

SLOPE AREA METHOD
FOR FLOOD ESTIMATION
SAMFE

by

Guy Vallieres

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SLOPE AREA METHOD

FOR FLOOD ESTIMATION

SAMFE

USER MANUAL FOR VERSION 1 - DEC PRO/350-380

by

GUY VALLIERES

PLANNING AND STUDIES SECTION
WATER RESOURCES BRANCH
INLAND WATERS DIRECTORATE
ENVIRONMENT CANADA
VANCOUVER

JULY 1986

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DISCLAIMER

This program has been tested, but exhaustive testing is naturally impossible. Hence, the Inland Waters Directorate makes no warranty, expressed or implied, as to the performance of this program. The users of the program are expected to make the final evaluation as to the usefulness and correctness of the program in their own set of circumstances.

It is recognized that digital computers and other electronic aids are useful and necessary parts of modern engineering practice. However, the use of such tools does not relieve the engineer from the requirement to provide a safe and adequate design. Ultimately, the engineer is responsible for the correct working of the software and hardware used and of the design that results.

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1. ABSTRACT

Documentation of Slope-Area Program for Indirect Estimation of Flood:
"SAMFE"

PROGRAM LANGUAGE: Digital Equipment Corporation (DEC) 300 Series
PRO/BASIC Language

COMPUTER: DEC Professional 350 Micro-Computer

AVAILABLE FROM: Hydrologic Studies Division, Water Resources Branch,
Vancouver B.C.

PURPOSE/TECHNIQUE: To provide a user-friendly interactive program to:
1) Compute tables for cross-section geometry parameters
2) Compute hydraulic parameters for each measurement
3) Compute rating table for conveyance
4) Estimate flood flow

INPUT: Data are input to mass storage via the keyboard in
free-form.

OUTPUT: Results are displayed on monitor or printed.

RESUME

Manuel d'utilisation du programme "SAMFE": Estimation de débit de crue par la méthode indirecte de pente-débitance,

Langage du Programme: Digital Equipment Corporation (DEC), Série 300, PRO/BASIC.

Ordinateur: Mirco-ordinateur DEC PRO 350

Fournisseur: Division des études hydrologiques
Direction des ressources en eau
Environnement Canada, Vancouver

But/Technique: Fournir un progiciel interactif à la portée de l'utilisateur pour:

- 1) Calculer des tables de paramètres géométriques des section d'écoulement.
- 2) Calculer les paramètres hydrauliques pour chaque mesure de débit.
- 3) Calculer la table de calibration de débitance.
- 4) Estimer le débit de crue.

Entrée: Les données sont introduites dans des fichiers de storage par clavier, sous format libre.

Sortie: Les résultats sont affichés sur l'écran cathodique ou imprimés.

2. INTRODUCTION

This program, based on slope-area model, is an engineering tool to estimate flood flow from maximum gauge heights measured at 2 sections or more along a reach of river. It allows the user to proceed step by step while making choices to evaluate several options. The user has the option to return to a previous step to change data or select a different approach to improve the model.

The program is totally conversational and works with a series of menus. The data are entered from the terminal, stored on a diskette and can be modified using the editing option of the menus.

Features include plots of the rating-curve and cross-sections, Table of cross-section geometry, Table of Hydraulic parameters of the reach, Tables of the geometric parameters of each cross-section and the average for the reach.

More details about the specific options are given in Chapter 4.

3. DATA COLLECTION

The selection of a suitable reach is the most important part of a slope-area measurement. Marked changes in the water surface slope along the reach should be avoided because of uncertainties regarding the loss of velocity head. The channel should be as prismatic as possible within the reach. And the reach should be contracting rather than expanding. The water surface profile should be as uniform as possible along the reach.

Two, 3, 4 or 5 cross-sections are defined along the chosen reach, including the upstream and downstream cross-sections. The geometry of each cross section has to be measured. Each discharge measurement should be taken with the corresponding water surface elevations at each cross-section of the reach.

4. PROGRAM DOCUMENTATION

4.1 Data Storage

All the data for a given station are stored in 3 virtual files. These files cannot be displayed on terminal or modified from an editing or prose application of a computer. Each file is named from the station number plus a letter at the beginning:

- T Station#: Contains the name of the station and the period of validation for the calibration curve
- S Station#: Contains the cross-sections data and all the other parametric data related to the reach.
- P Station#: Contains the series of measurements (Q, H) and other hydraulic parameters related to each measurement.

4.2 How to Start the Program SAMFE

4.2.1 Object of Program

A MAIN MENU will be displayed on the CRT (terminal screen), from which to select the various tasks related to computation of tables for the geometric parameters of the reach.

4.2.2 User Instructions

- 1.a) Turn the machine on, and wait for display of MAIN MENU.
 - b) Select PRO/BASIC from main menu of the operating system. This is achieved by using the arrow keys to move the monitor's arrow opposite PRO/BASIC and then pressing the key "DO".
 - c) Insert Diskette "SAMFE" into Diskette 1. Insert Diskette "SAMFE DATA" into Diskette 2. Ensure orange arrows align when inserting the floppy disks.
2. To load the program into memory and execute the program:
 - a) ENTER: RUN DZ1:[USERFILES]SAMFE

b) PRESS: Carriage return (CR). Note that the key labelled "RETURN" is commonly referred to as the carriage return (CR).

3. When the following instructions are displayed:

```
+++++  
PROGRAM "SAMFE"  
SLOPE-AREA MODEL FOR  
FLOOD ESTIMATION  
WATER RESOURCES BRANCH  
+++++  
INPUT NEW CROSS-SECTIONS . . . . . 1  
EDIT CROSS-SECTION DATA . . . . . 2  
PRINT CROSS-SECTION PLOTS ON HARD COPIER . . . 3  
COMPUTE AREA AND HYDRAULIC RADIUS TABLE . . . 4  
CURVE CALIBRATION MENU . . . . . 5  
ESTIMATION OF FLOOD FLOW FROM CONEYANCE CURVE. 6  
END OF SESSION . . . . . 7  
TYPE IN THE NUMBER OF WANTED ITEM (1 TO 7)
```

a) ENTER: 1 if you want to enter the cross-section data. The data are entered from the keyboard.

b) PRESS: CR

c) Go to Section 4.3

or

a) ENTER: 2 if you want to modify or list the data related to the channel geometry.

b) PRESS: CR

c) Go to Section 4.4

or

a) ENTER: 3 if you want to plot one or several cross-sections.

b) PRESS: CR

c) Go to Section 4.5

or

- a) ENTER: 4 if you want the tables of Area, Wetted Perimeter and Hydraulic Radius.
- b) PRESS: CR
- c) Go to Section 4.6

or

- a) ENTER: 5 if you want to access the curve calibration menu.
- b) PRESS: CR
- c) Go to Section 4.7

or

- a) ENTER: 6 if you want to estimate a flood.
- b) PRESS: CR
- c) Go to Section 4.8

or

- a) ENTER: 7 if you want to stop execution of the SAMFE.
- b) PRESS: CR
- c) Go to Section 4.9 (to turn the machine off).

4.3 Data Entry Program: SLOPAREA

4.3.1 Object of Program

This program allows the user to enter cross-section and channel data from terminal to storage in virtual files on "SAMFE DATA" diskette. It is also used to edit these data.

4.3.2 User Instructions

1. When "ENTER THE STATION NUMBER" is displayed:
 - a) ENTER: the station number (1 to 7 characters. eg: 08NL001)
 - b) PRESS: CR

2. When the following prompt is displayed:
THIS PROGRAM IS USED TO ENTER OR EDIT DATA RELATED TO THE
CHANNEL GEOMETRY. DO YOU WANT TO RETURN TO THE MAIN MENU
IMMEDIATELY (Y/N)?

