

FEB 2008

**GUIDELINES ON
RECORD STRUCTURAL PLANS AND
TEST RECORDS**

Building and Construction Authority

INTRODUCTION

This section explains the requirements on submission of record structural plans, and the site and tests records to be kept during the course of construction works.

These requirements are administered by the Building Engineering Division of the Building Control. It is located at the following address:

Building Engineering Division
Building Control
5 Maxwell Road, #05-00
Tower Block, MND Complex
Singapore 069110.

This document must be read with reference to the following Act, Regulations and guidelines:

- a) The Building Control Act (Chapter 29)
- b) The Building Control Regulations.
- c) The Building Control (Accredited Checkers and Accredited Checking Organisations) Regulation.
- d) Guidelines on submission procedures.

WHAT ARE THE REQUIREMENTS FOR SUBMISSION OF RECORD PILING PLANS?

Form BCA-BE-QPCTPW (BEV/C1) - Certificate of Supervision of Piling Works and Notice of Completion By the Qualified Person for Structural

The qualified person must ensure that the relevant construction tests in connection with the building works as described in section 7 of this document are carried out.

- a) Form BCA-BE-QPCTPW (BEV/C1) is to be submitted together with the record piling plans, showing the pile penetration length, pile set (for driven piles), the location and type of pile load tests, within 28 days after completion of piling works.
- b) Records of piles eccentricities and calculations (if necessary) are to be submitted before commencement of basement floor or 1st storey floor, whichever is earlier.
- c) Form BCA-BE-QPCTPW (BEV/C1) is to be endorsed by the QP appointed under section 18(1)(b) or 11(1)(d)(ii) of the Building Control Act.
- d) All items in the form are to be duly completed.

Record Piling Plans.

- a) All plans are to be clear and legible.
- b) All plans are to be endorsed by both the QP appointed under section 18(1)(a) or 11(1)(d)(i) of the Building Control Act and AC (if applicable), and bear the standard endorsement and Regulations 18(3)(b) and 18(3)(c) (if applicable) of the Building Control Regulations on the first and last sheet of the plans. [refer to section on Endorsement by QP and AC]
- c) The total number of plans, sheet no. and project reference no. are to be indicated on all plans.

Calculations (if necessary)

- a) All calculations are to be endorsed by the QP appointed under section 18(1)(a) or 11(1)(d)(i) of the Building Control Act and AC (if applicable), and bear the standard endorsement and Regulations 18(3)(b) and 18(3)(c) (if applicable) of the Building Control Regulations on the first and last sheet of the calculations. [refer to section on Endorsement by QP and AC]
- b) The QP is to verify the structural adequacy of the record piles if the penetration length is significantly less than its estimated design length.

WHAT ARE THE REQUIREMENTS FOR SUBMISSION OF RECORD STRUCTURAL PLANS?

Form BCA-BE-QPCTSSW (BEV/C2) – Certificate of Supervision of Structural Works By the Qualified Person for Structural Works.

Form BCA-BE-CTASST (BEV/C3) – Submission Certificate of Record Structural Plans/Calculations.

- a) Forms BCA-BE-QPCTSSW (BEV/C2) and BCA-BE-CTASST (BEV/C3) are to be submitted together with the record structural plans and calculations when the structural works are completed.
- b) Form BCA-BE-QPCTSSW (BEV/C2) is to be endorsed by the QP appointed under section 18(1)(b) or 11(1)(d)(ii) of the Building Control Act.
- c) BCA-BE-CTASST (BEV/C3) is to be endorsed by the QP appointed under section 18(1)(a) or 11(1)(d)(i) of the Building Control Act. Either paragraph (a) or (b) in Form BCA-BE-CTASST (BEV/C3) is to be deleted.
- d) All items in both forms are to be duly completed.

Record Structural Plans

- a) All plans are to be clear and legible.
- b) All plans are to be endorsed by the QP appointed under section 18(1)(a) or 11(1)(d)(i) of the Building Control Act and AC (if applicable), and bear the standard endorsement and Regulations 18(3)(b) and 18(3)(c) (if applicable) of the Building Control Regulations on the first and last sheet of the plans. [refer to section on Endorsement by QP and AC]
- c) The total number of plans, sheet no. and project reference no. are to be indicated on all plans.
- d) All amendment works are to be clouded on the plans.
- e) Record plan is not required if there is no departure from the approved plans.

