Supplementary pages to

the disk of

The Directory of the World Landslide Inventory

by

William M. Brown III

David M. Cruden

and

Judith S. Denison

USGS Open-File Report 92-427 - B

June 1992

comprising:

Table of foreign characters

Appendix

FOREIGN CHARACTERS USED IN THE DIRECTORY OF THE WORLD LANDSLIDE INVENTORY

ASCII Characters

Hex	Dec	Char	Hex	Dec	Char	Hex	Dec	Char
80	128	Ç	90	144	É	A0	160	á
81	129	ü	91	145	æ	A1	161	í
82	130	é	92	146	Æ	A2	162	ó
83	131	â	93	147	ô	A3	163	ú
84	132	ä	94	148	ö	A4	164	ñ
85	133	à	95	149	ò	A5	165	Ñ
86	134	å	96	150	û	A6	166	ª
87	135	ç	97	151	ù	A7	167	º
88	136	ê	98	152	ÿ	A8	168	¿
89	137	ë	99	153	Ö	AD	173	¡
8A	138	è	9A	154	Ü	AE	174	«
8B	139	ï	9B	155	¢	AF	175	»
8C	140	î	9C	156	£	E1	225	ß
8D	141	ì	9D	157	¥			
8E	142	Ä	9E	158	₧			
8F	143	Å	9F	159	ƒ			

Diacriticals

Characters with diacritical marks that are not included in the above list are represented by a character pair, as in the examples below. The character pair is preceded by a pound sign (#) and can be replaced by the appropriate symbol using your own word processor. The pairs shown are appropriate for WordPerfect 5.1 "Compose".

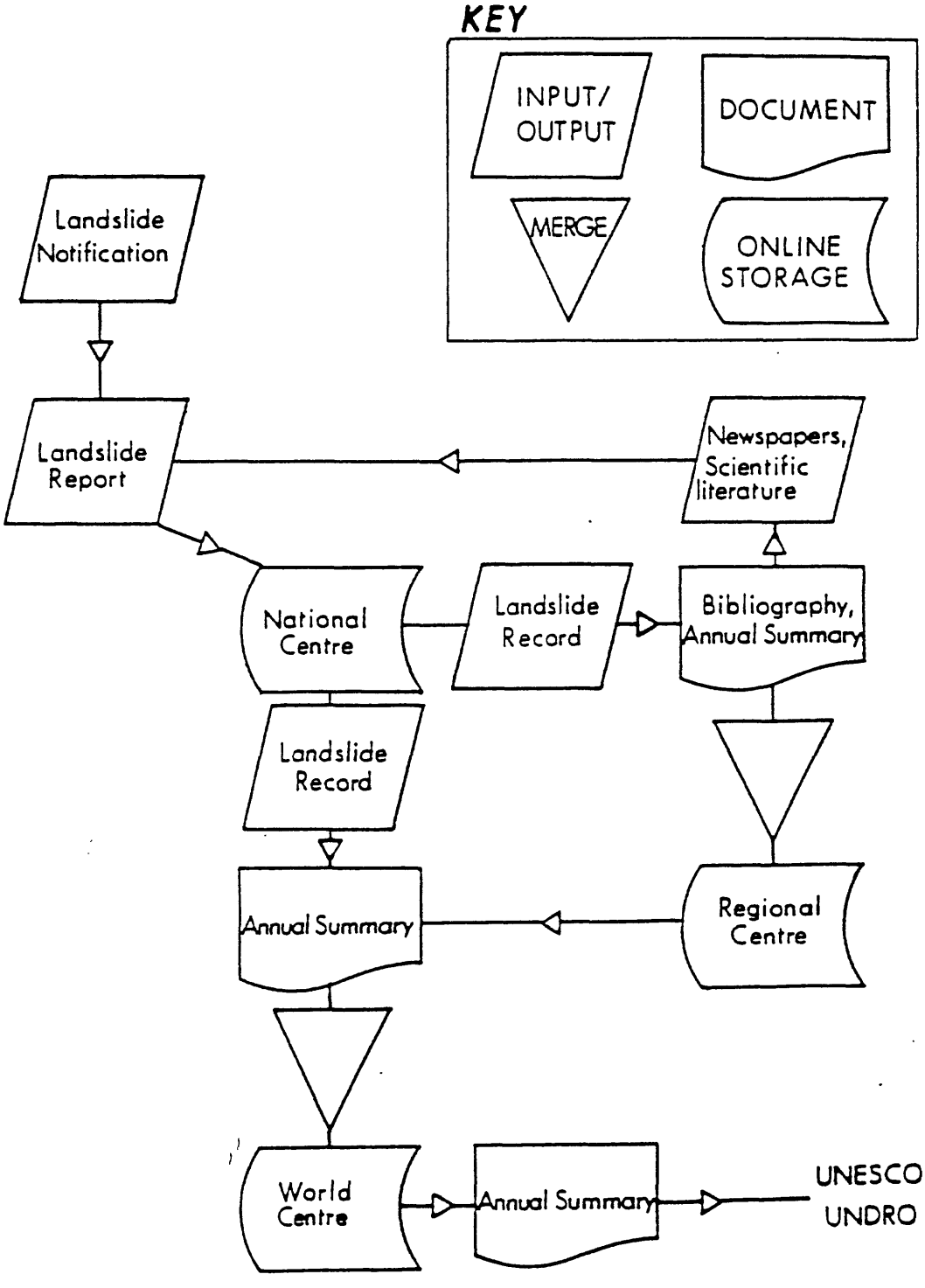
Mark	Example	Result
Acute	'E	É
Caron	vc	č
Cedilla	,c	ç
Centered Dot	:l	l·
Circumflex	^a	â
Crossbar	-t	ŧ
Dot Above	.c	ċ
Grave	`e	è
Macron	_u	ū
Ogonek	;a	ą
Ring Above	@a	å
Slash	/o	ø
Stroke	\l	ł
Tilde	~n	ñ
Umlaut	"u	ü

