10 Some Features of Landslide Caused by Typhoon 18, 1982 at Different Land Use in Fujieda

藤枝地区の土地利用形態と台風18号による崩壊の特徴

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I Introduction

Because front and typhoon 18, 1982 hit Fujieda City situated on Palaeogene stage,Setogawa groups of sand stone and shale & sand stone, heavy rainfall have triggered many quick shallow landslides. The purpose of this short report is to clear the features of landslide at different landuse of orange garden, tea garden, cut down & young age forest, needle leaved forest and broad leaved forest in Fujieda region.

II Surveying Method

Density and size of landslide were surveyed by a series of aero-photographs of scale 1:8000 taken after storm. The magnifying scale glass of 10X was used to measure each length. Profile of landslides were observed at each spot in field, then undisturbed soil were sampled for CD shear test.

III Landslide Type at Different Land Use

Plate 1 and 2 show the typical example of landslides occured at orange and tea garden respectively. The profile of landslide at orange garden is illustrated by Fig.6.

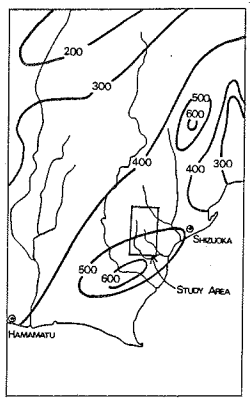


Fig.1 Total Precipitation Map

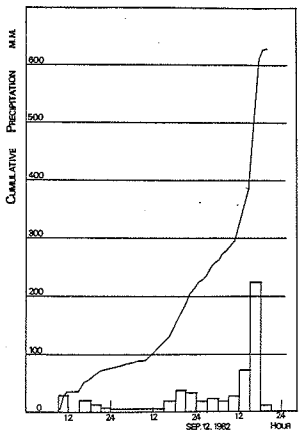
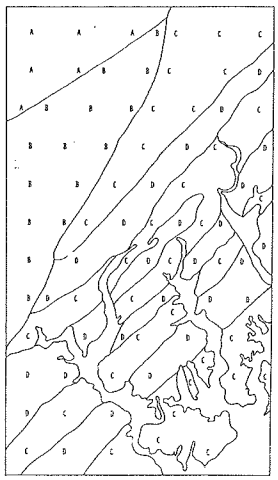


Fig.2 Time Series of Hourly Precipitation and Its Accumulation



A; Tuff Shale
B; Turbidite
C; Sand Stone
D; Sand Stone & Shale

Fig.3 Surface Geological Map

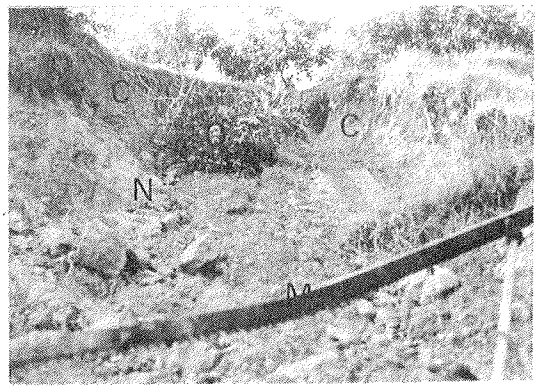


Plate 1 Landslide at Orange Garden
C; Cliff N; Clay M; Monorail

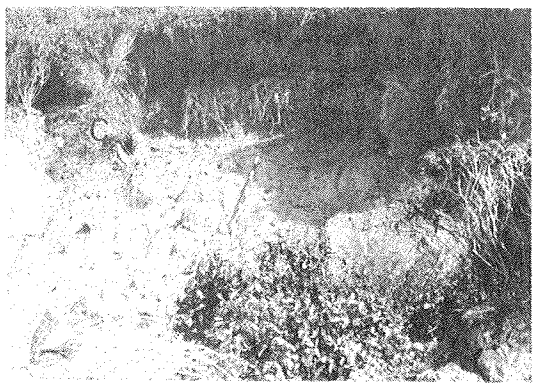


Plate 2 Landslide at Tea Garden
O; Orange T; Tea

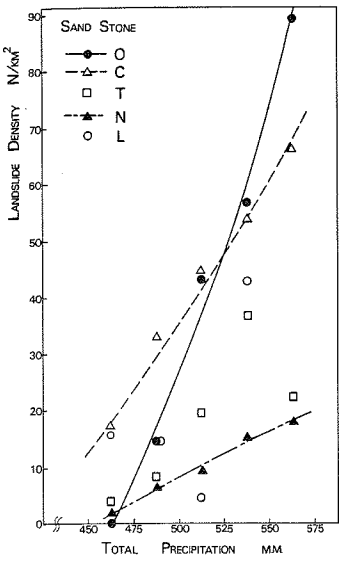


Fig.4 Relation between Total Precipitation and Landslide Density (1)

