

《2004年混凝土的結構使用作業守則》

《2004年混凝土的結構使用作業守則》（下稱“《守則》”）於2004年12月公布。業界如使用整套《守則》，並符合《守則》的要求，便可視作符合《建築物（建造）規例》（下稱“《規例》”）下有關混凝土設計的規定。如於2006年12月15日後就新建築發展計劃或改動及加建工程呈交結構或基礎圖則以申請批准，有關工程的混凝土設計必須以《守則》為依據。

2. 《守則》載列了《規例》下某些條文的可作替代規定。建築事務監督在接獲以指明表格填寫的申請後，會批准對《規例》的相關條文作出變通，以准許改用這些替代規定。附錄A載列了《規例》內可能須予變通的相關條文一覽表。

3. 自2004年《守則》公布以來，根據使用《守則》的經驗顯示，《守則》某些內容須予修訂和改良，以臻完善。《守則》的各項修訂詳列於附錄B。主要的更改事項如下：

- (a) 混凝土的分類改為(i)C45或以下的等級（以往為C40或以下的等級）；(ii)C45以上至C70級（以往為C40以上至C70級）；以及(iii)C70以上至C100級)。C45是業界通常使用的等級，對於已達到C45級的混凝土而言，許多沿用的設計工具和電腦程式仍可繼續使用，無須更改設計程式。
- (b) 《守則》圖6.1載示了混凝土處於極限狀態時的簡化應力區，圖表內容已經修訂，藉以清楚顯示上文(a)段提述的3類混凝土的應力區。
- (c) 其他改動大多數是由於上述修訂，或是勘正印刷和圖表錯誤所致。

4. 上述各項修訂會納入來次編印的《守則》內。《守則》的更新版本已上載屋宇署網頁<http://www.bd.gov.hk>中，“刊物”欄下“作業守則和設計手冊”部分，以供瀏覽。在不違反網站條款及規則的情況下，市民可隨意下載。

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檔號： **BD GR/1-125/58**

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編入索引： 混凝土的結構使用作業守則
混凝土 — 結構使用作業守則

《建築物（建造）規例》內可能須予變通的條文一覽表

項目	《建築物（建造）規例》	事項	《守則》的相關段落／列表	備註
1	第56(2)條	水泥含量限於每立方米550公斤	第4.2.6段	如每立方米混凝土的水泥含量超過550公斤，則須就《規例》進行變通。
2	第57條及表6	訂明最低水泥含量	表4.2，以及第4.2.5.4段	如水泥含量低於指明下限，則須就《規例》進行變通。
3	第58條	混凝土立方塊須為150毫米	第10.3.4.2段	如使用100毫米的混凝土立方塊，則須就《規例》進行變通。
4	第59條及表8	混凝土立方塊的接受準則	表10.2	如使用《守則》表10.2的C2準則，便須就《規例》進行變通。

附錄B
(認可人士及註冊結構工程師作業備考296)
(APP-142)

《2004年混凝土的結構使用作業守則》的各項修訂

	修訂內容
AMD 1 Jun 2007	<p>Clause 1.2 (page 1)</p> <p>Delete 'Hong Kong Code of Practice for Dead and Imposed Loads for Buildings'</p>
AMD 1 Jun 2007	<p>Clause 2.3.1.1 (page 8)</p> <p>Replace the first and second bullet points with the following:</p> <ul style="list-style-type: none"> ● characteristic dead load, G_k, which shall be taken as the dead loads calculated in accordance with Building (Construction) Regulation 16; ● characteristic imposed load, Q_k, which shall be taken as the imposed loads stipulated in Building (Construction) Regulation 17; and
AMD 1 Jun 2007	<p>Clause 2.3.1.4 (d) (page 9)</p> <p>Replace the clause with the following:</p> <p>(d) Vehicular impact</p> <p style="padding-left: 40px;">Where vertical elements are to be designed for vehicular impact the nominal design load shall be as specified in Building (Construction) Regulation 17.</p>
AMD 1 Jun 2007	<p>Figure 3.3 (page 17)</p> <p>At the Y-axis,</p> <p>replace : Shrinkage K_c with : Creep/shrinkage K_c</p>
AMD 1 Jun 2007	<p>Figure 3.5 (page 17)</p> <p>At the Y-axis,</p> <p>replace : Shrinkage K_j with : Creep/shrinkage K_j</p>

