Summary of Decisions of the Structural Engineering Committee
SEC 7/2009 held on 29.07.2009

(a) Case 7/2009

Issue: Use of 63.5 mm diameter high strength (grade 555/700) hot rolled thread bars in mini-piles socketted into rock

Recommendation: The use of 63.5 mm diameter high strength (grade 555/700 i.e. f_y = 520MPa) hot rolled thread bars as steel bars without bends in the mini-piles socketted into rock at this site be accepted.

Decision: Noting the background information provided, the endorsement of a similar applications in SEC Case 02/07, and having due regard to the site constraints, the transient nature and magnitude of the tensile load acting on the mini-piles, and the tension capacity of pile which is taken as 0.5 x compression capacity, members endorsed the recommendation for the use of the proposed thread bars at this site subject to the following conditions:-

1. The design of mini-piles shall be in accordance with Building (Construction) Regulations and Code of Practice for Foundations.

2. A single trial pile is proposed for compression and tensile load test to verify the design assumption and performance of the proposed min-piles system. The requirements of test will be carried out in accordance with Code of Practice for Foundations.

3. The nominal diameter of the hot rolled thread bar shall be 63.5 mm, the yield strength shall be 520 MPa, the tensile strength shall be 700 MPa and the minimum elongation shall be 10%.

4. The maximum number of couplers in each steel bar of the mini-piles shall be 6.

5. The couplers shall be staggered so that not more than half of the total number of the steel bars shall be spliced at any cross section.

6. No coupler connection shall be made within the rock socket zone.

7. No welding shall be carried out to the hot rolled thread bar.

8. Slip tests shall be carried out to demonstrate the load carrying capacity of the Straight Round Coupler with Lock Nut Big and pile head Anchor Nut system.

9. The sampling, testing and reporting system, other than checking the chemical composition, performing the bend and rebend tests and testing by HOKLAS accredited testing laboratories, will follow the recommendations of CS2:1995. The tensile tests will be witnessed by a RSE's representative who is versatile with the HOKLAS requirements.

10. The tensile capacity of the Straight Round Coupler with Lock Nut Big and pile head Anchor Nut system shall be not less than 125% of the capacity of the hot rolled thread bar (i.e. 1.25 x 520 MPa = 650 MPa).

11. Mill certificates and test reports of the hot rolled thread bar, the Straight Round Coupler with Lock Nut Big and pile head Anchor Nut system shall be submitted to the Building Authority for record.

12. Full time qualified supervision on bar fixing and splicing of the hot rolled thread bars shall be provided.

13. Material tests on the hot rolled thread bar shall satisfy the following requirements:
    (a) Rate of testing for thread bars upon material delivery as stipulated in Table 9 of CS 2: 1995.
    (b) Tension test shall be carried out in accordance with Cl. 6.2 of CS 2: 1995.

14. Material tests on the Straight Round Coupler with Lock Nut Big and pile head Anchor Nut system shall satisfy the following requirements:
    (a) Rate of testing for mechanical couplers and anchor nut system upon material delivery as stipulated in clause 15.30 of the General Specification for Civil Engineering Works.
    (b) Tension test shall be carried out in accordance with Cl. 6.2 of CS 2: 1995.
    (c) Slip test for thread bars with mechanical couplers and anchor nut shall be conducted in accordance with ISO/DIS 15835-2 "Steel for the Reinforcement of Concrete – Mechanical Splices for Bars – Part 2: Test Methods".
    (d) Maximum permanent elongation of the mechanical couplers and anchor nut when loaded to 0.45 f_y (i.e. 234 MPa) shall not exceed 0.1mm.