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JAPAN INTERNATIONAL
COOPERATION AGENCY
(JICA)

THE PUBLIC WORKS
DEPARTMENT (JKR)
MALAYSIA

# THE STUDY ON SLOPE DISASTER MANAGEMENT FOR FEDERAL ROADS IN MALAYSIA

## GUIDE V

## GUIDE TO SLOPE INFORMATION MANAGEMENT SYSTEM (SIMS)

**MARCH 2002**

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## GUIDE TO
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## MANAGEMENT SYSTEM
## (SIMS)

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# GUIDE V GUIDE TO SLOPE INFORMATION MANAGEMENT SYSTEM (SIMS)

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# CHAPTER 1 INTRODUCTION

The SIMS application has been developed in co-ordination with the Slope Disaster Management program and the Slope Inspection Format developed by the JICA Study Team. Designed as a simple to use application, it is delivered as a product to be used in a networked environment, as conceived for the JKR Headquarters at Kuala Lumpur, and multiple stand-alone installations for use at District Offices.

SIMS integrates database functionality and GIS functionality to provide a complete system for Slope Information Management. Embedding the GIS functionality into SIMS makes it easier for the user to become familiar with the use of GIS as well as reduces dependency on externalized GIS software.

# CHAPTER 2 OVERALL STRUCTURE OF SIMS USER GUIDE

The SIMS Application Guide consists of the following sections:

2.1 Design Guidelines and Considerations
2.2 Hardware and Software Requirements for Application Operation
2.3 Application Installation Instructions
2.4 Application Modules
2.5 Administrative Functions
2.6 User Levels
2.7 Help Function
2.8 Lookup Tables and Standard Values

## 2.1 Design Guidelines and Considerations

To direct the creation of SIMS, design guidelines were established at the outset of the application development efforts. Additional considerations in the design and development of SIMS were also identified at the outset, with revisions made during the development process based on feedback from JKR and the JICA Study Team.

## 2.2 Hardware and Software Requirements for Application Operation

The Guide clearly identifies the technical specification of the hardware and software environment required for the use of this application. This will serve as a guide to the up gradation and procurement of additional equipment where necessary.

### 2.2.1 Software Requirements

Prequisite Software in addition to SIMS

1. MS Windows 98 SE, MS Windows 2000 SP2, or MS Windows NT 4 SP6a
2. MS Office 2000 Professional SR-1 SP2
3. Adobe Acrobat 5 – with PDF Writer printer driver installed
4. Internet Explorer 6 or above

HQ Server Installation

1. SIMS Application
2. SQL-Server 2000 SP 1

HQ Client Installation

1. SIMS Application
2. Connects to HQ SQL Server

District Client Installation

1. SIMS Application
2. MSDE 2000

### 2.2.2 Hardware Requirements

HQ Networked Data Server and Database Server

1. Pentium III or above
2. RAM – minimum 512 MB (additional 256MB for every 5 users)
3. Hard Disk requirement – 40GB + 20GB * number of district (*Please refer to notes below)
4. CD writer
5. 17' monitor
6. Backup device (preferably tape backup)

HQ Client Workstations / Individual Office Workstations

1. Pentium III or above
2. RAM – 128 MB, 256 recommended for optimum performance
3. Hard Disk requirement – 20 GB (*Please refer to notes below)

4. CD writer
5. 17' monitor
6. Scanner (on one system)

### 2.2.3 Estimated Hard Disk Space Requirement

The data expected to be created and used in SIMS and the associated software requirements will create varying levels of space requirements. The estimated space requirements have been computed based on approximately 1000 slopes (covering the project study areas). These space requirements do not include space required for other software that is expected on the system such as an Operating System, Microsoft Office, and the appropriate database software.

The details are for disk space requirements are provided below:

1. Database

Database of approximately 1000 records is expected to take less than 20 MB of space.

2. Images

Image files will contain pictures of the slope feature and scanned sketches from field inspection. These image files will occupy approx. 1 GB of space for 1000 records

3. GIS Vector Data

The vector data of slope feature polygons for 1000 slope features and all additional background vector data identified for SIMS will occupy less than 50 MB of space.

4. GIS Raster Data

Background raster graphic maps for SIMS, providing general coverage for all of Malaysia will be included in the dataset. Additional raster map coverage for the study area, providing additional detail will also be included in this data set. The cumulative volume of this is estimated to be less than 2.0 GB.

5. Application

The SIMS Application will occupy approximately 15 MB of space on the machines it is installed on

6. Additional 3rd Party Software

Additional software such as Adobe PDF Writer will facilitate the functioning of some aspects of SIMS. This will occupy approximately 100MB of space.

7. Working Space

PDF output files with Slope Inspection Information (on individual workstations) are expected to be used as a standard report generation and information review/ exchange

format. Although the PDF report for a slope feature will vary with details on number of image files associated, disk space requirements can be estimated as approximately 0.8 GB of space for every 1000 slope features.

Table 2.2.1 Estimated Hard Disk Space Requirements

| PDF Form Type | Estimated Size per record | | Notes | Estimated Total Size for 1000 records |
|---|---|---|---|---|
| | Min | Max | | |
| FormA | 50 KB | | | < 50 MB |
| FormA-Map | 300 KB | X KB | Contour lines and slope features only | < 300 MB |
| FormB | 31 KB | X KB | Depends on image size | < 50 MB |
| FormC | 137 KB | X KB | Depends on images size | < 150 MB |
| FormD | 80 KB | | | < 100 MB |
| FormE1 – E5 | 60 KB | | | < 75 MB |
| Form F | 60 KB | | | < 75 MB |
| **TOTAL** | **718 KB** | | | **< 800 MB** |

Based on the above details, the disk space requirements can be summarized as:-

HQ SIMS Server Disk Space:

For approximately 1000 slopes:
(20 MB + 1 GB + 50 MB + 2 GB + 15MB + 100MB) =3.2 GB
For approximately 20,000 slopes:
(20 MB x 20, 1 GB x 20, 50 MB x 20, 2 GB x 5 , 100MB , 15 MB) = 31.5 GB

HQ SIMS Workstation Disk Space:

Assuming that reports for not more than 1000 slope features are being saved on the workstation, the disk space requirements expected are:
(100 MB + 15 MB + 800 MB) = approx. 1 GB

Individual SIMS System Disk Space:

The individual installation of SIMS would require space for all the data relevant for the region, in addition to the space requirements of the workstation. For each individual installation, the disk space requirements are:
For 1000 Slopes: Approximately 4 GB
For 2000 Slopes: Approximately 6 GB

## 2.3 Application Installation Instructions

There are three different installation configurations to consider for a nation-wide deployment of SIMS. Please select the installation type appropriate for your system.

HQ Server Installation
- SIMS Application
- SQL-Server 2000 SP 1

HQ Client Installation
- SIMS Application
- Connection to HQ SQL Server

District Client Installation
- SIMS Application
- MSDE 2000

### 2.3.1 SIMS Installation Procedures

Prior to beginning installation of SISM, please make sure that MS Office 2000 and Adobe Acrobat 5 are pre-installed before the installation of SIMS application.

Installation Process A: SIMS Application

**STEP 1:**

1. Load the SIMS installation CD on to the CD-ROM drive.
2. Go to folder <Installation>
3. Look for filename <setup.exe>
4. Double-click the filename <setup.exe>

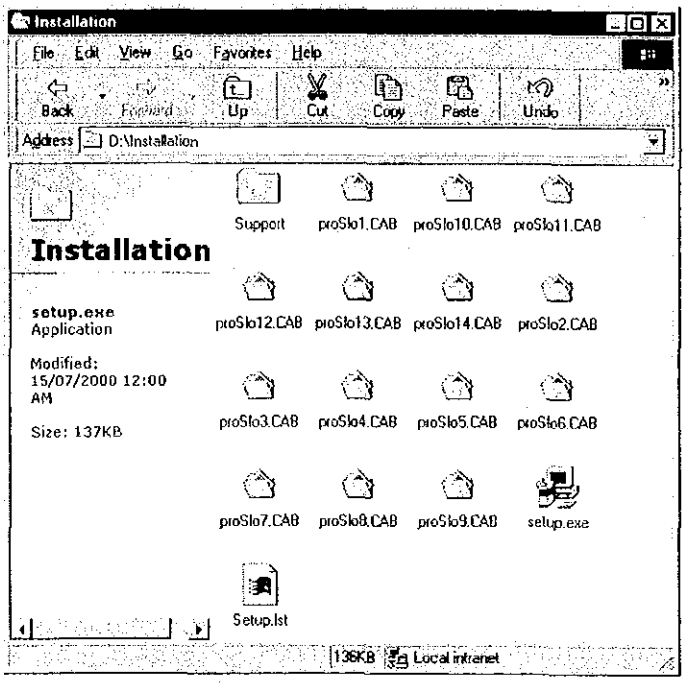



Figure 2.3.1 Installation Directory

**STEP 2**

1. SIMS setup screen will appear as above
2. Please make sure, before proceeding, that any other applications that are running be closed
3. Click on the <OK> button

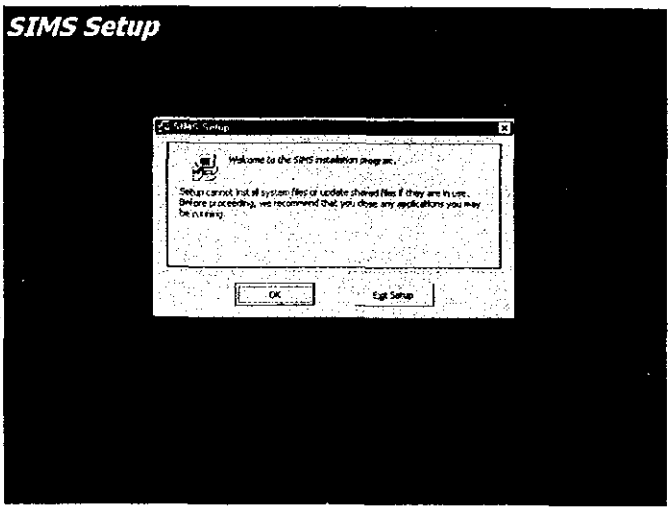



Figure 2.3.2 Setup Startup

**STEP 3**

1. The SIMS setup dialog will appear as shown.
2. Click on the main button as highlighted.

Note:- Do not change the installation Directory to other than that defined by the application. Changing this installation directory may have some undesirable effects on the application.

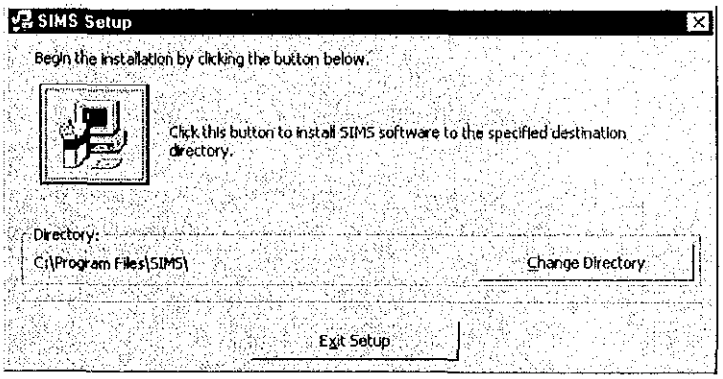



Figure2.3.3 SIMS Setup Dialog

**STEP 4**

1. Click on the <Continue> button
2. After clicking the <Continue> button, the installation package will start to install the SIMS Application
3. Please wait for the installation to complete

Notes:-

- During installation the installation package may ask you to re-start the computer. Please do as advised.
- After re-starting, please repeat from STEP 1 again to continue the installation.

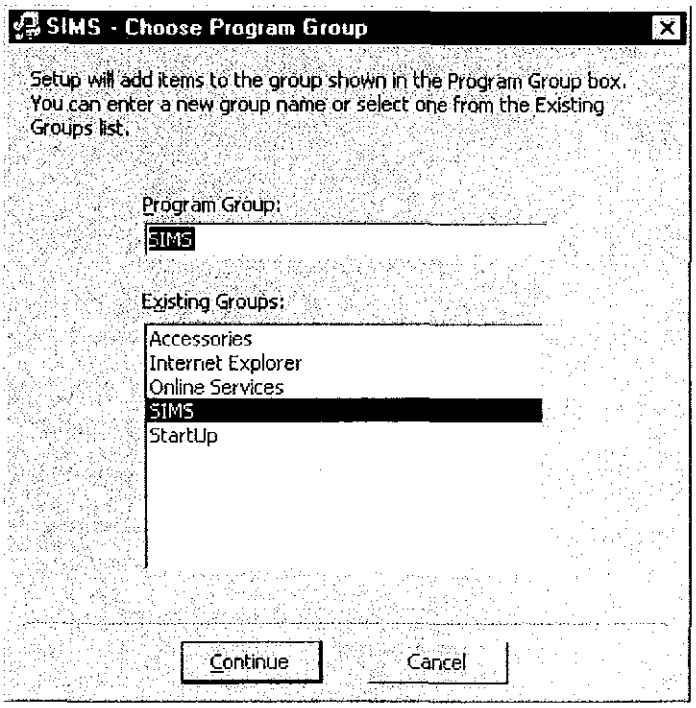



Figure2.3.4 SIMS Choose Program Group

When the installation package completes, the dialog box as shown will appear

1. Click on the <OK> button to end the installation
2. Please <RE-START> the system.
3. After restarting. The Sims menu will *appear in the START menu bar.*
4. **Do not** proceed to start the application.