- a) ENTER: Y if you do not want to enter or edit data.
- b) PRESS: CR
- c) Go to section 4.2, instruction step 3.

or

- a) ENTER: N if you want to enter or edit data.
- b) PRESS: CR

3. When "ENTER NAME OF STATION" is displayed:

- a) ENTER: Name of the station (< = 72 characters)
eg: Chilliwack River at Vedder Crossing
- b) PRESS: CR

4. When "ENTER TITLE FOR OUTPUT" is displayed:

- a) ENTER: Any title to appear on output like: time span of
measurement, distinctive characteristic of the
current run of the program, date of the run etc.
(< = 72 characters)
- b) PRESS: CR

5. When "ARE DATA IN METRIC OR IMPERIAL SYSTEM OF UNITS
(M/I)?" is displayed:

- a) ENTER: M if data are in metric (metres, cms, etc.)
- b) PRESS: CR

or

- a) ENTER: I if data are in imperial (feet, cfs, etc.)
- b) PRESS: CR

NOTE: All the data must be in the same unit system.

6. When "ENTER MAXIMUM ELEVATION FOR MAXIMUM FLOOD" is
displayed:

- a) ENTER: The elevation at upstream gauge corresponding to the flood to estimate. This will be the maximum limit for computation of the tables and the rating curve.
- b) PRESS: CR

NOTE: When the maximum elevation is above the highest point of a cross-section as defined by the user, the program will extend the cross-section to that elevation using the slope between the two highest points of each bank. Therefore the user must pay attention to the "flood channel" when defining the cross-sections.

- 7. When "ENTER FRACTION OF METRE OR FOOT FOR INCREMENT OF ELEVATION" is displayed:

- a) ENTER: A fraction >0 and <1 (eg. 0.2)
- b) PRESS: CR

NOTE: This fraction of metre or foot will be used as an increment of elevation for computation of the tables of geometric parameters from which values are interpolated. Therefore this increment must be small enough for the tables to provide 3 significant figures by interpolation. Important: The fraction must be $>$ Maximum depth divided by 50.

- 8. When "ENTER LENGTH OF REACH" is displayed:

- a) ENTER: The length between the upstream cross-section and the downstream cross-section. Only metres or feet units can be used; (eg. 55.4).
- b) PRESS: CR

- 9. When "ENTER NUMBER OF CROSS-SECTIONS (2 to 5)" is displayed:

- a) ENTER: The number of cross-sections that you will enter to define the geometry of the reach. This number must

be between 2 and 5 and includes the upstream and downstream cross-sections.

10. When the following instructions are displayed:
SPECIFY THE KIND OF DATA FOR THE CURRENT CROSS-SECTION
FOR DISTANCE-DEPTH SETS, ENTER 1
FOR DISTANCE-ELEVATION SETS, ENTER . . 2

- a) ENTER: 1 if the current cross-section is defined with distance-depth sets. This is usually the case for a cross-section taken during a standard discharge measurement.
- b) PRESS: CR
- c) Go to instruction step 11 of this section.

or

- a) ENTER: 2 if the cross-section is defined with distance-elevation sets. This is the case for a cross-section measured with a rod.
- b) PRESS: CR
- c) Go to instruction step 13 of this section.

11. When "ENTER WATER SURFACE ELEVATION AT CROSS-SECTION ..." is displayed:

- a) ENTER: The water surface elevation at the present cross-section. When the actual cross-section is at the inlet of a recorder, the recorded gauge height can be used.
- b) PRESS: CR

12. When the following instructions are displayed:
ENTER SET OF DISTANCE-DEPTH AND PRESS RETURN KEY FOR EACH VERTICAL OF CROSS-SECTION... AFTER THE LAST VERTICAL, ENTER: 99,99

- a) ENTER: Distance and depth separated by a comma (e.g.: 12.5, 2.63)

- b) PRESS: CR
- c) Go to a) for the next vertical

or

- c) ENTER: 99,99 after the last vertical.
- d) PRESS: CR
- e) Go to instruction step 14.

NOTE: You cannot enter more than 40 verticals for a cross-section. But if there is more than 40 verticals, you have to eliminate some by averaging the depth of the bottom of the river as in the following example.

<u>ORIGINAL</u>		<u>MODIFIED</u>	
eg. DISTANCE	DEPTH	DISTANCE	DEPTHS
2	5	2	5
4	3.2	4	3.2
6	2.41	6	2.415
8	2.42	12	2.415
10	2.41	14	5
12	2.42		
14	5		

13. When the following instructions are displayed:

ENTER SET OF DISTANCE-ELEVATION AND PRESS RETURN KEY FOR EACH VERTICAL OR SECTION ... WHEN ALL VERTICALS OF SECTION ARE ENTERED, ENTER 99,99

- a) ENTER: Distance and elevation separated by a comma (eg. 15.3, 4.25).
- b) PRESS: CR
- c) Go to a) for next vertical

or

- c) ENTER: 99,99 after the last vertical
- d) PRESS: CR

NOTE: You cannot enter more than 40 verticals for a station. To overcome this limitation see NOTE in instruction step 12.

SECTION-NUMBER 1
WATER SURFACE ELEVATION AT SECTION 1 4.5

RECORD #	DISTANCE	DEPTH
1	1.00	0.000
2	2.00	3.000
3	3.00	4.500
4	4.00	5.000
5	5.00	5.200
6	6.00	5.100
7	7.00	4.000
8	8.00	0.000

SECTION-NUMBER 2
WATER SURFACE ELEVATION AT SECTION 2 0

RECORD #	DISTANCE	DEPTH
1	1.00	0.000
2	2.00	3.500
3	3.00	4.900
4	4.00	5.000
5	5.50	4.150
6	7.00	1.500
7	9.20	0.000

4.4 Data Editor Program: SLOPAREA

4.4.1 Object of Program

This part of the program SLOPAREA allows the user to correct or add titles, cross-section or other channel geometry data.

4.4.2 User Instructions

1. When "DO YOU WANT TO MODIFY THE DATA (Y/N)? is displayed:
 - a) ENTER: Y or y if you want to correct or add data. You can delete a vertical in a section, or you can delete the 3rd, 4th, or 5th section by diminishing

the number of cross-sections. See instruction step 2.

- b) PRESS: CR
- c) Go to instruction step 2.

or

- a) ENTER: N or n if you don't want to correct or add data.
- b) PRESS: CR
- c) Go to instruction step 4 of this section.

2. When the following text is displayed:

WHICH PART DO YOU WANT TO CHANGE? ENTER A NUMBER (1 TO 10) ENTER '0' TO EXIT FROM MODIFICATIONS

- 1 NAME OF STATION
- 2 TITLE OF CURRENT RUN
- 3 TYPE OF DATA
- 4 INCREMENT OF ELEVATION
- 5 MAXIMUM ELEVATION
- 6 LENGTH OF REACH
- 7 NUMBER OF SECTIONS
- 8 WATER SURFACE ELEVATION AT A SECTION
- 9 DISTANCE-DEPTH OR DISTANCE-ELEVATION RECORD(S)
- 10 DELETE A VERTICAL

- a) ENTER: 0 if you have no modification to do.
- b) PRESS: CR
- c) Go to instruction step 3 of this section.

or

- a) ENTER: 1 if you want to modify the name of the station.
- b) PRESS: CR
- c) When "ENTER REVISED NAME OF STATION" is displayed:
ENTER: Name of station.
PRESS: CR

- d) Go to the beginning of instruction step 2 of this section.

