

29 April 2011

To: All Authorized Persons
Registered Structural Engineers
Registered Geotechnical Engineers
Registered General Building Contractors
Registered Specialist Contractors and
Registered Minor Works Contractors

Dear Sir/Madam,

Code of Practice for Structural Use of Concrete 2004

With a view to enhancing the structural performance and safety of buildings and to keep up with the latest development in design and technology on the use of concrete, the Buildings Department (BD) has issued the Code of Practice for Structural Use of Concrete 2004 (the Code) in August 2004. The Code has, inter alia, introduced a set of new requirements on reinforcing bar detailing. Since then, the BD has received enquiries from practitioners of the construction industry from time to time concerning these new requirements.

In order to provide more flexibility for the industry to cope with the new requirements in the Code, the BD has compiled a set of reinforcing bar details to illustrate some of the methods that may be adopted to comply with the requirements. Such details are given in the Annex for reference. Please note that adoption of such details is optional. Practitioners would not be precluded from using any other viable methods to comply with the requirements of the Code.

Some of the requirements of the Code, such as the provision of shear reinforcing bars at beam-column joints and the 135-degree (versus the previous 90-degree) anchorage of links, require greater skill and effort

in fixing the reinforcing bars on site. However, any good design specified in the Code will not be able to achieve the design objectives without proper fixing of the reinforcing bars in the final structure. I therefore solicit your efforts to ensure that the reinforcing bars are properly fixed on site, with due consideration on the enhancement in the reinforcing bar details which may not yet be fully conversant with by the bar benders. Please ensure, in particular, that all links are securely anchored and fixed to the main reinforcing bars.

In this connection, BD will increase its audit checking on reinforcing bar fixing on site, and take action if any non-conformities from the approved plans or the Code are found.