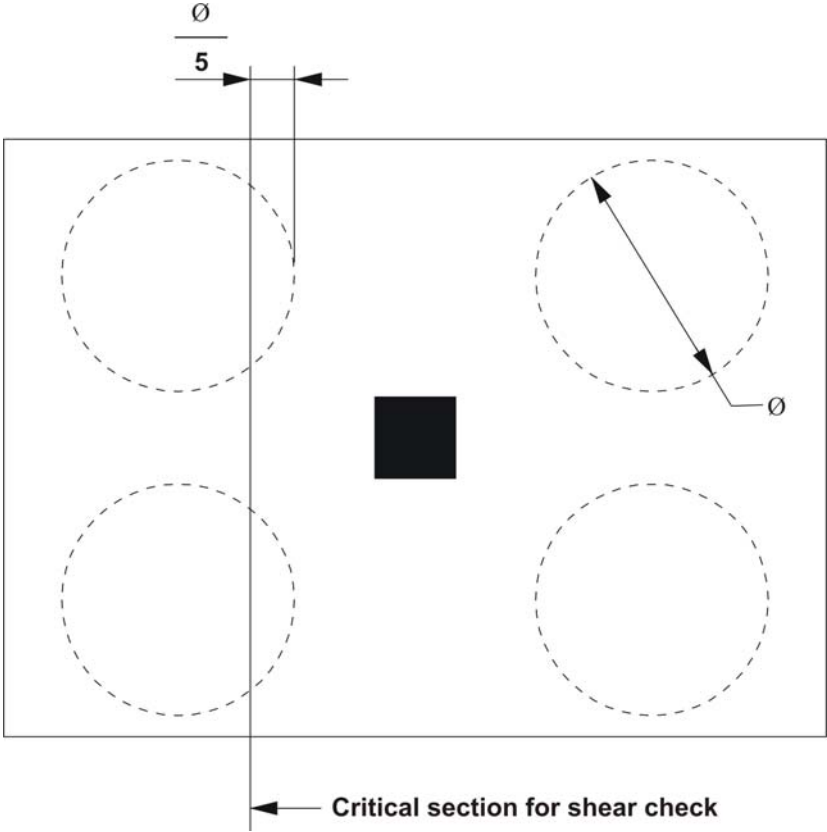
	修訂內容
AMD 1 Jun 2007	<p>Clause 3.1.8 (page 18)</p> <p>In the definition of c_s,</p> <p>replace : 4.0 with : 3.0</p>
AMD 1 Jun 2007	<p>Figure 3.8 (page 19)</p> <p>Replace : See table 3.2</p> <p>with : $3.46\sqrt{\frac{f_{cu}}{\gamma_m}} + 3.21 \text{ kN/mm}^2$</p> <p>Replace : $2.4 \times 10^{-4} \sqrt{\frac{f_{cu}}{\gamma_m}}$</p> <p>with : $\frac{1.34(f_{cu}/\gamma_m)}{E_c}$</p>
AMD 1 Jun 2007	<p>Clause 4.2.7.1 (page 29)</p> <p>Replace : section 10 with : Table 4.5</p>
AMD 1 Jun 2007	<p>Clause 5.2.1.1 (e) (page 33)</p> <p>Delete “and the height is at least 3 times the section depth”.</p>
AMD 1 Jun 2007	<p>Clause 5.2.1.2 (b) (page 36)</p> <p>In the pen-ultimate paragraph:</p> <p>replace : taken as the elastic or redistributed values with : taken as the greater of the elastic or redistributed values</p>
AMD 1 Jun 2007	<p>Figure 6.1 (page 41)</p> <p>Replace : $0.9x$ with : $0.9x$ for $f_{cu} \leq 45 \text{ N/mm}^2$, $0.8x$ for $45 < f_{cu} \leq 70 \text{ N/mm}^2$, or $0.72x$ for $70 < f_{cu} \leq 100 \text{ N/mm}^2$.</p>