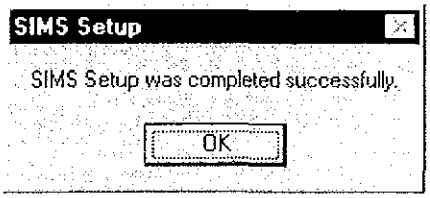



Figure2.3.5 Completion of SIMS Setup

**STEP 5**

1. Goto the <Control Panel> menu as from the START menu bar
2. Click on the <Control Panel> menu

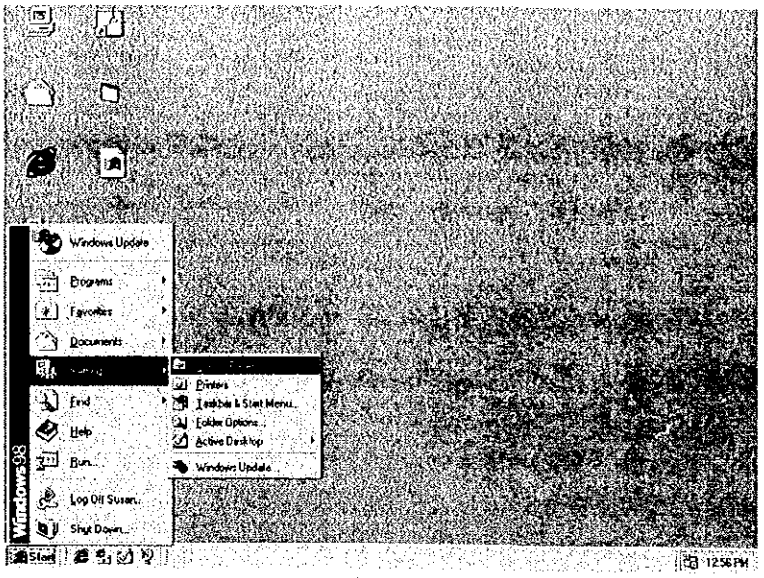



Figure2.3.6 SIMS Control Panel Menu

**STEP 6**

1. The <Control Panel> window will appear as above
2. Click on the <ODBC Data Source (32-bit) icon

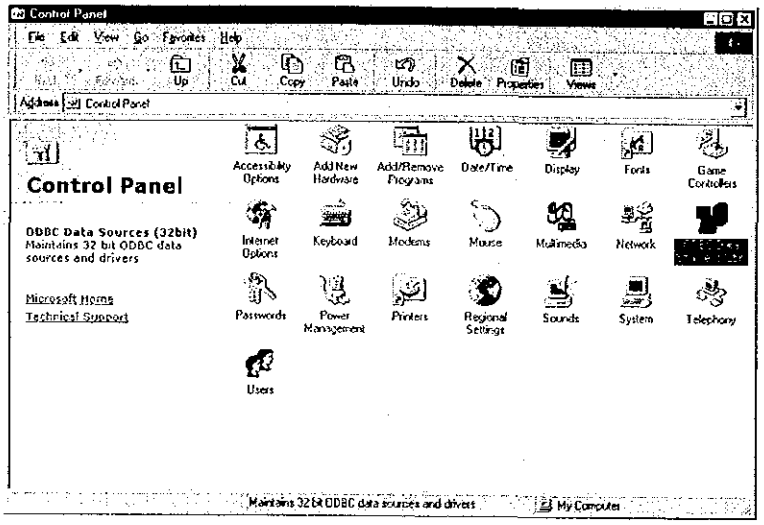



Figure2.3.7 Selection of ODBC Data Source Icon

**STEP 7**

The <ODBC Data Source Administrator> form will appear as above

1. Click on the <System DSN> Tab to get to the form as above
2. Click on the <Add> button

**STEP 8**

1. Select <SQL Server> item in the list, and click the <Finish> button

**STEP 9**

1. The <Microsoft SQL Server DSN Configuration> appears as above
2. Enter <SIMS> in to the <Name> field as shown above
3. After entering, click on the <Server> list that is at the bottom of the form
4. Please select <local> if the installation package is to be installed on the server (HQ or District).
5. If the installation package is to be installed on the client, then please select the <Server> name.
6. Please check with your System Administrator for the <Server> name.
7. Click on the <Next> button to get to the next screen

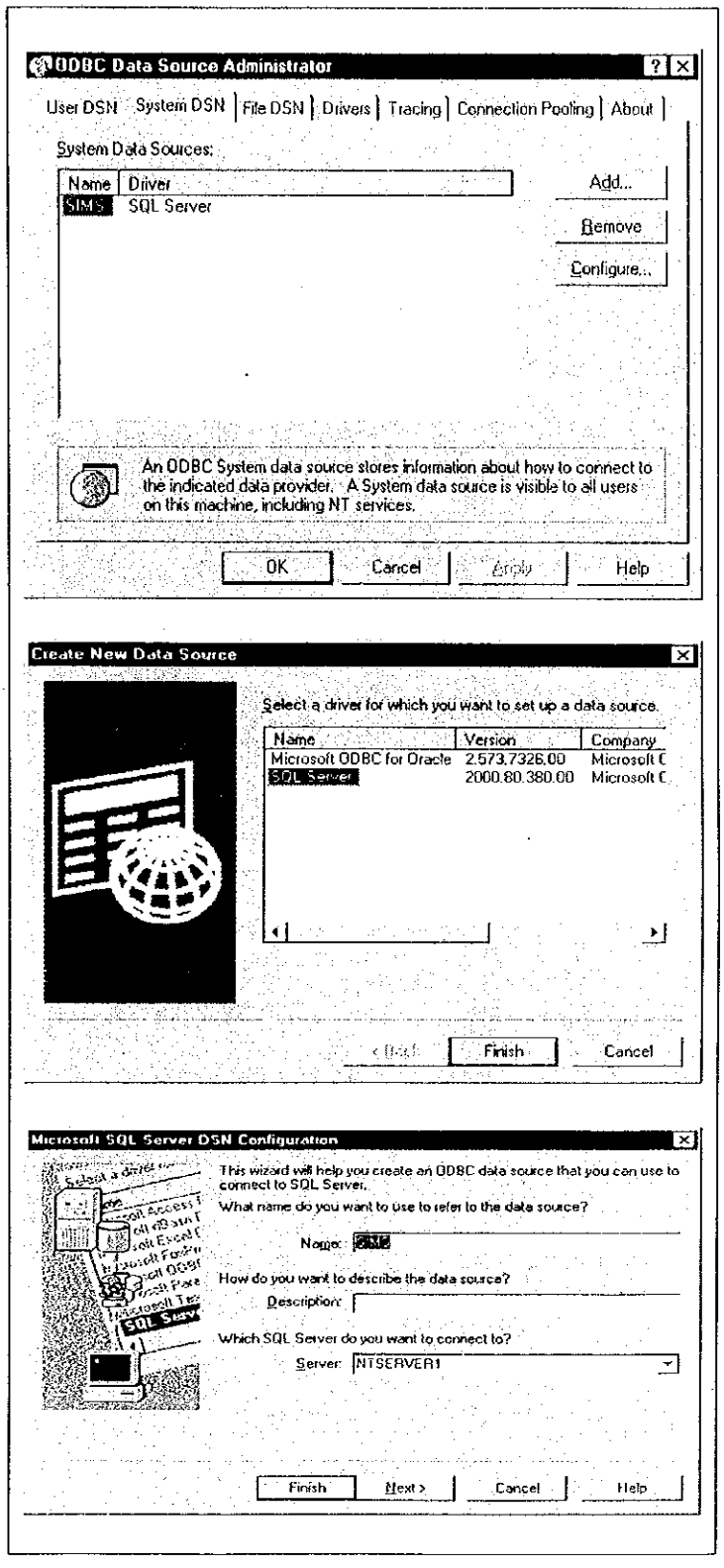



Figure2.3.8 ODBC Configuration

**8. STEP 10**

1. On this form please select the second option as shown above.
2. Please make sure that <With SQL Server authentication using login ID and password entered by the user> is selected
3. Enter <sims> into the <Login ID> box
4. Click on the <Next> button to get to the next screen

**STEP 11**

1. Please check the <change the default database to> <Slope3> as shown above
2. Click on the <Next> button to get to the next form

**STEP 12**

1. Do not change anything in this form
2. Click on the <Finish> button

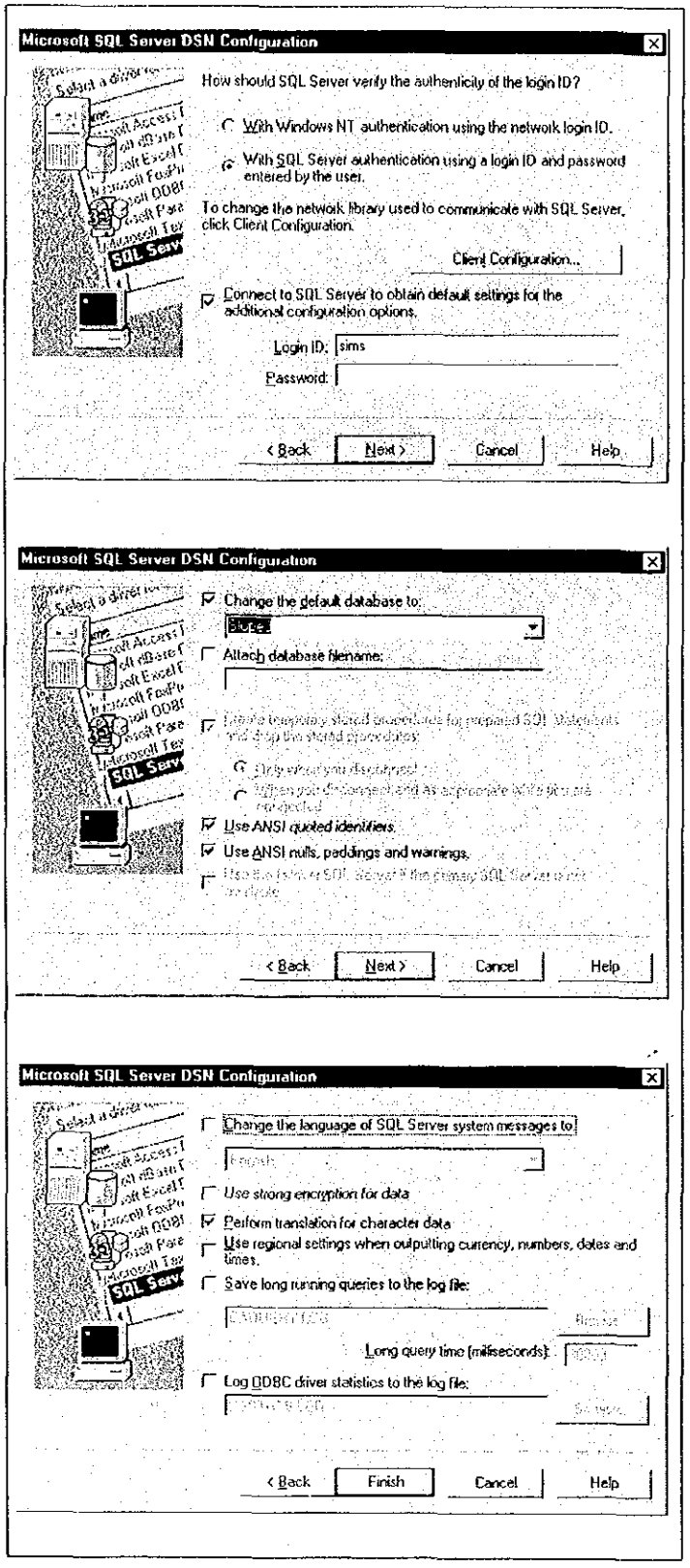



Figure2.3.9 ODBC SQL Setup (1)

**STEP 13**

1. The form above will be shown right after clicking the <Finish< button on the previous form
2. Please click on the <Test Data Source> button to test the configuration

**STEP 14**

1. If the configuration has been setup properly the form above will be shown will the message "TEST COMPLETED SUCCESSFULLY!"
2. If the message "FAILED!" appears, please check the configuration setting again from STEP 7 again

Notes:

- If the setting is correct, but the *application* does not run, then the Database Server may not be running. Please contact your System Administrator.