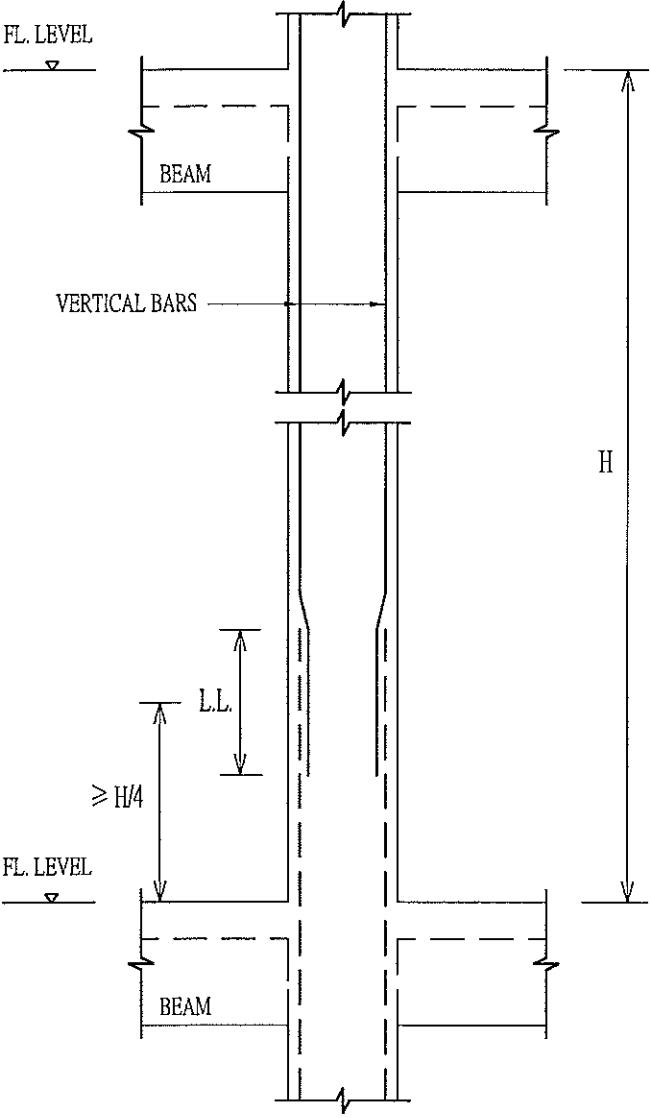
Yours sincerely,

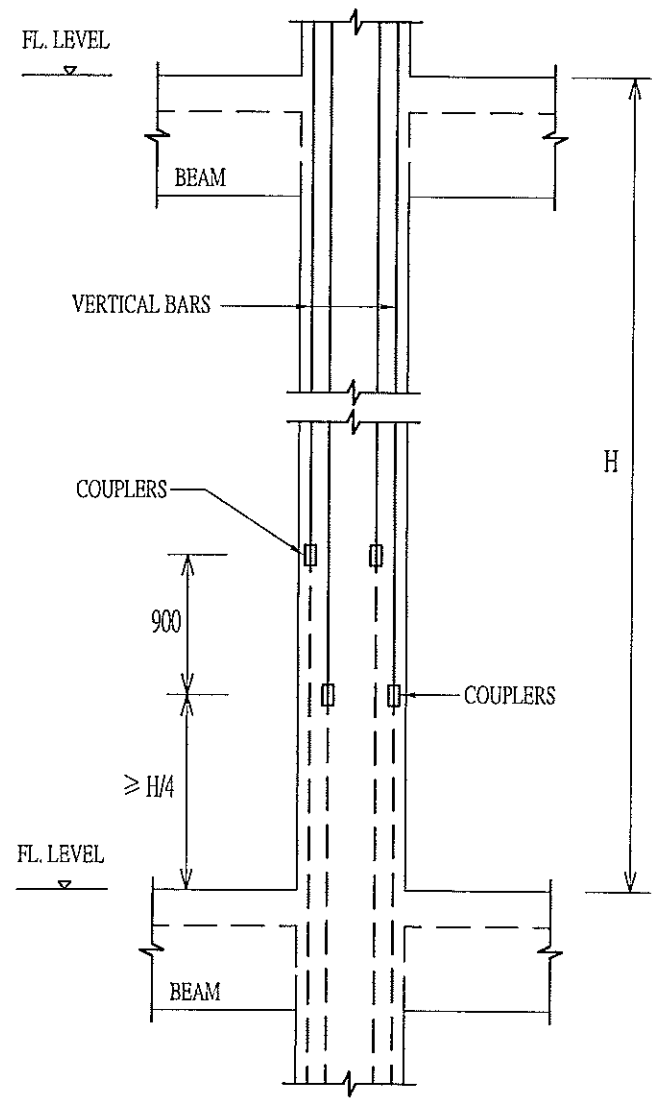
A handwritten signature in black ink, appearing to read 'C M KOON', with a stylized, cursive flourish at the end.

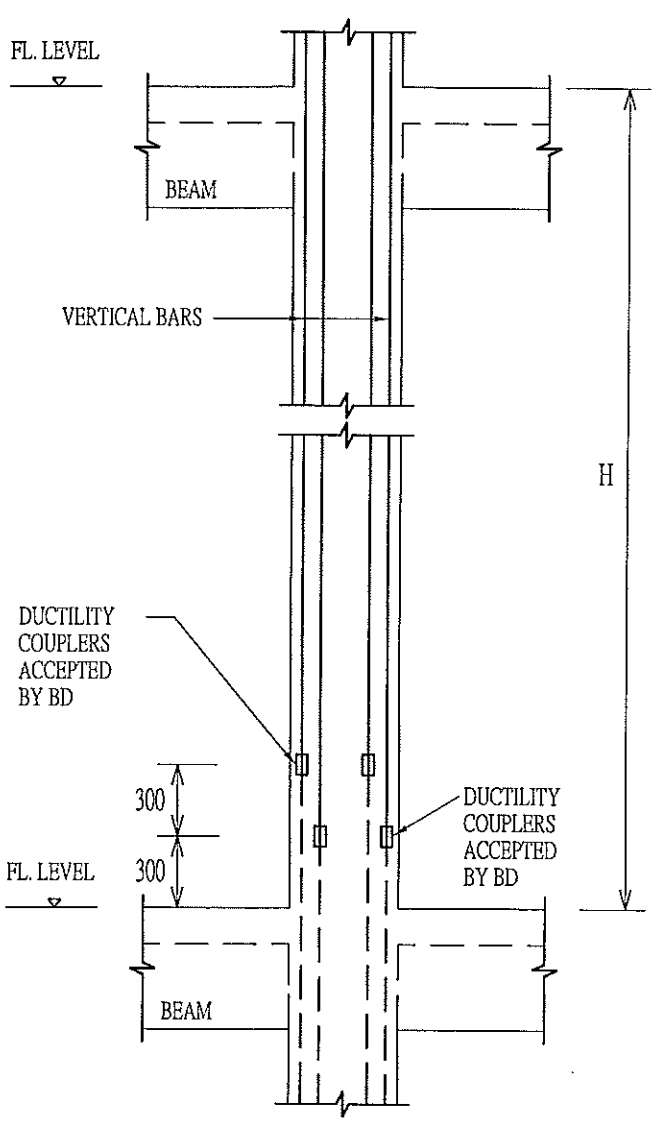
(C M KOON)