	修訂內容
AMD 1 Jun 2007	<p>Equation 6.1 (page 41)</p> <p>Replace the existing equation with the following :</p> $x \leq 0.5d \text{ for } f_{cu} \leq 45 \text{ N/mm}^2 ;$
AMD 1 Jun 2007	<p>Equation 6.2 (page 41)</p> <p>Replace the existing equation with the following :</p> $x \leq 0.4d \text{ for } 45 < f_{cu} \leq 70 \text{ N/mm}^2 ; \text{ or}$
AMD 1 Jun 2007	<p>Equation 6.4 (page 41)</p> <p>Replace the existing equation with the following :</p> $x \leq (\beta_b - 0.4)d \text{ for } f_{cu} \leq 45 \text{ N/mm}^2 ; \text{ or}$
AMD 1 Jun 2007	<p>Equation 6.5 (page 41)</p> <p>Replace the existing equation with the following :</p> $x \leq (\beta_b - 0.5)d \text{ for } 45 < f_{cu} \leq 70 \text{ N/mm}^2$
AMD 1 Jun 2007	<p>Equation 6.8 (page 42)</p> <p>Replace the existing equation with the following :</p> $K' = 0.156 \text{ for } f_{cu} \leq 45 \text{ N/mm}^2 ; \text{ or}$ $0.120 \text{ for } 45 < f_{cu} \leq 70 \text{ N/mm}^2 ; \text{ or}$ $0.094 \text{ for } 70 < f_{cu} \leq 100 \text{ N/mm}^2 \text{ and no moment redistribution.}$
AMD 1 Jun 2007	<p>Equation 6.9 (page 42)</p> <p>Replace the existing equation with the following :</p> $K' = 0.402(\beta_b - 0.4) - 0.18(\beta_b - 0.4)^2, \text{ for } f_{cu} \leq 45 \text{ N/mm}^2 ; \text{ or}$ $0.357(\beta_b - 0.5) - 0.143(\beta_b - 0.5)^2, \text{ for } 45 < f_{cu} \leq 70 \text{ N/mm}^2.$

	修訂內容
AMD 1 Jun 2007	<p>Equations 6.11 and 6.14 (page 42)</p> <p>Replace the existing equations with the following :</p> $x = (d - z)/0.45, \text{ for } f_{cu} \leq 45 \text{ N/mm}^2; \text{ or}$ $(d - z)/0.40, \text{ for } 45 < f_{cu} \leq 70 \text{ N/mm}^2; \text{ or}$ $(d - z)/0.36, \text{ for } 70 < f_{cu} \leq 100 \text{ N/mm}^2.$
AMD 1 Jun 2007	<p>Equation 6.17 (page 42)</p> <p>Replace the existing equation with the following :</p> $A_s = \frac{M + k_1 f_{cu} b_w d (k_2 d - h_f)}{0.87 f_y (d - 0.5 h_f)}$ <p>where $k_1 = 0.1$ for $f_{cu} \leq 45 \text{ N/mm}^2$, 0.072 for $45 < f_{cu} \leq 70 \text{ N/mm}^2$ and 0.054 for $70 < f_{cu} \leq 100 \text{ N/mm}^2$; and</p> $k_2 = 0.45$ for $f_{cu} \leq 45 \text{ N/mm}^2$, 0.32 for $45 < f_{cu} \leq 70 \text{ N/mm}^2$ and 0.24 for $70 < f_{cu} \leq 100 \text{ N/mm}^2$.
AMD 1 Jun 2007	<p>Equation 6.18 (page 43)</p> <p>Replace the existing equation with the following:</p> $\beta_f = 0.45 \frac{h_f}{d} \left(1 - \frac{b_w}{b}\right) \left(1 - \frac{h_f}{2d}\right) + K' \frac{b_w}{b}$
AMD 1 Jun 2007	<p>Table 6.3 (page 44)</p> <p>In the last column,</p> <p>replace : ≥ 400 with : 400</p>
AMD 1 Jun 2007	<p>Clause 6.1.2.5 (page 45)</p> <p>In line 9 under item (e):</p> <p>replace : α and β are both greater than 45° with : α and β are both equal to or greater than 45°.</p>