APPENDIX

Concept and preparation of the World Landslide Inventory (WP/WLI, 1990 and 1991).

Conceptual Information Flow for the

World Landslide Inventory



United States Department of the Interior

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In reply refer to:
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TAKE PRIDE IN AMERICA

October 1991

Greetings!

Reliable historical data on the world distribution of landslides is fundamental for disaster risk assessment and for averting loss of life and economic damages.

With this end in mind, and in conjunction with the United Nations International Decade for Natural Disaster Reduction, a Working Party on World Landslide Inventory (WP/WLI) has been formed under the auspices of UNESCO.

The WP/WLI is now setting up an list of contact persons in each country who could provide information on landslides in that country.

Your organization has been suggested to us as a possible source for landslide information for your country. If your office is able to provide such information, we would appreciate it very much if you would return the enclosed form as soon as possible to the above address or FAX number. We will provide you periodically with reports and other information on the status of the World Landslide Inventory.

If your office does not have access to information on landslides, it would be most helpful if you would forward this letter to the appropriate agency, or return the form to us with a notation of the name and address of the agency. Also, please inform us if your organization should not be on our mailing list.

The contribution of each country is important to provide complete coverage of the Earth's surface.

Thank you very much. We look forward to cooperation and exchange of information in the future.

Sincerely yours,

William M. Brown III
Judith S. Denison
National Landslide Information Center

#212

WP/WLI REPORT OF CURRENT LANDSLIDE INVENTORY

COUNTRY:

CLASS OF INVENTORY (see definitions below):

PERSON IN CHARGE:

POSITION:

ADDRESS:

TELEPHONE: FAX:

TELEX: CABLE:

INVENTORY CONTACT:

ADDRESS:

TELEPHONE: FAX:

TELEX: CABLE:

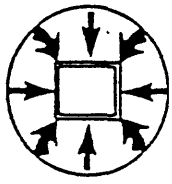
ADDITIONAL COMMENTS:

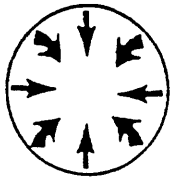
DEFINITIONS: An inventory is a detailed list. The WP/WLI has recognized five Inventory Classes as follows:

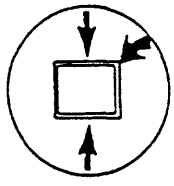
Class 5: Machine processible with systematic data capture and complete national coverage
Class 4: Systematic data capture and complete national coverage
Class 3: Machine processible local inventory
Class 2: Local inventory
Class 1: No inventory, some landslides known
(Class 0: Nothing known)

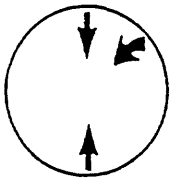
Please return to: William M. Brown III, NLIC, USGS, Box 25046, MS 966, Federal Center, Denver, CO 80225, U.S.A. (FAX 303/273-8600)