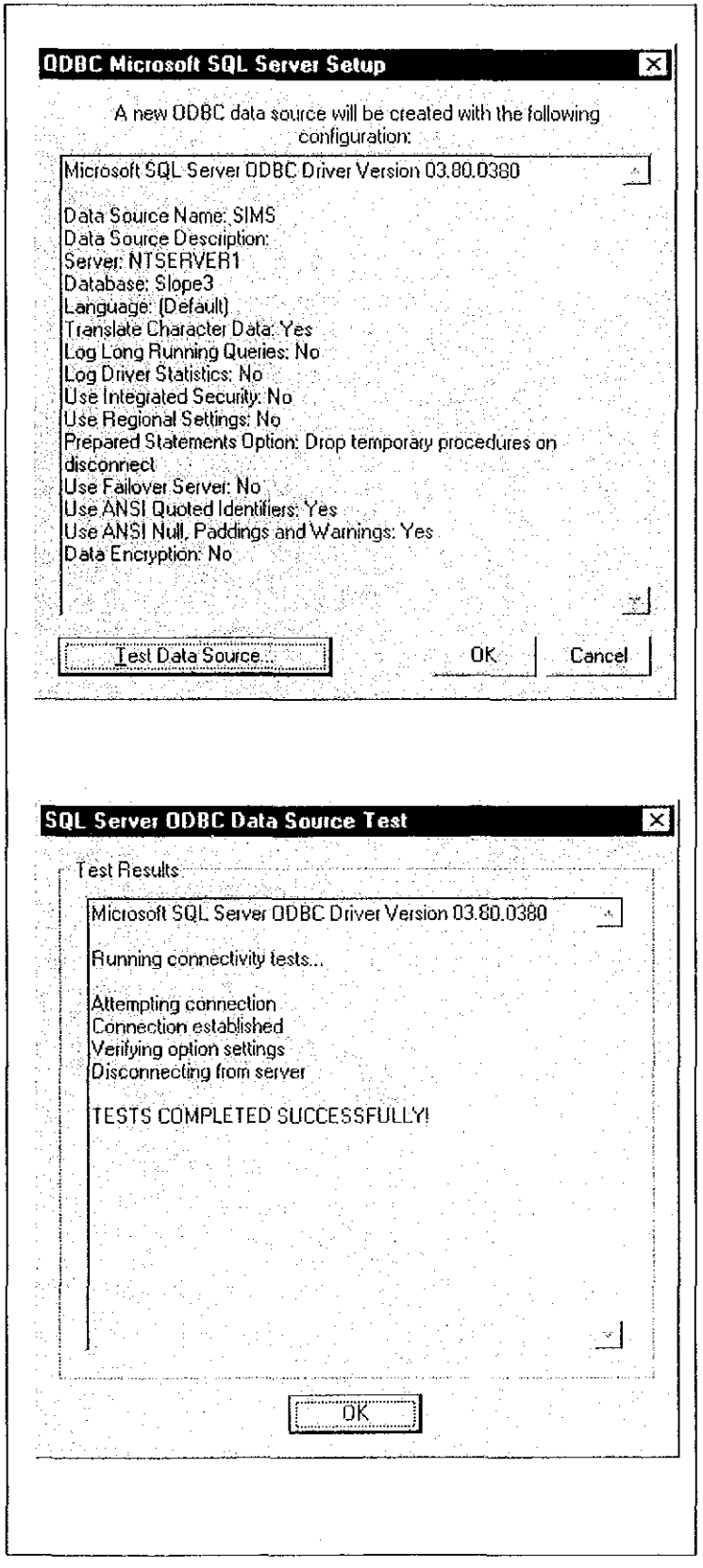



Figure2.3.10 ODBC SQL Setup (2)

## 2.4 Application Workflow and Modules

After installing the application, the user accesses it from the "Start Menu" on the computer.

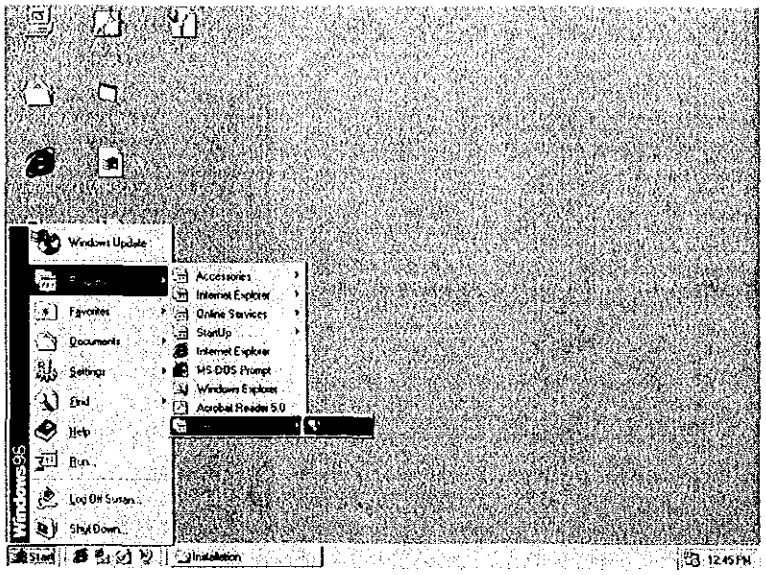



Figure2.4.1 Startup Menu

### Application Login

After startup, the application provides a login screen in which the user can enter their assigned login name and password. If the cancel button is selected the application will appear on screen but will not be functional till the login is done

Should an incorrect login/ password be entered, an error message will be displayed, as shown.

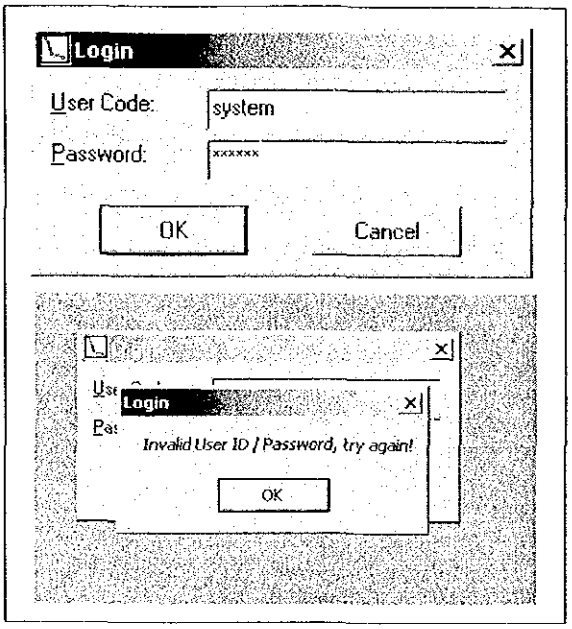



Figure2.4.2 Application Login

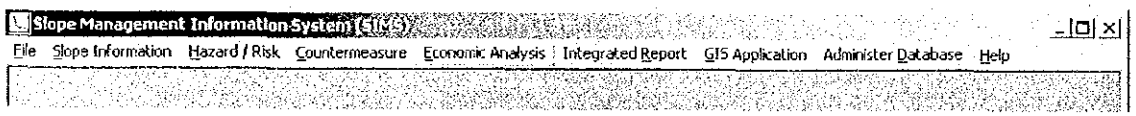



Figure2.4.3 Application Main Menu

After addressing the login form, the user will be presented with the SIMS Application *Main Menu. Selecting any item on the main menu will present a drop-down menu with* module specific functionality. This provides access to the various modules, the administrative functions, and to the help section.

### Using the SIMS Menu: *FILE*

The menu options under "File" provide login/ allow the user to address changing passwords, logon/ logoff functions, and saving data from SIMS to an external location, in an editable data format in Microsoft Excel.

To change the password for login, select "Change Password" from menu. Enter in the old password, the new password, and reconfirm the new password.

If the password entered in "Old Password" is incorrect, an error message will be displayed.

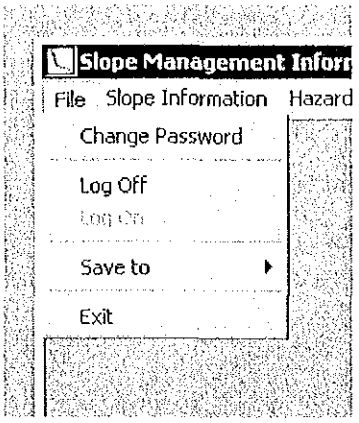



Figure2.4.4 SIMS Menu: FILE

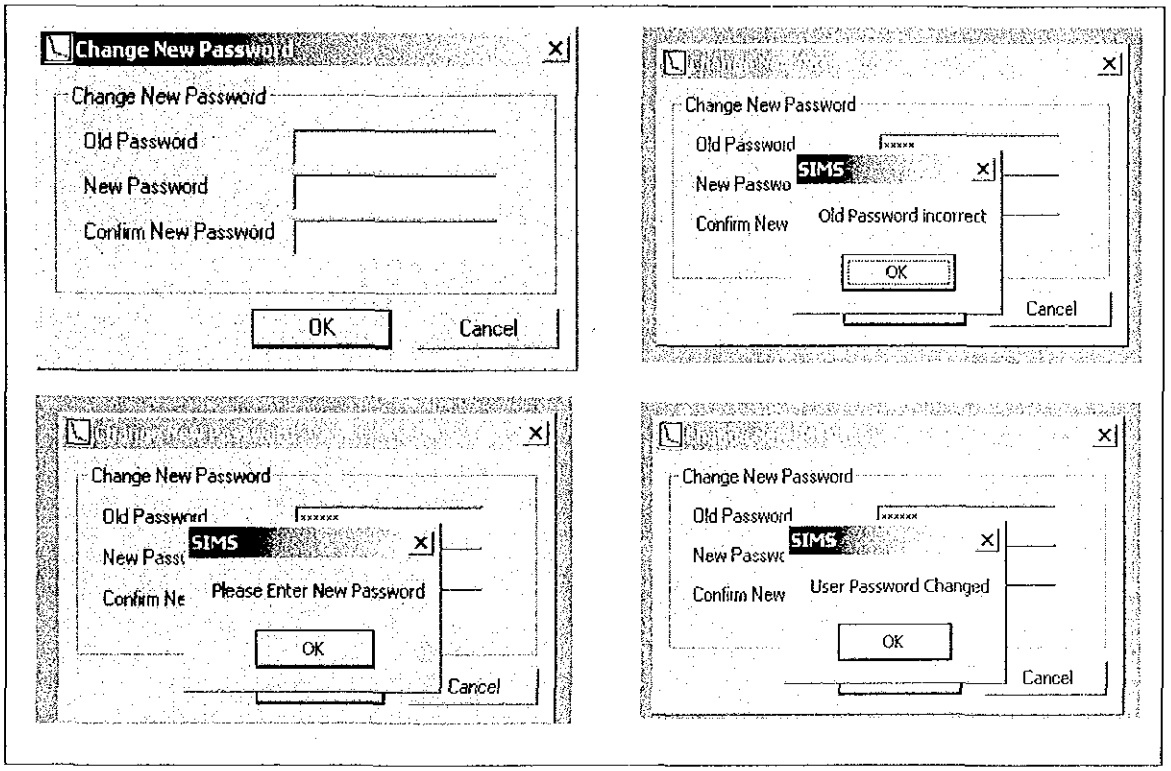



Figure2.4.5 Password in FILE

To save data externally in digital format, use the "Save to" function in the menu. On selecting the data format desired, a search form will be generated which will give the user the ability to select out the desired data (Explained under section on Data Search).

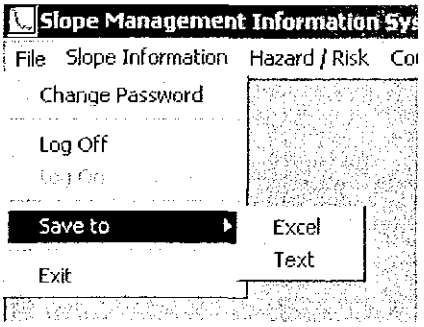



Figure2.4.6 Saving Data Externally

### 2.4.1 2.4.1 Slope Information Module

The slope information module provides the user with the functionality to integrate information gathered from the field inspection activities, as organized in the slope inspection forms prepared by the JICA study team.

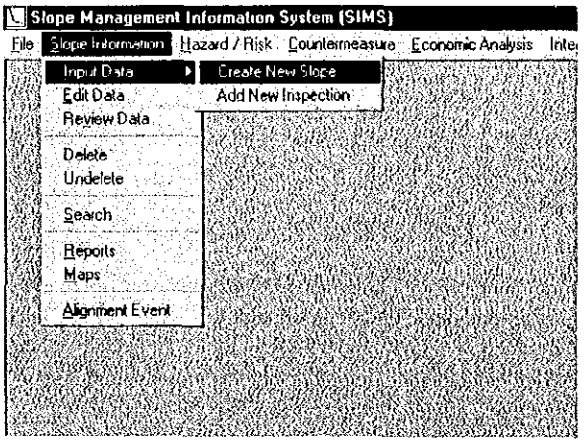



Figure2.4.7 Enter New Slope Details

On accessing the slope information module, the module sub-selections presented are:

Input : To input new slope feature information into SIMS
Edit : To edit and update existing slope feature information in SIMS
Review : To review existing slope feature information in SIMS
Search : To search for existing slope feature information in SIMS
Report : To generate reports for selected slope features from information in SIMS
Map : To generate standard slope feature map for identified slopes.