	修訂內容
AMD 1 Jun 2007	<p>Table 6.8 (page 55)</p> <p>In third column,</p> <p>replace : $A_{sb} >$ with : $A_{sb} \geq$</p>
AMD 1 Jun 2007	<p>Figure 6.12 (page 67)</p> <p>Replace : $1.4v_t$ (see clause 6.1.5.6(b)) with : $1.4v_t$ (see clause 6.1.5.6(c))</p>
AMD 1 Jun 2007	<p>Clause 6.1.5.7(e) (page 69)</p> <p>In the last sentence:</p> <p>Replace : $0.4ud/087f_{yv}$. with : $v_rud/087f_{yv}$, where v_r is defined in Table 6.2.</p>
AMD 1 Jun 2007	<p>Clause 6.2.1.3 (page 75)</p> <p>In line 3 under item (c),</p> <p>replace : 6.49 with : 6.48</p>
AMD 1 Jun 2007	<p>Figure 6.17 (page 77)</p> <p>Interchange all 'k_1' and 'k_2'.</p> <p>Interchange all 'M_1' and 'M_2'.</p>
AMD 1 Jun 2007	<p>Clause 6.3.2 (page 84)</p> <p>In the second paragraph,</p> <p>replace : St. Venant torsional stiffness with : torsional constant</p>

	修訂內容									
AMD 1 Jun 2007	<p>Equation 6.64 (page 84)</p> <p>Replace the existing equation with the following :</p> $C = \frac{1}{2} \beta h_{\min}^3 \cdot h_{\max} .$									
AMD 1 Jun 2007	<p>Table 6.17 (page 85)</p> <p>In the last line,</p> <p>replace : N/mm³ with : N/mm²</p>									
AMD 1 Jun 2007	<p>Table 6.18 (page 85)</p> <p>Replacing the existing Table 6.18 with the following:</p> <table border="1"> <thead> <tr> <th></th> <th>$v_t \leq v_{t \min}$</th> <th>$v_t > v_{t \min}$</th> </tr> </thead> <tbody> <tr> <td>$v \leq v_c + v_r$</td> <td>Minimum shear reinforcement; no torsion reinforcement</td> <td>Designed torsion reinforcement but not less than the minimum shear reinforcement</td> </tr> <tr> <td>$v > v_c + v_r$</td> <td>Designed shear reinforcement; no torsion reinforcement</td> <td>Designed shear and torsion reinforcement</td> </tr> </tbody> </table> <p>Notes: v_r is defined in Table 6.2.</p> <p>Table 6.18 - Reinforcement for shear and torsion</p>		$v_t \leq v_{t \min}$	$v_t > v_{t \min}$	$v \leq v_c + v_r$	Minimum shear reinforcement; no torsion reinforcement	Designed torsion reinforcement but not less than the minimum shear reinforcement	$v > v_c + v_r$	Designed shear reinforcement; no torsion reinforcement	Designed shear and torsion reinforcement
	$v_t \leq v_{t \min}$	$v_t > v_{t \min}$								
$v \leq v_c + v_r$	Minimum shear reinforcement; no torsion reinforcement	Designed torsion reinforcement but not less than the minimum shear reinforcement								
$v > v_c + v_r$	Designed shear reinforcement; no torsion reinforcement	Designed shear and torsion reinforcement								
AMD 1 Jun 2007	<p>Clause 6.7.2.2 (page 91)</p> <p>In line 7,</p> <p>replace : L_c with : l_c</p>									

