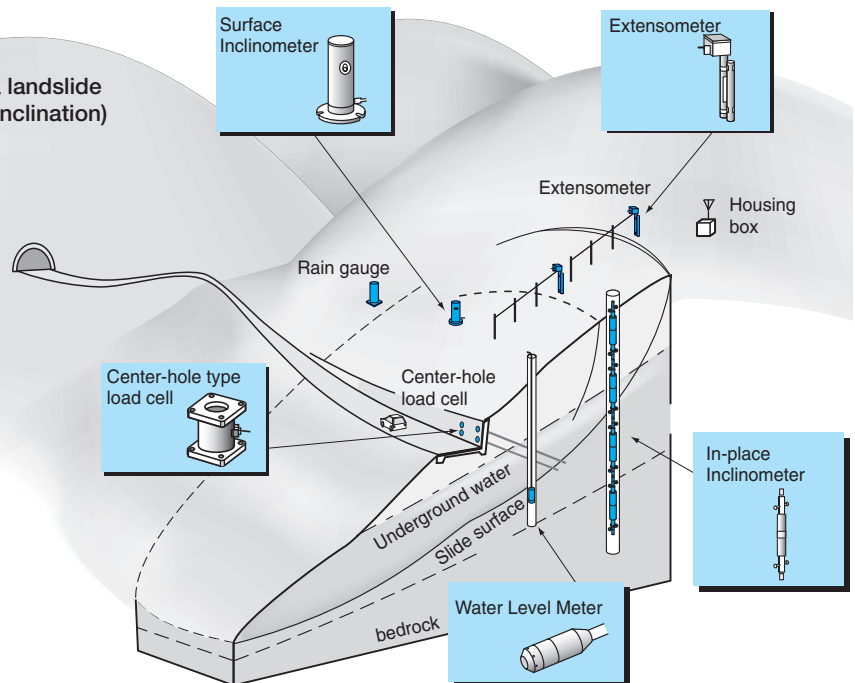


12 Landslide Measurement

In making a landslide measurement plan, it is necessary to have a thorough knowledge of the three-dimensional profile and the ground-movement direction of landslide area. A measurement system that TML recommends is a centralized, automated measurement control system in which measuring instruments, data loggers, computers, and so on are connected in an online network. The addition of a communication function would turn this system into a wireless-communications measurement system.

Main measurement items

- Ground surface displacement caused by a landslide (conditions of expansion/contraction and inclination)
- Variation of underground water
- Sliding surface displacement
- External stress on and deformation of structures built to prevent landslide



A list of Measuring Instruments

Measurement objects	Measurement items	Instruments	Type
Variation of ground surface	Expansion	Extensometer	KLG-A, KLG-B, NKLG-A, NKLG-B
		Water-tube displacement meter	KWL-B/-E
	Moving pile/survey apparatus	Other maker	
Variation of Underground	Inclination	Inclinometer	KB-AB, KB-AC
	Soil mass movement	Insertion type inclinometer	KB-GC, KB-HC
		In-place inclinometer	KB-JE, KB-KE, NKB-LD, NKB-MD
Hydrological observation	Underground water pressure	Pipe strain meter	P401
		Water level meter	KW-C
	Wheather	Pore pressure gauge	KPB-PA, KPD-PA
		Rain gauge	Other maker
Behaviour of strctures	Soil pressure	Snow depth meter	Other maker
		Soil pressure gauge	KDB-PA, KDD-PA, KDF-PA
	Stress	Strain transducer	KM-A, KM-AT, KM-B, KM-BT
		Re-bar meter	KSA-A, KSAT-A
	Inclination	Insertion type inclinometer	KB-GC, KB-HC
		Small inclinometer	KB-DB, KB-EB, KB-AB, KB-AC
		In-place inclinometer	KB-JE, KB-KE, NKB-LD, NKB-MD
Axial force of anchor	Center-hole load cell	CLC-NA, KCM-NA, KCE-NA	

Measuring System Block Diagram