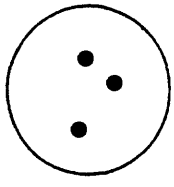
Inventory Classes

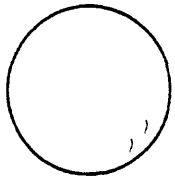
Class 5:  Machine processible with systematic data capture and complete national coverage

Class 4:  Systematic data capture and complete national coverage

Class 3:  Machine processible local inventory

Class 2:  Local inventory

Class 1:  No inventory, some landslides known

Class 0:  Nothing known

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(International Association of Engineering Geology,
International Society for Soil Mechanics and Foundation Engineering,
International Society of Rock Mechanics)
UNESCO WORKING PARTY
ON WORLD LANDSLIDE INVENTORY

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WORKING GROUPS: WP/WLI

Topic	Members	
Rate of Movement	C. Bonnard	**Chairman**
	H.H. Einstein	
	D.J. Varnes	
	D.M. Cruden	
	G. Salt	
	S. Novosad	
	Z. G. Ter-Martirosian	
	Z.Y. Zhang	
Causes of Landslides	M. Popescu	**Chairman**
	R. Fell	
	D.M. Cruden	
	S. Novosad	
	J. Farkas	
	P. Anagnosti	
	W.A. Lacerda	
	K. Sassa	
	F. Esu	
	G.X. Wang	
Geology	R. Fell	**Chairman**
	H. Nakamura	
	L. Beltran	
	D.M. Cruden	
	Z.Y. Zhang	
	E. Krauter	
Distribution of Movement	D.M. Cruden	**Chairman**
	W.H. Ting	
Activity	D.J. Varnes	
	J.N. Hutchinson	
(2 topics)	S. Novosad	
	G.X. Wang	
	J. Farkas	
Landslide Summaries	D.M. Cruden	**Chairman**
	C. Bonnard	
	H.H. Einstein	
	K.Sassa	
	M. Hashizume	
	M. Popescu	
	Z.Y. Zhang	
Damage	H. Einstein	**Chairman**
	M. Pachakis	
	E. Krauter	
	D.M. Cruden	

The Landslide Report Form - Side One

LANDSLIDE REPORT

Date of Report day ____ / mo. ____ / yr. ____

Landslide Locality _____ National Inventory Number _____

Reporter: Name _____

Affiliation _____

Address _____

_____

_____

_____

Phone _____

Position: Latitude degrees _____ ° minutes _____ ' seconds _____ " hemisphere _____

Longitude _____ ° _____ ' _____ " hemisphere _____

Elevation: crown _____ m a.s.l.

rupture surface toe _____ m a.s.l.

tip _____ m a.s.l.

Date of occurrence: day ____ / mo. ____ / yr. ____

Type: First movement (circle the appropriate numbers and terms)

1. rock 2. debris 3. earth

1. fall 2. topple 3. slide 4. lateral spread 5. flow

Second movement (circle the appropriate numbers and terms)