	修訂內容
AMD 1 Jun 2007	<p>Figure 6.19 (page 92)</p> <p>Replace the existing Figure 6.19 with the following new Figure 6.19.</p>  <p>The diagram shows a rectangular pile cap with four piles arranged in a square pattern. A central pile is represented by a solid black square. The piles are represented by dashed circles. A vertical line passes through the center of the cap, and a horizontal dimension line above it indicates a distance of $5d$ from the center of the cap to the critical section for shear check. The diameter of the piles is denoted by \emptyset. An arrow points to the critical section with the text "Critical section for shear check".</p> <p>Figure 6.19 – Critical section for shear check in a pile cap</p>
AMD 1 Jun 2007	<p>Clause 7.1.5 (page 96)</p> <p>In line 6,</p> <p>replace : at the ends of the ranges with : in table 3.2</p>
AMD 1 Jun 2007	<p>Clause 7.2.3 (page 97)</p> <p>Before the definition of a' under equation 7.2, add:</p> <p>ϵ_1 is the strain at the level considered, calculated ignoring the stiffening effect of the concrete in the tension zone,</p>

	修訂內容
AMD 1 Jun 2007	<p>Clause 7.2.3 (page 97)</p> <p>In the paragraph after equation 7.2,</p> <p>replace : In this 7.2 with : In equation 7.2</p>
AMD 1 Jun 2007	<p>Table 7.4 (page 101)</p> <p>In Notes 2,</p> <p>replace : clause <u>6.1.2.4(c)</u> with : clause <u>6.1.2.4(b)</u></p>
AMD 1 Jun 2007	<p>Table 7.5 (page 101)</p> <p>In Notes 2,</p> <p>replace : A with : $A'_{s,prov}$</p>
AMD 1 Jun 2007	<p>Clause 7.3.6(a) (page 105)</p> <p>Under the third bullet point,</p> <p>replace : $1/(1+\phi)$ times the short-term modulus where ϕ with : $1/(1+\phi_c)$ times the short-term modulus where ϕ_c</p>
AMD 1 Jun 2007	<p>Figure 7.1a) (page 106)</p> <p>In the strain diagram,</p> <p>replace : f_s / E with : f_s / E_s</p>
AMD 1 Jun 2007	<p>Clause 8.6 (page 114)</p> <p>In the paragraph after the definitions of notations for equation 8.7,</p> <p>replace : equation 8.5 with : equation 8.7</p>

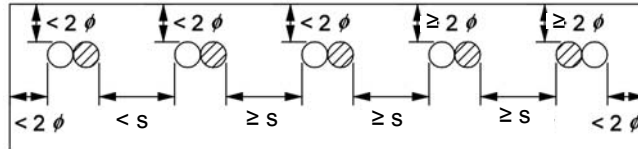
修訂內容

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Figure 8.5 (page 116)

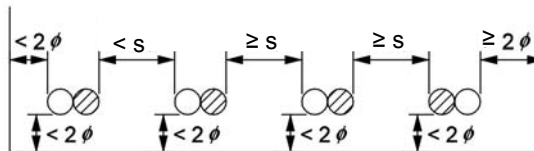
Replace the existing Figure 8.5 with the following new Figure 8.5.

Top bars



Factor 2 2 1.4 1.0 1.4

Bottom bars



Factor 1.4 1.4* 1.0* 1.4

ϕ = diameter of the lapped reinforcement
 s = 75 mm or 6ϕ , whichever is the greater

* Note : For laps in bottom of section as cast minimum cover criteria applies to corner bars only

Figure 8.5 – Factors for lapping bars

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Figure 8.6 (page 118)

Replace the existing Figure 8.6 with the following new Figure 8.6.

