special Administrative Region**

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- 7.14 TGN 41 A14 - Amendments to Geospec 1: Model Specification for Prestressed
Ground Anchors (Second Edition)
- 7.15 TGN 41 A15 - Amendments to Geospec 3: Model Specification for Soil Testing

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Head, Geotechnical Engineering Office

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Annex TGN 41 A1 - Amendments to Geotechnical Manual for Slopes (Second Edition)

- (a) Section 3.6
In paragraph 2, lines 1 and 2, delete '(BS 1377, 1975, test 17)' and substitute '(Geospec 3, GEO, 2001, Clause 14)'.
- (b) Section 3.12
Delete paragraph 1 and substitute the following new paragraph 1.
'It is important to present good records of both soil and rock tests. Appendix B of Geospec 3 (GEO, 2001) and Akroyd (1969) give typical data and calculation forms as well as information to be included in test reports for the tests they describe.'
- (c) Section 5.3.2, (2) Geology
In paragraph 2, line 5, delete 'British Standards Institution (1981)' and substitute 'Geoguide 3 (GCO, 1988)'.
- (d) Section 5.5.2
In paragraph 1, line 4, delete '95% of British Standard maximum dry density' and substitute '95% of maximum dry density determined in accordance with Geospec 3 (GEO, 2001)'.
- (e) Section 9.4.2
In paragraph 8, lines 2 and 3, delete '95% of British Standard maximum dry density (BS 1377, test 12)' and substitute '95% of maximum dry density determined in accordance with Geospec 3 (GEO, 2001)'.
- (f) Section 9.4.7
In paragraph 1, line 17, delete '95% of British Standard maximum dry density' and substitute '95% of maximum dry density determined in accordance with Geospec 3 (GEO, 2001)'.
- (g) Section 9.5.1
In paragraph 3, lines 2 and 3, delete '95% of British Standard maximum dry density' and substitute '95% of maximum dry density determined in accordance with Geospec 3 (GEO, 2001)'.
- (h) Section 9.5.5, (3) Core cutter method
In paragraph 1, line 2, delete '(BS 1377) test 15(D))' and substitute '(BS 1377-9, Clause 2.4 (BSI, 1990b))'.

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(i) Section 9.5.6, (2) Rapid methods

Delete paragraph 1 and substitute the following new paragraph 1

‘Rapid methods for site use, for example the sand bath method and the calcium carbide method, are provided for in BS 1377-2 (BSI, 1990a). The sand bath method is not as accurate as the standard method and cannot be used for soils containing large proportions of halloysite, gypsum, or calcareous or organic matter. The calcium carbide method measures the pressure of acetylene gas released when carbide reacts with the soil moisture. However, this method is not sufficiently reliable for strict control.’

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance documents are included here for brevity.)

- (a) BSI (1990a). *Methods of Test for Soils for Civil Engineering Purposes - Part 2: Classification Tests (BS 1377-2:1990)*. British Standards Institution, London, 65 p.
- (b) BSI (1990b). *Methods of Test for Soils for Civil Engineering Purposes - Part 9: In-situ Tests (BS 1377-9 : 1990)*. British Standards Institution, London, 70 p.
- (c) GCO (1988). *Guide to Rock and Soil Descriptions (Geoguide 3)*. Geotechnical Control Office, Hong Kong, 186 p. (Reprinted in 2000).
- (d) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.

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Annex TGN 41 A2 - Amendments to Geoguide 1: Guide to Retaining Wall Design (Second Edition)

- (a) Section 5.5.3
In paragraph 3, line 4, delete 'BS 1377: Part 8 (BSI, 1990a)' and substitute 'Geospec 3 (GEO, 2001)'.
- (b) Section 7.2.1
Delete paragraph 1 and substitute the following new paragraph 1.
'In Hong Kong, public highway and railway structures, including retaining walls and bridge abutments which form part of a highway or railway, are generally designed for loads given in the Structures Design Manual for Highways and Railways (HyD, 2013). Where special conditions indicate that a smaller load would be appropriate, the agreement of the relevant authorities should first be obtained.'
- (c) Section 9.3.3, (1) Concrete
In paragraph 1, line 2, delete 'BS 8110: Part 1 (BSI, 1985)' and substitute 'BS EN 206-1 (BSI, 2000b), BS8500-1:2006+A1:2012 (BSI, 2012a), and BS8500-2:2006+A1:2012 (BSI, 2012b)'.
- (d) Section 9.3.4
In paragraph 2, lines 1 and 2, delete 'BS 8007 (BSI, 1987a) provides guidance on details of expansion, contraction and other movement joints, as well as their spacings.' and substitute 'BS EN 1992-3:2006 (BSI, 2006) provides general guidance on movement joints.'
- (e) Section 9.5.3, (1) Gabion Materials
In paragraph 5, line 1, delete 'BS 1052 (BSI, 1986b)' and substitute 'BS 1052 (BSI, 1980)'.
- In paragraph 5, line 4, delete 'BS 443 (BSI 1990b)' and substitute 'BS EN 10244-1 (BSI, 2009a) and BS EN 10244-2 (BSI, 2009b)'.
- In paragraph 5, line 5, delete 'BS 729 (BSI, 1986c)' and substitute 'BS EN ISO 1461 (BSI, 2009c)'.
- In paragraph 6, line 6, delete 'BS 4102 (BSI, 1990c)' and substitute 'BS EN 10245-1 (BSI, 2011a) and BS EN 10245-2 (BSI, 2011b)'.

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- (f) Section 11.3.4, (2) Large Diameter Machine Bored Piles
In paragraph 2, lines 2, and 3, delete '(Hong Kong Government, 1992)' and substitute '(HKSARG, 2006)'.
- (g) Section 12.1
In paragraph 3, line 6, delete 'British Standards in the BS 5750 series (BSI, 1987b)' and substitute 'BS EN ISO 9000 family of standards (BSI, 2005, 2009d, 2009e, 2011c)'.
- (h) Table 4
Add the following as Note (7).
'(7) BS Sieve Sizes are specified in BS 410-1:2000, ISO 3310-1:2000 (BSI, 2000a).'
- (i) Table 16
In row 1, under column 'Source of Loading', delete '(3)' after 'Highway structures', delete '(a) HA Loading' and '(b) HB Loading (45 Units)'.

In row 1, under column 'Equivalent Uniformly-Distributed Load', delete '10 kPa' and '20 kPa' and add 'See Note (3)'.

In Note (3), add the sentence 'Design loads for highway structures should be determined in accordance with the guidance given in the Structures Design Manual for Highways and Railways (HyD, 2013) for design of new and modification of existing retaining walls that are subject to traffic loadings, but not for stability assessment of existing retaining walls.' at the start of this footnote.

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) BSI (1980). *Specification for Mild Steel Wire for General Engineering Purposes (BS 1052:1980)*. British Standards Institution, London, 10 p.
- (b) BSI (2000a). *Test Sieves - Technical Requirements and Testing - Part 1: Test Sieves of Metal Wire Cloth (BS 410-1:2000, ISO 3310-1:2000)*. British Standards Institution, London UK, 22 p.
- (c) BSI (2000b). *Concrete - Part 1: Specification, Performance, Production and Conformity (BS EN 206-1:2000)*. British Standards Institution, London, 74 p.
- (d) BSI (2005). *Quality Management Systems - Fundamentals and Vocabulary (BS EN ISO 9000:2005)*. British Standards Institution, London, 42 p.

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- (e) BSI (2006). *Eurocode 2. Design of Concrete Structures - Liquid Retaining and Containing Structures (BS EN 1992-3:2006)*. British Standards Institution, London, 28 p.
- (f) BSI (2009a). *Steel Wire and Wire Products - Non-ferrous Metallic Coatings on Steel Wire, Part 1: General Principles (BS EN 10244-1:2009)*. British Standards Institution, London, 12 p.
- (g) BSI (2009b). *Steel Wire and Wire Products. Non-ferrous Metallic Coatings on Steel Wire, Part 2: Zinc or Zinc Alloy Coatings (BS EN 10244-2:2009)*. British Standards Institution, London, 22 p.
- (h) BSI (2009c). *Hot Dip Galvanized Coatings on Fabricated Iron and Steel Articles - Specifications and Test Methods (BS EN ISO 1461:2009)*. British Standards Institution, London, 24 p.
- (i) BSI (2009d). *Quality Management Systems - Requirements (BS EN ISO 9001:2008) (Incorporating corrigendum July 2009)*. British Standards Institution, London, 40 p.
- (j) BSI (2009e). *Managing for the Sustained Success of an Organization - A Quality Management Approach (BS EN ISO 9004:2009)*. British Standards Institution, London, 56 p.
- (k) BSI (2011a). *Steel Wire and Wire Products - Organic Coatings on Steel Wire, Part 1: General Rules (BS EN 10245-1:2011)*. British Standards Institution, London, 22 p.
- (l) BSI (2011b). *Steel Wire and Wire Products. Organic Coatings on Steel Wire, Part 2: PVC Finished Wire (BS EN 10245-2:2011)*. British Standards Institution, London, 14 p.
- (m) BSI (2011c). *Guidelines for Auditing Management Systems (ISO 19011:2011) (BS EN ISO 19011:2011)*. British Standard Institution, London, 56 p.
- (n) BSI (2012a). *Concrete - Complementary British Standard to BS EN 206-1 - Part 1: Method of Specifying and Guidance for the Specifier (BS 8500-1:2006+A1:2012)*. British Standards Institution, London, 66 p.
- (o) BSI (2012b). *Concrete - Complementary British Standard to BS EN 206-1 - Part 2: Specification for Constituent Materials and Concrete (BS 8500-2:2006+A1:2012)*. British Standards Institution, London, 52 p.
- (p) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.

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- (q) HKSARG (2006). *General Specification for Civil Engineering Works (2006 Edition) (Incorporating all Amendments)*. The Government of Hong Kong Special Administrative Region, Hong Kong, Volumes 1 and 2.
- (r) HyD (2013). *Structures Design Manual for Highways and Railways (2013 Edition)*. Highways Department, Hong Kong, 274 p.

