

Computer Programs for Use in Structural and Geotechnical Design

An authorized person (AP) or a registered structural engineer (RSE) may use computer programs to produce calculations to support his design or to produce designs for submissions to the Building Authority (BA). Where he intends to do so, he should ensure that the program from which such calculations or designs are produced is acceptable to the BA before submitting plans for approval under the Buildings Ordinance.

Prior Acceptance of Computer Program

2. An application for prior acceptance of structural computer program should be made by a RSE. An application for prior acceptance of geotechnical computer program should be made by an AP or RSE and a geotechnical consultant should be appointed to advise on the geotechnical content. A computer program accepted by the Buildings Department (BD) will be assigned a BD reference number (prefixed 'S' for structural and 'G' for geotechnical), which should be quoted in submissions.

3. Application for prior acceptance of a computer program (including the renewal of the prior acceptance) should be made using the standard pro forma in Appendix A. The completed pro forma should be accompanied by relevant documentation of the program including a user's manual giving the following information:

- (a) mathematical modelling of the analysis and/or design;
- (b) flow charts showing the analysis and/or design procedure;
- (c) Building Regulations, codes of practice or other requirements which the analysis or design produced by the program will comply with;
- (d) theory of analysis and mathematical basis of the computational algorithm which are used in the program including any references;
- (e) limitations and applicability of the program;
- (f) structure and method of data input and output;
- (g) interpretation of results; and

/(h)

- (h) examples which are sufficient to illustrate the operation of every part of the program at all representative input data values and verified by the RSE or the appointed geotechnical consultant, as appropriate to the type of computer program.

Additional test examples may be required in order that the accuracy of the computer program can be fully demonstrated.

Use of computer Program in Submission of Plans for Approval

4. When using the program to support structural or geotechnical design, the AP or RSE is required to include a statement containing the following information in the submission of plans for approval:

- (a) the name, version, developer's name/identification, BD reference number and validity period of the computer program;
- (b) a list of the limitations in application, including the program limitations observed during processing for prior acceptance (which may not be exhaustive and are available for viewing in the BD);
- (c) the justifications on the simulation of the problems by the mathematical models used in the computer program;
- (d) an explanation of how the values are calculated for any parameters e.g. material properties and boundary conditions used in the model;
- (e) the preparation of the input data from the structural details and/or the ground conditions;
- (f) a brief description of the computer output; and
- (g) the application and interpretation of the computer output in the design.

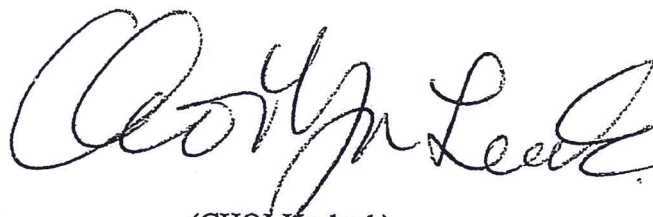
5. For structural computer programs, the RSE should be responsible for the program execution. For geotechnical computer programs, a qualified geotechnical engineer (e.g. Registered Professional Engineer in the Geotechnical Discipline) who is competent and conversant with the geotechnical application of the computer programs should be responsible for the program execution. In the latter case, the name and relevant curriculum vitae (CV) of the person responsible for the program execution should be included in the statement required in paragraph 4. The AP/RSE is also required to complete the standard pro forma in Appendix B and/or C and include it in the submission.

6. When a submission is supported by a computer program which does not bear a valid prior acceptance, the BA may require all information listed in paragraph 3 to be included in the submission for consideration.

/Renewal

Renewal of Prior Acceptance and Changes to Pre-Accepted Programs

7. The prior acceptance of any computer program will be valid for a period of up to three years. In view of advances in science and technology and periodic revision to Codes of Practice, prior acceptance of any computer program will be considered to have expired on a date three years from the date of last acceptance.
8. Application for renewal of the prior acceptance may be made upon expiry, but not earlier than four months from the expiry date. Such applications will be examined by BD in the light of the requirements set out in this practice note.
9. If changes are proposed to an accepted program, details of the amendments and the updated user manual (if applicable) should be submitted to BD for acceptance before using the revised program.
10. Lists of currently accepted structural and geotechnical computer programs, and program limitations are available for inspection at the general registries of BD on 13/F, 14/F & 15/F of Pioneer Centre, 750 Nathan Road, Mong Kok, Kowloon.