Assistant Director/New Buildings 2
for Building Authority

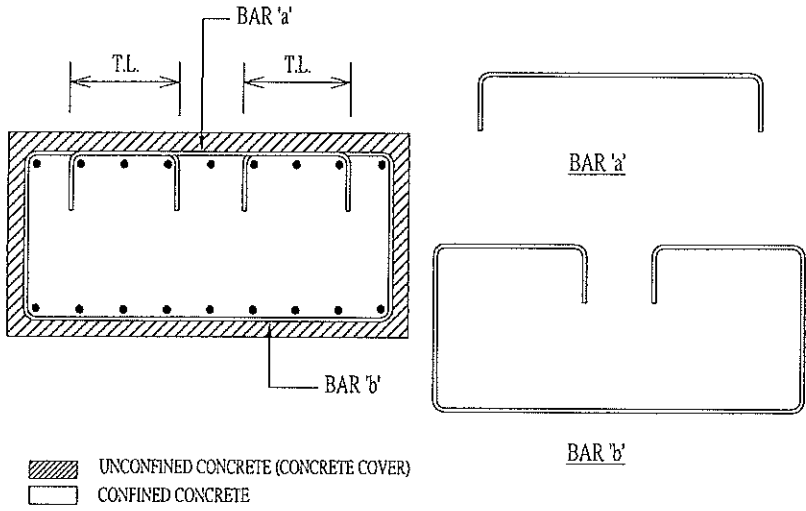
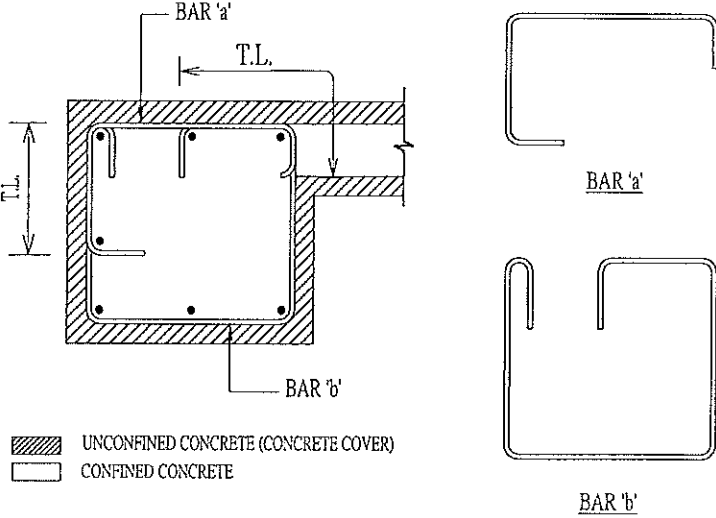
ACCEPTABLE REINFORCEMENT DETAILS

ITEM	ACCEPTABLE REINFORCEMENT DETAILS
1	 <p> NOTES: 1. CENTRE OF THE LAP LENGTH (L.L.) TO BE LOCATED AT A HEIGHT NOT BELOW 1/4 STOREY HEIGHT ABOVE FLOOR LEVEL. 2. COLUMN LINKS NOT SHOWN FOR CLARITY. </p> <p style="text-align: center;"><u>BAR LAPPING DETAILS FOR COLUMN</u></p>