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Annex TGN 41 A3 - Amendments to Geoguide 2: Guide to Site Investigation

- (a) Section 1
In paragraph 3, line 1, delete ‘, as in BSI (1981a),’.

In paragraph 3, line 5, delete ‘BSI (1981b)’ and substitute ‘BSI (2009)’.
- (b) Section 8.2
In paragraph 3, line 5, delete ‘in BSI (1981b) and ’.
- (c) Section 13.2
In paragraph 1, line 3, delete ‘(BSI, 1975b)’ and substitute ‘(GEO, 2001)’.
- (d) Section 13.3
In paragraph 1, lines 5 and 6, delete ‘the Model Specification for Reinforced Fill Structures (Brian-Boys et al, 1986)’ and substitute ‘Geoguide 6 (GEO, 2002)’.

In paragraph 1, line 9, delete ‘BSI (1973)’ and substitute ‘BSI (1990)’.
- (e) Section 18.3
In line 4, delete ‘BSI (1981a)’ and substitute ‘BSI (2010)’.
- (f) Section 18.6
In line 5, delete ‘BSI (1981a)’ and substitute ‘BSI (2010)’.
- (g) Section 19.2
In paragraph 4, line 1, delete ‘BSI (1975b, 1975c)’ and substitute ‘GEO (2001) and BSI (1990)’.

In paragraph 4, line 7, delete ‘BSI (1975a)’ and substitute ‘CS3:2013’.
- (h) Section 19.4.5
In line 2, delete ‘Test 19 of BSI (1975b)’ and substitute ‘BSI (2011b)’.
- (i) Section 19.8
In paragraph 1, line 3, delete ‘(BSI, 1974a)’.
- (j) Section 21.2.1
In paragraph 1, line 2, delete ‘Test 19 of BSI (1975b)’ and substitute ‘BSI (2011b)’.

In paragraph 2, line 4, delete ‘Test 19 of BSI (1975b)’ and substitute ‘BSI (2011b)’.

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In paragraph 2, delete items (a) and (b).

In paragraph 2, re-number items (c) and (d) to items (a) and (b) respectively.

In paragraph 2, add the following new item (c).

‘(c) The results of standard penetration tests should be included in borehole records without the application of corrections.’

Delete paragraph 3.

(k) Section 21.2.3

In paragraph 2, line 3, delete ‘BSI (1975b)’ and substitute ‘BSI (2011b)’.

(l) Section 21.3.1

In paragraph 1, line 4, delete ‘Test 18 of BSI (1975b)’ and substitute ‘BSI (1990)’.

(m) Section 21.3.2

In paragraph 2, lines 1 and 2, delete ‘Test 18 of BSI (1975b)’ and substitute ‘BSI (1990)’.

(n) Section 23.4

In lines 4 and 5, delete ‘; this technique is further discussed in BSI (1981a)’.

(o) Section 25.2

In paragraph 3, line 2, delete ‘BSI (1981a)’ and substitute ‘BSI (2010)’.

(p) Section 25.7

In paragraph 2, line 5, delete ‘BSI (1981a)’ and substitute ‘BSI (2012c)’.

(q) Section 27.1

In paragraph 4, line 5, delete ‘BSI (1975b, Test 1A)’ and substitute ‘GEO (2001)’.

In paragraph 4, lines 8 and 9, delete ‘BSI (1975b), Test 1’ and substitute ‘BSI (1990)’.

In paragraph 5, lines 2 and 3, delete ‘Test 15 of BSI (1975b)’ and substitute ‘Geospec 3 (GEO, 2001) and BSI (1990)’.

(r) Section 27.2

In paragraph 1, line 1, delete ‘BSI (1975b) describes three variations’ and substitute ‘GEO (2001) describes two variations’.

In paragraph 1, line 3, delete ‘, as defined in BSI (1975b)’.

In paragraph 1, lines 4 to 7, delete the last sentence.

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- (s) Section 27.3
In line 1, delete 'BSI (1975b)' and substitute 'BSI (1990)'.
- (t) Section 27.4
In the title, delete 'WEIGHT' and substitute 'IMMERSION'.

In line 1, delete 'weight' and substitute 'immersion'.

In line 1, delete 'BSI (1975b)' and substitute 'BSI (1990)'.
- (u) Section 27.5
In line 1, delete 'BSI (1975b)' and substitute 'BSI (1990)'.

In line 2, delete 'weight' and substitute 'immersion'.
- (v) Section 28.2
In paragraph 5, line 2, delete 'BSI (1981a)' and substitute 'BSI (2010)'.
- (w) Section 29.1.4
In paragraph 5, line 2, delete 'BSI (1981a)' and substitute 'BSI (2010)'.
- (x) Section 29.4.2
In lines 1 to 3, delete 'Test 16 of BSI (1975b) excluding the compaction, and subject only to those alterations necessary to enable it to be carried out in the field' and substitute 'BSI (1990)'.

In lines 7 to 14, delete the third sentence to the last sentence.
- (y) Section 31.2
In paragraph 1, line 4, delete 'BSI, 1981b' and substitute 'BSI, 2009'.
- (z) Section 31.3
In paragraph 2, line 7, delete '(BSI, 1981b)' and substitute '(BSI, 2009)'.
- (aa) Section 33.2.1
In line 3, delete '(BSI, 1965)' and substitute '(BSI, 1990)'.
- (bb) Section 34
In paragraph 2, line 6, delete 'BSI (1975b)' and substitute 'BSI (1990) and GEO (2001)'.
- (cc) Section 38
In paragraph 2, line 6, delete 'BSI (1981a)' and substitute 'BSI (2010)'.

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- (dd) Section 39
In paragraph 1, lines 7 and 8, delete 'BSI (1981a)' and substitute 'BSI (1990a) and the appropriate Parts of BSI (2011a, 2011b, 2012a, 2012b, 2012c, 2012d, 2012e, 2012f)'. .
- (ee) Section 40.3.1
In line 4, delete 'BSI , 1965; 1973; 1974b; 1975a; 1977; 1981b; 1986' and substitute 'BSI , 1974b; 1986, 1991; 2004; 2007; 2009'.
- (ff) Table 5
In Note (2), delete 'BS 4019: Part 1 (BSI 1974a) on rotary core drilling equipment and Figure 29 of BS 5930 (BSI, 1981a)' and substitute 'BS EN ISO 22475-1:2006 (BSI, 2006)'.
- (gg) Table 7
In Note, delete '(BSI, 1981a)' and substitute '(BSI, 2010)'.
- (hh) Table 9
In Note (3), delete 'taken from BS 5930 (BSI, 1981a)' and substitute 'adapted from BS EN 1997-2:2007 (BSI, 2007)'.
- (ii) Table 12
In row 1, under the column 'Recommended References', delete 'BS 1377 (BSI, 1975b) Test 1 (A)' and substitute 'Geospec 3 (GEO, 2001) Clause 5'.
- In row 2, under the column 'Recommended References', delete 'BSI (1975b) Test 2 (A) or 2(B) and Test 3' and substitute 'Geospec 3 (GEO, 2001) Clause 6'.
- In row 3, under the column 'Recommended References', delete 'BSI (1975b) Test 5' and substitute 'BS 1377-2 (BSI, 1990a) Clause 6.5'.
- In row 4, under the column 'Recommended References', delete 'BSI (1975b) Test 6' and substitute 'Geospec 3 (GEO, 2001) Clause 7'.
- In row 5, under the column 'Recommended References', item (a), delete 'BSI (1975b) Test 7(A)' and substitute 'Geospec 3 (GEO, 2001) Clause 8'.
- In row 5, under the column 'Recommended References', item (b), delete 'BSI (1975b) Test 7(C) or 7(D)' and substitute 'Geospec 3 (GEO, 2001) Clause 8'.

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In row 5, under the column 'Remarks', item (a), delete 'The standard method of dry sieving (BSI, 1975b Test 7(B)) is not recommended for general use in Hong Kong. As a variation to the standard method of wet sieving (BSI, 1975 b Test 7(A)), it will be appropriate to exclude the use of dispersant' and substitute 'Dispersant should be excluded'.

In row 7, under the column 'Recommended References', delete 'BSI (1975b) Test 8' and substitute 'Geospec 3 (GEO, 2001) Clause 9.1'.

In row 8, under the column 'Recommended References', item (a), delete 'BSI (1975b) Test 9' and substitute 'Geospec 3 (GEO, 2001) Clause 9.3'.

In row 8, under the column 'Recommended References', item (b), delete 'BSI (1975b) Test 10' and substitute 'Geospec 3 (GEO, 2001) Clause 9.3'.

In row 8, under the column 'Remarks', lines 2 and 3, delete 'Test 9 of BSI (1975b)' and substitute 'Geospec 3 (GEO, 2001) Clause 9.3'.

In row 10, under the column 'Recommended References', delete 'BSI (1975b) Test 11(A)' and substitute 'Geospec 3 (GEO, 2001) Clause 9.5'

In row 14, under the column 'Remarks', line 3, delete 'CP1021 (BSI, 1973)' and substitute 'BS 1377-9 (BSI, 1990)'.

Delete row 15.

In row 16, under the column 'Recommended References', item (a), delete 'BSI (1975b) Test 21' and substitute 'Geospec 3 (GEO, 2001) Clause 15'.

In row 18, under the column 'Recommended References', item (a), delete 'BSI (1975b) Test 17' and substitute 'Geospec 3 (GEO, 2001) Clause 14'.

In row 21, under the column 'Recommended References', delete 'BSI (1975b) Tests 12, 13, 14' and substitute 'Geospec 3 (GEO, 2001) Clause 10'.

In row 21, under the column 'Remarks', delete 'Test 12 is commonly used in Hong Kong', and delete 'BSI, 1975b Test 15' and substitute 'Geospec 3 (GEO, 2001) Clause 11'.

In row 22, under the column 'Recommended References', delete 'BSI (1975b) Test 16' and substitute 'GEO (2001) Clause 12'.