or

- a) ENTER: 2 if you want to modify the subtitle.
- b) PRESS: CR
- c) When "ENTER REVISED TITLE" is displayed:
ENTER: corrected subtitle (< = 72 characters).
PRESS: CR
- d) Go to the beginning of instruction step 2 of this section.

or

- a) ENTER: 3 if you want to specify a different type of data.
- b) PRESS: CR
- c) When "ENTER REVISED TYPE OF DATA: 1 for METRIC or 0 for IMPERIAL" is displayed:
ENTER: the correct type of data (1 or 0).
PRESS: CR
- d) Go to the beginning of instruction step 2 of this section.

or

- a) ENTER: 4 if you want to modify the increment of elevation.
- b) PRESS: CR
- c) When "ENTER REVISED INCREMENT OF ELEVATION" is displayed:
ENTER: the modified increment of elevation (> 50/maximum depth).
PRESS: CR
- d) Go to the beginning of instruction step 2 of this section.

or

- a) ENTER: 5 if you want to modify the maximum elevation.
- b) PRESS: CR
- c) When "ENTER REVISED MAXIMUM ELEVATION" is displayed:
ENTER: the modified maximum elevation.
PRESS: CR
- d) Go to the beginning of instruction step 2 of this section.

or

- a) ENTER: 6 if you want to modify length of reach.
- b) PRESS: CR
- c) When "ENTER REVISED LENGTH OF REACH" is displayed:
ENTER: the revised length of reach.
PRESS: CR

d) Go to the beginning of instruction step 2 of this section.

or

a) ENTER: 7 if you want to modify the number of sections. It may be used to delete the last cross-section but not the second or the first, by entering a smaller value.

b) PRESS: CR

c) When "ENTER REVISED NUMBER OF SECTIONS" is displayed:
ENTER: the revised number of sections (2, 3, 4 or 5).
PRESS: CR

d) Go to the beginning of instruction step 2 of this section.

or

a) ENTER: 8 if you want to modify the water surface elevation at a section.

b) PRESS: CR

c) When "ENTER SECTION NUMBER OF WATER SURFACE ELEVATION" is displayed:
ENTER: Section No. and water surface elevation separated by a comma.

PRESS: CR

d) Go to the beginning of instruction step 2 of this section.

or

a) ENTER: 9 if you want to modify or add some distance-depth or some distance-elevation sets of a section.

b) PRESS: CR

c) When "ENTER SECTION NUMBER" is displayed:
ENTER: Number of the section to modify (1, 2, 3, 4 or 5).
PRESS: CR

d) When "ENTER NUMBER OF SETS TO ADD OR TO CORRECT" is displayed:
ENTER: the number of sets to add or to modify.
PRESS: CR

e) When "FOR DISTANCE-DEPTH SETS, ENTER 1
FOR DISTANCE-ELEVATION SETS, ENTER . . 2"
is displayed:

- i. ENTER: 1 if your data are in distance-depth sets.
- ii. PRESS: CR
- iii. When "ENTER THE SET-NUMBER OF THE SET TO ADD OR TO CORRECT" is displayed:
ENTER: the number corresponding to the set of distance-depth to change or to add.
PRESS: CR
- iv. When "ENTER SET OF DISTANCE-DEPTH" is displayed:
ENTER: the corrected distance and depth separated by a comma.
PRESS: CR

or

- i. ENTER: 2 if your data are in distance-elevation sets.
- ii. PRESS: CR
- iii. When "ENTER THE SET-NUMBER OF THE SET TO ADD OR TO CORRECT" is displayed:
ENTER: the number corresponding to the set of distance-elevation to change or to add.
PRESS: CR
- iv. When "ENTER SET OF DISTANCE-ELEVATION" is displayed:
ENTER: the corrected distance and elevation separated by a comma.
PRESS: CR

or

- f) Go to the beginning of instruction step 2 of this section.
- a) ENTER: 10 if you want to delete a vertical
 - b) PRESS: CR
 - c) When "ENTER SECTION NUMBER AND SET NUMBER OF VERTICAL TO DELETE" is displayed:
ENTER: Section number of the cross-section to modify and the number of the vertical to delete separated by a comma.
PRESS: CR
 - d) Go to the beginning of instruction step 2 of this section.

3. When the following instructions are displayed:

IF NO LISTING OF DATA IS WANTED ENTER: 0
TO LIST DATA ENTERED OR CORRECTED ENTER: 1
TO PRINT DATA ENTERED OR CORRECTED ENTER: 2

- a) ENTER: 0 if no listing of the titles and the geometry data is wanted.
- b) PRESS: CR
- c) Go to instruction step 1 of this section

or

- a) ENTER: 1 if you want the titles and the geometry data displayed on your screen.
- b) PRESS: CR
- c) Go to instruction step 1 of this section (see example of output at section 4.3 instruction step 15).

or

- a) ENTER: 2 if you want the titles and geometry data printed on hard copies.
- b) PRESS: CR
- c) Go to instruction step 1 of this section (an example of listing is given at section 4.3 instruction step 15).

4. When the following instructions are displayed:

TO SAVE THE CORRECTIONS AND COMPUTE A, WP AND R, ENTER . 1
TO SAVE NEW VALUES AND RETURN TO MAIN MENU, ENTER . . . 2
TO RETURN TO MAIN MENU WITHOUT SAVING VALUES, ENTER . . 3

- a) ENTER: 1 if you want to save the latest data set entered and compute the tables for area "A", wetted perimeter "WP" and hydraulic radius "R".
- b) PRESS: CR
- c) Go to section 4.2.2 instruction step 3.

or

- a) ENTER: 2 if you want to save the latest data set entered and return to the main menu. This option is used

to save modifications in name of station, or length of reach without recomputing the tables for A, WP and R which are not affected by these changes.

- b) PRESS: CR
- c) Go to section 4.2.2 instruction step 3.

or

- a) ENTER: 3 this causes the program to return to the main menu without saving the latest data set entered. If it is a new station, this option causes the loss of all the data entered for that station.
- b) PRESS: CR
- c) Go to section 4.2.2 instruction step 3.

4.5 Program for Plotting Cross-Sections: PLOTSEC

4.5.1 Object of Program

This program produces a plot of any cross-section entered in a virtual file with the help of the program SLOPAREA. The user can choose to transform the units, introduce his/her own scale limits, reverse the plot from bank to bank, enter a name for the section and get a hard copy.

4.5.2 User Instructions

1. When "ENTER THE STATION NUMBER" is displayed:
 - a) ENTER: the station number (1 to 7 characters eg: 08NL001).
 - b) PRESS: CR

2. When "ENTER THE SECTION NUMBER" is displayed:
 - a) ENTER: the number (1 to 5) of the section to be plotted.
Note that the number increases from upstream to downstream.
 - b) PRESS: CR

3. When "ENTER NAME OF THE SECTION" is displayed:
 - a) ENTER: the name of the section eg: recorder, cableway or IP-20.
 - b) PRESS: CR

4. When "ENTER DATE OF CROSS-SECTION MEASUREMENT" is displayed:
 - a) ENTER: the date appearing on the field notes which contain the data.
 - b) PRESS: CR

5. When the following instructions are displayed:
TO KEEP THE SAME UNITS, ENTER 0
TO CONVERT DATA FROM IMPERIAL TO METRIC ENTER 1
TO CONVERT DATA FROM METRIC TO IMPERIAL ENTER 2
 - a) ENTER: 0 if you want to change the units of the data.
 - b) PRESS: CR
 - c) Go to instruction step 6 of this section.

or

 - a) ENTER: 1 if your data are in imperial units and you want to convert them into metric units.
 - b) PRESS: CR
 - c) Go to instruction step 6 of this section.

or

 - a) ENTER: 2 if your data are in metric units and you want to convert them into imperial units.
 - b) PRESS: CR

6. When "DO YOU WANT TO ENTER YOUR SCALE LIMITS (Y/N)?" is displayed:
 - a) ENTER: Y if you want to enter from terminal the scale limits for x and y axis of the plot.
 - b) PRESS: CR
 - c) Go to instruction step 7 of this section.

or

- a) ENTER: N if you want the scale limits to be determined by the program.
- b) PRESS: CR
- c) Go to instruction step 9 of this section.