ITEM	ACCEPTABLE REINFORCEMENT DETAILS
2	 <p> NOTES: 1. COUPLERS TO BE LOCATED AT A HEIGHT NOT BELOW 1/4 STOREY HEIGHT ABOVE FLOOR LEVEL. 2. COUPLERS TO BE STAGGERED AT 900mm MINIMUM. 3. COLUMN LINKS NOT SHOWN FOR CLARITY. </p> <p style="text-align: center;"><u>COUPLER DETAILS FOR COLUMN</u></p>

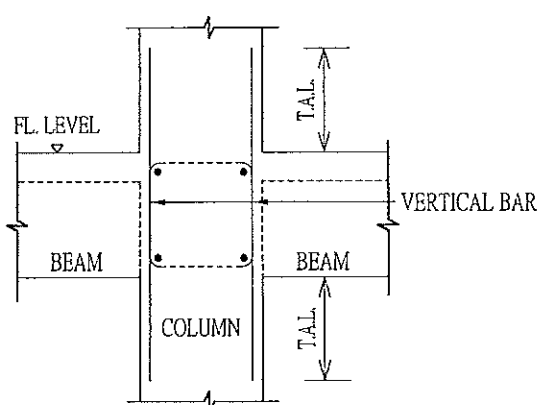
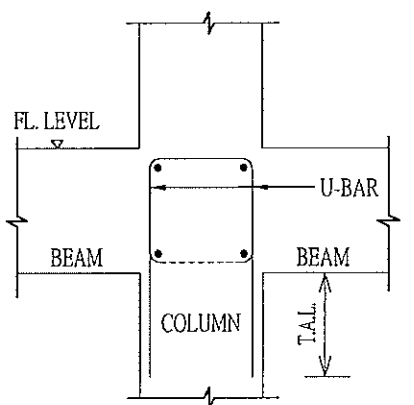
ITEM	ACCEPTABLE REINFORCEMENT DETAILS
3	 <p>FL. LEVEL</p> <p>BEAM</p> <p>VERTICAL BARS</p> <p>H</p> <p>DUCTILITY COUPLERS ACCEPTED BY BD</p> <p>300</p> <p>FL. LEVEL</p> <p>300</p> <p>BEAM</p> <p>DUCTILITY COUPLERS ACCEPTED BY BD</p> <p>NOTE: COLUMN LINKS NOT SHOWN FOR CLARITY.</p> <p><u>DUCTILITY COUPLER DETAILS FOR COLUMN</u></p>

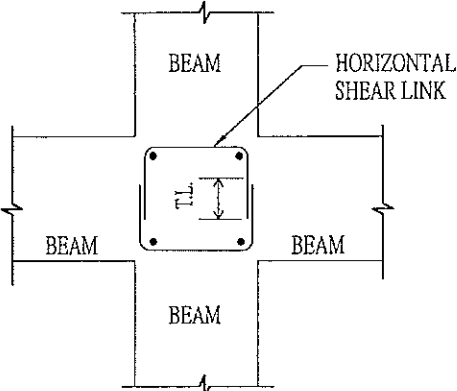
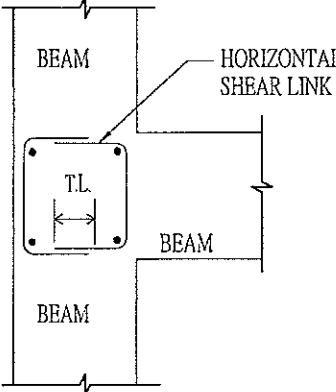
ITEM	ACCEPTABLE REINFORCEMENT DETAILS
4	<div> <p>  UNCONFINED CONCRETE (CONCRETE COVER)  CONFINED CONCRETE </p> </div> <div> </div> <div> <p>NOTE: NOT APPLICABLE FOR TORSIONAL LINKS. <u>BEAM SHEAR LINK DETAILS (CASE 1)</u></p> </div>
5	<div> <p>  UNCONFINED CONCRETE (CONCRETE COVER)  CONFINED CONCRETE </p> </div> <div> </div> <div> <p>NOTE: NOT APPLICABLE FOR TORSIONAL LINKS. <u>BEAM SHEAR LINK DETAILS (CASE 2)</u></p> </div>

ITEM	ACCEPTABLE REINFORCEMENT DETAILS
6	 <p>NOTE: T.L. = TENSION LAP.</p> <p><u>BEAM TORSIONAL LINK DETAILS (CASE 1)</u></p>
7	 <p>NOTE: T.L. = TENSION LAP.</p> <p><u>BEAM TORSIONAL LINK DETAILS (CASE 2)</u></p>