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- (jj) Figure 20
In Note, delete 'BS 5930 (BSI, 1981a)' and substitute 'BS 5930 (BSI, 2010)'.
- (kk) Figure 25
In Note (1), delete 'BS 1377 (BSI, 1975 b)' and substitute 'BS EN ISO 22476-3 (BSI, 2011b)'.
- (ll) Figure 26
In Note, delete 'BS 1377 (BSI, 1975 b)' and substitute 'BS 1377-9 (BSI, 1990)'.
- (mm) Figure 28
In Note (1), delete 'BS 5930 (BSI, 1981a)' and substitute 'BS 5930 (BSI, 2010)'.
- (nn) Figure 39
In Note (1), delete 'BS 5930 (BSI, 1981a)' and substitute 'BS EN ISO 22476-1 (BSI, 2012f)'.
- (oo) Figure 43
In Note, delete 'BS 5930 (BSI, 1981a)' and substitute 'BS 5930 (BSI, 2010)'.
- (pp) Section E.2
In paragraph 4, item (c), lines 1 to 3, delete 'BSI 5573: Code of Practice for Safety Precautions in the Construction of Large Diameter Boreholes for Piling and Other Purposes (BSI, 1978)' and substitute 'BS 8008: Safety Precautions and Procedures for the Construction and Descent of Machine-bored Shafts for Piling and Other Purposes (BSI, 2008)'.

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) BSI (1990). *Methods of Test for Soils for Civil Engineering Purposes - Parts 1 to 9 : (BS1377, Parts 1 to 9:1990)*. British Standards Institution, London, 406 p.
- (b) BSI (1991). *Cathodic Protection - Part 1: Code of Practice for Land and Marine Applications - (formerly CP 1021) (BS 7361-1:1991)*. British Standards Institution, London, 122 p.
- (c) BSI (2004). *Eurocode 7: Geotechnical Design - Part1: General Rules (BS EN 1997-1:2004)*. British Standards Institution, London, 174 p.

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- (d) BSI (2006). *Geotechnical Investigation and Testing - Sampling Methods and Groundwater Measurements - Part 1: Technical Principles for Execution (BS EN ISO 22475-1:2006)*. British Standards Institution, London, 134 p.
- (e) BSI (2007). *Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing (BS EN 1997-2:2007)*. British Standards Institution, London, 202 p.
- (f) BSI (2008). *Safety Precautions and Procedures for the Construction and Descent of Machine-bored Shafts for Piling and Other Purposes (BS 8008:1996+A1:2008)*. British Standards Institution, London, 20 p.
- (g) BSI (2009). *Code of Practice for Earthworks (BS 6031:2009)*. British Standards Institution, London, 128 p.
- (h) BSI (2010). *Code of Practice for Site Investigations (BS 5930:1999+A2:2010)*. British Standards Institution, London, 206 p.
- (i) BSI (2011a). *Geotechnical Investigation and Testing - Field Testing - Part 2: Dynamic Probing (BS EN ISO 22476-2:2005+A1:2011)*. British Standards Institution, London, 40 p.
- (j) BSI (2011b). *Geotechnical Investigation and Testing - Field Testing - Part 3: Standard Penetration Test (BS EN ISO 22476-3:2005+A1:2011)*. British Standards Institution, London, 26 p.
- (k) BSI (2012a). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 2: Water Permeability Tests in a Borehole using Open Systems (BS EN ISO 22282-2:2012)*. British Standards Institution, London, 36 p.
- (l) BSI (2012b). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 3: Water Pressure Tests in Rock (BS EN ISO 22282-3:2012)*. British Standards Institution, London, 36 p.
- (m) BSI (2012c). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 4: Pumping Tests (BS EN ISO 22282-4:2012)*. British Standards Institution, London, 34 p.
- (n) BSI (2012d). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 5: Infiltration Tests (BS EN ISO 22282-5:2012)*. British Standards Institution, London, 30 p.

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- (o) BSI (2012e). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 6: Water Permeability Tests in a Borehole using Closed Systems (BS EN ISO 22282-6:2012)*. British Standards Institution, London, 24 p.
- (p) BSI (2012f). *Geotechnical Investigation and Testing - Field Testing, Part 1: Electrical Cone and Piezocone Penetration Test (BS EN ISO 22476-1:2012)*. British Standards Institution, London, 46 p.
- (q) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.
- (r) GEO (2002). *Guide to Reinforced Fill Structure and Slope Design (Geoguide 6)*. Geotechnical Engineering Office, Hong Kong, 236 p.
- (s) HKSARG (2013). *Construction Standard, Aggregates for Concrete (CS3:2013)*. The Government of the Hong Kong Special Administrative Region, Hong Kong, 140 p.

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Annex TGN 41 A4 - Amendments to Geoguide 3: Guide to Rock and Soil Descriptions

- (a) Section 2.3.4, (2) Classification of Decomposition Grades
In paragraph 9, line 11, delete 'BSI (1975)' and substitute '(GEO (2001))'.
- (b) Section 3.3.4, (1) General Aspects
In paragraph 1, lines 10 and 11, delete '(BSI, 1975)' and substitute '(GEO, 2001)'.
- (c) Section 3.3.4, (3) Plasticity
In paragraph 1, lines 8 and 9, delete '(BSI, 1975)' and substitute '(GEO, 2001)'.

In paragraph 4, line 5, delete '(BSI, 1975)' and substitute '(GEO, 2001)'.
- (d) Section 4.3
In paragraph 7, lines 3 to 9, delete sentences 2 to 4.

In paragraph 7, line 18, add '(GEO, 2001)' after 'reports'.
- (e) Table 17
In Note, line 1, delete 'BS 5930 (1981)' and substitute 'BS 5930 (2010)'.
- (f) Glossary
Grading, line 3, delete '(BSI, 1975)' and substitute '(GEO, 2001)'.

Liquid limit (LL), line 2, delete '(BSI, 1975)' and substitute '(GEO, 2001)'.

Plastic limit (PL), line 2, delete '(BSI, 1975)' and substitute '(GEO, 2001)'.

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) BSI (2010). *Code of Practice for Site Investigations (BS 5930:1999+A2:2010)*. British Standards Institution, London UK, 206 p.
- (b) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.

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Annex TGN 41 A5 - Amendments to Geoguide 4: Guide to Cavern Engineering

- (a) Section 3.7.8
In paragraph 2, lines 4 and 5, delete 'BS 1377: Part 3: 1990, Method 5 and 9 (BSI, 1990)' and substitute 'Geospec 3, Clause 9 (GEO, 2001)'.
- (b) Section 5.6.6, (4) Properties
In paragraph 4, line 3, delete 'Government of Hong Kong, 1990' and substitute 'HKSARG, 2010'

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance documents are included here for brevity.)

- (a) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.
- (b) HKSARG (2010). *Construction Standard, Testing Concrete (CS1:2010)*. The Government of Hong Kong Special Administrative Region, Hong Kong, Volumes 1 and 2, 61 p. and 98 p.

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Annex TGN 41 A6 - Amendments to Geoguide 6: Guide to Reinforced Fill Structure and Slope Design

(a) Section 4.1.2

In line 3, delete 'BS EN 10025 (BSI, 1993)' and substitute 'BS EN 10025-1 (BSI, 2004b), BS EN 10025-2 (2004c)'.

In line 3, delete 'BS 4449 (BSI, 1997)' and substitute 'BS 4449 (BSI, 2009c)'.

In line 5, delete 'BS EN 10002-1 (BSI, 2001)' and substitute 'BS EN ISO 6892-1 (BSI, 2009b)'.

(b) Section 4.1.3

In paragraph 1, line 6, delete 'BS EN 10319 (BSI, 1996)' and substitute 'BS EN ISO 10319 (BSI, 2008a)'.

(c) Section 4.1.9

In paragraph 2, line 10, delete 'BS 8006 (BSI, 1995)' and substitute 'BS 8006-1 (BSI, 2010)'.

(d) Section 4.1.10

In paragraph 1, lines 1 and 2, delete 'BS EN ISO 10321 (BSI, 1996)' and substitute 'BS EN ISO 10321 (BSI, 2008b)'.

In paragraph 1, line 2, delete 'BS EN ISO 10002-1 (BSI, 2001)' and substitute 'BS EN ISO 6892-1 (BSI, 2009b)'.

(e) Section 4.2.1

In paragraph 2, lines 2 and 3, delete 'BS 5400: Part 4 (BSI, 1990), BS 8110: Part 1 (BSI, 1997)' and substitute 'BS EN 206-1 (BSI, 2000), BS EN 1992-1-1 (BSI, 2004a)'.

In paragraph 2, line 3, delete 'Buildings and Lands Department (1987a)' and substitute 'BD (2013)'.

In paragraph 2, line 4, delete 'BS 449: Part 2 (BSI, 1969), BS 5950: Part 1 (BSI, 2000)' and substitute 'BS EN 14475 (BSI, 2006b)'.

In paragraph 2, lines 4 and 5, delete 'Buildings and Lands Department (1987b)' and substitute 'BD (2011)'.

