

## Appendix J

Summaries for GCO Publication No. 2/90: Foundation  
Properties of Marble and Other Rocks  
in the Yuen Long - Tuen Mun Area

Table J1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Technical Clauses in Report						
BS5930:1981 Code of Practice for Site Investigation						
Revised, Withdrawn	BS5930:1981	P2-90:5930-2	12	The weathering terms used in the following sub-sections are taken from a rock mass classification which is based on the scheme given by BSI(1981). The details of this classification are explained in Section 3.2. This classification was found to be the most appropriate for the purposes of the project.	1981; Historical; P2-90:5930-2; The text is historically descriptive. It gives the background reference for a subsequently developed weathering classification which is described in Section 3.2 and used throughout the publication. To change the reference would invalidate the text.	1
Revised, Withdrawn	BS5930:1981	P2-90:5930-3	15	A unified mass classification scheme broadly based on BS 5930 (BSI, 1981) has been used to characterize the weathering and alteration state of all the foundation rocks (Table 3). The application of this scheme, with modifications as explained below, to various igneous, volcanic and sedimentary rock sequences is described in several GCO unpublished reports and technical publications (e.g. Powell & Irfan, 1987 for volcanic and volcano-sedimentary rocks; Irfan & Powell, 1985 and Choy et al, 1987 for granites; Irfan, 1988 for metamorphic rocks). A brief discussion of weathering processes and the applicability of the scheme to carbonate rocks in general, and to the marble unit in Yuen Long in particular, is given in the next section.	1981; Historical; P2-90:5930-3; The text is historically descriptive. It gives the background reference to material subsequently modified for use in the publication, which refers to a specific location. To change the reference would invalidate the text.	1
BS8004:1986 Code of Practice for Foundations						
Superseded, Withdrawn, but contains NCCI	BS8004:1986	P2-90:8004-2	35	The settlement of a rigid foundation or average settlement, S, of a flexible foundation at the surface of a rock mass modelled as an homogeneous elastic half-space can be calculated by the following formula : $S = \frac{q_a B (1 - \nu^2)}{E_m} I \dots\dots\dots(4)$ where $q_a$ = average bearing pressure on the rock, $B$ = width or diameter of the foundation, $\nu$ = Poisson's ratio of the rock mass, $E_m$ = deformation modulus of the rock mass, $I$ = influence value, which is dependent upon the shape of the foundation (see, for example, BSI, 1986)	1986; Informative; P2-90:8004-2; The information cited is itself referenced to LYSMER, J. and DUNCAN, J.M. 1969. Stresses and deflections in foundations and pavements, Univ. California, Berkley, 4 ed. The information is NCCI for use with BS EN 1997-1:2004 as defined in UK NA to BS EN 1997-1:2004. The reference is therefore current in respect of this citation.	1
Superseded, Withdrawn, but contains NCCI	BS8004:1986	P2-90:8004-3	36	Table 13 gives a rock mass quality classification based on approximate relationships between RQD, discontinuity spacing and rock mass factors. For practical purposes, BS 8004 (BSI, 1986) suggests that the value for j can be approximated by the average discontinuity spacing in metres, if the discontinuities are reasonably tight.	1986; Informative; P2-90:8004-3; The citation refers to Appendix A of BS8004:1986. Appendix A can be considered NCCI for use with BS EN 1997-1:2004 as defined in UK NA to BS EN 1997-1:2004. The reference is therefore current in respect of this citation.	1
Superseded, Withdrawn, but contains NCCI	BS8004:1986	P2-90:8004-4	61	In Table 11 - Presumptive Allowable Bearing stress (MPa) for Rock Specified by Various Building Codes and Authorities, row 6	1986; Informative; P2-90:8004-4; The citation refers to Table 1 of BS8004:1986. BS EN 1997-1:2004 states that spread foundations on rock may normally be designed using the method of presumed bearing pressures (Clause 6.7(2)). Informative Annex G gives a method of deriving presumed bearing pressures on weak and broken rocks with tight joints, but nowhere in BS EN 1997-1:2004 are values given for strong intact rock. The method of deriving presumed bearing pressures given in Annex G is identical to that in BS 8004:1986, which is referenced as NCCI in the UK NA to BS EN 1997-1. On that basis it is assumed that the values in Table 1 of BS 8004:1986, which are reproduced in GCO Publication No. 2/90, are also acceptable as NCCI.	1
Reference Section of Report						
Revised, Withdrawn	BS5930:1999+A2:2010, BS EN 1997-2:2007	P2-90:5930-1	43	(BSI, 1981). Code of Practice for Site Investigations, BS5930:1981 (Formerly CP2001). British Standards Institution, London, 147 p.	1981a; Reference; P2-90:5930-1; This reference has two citations, both historical. Consequently there is no justification to change the reference.	1
Superseded, Withdrawn, but contains NCCI	BS8004:1986, BS EN 1997-1:2004	P2-90:8004-1	43	(BSI, 1986). British Standard Code of Practice for Foundations, BS 8004:1986 (Formerly CP2004). British Standards Institution, London, 149 p.	1986; Reference; P2-90:8004-1; There are three citations of this reference in the publication. All three are informative and relate to NCCI that remains current. Consequently there is no requirement to change the reference.	1

Table J2 - Extracts of Relevant Sections or Clauses of the British Standards and Eurocodes / National Annexes