7. When "ENTER XMIN AND XMAX" is displayed:

- a) ENTER: The scale limits for the distance across the river.
- b) PRESS: CR

8. When "ENTER YMIN AND YMAX" is displayed:

- a) ENTER: The scale limits for the elevation of the river bottom.
- b) PRESS: CR

9. When "DO YOU WANT TO REVERSE THE SECTION FROM BANK TO BANK (Y/N)?" is displayed:

- a) ENTER: Y if the cross-section has been measured from right to left.*
- b) PRESS: CR

or

- a) ENTER: N if the cross-section was measured from left to right.*
- b) PRESS: CR

NOTE: Right and left bank sides are determined by facing downstream.

10. When "DO YOU WANT A HARD COPY OF THE CROSS-SECTION (Y/N)?" is displayed:

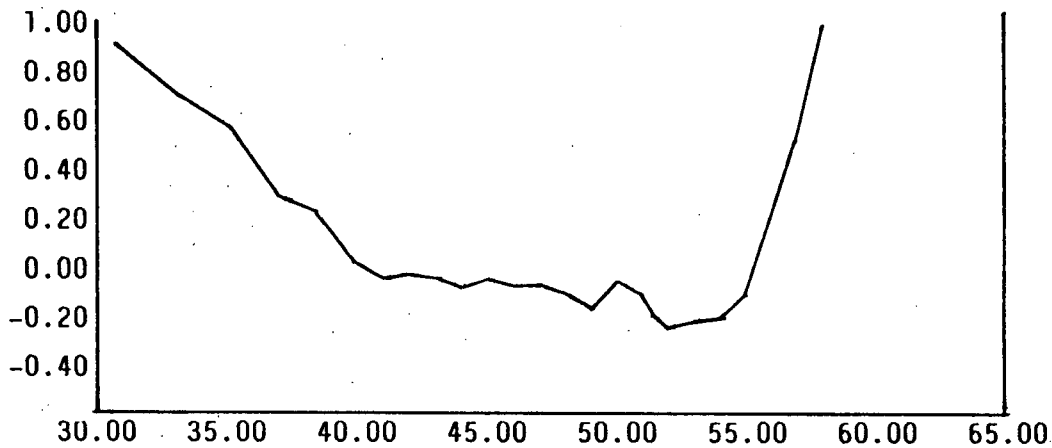
- a) ENTER: Y if you want the plot of the cross-section to be printed on hard copier. A listing of the data will also be printed. (See example on page 20.)
- b) PRESS: CR

or

LISTING OF DATA FOR CROSS-SECTION AT RECORDER.

DISTANCE	ELEVATION
30.50	0.91
33.00	0.69
35.00	0.57
37.00	0.29
38.50	0.23
40.00	0.03
41.00	-0.05
42.00	-0.03
43.00	-0.05
44.00	-0.09
45.00	-0.05
46.00	-0.09
47.00	-0.09
48.00	-0.11
49.00	-0.17
50.00	-0.07
51.00	-0.11
51.50	-0.19
52.00	-0.27
53.00	-0.23
54.00	-0.21
55.00	-0.11
56.00	0.39
57.00	0.51
58.00	0.91

CROSS-SECTION AT RECORDER ON MARCH 21, 1984



- a) ENTER: N to view the plot on the screen without printing it. This allows the user to view the different options for his plot before having it printed.
- b) PRESS: CR

11. When the following instructions are displayed:

- TO PLOT THE SAME CROSS-SECTION AGAIN, ENTER 1
- TO PLOT ANOTHER CROSS-SECTION AT THE SAME STATION, ENTER 2
- TO PLOT A CROSS-SECTION AT ANOTHER STATION, ENTER . . . 3
- TO RETURN TO THE MAIN MENU, ENTER 4
- TO QUIT THE PROGRAM, ENTER 5

- a) ENTER: 1 if you want to plot the same cross-section. This enables you to modify some options on the last plot.
- b) PRESS: CR
- c) Go to instruction step 5 of this section.

or

- a) ENTER: 2 if you want to plot another cross-section of the same reach.
- b) PRESS: CR
- c) Go to instruction step 2 of this section.

or

- a) ENTER: 3 if you want to plot a cross-section of another reach. This option can be used when another set of data has been entered under a different station number, or for comparison with another station.
- b) PRESS: CR
- c) Go to instruction step 1 of this section.

or

- a) ENTER: 4 if you want to return to the main menu of SAMFE.
- b) PRESS: CR
- c) Go to section 4.2.2 instruction step 3.

or

- a) ENTER: 5 if you want to quit SAMFE.
- b) PRESS: CR

- c) The application stops. To run SAMFE again go to section 4.2.2 instruction step 2. To turn off the machine go to section 4.9.

4.6 Program for Computation of Geometric Tables: SLOPEC

4.6.1 Object of Program

This program computes the area "A", the wetted perimeter "WP" and the hydraulic radius "R" vs. elevation of water in the channel.

4.6.2 User Instructions

When "DO YOU WANT A HARD COPY OF THE TABLE FOR THE AREA, THE WETTED PERIMETER AND THE HYDRAULIC RADIUS-(Y/N)?"

- a) ENTER: Y if you want an output of the table on the hardcopier.
- b) PRESS: CR
- c) Go to section 4.2.2 instruction step 3.

or

- a) ENTER: N if you don't want an output of the table.
- b) PRESS: CR
- c) Go to section 4.2.2 instruction step 3.

4.7 Curve Calibration Menu: SLOPRMEN

4.7.1 Object of Program

This program allows users to access the programs related to the computation of the rating curve for conveyance factor.

4.7.2 User Instructions

1. When the following instructions are displayed:
 - INPUT NEW MEASUREMENTS 1
 - CORRECT OR ADD MEASUREMENTS 2
 - COMPUTE CONVEYANCE, MANNING COEFFICIENT AND
FRICTION SLOPE 3

COMPUTE CALIBRATION CURVE FOR CONVEYANCE "K".

AS GIVEN IN TABLE 4
COMPUTE CALIBRATION CURVE FOR DISCHARGE "Q". 5
RETURN TO MAIN MENU 6
TERMINATE THE CURRENT SESSION 7

Enter a number (1 to 7)

- a) ENTER: 1 if you want to enter new flow measurement data.
These measurements will be used to compute Manning's coefficient, energy slope and conveyance factor.
- b) PRESS: CR
- c) Go to section 4.7.3.

or

- a) ENTER: 2 if you want to modify or list the data related to the flow measurements.
- b) PRESS: CR
- c) Go to section 4.7.4.

or

- a) ENTER: 3 if you want to compute conveyance, Manning's coefficient and friction slope according to flow measurements entered.
- b) PRESS: CR
- c) Go to section 4.7.5.

or

- a) ENTER: 4 if you want to compute the conveyance calibration curve, using conveyance values computed from flow measurements.
- b) PRESS: CR
- c) Go to section 4.7.6.

or

- a) ENTER: 5 if you want to compute the discharge calibration curve, using the flow measurements. This option corresponds to a standard H-Q curve calibration method and is used for comparison.

