Building and Construction Authority

We shape a **safe**, **high quality**, **sustainable** and **friendly** built environment.

Our Ref : BCA BC 15.0.3

Building Engineering Division (#05-00)
Fax : 6325 7482
DID : 6325 4321
E-mail : thanabal_kaliannan@bca.gov.sg

28 Apr 2010

See **Distribution List**

Dear Sir/Madam

**PUBLIC VEHICULAR BRIDGE DECKS OVER EXCAVATION SITES**

In the Building Control (Amendment) Act 2007, the provision requiring bridges and decking for public vehicles over excavation sites to be subjected to similar approval processes as permanent structures came into operation on 1 Oct 2008.

2 We would like to inform the industry that vehicular deck carrying public traffic over excavation sites can be designed to be supported either on independent support system or on a support system that is integrated with the structural system for the Earth Retaining or Stabilizing Structures (ERSS) for the excavation. In determining the appropriate support system to be adopted, the Qualified Person (QP) should refer to the design guidelines provided in Table 1 in Annex A.

3 In order to ensure that the vehicular deck has been completed in accordance to the design before it is put to use, the QP will have to apply for a Temporary Occupation Permit (TOP) before the vehicular deck is opened to public traffic for the first time. The procedures are outlined in Annex B.

4 I would appreciate it if you could bring to the attention of your members the contents of this circular. Please contact Mr Lung Hian Hao at Tel: 6325-2090 or e-mail: lung_hian_hao@bca.gov.sg if you need further clarification.

Thank you.

Yours faithfully

K THANABAL
DEPUTY DIRECTOR, BUILDING ENGINEERING DIVISION
for COMMISSIONER OF BUILDING CONTROL
BUILDING AND CONSTRUCTION AUTHORITY

## Table 1 – Design considerations when adopting either independent support system or support system that is integrated with the structural system for the Earth Retaining or Stabilizing Structures (ERSS)

All structures for the public vehicular deck shall be designed in accordance with BS5400 to be structurally safe and robust. In addition, the following factors should be taken into consideration in the design:

| Description | Support systems which are integrated with earth-retaining or stabilising structures | Support system on independent support system |
|---|---|---|
| **1. Design code** | Design to comply with BS5400. | Design to comply with BS5400. |
| **2. Unbraced effective length of deck post** | Design of deck post to consider soil type and construction sequence including removal stages. | Design of deck post to consider soil type and construction sequence including removal stages. |
| **3. Lateral stability** | Provision of lateral stability (e.g. use of vertical and/or horizontal bracings) in resisting lateral forces arising from both imposed load on deck as well as load from earth-retaining structures. | Provision of lateral stability (e.g. use of vertical and/or horizontal bracings) in resisting lateral forces arising from imposed load on deck. |
| **4. Design loads** | In addition to normal design loads, effects of accidental loads, environmental load (such as temperature effect), construction loads (such as erection load), construction tolerances (such as eccentricity of deck post) shall be considered.<br><br>Note: Where appropriate, the design of the deck-post and/or other elements supporting the bridge deck shall take into consideration the load transferred to it arising from the accidental load of not less than 50KN applied normal to the strut at any point in any direction. | In addition to normal design loads, effects of accidental loads, environmental load (such as temperature effect), construction loads (such as erection load), construction tolerances (such as eccentricity of deck post) shall be considered. |
| **5. Robustness**<br>This requirement is a principle that the QP for design [QP(D)] must consider in the detailing of the structural elements whether it is on integrated or independent supports. No specific calculations are required so long as the design is in accordance with the design code. | Decking system shall be sufficiently robust to prevent disproportionate collapse. | Decking system shall be sufficiently robust to prevent disproportionate collapse. |

| Description | Support systems which are integrated with earth-retaining or stabilising structures | Support system on independent support system |
|---|---|---|
| **6. Effects of vibration**<br>This requirement is a principle that the QP(D) must consider in the detailing of the structural elements, and other attachments that affect the structural system, such as jacks, if any. No dynamic calculations are required if the magnitude of the vibrations are within generally accepted level envisaged in the design code. The QP(D) is to assess whether additional measures such as monitoring of vibration levels and inspection would be required. | Effects of vibration on earth-retaining structures such as connections between strut and deck post, strut and waler, waler and earth retaining wall; preloading system; etc. | To be checked where appropriate |
| **7. Assessment of impact of movements of earth-retaining or stabilising structures on deck structure**<br>The QP(D) is to consider the impact of maximum allowable movement of the earth-retaining or stabilising structures on the integrated posts and deck structure at design stage. During construction the wall movement should be monitored; and if the wall movement reaches the work suspension level, the effect of the movement on the deck structure should be checked by physical measurements and the deck structures checked for structural stability. | Assessment of impact of movements of earth-retaining structures on robustness of deck structure. Allowable movement limits shall be specified and closely monitored for the deck posts. | Not applicable |
| **8. Certification of QPs, if designs of earth-retaining structures and deck are by different QPs** | The QP for design of earth-retaining or stabilising structures and QP for design of deck should each certify that all loads/effects from deck and earth-retaining structures respectively have been considered in the design. | Not applicable |