Relevant Updated Code for Citation	ID No.	Page no.	Scope of Updating	Extracts of Relevant Sections or Clauses of the superseded British Standard(s)	Extracts of Relevant Sections or Clauses of the replacement British/European Standards
Technical Clauses in Report					
BS5930:1981 Code of Practice for Site Investigation					
BS5930:1981	P2-90:5930-2	12	1	General historical reference.	No change
BS5930:1981	P2-90:5930-3	15	1	General historical reference.	No change
BS8004:1986 Code of Practice for Foundations					
BS8004:1986	P2-90:8004-2	35	1	Appendix A	No change
BS8004:1986	P2-90:8004-3	36	1	Appendix A	No change
BS8004:1986	P2-90:8004-4	61	1	Table 1	No change

Table J3 - Description of Standards, Differences and Recommended Amendments

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
Technical Clauses in Report						
BS5930:1981 Code of Practice for Site Investigation						
P2-90:5930-2	12	1	Historical descriptive text setting background to rock mass weathering criteria.	N/A	N/A	No amendment required.
P2-90:5930-3	15	1	Historical descriptive text setting background to rock mass weathering criteria.	N/A	N/A	No amendment required.
BS8004:1986 Code of Practice for Foundations						
P2-90:8004-2	35	1	Settlement equation factors.	N/A	N/A	No amendment required.
P2-90:8004-3	36	1	Settlement equation factors.	N/A	N/A	No amendment required.
P2-90:8004-4	61	1	Presumed bearing values.	N/A	N/A	No amendment required.
Reference Section of Report						
P2-90:5930-1	43	1	This reference document is: Revised, Withdrawn.	The current document(s) is (are): BS5930:1999+A2:2010, BS EN 1997-2:2007	The citations of this reference are historical.	Reference should be retained.
P2-90:8004-1	43	1	This reference document is: Superseded, Withdrawn, but contains NCCI.	The current document(s) is (are): BS8004:1986, BS EN 1997-1:2004	The citations of this reference are to NCCI elements and therefore do not relate to BS EN	Reference should be retained.

Table J4 - Recommended Revisions to Existing Clauses referring to British Standards

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document																					
12	BS5930:1981	1	P2-90:5930-2	<p>The weathering terms used in the following sub-sections are taken from a rock mass classification which is based on the scheme given by BSI (1981). The details of this classification are explained in Section 3.2. This classification was found to be the most appropriate for the purposes of the project.</p>	No change.																					
15	BS5930:1981	1	P2-90:5930-3	<p>A unified mass classification scheme broadly based on BS 5930 (BSI, 1981) has been used to characterize the weathering and alteration state of all the foundation rocks (Table 3). The application of this scheme, with modifications as explained below, to various igneous, volcanic and sedimentary rock sequences is described in several GCO unpublished reports and technical publications (e.g. Powell &amp; Irfan, 1987 for volcanic and volcano-sedimentary rocks; Irfan &amp; Powell, 1985 and Choy et al, 1987 for granites; Irfan, 1988 for metamorphic rocks). A brief discussion of weathering processes and the applicability of the scheme to carbonate rocks in general, and to the marble unit in Yuen Long in particular, is given in the next section.</p>	No change.																					
35	BS8004:1986	1	P2-90:8004-2	<p>The settlement of a rigid foundation or average settlement, S, of a flexible foundation at the surface of a rock mass modelled as an homogeneous elastic half-space can be calculated by the following formula :</p> $S = \frac{q_a B (1-\nu^2)}{E_m} \quad (4)$ <p>where    <math>q_a</math>    = average bearing pressure on the rock,           B        = width or diameter of the foundation,           n        = Poisson's ratio of the rock mass,           <math>E_m</math>    = deformation modulus of the rock mass,           I        = influence value, which is dependent upon the shape of the foundation (see, for example, BSI, 1986)</p>	No change.																					
36	BS8004:1986	1	P2-90:8004-3	<p>Table 13 gives a rock mass quality classification based on approximate relationships between RQD, discontinuity spacing and rock mass factors. For practical purposes, BS 8004 (BSI, 1986) suggests that the value for j can be approximated by the average discontinuity spacing in metres, if the discontinuities are reasonably tight.</p>	No change.																					
61	BS8004:1986	1	P2-90:8004-4	<table><tr><td colspan="7">In Table 11 - Presumptive Allowable Bearing stress (MPa) for Rock Specified by Various Building Codes and Authorities, row 6</td></tr><tr><td>Column 1</td><td>Column 2</td><td>Column 3</td><td>Column 4</td><td>Column 5</td><td>Column 6</td><td>Column 7</td></tr><tr><td>British Standards Institution, BS8004 1986</td><td>10</td><td>3</td><td>2-4</td><td>To be assessed after inspection</td><td>To be assessed after inspection</td><td>May need alteration upwards or downwards</td></tr></table>	In Table 11 - Presumptive Allowable Bearing stress (MPa) for Rock Specified by Various Building Codes and Authorities, row 6							Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	British Standards Institution, BS8004 1986	10	3	2-4	To be assessed after inspection	To be assessed after inspection	May need alteration upwards or downwards	No change.
In Table 11 - Presumptive Allowable Bearing stress (MPa) for Rock Specified by Various Building Codes and Authorities, row 6																										
Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7																				
British Standards Institution, BS8004 1986	10	3	2-4	To be assessed after inspection	To be assessed after inspection	May need alteration upwards or downwards																				
43	BS5930:1981	1	P2-90:5930-1	(BSI, 1981). Code of Practice for Site Investigations, BS5930:1981 (Formerly CP2001). British Standards Institution, London, 147 p.	No change.																					
43	BS8004:1986	1	P2-90:8004-1	(BSI, 1986). British Standard Code of Practice for Foundations, BS 8004:1986 (Formerly CP2004). British Standards Institution, London, 149 p.	No change.																					