ITEM	ACCEPTABLE REINFORCEMENT DETAILS
8	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 20%;"> <p>UNCONFINED CONCRETE (CONCRETE COVER)</p> <p>CONFINED CONCRETE</p> </div> <div style="width: 60%; text-align: center;"> <p>COVER</p> <p>±150 mm</p> <p>RECTANGULAR</p> <p>SEE DETAIL '1'</p> <p>SEE DETAIL '2'</p> <p>DETAIL '1'</p> <p>OR</p> <p>DETAIL '2'</p> </div> </div> <p style="text-align: center;"><u>TRANSVERSE REINFORCEMENT DETAILS FOR COLUMN</u></p>
9	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 20%;"> <p>UNCONFINED CONCRETE (CONCRETE COVER)</p> <p>CONFINED CONCRETE</p> </div> <div style="width: 60%; text-align: center;"> <p>DETAIL '3'</p> <p>CIRCULAR</p> <p>MINIMUM OVERLAP</p> <p>DETAIL '3'</p> </div> </div> <p style="text-align: center;"><u>TRANSVERSE REINFORCEMENT DETAILS FOR COLUMN</u></p>

ITEM	ACCEPTABLE REINFORCEMENT DETAILS
10	<div> <p>  UNCONFINED CONCRETE (CONCRETE COVER)  CONFINED CONCRETE </p> </div> <div> </div> <div> <p style="text-align: center;"><u>DETAILS OF TRANSVERSE REINFORCEMENT AT BEAM-COLUMN JOINT</u></p> </div>

ITEM	ACCEPTABLE REINFORCEMENT DETAILS
11	<div style="text-align: center;">  <p><u>CASE 1</u></p> </div> <div style="text-align: center; margin-top: 20px;">  <p><u>CASE 2</u></p> </div> <p>NOTES:</p> <ol style="list-style-type: none"> 1. VERTICAL SHEAR REINFORCEMENT MAY BE PROVIDED BY VERTICAL BARS OR INVERTED U-BARS WITH ADEQUATE ANCHORAGES INTO COLUMN ABOVE OR BELOW THE JOINT. 2. T.A.L. = TENSION ANCHORAGE LENGTH. <p style="text-align: center;"><u>BEAM-COLUMN JOINT - ELEVATION SHOWING VERTICAL SHEAR REINFORCEMENT</u></p>

ITEM	ACCEPTABLE REINFORCEMENT DETAILS
12	<div style="text-align: center;">  <p>CASE 1</p> </div> <div style="text-align: center;">  <p>CASE 2</p> </div> <p>NOTES:</p> <ol style="list-style-type: none"> 1. HORIZONTAL SHEAR REINFORCEMENT MAY BE PROVIDED BY U-BARS. 2. SHEAR REINFORCEMENT SHOULD NOT EXTEND OUTSIDE COLUMN SECTION. <p style="text-align: center;"><u>BEAM-COLUMN JOINT - PLAN SHOWING</u> <u>HORIZONTAL SHEAR REINFORCEMENT</u></p>

ITEM	ACCEPTABLE REINFORCEMENT DETAILS
13	<p><u>JOINT SHEAR REINFORCEMENT</u></p> <p>The following assumption may be used in calculating the joint shear reinforcement:</p> $C = T = 1.0 A_s f_y$ <p>where C = compression force due to bending moment in beam T = tension force due to bending moment in beam A_s = area of beam tension reinforcement provided f_y = characteristic yield strength of reinforcement</p>
14	<p><u>VERTICAL REINFORCEMENT IN COLUMN</u></p> <p>Vertical reinforcement in column may lap at any location if:</p> $\Sigma M_c \geq 1.2 \Sigma M_b$ <p>where ΣM_c = sum of moment capacities under the appropriate axial load of the column sections above and below the joint ΣM_b = sum of either the clockwise or anti-clockwise moment capacities of the beams on both sides of the joint, whichever is the greater</p>
15	<p><u>LINKS WITHIN CRITICAL REGIONS IN COLUMN</u></p> <p>A link spacing of 100 mm may be used.</p>