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- (f) Section 4.2.2, (1) Reinforced concrete
In paragraph 1, line 3, delete ‘BS 8110: Part 1 (BSI, 1997)’ and substitute ‘BS EN 206-1 (BSI, 2000), BS 8500-1 (BSI, 2012a), and BS 8500-2 (BSI, 2012b)’.
- (g) Section 6.12
In paragraph 3, line 2, delete ‘(GEO, 1998)’ and substitute ‘(GEO, 2003)’.
- (h) Section 7.9.2
In second bullet point, line 2, delete ‘(BS 8006)’ and add ‘(BS 8006-1 (BSI, 2010))’ in the last line after ‘connection’.
- (i) Section 9.1
In paragraph 1, line 6, delete ‘GEO Publication No. 1/2000 (GEO, 2000)’ and substitute ‘GEO Publication No. 1/2011 (GEO, 2011)’
- (j) Section 9.4
In paragraph 1, line 3, delete ‘(GEO, 1998)’ and substitute ‘(GEO, 2003)’
- (k) Table 2
In Note (1), delete ‘BS 8006 (BSI, 1995)’ and substitute ‘BS 8006-1 (BSI, 2010)’.
- (l) Table 9
In Note (1), delete ‘BS 8006 (BSI, 1995)’ and substitute ‘BS 8006-1 (BSI, 2010)’.
- (m) Table 10
In Note, delete ‘BS 8006 (BSI, 1995)’ and substitute ‘BS 8006-1 (BSI, 2010)’.
- (n) Figure 26
In Note, delete ‘BS 8006 (BSI, 1996)’ and substitute ‘BS 8006-1 (BSI, 2010)’.
- (o) Appendix A, Clause A.12(1)(a)
Delete ‘BS 8110: 1997’ and substitute ‘BS EN 206-1: 2000, BS 8500-1: 2006+A1: 2012 and BS 8500-2: 2006+A1: 2012’.
- (p) Appendix A, Clause A.12(1)(b)
In lines 1 to 3, delete ‘BS 4482: 1995, BS 4483: 1998, BS EN 10025: 1993 or BS EN 10130: 1999’ and substitute ‘BS 4482: 2005, BS4483: 2005, BS EN 10025-1: 2004, BS EN 10025-2: 2004 or BS EN 10130: 2006’.
- (q) Appendix A, Clause A.12(1)(c)
In lines 1 to 2, delete ‘BS EN 10025: 1993’ and substitute ‘BS EN 10025-1: 2004 and BS EN 10025-2: 2004’.

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- (r) Appendix A, Clause A.13(1)(a)
In lines 2 to 4, delete 'BS 4482: 1995, BS 4483: 1998, BS EN 10025: 1993 or BS EN 10130: 1999' and substitute 'BS 4482: 2005, BS 4483: 2005, BS EN 10025-1: 2004, BS EN 10025-2: 2004 or BS EN 10130: 2006'.
- (s) Appendix A, Clause A.13(2)(d)
In line 2, delete 'BS 4449:1997' and substitute 'CS2:2012'.

In line 3, delete 'BS 4482: 1985 or BS EN 10025: 1993' and substitute 'BS 4482: 2005, BS EN 10025-1:2004 or BS EN 10025-2:2004'.
- (t) Appendix A, Clause A.13(2)(e)
In lines 2 and 3, delete 'BS 4482: 1985, BS EN 10025: 1993, or BS EN 10130:1999' and substitute 'BS 4482:2005, BS EN 10025-1:2004, BS EN 10025-2:2004, or BS EN 10130:2006'.
- (u) Appendix A, Clause A.14
In line 1, delete 'BS EN ISO 1461: 1999' and substitute 'BS EN ISO 1461:2009'.
- (v) Table A.1
In Note, insert '(1)' before 'No dispersant'.

Add the following as Note (2).
'(2) BS Sieve Sizes are in accordance with BS 410-1:2000, ISO 3310-1:2000.'
- (w) Table A.2
Note (3), delete 'either' and 'or microbial activity index'.

Add the following as Note (4).
'(4) BS Sieve Sizes are in accordance with BS 410-1:2000, ISO 3310-1:2000.'
- (x) Appendix A, Clause A.40(1)
In line 3, delete 'BS EN 10002-1: 2001' and substitute 'BS EN ISO 6892-1: 2009'.
- (y) Appendix A, Clause A.40(2)
In line 2, delete 'BS EN ISO 10319:1996' and substitute 'BS EN ISO 10319:2008'.

In line 4, delete 'BS EN ISO 10321:1996' and substitute 'BS EN ISO 10321:2008'.
- (z) Appendix A, Clause A.42
In line 2, delete 'BS EN ISO 1461:1999' and substitute 'BS EN ISO 1461:2009'.

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- (aa) Appendix A, Clause A.53
In line 2, delete 'BS 1377: Part 3: 1990, test 3' and substitute 'Geospec 3, Clause 9'.
- (bb) Appendix A, Clause A.55
Delete lines 1 and 2, and substitute 'Not used.'

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) BD (2011). *Code of Practice for the Structural Use of Steel*. Buildings Department, Hong Kong, 366 p.
- (b) BD (2013). *Code of Practice for Structural Use of Concrete*. Buildings Department, Hong Kong, 191 p.
- (c) BSI (2000) *Concrete - Part 1: Specification, Performance, Production and Conformity (BS EN 206-1:2000)*. British Standards Institution, London, 74 p.
- (d) BSI (2004a). *Eurocode 2: Design of Concrete Structures - Part 1-1: General Rules and Rules for Buildings (BS EN 1992-1-1:2004)*. British Standards Institution, London, 230 p.
- (e) BSI (2004b). *Hot Rolled Products of Structural Steels - Part 1: General Technical Delivery Conditions (BS EN 10025-1:2004)*. British Standards Institution, London, 36 p.
- (f) BSI (2004c). *Hot Rolled Products of Structural Steels - Part 2: Technical Delivery Conditions for Non-alloy Structural Steels (BS EN 10025-2:2004)*. British Standards Institution, London, 38 p.
- (g) BSI (2005a). *Steel Fabric for the Reinforcement of Concrete - Specification (BS 4483:2005)*. British Standards Institution, London, 18 p.
- (h) BSI (2005b). *Steel Wire for the Reinforcement of Concrete Products - Specification (BS 4482:2005)*. British Standards Institution, London, 30 p.
- (i) BSI (2006a). *Cold Rolled Low Carbon Steel Flat Products for Cold Forming - Technical Delivery Conditions (BS EN 10130:2006)*. British Standards Institution, London, 16 p.
- (j) BSI (2006b). *Execution of Special Geotechnical Works - Reinforced Fill (BS EN 14475:2006)*. British Standards Institution, London, 60 p.

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- (k) BSI (2008a) *Geosynthetics - Wide-width Tensile Test (ISO 10319:2008) (BS EN ISO 10319:2008)*. British Standards Institution, London, 18 p.
- (l) BSI (2008b) *Geosynthetics - Tensile Test for Joints/Seams by Wide-width Strip Method (ISO 10321:2008) (BS EN ISO 10321:2008)*. British Standards Institution, London, 20 p.
- (m) BSI (2009a). *Hot Dip Galvanized Coatings on Fabricated Iron and Steel Articles - Specifications and Test Methods (ISO 1461:2009) (BS EN ISO 1461:2009)*. British Standards Institution, London, 24 p.
- (n) BSI (2009b). *Metallic Materials - Tensile Testing, Part 1: Method of Test at Ambient Temperature (BS EN ISO 6892-1:2009)*. British Standards Institution, London, 76 p.
- (o) BSI (2009c). *Steel for the Reinforcement of Concrete - Weldable Reinforcing Steel - Bar, Coil and Decoiled product - Specification (BS 4449:2005+A2:2009)*. British Standards Institution, London, 34 p.
- (p) BSI (2010). *Code of Practice for Strengthened/Reinforced Soils and Other Fills (BS 8006-1:2010)*. British Standards Institution, London, 260 p.
- (q) BSI (2012a). *Concrete - Complementary British Standard to BS EN 206-1 - Part 1: Method of Specifying and Guidance for the Specifier (BS 8500-1:2006+A1:2012)*. British Standards Institution, London, 66 p.
- (r) BSI (2012b). *Concrete - Complementary British Standard to BS EN 206-1 - Part 2: Specification for Constituent Materials and Concrete (BS8500-2:2006+A1:2012)*. British Standards Institution, London, 52 p.
- (s) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.
- (t) GEO (2003). *Guide to Slope Maintenance (Geoguide 5). (Third edition)*. Geotechnical Engineering Office, Hong Kong, 132 p.
- (u) GEO (2011). *Technical Guidelines on Landscape Treatment for Slopes (GEO Publication No. 1/2011)*. Geotechnical Engineering Office, Hong Kong, 217 p.
- (v) HKSARG (2012). *Construction Standard, Steel Reinforcing Bars for the Reinforcement of Concrete (CS2:2012)*. The Government of the Hong Kong Special Administrative Region, Hong Kong, 50 p.

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Annex TGN 41 A7 - Amendments to Geoguide 7: Guide to Soil Nail Design and Construction

(a) Section 5.5

In item (a), line 2, delete ‘BS EN ISO 1461:1999 (BSI, 1999)’ and substitute ‘BS EN ISO 1461:2009 (BSI, 2009)’.

In item (a), line 4, delete ‘CEDD’ and substitute ‘HKSARG’.

In item (b), line 2, delete ‘BS EN ISO 1461:1999 (BSI, 1999)’ and substitute ‘BS EN ISO 1461:2009 (BSI, 2009)’.

In item (c), line 2, delete ‘BS EN ISO 1461:1999 (BSI, 1999)’ and substitute ‘BS EN ISO 1461:2009 (BSI, 2009)’.

(b) Section 5.6.3

Delete Equation (5.3) and explanatory notes and substitute the following.

$$T_{GR} = \frac{2.25\eta_1\eta_2 f_{ctd}P_r L}{F_{GR}} \dots\dots\dots(5.3).$$

- where η_1 = the coefficient related to the quality of the bond condition and the position of the bar during concreting in accordance with Clause 8.4.2 of BS EN 1992-1-1:2004 (BSI, 2004)
- η_2 = the coefficient related to the bar diameter in accordance with Clause 8.4.2 of BS EN 1992-1-1:2004 (BSI, 2004)
- f_{ctd} = the design value of concrete tensile strength in accordance with Clause 3.1.6(2)P of BS EN 1992-1-1:2004 (BSI, 2004) and NA to BS EN 1992-1:2004 (BSI, 2005)
- P_r = effective perimeter of the soil-nail reinforcement
- L = bond length of the soil-nail reinforcement in the passive zone
- F_{GR} = factor of safety against pullout failure at grout-reinforcement interface

(c) Section 5.6.4

In Figure 5.5, item (3), delete ‘CEDD’ and substitute ‘HKSARG’.

(d) Section 5.6.5

In paragraph 7, lines 1 to 3, delete ‘GEO Publication No. 1/2000 : Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls (GEO, 2000b) and GEO Technical Guidance Note No. 20 (GEO, 2007b)’ and substitute ‘GEO Publication No. 1/2011 : Technical Guidelines on Landscape Treatment for Slopes (GEO, 2011)’.