- b) PRESS: CR
- c) Go to section 4.7.6.

or

- a) ENTER: 6 if you want to return to the main menu of SAMFE.
- b) PRESS: CR
- c) Go to section 4.2.2 instruction step 3.

or

- a) ENTER: 7 if you want to quit SAMFE.
- b) PRESS: CR
- c) The application stops and the prompt "READY" is displayed. To run SAMFE again go to section 4.2.2. To turn the machine off go to section 4.9.

4.7.3 Program to Input Flow Measurement Data: SLOPROFI

4.7.3.1 Object of Program

This program allows users to enter the flow measurement data from terminal. It also contains a routine to edit these data. For data modification see section 4.7.4.

4.7.3.2 User Instructions

1. When "DO YOU WANT A HARDCOPY OF THE OUTPUT (Y/N)?" is displayed:

- a) ENTER: Y if you want a copy of all the outputs on the printer.
- b) PRESS: CR
- c) Go to instruction step 2 of this section

or

- a) ENTER: N then the outputs will be displayed on terminal screen if wanted.
- b) PRESS: CR

2. When "ENTER MAXIMUM NUMBER OF SECTIONS FOR WATER SURFACE PROFILE" is displayed:

- a) ENTER: the maximum number of sections where the water surface elevation was taken for the flow measurement. The method needs a minimum of 2 water surface elevation for each measurement and the program can take up to 5 of them.

NOTE: This option is used to eliminate the last, the two last or the three last cross-sections previously entered (see section 4.3.2 instruction step 10 to 13).

- b) PRESS: CR

- 3. When "ENTER DISTANCE BETWEEN SECTION 1 AND SECTION 2" is displayed:

- a) ENTER: the distance between the two sections indicated.
- b) PRESS: CR
- c) The program will ask for the following distance (see step 2) or, when all distances are entered the program will go to step 4.

- 4. When "ENTER NUMBER OF FLOW MEASUREMENTS" is displayed:

- a) ENTER: the number of flow measurements available for the current study. The program is limited to 20 measurements. The value of the model increases with that number.

- b) PRESS: CR

- 5. When "ENTER COMPUTED FLOWRATE FOR MEASUREMENT 1" is displayed:

- a) ENTER: the value of the flowrate in cms or cfs depending on the unit chosen.

- b) PRESS: CR

- c) When "ENTER SETS OF SECTION-NUMBER AND ELEVATION OF WATER SURFACE FOR MEASUREMENT 1, ENTER 9, 9 WHEN YOUR FINISHED"

- i. ENTER: section number and elevation of water separated by a comma, eg. 1, 4.554

- ii. PRESS: CR

Then the program asks for the next set (step 5c.). When

9, 9 is entered the program asks for the next flowrate (step 4) until all the measurements are entered.

6. When "DO YOU WANT A LISTING OF MEASUREMENTS DATA (Y/N)?" is displayed:

a) ENTER: Y then the measurement data are displayed on screen or printed on hardcopier depending on the option chosen at instruction step 1; of this section.

b) PRESS: CR

The following is an example of listing of measurement data.

LIST OF MEASUREMENTS AT STATION 08NLO24

DISCHARGE AND PROFILE TABLE					
MEASUREMENT#	DISCHARGE	SECTION			NUMBER
		1	2	3	4
1	77.60	1.616	0.713		
2	41.20	1.102	0.352		
3	127.00	2.006	0.871		
4	170.00	2.270	1.078		
5	96.90	1.902	0.936		
6	15.90	0.966	0.344		

LENGTH BETWEEN SECTION # 1 AND SECTION # 2 = 282

7. When "DO YOU WANT TO MODIFY THE MEASUREMENTS DATA (Y/N)?" is displayed:

a) ENTER: Y to correct, add or delete a measurement, or to correct a distance between two sections.

b) PRESS: CR

c) Go to section 4.7.4

i. ENTER: N when you are finished with modifications.

ii. PRESS: CR.

8. When "DO YOU WANT TO SAVE THE DATA (Y/N)?" is displayed:
 - a) ENTER: Y to transfer the data in a file on diskette 2.
Then they can be used or modified later on.
 - b) PRESS: CR
 - a) ENTER: N if you want to delete all the measurement data.
This option may be used when it is faster to re-enter the data than correcting them.
 - b) PRESS: CR
 - c) Go to section 4.7.

4.7.4 Program to Modify Flow Measurement Data: SLOPROFI

4.7.4.1 Object of Program

This part of the program SLOPROFI allows the user to correct, add or delete flow measurement data and to correct the distance(s) between sections.

4.7.4.2 User Instructions

1. When "DO YOU WANT A HARDCOPY OF THE MEASUREMENTS (Y/N)?" is displayed:
 - a) ENTER: Y if you want a copy of all the outputs on the printer.
 - b) PRESS: CR
 - c) Go to instruction step 2 of this section. See the example of measurement listing at instruction step 6 of section 4.7.3.2.

or

- a) ENTER: N then the outputs will be displayed on terminal screen if wanted.
 - b) PRESS: CR
 - c) See the following example of listing of measurements, at instruction step 6 of section 4.7.3.2.
2. When the following instructions are displayed:
LENGTH BETWEEN TWO SECTIONS 1

DISCHARGE 2
WATER SURFACE ELEVATION 3
ADD A MEASUREMENT 4
DELETE A MEASUREMENT 5

ENTER THE OPTION NUMBER: (0 to 5)

ENTER 0 IF NO MORE MODIFICATIONS ARE WANTED

- a) ENTER: 0 if you have finished your modifications.
- b) PRESS: CR
- c) Go to section 4.7.3.2 instruction step 6.

or

- a) ENTER: 1 to modify the distance between two sections.
- b) PRESS: CR
- c) When "ENTER THE NUMBER OF THE UPSTREAM SECTION AND THE DISTANCE TO THE FOLLOWING SECTION, eg: 2, 107.4" is displayed:
 - i) ENTER: the upstream section number of the subreach, and the length of the subreach separated by a comma.
 - ii) PRESS: CR
 - iii) Go to the beginning of instruction step 1 of this section.

or

- a) ENTER: 2 to modify flowrate.
- b) PRESS: CR
- c) When "ENTER THE MEASUREMENT NUMBER AND THE FLOWRATE" is displayed:
 - i) ENTER: measurement number (1 to n) and flowrate to correct a measurement.
 - ii) PRESS: CR
 - iii) Go to instruction step 1 of this section.

or

- a) ENTER: 3 to modify the water surface elevation at a section for a given measurement.
- b) PRESS: CR
- c) When "ENTER MEASUREMENT NUMBER" is displayed:

- d) ENTER: the measurement number: 1 to n. Where " " is the actual number of measurement entered.
- e) PRESS: CR
- f) When "ENTER SECTION NUMBER AND WATER SURFACE ELEVATION" is displayed:
- g) ENTER: section number and the elevation of water at that section.
- h) Go to instruction step 1 of this section.

or

- a) ENTER: 4 to add a measurement.
- b) PRESS: CR
- c) When "ENTER THE DISCHARGE FOR MEASUREMENT # n+1 * " is displayed:
 - i) ENTER: Flowrate of new measurement.
 - ii) PRESS: CR
- d) When the following instructions are displayed:
ENTER THE WATER SURFACE PROFILE OF MEASUREMENT # n+1
ENTER SECTION-NUMBER AND WATER SURFACE ELEVATION
 - i) ENTER: Section number and corresponding elevation separated by a comma.
 - ii) PRESS: CR
 - iii) Go to i). Steps i) and ii) are repeated until the surface elevations are entered for all the sections.
- e) Go to beginning instruction step 1 of this section.