For Input/ Edit/ Review, the user is presented with similar looking screens in each of these sub-selections. The fields for required information are identified in red. As the user enters information on this form, they are presented with a pull-down selection list where appropriate.

#### (1) Add New Slope Inventory

**STEP 1: Getting ready to enter information using the Module**

Please ensure that your computer system is set to the right date and time, and that you have logged in using the correct login name. The SIMS application will use the computer system time and date, along with your login ID to provide informational details on the data entry.

Select the Slope Inspection forms you wish to use and review them for completeness and content. Specifically, identify the names of the individuals/ team members who conducted the slope inspection, and those who checked the slope inspections. These names must be provided to your SIMS administrator for entry into the system, for your use during slope inspection. Although this information while useful, the absence of this will not prevent you from doing the data entry and analysis from the Slope Inspection Information.

**STEP 2: Create New Slope With Zero Alignment Event**

This section will explain the function of creating a new slope inventory.

1. Select Slope Information -> Input Data - > Create New Slope from the menu bar as shown on the Figure (a).

2. Form A: Add New Slope Inventory will be display. Users need to fill in the blanks to create a new slope inventory.

3. There are five mandatory fields that require the users must fill in. it is mark by the red symbol stars. They are road name, chainage start km, side of road, alignment event and type of slope. It is important to generate the JKR ID. Date inspected also a require field that the user must fill in to identify when the first inspection being done. If these require fields are not fill in, when the <Save> button being press, the labels of these require fields will in red colour to remind the users to fill in.

4. Users can select the road name, district name, state name, side of road, alignment event, type of slope and most likely failure type form the combo boxes.

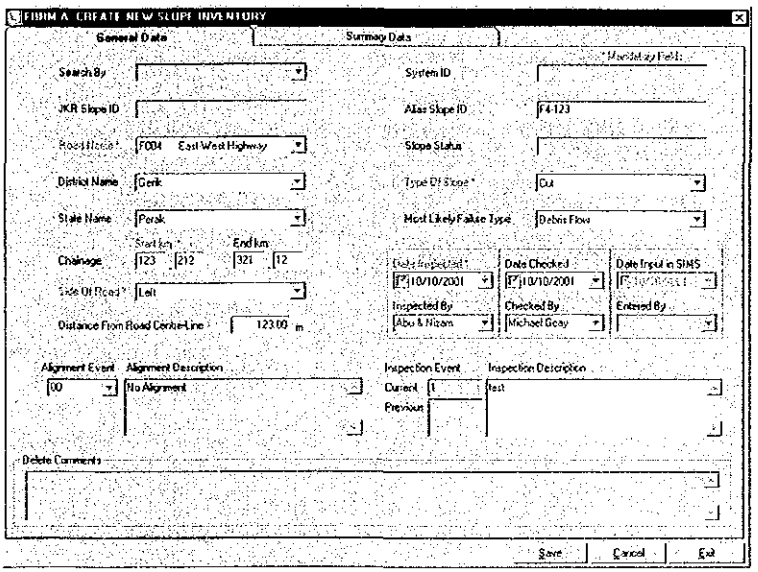



Figure2.4.8 Add New Slope

5. For the chainage start km and end km and distance from road centre-line only let the users to key in numbers. The chainage start km must smaller than chainage end km. Otherwise, a message will prompt out to warn the users.

6. For the Alias Slope ID, the user only can key in until 20 characters. More than that, a message will prompt out to tell the users the limitation for this field.

7. If the users choose the date inspected and date checked, then the date checked should be not earlier than date inspected. Otherwise, message will prompt out again.

8. The field inspected by and checked by can key in by the users or the users can select from the combo boxes.

9. Inspection event is set to '1' automatically when add a new slope inventory.

10. If the most likely failure type does not select by the user, the system will set the field to 'Undefined' value when the <Save> button is press by the user.

11. After filling in all the require fields, press the <Save> button. A message will prompt out to notice the users that a new slope inventory had been created.

12. The system will continue to ask users if they want to continue the process to insert the hazard info or not. If the users click <OK>, then the system will continue load the Slope Information to let the users to insert the set of hazard info for that particular slope inventory. The adjacent figure shows the message that prompt out to ask users to continue to insert the hazard info.

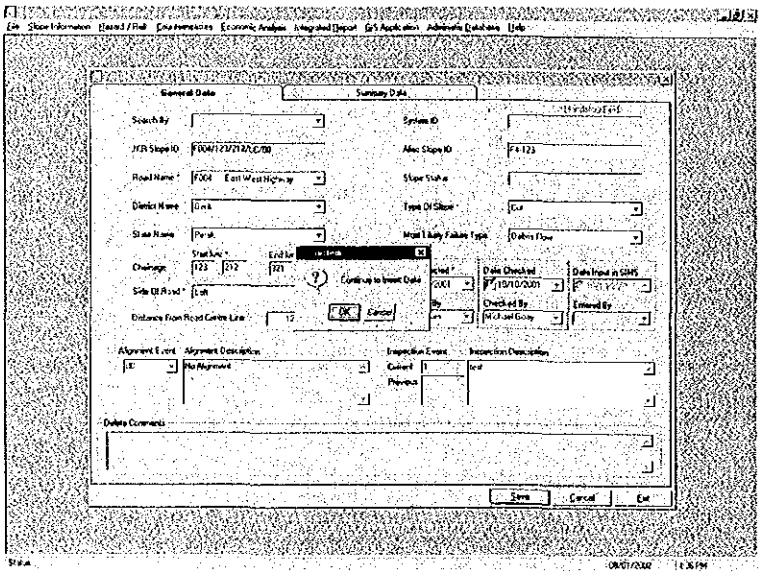


Figure2.4.9 Create New Slope (1)

13. If there has been an error in the entry of information on this form, press the <Cancel> button is use to reinitialize all the fields.

14. Select the "Summary Data" tab to review summary information from other modules associated with this slope feature. This tab will be populated only after the completion of data entry in subsequent forms in this module, and after review and data input in the other modules as well.

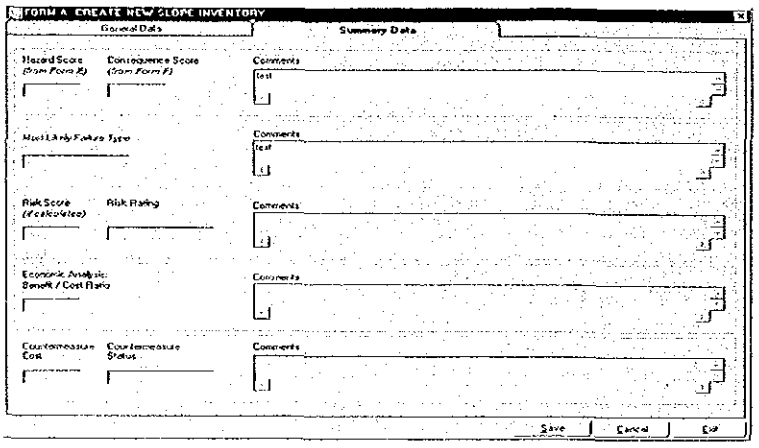



Figure2.4.10 Create New Slope (2)

15. To close this form with both the tabs, select the <Exit> button.

## STEP 2A: Create New Slope Inventory With New Alignment Event

1. All the requirements for creating a new slope inventory with a new alignment event are the same as described in STEP1 above, except that the system will pop out a dialog box to ask the users to select the previous JKR ID for this new slope inventory as reference as shown in the figure.

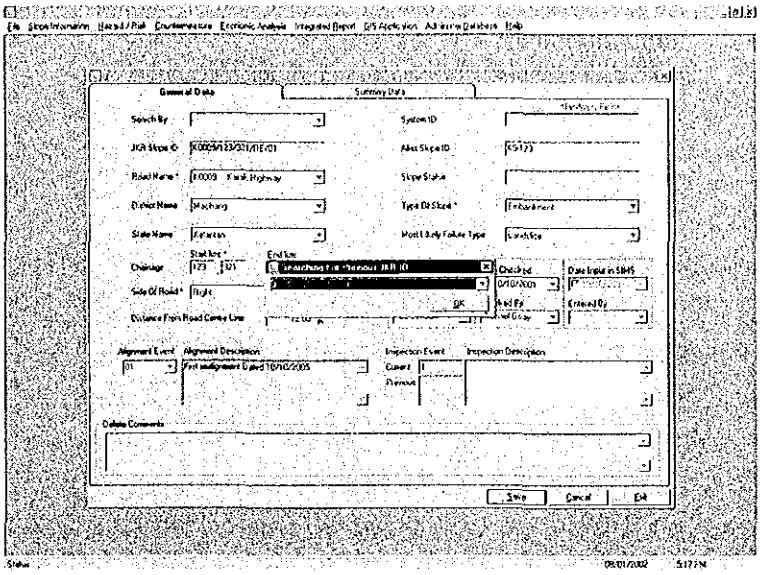


Figure2.4.11 New Alignment Event

2. After select a previous JKR ID for it, <OK> button should be press. 'Searching For Previous JKR ID' dialog box will be unload.

3. Press the <Save> button for saving the slope inventory into the database as usual.

4. The <Cancel> button is use to reinitialize all the fields.

5. The <Exit> button is to close the form.

## STEP 2B: Create a New Inspection for a Slope Feature

1. To create a new inspection for the existing slope inventory, the users need to select the menu from the menu bar as shown in adjacent figure

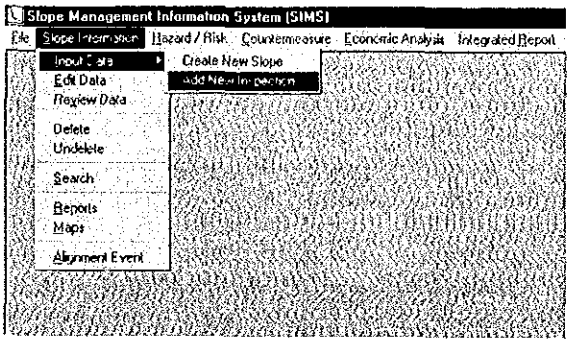



Figure2.4.12 Add New Inspection (1)

2. Users can select the existing slope inventory using search by Alias Slope ID or JKR ID as shown in adjacent figure.

3. Users can edit the fields that are in white color. The inspection event will automatically increase by '1'.

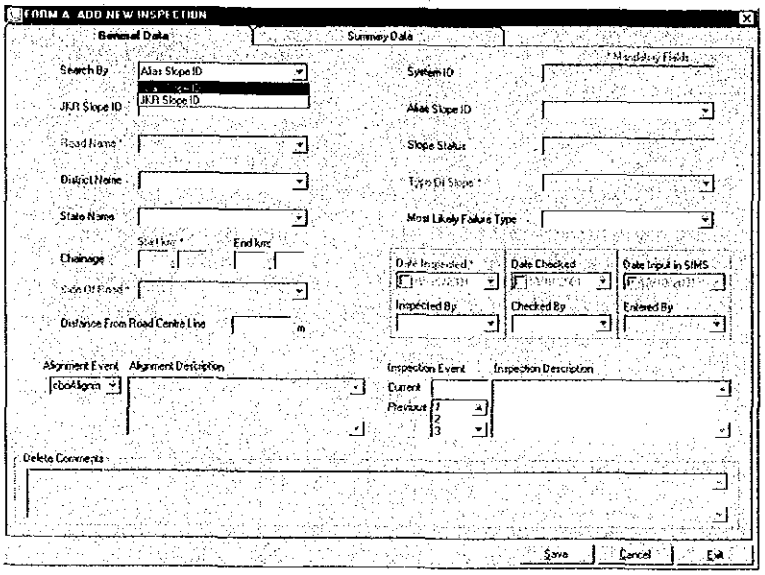



Figure2.4.13 Add New Inspection (2)

4. All the requirements to create a new inspection for the particular slope inventory is same as create a new slope inventory. Except the date inspected for the new inspection must not be earlier than the date inspected for the previous inspection. A system message will alert the users.

5. The <Cancel> button is use to reinitialize all the fields.

6. The <Exit> button is to close the form.

### STEP 3: Entering Additional Information for a Slope Feature

There are two possibilities to let user to insert additional information:

- When a new slope inventory is created, the system will ask the user if the user wants to insert additional information.
- While the user select a JKR ID for editing or viewing purpose. If there is no hazard info to that selected JKR ID, the system will ask the user to insert a new set of hazard information (Form D), which will also provide access to other associated forms for the slope feature.