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In paragraph 7, lines 6 and 7, delete ‘GEO Report No. 56 (Wong et al, 1999)’ and substitute ‘GEO Publication No. 1/2009 (GEO, 2009)’.

In paragraph 7, line 8, delete ‘CEDD’ and substitute ‘HKSARG’.

(e) Section 5.9

In paragraph 2, lines 2 and 4, delete ‘GEO Report No. 56 (Wong et al, 1999), GEO Report No. 165 (Lui & Shiu, 2005) and GEO Technical Guidance Note No. 9 (GEO, 2004a)’ and substitute ‘GEO Publication No. 1/2009 (GEO, 2009)’.

(f) Section 5.10

In paragraph 7, lines 1 and 2, delete ‘GEO Report No. 56 (Wong et al, 1999)’ and substitute ‘GEO Publication No. 1/2009 (GEO, 2009)’.

(g) Section 5.11

In paragraph 2, lines 9 to 11, delete ‘GEO Publication No. 1/2000 : Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls (GEO, 2000b)’ and substitute ‘GEO Publication No. 1/2011 : Technical Guidelines on Landscape Treatment for Slopes (GEO, 2011)’.

In paragraph 2, lines 13 and 14, delete ‘GEO Technical Guidance Note No. 20 (GEO, 2007b)’ and substitute ‘GEO Publication No. 1/2011 (GEO, 2011)’.

(h) Section 6.2.1

In paragraph 2, line 2, delete ‘CEDD’ and substitute ‘HKSARG’.

In paragraph 2, line 4, delete ‘CEDD’ and substitute ‘HKSARG’.

(i) Section 6.3.1

In paragraph 1, line 7, delete ‘CEDD’ and substitute ‘HKSARG’.

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) BSI (2004). *Eurocode 2: Design of Concrete Structures - Part 1-1: General Rules and Rules for Buildings (BS EN 1992-1-1:2004)*. British Standards Institution, London, 230 p.
- (b) BSI (2009). *Hot Dip Galvanised Coatings on Fabricated Iron and Steel Articles - Specifications and Test Methods (ISO 1461:2009) (BS EN ISO 1461: 2009)*. British Standards Institution, London, 24 p.

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- (c) BSI (2005). *UK National Annex to Eurocode 2: Design of Concrete Structures - Part 1-1: General Rules and Rules for Buildings (NA to BS EN 1992-1-1:2004)*. British Standards Institution, London, 26 p.
- (d) GEO (2009). *Prescriptive Measures for Man-made Slopes and Retaining Walls (GEO Publication 1/2009)*. Geotechnical Engineering Office, Hong Kong, 74 p.
- (e) GEO (2011). *Technical Guidelines on Landscape Treatment for Slopes (GEO Publication No. 1/2011)*. Geotechnical Engineering Office, Hong Kong, 217 p.
- (f) HKSARG (2006a). *General Specification for Civil Engineering Works (2006 Edition) (Incorporating all Amendments)*. The Government of Hong Kong Special Administrative Region, Hong Kong, Volumes 1 and 2.

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Annex TGN 41 A8 - Amendments to GCO Publication No. 1/90: Review of Design Methods for Excavations

(a) Section 8.1.4

In paragraph 4, line 3, add ‘Additional useful information is contained in British Standards Institution (2013).’ after ‘(GCO, 1989).’

(b) Figure 29

Typos are identified and the Figure is amended as follow:

In the Legend for P_a , delete “(including water pressure)” and substitute “(including net water pressure)”.

In the Legend for P_p , delete “(including water pressure)”.

In the Legend for P_{a1} , add “(including net water pressure)” after “point A”.

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) BSI (2013). *Execution of Special Geotechnical Works - Ground Anchors (BS EN 1537:2013)*. British Standards Institution, London, 56 p.

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Annex TGN 41 A9 - Amendments to GEO Publication No. 1/93: Review of Granular and Geotextile Filters

(a) Section 5.3

In paragraph 1, line 2, delete 'usually' and substitute 'may be', and delete (BSI, 1990) and substitute GEO (2001).

In paragraph 2, lines 2 and 3, delete 'using a method such as that given by BS 1377 (BSI, 1990) but without the use of dispersants.' and substitute 'without the use of dispersants using a method such as that given by Geospec 3 (GEO, 2001).'

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.

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Annex TGN 41 A10 - Amendments to GEO Publication No. 1/2006: Foundation Design and Construction

- (a) Section 1.1
In paragraph 2, lines 3 and 4, delete ‘BS 8004 (BSI, 1986) adopts an arbitrary embedment depth of 3m as a way to define shallow foundations.’
- (b) Section 2.1
In paragraph 4, line 3, delete ‘BS 6349-1:2000 (BSI, 2000a)’ and substitute ‘BS 6349-1-3:2012 (BSI, 2012a)’.
- (c) Section 3.4
In paragraph 1, line 1, delete ‘BS EN 1997-1:2004 (BSI, 2004)’ and substitute ‘BS EN 1997-2:2007 (BSI, 2007)’.

In paragraph 1, line 2, delete ‘DD ENV 1997-3:2000 (BSI, 2000b)’.

In paragraph 1, line 7, delete ‘(BSI, 2000b)’.
- (d) Section 6.3.4
In paragraph 2, line 3, delete ‘2004d’ and substitute ‘2013b’.
- (e) Section 6.14
In paragraph 6, line 5, delete ‘BS 8500-1:2002 (BSI, 2002)’ and substitute ‘BS 8500-1:2006+A1:2012 (BSI, 2012b)’.

In paragraph 8, lines 5 and 6, delete ‘BS 8110 (BSI, 1997) for ‘moderate’ conditions’ and substitute ‘BS EN 1992-1-1:2004 (BSI, 2004a)’.
- (f) Section 7.2
In paragraph 2, line 1, delete ‘(HKG, 1992)’ and substitute ‘(HKSARG, 2006)’.
- (g) Table 7.1
In the title, delete ‘(HKG, 1992)’ and substitute ‘(HKSARG, 2006)’.

In row 1, under the column Land Piles, add ‘15 mm for minipiles’.

In row 2, under column Land Piles, add ‘1 in 100 for minipiles’.
- (h) Section 8.2.4.2
In paragraph 7, line 4, delete ‘(BSI, 1997)’, and substitute ‘(BSI, 2004a)’.

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- (i) Section 8.2.5.2
In paragraph 6, line 1, delete '(HKG, 1992)' and substitute '(HKSARG, 2006)'.
- (j) Section 8.2.5.7
In paragraph 2, line 3, delete '(e.g. HKG, 1992)' and substitute '(e.g. HKSARG, 2006)'.
- (k) Section 8.2.5.12
In paragraph 3, line 5, delete '(HKG, 1992)' and substitute '(HKSARG, 2006)'.
- (l) Section 8.2.5.14
In paragraph 2, line 2, delete '(HKG, 1992)' and substitute '(HKSARG, 2006)'.
- (m) Section 8.2.6.4
Delete paragraph 5 and substitute the following new paragraph 5:
'BS5228:2-2009 (BSI, 2009) gives some guidance on the control of vibration due to percussive piling. The method for estimating peak particle velocity takes similar form as Equation [8.3], with the exception that it is based on radial distance between the pile toe and the receiver. A range of values of coefficient k are given for different ground conditions for percussive piling (BSI, 2009), but this should be confirmed with field measurements.'

In paragraph 7, line 4, delete 'Practice Note for Authorized Persons and Registered Structural Engineer No. 77 (BD, 2004b), 279 (BD,2004c) and 289 (BD,2005)' and substitute 'Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers Nos. APP-24 (BD, 2013a) and APP-137 (2012).'

In paragraph 8, line 5, delete '(BD, 2005)' and substitute, '(BD, 2012)'.

In paragraph 8, lines 8 and 9, delete 'BS 7385 Part 1:1990 (BSI, 1990)' and substitute 'BS ISO 4866:2010 (BSI, 2010b)'.
- (n) Section 8.3.2.3
In paragraph 3, line 2, delete '(HKG, 1992)' and substitute '(HKSARG, 2006)'.

In paragraph 3, line 2, delete 'BS EN 1536:2000 (BSI, 2000c)' and substitute 'BS EN 1536:2010 (BSI, 2010a)'.
- (o) Table 8.7
Replace Table 8.7 with the following new Table 8.7.

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Table 8.7 – Limits on Properties of Bentonite Slurry

Bentonite Property at 20 °C	Method of Testing	General Specification for Civil Engineering Works (HKSARG, 2006)	BS EN 1536:2010 (BSI, 2010a)	Common Specifications by Local Contractors (up to 2006)
Density as supplied to excavation	Mud density balance	> 1.015 g/ml ≤ 1.15 g/ml ⁽¹⁾	≤ 1.10 g/ml ≤ 1.15 g/ml ⁽¹⁾	≤ 1.015 to 1.03 g/ml ≤ 1.15 to 1.2 g/ml ⁽¹⁾
Viscosity	Marsh cone method (946ml flow through cone)	≤ 35 sec ≤ 40 sec ⁽¹⁾	32 to 50 sec	≤ 32 sec ≤ 40 sec to 45 sec
Fluid loss	Baroid filter press (in 30 minute test) / API Recommended Practice: RP13B-1	≤ 25 ≤ 40 ⁽¹⁾	< 30 NA ⁽¹⁾	≤ 25 ≤ 35 to 40 ⁽¹⁾
Shear strength (10 min gel strength)	Shearometer	NA	NA	1.4 to 10 N/m ²
pH value	pH indicator paper strips or electrical pH meter	8 to 10.5 8 to 11 ⁽¹⁾	7 to 11 NA ⁽¹⁾	8 to 11
Sand content		≤ 3% ⁽¹⁾	≤ 4% ⁽¹⁾	≤ 3% ⁽¹⁾
Filter Cake		≤ 1 mm ≤ 5 mm ⁽¹⁾	≤ 3 mm NA ⁽¹⁾	-

Notes : (1) Denotes condition before concreting. Other values refer to bentonite in fresh or recycled condition.
(2) NA denotes no requirement imposed.