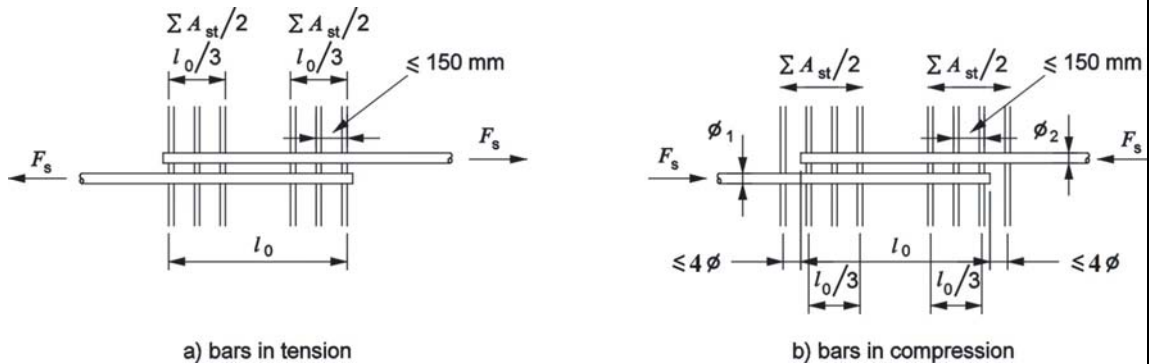


Figure 8.6 – Transverse reinforcement for lapped splices

	<p>修訂內容</p>
<p>AMD 1 Jun 2007</p>	<p>Clause 8.8 (pages 118-119)</p> <p>In the line preceding Figure 8.7,</p> <p>replace : In figure 8.7a, $n_1=1, n_2=1$ with : In figure 8.7a, $n_1=1, n_2=2$</p> <p>In the second and last paragraphs, delete '(see clause 9.2.4)'. At the end of the last paragraph, insert the following:</p> <p>$A_{ct,ext}$ denotes the area of the tensile concrete external to the links, defined by Figure 8.7c.</p>
<p>AMD 1 Jun 2007</p>	<p>Figure 8.7 (page 118)</p> <p>Replace the existing Figure 8.7 with the following new Figure 8.7.</p> <div style="text-align: center;"> <p>a) $\Sigma A_{sv} \geq 0.5 A_s$ $\Sigma A_{sh} \geq 0.25 A_s$</p> <p>b) $\Sigma A_{sv} \geq 0.5 A_s$ $\Sigma A_{sh} \geq 0.5 A_s$</p> <p>○ Anchored bar ● Continuing bar</p> <p>Additional reinforcement in an anchorage where there is no transverse compression</p> <p>c) $A_{ct,ext}$ 600mm $d-x$ W Surface reinforcement $A_{s,surf}$ 150mm</p> <p>$A_{s,surf} \geq 0.02 A_{ct,ext}$ $A_{s,surf} \geq 0.01 A_{ct,ext}$</p> <p>Additional surface reinforcement</p> </div> <p>Figure 8.7 – Additional reinforcement for large diameter bars</p>

	修訂內容
AMD 1 Jun 2007	<p>Clause 9.1 (page 128)</p> <p>Add the following paragraphs at the end of the clause 9.1:</p> <p>Detailing of members should normally comply with both the general detailing rules given in clauses 9.2 to 9.8 and the particular rules for ductility given in clause 9.9. However, members not contributing in the lateral load resisting system do not need to conform to the requirements of clause 9.9.</p>
AMD 1 Jun 2007	<p>Equation 9.4 (page 131)</p> <p>Replacing the existing equation 9.4 with the following:</p> $A_{sv} \geq v_r b_v s_v / (0.87 f_{yv}) \quad 9.4$ <p>where v_r is defined in Table 6.2.</p>
AMD 1 Jun 2007	<p>Clause 9.4.3 (page 133)</p> <p>Replace : A full anchorage length beyond the centreline of the supporting member should be provided for top tension reinforcement of a cantilevered projecting structure.</p> <p>with : A full anchorage length should be provided for the top tension reinforcement of a cantilevered projecting structure. Where full rotational restraint is provided at the near face of the supporting member, i.e. the face at which the bar enters the supporting member, the anchorage shall be deemed to commence at 1/2 the width of the supporting member or 1/2 the effective depth of the cantilevered projecting structure whichever is the less, from the near face of the supporting member. Where the cantilevered projecting structure is a continuous slab or beam and the support is not designed to provide rotational restraint in the analysis of the continuous structure, the anchorage shall be deemed to commence at the far face of the supporting member.</p>
AMD 1 Jun 2007	<p>Clause 9.9.1.1(d) (page 138)</p> <p>Before the definition for f_{yt}, add:</p> <p>n number of bars uniformly spaced around circular sections, or the number of longitudinal bars in the layer through which a potential plane of splitting would pass,</p>

