

Application of GIS Technology on slope registration for the prevention of landslide

WOO Chi Pong, MHKIS, MRICS



Civil Engineering and Development Department
The Government of the Hong Kong Special Administrative
Region, China

Hong Kong

- 1,100 Km² – Area
- 2,200mm – Annual average rainfall (80% between May and September)
- 200~300 Nos – Annual landslips



Civil Engineering and Development Department

- Implement and maintain high quality public works projects in Hong Kong
 - Oversee Slope Safety System
 - Implement 10-year Extended Landslip Preventive Measures Programme
 - Annual budget : US\$ 115,000,000
 - Registered man-made slopes : 58,000



Substandard



Up-to-Standard



Slope Safety Division

- Oversee Slope Information System (SIS)
 1. Slope field data, digital slope map, landslide incident, geology,
 2. Slope Types (8 Nos.)



Survey Division

- Oversee Computerized Slope Registration and Location Plan (CSRLP) System
 - digital slope map
- Support Squatter Slope Information System
 - data analysis



CSRLP V1.0 (1996)

- 1970's :
catalogue of slopes
(paper)
- 1994 :
field inspection, aerial
photos, existing
topographic plans



5 Main Functions (1996)

1. Slope Registration – unique slope no.
(e.g. 11NE-A/FR88)
2. Plan Production – interactive/batch
3. Data Retrieval – sheet no./slope no./slope
type/extent of area
4. System Administration – access
authority/backup
5. Network Administration



CSRLP	V1.0 1996
Hardware	
Server	P100 Dual CPU 64 MB 9 GB HD
Workstation	P100 Single CPU 32 MB 1 GB HD
Peripherals	A0 digitizer
Backup	4GB 4mm tape drive
UPS	10 minutes
Software	
	- NT Networking and operating system - NT MicroStation - NT Geographic - NT Oracle 7 RDBMS
Link to SES	T1



Areas for Improvement

- 8 slope types or more ?
- Adjacent slope affected during
modification ?
- Job progress ?



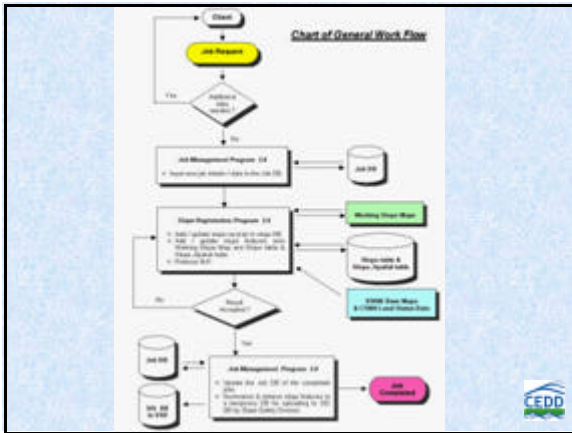
CSRLP (V2.0) (2006)

1. Spatial Data Object – Oracle / Single
entity (graphic + text)
2. Interface Programme – VBA
3. Data Quality Checking
4. Add-on land status – land ownership /
maintenance responsibility
5. Job Monitoring – trace job progress



CSRLP	V1.0- 1996	V2.0- 2006
Hardware		
Server	P100 Dual CPU- 64 MB- 9 GB HD-	Xeon 3.2GHz (Dual CPU)- 1 GB- 100 GB-
Workstation	P100 Single CPU- 32 MB- 1 GB HD-	PIV 3.0 GHz- 512 MB- 144 GB HD-
Peripherals	A0 digitizer-	Calcomp 16400 A0 digitizer- HP 4450-4s Colour Laser Printer- Scanner-
Backup	4GB 4mm tape drive-	14 GB tape drive-
UPS	10 minutes-	12 minutes-
Software		
	- NT Networking and operating system- - NT MicroStation- - NT Geographic- - NT Oracle 7 RDBMS-	- Microsoft Windows 2000 Server- - Microsoft Windows XP for Workstations- - Oracle Enterprise 9i- - MicroStation V8i 2004- - MicroStation Geography V8i 2004- - ArcServe Backup v11.1 for Windows- - ArcServe Backup Agent for Oracle- - Oracle Backup Disaster Recovery Options-
Link to SES	T1-	T1-