- (p) Section 8.3.4.12
In line 1, delete '(BSI, 2000b)'.
- (q) Section 8.3.5.3
In paragraph 4, line 3, delete '(HKG, 1992)' and substitute '(HKSARG, 2006)'.
- (r) Section 9.3.3.2
In paragraph 2, line 2, delete '(HKG, 1992)' and substitute '(HKSARG, 2006)'.
- (s) Table 9.1
In row 1, under the column 'Reference Document', delete '(HKG, 1992)' and substitute '(HKSARG, 2006)'.
- (t) Section 9.3.5.3
In paragraph 1, item (a), delete '(HKG, 1992)' and substitute '(HKSARG, 2006)'.

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- (u) Section 9.3.5.5
In paragraph 1, line 2, delete '(HKG, 1992)' and substitute '(HKSARG, 2006)'.
- (v) Section 9.3.5.2
In paragraph 2, line 6, delete 'pile diameter (BSI, 1986)' and substitute 'pile base diameter (BSI, 2004b)'.

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) BD (2012). *Ground-borne Vibrations and Ground Settlements Arising from Pile Driving and Similar Operations, Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers No. APP-137 (PNAP No. APP-137)*. Buildings Department, Hong Kong, 7 p.
- (b) BD (2013a). *Railway Protection, Railways Ordinance, Mass Transit Railway (Land Resumption and Related Provisions) Ordinance, Area Number 3 of the Scheduled Areas in Schedule 5, Buildings Ordinance, Cap 123, Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers No. APP-24 (PNAP No. APP-24)*. Buildings Department, Hong Kong, 8 p.
- (c) BD (2013b). *Code of Practice for Structural Use of Concrete*. Buildings Department, Hong Kong, 191 p.
- (d) BSI (2004a). *Eurocode 2: Design of Concrete Structures - Part 1-1: General Rules and Rules for Buildings (BS EN 1992-1-1:2004)*. British Standards Institution, London, 230 p.
- (e) BSI (2007). *Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing (BS EN 1997-2:2007)*. British Standards Institution, London, 202 p.
- (f) BSI (2009). *Code of Practice for noise and Vibration Control on Construction and Open Sites - Part 2: Vibration (BS 5228-2:2009)*. British Standards Institution, London, 98 p.
- (g) BSI (2010a). *Execution of Special Geotechnical Works - Bored Piles (BS EN 1536:2010)*. British Standards Institution, London, 86 p.
- (h) BSI (2010b). *Mechanical Vibration and Shock - Vibration of Fixed Structures - Guidelines for the Measurement of Vibrations and Evaluation of Their Effects on Structures (BS ISO 4866:2010)*. British Standards Institution, London, 52 p.

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- (i) BSI (2012a). *Maritime Works, Part 1-3: General - Code of Practice for Geotechnical Design (BS 6349-1-3:2012)*. British Standards Institution, London, 74 p.
- (j) BSI (2012b). *Concrete - Complementary British Standard to BS EN 206-1 - Part 1: Method of Specifying and Guidance for the Specifier (BS 8500-1:2006+A1:2012)*. British Standards Institution, London, 66 p.
- (k) HKSARG (2006). *General Specification for Civil Engineering Works (2006 Edition) (Incorporating all Amendments)*. The Government of Hong Kong Special Administrative Region, Hong Kong, Volumes 1 and 2.

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Annex TGN 41 A11 - Amendments to GEO Publication No. 1/2007: Engineering Geological Practice in Hong Kong

- (a) Section 2.3
In paragraph 1, line 6, delete '(GEO, 2005d)' and substitute '(GEO, 2012)'.
- (b) Section 2.4
In paragraph 1, lines 5 and 6, delete 'GEO (2004b, c, d, e)' and substitute 'GEO (2004b, d, e, 2009a)'.

In paragraph 4, lines 2 and 3, delete 'GEO (2005a, b)' and substitute 'GEO (2009d, e)'.
- (c) Section 3.1.2
In paragraph 1, line 9, delete 'BD (2003)' and substitute 'BD (2005c)'.
- (d) Section 3.1.4
In paragraph 3, line 2, delete 'GEO (2004n) and Wong et al. (1999)' and substitute 'GEO Publication No. 1/2009 (GEO, 2009c)'.

In paragraph 3, line 9, delete 'Wong et al. (1999)' and substitute 'GEO (2009c)'.
- (e) Section 3.1.5
In paragraph 2, lines 9 and 10, delete 'GEO, 2005b' and substitute 'GEO, 2009e'.
- (f) Section 3.2.1
In paragraph 2, line 6, delete 'GEO (2004f)' and substitute 'GEO (2009b)'.
- (g) Section 3.3.3
In paragraph 4, line 8, delete 'GEO (2004c, i)' and substitute 'GEO (2004i, 2009a)'.
- (h) Section 3.4.2
In paragraph 1, third bullet point, delete 'BS5930 (BSI, 1999) gives' and substitute 'BS5930:1999+A2:2010 (BSI, 2010) and BS EN 1997-2:2007 (BSI, 2007) give'.

In paragraph 1, sixth bullet point, delete 'GEO (2005a)' and substitute 'GEO (2009d)'.
- (i) Section 3.5.4
In sub-section 'Effect of Discontinuities on the Mass Properties of Weathered Rocks', paragraph 4, line 1, delete 'GEO (2004c)' and substitute 'GEO (2009a)'.
- (j) Section 3.6.2
In paragraph 2, delete first bullet point, and substitute 'PNAPs APP-22, APP-28, APP-30, APP-61 and APP-128 (BD 1994, 1997, 2005a, b, c)'.

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In paragraph 2, the third bullet point, delete '(GEO, 2004b,c, d, e, i, f)' and substitute '(GEO 2004b, d, e, i, j, 2009a)'.

(k) Section 4.3.1

In paragraph 9, line 10, delete 'BS 5930 (BSI, 1999)' and substitute 'BS EN ISO 14689-1:2003 (BSI, 2003) and BS 5930:1999+A2:2010 (BSI, 2010)'.

(l) Section 4.4.1

In paragraph 1, line 10, delete 'BS 5930 (BSI, 1999)' and substitute 'BS EN ISO 14689-1:2003 (BSI, 2003) and BS 5930:1999+A2:2010 (BSI, 2010)'.

In paragraph 6, line 5, delete 'BSI (1999)' and substitute 'BSI (2003, 2010)'.

(m) Section 4.4.3

In paragraph 5, line 6, delete 'BS 5930 (BSI, 1999)' and substitute 'BS EN ISO 14689-1:2003 (BSI, 2003) and BS 5930:1999+A2:2010 (BSI, 2010)'.

(n) Section 5.5.5

In paragraph 1, line 7, delete 'BD (1993)' and substitute 'BD (2005a)'.

In paragraph 1, line 13, delete 'BD (2004b)' and substitute 'BD (2006)'.

In paragraph 6, line 8, delete 'BD (1993)' and substitute 'BD (2005a)'.

(o) Section 5.6.3

In paragraph 5, line 8, delete 'BS 5930 (BSI, 1999)' and substitute 'BS EN ISO 14689-1:2003 (BSI, 2003) and BS 5930:1999+A2:2010 (BSI, 2010)'.

(p) Section 5.7.2

In paragraph 6, line 7, delete 'BS 5930 (BSI, 1999)' and substitute 'BS EN ISO 14689-1:2003 (BSI, 2003) and BS 5930:1999+A2:2010 (BSI, 2010)'.

(q) Section 6.5.6

In paragraph 2, the first bullet point, delete 'BD (1993)' and substitute 'BD (2005a)'.

In paragraph 2, the second bullet point, delete 'BD (2004b)' and substitute 'BD (2006)'.

In paragraph 2, the fourth bullet point, delete 'BD (1997, 2000)' and substitute 'BD (1997, 2009)'.

(r) Section 6.6.3

In paragraph 2, line 7, delete 'GEO (2005b)' and substitute 'GEO (2009e)'.

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- (s) Section 6.7.1
In sub-section 'Overview', paragraph 3, line 8, delete 'GEO (2005a, b)' and substitute 'GEO (2009d, e)'.

In sub-section 'Engineering Geological Issues', paragraph 9, line 5, delete 'GEO (2005a, b)' and substitute 'GEO (2009d, e)'.
- (t) Section 6.7.4
In sub-section 'General', paragraph 1, line 8, delete 'GEO (2005a)' and substitute 'GEO (2009d)'.

In paragraph 2, lines 6 and 7, delete 'GEO, 2005b' and substitute 'GEO, 2009e'.

In sub-section 'Ground Investigation Strategies and Assessment Methods', paragraph 22, line 6, delete '(GEO, 2005a)' and substitute '(GEO, 2009d)'.
- (u) Section 6.7.7
In sub-section 'Tai Koo Shing MTR Station', paragraph 8, line 13, delete 'GEO, 2005a, b' and substitute 'GEO, 2009d, e'.
- (v) Section 6.8.2
In sub-section 'Fill Material', paragraph 1, line 10, delete 'CED (2002a)' and substitute 'HKSARG (2006)'.
- (w) Section 6.10.2
In sub-section 'Concrete Aggregate', paragraph 2, line 7, delete 'CED (2002a)' and substitute 'HKSARG (2006)'.

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) BD (2005a). *Development in Area Numbers 2 & 4 of the Scheduled Areas, Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers No. APP-61 (PNAP No. APP-61)*. Buildings Department, Hong Kong, 7 p.
- (b) BD (2005b). *Development in Mid-levels Scheduled Area, Buildings Ordinance Section 2(1), Building (Administration) Regulation 8(1) (bb) (vii) and 8(1)(l), Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers No. APP-30 (APP-30)*. Buildings Department, Hong Kong, 3 p.

