931176
Analysis of Shanghai land subsidence
Gu, X Y; Tsien, S I; Huang, H C; Liu, Y
Proc 4th International Conference on Land Subsidence, Houston, 12-17 May 1991 *P603-612. Publ Wallingford: IAHS Press, 1991*

Subsidence in Shanghai started in the 1920s but was brought under control by groundwater management. Minor subsidence due to secondary consolidation of compressible layers is still observed. Data from stratification benchmarks, observation wells and piezometers, geotechnical boreholes, and consolidation under laboratory pumping and cyclic consolidation tests have been collected and analysed to allow determination of effective control measures and prediction of future movements. In computational analysis, the boundary water level change is resolved into fixed drawdown, linear rising, and cyclic change components,and the 1D consolidation equation solved for each.

931177
Stochastic theory of one-dimensional secondary compression
Bordeau, P L
Proc 10th European Conference on Soil Mechanics and Foundation Engineering, Florence, 26-30 May 1991 *V1, P189-192. Publ Rotterdam: A A Balkema, 1991*

Empirical creep models are of limited validity to describe secondary compression settlement of soils. A new particulate mechanics theory to describe the phenomenon is presented. Under applied loading, unbalanced increments of intergranular contact forces cause compression and sliding of grains at contacts and consequent migration of excess volume of void. When the void crosses a material boundary and escapes, an elementary deflection of the soil surface occurs. The propagation of the excess void can be modelled as a stochastic diffusion process. Implementation for cases of uniform compression and constant effective stress is illustrated,with temporal evolution of porosity and settlement examined.

931178
Numerical analysis of peat bank base deformations
Bronin, V N; Kozmin, D D; Stekliannicova, N I
Proc 10th European Conference on Soil Mechanics and Foundation Engineering, Florence, 26-30 May 1991 *V1, P193-196. Publ Rotterdam: A A Balkema, 1991*

Peatlands are usually prepared for industrial use by surface surcharging. To decrease preparation time, it is proposed to increase rate of application of preload, but this may cause weak soils to extrude from under the surcharge embankment. This can result in bulging or mounds at considerable distance from the surcharge embankment, which can disturb previously prepared areas. A numerical analysis of the problem is presented which uses the ground model of Gersevanov and Newton's incompressible viscous liquid theory.

931179
Method of solution to contact problems of the Biot consolidation theory
Glagovsky, V B; Goldin, A L; Nuller, B M
Proc 10th European Conference on Soil Mechanics and Foundation Engineering, Florence, 26-30 May 1991 *V1, P207-208. Publ Rotterdam: A A Balkema, 1991*

Consolidation of a two-phase layer of given thickness according to Biot theory is described. The solid phase is characterised by skeleton elastic properties, compressibility, and porosity, the liquid phase by compressibility and coefficient of permeability. A range of boundary conditions is considered. Contact problems for slab foundations are solved analytically by the method of piecewise homogeneous solutions, making possible determination of strains and settlement of the foundations and contact pressures.

931180
Evaluation of swelling of an expansive clay from Mae Moh, Thailand
Indraratna, B; Husin, M R B
Proc 6th Australia-New Zealand Conference on Geomechanics, Christchurch, 3-7 February 1992 *P324-329. Publ New Zealand: New Zealand Geomechanics Society, 1992*

Expansive clay shales have led to stability problems and failures of diversion channel linings in northern Thailand. The fine grained, fissured material from Mae Moh has been tested in the laboratory. Undisturbed, remoulded, and pressurised samples were prepared. Tests included free swell, double oedometer, swell consolidation oedometer, different pressure oedometer, Huder Amberg oedometer, variable density oedometer, and pressure membrane oedometer methods. Relations between swell potential and soil properties are examined. Mineral orientation is seen to influence swelling. Soil variability in the field complicates remedial measures.

931181
Small scale variability of reactive soils in western Sydney
Mostyn, G R; Waters, M
Proc 6th Australia-New Zealand Conference on Geomechanics, Christchurch, 3-7 February 1992 *P353-357. Publ New Zealand: New Zealand Geomechanics Society, 1992*

Estimation of maximum ground surface movement is often made using shrink-swell index (Iss) test results. The small scale variability of this parameter across a site (chosen for its low variability) was examined using laboratory tests on samples taken during site investigation. Results indicate a single test gives poor indication of site reactivity, even for a site of low variability. Multiple tests, preferably in conjunction with engineering interpretation of detailed borehole logging, are suggested.

931182
Sedimentation-consolidation analyses of pump-dredged cohesive soils
Yamauchi, H; Imai, G; Watanabe, K; Ogata, K
Proc International Conference on Geotechnical Engineering for Coastal Development, GEO-COAST'91, Yokahama, 3-6 September 1991 *P129-134. Publ Japan: Coastal Development Institute of Technology, 1991*

Pump-dredged cohesive sediments are generally left to consolidate under self-weight. Where it is necessary to increase the disposal rate for a sedimentation pond of limited size, the speed of consolidation must be increased. A method for this is proposed, which uses base drainage (hydraulic consolidation). The water drained flows back to the original dredging area. The basis of the system is illustrated. A sedimentation-consolidation analysis for the process is presented, and the results are compared to site measurements.