### STEP 4: Entering Slope Feature Information: Form D

1. The Slope Feature Information Form is opened (as shown as in the figure)

2. There are three main tabs in this form (Slope Information, Map Location, Photo & Sketch – (Form B & C).

3. For the tab 'Slope Feature – (Form D)', is divided into Part 1 and Part 2 as shown in figures above and adjacent.

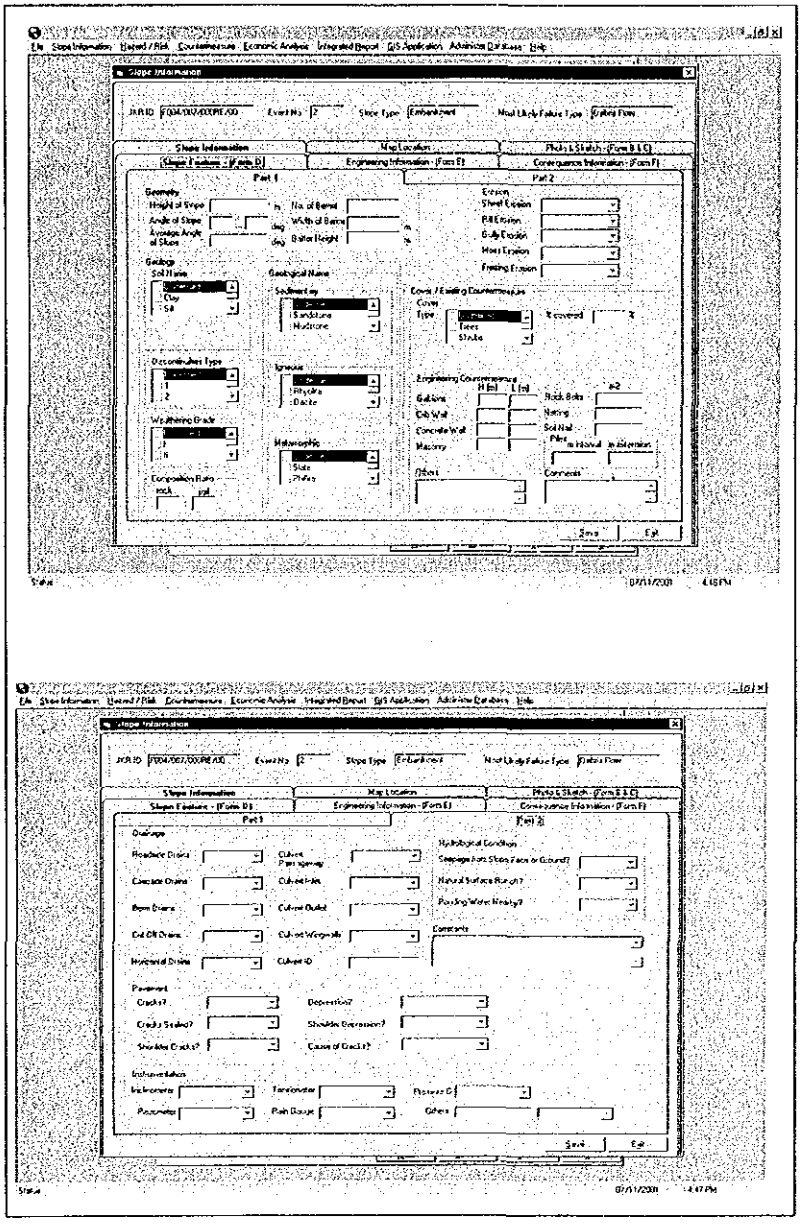


Figure2.4.14 Slope Information Form

## STEP 5: Entering Engineering Information: Form E

1 Hazard related information about the slope feature is entered through this Form. Based on the "Most Likely Failure Type" the appropriate Form E is selected. (There are 5 options currently provided for Form E). Information entered in this form provides the basis for the hazard score and risk rating.

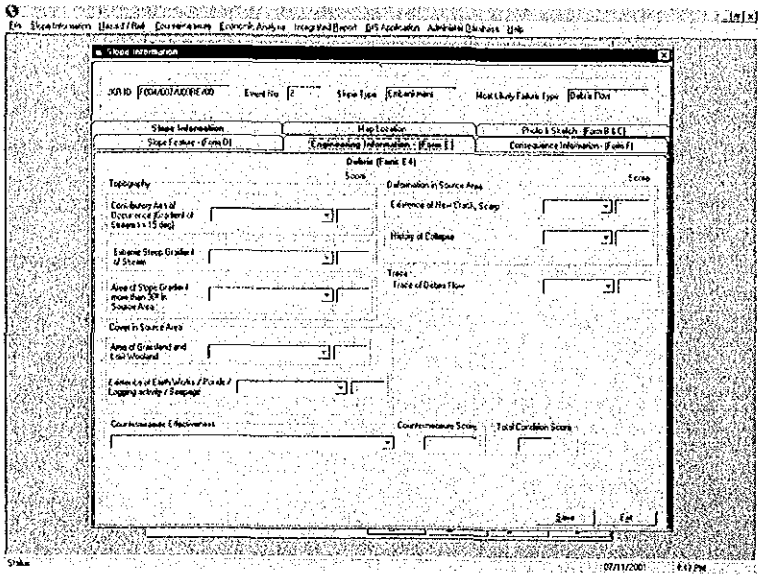


Figure2.4.15 Entering Engineering Information

2 If the most likely failure type identified in Form A is 'Undefined', then the Slope Information will not display any interface for Form E or Form F.

3 This Form E associates the engineering information with predefined hazard scores entered in the system. For the available fields, the user makes a selection from the choices in the combo boxes, key in the blank boxes and tick the list boxes.

4 When the <Save> button is press, the system will check if all the blanks had been filled in. if not, a message will prompt out to alert the user that the form is not complete be filled and does the user still want to continue to save the data and exit.

5 If the user still want to continue to save the hazard info even it is not complete been filled, the system will set the combo boxes and the list boxes to 'Undefined' before continue to save the info.

6 If user does not want to continue, then the system will reinitialize the form.

7 After saving process is complete, the <Save> button will invisible and the <Update>button will visible to user to let the user to continue to updating the hazard info if necessary.

8 The <Exit> button will close the form.

## STEP 6: Additional Information about the New Slope Feature: Form F

Information on potential consequence of failure of slope feature is entered through this Form. The Economic Analysis Module has a data dependency on information entered on this form.

The Consequence scores are automatically generated based on the data option selected in the consequence criteria.

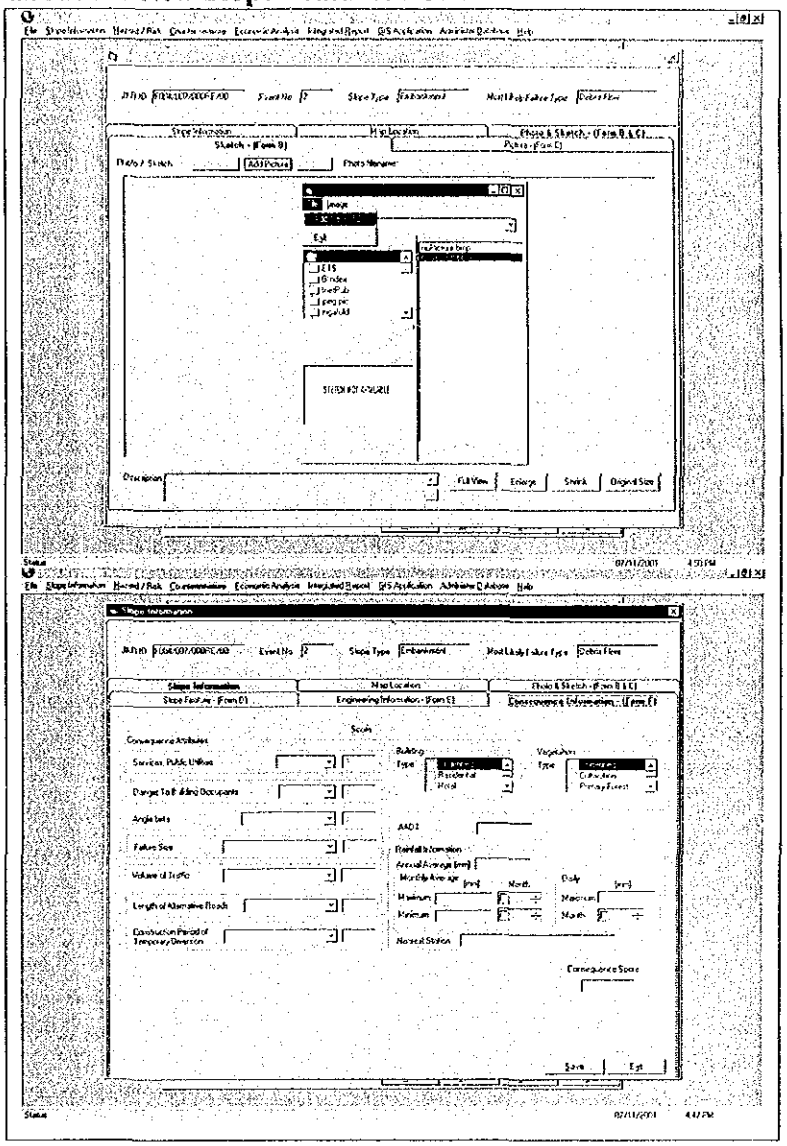


Figure2.4.16 Additional Information Form F

## *STEP 7: Additional Information about the New Slope Feature: Forms B & C*

1. In this form the user can add or delete the existing picture or sketch for this particular slope inventory.

2. At Sketch tab as shown in Figure (g) user can add the sketch by press the <Add Picture> button.

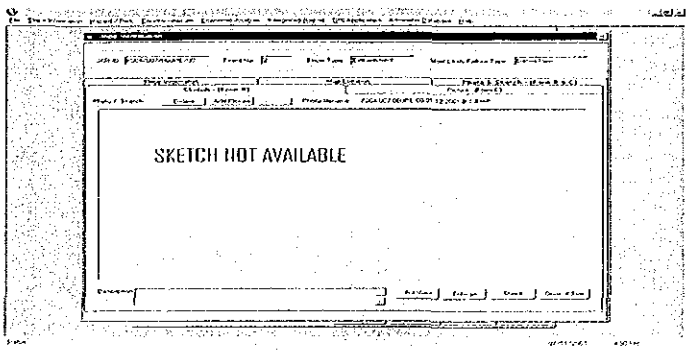



Figure2.4.17 Form B and C

Then, a dialog box will pop out to let the user to choose the path and add the sketch into the slope inventory as shown.

3. If more than one sketch is being add into the slope inventory, then the <<> button and <>> button are enable to let the user to navigate the sketches.

4. The description box is allow the user to key in the description for the sketch.

5. <Full View> button let the user the view the sketch full screen.

6. <Enlarge> button allow the user to enlarge the size of sketch.

7. <Shrink> button allow the user to down sizing the sketch.

8. <Original Size> button set the sketch to its original size.

9. <Delete> button allows the user to discard the sketch from the slope inventory.

10. From the tab Picture, the user is allow to add or discard the picture(s) from slope inventory.

11. The dialog box will pop out to let the user to select the picture file and add into the slope inventory when the <Add Picture> is pressed.

