Effects of water content on the behaviour of volcanic pumice in the direct shear box test

火山性軽石の一面せん断挙動における含水比の影響

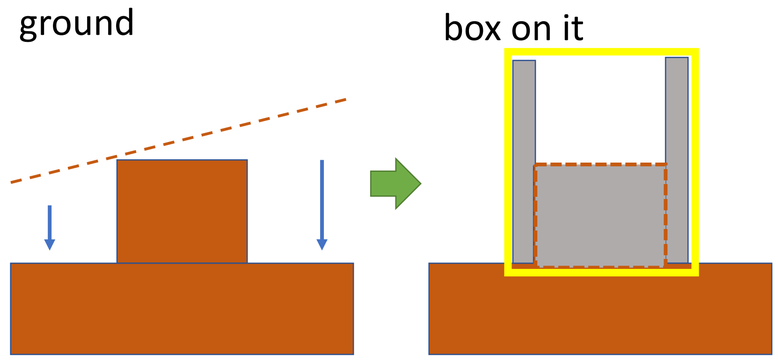
平成30年9月6日の北海道胆振東部地震では大規模な斜面崩壊が発生しましたが、その現場には多量の水の存在を示す痕跡が残されていました。そこで本研究では、現場に広く分布する火山性軽石（Ta-d）の含水比がせん断特性にもたらした影響を調べるため、現場で不攪乱試料を採取し、再構成試料と比較しつつ、浸水および非浸水条件での一面せん断試験を実施しました。

2018 Hokkaido Eastern Iburi earthquake caused a wide-area slope failure, and the site indicated the presence of plenty of soil water. This research investigated how the water content affects the shear strength in the volcanic pumice (Ta-d) which is distributed at the site. We collected undisturbed samples and conducted direct shear box test with samples soaked and non-soaked.

