

Study of Tertiary Creep Mechanism by Ring Shear Apparatus in Predicting Initiation Time of Rainfall–Induced Landslides

BACKGROUND

Landslides are complex geo-disasters frequently triggered by earthquake and/or intense heavy rainfall or other related natural/ anthropogenic impacts. Such catastrophic disasters have not only claimed residents' lives, but also resulted in property damages and other socio-economic consequences, which significantly interrupts the development of the communities and nations. Since the social resources for preventing those threatening potential landslides is limited in every country, the best solution is safe evacuation immediately before the final catastrophic failure of the landslide. To realize the effective evacuation, reliable prediction methodology must be established.

Accordingly, in landslide fields, failure-time prediction methods of landslide have been widely developed by many researchers. Remarkably, Fukuzono (1985) found a new method for predicting failure time of a slope based on the findings obtined from a series of large scale flume tests that logarithm of acceleration is proportional to logarithm of velocity of surface displacement immediately before the

Test no.	Samples	OCR	Pore pressure increase rate (du/dt, kPa/hr.)
1	SS8	1.0	150
2	SS8	1.0	150
3	SS8	1.0	150
4	SS8	1.0	100
5	SS8	1.0	100
6	SS8	1.0	100
7	SS8	2.0	150
8	SS8	2.0	150
9	SS8	2.0	150
10	SS8	2.0	100
11	SS8	2.0	100
12	SS8	2.0	100
13	SS8	4.0	150
14	SS8	4.0	150
15	SS8	4.0	150
16	SS8+Ben10%	1.0	150
17	SS8+Ben10%	1.0	150
18	SS8+Ben10%	1.0	150
19	SS8+Ben10%	5.0	150
20	SS8+Ben20%	1.0	75
21	E1 Salvador	1.0	25
22	Shobara	1.0	150

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- 1. Samples were freely placed with filter paper insertion at the top and bottom.
- 2. CO₂ and de-aired water circulation for 1 or 2hr.(s) and 1 overnight respectively.
- 3. BD= $\Delta u/\Delta \sigma$ (BD ≥ 0.95) ($\sigma = 50-$ 100 kPa in undrained condition)
- 4. Slowly load σ and τ (natural condition simulation) OCR = 1.0-5.0 with θ =30°
- 5. Progressively increase pore water pressure to a targeted value (95kPa) with the particular σ and τ applied till failure occurs.

LANDSLIDE IN SHOBARA CITY







PLOTS OF ALL TEST RESULTS