*NOTE: "n+1" is the number of measurements Plus 1.

or

- a) ENTER: 5 if you want to delete a measurement.
- b) PRESS: CR
- c) When "ENTER THE NUMBER OF THE MEASUREMENT TO DELETE", is displayed:
- d) ENTER: the number corresponding to the measurement that you want to delete: 1 to n where n is the total number of measurements existing in the file.
- e) PRESS: CR
- f) Go to instruction step 1 of this section.

4.7.5 Computation of Conveyance, Manning's Coefficient, and Friction

Slope: SLOPMANN

4.7.5.1 Object of the Program

This program computes Manning's coefficient, friction slope and conveyance factor according to the given flow measurements and the given geometry of the reach.

4.7.5.2 User Instructions

1. When "DO YOU WANT A HARDCOPY OF THE OUTPUT (Y/N)?" is displayed:

- a) ENTER: Y if you want a copy of all the outputs on the printer.
- b) PRESS: CR
- c) Go to instruction step 2.

or

a) ENTER: N then the outputs will be displayed on terminal screen if wanted.

b) PRESS: CR

2. The program gives a table of Manning's coefficients computed according to two different methods identified by "WRB" and "USGS", for each given measurement eg.

TITLE OF THE STUDY: TULAMMEN STUDY
NAME OF STATIONS: TULAMEEN RIVER AT PRINCETON

MEASUREMT	WRB	USGS	CHEZY
1	0.0655	0.0651	17.2929
2	0.0754	0.0751	15.2378
3	0.0783	0.0780	14.7715
4	0.0898	0.0892	12.9777
5	0.0889	0.0882	13.1894
<hr/>			
AVERAGE	0.0796	0.0791	14.6939

When the following instructions are displayed:

FOR COMPUTATION OF CONVEYANCE FACTOR "K",

SELECT ONE OF THE FOLLOWING OPTIONS:

- USE 'n' COMPUTED FROM WRB EQUATION 1
- USE 'n' COMPUTED FROM USGS EQUATION 2
- USE AVERAGE OF 'n' COMPUTED FROM WRB EQUATION 3
- USE AVERAGE OF 'n' COMPUTED FROM USGS EQUATION 4
- USE A VALUE OF 'n' ENTERED FROM THE TERMINAL 5

- a) ENTER: 1 if you want to compute "K" using "n" computed from WRB equation.
- b) PRESS: CR
- c) Go to instruction step 3 of this section.

or

- a) ENTER: 2 if you want to compute K using "n" computed from USGS equation.
- b) PRESS: CR
- c) Go to instruction step 3 of this section.

or

- a) ENTER: 3 if you want to compute K using the average "n" computed from WRW equation, of all the given measurements. This option is useful when the plot of "n" vs. "elevation of water" is too scattered.
- b) PRESS: CR
- c) Go to instruction step 3 of this section.

or

- a) ENTER: 4 if you want to compute K using the average "n" computed from USGS equation, of all the given measurements. This option is useful when the plot of "n" vs. "elevation of water" is too scattered to determine any curve.
- b) PRESS: CR
- c) Go to instruction step 3 of this section.

or

a) ENTER: 5 if you want to enter a value of "n" from the terminal. The user can determine Manning's coefficient, using handbooks or studies of the specific reach.

b) PRESS: CR

c) Go to instruction step 3 of this section.

3. Then the tables of results are displayed on screen or on printer depending on the choice made at section 4.7.2 instruction step 2. The following tables are an example of the output:

TABLE OF REACH HYDRAULIC PARAMETERS FOR EACH MEASUREMENT

MEAS NO	UPSTREAM ELEV	DOWNSTREAM ELEV	AVE SLOPE	FRICTION SLOPE	MANNING COEF	CONVEYANCE (CMS)
1	1.616	0.713	0.0032	0.00307	0.0339	1401.05
2	1.102	0.352	0.0027	0.00262	0.0314	804.18
3	2.006	0.871	0.0040	0.00345	0.0300	2161.04
4	2.270	1.078	0.0042	0.00347	0.0284	2884.71
5	1.902	0.936	0.0034	0.00326	0.0374	1697.87
6	0.966	0.344	0.0022	0.00222	0.0661	337.15

TABLE OF REACH AVERAGE GEOMETRY PARAMETERS

MEASUREMENT NUMBER	ELEVATION	AREA	WETTED PERIMETER	HYDRAULIC RADIUS
1	1.165	43.04	37.19	1.1574
2	0.727	28.06	32.83	0.8550
3	1.438	53.37	39.89	1.3378
4	1.674	62.83	42.23	1.4878
5	1.419	52.60	39.69	1.3253
6	0.655	25.77	32.02	0.8049

When "DO YOU WANT TO SAVE THE TABLE OF HYDRAULIC PARAMETERS (Y/N)?" is displayed:

- a) ENTER: Y if you want to store the table of conveyance, Manning's coefficient, friction slope and surface slope in a file. This option must be chosen if you want to compute the calibration curve for the latest values of conveyance computed. Any previous values will be deleted and replaced by the new ones.
- b) PRESS: CR
- c) Go to instruction step 4 of this section.

or

- a) ENTER N if you don't want to keep these values in storage on a file. Then if a conveyance calibration curve is wanted, it will be computed from the previously stored values of conveyance.
- b) PRESS: CR
- c) Go to instruction step 4 of this section. Note that option 1 will not be available.

4. When the following instructions are displayed:

FOR COMPUTATION OF CONVEYANCE CURVE, ENTER 1
FOR COMPUTATION OF "K" WITH DIFFERENT 'n' VALUE, ENTER . 2
TO RETURN TO THE CALIBRATION MENU, ENTER 3
TO RETURN TO THE MAIN MENU, ENTER 4
TO QUIT THE APPLICATION, ENTER 5

- a) ENTER: 1 if you want to get a calibration curve for the last conveyance values computed. Then, this calibration curve will enable you to estimate a flood discharge, (see section 4.8).
- b) PRESS: CR
- c) When the following instructions are displayed:

- UPSTREAM SECTION ELEVATION 1
- DOWNSTREAM SECTION ELEVATION 2
- OTHER SECTION'S ELEVATION 3
- REACH AVERAGE ELEVATION 4

i) ENTER: 1 if you want to use the upstream section elevation to calibrate the conveyance rating curve.

ii) PRESS: CR

iii) Go to section 4.7.6.2 instruction step 1.

or

i) ENTER: 2 if you want to use the downstream section elevation to calibrate the conveyance rating curve.

ii) PRESS: CR

iii) Go to section 4.7.6.2 instruction step 1.

or

i) ENTER: 3 if you want to use a middle section elevation to calibrate the conveyance rating curve.

ii) PRESS: CR

iii) When "ENTER SECTION NUMBER OF ELEVATION TO USE IN THE CALIBRATION OF THE CURVE" is displayed:

iv) ENTER: the number of the section that you want to use to calibrate the conveyance rating curve. This number must be between 1, for the upstream section, and the number of section, which is the downstream section's number. Therefore, this option can also be used to specify the upstream section or the downstream section. This option is recommended when the elevation at a specific section is more representative of the whole reach than the average elevation, because of its accuracy or the absence of control, backwater effect etc. at that section. See next option.

v) PRESS: CR

vi) Go to section 4.7.6.2 instruction step 1.

or

1) ENTER: 4 if you want to use the average water elevation of the whole reach. This option is specially recommended since the slope-area model considers the conveyance of the whole reach and not the conveyance at a specific section. See previous option.

ii) PRESS: CR

iii) Go to section 4.7.6.2 instruction step 1.

or

a) ENTER: 2 if you want to compute "K" with a different option of "n" value(s) (see instruction step 1 of this section).

b) PRESS: CR

c) Go to instruction step 1 of this section.

or

a) ENTER: 3 if you want to return to the calibration menu, (see section 4.7.2).

b) PRESS: CR

c) Go section 4.7.2.

or

a) ENTER: 4 if you want to return to the main menu of SAMFE, (see section 4.2.2 instruction step 3).

b) PRESS: CR

c) Go section 4.2.2 instruction step 3.

or

a) ENTER: 5 if you want to quit SAMFE. This option will put you back on PRO/BASIC environment.

b) PRESS: CR

c) Go section 4.9 to turn off the computer.

