Summary of Decisions of te Structural Engineering Committee
SEC 09/2012 held on 19 June 2012

(a) Case 09/2012

Issue:

(1) Two trial piles (TP-1 and TP-2) under compression tests and two trial piles (RP-1 and RP- 7) under tension tests for Steel H-Pile grouted in prebored holes with post-pressurized grout in Alluvium and CDG.

(2) The centres of piles be placed at less than the length of the perimeter of the pile from the centres of adjacent piles.

Recommendation:

(1) To accept the design principle of steel H-pile (Grade S450 J0, 305x305x223 kg/m) grouted in pre-bored holes (610mm diameter) with pressurized grout in Alluvium and CDG to enhance shaft friction for resisting vertical load, subject to satisfactory verification by static loading tests on the four trial piles complying with the acceptance criteria stipulated in paragraph 4 and the following criteria/conditions:

1.1. The ultimate shaft grouted friction in Alluvium shall not exceed 4.5 x N with a maximum limit of SPT "N" value of 35 (i.e. 157kPa);

1.2. The ultimate shaft grouted friction in Completely Decomposed Granite (CDG) shall not exceed 4.8 x N with a maximum limit of SPT "N" value of 40 (i.e. 192kPa);

1.3. A factor of safety (FOS) of 3 will be adopted for calculating the allowable shaft friction;

1.4. A detailed quality assurance proposal on grouting works shall be submitted. It shall specify the measures adopted in controlling grout pressure, volume and time;

1.5. For each grout mix one sample of grout shall be provided from each 10 batches of grout, or every $10m^3$ from the amount of grout produced in a day, whichever is the smaller, to determine the crushing strength of the grout. Samples shall be provided not more than 1 hour after the grout has been mixed;

1.6. Working piles will be load-tested to 2 times of the working pile capacity for performance test; and

1.7. A performance review report of trial pile tests shall be submitted to the satisfaction of the Building Authority upon completion of the static loading tests.

Eight reaction piles are proposed to provide reactions for the static loading tests (4 reaction piles for each trial pile, TP-1 and TP-2). The tension load induced in these reaction piles by compressing the trial pile will be used to verify the designed tension capacity of the working piles. Two out of the eight reaction piles (RP-1 and RP-7) are selected to verify the design tension capacity.

(2) To permit modification to Building (Construction) Regulation 26(5)(a) that the centres of the steel H-piles grouted in pre-bored holes will be placed at less than the length of the perimeter of the pile of 1.916m (i.e. π x 610mm) from the centres of adjacent piles but subject to a minimum centre to centre spacing of 1.368m and a group reduction factor of 0.85 will be applied to calculate the pile capacity.

Decision: Members endorsed the recommendations subject to the following conditions:

(1) The structural integrity of the adjacent structures should be further assured by a detailed assessment by the RSE in view of the pre-boring works are very close to the adjacent buildings.
(2) A detailed construction sequence, grouting method statements, verification and remedial proposal to cope with the high water table should be submitted.
(3) Approval of the working piles would be subject to the satisfactory results of the loading tests and performance review, i.e. condition survey of the adjacent buildings after the trial pile works.