1. rock 2. debris 3. earth

1. fall 2. topple 3. slide 4. lateral spread 5. flow

The Landslide Report Form - Side Two

Geometry: Rupture Surface Displaced Mass

Length L_r = _____ m L_d = _____ m L = _____ m

Width W_r = _____ m W_d = _____ m

Depth D_r = _____ m D_d = _____ m

Volume: $V = \pi L_d D_d W_d / 6$ or V = Swell factor =

V = _____ $m^3 \times 10^n$ n = _____

Damage: Value _____ Currency _____

Injuries _____ Deaths _____

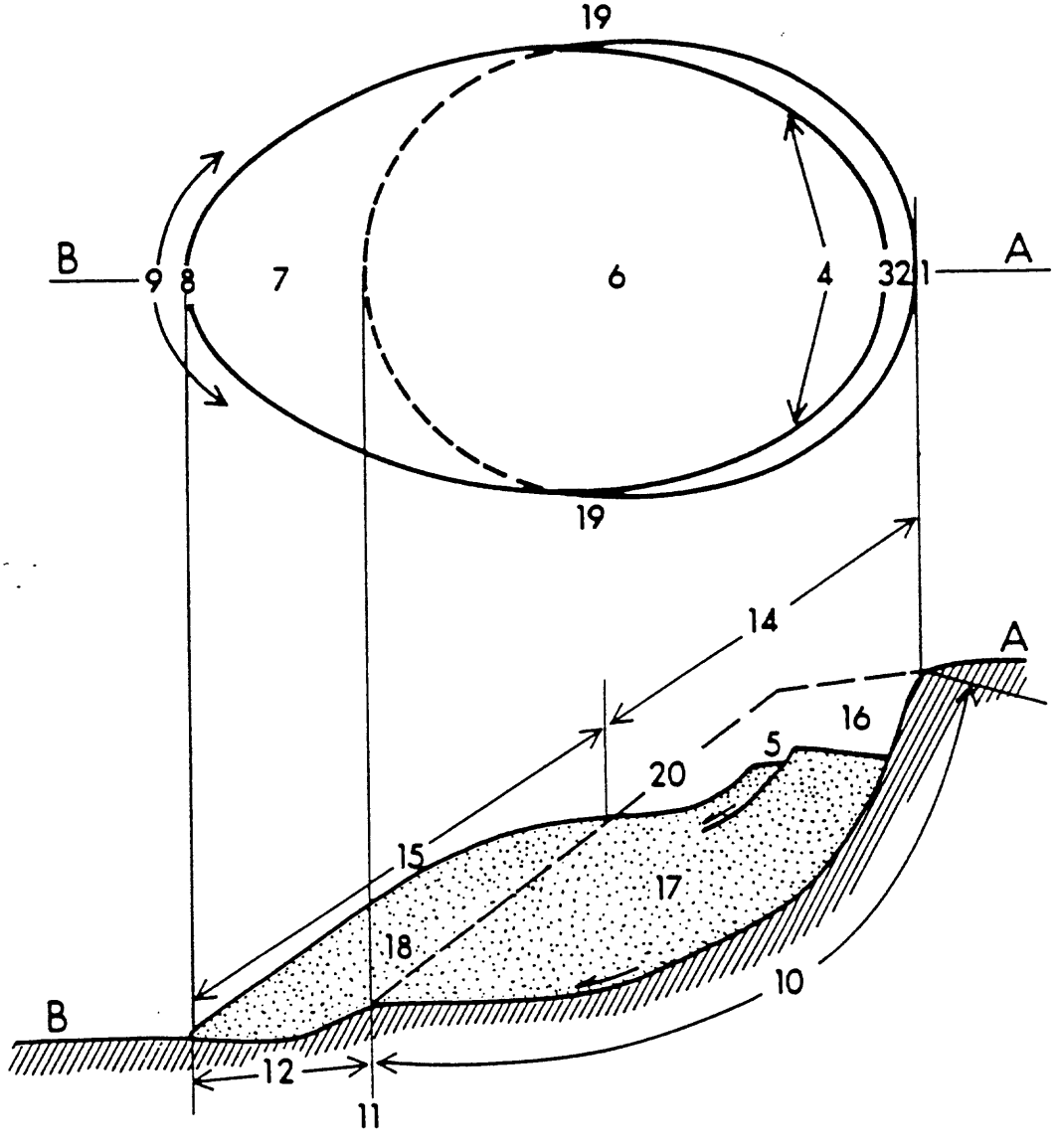
References:

