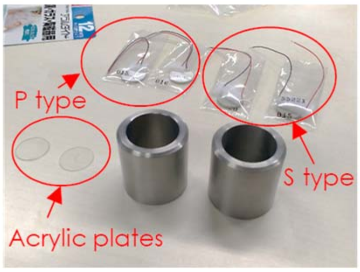
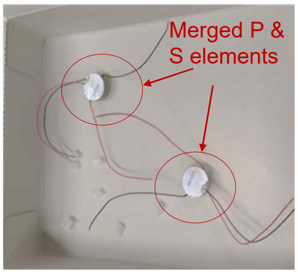
Evolution of Stress Wave Velocities During Triaxial Compression Using Disk Transducers

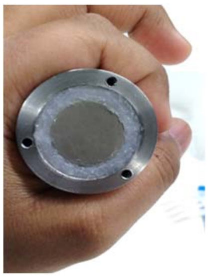
ディスクトランスデューサーを用いた三軸圧縮中の弾性波速度の評価

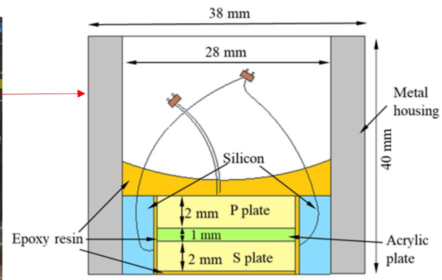
The precise assessment of stress wave velocities and stiffness is indispensable for the accurate design of structures as well as authentic geotechnical characterization of sediments. The development of the geophysical testing method is important to estimate the mechanical properties of in-situ soils. In the present study, planar piezoelectric transducers have been employed to measure the shear wave (V_s) and compression wave velocities (V_p) of silica sand in both isotropic and anisotropic stress states. Wave velocities of loose and dense specimens at large axial strain tend to converge similar to the stress-strain relationship. The increment of normal stress component (σ_1) has a significant influence on compression wave velocity as compared to shear wave velocity. This axial strain at which peak shear wave velocity is observed is comparable to the axial strain at which fabric of the specimen takes place.

Development of Disk Transducers for Standard Triaxial Apparatus

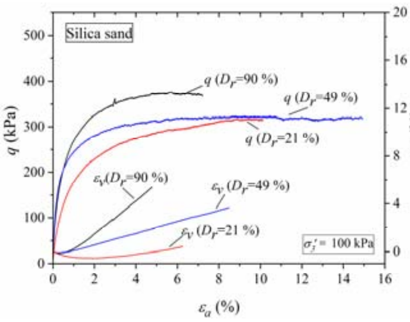




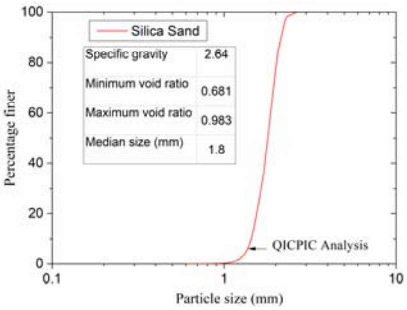


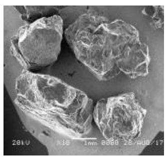


Deviator stress vs. axial strain

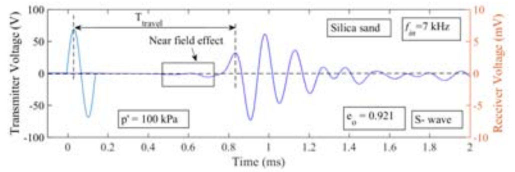


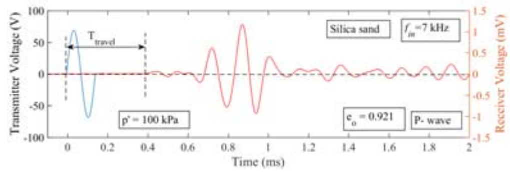
Tested Material



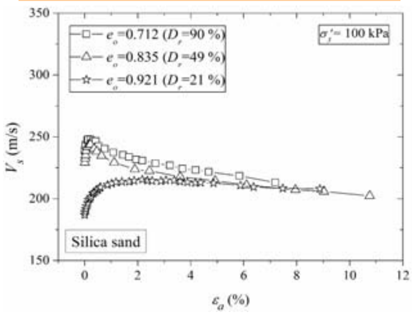


Silica sand

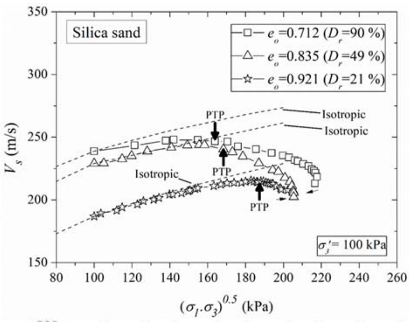


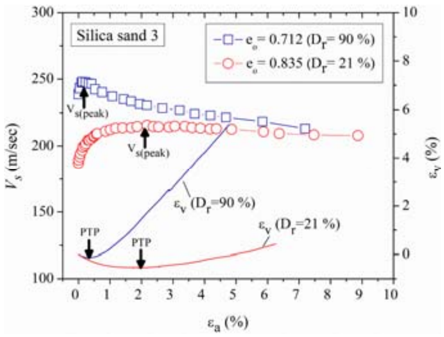


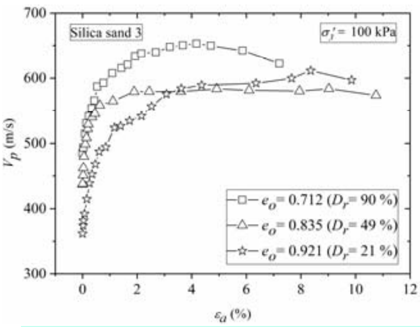
Wave velocities vs. axial strain

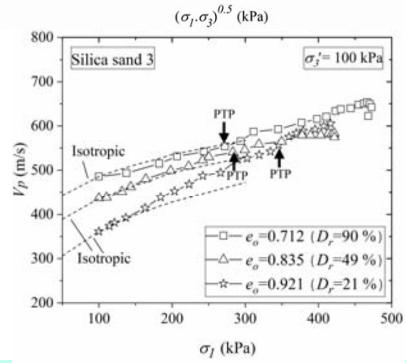


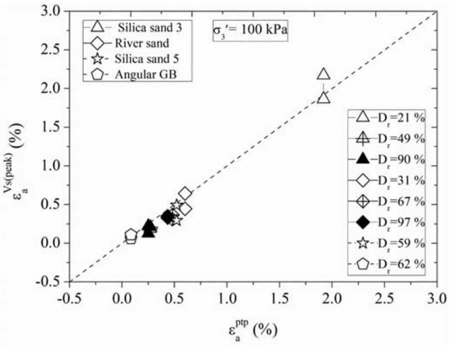
Wave velocities vs. stress state











★ V_s & V_p of loose and dense specimens converge at large axial strain

★ Increment of normal stress has substantial effect on V_p as compared to V_s

★ ε_a at peak Vs ≈ ε_a at which fabric of specimen changes

本研究に関する担当研究室は桑野研究室です.
部屋は東京大学生産技術研究所B棟3階のBw-304

電話: 03-5452-6843, FAX: 03-5452-6844
E-mail: kuwano@iis.u-tokyo.ac.jp

For further information, contact below.
Prof. Reiko Kuwano,
#Bw-304, Institute of Industrial Science

TEL: +81-3-5452-6843, FAX: +81-3-5452-6844
E-mail: kuwano@iis.u-tokyo.ac.jp

Troyee Tanu Dutta (2019)