	修訂內容
AMD 1 Jun 2007	<p>Clause 9.9.2.1(a) (page 139)</p> <p>Replace : The area of longitudinal reinforcement shall not be greater than 4% of the gross concrete area except that at laps the area may increase to 5.2%.</p> <p>with : The area of longitudinal reinforcement for strength design shall not be greater than 4% of the gross concrete area except that at laps the area may increase to 5.2%.</p>
AMD 1 Jun 2007	<p>Clause 10.3.4.1 (page 143)</p> <p>In the first bullet point in paragraph 2,</p> <p>replace : clause 13.1.8.1</p> <p>with : clause 12.1.8.1</p>
AMD 1 Jun 2007	<p>Clause 10.3.6.1 (page 147)</p> <p>In line 4 of the last paragraph,</p> <p>replace : all concrete mixes of grade C60 or above</p> <p>with : all concrete mixes of grade greater than C60</p>
AMD 1 Jun 2007	<p>Table 12.1 (page 166)</p> <p>In the second column,</p> <p>replace : C30</p> <p>with : C35</p>
AMD 1 Jun 2007	<p>Clause 12.3.4.3 (page 166)</p> <p>In line 5 of the second paragraph,</p> <p>replace : class 1 and class 2</p> <p>with : groups a) and b)</p> <p>In line 6 of the second paragraph,</p> <p>replace : class 3</p> <p>with : group c)</p>

	修訂內容
AMD 1 Jun 2007	<p>Table 12.2 (page 166)</p> <p>In the third column,</p> <p>replace : C30 with : C35</p>
AMD 1 Jun 2007	<p>Clause 12.3.7.1 (page 168)</p> <p>Replace the second bullet point (including the Note) with the following :</p> <ul style="list-style-type: none"> the design stresses in the concrete in compression are derived either from the stress-strain curve given in figure 3.8 or from the simplified stress block given in figure 6.1, with $\gamma_m = 1.5$ in both cases;
AMD 1 Jun 2007	<p>Equations 12.2 and 12.3 (page 168)</p> <p>Replace the existing equations with the following:</p> $f_{pb} = f_{pe} + \frac{70000\lambda_1}{l/d} \left(1 - 0.7\lambda_2 \frac{f_{pu}A_{ps}}{f_{cu}bd} \right) \quad 12.2$ $x = \lambda_2 \left[\left(\frac{f_{pu}A_{ps}}{f_{cu}bd} \right) \left(\frac{f_{pb}}{f_{pu}} \right) d \right] \quad 12.3$ <p>where $\lambda_1 = 1$ for $f_{cu} \leq 60$ N/mm², or $1 - 0.017\sqrt{f_{cu} - 60}$ for $f_{cu} > 60$ N/mm², and $\lambda_2 = 2.58$ for $f_{cu} \leq 45$ N/mm², 2.78 for $45 < f_{cu} \leq 70$ N/mm², or 3.09 for $70 < f_{cu} \leq 100$ N/mm².</p>
AMD 1 Jun 2007	<p>Table 12.5 (page 171)</p> <p>In the second column,</p> <p>replace : 30 N/mm² with : 35 N/mm²</p>
AMD 1 Jun 2007	<p>Clause 12.3.8.7 (page 171)</p> <p>In the caption,</p> <p>replace : <i>where $V_r = 0.4f_{cu}b_vd$ for $f_{cu} \leq 40$ N/mm² or $0.4(f_{cu}/40)^{2/3}b_vd$ for $f_{cu} > 40$ N/mm².</i> with : <i>where $V_r = v_r b_vd$ and v_r is as defined in Table 6.2.</i></p>

	修訂內容
AMD 1 Jun 2007	<p>Equation 12.7 (page 172)</p> <p>Replace the existing equation with the following :</p> $\frac{A_{sv}}{s_v} = \frac{V_r}{0.87 f_{yv} d} \quad 12.7$
AMD 1 Jun 2007	<p>ANNEX A</p> <p>In the first paragraph,</p> <p>replace : the Code of Practice for the Structural Use of Concrete (Limit State Approach)</p> <p>with : this Code of Practice</p>
AMD 1 Jun 2007	<p>ANNEX A</p> <p>Delete the second bullet point, i.e. ‘ • Hong Kong Code of Practice for Dead and Imposed Loads for Buildings’</p>