Calculations (if necessary)

- a) All calculations are to be endorsed by the QP appointed under section 18(1)(a) or 11(1)(d)(i) of the Building Control Act and AC (if applicable), and bear the standard endorsement and Regulations 18(3)(b) and 18(3)(c) (if applicable) of the Building Control Regulations on the first and last sheet of calculations. [refer to section on Endorsement by QP and AC]

WHAT ARE THE ENDORSEMENTS REQUIRED FROM THE PE AND AC?

Regulation 18(3)(b) of the Building Control Regulations for QP:

I, _____, the Qualified Person for structural works appointed under section 18(1)(a) or 11(1)(d)(i) of the Building Control Act, certify that to the best of my knowledge and belief the departures or deviations shown on the record plans do not affect the structural adequacy or stability of the building.

Standard Endorsement for QP:

In accordance with Regulation 9 of the Building Control Regulations, I, _____, the Qualified Person for structural works appointed under section 18(1)(a) or 11(1)(d)(i) of the Building Control Act, hereby submit the detailed structural plans and design calculations prepared by me and certify that they have been prepared in accordance with the provisions of the Building Control Regulations, the Building Control Act and any other written law pertaining to buildings and construction for the time being in force.

I further certify that these detailed structural plans and design calculations are in reference to Project Reference No: _____

Total number of structural plans submitted : _____ and total number of pages of design calculations in this book : _____

Regulation 18(3)(c) of the Building Control Regulations for AC:

I, _____, (Accredited Checker) certify that to the best of my knowledge and belief, the record plans do not show any inadequacy in key structural elements of the building to be erected or affected by building works carried out in accordance with those plans.

Standard Endorsement for AC:

I, _____, (Accredited Checker) hereby certify that I have carried out an evaluation, analysis and review of the detailed structural plans and design calculations presented herein and am satisfied that there are no inadequacies in the key structural elements.

I further certify that these detailed structural plans and design calculations are in reference to Project Reference No: _____ and the key structural elements are consistent with the layout shown in the architectural plans.

Total number of structural plans checked : _____ and total number of pages of design calculations checked in this book : _____

I hereby declare that I have no professional or financial interest in the building works shown in the plans as defined in Section 18 of the Building Control Act.

WHAT ARE THE RECORDS AND TESTS REQUIRED IN CONSTRUCTION WORKS?

The following are the essential site records and test records that must be compiled and kept at the site office:

- a) Schedule of structural works
- b) Attendance record
- c) Site record book
- d) Approved structural plans, amendments and specifications
- e) Record of all departures or deviations relating to structural elements of the building works
- f) Record of inspection and approval for concreting
- g) Record of repairs to defective structural works
- h) Soil investigation and soil test report
- i) Record of piles installed
- j) Record of pile load tests
- k) Record of tests on cement, sand and aggregates
- l) Record of concrete cube tests
- m) Record of tests on steel reinforcements
- n) Record of tests on prestressing steel
- o) Prestressing records
- p) Record of tests on welding works
- q) Record of other necessary tests and site records

Details of the above records needed are further illustrated in Appendix A.

APPENDIX A : DETAILS OF SITE AND TEST RECORDS

Schedule of Structural Works

The professional engineer must ensure that a schedule of structural works to be carried out every 3 or months is kept at the site. It must specify in particular the construction fabrication of the key structural elements in the building works.

Attendance Record

The professional engineer must ensure that his attendance record and his resident engineer or resident technical officer' attendance record are kept to monitor their presence at the construction site. [[download sample form for site supervisor attendance](#)] [[download sample form for QP attendance](#)]

Site Record Book

The professional engineer must ensure that a site record book is properly maintained. The resident engineer / resident technical officer should also record his time spent at the site as well as any comments or instructions given in the record book. [[download sample form for site record](#)]

Approved Structural Plans, Amendments & Specifications

The professional engineer must ensure that the specifications, approved structural plans and amendments are properly documented and a complete set be kept on site for use.