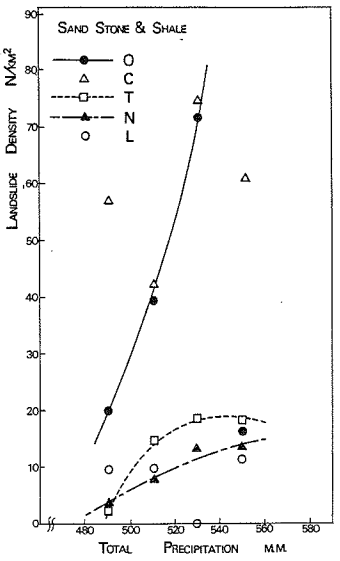


Fig.5 Relation between Total Precipitation and Landslide Density (2)

O; Orange Garden C; Cut Down & Young Forest T; Tea Garden
N; Needle Leaved Forest L; Broad Leaved Forest

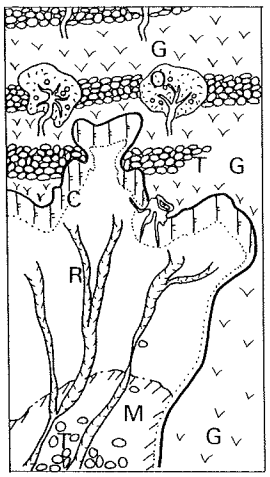


Fig.6 Profile of Landslide at Orange Garden

C; Cliff
G; Grass
M; Collurial Deposit
O; Orange
R; Rill
Shear Exam. Cd=1.50 ton/m^2
ϕd=11.0°

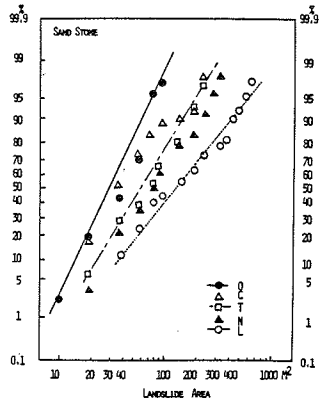


Fig.7 Distribution of Landslide Area (1)

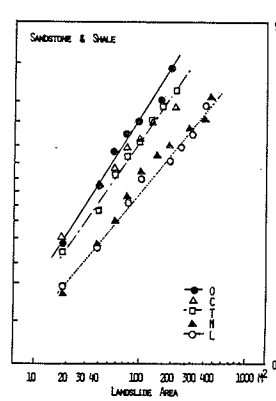


Fig.8 Distribution of Landslide Area (2)

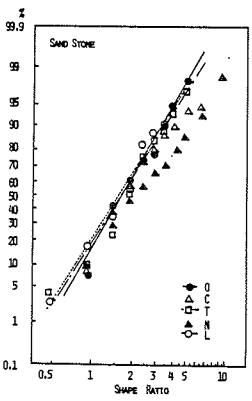


Fig.9 Shape Ratio of Landslide (1)

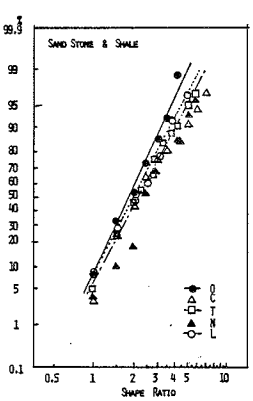


Fig.10 Shape Ratio of Landslide (2)

Table 1 Landslide type in different land use

Land Use	Soil	Slope °	Density n/km²	Landslide Size m²	Area Ratio %	Shape Ratio
Orange Garden	Silty Immature	30	49.6	45	0.223	2.20
Tea Garden	Silty Immature	20	27.9	88	0.246	2.27
Cut & Young Forest	Brown	40	47.5	64	0.304	2.35
Needle Leaved Forest	Brown	40	10.9	109	0.119	3.55
Broad Leaved Forest	Brown	50	20.2	197	0.398	2.10

At orange garden of steep slope that is artificial banking composed of silty immature soil in step wise, many uniform small landslides have been triggered by seepage from natural pipes.

At tea garden, smaller number of landslides have occured because of their developed fine root net and gentle slope. But their bed is artificial,too.

At cut down & young forest, a number of shallow landslide have been triggered by direct rainfall impact to surface and rotten of root system having pile effect than needle leaved forest. At broad leaved forest, big landslide have occured in deep fractured stratum affected Median Dislocation Line. These features of landslide are more distinct in sand stone stratum than shale & sand, and summarized by Table 1.

IV Conclusion

Orange and tea garden need for more drain pipes system in artificial banking to keep their base in safety. At cut down forest, new planting must be carried out in a hurry. We hope that selection cutting work will be tried for two storied forest in future forest management.