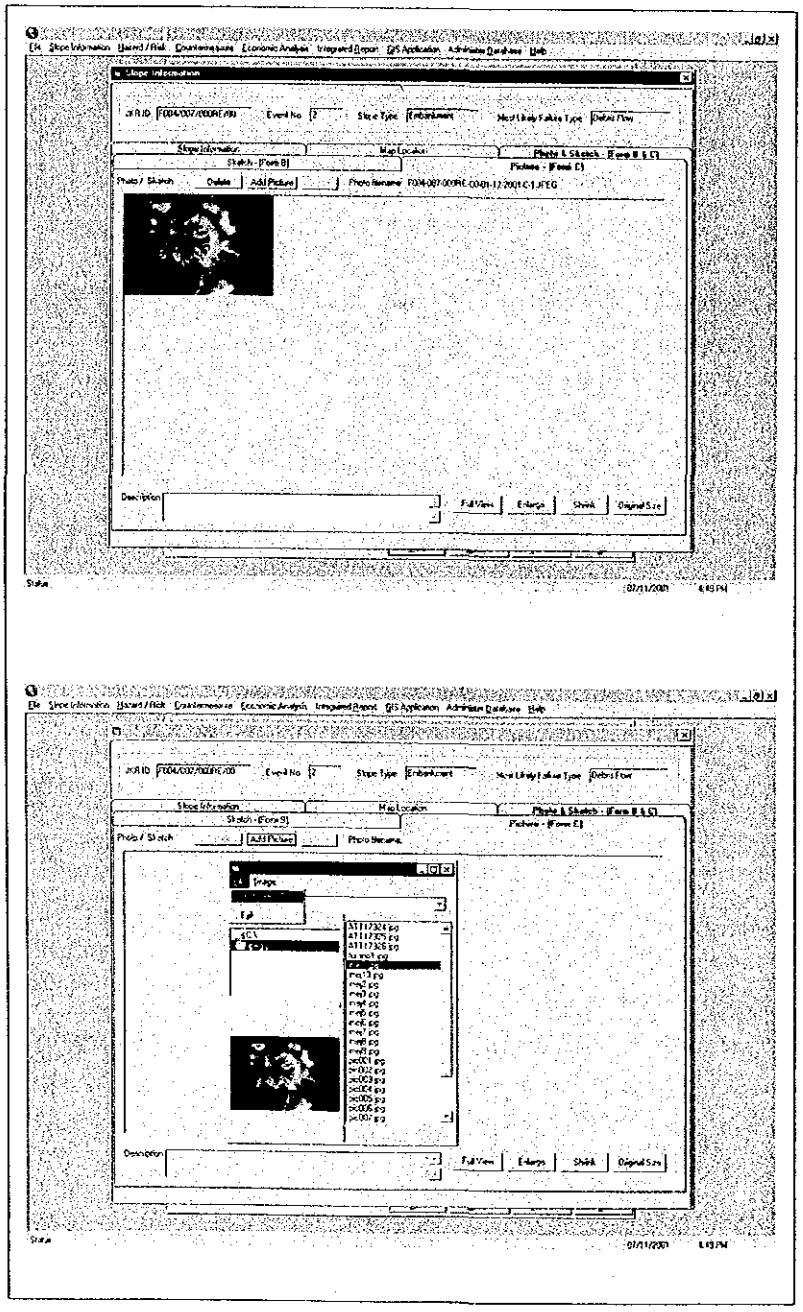


Figure2.4.18 Additional Information Form B and C

12. If more than one picture is being add into the slope inventory, then the <<> button and <>> button are enable to let the user to navigate the pictures.

13. The description box is allow the user to key in the description for the picture.

14. <Full View> button let the user the view the picture full screen.

15. <Enlarge> button allow the user to enlarge the size of picture.

16. <Shrink> button allow the user to down sizing the picture.

17. <Original Size> button set the picture to its original size.

18. <Delete> button allow the user to discard the picture from the slope inventory.

**STEP 8: Reviewing Map Location**

This tab will shown the map for the slope inventory if there is a map for it.

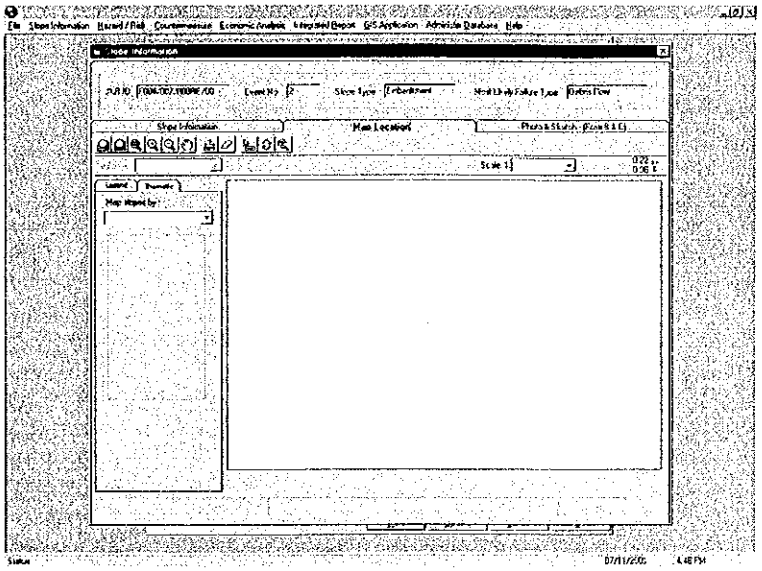


Figure2.4.19 Reviewing Map Location

### (2) Editing Slope Feature Information

1. Go to the menu bar, select Slope Information -> Edit Data

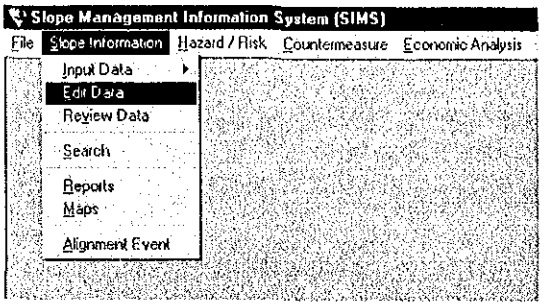



Figure2.4.20 Edit Data Menu

2. Users can select the particular slope inventory searching by JKR Slope ID or Alias Slope ID. (There are two tabs in this form. The first tab, General Data, is editable to the user but the second tab, Summary Data, is just for viewing).

3. After select a JKR ID, users can edit to the fields which are white in color.

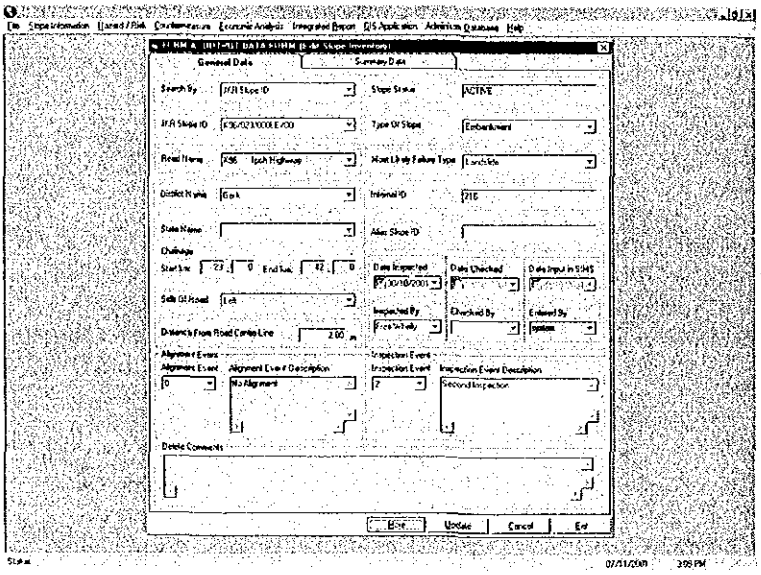


Figure2.4.21 Form A: Output Data From (1)

4. If more than one inspection has been done for a particular slope feature, the system will automatically load the latest inspection of the particular slope inventory. The user can select any inspection event and load information for that inspection.

5. Click the <Update> button. (The system will make sure that all the requirements have been met which are the same as create a new slope inventory).

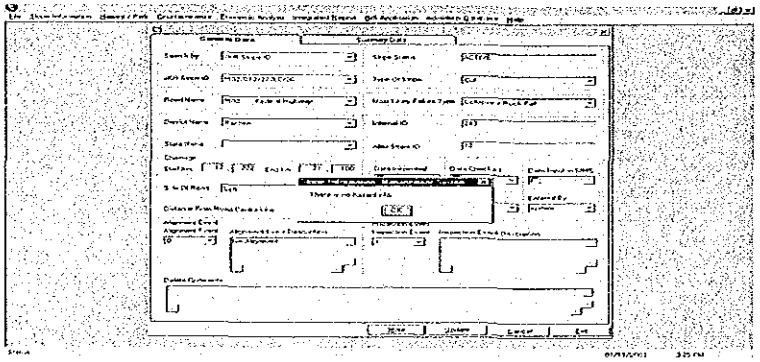


Figure2.4.22 Form A: Output Data Form (2)

6. Click the <More> button to load the detailed Slope Information. If there is hazard information for the selected JKR ID, the system will open Slope Information forms and permit the user to make edits. If there is no hazard info for that JKR ID, then, the message will prompt out to tell the user there is no hazard info for the selected JKR ID as shown.

7. System will ask the user if the user wants to continue to insert a new set of data to that selected JKR ID. If user presses <OK>, then the system will continue to load the Slope Information to enable the users to create a new set of hazard info. If <Cancel> is selected, then the system won't open the Slope Information.

8. <Cancel> button in the edit form is to reinitialize the form.

9. <Exit> button will close the form when it is being press.

### (3) Reviewing Slope Information

The working of this section of the software is similar to the Edit mode, with the exception that the information can only be viewed, not edited.

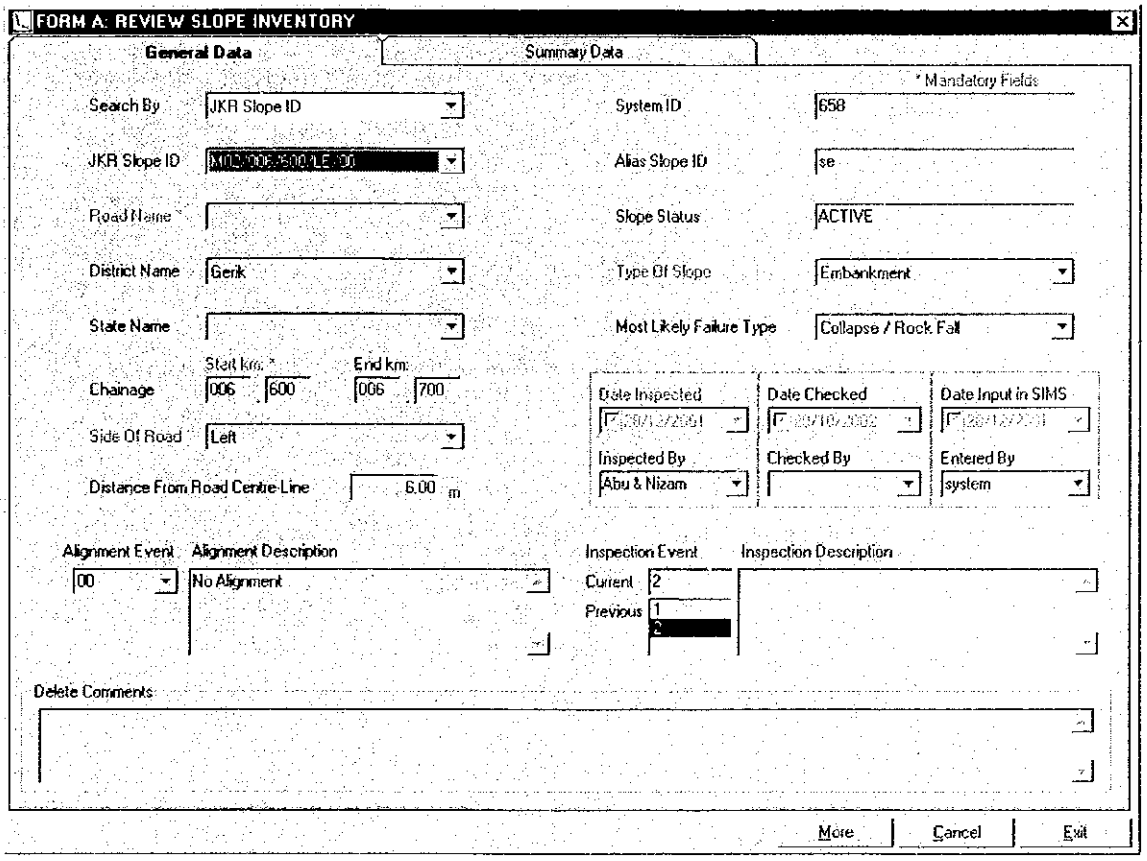



Figure2.4.23 Review Slope Inventory Form

### (4) Delete/ Undelete Slope Inventory

Slope features that need to be deleted from the overall slope inventory are handled through this menu function. Through this, specific slope features can be tagged for deletion, but remain as a part of the database until the administrator "Purges" the deleted slope information (explained under administrative functions). The slope features identified for deletion can also be "undeleted", till such time as they are not purged from the database.

1. Select Administer Database -> Slope Maintainace -> Delete Slope Information

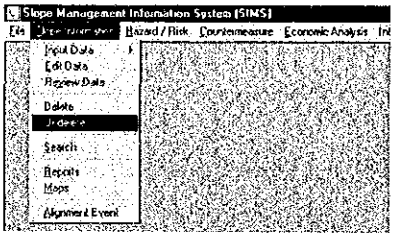



Figure2.4.24 Delete Slope Menu

2. The form as shown will appear

3. User must select a slope feature (by JKR ID or Alias Slope ID) to change its status.

4. When the button <Delete> being pressed, the system will update the status of that selected slope inventory form 'ACTIVE' to 'DELETED'.

