UNIVERSITY OF CANTERBURY
Department of Civil Engineering

COMPUTER PROGRAM LIBRARY

Program name:– **PQUAKE**	Program type:– Response Spectrum Analysis	Program code:– ANSI Fortran77
Author:– Athol J Carr		Date:– May 2, 2002

PQUAKE

Plotting of Earthquake Accelerograms

Purpose

This program is designed to an input earthquake accelerogram. The input formats for the accelerograms are the same as those formats accepted by the program RUAUMOKO.

Data for PQUAKE

All data for PQUAKE is prompted for by the program using the TinyCLIP command processor. For help on the input data or on the use of the SPECTRA program type **HELP** or **?** At any prompt. To get help on the command processor type **$HELP** at any prompt.

Running the program PQUAKE.

To run the program call the program by the method appropriate to your operating system. On a personal computer just type **PQUAKE** assuming that the files **PQUAKE.EXE** and the associated **.DLL** and **.HLP** files are in your current directory or path.

In Microsoft Windows operating systems another option is to create a shortcut on the desktop and for this purpose a suitable icon for PQUAKE, **Pquake.ico**, is supplied with the program.

The program prompts for responses to a series of questions. Default responses, where appropriate, are enclosed in square brackets, **[ ]**. File names must match the conventions of your operating system but file names, with paths where necessary, must not exceed 60 characters in length and must not contain blanks.

The first question asks for the name of the output file. The default is the computer console or terminal screen.

To get hard copies of the plots.

In Microsoft Windows operating systems to get hard copies of the graphs use the pull down 'file' menu and select the Print or Save options to send the graph to the printer or to save the plot as a bitmap file (**.BMP**).
On unix systems using GKS graphics select the Hard-copy option from the Choice window

Accelerogram Data

a. Accelerogram flag.

One input line with the word **STAR**, **START** or **DATA:** (the colon is mandatory) starting in column 1 and the word must be in upper case. This **START** line may be preceded by as many header lines as desired. This **START** line is not used for PEER Format records as these records start with 4 lines of header information.

START

b. Accelerogram

The remainder of the input is the acceleration record itself. The record is in the form of a series of lines each of which starts with a *Line Sequence Number* (which must be in an ascending order) followed by either (i) a group of 4 or 1 successive time-acceleration points (BERG, FREE or EXCEL Format), or (ii) a sequence of 10, 8 or 4 uniformly spaced acceleration values at **DELTAT** time intervals apart, the (CALTECH, NCEER, CSMIP or PEER Formats).

Note that the NCEER, CSMIP or PEER records do not have a line sequence number. The analysis acceleration record will begin at the first time on or implied by the beginning of the accelerogram line **ISTART** and there must then be sufficient lines remaining to span the analysis time-history length **TR**.

The record must be on one of the following formats depending on the value of **IBERG** provided in the earlier data. The FORTRAN format is provided in parentheses for each case.

(1) **BERG** FORMAT **(I3,4(F8.4,F9.6))**

ISEQ T1 G1 T2 G2 T3 G3 T4 G4

ISEG	Line sequence number	**I 3**
Ti	Time of point on accelerogram (seconds)	**F 8.4**
Gi	Acceleration (decimal fraction of gravity)	**F 9.6**

If the line sequence number is greater than 999 it is not read or checked by the program.

(2) **CALTECH** FORMAT **(I4,6X,10F6.0)** or more precisely **(I4,6X,10I6)**

ISEQ G1 G2 G3 G4 G5 G6 G7 G8 G9 G10

ISEQ	Line sequence number	**I 4**
Gi	Acceleration (multiplied by **ASCALE**) at intervals of **DELTAT**	**I 6**

If the line sequence number is greater than 9999 it is not read or checked by the program.

(3) **NCEER** FORMAT **(10F8.2)**

G1 G2 G3 G4 G5 G6 G7 G8 G9 G10

Gi	Acceleration (multiplied by **ASCALE**) at intervals of **DELTAT**	**F 8.2**

(4) **FREE** FORMAT **(*)**

ISEQ T1 G1

ISEQ	Line sequence number	**I**
T1	Time of point on accelerogram (seconds)	**F**
G1	Acceleration (decimal fraction of gravity)	**F**

The three items may be placed anywhere on the line and separated by at least one blank column. The lines must be in consecutive order with **ISEQ** starting at 1 and increasing line by line. This format is particularly useful where the excitation record has been generated on a spreadsheet.

(5) **CSMIP** FORMAT **(8F10.3)**

G1 G2 G3 G4 G5 G6 G7 G8

Gi	Acceleration (multiplied by **ASCALE**) at intervals of **DELTAT**	**F 10.3**

(6) **EXCEL** FORMAT **(*)**

T1 G1

T1	Time of point on accelerogram (seconds)	**F**
G1	Acceleration (decimal fraction of gravity)	**F**

The three items may be placed anywhere on the line and separated by at least one blank column. The lines must be in consecutive order. This format, which is similar to the FREE format except without the sequence numbers is particularly useful where the excitation record has been generated on a spreadsheet.

(6) **PEER** FORMAT **(4E15.7)**

G1 G2 G3 G4

Gi	Acceleration (multiplied by **ASCALE**) at intervals of **DELTAT**	**E 15.7**

Note, The accelerogram time-step **DELTAT** is usually 0.005 seconds

Example

The page following the information on the accelerograms gives the graphic output for the El Centro May 1940 North-South component from the file **EL40NSC.EQB** using the default inputs except for 20 seconds duration and for monochromatic plotting.