4.7.6 Curve Calibration Program: SLOPCURV

4.7.6.1 Object of the Program

This program fits a straight line on a log-log plot of

"elevation of water vs. conveyance" or "elevation of water vs. discharge". It also gives a rating table and 2 plots of the rating curve including the measurement points.

4.7.6.2 User Instructions

1. When "DO YOU WANT A HARDCOPY OF THE OUTPUT (Y/N)?" is displayed:

- a) ENTER: Y if you want a copy of all the outputs on the printer.
- b) PRESS: CR
- c) Go to instruction step 2 of this section.

or

- a) ENTER: N then the outputs will be displayed on terminal screen if wanted.
- b) PRESS: CR

2. When "DO YOU WANT THE RATING TABLE (Y/N)?" is displayed:

- a) ENTER: Y if you want to have the rating table displayed on screen or printed on hard copier depending on instruction step 1 of this section.
- b) PRESS: CR

The following is an example of rating table as printed on hard copier:

STAGE-CONVEYANCE RATING FOR LILLOOET RIVER NEAR PEMBERTON
 FOR PERIOD LARGE CROSS-SECTIONS

DERIVED EQUATION FOR CONVEYANCE: $K = 3195.91000 \cdot (G - 0.82350)^{1.550470}$

For Gauge Hit. of Zero Disch. = 0.82 M, Coefficient of Corr. = 1.00000
 Standard Error of Est. = 0.000 M

Gauge Height	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
METERS	CMS	CMS	CMS	CMS	CMS	CMS	CMS	CMS	CMS	CMS
0.9	59.4	71.9	85.1	99.2	114	130	146	163	180	198
1.0	217	236	256	277	298	320	342	364	388	411
1.1	435	460	485	511	537	563	590	618	646	674
1.2	703	732	762	792	822	853	884	915	947	980
1.3	1013	1046	1079	1113	1147	1182	1217	1252	1288	1324
1.4	1361	1397	1434	1472	1510	1548	1586	1625	1664	1704
1.5	1744	1784	1824	1865	1906	1947	1989	2031	2073	2116
1.6	2159	2202	2246	2290	2334	2378	2423	2468	2514	2559
1.7	2605	2651	2698	2745	2792	2839	2887	2935	2983	3031
1.8	3080	3129	3179	3228	3278	3328	3379	3429	3480	3531
1.9	3583	3635	3687	3739	3791	3844	3897	3951	4004	4058
2.0	4112	4166	4221	4276	4331	4386	4442	4497	4553	4610
2.1	4666	4723	4780	4837	4895	4953	5011	5069	5128	5186
2.2	5245	5304	5364	5424	5483	5544	5604	5665	5725	5786
2.3	5848	5909	5971	6033	6095	6158	6220	6283	6346	6410
2.4	6473	6537	6601	6665	6730	6794	6859	6924	6990	7055
2.5	7121	7187	7253	7319	7386	7453	7520	7587	7654	7722
2.6	7790	7858	7926	7995	8064	8133	8202	8271	8341	8410
2.7	8480	8551	8621	8692	8762	8833	8904	8976	9047	9119
2.8	9191	9263	9336	9408	9481	9554	9627	9701	9774	9848
2.9	9922	9996	10071	10145	10220	10295	10370	10446	10521	10597
3.0	10673	10749	10825	10902	10979	11055	11133	11210	11287	11365
3.1	11443	11521	11599	11677	11756	11835	11914	11993	12072	12152
3.2	12231	12311	12391	12472	12552	12633	12714	12795	12876	12957
3.3	13039	13120	13202	13284	13367	13449	13532	13614	13697	13781
3.4	13864	13947	14031	14115	14199	14283	14368	14452	14537	14622
3.5	14707	14792	14878	14964	15049	15135	15221	15308	15394	15481
3.6	15568	15655	15742	15829	15917	16005	16093	16181	16269	16357
3.7	16446	16534	16623	16712	16802	16891	16981	17070	17160	17250
3.8	17341	17431	17522	17612	17703	17794	17886	17977	18069	18160
3.9	18252	18344	18437	18529	18621	18714	18807	18900	18993	19087
4.0	19180	19274	19368	19462	19556	19650	19745	19840	19934	20029
4.1	20125	20220	20315	20411	20507	20603	20699	20795	20892	20988
4.2	21085	21182	21279	21376	21473	21571	21669	21766	21864	21963
4.3	22061	22159	22258	22357	22456	22555	22654	22753	22853	22953
4.4	23053	23153	23253	23353	23454	23554	23655	23756	23857	23958
4.5	24060	24161	24263	24365	24467	24569	24671	24774	24876	24979
4.6	25082	25185	25288	25391	25495	25599	25702	25806	25910	26015
4.7	26119	26224	26328	26433	26538	26643	26748	26854	26959	27065
4.8	27171	27277	27383	27490	27596	27703	27809	27916	28023	28130
4.9	28238	28345	28453	28561	28669	28777	28885	28993	29102	29210
5.0	29319	29428	29537	29646	29756	29865	29975	30084	30194	30304
5.1	30415	30525	30635	30746	30857	30968	31079	31190	31301	31413

- a) ENTER: N if you don't want the rating table
- b) PRESS: CR

3. When "DO YOU WANT THE PLOT OF RATING CURVE (Y/N)?" is displayed:

- a) ENTER: Y if you want to view on screen or to view screen and print on hard copier the plots of rating curve. The program will display 2 plots: the first on rectangular coordinates, the second on LOG-LOG coordinates.

b) PRESS: CR

c) When the rectangular plot is completely drawn:

- 1) PRESS: CR, to view the log-log plot.

or

- 1) PRESS: PRINT SCREEN, to obtain a hard copy of the plot.

- 11) PRESS: CR, to view the log-log plot.

d) When the log-log plot is complete

- 1) PRESS: CR, to return to the MAIN MENU

or

- 1) PRESS: PRINT SCREEN, to obtain a hard copy of the plot.

- 11) PRESS: CR, to return to the main menu

e) The following figures represent a rectangular plot and a log-log plot of the rating curve.

f) Go to section 4.2.2 instruction step 3.

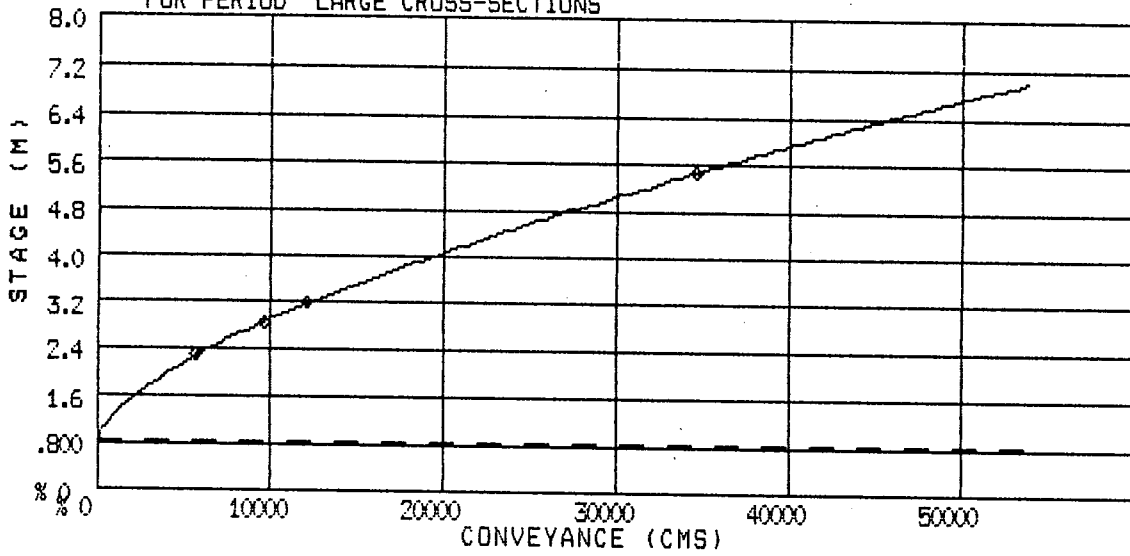
or

a) ENTER: N if you don't want to view or print the plots of the rating curve.