1. _____

2. _____

3. _____

Comments: _____

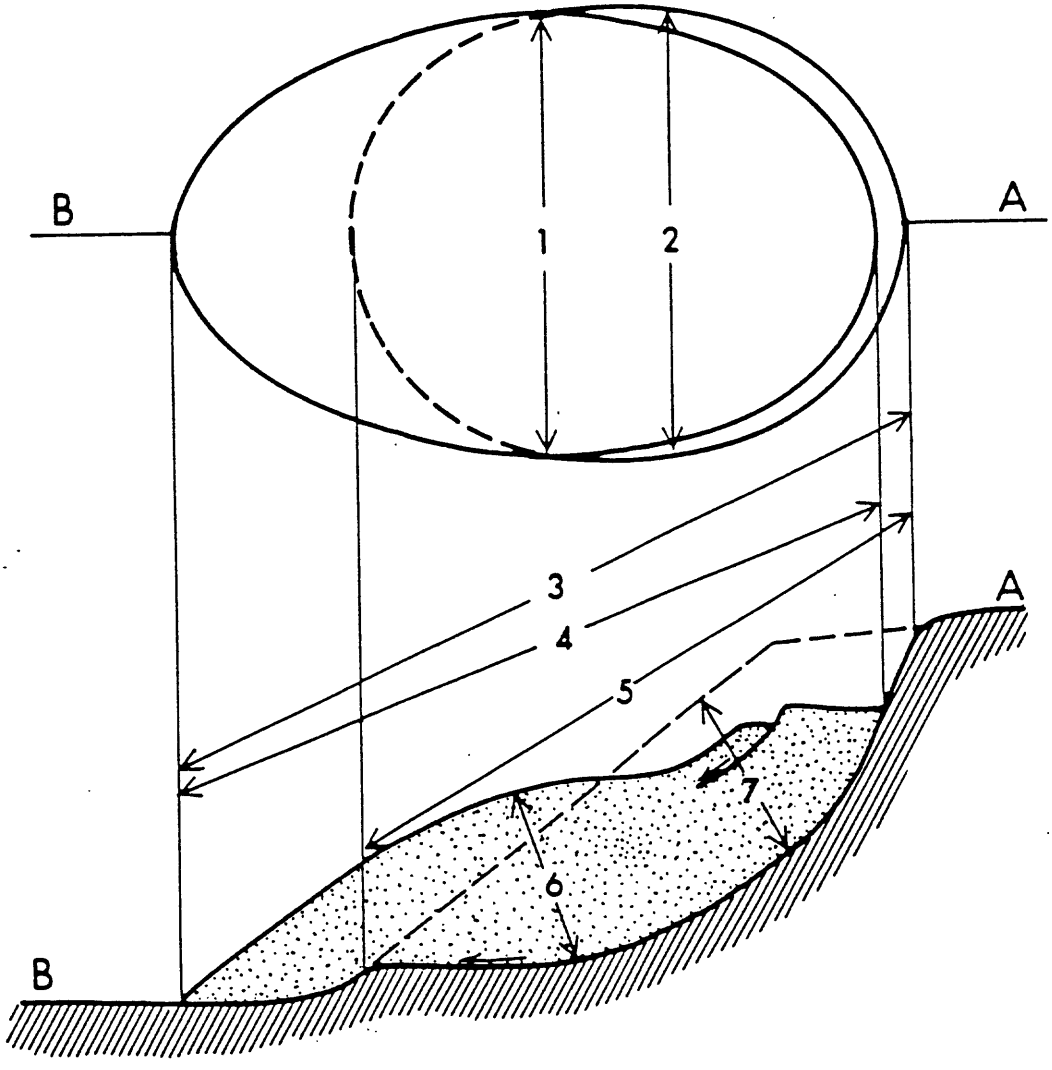


Landslide Features

Landslide Features

1) **Crown:** The practically undisplaced material adjacent to the highest parts of the main scarp.
2) **Main scarp:** A steep surface on the undisturbed ground at the upper edge of the landslide caused by movement of the displaced material away from the undisturbed ground.
3) **Top:** The highest point of contact between the displaced material (13) and the main scarp (2).
4) **Head:** The upper parts of the landslide along the contact between the displaced material and the main scarp (2).
5) **Minor scarp:** A steep surface on the displaced material of the landslide produced by differential movements within the displaced material.
6) **Main body:** The part of the displaced material of the landslide that overlies the surface of rupture between the main scarp (2) and the toe of the surface of rupture (11).
7) **Foot:** The portion of the landslide that has moved beyond the toe of the surface of rupture (11) and overlies the original ground surface (20).
8) **Tip:** The point on the toe (9) farthest from the top (3) of the landslide.
9) **Toe:** The lower, usually curved margin of the displaced material of a landslide, it is the most distant from the main scarp (2).
10) **Surface of rupture:** The surface forming the lower boundary of the displaced material below the original ground surface.
11) **Toe of surface of rupture:** The intersection (usually buried) between the lower part of the surface of rupture (10) of a landslide and the original ground surface.
12) **Surface of separation:** The part of the original ground surface now overlain by the foot (7) of the landslide.
13) **Displaced material:** Material displaced from its original position on the slope by movement in the landslide. It forms both the depleted mass (17) and the accumulation (18). It is stippled in the figure.
14) **Zone of depletion:** The area of the landslide within which the displaced material (13) lies below the original ground surface (20).
15) **Zone of accumulation:** The area of the landslide within which the displaced material lies above the original ground surface (20).
16) **Depletion:** The volume bounded by the main scarp (2), the depleted mass (17) and the original ground surface (20).
17) **Depleted mass:** The volume of the displaced material which overlies the rupture surface (10) but underlies the original ground surface (20).
18) **Accumulation:** The volume of the displaced material (13) which lies above the original ground surface (20).
19) **Flank:** The undisplaced material adjacent to the sides of the rupture surface. Compass directions are preferable in describing the flanks but if left and right are used, they refer to the flanks as viewed from the crown.
20) **Original ground surface:** The surface of the slope that existed before the landslide took place.