Undisturbed sampling

1. Dig and shape the ground

2. Put the shear box on it

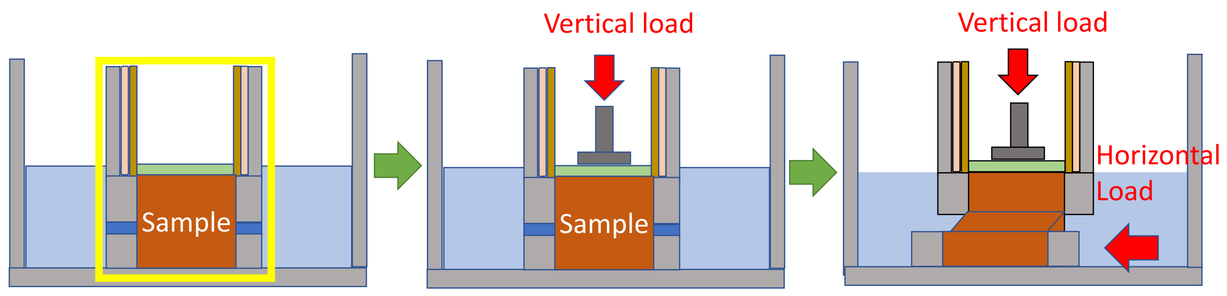


Direct shear box test

1. Soaking

2. consolidation

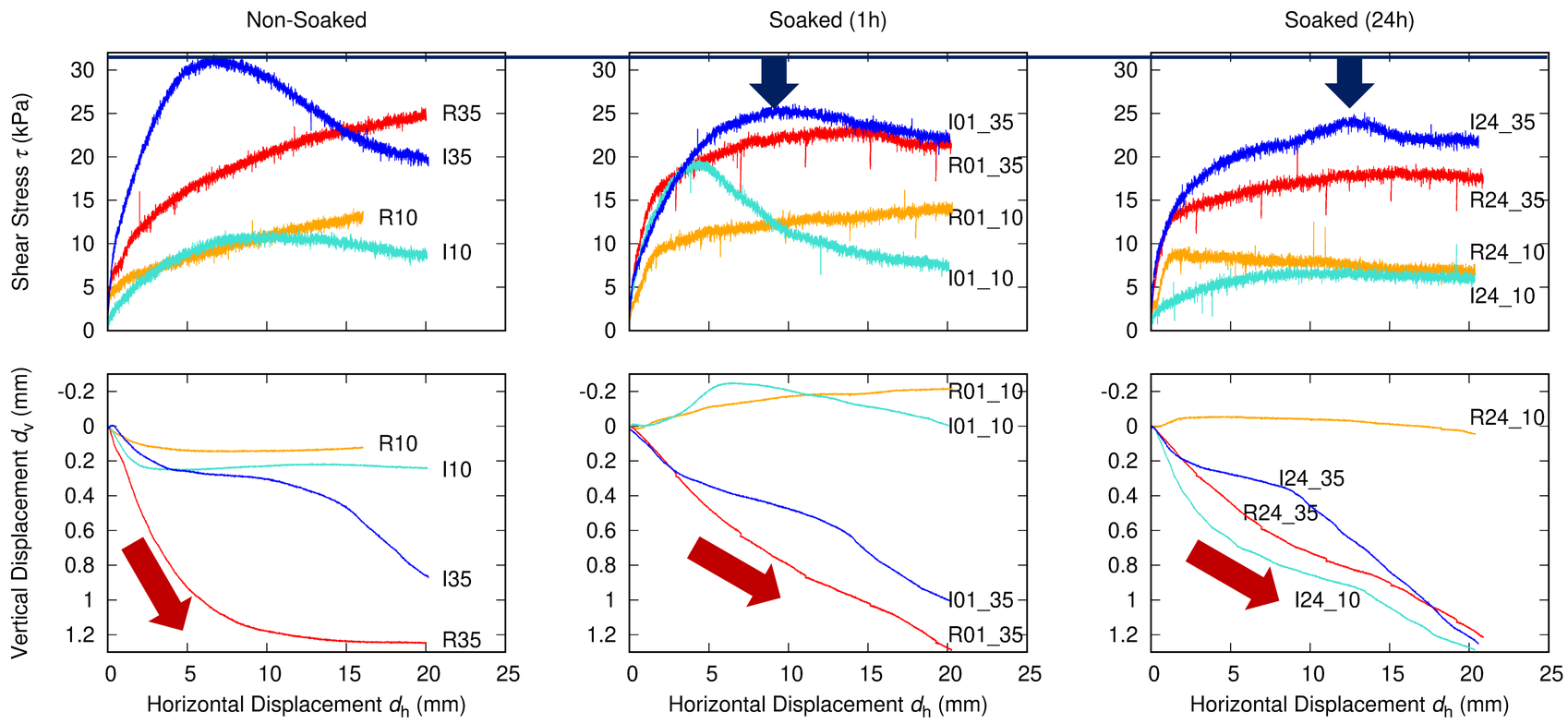
3. shear deformation



Test conditions

	No.	Type	Soaking time T_{sink} (h)	Vertical stress σ (kPa)	Initial water content W_{ini} (%)	Final water content W_{fin}(%)	Initial void ratio e_i	Void ratio after consoli-dation e_c
Soaked	R24_10	Disturbed	24	11	138	148	4.29	4.19
	R01_10	Disturbed	1	11	125	149	4.24	4.18
	R24_35	Disturbed	24	34	131	154	4.55	4.40
	R01_35	Disturbed	1	34	127	144	4.30	4.12
	I24_10	Undisturbed	24	10	80	131	4.24	3.74
	I01_10	Undisturbed	1	11	109	150	4.65	4.50
	I24_35	Undisturbed	24	35	116	153	5.12	4.46
	I01_35	Undisturbed	1	34	97	129	4.21	3.73
Non-soaked	R10	Disturbed	N/A	10	113	N/A	4.58	4.43
	R35	Disturbed	N/A	35	131	N/A	4.97	4.58
	I10	Undisturbed	N/A	11	112	N/A	4.77	4.64
	I35	Undisturbed	N/A	35	105	N/A	4.63	4.23

Result



- Greater peak shear stress in non-soaked tests
  → the result does not contradict the hypothesis that water content had weakened the soil strength
- Moderate contractancy in soaked tests
  → soaking have some effect on dilatancy/contractancy

For further information, contact below.
Prof. Reiko Kuwano
Bw-304, Institute of Industrial Science, the University of Tokyo
TEL：+81-3-5452-6843
E-mail: kuwano@iis.u-tokyo.ac.jp

真下康平(2023)
2022年度B3少人数セミナー
桑野研究室
東京大学 生産技術研究所 Bw-304
電話: 03-5452-6843
E-mail: kuwano@iis.u-tokyo.ac.jp