(CHOU Yu-leuk)
Building Authority

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Index under: Computer Programs

**APPLICATION FOR PRIOR-ACCEPTANCE* / RENEWAL*
OF STRUCTURAL* / GEOTECHNICAL* COMPUTER PROGRAM**

**Appendix A
(PNAP 79)**

A. Details of Applicant (RSE for Structural Program; AP/RSE for Geotechnical Program):

Name:.....(AP* / RSE*) & Registration No.:.....
Address:

B. [For Geotechnical Programs Only] Details of Geotechnical Consultant appointed to advise on the geotechnical content:

Professional Qualifications:
Name:.....
Address:

C.

Program Name:.....
Program Version:.....
Program Developer:
(Name/Identification)
BD Reference Number (for renewal case only):

D. The following Supporting Documents substantiating the application are enclosed (please tick box):-

(a) Structural Program:- One copy of Program Manual☐ & Flow chart(s).....☐
(b) Geotechnical Program:- TWO copies of Program Manual☐ & Flow chart(s).....☐

E. Areas of application of the computer program (e.g. Space frame/space truss/core wall/seepage/slope stability/retaining wall stability analysis, etc.):

F. Brief description of program, assumptions and theory (e.g. linear/non-linear, static/dynamic analysis; method of data input and result output; modular ratio/finite element/stiffness method; etc.):

G. Program Limitations (e.g. number of elements/joints/nodes/material zones/struts/surcharges/load cases/end releases; load types/conditions; scope of analysis; compliance standards/codes; partial load factors; load combination factors; etc.):

[Use Additional sheets as required]

H. Other relevant information supporting the application (e.g. codes of practice or other requirements with which the program complies, sufficient self-verified examples to demonstrate the operation of every part of the program, etc.):

I confirm that I have carried out adequate assessment on the computer program and I consider it suitable to be used to support designs for submission to the Building Authority.

Signature of Applicant(AP* / RSE*):..... Date:.....
& Full Name (Block Letters):.....

(Rev. 6/99)

* Delete whichever is inapplicable.

Structural Computer Program Statement

BD file ref. no. :

Address of site :

Authorized Person :

Registered Structural Engineer :

Structural computer programs used :-

| Program Name | BD Ref. No. |
|--------------|-------------|
| (1)† | S |
| (2)† | S |
| (3)† | S |
| (4)† | S |
| (5)† | S |

(Show against each program the Methodology Adopted e.g., Elastic Theory, Load Factor, Ultimate Limit State, etc.)

The above programs were used to perform the following († insert the appropriate number from table in brackets) :-

- | | |
|--|--|
| () Foundation *Analysis/Design | () Pile cap *Analysis/Design |
| () Footing *Analysis/Design | () Superstructure *Analysis/Design |
| () Others (please specify)..... *Analysis/Design | |

I confirm that I have carried out adequate assessment on the above computer programs and I consider them suitable to be used to support design for the above structural submission to the Building Authority.

— The information about the structural computer programs is also enclosed in pursuance of paragraph 4 of PNAP 79.

Signature of RSE :Date :

RSE's full name :

* Delete whichever is inapplicable

Geotechnical Computer Program Statement

BD file ref. no.:

Address of site:

Authorized Person:

Registered Structural Engineer:

Geotechnical computer programs used :-

| Program Name | BD Ref. No. |
|--------------|-------------|
| (1)† | G..... |
| (2)† | G..... |
| (3)† | G..... |

Above programs were used to analyse the following designs († insert the appropriate number from table in brackets) :-

() Earth-retaining Structures

() Excavation and Lateral Support Works

() Slope Works

() Others (please specify)

I confirm that(name)

of(firm)
is responsible for executing the geotechnical computer programs in respect of the above designs and is a qualified geotechnical engineer competent and conversant with the geotechnical application of the computer programs. I hereby enclose his/her CV.

— The information about the geotechnical computer programs is also enclosed in pursuance of paragraph 4 of PNAP 79.

Signature of AP* / RSE* Date:.....

& Full name in (block letters):.....