Notation

H	specimen's height, mm
M_T	applied torque, N·m
Nc	number of cyclic loading
Nl	number of loading set
f	frequency, Hz
p	mean normal stress, kPa
q	deviator stress, kPa
r_i	specimen's inner radius, mm
r_o	specimen's outer radius, mm
u_a	pore air pressure, kPa
u_w	pore water pressure, kPa
δ	cyclic torsional angle, rad
ϕ	angle of internal friction, deg
γ_a	double amplitude of torsional shear strain, —
$\gamma_{z\theta}$	torsional shear strain, —
η	effective stress ratio, —
ν	specific volume, m^3/Mg
ρ	bulk density, Mg/m^3
σ_1	major principal stress, kPa
σ'_1	effective major principal stress, kPa
σ_2	intermediate principal stress, kPa
σ'_2	effective intermediate principal stress, kPa

σ_3 minor principal stress, kPa

σ'_3 effective minor principal stress, kPa

σ_c confining stress, kPa

σ'_c effective confining stress, kPa

σ_h horizontal stress, kPa

σ_m mean normal stress, kPa

σ'_m effective mean normal stress, kPa

σ'_n effective normal stress, kPa

σ_{oct} octahedral normal stress, kPa

σ_v vertical stress, kPa

τ shear stress, kPa

τ_A cyclic shear stress, kPa

τ_f shear stress at failure, kPa

τ_{oct} octahedral shear stress, kPa

τ_r residual shear stress, kPa

τ_{vh} horizontal shear stress, kPa

$\tau_{z\theta}$ cyclic torsional shear stress, kPa

χ wet area per unit gross area,—

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