GLOSSARY OF TERMS AND SYMBOLS

GLOSSARY OF TERMS

Adsorbed water. A soil particle carries an electrical charge, which attracts ions to neutralize its net charge. Such attracted ions, which are weakly held on the particle surface and can be readily replaced by other ions, are termed exchangeable ions. The water attached to the exchangeable ions attracted to the soil surface is called adsorbed water and is not free to flow under gravity, unlike the pore water.

Blanket layer. A layer of free draining granular material placed on top of the seabed in a drained reclamation. It is used primarily for spreading the load of fill placed on top of it and to provide a filter layer to prevent coarser material being punched into the soft marine deposits. If vertical drains are used, it also provides a drainage layer that ensures vertical drainage from the underlying marine deposits.

Compression ratio. Slope of the virgin compression line in a strain-log effective stress curve.

Creep. Long-term time dependent compression of soil under constant loading.

Differential settlement. Settlement of one location relative to another, usually expressed as a ratio (e.g. 1:300) of the distance between the two locations.

Displacement method. An old reclamation method involving direct tipping of fill from trucks onto the seabed without dredging away or treating the underlying soft deposits.

Drained reclamation. Reclamation with the soft deposits left in place with or without surcharge preloading and/or vertical drains.

Dredged reclamation. Reclamation with the soft deposits removed before the fill is placed.

Dynamic compaction. A fill densification method which involves repeated dropping of heavy weights from a height onto the ground surface.

Effective preconsolidation pressure. The maximum effective vertical stress that has acted on a soil layer in the past.

Excess pore water pressure. The increase in pore water pressure above the final or steady-

state value.

Mud wave. Excessive displacement of mud in a reclamation following successive slip failures caused by loading too quickly, loading in an unbalanced manner, or inadequate drainage of the mud.

One-dimensional (1-D) strain. A type of consolidation in which deformation and water flow are all in one direction and the deformation in orthogonal directions is considered to be zero. It is generally applicable to reclamation works where the thickness is small compared to the lateral extent.

Primary consolidation. A process of gradual reduction in the volume of a fully-saturated soil of low permeability due to the drainage of pore water.

Recompression. The compression of over-consolidated soil when the effective stress is smaller than the effective preconsolidation pressure.

Recompression ratio. Average slope of the recompression line in a strain-log effective stress curve.

Residual settlement. The amount of remaining settlement due to primary consolidation and secondary consolidation (or creep) of the sub-soils and fill that would occur from a given time onwards, after the completion of filling works.

Secondary consolidation. Long-term settlement of clay that occurs under constant effective stress (thought to be due to squeezing out of the adsorbed water and rearrangement and/or deformation of clay particles).

Smear effect. Effect of reduced permeability of the soil surrounding a vertical drain due to the disturbance caused by the installation of the vertical drain.

Surcharge preloading. A ground treatment method, which can both accelerate the consolidation of sub-soil layers and densify the fill, by placing surcharge (usually additional fill) temporarily on top of the reclamation.

Vertical drains. Vertical drainage conduits (such as band drains) or wells (such as sand drains) installed within the soils at spacing closer than the drainage distance for vertical flow, which shorten the drainage path and hence accelerate the consolidation

process.

Vibrocompaction. A fill densification method for granular soils, which involves penetration and controlled retraction of a vibrating tool in the soil.

Virgin compression. The compression of a normally consolidated soil due to an increase in effective stress.

Well resistance. The finite permeability of vertical drains with respect to the surrounding soil.

GLOSSARY OF SYMBOLS

α	Logarithmic creep compression rate (%)
β_0 , β_1	Parameters obtained from Asaoka's Graphical Method for prediction of primary consolidation settlement
γ	Unit weight
γ_d	Dry unit weight
$\gamma_{d\,max}$	Dry unit weight of soil in densest condition
$\gamma_{d\,min}$	Dry unit weight of soil in loosest condition
δ_H	Lateral deformation
$\Delta\sigma_v$	Applied vertical load
$\Delta\sigma_{v(\text{fill})}$	Applied loading due to the reclamation fill
$\Delta\sigma_{v(\text{imposed load})}$	Applied loading due to the future imposed load
$\Delta\sigma_{v(\text{surcharge})}$	Applied loading due to the surcharge mound
μ	Correction factor for $(c_u)_{FV}$
σ_p'	Effective preconsolidation pressure
σ_{v0}'	Initial effective stress
τ_f	Shear strength along the selected surface in slip surface analysis
$C_{\alpha\varepsilon}$	Coefficient of secondary consolidation in terms of strain
C_c	Compression index
c_h	Coefficient of consolidation (horizontal)
CR	Compression ratio
C_r	Recompression index
c_u	Undrained shear strength
c_v	Coefficient of consolidation (vertical)
$(c_u)_{FV}$	Measured undrained shear strength from field vane
D	Diameter of the equivalent cylinder of soil drained by a vertical drain

d	Length of longest drainage path
d'	Drain diameter of a vertical drain
D_r	Relative density
e	Void ratio
e_0	Initial void ratio
e_{max}	Void ratio of the soil in loosest condition
e_{min}	Void ratio of the soil in densest condition
F	Factor of safety
H	Layer or fill thickness
I_p	Plasticity index
K_a	Coefficient of active pressure
l	Length of vertical slices along the selected surface in slip surface analysis
L_e	Length from the toe to the crest of embankment
n	spacing ratio of a vertical drains system
r	Moment arm for τ_f in slip surface analysis
RR	Recompression ratio
s	Settlement
S_c	Settlement of fill due to creep
$S_{c,t(residual)}$	Residual settlement of fill due to creep at time t
S_p	Ultimate primary consolidation settlement
$S_{p,t}$	Primary consolidation settlement achieved at time t
$S_{p,t(residual)}$	Residual settlement of a sub-soil layer due to primary consolidation at time t
$S_{residual,t}$	Residual settlement of a reclamation due to the sub-soil and fill at time t
S_s	Settlement due to secondary consolidation

$S_{s,t(residual)}$	Residual settlement of a soil layer due to secondary consolidation after a given time *t*
t	Time from the instantaneous application of a total stress increment
t_0	Start of the time for secondary-consolidation calculations
t_1	Time at which secondary consolidation begins
t_c	Time for completing fill placement or the construction period
T_h	Time factor (horizontal drainage)
T_v	Time factor (vertical drainage)
u	Excess pore water pressure
U_f	Effective degree of consolidation due to vertical and horizontal drainage
U_h	Degree of consolidation (horizontal drainage)
U_t	Degree of consolidation at time *t*
U_v	Degree of consolidation (vertical drainage)
W	Weight of vertical slices in slip surface analysis
x	Moment arm for *W* in slip surface analysis