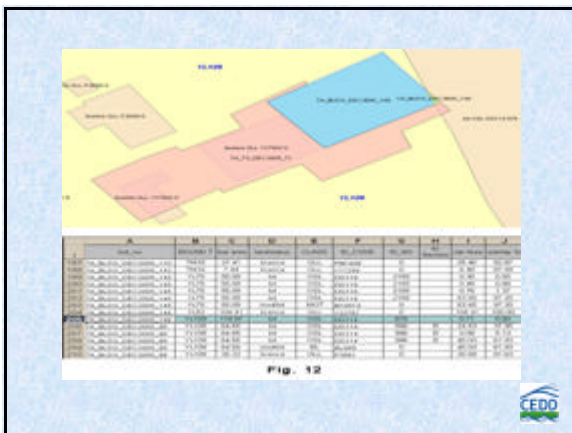
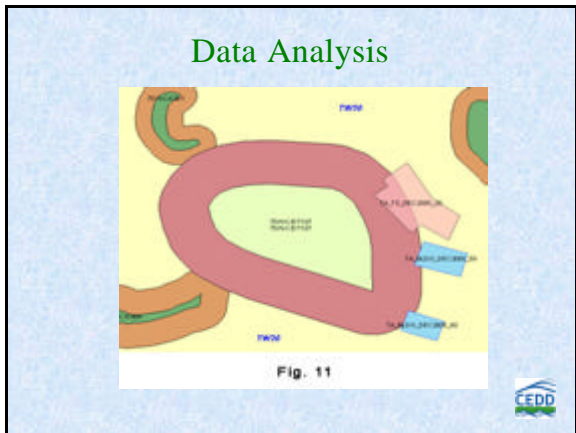


Squatter Slope Information System (2002)

- 1980's – 75,000 people
- 2003 – 9,600 people

Components

1. Non Development Clearance Area
2. Cadastral Information
3. Base Map Information
4. Slope Boundary Information



Way Forward

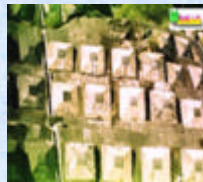
1. Information sharing
2. Efficient data management
3. Slope modification history



Thank You



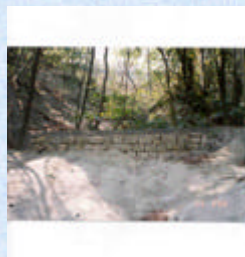
Cutting



Filling



Cutting&Filling Cutting&Retaining



1,100 Km²



57,000 Registered Slopes
in Hong Kong



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Civil Engineering Department



1,100Km² , 7 Million



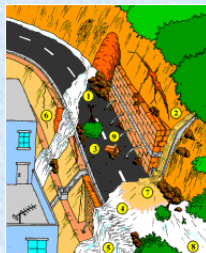
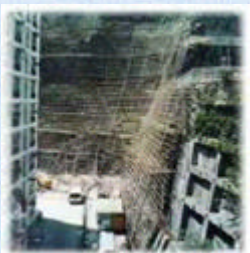
Present day Hong Kong
(Intense development on hillsides)



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Slope near building



Slope near highway



Many slopes formed for
infrastructure development



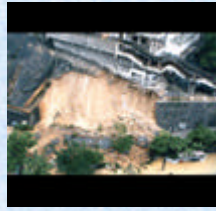
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Landslip