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- (c) BD (2005c). *Geotechnical Design Information, Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers No. APP-128 (APP-128)*. Buildings Department, Hong Kong, 5 p.
- (d) BD (2006). *Development in the Designated Area of Northshore Lantau, Practice Note for Authorized Persons, Registered Structural Engineers and Registered Geotechnical Engineers No. APP-134 (APP-134)*. Buildings Department, Hong Kong, 4 p.
- (e) BD (2009). *Code of Practice for Site Supervision*. Buildings Department, Hong Kong, 115 p.
- (f) BSI (2003). *Geotechnical Investigation and Testing - Identification and Classification of Rock - Part 1: Identification and Description (BS EN ISO 14689-1:2003)*. British Standards Institution, London, 28 p.
- (g) BSI (2007). *Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing (BS EN 1997-2:2007)*. British Standards Institution, London, 202 p.
- (h) BSI (2010). *Code of Practice for Site Investigations (BS 5930:1999+A2:2010)*. British Standards Institution, London, 206 p.
- (i) GEO (2009a). *Enhancement of Rock Slope Engineering Practice Based on Findings of Landslide Studies, Technical Guidance Note No. 10, Issue No. 2 (TGN 10)*. Geotechnical Engineering Office, Hong Kong, 5 p.
- (j) GEO (2009b). *Geoguide 2 – Guide to Site Investigation, Updated Appendix B: Sources of Information, Technical Guidance Note No. 5, Issue No. 4 (TGN 5)*. Geotechnical Engineering Office, Hong Kong, 24 p.
- (k) GEO (2009c). *Prescriptive Measures for Man-made Slopes and Retaining Walls (GEO Publication 1/2009)*. Geotechnical Engineering Office, Hong Kong, 74 p.
- (l) GEO (2009d). *Site Investigation for Tunnel Works, Technical Guidance Note No. 24, Issue No. 2 (TGN 24)*. Geotechnical Engineering Office, Hong Kong, 9 p.
- (m) GEO (2009e). *Geotechnical Risk Management for Tunnel Works, Technical Guidance Note No. 25, Issue No. 2, Revision A (TGN 25)*. Geotechnical Engineering Office, Hong Kong, 10 p.

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- (n) GEO (2012). *Technical Guidance Documents. Technical Guidance Note No. 1, Issue No. 1, Revision M (TGN 1)*. Geotechnical Engineering Office, Hong Kong, 6 p.

- (o) HKSARG (2006). *General Specification for Civil Engineering Works (2006 Edition) (Incorporating all Amendments)*. The Government of Hong Kong Special Administrative Region, Hong Kong, Volumes 1 and 2.

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Annex TGN 41 A12 - Amendments to GEO Publication No. 1/2009: Prescriptive Measures for Man-made Slopes and Retaining Walls

(a) Section 3.2.1

In Table 3.2, Note (1), delete ‘GEO Publication No. 1/2000 (GEO, 2000a)’ and substitute ‘GEO Publication No. 1/2011 (GEO, 2011)’.

(b) Section 5.4.3

In paragraph 5, item (d), lines 1 to 3, delete ‘GEO Publication No. 1/2000 : Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls (GEO, 2000a)’ and substitute ‘GEO Publication No. 1/2011 : Technical Guidelines on Landscape Treatment for Slopes (GEO, 2011)’.

(c) Section 6.2

In paragraph 1, lines 5 and 6, delete ‘GEO Publication No. 1/2000 : Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls (GEO, 2000a)’ and substitute ‘GEO Publication No. 1/2011 : Technical Guidelines on Landscape Treatment for Slopes (GEO, 2011)’.

In paragraph 2, line 3, delete ‘GEO (2000a)’ and substitute ‘GEO (2011)’.

In paragraph 2, lines 9 to 11, delete ‘GEO Technical Guidance Note No. 2 : Update of GEO Publication 1/2000 - Technical Guidelines on Landscape Treatment and Bio-engineering for Man-made Slopes and Retaining Walls (GEO, 2007c)’ and substitute ‘Geo Publication No. 1/2011 – Technical Guidelines on Landscape Treatment for Slopes (GEO, 2011)’.

REFERENCES

(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) GEO (2011). *Technical Guidelines on Landscape Treatment for Slopes* (GEO Publication No. 1/2011). Geotechnical Engineering Office, Hong Kong, 217 p.

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Annex TGN 41 A13 - Amendments to GEO Technical Guidance Note No. 25: Geotechnical Risk Management for Tunnel Works

(a) Section 3.4

Delete Section 3.4 and substitute the following:

‘BSI (2011). *BS 6164:2011 Code of Practice for Safety in Tunnelling in the Construction Industry*. British Standards Institution, London, 162 p.’

(b) Section 5.1.2

In paragraph 1, line 3, delete ‘BSI (2001)’ and substitute ‘BSI (2011)’.

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Annex TGN 41 A14 - Amendments to Geospec 1: Model Specification for Prestressed Ground Anchors (Second Edition)

(a) Section 3.2

In paragraph 1, item (a), delete 'BS 5896:1980' and substitute 'BS 5896:2012'.

In paragraph 1, delete item (b) and re-number item (c) to item (b).

(b) Section 3.3

In paragraph 1, line 1, delete 'BS 12:1978' and substitute 'BS EN 197-1:2011'.

In paragraph 4, line 2, delete 'BS 3148:1980' and substitute 'BS EN 1008:2002'.

Delete paragraph 5, and substitute the following:

'Admixtures shall only be used with the prior agreement of the Engineer and shall comply with the requirements of the following standards where deemed appropriate by the Engineer:

BS EN 480-1:2006+A1:2011
BS EN 480-2:2006
BS EN 480-4:2005
BS EN 480-5:2005
BS EN 480-6:2005
BS EN 480-8:2012
BS EN 480-10:2009
BS EN 480-11:2005
BS EN 480-12:2005
BS EN 934-2:2009+A1:2012
BS EN 934-6:2001'

In paragraph 6, line 5, delete 'BS 1881:Part 6:1974' and substitute 'Construction Standard CS1:2010'.

(c) Section 3.7

In paragraph 1, line 2, delete 'BS 2494:1986' and substitute 'BS EN 681-1:1996'.

In paragraph 2, lines 3, delete 'BS 2494:1986' and substitute 'BS EN 681-1:1996'.

(d) Section 4.3.4

In line 2, delete 'BS 4447:1973' and substitute 'BS EN 13391:2004'.

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(e) Section 5.4.3

Delete paragraph 1, and add following paragraph:

‘Grout cubes of 100mm size shall be prepared, cured and strength tested in accordance with Construction Standard CS1:2010’

(f) Section 5.6.3

In paragraph 1, lines 4 and 5, delete ‘BS 4447:1973’ and substitute ‘BS EN 13391:2004’.

(g) Table 2

In row 1, delete the test method ‘BS 2782: Part 6: 1980, Method 620A’ and substitute ‘BS EN ISO 1183-1:2012’.

In row 2, delete the test method ‘BS 2782: Part 3: 1976, Method 320C’ and substitute ‘BS EN ISO 527-1:2012 and BS EN ISO 527-2:2012’.

In row 3, delete the test method ‘BS 2782: Part 1: 1976, Method 120A’ and substitute ‘BS EN ISO 306:2004’.

In row 4, delete the test method ‘BS 2782: Part 3: 1981, Method 365B’ and substitute ‘BS EN ISO 868:2003’.

In row 10, delete the test method ‘BS 6437:1984’ and substitute ‘BS EN 12201-1:2011 and BS EN 12201-2:2011’.

(h) Section A.15.6

In line 1, delete ‘BSI (1989)’ and substitute ‘BSI (2013)’

(i) Section A.22

Delete ‘BS 12:1978 - Specification of Ordinary and Rapid-hardening Portland Cement. (Including amendment AMD 4259, 1983).’ and substitute ‘BS EN 197-1:2011 - Cement. Composition, Specifications and Conformity Criteria for Common Cements.’

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For 'BS 1881 : Testing Concrete', delete the following:

'BS 1881 : Testing Concrete.

- Part 3: 1970 - Methods of Making and Curing Test Specimens. (Including amendments AMD 1948, 1976 and AMD 3062, 1979).
- Part 4: 1970 - Methods of Testing Concrete for Strength, (Including amendments AMD 782, 1971 and AMD 2167, 1976)
- Part 6: 1971 - Analysis of Hardened Concrete. (Including amendment AMD 763, 1971).'

and substitute the following:

'Construction Standard CS1:2010 - Testing Concrete (2010), HKSARG.'

Delete 'BS 2494:1986 - Elastomeric Joint Ring for Pipework and Pipelines.' and substitute 'BS EN 681-1:1996 - Elastomeric Seals. Material Requirements for Pipe Joint Seals Used in Water and Drainage Applications. Vulcanized Rubber.'

For 'BS 2782 : Methods of Testing Plastics.', delete the following:

'BS 2782 : Methods of Testing Plastics.

- Part 1: 1976 - Method 120A. Determination of the Vicat Softening Temperature of Thermoplastics.
- Part 3: 1976 - Method 320C. Tensile Strength, Elongation and Elastic Modulus.'
- Part 3: 1981 - Method 365B. Determination of Indentation Hardness by Means of a Durometer (Shore Hardness).
- Part 6: 1980 - Method 620A. Determination of Density of Solid Plastics Excluding Cellular Plastics (Immersion Method).'

and substitute the following:

'BS EN ISO 306 2004 - Plastics. Thermoplastic Materials. Determination of Vicat Softening Temperature (VST).

BS EN ISO 527: Plastics. Determination of Tensile Properties

Part 1:2012 - General Principles

Part 2:2012 - Test Conditions for Moulding and Extrusion Plastics.

BS EN ISO 868:2003 - Plastics and Ebonite. Determination of Indentation Hardness by Means of a Durometer (Shore Hardness).

BS EN ISO 1183-1:2012 - Plastics. Methods for Determining the Density of Non-cellular Plastics. Immersion Method, Liquid Pyknometer Method and Titration Method.'

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Delete 'BS3148:1980 - Methods of Test for Water for Making Concrete (Including Notes on the Suitability of Water).' and substitute 'BS EN 1008:2002 - Mixing Water for Concrete. Specification for Sampling, Testing and Assessing the Suitability of Water, Including Water Recovered from Processes in the Concrete Industry, as Mixing Water for Concrete.'