**Procedure for obtaining Temporary Occupation Permit (TOP) for Public Vehicular Deck over Excavation Sites**

1 TOP application is required for the completed part of the deck structures and posts before opening of the deck to public vehicles for the first time. This is done by submitting Form C1 (Certificate of Supervision of Piling Works and Notice of Completion), C2 (Certificate of Supervision of Structural Works), C3 (Submission Certificate of Record Structural Plans/Calculation) and the BC (Builder's Certificate of Completion of the Completed Works).

2 TOP application is not required during the subsequent excavation and backfilling stages. These subsequent excavation and backfilling stages would had been considered in the design by the QP(D), who will identify on his design drawings specific stages when subsequent lodgement to BCA of Forms C2, C3 and BC are required.

3 Should there be major deviations from approved design during construction, the QP(D) must submit the revised design to BCA for approval.

4 If a separate traffic decking is required to cater for traffic diversion, the same requirements above will apply.

**DISTRIBUTION (via e-mail):**

President
Institution of Engineers, Singapore (IES)
70, Bukit Tinggi Road
Singapore 289758
ies@iesnet.org.sg

President
Association of Consulting Engineers, Singapore (ACES)
70, Palmer Road, #04-06
Palmer House
Singapore 079427
acesing@starhub.net.sg

President
Real Estate Developers' Association of Singapore (REDAS)
190 Clemenceau Avenue
#07-01 Singapore Shopping Centre
Singapore 239924
enquiry@redas.com

President
Singapore Contractors Association Limited (SCAL)
Construction House
1 Bukit Merah Lane 2
Singapore 159760
enquiry@scal.com.sg

President
Singapore Institute of Architects (SIA)
79 Neil Road
Singapore 088904
info@sia.org.sg

President
Society of Project Managers (SPM)
Macpherson Road P.O.Box 1083
Singapore 913412
sprojm@yahoo.com

President
Singapore Institute of Building Limited (SIBL)
70 Palmer Road,
#03-09C Palmer House
Singapore 079427
josephine@sib.com.sg

President
Singapore Institute of Surveyors & Valuers (SISV)
20 Maxwell Road #10-09B
Maxwell House Singapore 069113
sisv.info@sisv.org.sg

President
Singapore Structural Steel Society (SSSS)
336-C King George's Avenue
King George Building
Singapore 208572
paulinezee@avconsultants.com.sg, secretariat@ssss.org.sg

President
Geotechnical Society of Singapore
c/o Professional Activities Centre
NUS Faculty of Engineering
9 Engineering Drive 1
Singapore 117576
geoss@nus.edu.sg

President
Professional Engineers Board, Singapore (PEB)
1st Storey, Tower Block, MND Complex,
5 Maxwell Road
Singapore 069110
registrar@peb.gov.sg

President
Board of Architects (BOA)
5 Maxwell Road
1st Storey Tower Block, MND Complex,
Singapore 069110
boarch@singnet.com.sg

Director
Protective Infrastructure & Estate
Defence Science & Technology Agency
1 Depot Road #03-01j
Singapore 109679
lcheehio@dsta.gov.sg

Deputy Director
Project Development & Maintenance Branch
Ministry Of Education
1 North Buona Vista Drive
Office Tower Level 9
Singapore 138675
eng_wee_tong@moe.gov.sg

Director
Best Sourcing Department
Public Utilities Board
40 Scotts Road #18-01
Environment Building
Singapore 228231
koh_boon_aik@pub.gov.sg

Deputy Chief Executive
Infrastructure & Development
Land Transport Authority
1 Hampshire Road
Block 8 Level 1
Singapore 219428
bok_ngam_lim@lta.gov.sg

Head
Building Quality Department
Housing & Development Board
HDB Hub
480 Lorong 6 Toa Payoh
Singapore 310480
hkc1@hdb.gov.sg

Director
Engineering Planning Group
JTC Corporation
The JTC Summit
8 Jurong Town Hall Road
Singapore 609434
giokhua@jtc.gov.sg

Director
Building
People's Association
9 Stadium Link
Singapore 397750
foo_soon_leng@pa.gov.sg

President
The Tunnelling and Underground Construction Society Singapore (TUCSS)
c/o CMA International Consultants Pte Ltd
1 Liang Seah Street
#02-12 Liang Seah Place
Singapore 189022
info@tucss.org.sg

President
Society of Rock Mechanics and Engineering Geology
1 Liang Seah Street
#02-12 Liang Seah Place
Singapore 189022
srmeg@cma.sg

All CORENET e-Info subscribers