Figure legend The upper portion of the figure is a plan of a typical landslide, the dashed line in it is the trace of the rupture surface on the original ground surface. In the section in the lower portion of the figure, cross hatching indicates undisturbed ground, stippling shows the extent of the displaced material.



Landslide Dimensions

Landslide Dimensions

1) Width of the displaced mass, W_d, the maximum breadth of the displaced mass perpendicular to the length, L_d.

2) Width of the rupture surface, W_r, the maximum width between the flanks of the landslide, perpendicular to the length, L_r.

3) Total length, L, the minimum distance from the tip of the landslide to its crown.

4) Length of the displaced mass, L_d, the minimum distance from the tip to the top.

5) Length of the rupture surface, L_r, the minimum distance from the toe of the surface of rupture to the crown.

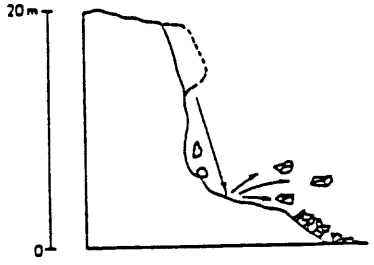
6) Depth of the displaced mass, D_d, the maximum depth of the displaced mass, measured perpendicular to the plane containing W_d and L_d.

7) Depth of the rupture surface, D_r, the maximum depth of the rupture surface below the original ground surface measured perpendicular to the plane containing W_r and L_r.

In the section, cross hatching indicates undisturbed ground and the broken line is the original ground surface. The dashed line in the plan is the trace of the rupture surface on the original ground surface.

Types of Landslides

1



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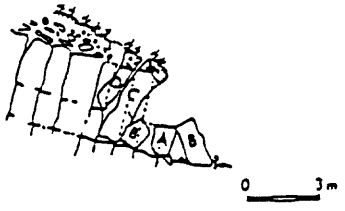

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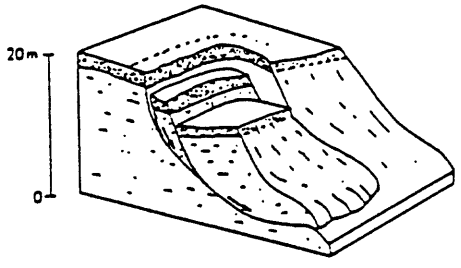

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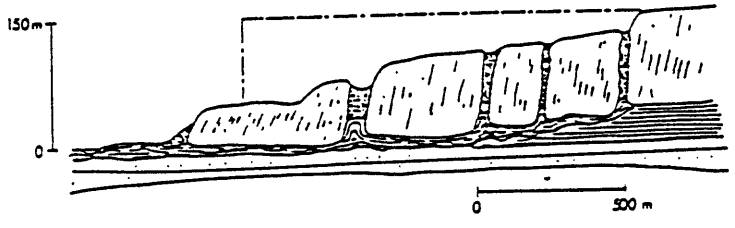
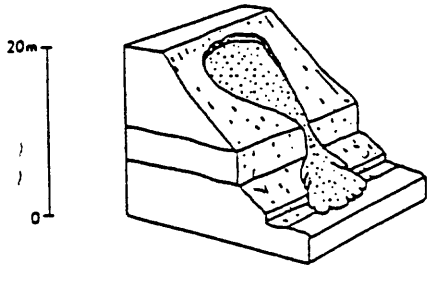


5



Types of Landslides

1) A Fall starts with the detachment of soil or rock from a steep slope along a surface on which little or no shear displacement takes place. The material then descends largely through the air by falling, saltation or rolling.

2) A Topple is the forward rotation, out of the slope, of a mass of soil or rock about a point or axis below its centre of gravity.

3) A Slide is a downslope movement of a soil or rock mass occurring dominantly on surfaces of rupture or relatively thin zones of intense shear strain.

4) A Spread is an extension of a cohesive soil or rock mass combined with a general subsidence of the fractured mass of cohesive material into softer underlying material. The rupture surface is not a surface of intense shear. Spreads may result from liquefaction or flow (and extrusion) of the softer material.

5) A Flow is a spatially continuous movement in which surfaces of shear are short-lived, closely spaced and not usually preserved. The distribution of velocities in the displacing mass resembles that in a viscous fluid.

The figures are based on examples from D.J. Varnes, 1978, Transportation Research Board Special Report 176, Figure 2.1. Broken lines indicate the original ground surface. Arrows show portions of the trajectories of individual particles of the displaced mass.