

# **Slope Maintenance Responsibility Information System (SMRIS)**

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## ***Background***

In Hong Kong, the lack of maintenance of man-made slopes is one of the main factors leading to landslides during the rainy season. The maintenance responsibility of slopes, however, is not obviously known in many cases and this has to interpret the conditions of the land title documents.

In July 1996, the Lands Department of the Government of HKSAR hired consultants to proceed a full-scale study of slopes in the territory to identify and document their maintenance responsibility. The maintenance responsibility information was separately stored in the Oracle database (particulars of individual slope) and the Electronic Filing System (scanned slope reports, slope plans and related documents). Since there is no connection between them, it is inconvenient for the officers to retrieve the information from the two separate systems when handling enquires or performing analysis. Also, in the absence of a GIS based computer system, it is difficult to identify the affected lots adjoining the slope, which will facilitate the identification of the appropriate responsible parties readily. The updating of slope reports and slope plans are both time and labour consuming.

Therefore, in 1999, a GIS based Slope Maintenance Responsibility Information System (**SMRIS**) was established to solve the above problem, i.e. handling of slope maintenance responsibility information, enhancing the performance of the current system and improving the management and updating of the slope maintenance responsibility information. On the other hand, the public can access the computer terminals in the Slope Maintenance Responsibility Information Centre to retrieve the maintenance responsibility information for individual slope. At the end of 2000, the public can retrieve this information from SMRIS website via Internet. The website is [www.slope.landsd.gov.hk/smrisk/](http://www.slope.landsd.gov.hk/smrisk/).

## *Architecture of SMRIS*

Basically, SMRIS consists of three main modules, Updating Module, Public Enquiry Module and Internet Module.

### **(i) Updating Module**

SMRIS consists of two Sun Enterprise 450 Servers, Production Server and Development Server. The Production Server maintains the current and proposed slope boundary, the slope boundary buffer, textual database and related document images. The Development Server is mainly to carry out further development, testing, training and on-going support of the system. Also, the SMRIS servers connected to the current file servers of Computerised Land Information System (CLIS) to retrieve the base map and cadastral information.

The Updating Module contains two parts, Updating of Graphical Data and Updating and Enquiry of Textual data. “Updating of Graphical Data” was developed in Visual Basic and Arc/Info 8. “Updating and Enquiry of Textual Data” was developed in Visual Basic and MapObject. The whole module is run under Window NT.

### **(ii) Public Enquiry Module**

Two user-friendly computer terminals with touch screen functions have been installed in the Slope Maintenance Responsibility Information Centre. This module has a vastly trimmed-down version of the updating module and a specially designed graphical user interface catered for touch-screen operations.

This module provides two search methods, **MAP SEARCH** and **KEYWORD SEARCH** for the public to inquire the slope maintenance responsibility information.

#### **(a) MAP SEARCH**

Public can navigate and zoom in/out the area of interest from the overview of map and then select the building or slope for retrieving the slope maintenance responsibility information.

## (b) KEYWORD SEARCH

To facilitate the users, the keyword search provides 7 types for retrieving the slope maintenance responsibility information, namely:

- (1) Building name,
- (2) Street name and number,
- (3) Estate name,
- (4) Slope number,
- (5) Lot number,
- (6) Licence number, and
- (7) Short Term Tenancy number

Moreover, the public can inquire by either English or Chinese and the result will be displayed in the same language. Also, the public can print the slope plan and the slope maintenance responsibility information for information.

## (iii) Internet Module

In order to facilitate the public to obtain the slope maintenance responsibility information effectively and efficiently, a separate bilingual system has been developed for the public to access the SMRIS via Internet at the end of 2000. The provision of Bilingual Internet System improves the accessibility to slope maintenance information and widens the reach of the public on the slope maintenance information. This system provides the MAP SEARCH and seven types of KEYWORD SEARCH for enquiry the slope maintenance responsibility information.

This system is established separately from the SMRIS and developed by another methodology and technology. The infrastructure consists of Map and Data server, Staging Server, Web Server, Firewall, Mapping component for Internet deployment and Browser Interface.

This system used a spatially enabled database (i.e. Oracle 8i with Spatial data Option) as the map and data server to achieve a robust and scalable solution. This means that a consolidated data store will be created from the existing separate graphic and textual data stores of SMRIS. Separate data conversion processes will be developed to import the required data from SMRIS and CLIS. It developed in MapXpreme, JavaScript and HTML.

## ***Conclusion***

A GIS based Slope Maintenance Responsibility Information System (**SMRIS**) is to provide a central database for both graphic data, textual data and relevant related document images, to improve the efficiency of identification of slope maintenance responsibility information and the efficiency and effectiveness of retrieval the slope maintenance responsibility information, to shorten the time to answer the enquires on the slope maintenance responsibility, to update the slope maintenance responsibility effectively and efficiently, to provide the spatial analysis facility for better support slope maintenance responsibility identification and decision making and to provide the management and statistical reports for monitoring the updating of database and formulating policy on the slope safety issue.

In addition, the provision of the Public Enquiry of slope maintenance responsibility in both Chinese and English via Internet and Centre is to improve the convenience and efficiency in delivering the information to the Public, to improve the accessibility and widen the reach of the Public enquiry on the slope maintenance responsibility information. Hence it helps to arouse the Public awareness of slope inspection and planning for regular maintenance slopes at an early stage.