Delete 'BS 4447:1973 - The Performance of Prestressing Anchorages for Post-tensioned Construction.' And substitute 'BS EN 13391:2004 - Mechanical Tests for Post-tensioning Systems.'

Delete 'BS 4757:1971 - Nineteen-wire Steel Strand for Prestressed Concrete.'

For 'BS 5075: Concrete Admixtures', delete the following:

'BS 5075: Concrete Admixtures.

Part 1: 1982 - Specification for Accelerating Admixtures, Retarding Admixtures and Water-reducing Admixtures. (Including amendments AMD 4183, 1983 and AMD 4910, 1985).'

BS 5075: Concrete Admixtures.

Part 3:1985 - Specification for Superplasticizing Admixtures.'

and substitute the following:

'BS EN 480: Admixtures for Concrete, Mortar and Grout. Test Methods.

Part 1: 2006 - Reference Concrete and Reference Mortar for Testing. (Including amendments A1:2011)

Part 2: 2006 - Determination of Setting Time.

Part 4: 2005 - Determination of Bleeding of Concrete.

Part 5: 2005 - Determination of Capillary Absorption.

Part 6: 2005 - Infrared Analysis.

Part 8: 2012 - Determination of the Conventional Dry Material Content.

Part 10: 2009 - Determination of Water Soluble Chloride Content.

Part 11: 2005 - Determination of Air Void Characteristics in Hardened Concrete.

Part 12: 2005 - Determination of the Alkali Content of Admixtures.

BS EN 934 : Admixtures for Concrete, Mortar and Grout.

Part 2: 2009 - Concrete Admixtures. Definitions, Requirements, Conformity, Marking and Labelling. (Including amendments A1:2012)

Part 6: 2001 - Sampling, Conformity Control and Evaluation of Conformity.'

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Delete 'BS 5896:1980 - Specification for High Tensile Steel Wire Strand for the Prestressing of Concrete.' and substitute 'BS 5896:2012 - High Tensile Steel Wire and Strand for the Prestressing of Concrete. Specification.'

Delete 'BS 6437:1984 - Polyethylene Pipes (Type 50) in Metric Diameters for General Purposes. (Including amendment AMD 5169, 1986).' and substitute the following:

'BS EN 12201: Plastics Piping Systems for Water Supply, and for Drainage and Sewerage under Pressure - Polyethylene (PE).

Part 1: 2011 - General.

Part 2: 2011 - Pipes.'

(j) Table A8

In row 2, delete the Test Method 'BS 2782: Part 3:1976, Method 320C' and substitute 'BS EN ISO 527-1:2012 and BS EN ISO 527-2:2012'.

In row 4, delete the Test Method 'BS 2782: Part 6:1980, Method 620A' and substitute 'BS EN ISO 1183-1:2012'.

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(Note: Only the references in addition to those in the technical guidance document are included here for brevity.)

- (a) BSI (1996). *Elastomeric Seals - Material Requirements for Pipe Joint Seals used in Water and Drainage Applications - Part 1: Vulcanized Rubber (BS EN 681-1:1996)*. British Standards Institution, London, 24 p.
- (b) BSI (2001). *Admixtures for Concrete, Mortar and Grout - Part 6: Sampling, Conformity Control and Evaluation of Conformity (BS EN 934-6:2001)*. British Standards Institution, London, 14 p.
- (c) BSI (2002). *Mixing Water for Concrete - Specification for Sampling, Testing and Assessing the Suitability of Water Including Water Recovered from Processes in the Concrete Industry, as Mixing Water for Concrete (BS EN 1008:2002)*. British Standards Institution, London, 22 p.
- (d) BSI (2003). *Plastics and Ebonite - Determination of Indentation Hardness by Means of a Durometer (Shore Hardness) (BS EN ISO 868:2003)*. British Standards Institution, London, 16 p.

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- (e) BSI (2004a). *Mechanical Tests for Post-tensioning Systems (BS EN 13391:2004)*. British Standards Institution, London, 24 p.
- (f) BSI (2004b). *Plastics - Thermoplastic Materials - Determination of Vicat Softening Temperature (VST) (BS EN ISO 306:2004)*. British Standards Institution, London, 20 p.
- (g) BSI (2005a). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 4: Determination of Bleeding of Concrete (BS EN 480-4:2005)*. British Standards Institution, London, 8 p.
- (h) BSI (2005b). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 5: Determination of Capillary Absorption (BS EN 480-5:2005)*. British Standards Institution, London, 10 p.
- (i) BSI (2005c). *Admixtures of Concrete, Mortar and Grout - Test Methods - Part 6: Infrared Analysis (BS EN 480-6:2005)*. British Standards Institution, London, 8 p.
- (j) BSI (2005d). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 11: Determination of Air Void Characteristics in Hardened Concrete (BS EN 480-11:2005)*. British Standards Institution, London, 22 p.
- (k) BSI (2005e). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 12: Determination of the Alkali Content of Admixtures (BS EN 480-12:2005)*. British Standards Institution, London, 13 p.
- (l) BSI (2006). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 2: Determination of Setting Time (BS EN 480-2:2006)*. British Standards Institution, London, 14 p.
- (m) BSI (2009). *Admixtures for Concrete, Mortar and Grout - Test Methods, Part 10: Determination of Water Soluble Chloride Content (BS EN 480-10:2009)*. British Standards Institution, London, 12 p.
- (n) BSI (2011a). *Cement, Part 1: Composition, Specifications and Conformity Criteria for Common Cements (BS EN 197-1:2011)*. British Standards Institution, London, 50 p.
- (o) BSI (2011b). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 1: Reference Concrete and Reference Mortar for Testing (BS EN 480-1:2006+A1:2011)*. British Standards Institution, London, 14 p.
- (p) BSI (2011c). *Plastics Piping Systems for Water Supply, and for Drainage and Sewerage under Pressure - Polyethylene (PE), Part 1: General (BS EN 12201-1:2011)*. British Standards Institution, London, 26 p.

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- (q) BSI (2011d). *Plastics Piping Systems for Water Supply, and for Drainage and Sewerage under Pressure - Polyethylene (PE), Part 2: Pipes (BS EN 12201-2:2011)*. British Standards Institution, London, 34 p.
- (r) BSI (2012a). *High Tensile Steel Wire and Strand for the Prestressing of Concrete - Specification (BS 5896:2012)*. British Standards Institution, London, 30 p.
- (s) BSI (2012b). *Admixtures for Concrete, Mortar and Grout - Test Methods, Part 8: Determination of the Conventional Dry Material Content (BS EN 480-8:2012)*. British Standards Institution, London, 12 p.
- (t) BSI (2012c). *Admixtures for Concrete, Mortar and Grout, Part 2: Concrete Admixtures - Definitions, Requirements Conformity, Marking and Labelling (BS EN 934-2:2009+A1:2012)*. British Standards Institution, London, 28 p.
- (u) BSI (2012d). *Plastics - Determination of Tensile Properties, Part 1: General Principles (BS EN ISO 527-1:2012)*. British Standards Institution, London, 32 p.
- (v) BSI (2012e). *Plastics - Determination of Tensile Properties, Part 2: Test Conditions for Moulding and Extrusion Plastics (BS EN ISO 527-2:2012)*. British Standards Institution, London, 20 p.
- (w) BSI (2012f). *Plastics - Methods for Determining the Density of Non-cellular Plastics, Part 1: Immersion Method, Liquid Pyknometer (BS EN ISO 1183-1:2012)*. British Standards Institution, London, 20 p.
- (x) BSI (2013). *Execution of Special Geotechnical Works - Ground Anchors (BS EN 1537:2013)*. British Standards Institution, London, 56 p.
- (y) HKSARG (2010). *Construction Standard, Testing Concrete (CS1:2010)*. The Government of Hong Kong Special Administrative Region, Hong Kong, Volumes 1 and 2, 61 p. and 98 p.

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Annex TGN 41 A15 - Amendments to Geospec 3: Model Specification for Soil Testing

- (a) Section 3.2
In paragraph 7, lines 9 and 10, delete '(Hong Kong Government, 1992)' and substitute '(HKSARG, 2006)'.
- (b) Section 3.8
In paragraph 6, line 6, delete '(Hong Kong Government, 1992)' and substitute '(HKSARG, 2006)'.
- (c) Section A.3.1.2.1
In line 5, delete 'BS EN 10002 : Part 3 : 1995 (BSI, 1995)' and substitute 'BS EN ISO 376 : 2011 (BSI, 2011b)'.
- (d) Section A.3.3.1
In line 4, delete 'BS 1797 : 1987 (BSI, 1987)' and substitute 'BS EN ISO 4787 : 2011 (BSI, 2011a)'.
- (e) Section A.3.4.1
In paragraph 2, lines 1 and 2, delete 'BS 907 : 1965 (BSI, 1965)' and substitute 'BS EN ISO 463 : 2006 (BSI, 2008)'.

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(Note: Only the references in addition to those cited in the technical guidance document are included here for brevity.)

- (a) BSI (2008). *Geometrical Product Specifications (GPS) - Dimensional Measuring Equipment – Design and Metrological Characteristics of Mechanical Dial Gauges (BS EN ISO 463:2006) (Incorporating Corrigenda January 2009 and June 2011)*. British Standard Institute, London, 24 p.
- (b) BSI (2011a). *Laboratory glassware - Volumetric Instruments - Methods for Testing of Capacity and for Use (ISO 4787 : 2010, Corrected Version 2010-06-05) (BS EN ISO 4787:2011)*. British Standard Institute, London, 30 p.
- (c) BSI (2011b). *Metallic Materials - Calibration of force-proving instruments used for the verification of uniaxial testing machines (ISO 376:2011) (BS EN ISO 376:2011)*. British Standard Institute, London, 42 p.
- (d) HKSARG (2006). *General Specification for Civil Engineering Works (2006 Edition) (Incorporating all Amendments)*. The Government of Hong Kong Special Administrative Region, Hong Kong, Volumes 1 and 2.