Record of Inspection and Approval for Concreting

- a) The professional engineer is to ensure that a copy of the approved concrete mix design is kept at the site for verification.
- b) The professional engineer must ensure the presence of his resident technical officer and/or resident engineer and/or himself in the inspection of the structural works prior to concreting is recorded. The time taken to carry out the necessary inspection as well as any comments or instructions given should also be recorded. [[download sample form for record of inspection](#)]

Record of Repairs to Defective Structural Works

When defective concrete works, such as honeycombs, cracks, etc are detected after the formwork has been stripped, the professional engineer is required to record these defects, the remedial measures taken and the type of repairs carried out. The date of the repair and the name of the supervising officer should be recorded.

Soil Investigation Report

These reports must be certified by a professional engineer and all soil tests shall be carried out by an approved laboratory or a SISIR accredited laboratory. Certain minor in-situ tests such as in-situ penetrometer may be carried out by the professional engineer. A copy of this soil investigation as well as soil tests report must be kept at the site office for reference.

Record of Piles Installed

The professional engineer is required to compile a record of all the piles installed on site in the normal pile record forms. These records shall be submitted to the Commissioner of Building Control upon completion of the piling works. [[download sample form for driven pile record](#)] [[download sample form for bored pile record](#)]

Records of Pile Load Tests

The professional engineer is required to compile records of all the load tests carried out on site. The records should be in the normal load test record format including the load vs. settlement graphs. The records should also include calibration reports for the gauges. These records must be submitted to the Commissioner of Building Control upon completion of the piling works. [[download sample form for pile load test record](#)]

Record of Tests on Cement, Sand and Coarse Aggregates

The professional engineer must ensure that a copy of the Cement Manufacturer's Test Certificate of the approved branch of cement is kept on site for verification. He should also ascertain the freshness of the cement. The professional engineer should instruct his clerk-of-works and/or resident engineer to carry out random checks at a regular interval on the quality of sand by performing the field sedimentation test. However, decantation or other more accurate methods could be used if the field tests indicate a larger than acceptable silt/clay content. As for the coarse aggregates, grading and crushing strength tests may be carried out when required. The source of supply should be recorded and checked regularly to ensure reliability.

Record of Concrete Cube Tests

The professional engineer must ensure that a record of all concrete cube tests is kept on site. The slump, structural element and location of the batch sample taken should also be recorded. In cases where the concrete failed to achieve the specified 28-day strength, the professional engineer must record the remedial measures that he had taken. [[download sample form for concrete cube test record](#)]

Record of Tests on Steel Reinforcement

The professional engineer must ensure that a copy of the mill certificate is kept on site for verification on the strength and quality of the reinforcement bars. The source of supply must be recorded and checked regularly (see Soil Investigation Report). Further tests may be carried out at the discretion of the professional engineer, at regular intervals. Where normal welding is done on reinforcement bars, sample of the welded joint should be tested by an approved laboratory (see Soil Investigation Report). [[download sample form for steel reinforcement test record](#)]

Record of Tests on Prestressing Steel

A copy of the Manufacturer's Test Certificates covering each coil to be used must be kept on site. Where testing of samples are to be done, they should be carried out in an approved laboratory (see Soil Investigation Report) and all test reports must be kept on site. [[download sample form for prestressing steel test record](#)]

Prestressing Records

Shop drawings and calculations of theoretical cable extensions etc provided by specialists firm should be kept on site. The records of actual site extension measurements including force-extension graphs should also be verified by the professional engineer and kept on site. The record should also include calibration report for stressing jacks and gauges. [[download form for prestressing record](#)]

Other Necessary Test Records & Site Records

The professional engineer must ensure that records of all other necessary tests which are mentioned above are kept. They may be results of core tests, tests on structural steel, welding tests or non-destructive tests, such as the rebound hammer and ultra-sonic tests. Other site records such as site instructions by professional engineer, resident engineer or site supervisors should also be properly filed. [download [[download form for welding test record](#)]