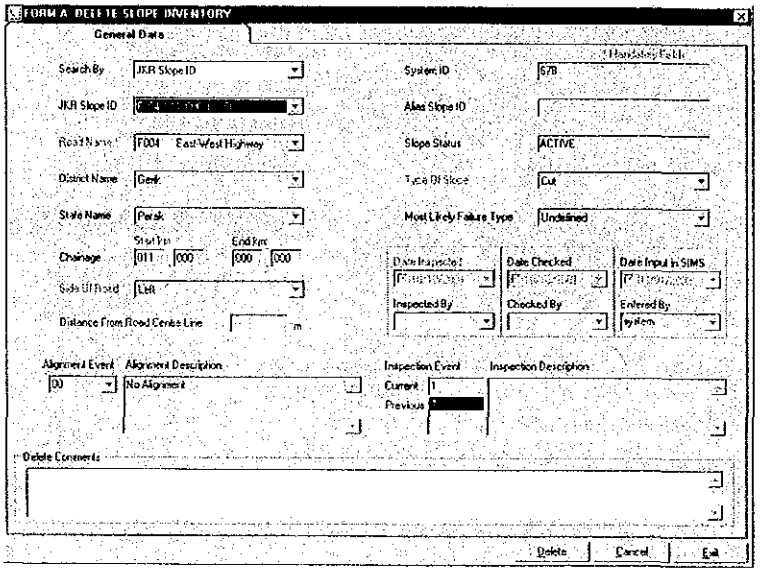



Figure2.4.25 Delete Slope Inventory Form

5. When the button <Undelete> is clicked, the system will update the status of that selected slope inventory form 'DELETED' to 'ACTIVE'.

6. <Cancel> button is use to reinitialize the form.

7. <Exit> button will close the form.

### (5) Creating Reports

1. For creating or review report, user can start from Menu for SIMS. From the menu, go to Slope Information -> Reports.

2. Click on Reports. A search form will appear which will help the user select slope features for report generation.

3. After executing the search, review the results on the next tab "Result Form"

4. A report will be generated for each of the slope features displayed after performing the search. To change the selected slope features, revise the search criteria and refresh the Result Form.

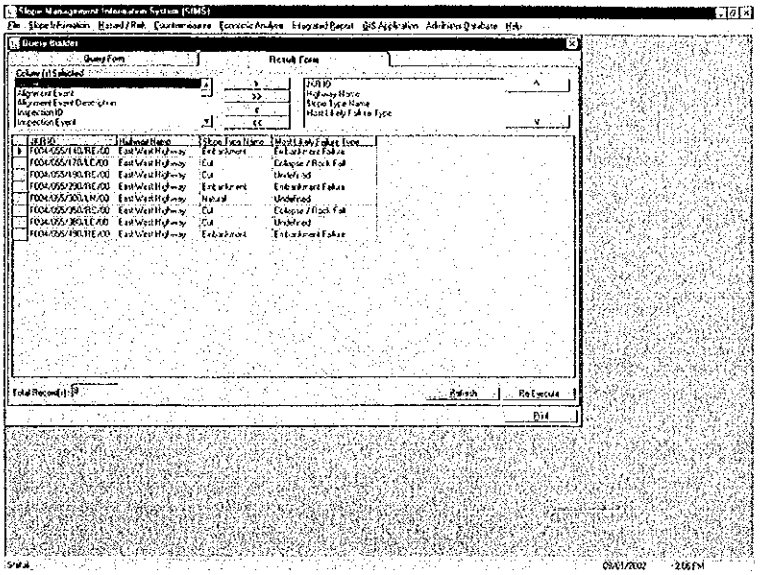


Figure2.4.26 Report Query Builder

5. Use the field selector on the result form to add/ delete fields required in the report

6. Click on the Print Report button at the bottom of the search form.

7. Printer Dialog form will appear. For a single report, the JKR ID and Highway will be displayed. For batch report, all the JKR ID's will be displayed on Selection list box.

8. User can print the report directly to the printer without viewing, print it on the screen (show & save) for viewing, or create the report as a PDF format document (without showing).

9. For batch report printing, screen display of the reports are disabled. The batch report can only be sent to printer for printing directly or saved as PDF format.

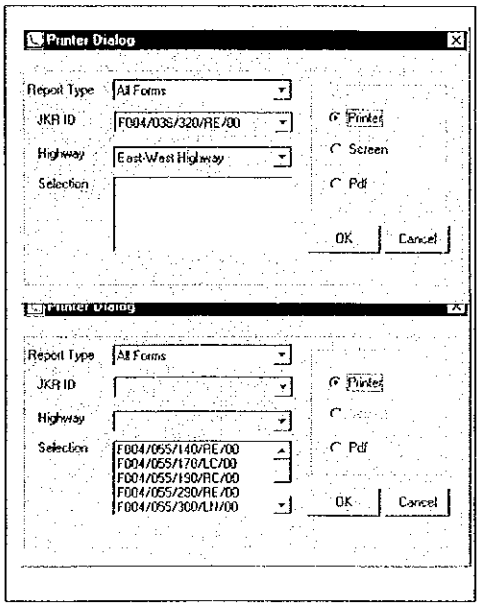



Figure2.4.27 Printer Dialog Box

### (6) Generate Maps

This functionality has been addressed under the GIS Application section.

### 2.4.2 Hazard/ Risk Module

#### (1) Calculate Hazard Risk Score

This section, will explain how to calculate the risk score for the slope inventory.

1. Select the menu from the menu bar as shown.

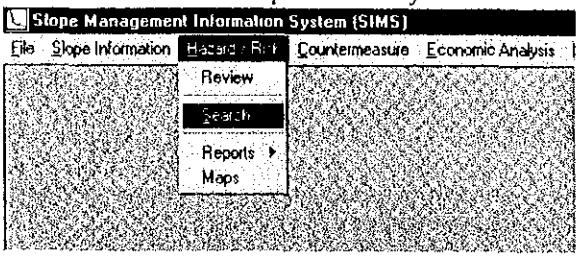
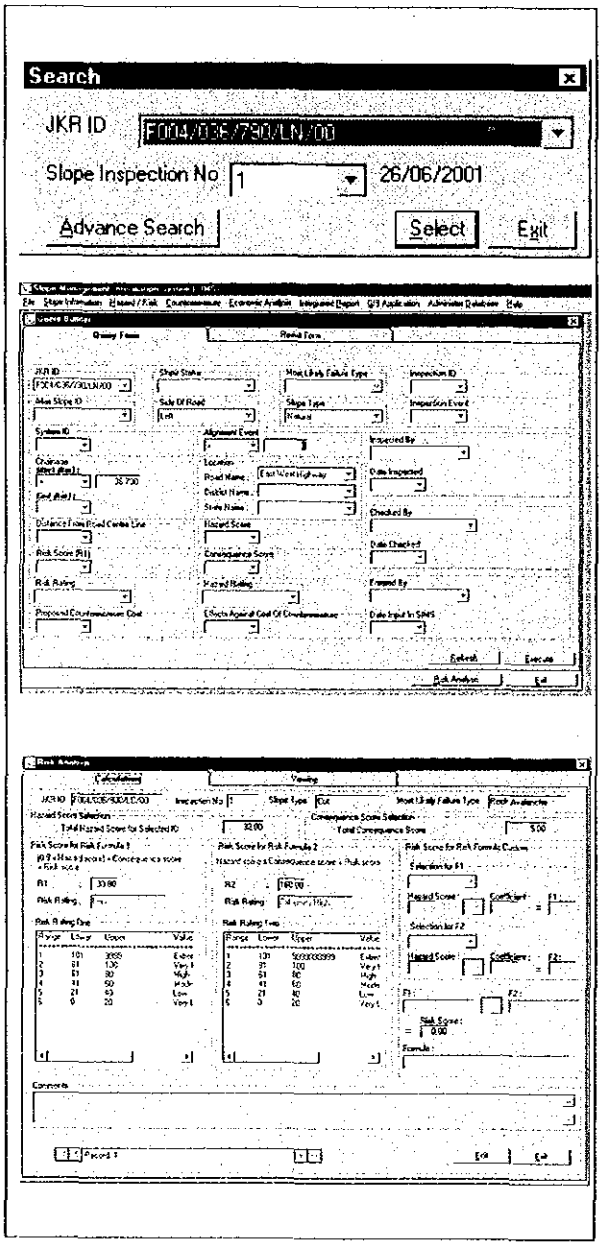



Figure2.4.28 Hazard Risk Menu

2. To calculate the hazard risk score, there are two ways to search a record.
   - Hazard/Risk -> Review (Easy Search)
   - Hazard/Risk - >Search (Query Builder).




3. For details on the usage of easy search form and query builder form, please refer to the Using Easy Search and Using Query Builder accordingly.

4. By pressing <Select> button in easy search form or <Risk Analysis) button in query builder, the Form Risk Analysis will shown.

5. There are two parts in this form, calculation and viewing.

6. User only can update the selected record when the button <Edit> being pressed. User can build a formula custom and comment the risk scores.

Figure2.4.29 Calculating Risk Score

7. There are three formulae that can be calculated in this form (Risk Formula 1, Risk Formula 2 and Risk Formula Custom).

8. Risk Formula 1 (JICA Study Team Formula) and Risk Formula 2 (Similar to SPRS Formula) are calculate by the system automatically if there are total hazard score and total consequence score for the selected slope inventory. The risk rating for these two formulae are display at the bottom of the risk score respectively.

9. To calculate the risk score with formula custom, select the <Edit> button to enable edit to the form.

10. Formula custom is build by two parts of subformula. It is either the user choose to calculate the hazard score as selection for F1 and the consequence score as selection for F2 or the other way round as shown.

11. The formula that is built from the two selections will be displayed and the risk score calculated.

12. To select other record for calculate the risk score by using the navigator button or from the datagrid as shown in the next figure, the user needs to press the <Refresh> button first.

13. The <Update> button is to save the calculated risk score for each formula into the database.

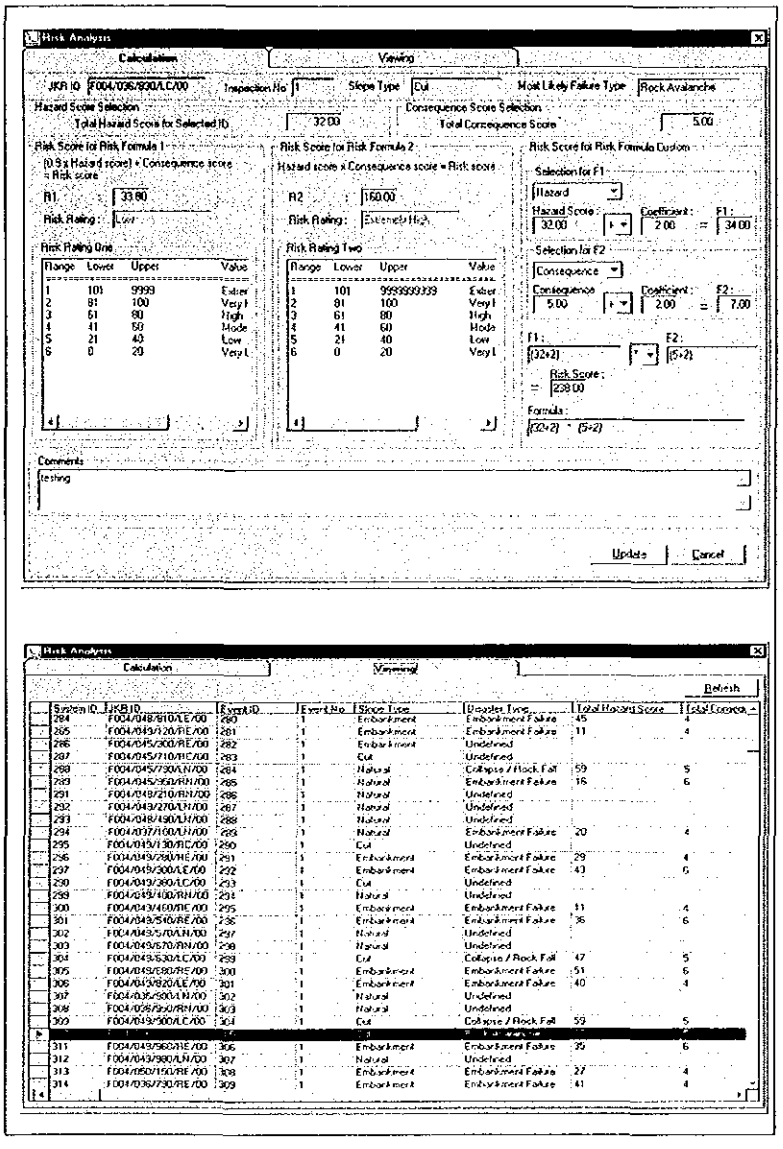



Figure2.4.30 Form Displaying Search Results

14. <Exit> button will end the task, and the <Cancel> button is use to disable the editing of this form.

### (2) Generate Hazard / Risk Report

This section will guide the user to generate and display the Hazard / Risk Report by three types of ordering: JKR ID, Hazard / Risk Score JICA and Hazard / Risk Score JKR.

1. Select one of the three ordering to generate and display the Hazard / Risk report.

2. A dialog box will pop out to let the user to choose which highway report that the user wants to generate and display as shown.