931183
Observational procedure for settlement of peat
Edil, T B; Fox, P J; Lan, L T
Proc International Conference on Geotechnical Engineering for Coastal Development, GEO-COAST'91, Yokahama, 3-6 September 1991 *P165-170. Publ Japan: Coastal Development Institute of Technology, 1991*

Conventional methods of time-settlement prediction used for inorganic soils are not, in general, applicable for peat. Settlement data for embankments on peats and clays have been analysed in order to assess the use of Asaoka's observational

method to predict time and settlement at the end of primary consolidation. Differences in behaviour of clays and peats are noted. Predictions from Asaoka's method are strongly dependent on the time increment chosen. Provided this is correctly selected, the method may be used with caution for clays, but not for peats, where it produces bilinear plots.

931184
Settlement of diluvial clay layers caused by a large scale man-made island
Endo, H; Oikawa, K; Komatsu, A; Kobayashi, M
Proc International Conference on Geotechnical Engineering for Coastal Development, GEO-COAST'91, Yokahama, 3-6 September 1991 *P177-182. Publ Japan: Coastal Development Institute of Technology, 1991*

The Kansai International Airport is under construction on a man-made island in 18m of water in Osaka Bay. The seabed has an alluvial clay layer about 20m thick over diluvial layers exceeding 400m in depth. The alluvial clay has been improved by sand drains to speed consolidation, but consolidation of the diluvial layers is expected to continue for a long time. Settlement measurements indicate consolidation of the diluvium started at surcharge about 170kPa, and rate increased with increasing load. It is considered that thin sandy layers in the diluvium mass effectively drain water from the clay layers.

931185
Estimation of long-term settlement for soft clay improved by preloading method
Fukazawa, E; Kurihara, H
Proc International Conference on Geotechnical Engineering for Coastal Development, GEO-COAST'91, Yokahama, 3-6 September 1991 *P183-186. Publ Japan: Coastal Development Institute of Technology, 1991*

Laboratory tests and field measurements have been carried out to establish a method for predicting settlement for overconsolidated soft clay ground due to secondary compression as a result of surcharging. The relation between overconsolidation ratio and coefficient of secondary compression has been evaluated in the laboratory and an equation to predict settlement is derived which includes OCR and natural water content.

931186
Lateral flow prediction and field observation in the port of Kumamoto
Itoh, N; Fuchigami, K
Proc International Conference on Geotechnical Engineering for Coastal Development, GEO-COAST'91, Yokahama, 3-6 September 1991 *P193-196. Publ Japan: Coastal Development Institute of Technology, 1991*

Kumamoto port in Ariake Bay, Japan, is a reclaimed structure on foundations of some 40m of soft clay. Site profiles of UCS, compression index, natural water content, and consolidation yield stress are illustrated. Finite element analysis was used to predict settlement and horizontal displacements. Field observations during the construction of a ferry berth on steel pile foundations in ground improved by sand drains are compared to predictions. Settlement values are in excellent agreement. The steel piles effectively prevent lateral soil movement.

931187
Settlement of reclaimed land at the coastal area
Kiyama, M
Proc International Conference on Geotechnical Engineering for Coastal Development, GEO-COAST'91, Yokahama, 3-6 September 1991 *P207-212. Publ Japan: Coastal Development Institute of Technology, 1991*

Long term settlement data from reclaimed ground at Osaka Port are presented. Ground improvement was by vertical sand drains and a sand mat, plus deep well dewatering in some areas. Observed and predicted settlements are compared, and the effectiveness of the vertical drains in speeding settlement is noted. Secondary consolidation settlement was seen in deep diluvial clay layers, which are not amenable to simple ground improvement treatment.

931188
Finite element analysis of the effectiveness of sand drains
Kobayashi, M
Proc International Conference on Geotechnical Engineering for Coastal Development, GEO-COAST'91, Yokahama, 3-6 September 1991 *P213-218. Publ Japan: Coastal Development Institute of Technology, 1991*

Sand drains are widely used to improve foundations for structures on soft clays. Case history data from highway embankments in Japan are presented and the ability of finite element analysis to model observed behaviour is assessed. Field evidence is that sand drains accelerate dissipation of excess pore pressure but have little influence on settlement rate. Nonlinear finite element analysis can reproduce this behaviour. Parametric finite element analysis indicates that dissipation of pore pressure, but not rate of settlement, is influenced by coefficient of consolidation.

931189
Residual deformation characteristics of man-made island on soft seabed deposit
Matsui, T; Abe, N
Proc International Conference on Geotechnical Engineering for Coastal Development, GEO-COAST'91, Yokahama, 3-6 September 1991 *P219-224. Publ Japan: Coastal Development Institute of Technology, 1991*

Finite element analysis with an elasto-viscoplastic material model is used to examine and predict the settlement pattern and residual deformation resulting from construction of a man-made island on a soft seabed. Results are in good agreement with observed behaviour. The possibility of limiting and controlling lateral displacements and settlements by foundation improvements (sand drains) is also investigated.

931190
Consolidation characteristics of deep alluvial clay and diluvial clay
Nishibayashi, K; Ueno, T; Takahashi, S
Proc International Conference on Geotechnical Engineering for Coastal Development, GEO-COAST'91, Yokahama, 3-6 September 1991 *P237-240. Publ Japan: Coastal Development Institute of Technology, 1991*

Settlement observations were made over a 4 year period for deep (up to 60m) alluvial and diluvial clay layers beneath reclaimed land in Tokyo Bay. Significant settlements of up to 200mm were seen. Settlement analysis was carried out using elastoplastic analysis with a modified Cam clay model to describe primary consolidation and rheology theory to describe secondary consolidation. Observed behaviour was reproduced. The importance of secondary consolidation of deep layers is emphasised.