Landslip



1972 landslip



- 67 fatalities



Slope Registration Plate



Interface Programme

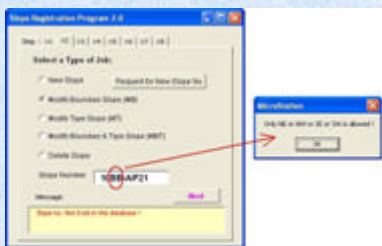


Fig. 3



Dangling Node

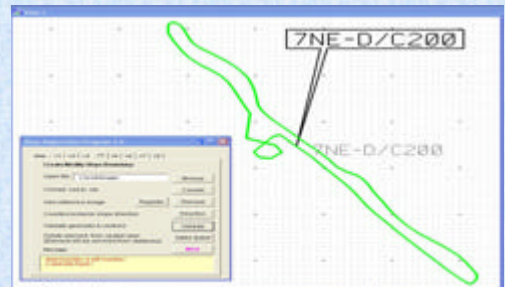
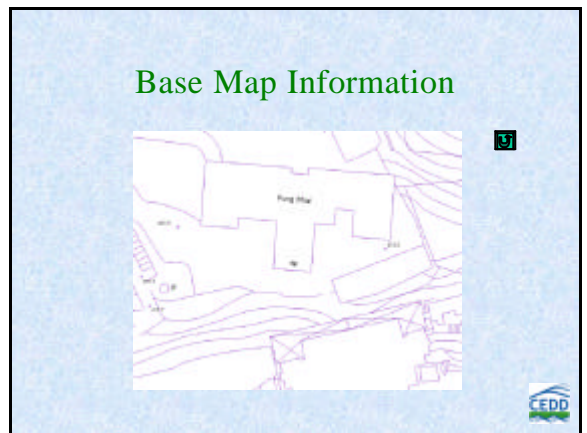
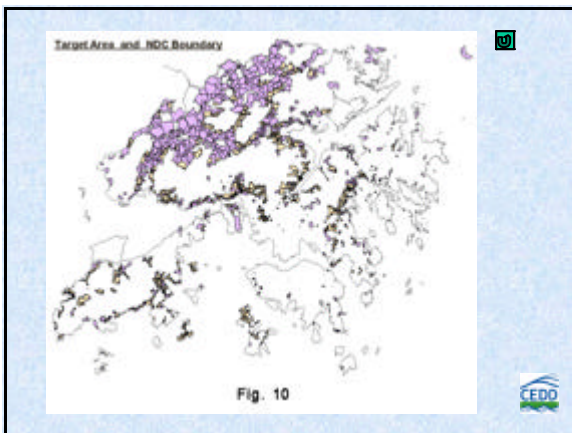
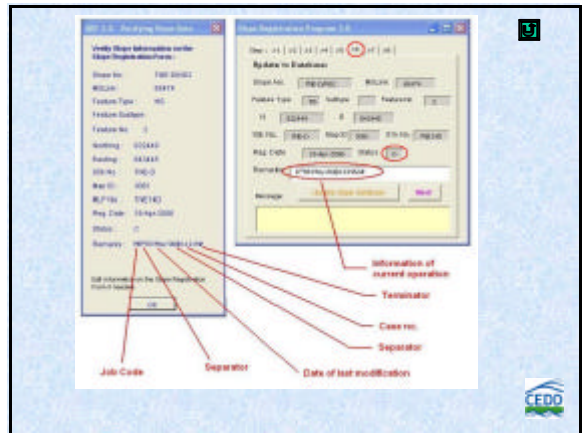
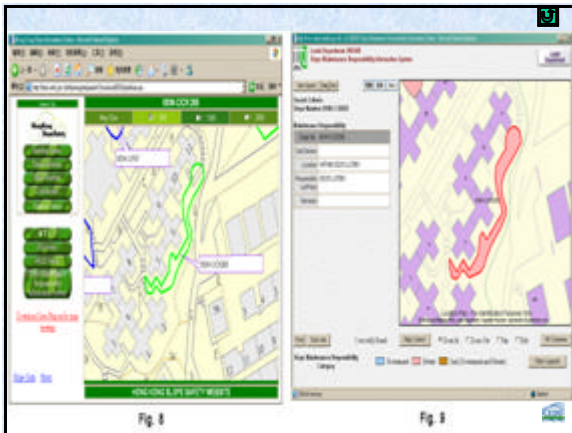
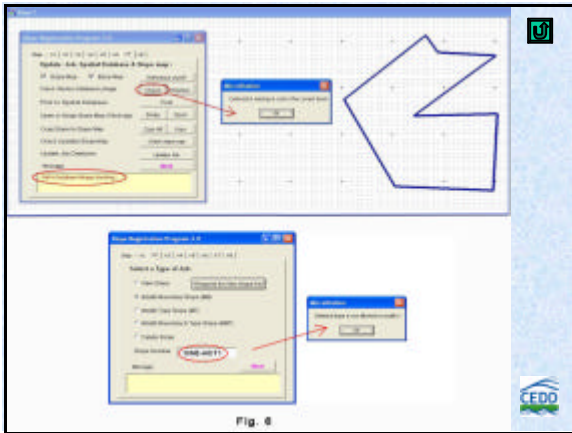


Fig. 5





Cadastral Information



Slope Boundaries



Job Progress

A screenshot of a 'Job Index Search' dialog box. The dialog has several input fields and buttons. The 'Slope Index' field is highlighted with a red circle. Below the dialog, there is a yellow message box that says 'No job found for the selected criteria'.



Job No	Job Name	Job Status	Job Type	Job Date	Job Location	Job Area	Job Size	Job Cost
100000	100000	100000	100000	100000	100000	100000	100000	100000
100001	100001	100001	100001	100001	100001	100001	100001	100001
100002	100002	100002	100002	100002	100002	100002	100002	100002
100003	100003	100003	100003	100003	100003	100003	100003	100003
100004	100004	100004	100004	100004	100004	100004	100004	100004
100005	100005	100005	100005	100005	100005	100005	100005	100005
100006	100006	100006	100006	100006	100006	100006	100006	100006
100007	100007	100007	100007	100007	100007	100007	100007	100007
100008	100008	100008	100008	100008	100008	100008	100008	100008
100009	100009	100009	100009	100009	100009	100009	100009	100009
100010	100010	100010	100010	100010	100010	100010	100010	100010