3. When the <Search> button is selected, the system will generate the report according to the highway name that selected by the user. Figures below are the examples report which are order by JKR ID, Hazard / Risk Score JICA and Hazard / Risk Score JKR respectively.

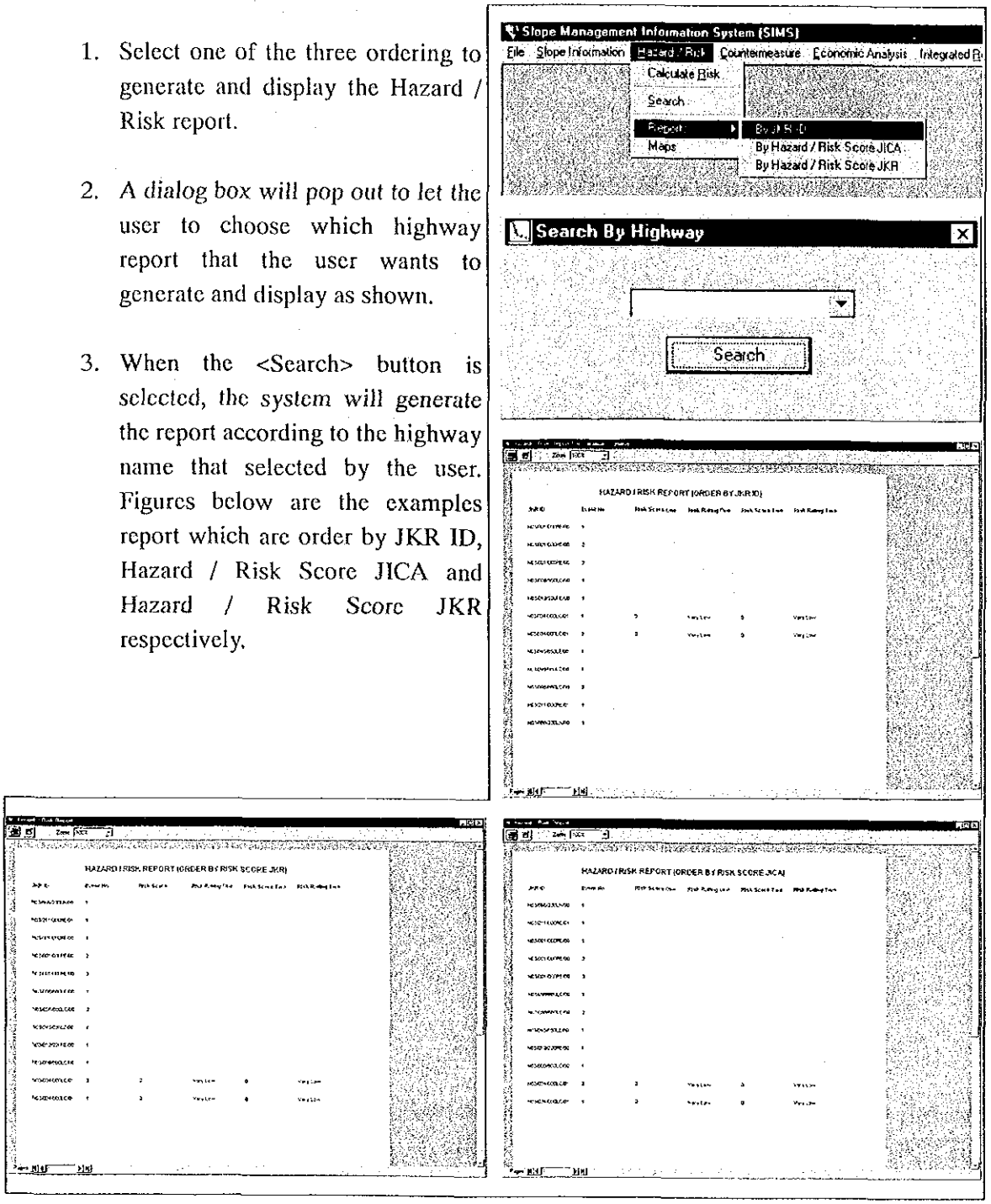



Figure2.4.31 Generating Hazard/Risk Report

The standard report will display the risk score and risk rating when the hazard / risk score for the particular JKR ID had been calculate.

### 2.4.3 Countermeasure Design

#### (1) Create New Countermeasure/ Edit Existing Countermeasure

To select the specific slope for which the countermeasure must be designed, on the menu go to *Countermeasure -> Edit* and click on it. The simple search interface will be displayed, as shown.

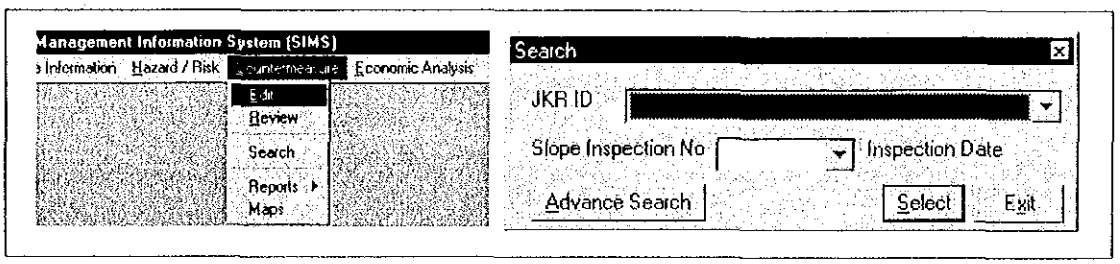



Figure2.4.32 Countermeasure Menu

1. If the JKR ID is not known, then click on the Advanced Search button and use any of the fields on this form to query the database and find the desired slope feature.

2. The results of the advanced search will be displayed in the data grid. Identify the specific slope in this data grid and double click on it. The countermeasure form for this slope record will be displayed with

3. The default counter-measure type would be displayed according to the failure type of the slope for the first time.

4. Fields requiring data entry are shown with a white background.

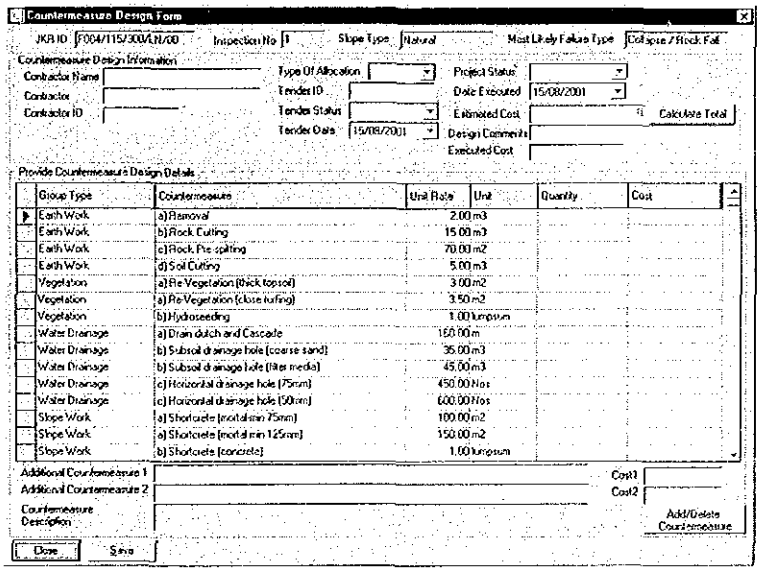



Figure2.4.33 Countermeasure Design Form

5. The add or delete the countermeasure, user need to click on button 'Groups' and a new form name 'Countermeasure Group Type' will be displayed.

6. To select sub group type from group type, user need to select one of the group type from the Group Type combo box, and the sub group type will be displayed under Countermeasure Options listbox. The list will be changed according to the Group Type being selected from the combo box.

7. User can highlight the sub group type they needed and click Add button to add the sub group type to the listbox under Selected Countermeasure Options frame. User also can press button Add All to add all the group type in list Countermeasure Options to list Selected Countermeasure Options.

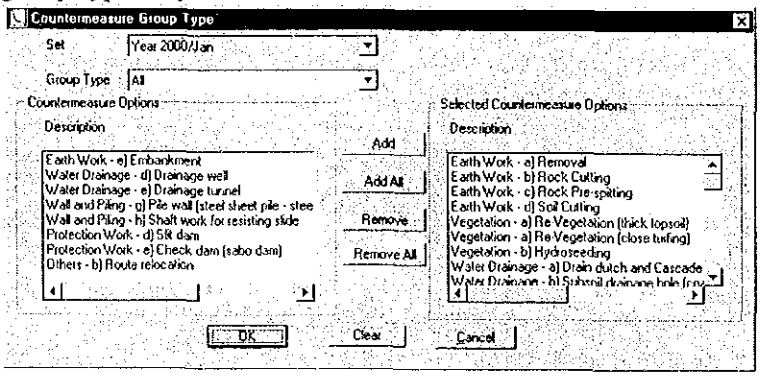



Figure2.4.34 Selecting the Sub – Groups

8. To remove the specific list from Selected Countermeasure Options, user need to highlight the specific sub group type and click Remove button. Or user can click on Remove All button to remove all the sub group type from Selected Countermeasure Options list.

9. To clear all those selection being made and return the form to original look, the user can click on Clear button.

10. To exit from the form and return to Countermeasure form, the user can click on Cancel.

11. After finished selected, click on OK button to put all those sub group type being selected to the Countermeasure datagrid under countermeasure form.

12. Then the user need to key in unit for Quantity column. The cost will be sum up for the user automatically while the user enter the Quantity (Unit Rate x Quantity).

13. Description for each type of countermeasure group type will be displayed at the bottom of the form. So user can click on the specific group type to read the description. Description also display as a tooltip when user click on the specific record.

14. User can add another 2 type of countermeasure groups type other than those display on the list. It can be added under Description 1 and Description 2 below the datagrid and the cost for them.

15. After entering all the data, user can get the total for the countermeasure by pressing Total button. Sum will be displayed in the textbox besides the Total button.

16. After all data being entered, user can click Save button to save the countermeasure record. Or click Close button to exit from the Countermeasure form without saving.

### (2) Review Countermeasure

1. To review countermeasure information, go to *countermeasure -> review* and click on it. Then the search interface will be displayed.

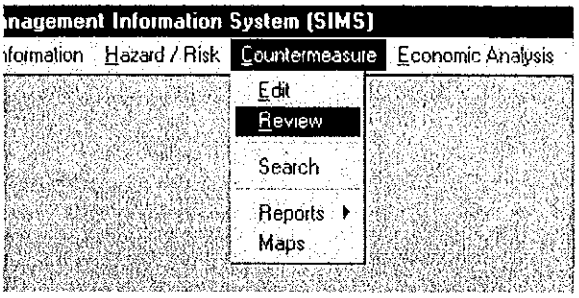



Figure2.4.35 Countermeasure Review Menu

2. Use the same search/ selection process as in above section.

3. After being identified, countermeasure for the slope will be displayed for review only. None of the part inside the form could be entered.

4. To exit from the countermeasure form, press the Close button at the bottom.

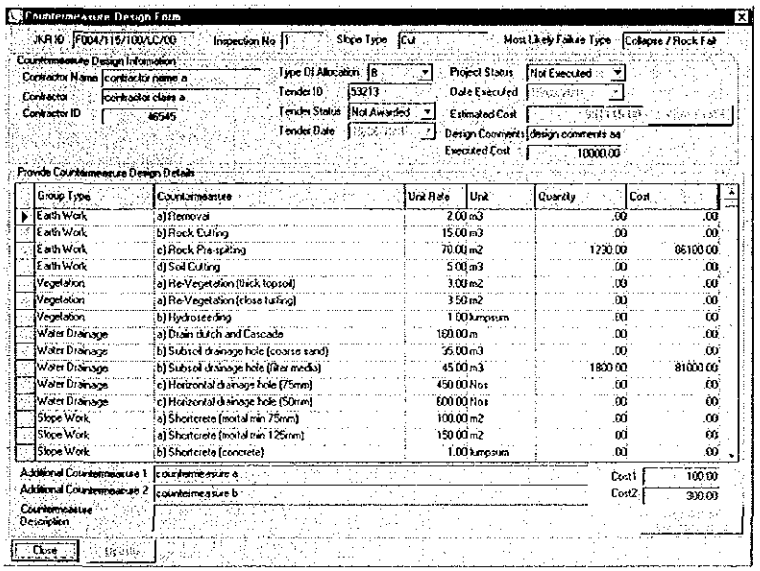



Figure2.4.36 Countermeasure Design Form

### (3) Create Report for Countermeasure

1. To create report for countermeasure that already exist, go to Menu of SIMS then click:
   - Countermeasure -> Reports -> By Individual Slope
   - Countermeasure -> Reports -> By Highway

2. Use the Search/ Selection as described in the earlier section

3. After the specific slope/s have been selected, click on the Countermeasure Report button to display the report on screen or generate a PDF file.