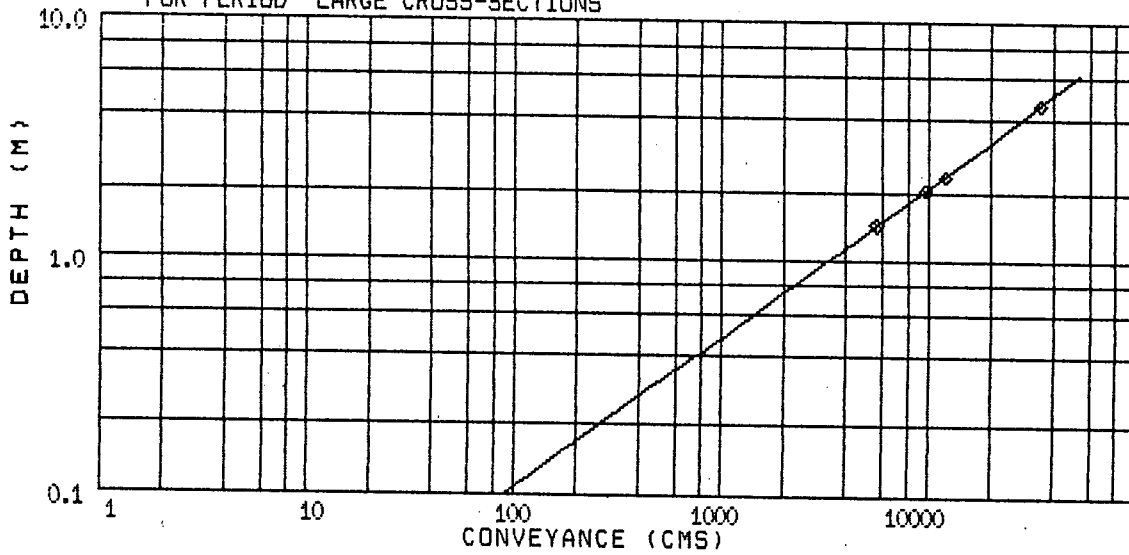
b) PRESS: CR

c) Go to section 4.2.2 instruction step 3.

STAGE-CONVEYANCE CURVE
 LILLOOET RIVER NEAR PEMBERTON
 FOR PERIOD LARGE CROSS-SECTIONS



STAGE-CONVEYANCE CURVE
 LILLOOET RIVER NEAR PEMBERTON
 FOR PERIOD LARGE CROSS-SECTIONS



4.8 Flood Estimation Program: SLOPESTI

4.8.1 Object of the Program

This program computes the estimated discharge according to a conveyance curve, a given surface profile and the given geometry of the reach. The conveyance rating curve is previously computed or it may be specified by the user.

4.8.2 User Instructions

1. When "DO YOU WANT TO ENTER THE CURVE PARAMETERS FROM TERMINAL (Y/N)?" is displayed:

a) ENTER: Y if you want to enter the three parameters of the rating curve from your terminal. The parameters CONS, AF and SLOP must be defined as in the following rating curve equation:

$$K = \text{CONS} (H - \text{AF})^{\text{SLOP}}$$

b) PRESS: CR

c) When ENTER CONS, AF AND SLOP" is displayed:

d) ENTER: The values of CONS, AF and SLOP separated by a comma. These values must correspond to the equation presented in "a".

e) PRESS: CR

f) Go to instruction step 2 of this section.

or

a) ENTER: N if you want to use the three parameters CONS, AF and SLOP as computed by the program SLOPCURV from the conveyance values.

e) PRESS: CR

2. When the following instructions are displayed:

ENTER SECTION-NUMBER AND ELEVATION OF WATER (Eg.: 2,102.0)
WHEN FINISHED ENTER -1, -1

a) ENTER: section number and elevation of water separated by a comma. Start with the upstream section (#1).

- b) PRESS: CR
 - c) Repeat a) and b) until the whole water surface profile is entered.
 - d) When all the elevations are entered
 - i) ENTER: -1, -1
 - ii) PRESS: CR
- Then the program gives an output on the hardcopier containing the estimated discharge of the flood.
eg.:

RESULTS OF DISCHARGE ESTIMATION FROM "SAMFE" PROGRAM FOR
STATION: LILLOOET RIVER NEAR PEMBERTON
STATION NUMBER: 08MG006
TITLE FOR THIS OUTPUT: **** TEST ****
WATER SURFACE PROFILE:

SECTION	ELEVATION	LENGTH	SURFACE SLOPE
1	6.554	226.0	0.00184
2	6.138	0.0	0.00184

ESTIMATION OF CONVEYANCE FACTOR

$$K_e = 3000.930 * (H - 0.8235) ** 1.55048$$

Where: H = 6.138

$$K_e = 40000.8$$

ESTIMATION OF DISCHARGE

$$Q_e = K_e * \text{SQRT}(S)$$

Where: S = .110656E-02

ESTIMATION DISCHARGE = 1330.62

NUMBER OF ITERATIONS = 17

- 3. When the following instructions are displayed:
 - TO COMPUTE ANOTHER DISCHARGE WITH THE SAME CURVE, ENTER . 1
 - TO COMPUTE ANOTHER DISCHARGE WITH A DIFFERNT CURVE, ENTER 2
 - TO RETURN TO MAIN MENU, ENTER 3
 - TO TERMINATE THE CURRENT SESSION, ENTER 4

a) ENTER: 1 if you want another estimation of discharge using the same H-K curve parameters. This option can be useful to estimate a second flood, or to compare some discharges estimated by the model with the measurements or to modify one or several elevations of the water surface profile during the flood.

b) PRESS: CR

c) Go to instruction step 2 of this section.

or

a) ENTER: 2 if you want another estimation of discharge using different H-K curve parameters entered from the terminal.

b) PRESS: CR

c) Go to instruction step 1 of this section.

or

a) ENTER: 3 if you want to return to the main menu of SAMFE.

b) PRESS: CR

c) Go to section 4.2.2 instruction step 3.

or

a) ENTER: 4 if you want to quit SAMFE.

b) PRESS: CR

c) Go to section 4.9.

4.9 How to Turn the Computer Off

1. When the message "READY" appears on the screen:
PRESS: EXIT to exit from PRO/BASIC environment.
2. When the MAIN MENU is displayed on the screen as following:

MAIN MENU - P/OS V2.0A

Copyright) 1984 Digital Equipment Corporation

For information on using the Professional, press HELP

Login/Logout

PROSE

PRO/Tool Kit V2.0

PRO/Communications Version 1.8

Disk/diskette services

File services

Print services

Additional applications

View Message/Status

Make a choice and press D0:

- a) REMOVE the diskettes from the disk drives.
- b) Turn the machine off.

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