

For such a shallow layer, the solutions of Dunn and Razouki also indicate that the effects of a are not serious, but that these effects become more significant as the relative layer depth increases. There are a number of differences between our solution and those presented by Dunn and Razouki.

They consider a plane-strain problem rather than an axially-symmetric problem. The boundary conditions are different (PTIB for the strip solutions, IFPB for the circle solutions). The method of computing the stress distribution may have been different. We have used that for a rough rigid base; Dunn and Razouki do not specify which they used. In addition, their method of analysis is not specified, nor is their value of Poisson's ratio ν' (although this would be irrelevant for a simple diffusion solution except in the computation of the stress distribution).

We concede that our statement regarding the insignificance of pore pressure parameter a may have been based on too little evidence. However, the statement of Dunn and Razouki of the effect of a in terms of the time required for 50% consolidation is perhaps too severe and a more useful practical expression would be in terms of the difference in the degree of consolidation at a particular time. The effect is then much less significant than is suggested by Fig. 1 of Dunn and Razouki. Finally, it would appear to be more logical to express the results in terms of the departures from the ideal elastic case ($A = \frac{1}{3}$) rather than the case $A = 1$.

The consolidation of soils exhibiting creep under constant effective stress

GARLANGER, J. E. (1972). *Géotechnique* 22, No. 1, 71–78.

Discussion by Šuklje (1972). *Géotechnique* 22, No. 4, 670–673.

Author's reply to discussion by Šuklje (1972). *Géotechnique* 22, No. 4, 673–674.

L. Šuklje, University of Ljubljana, Yugoslavia

The Author's comments to my discussion require the following points to be made. The analytical expression for the set of time-lines according to the suggestions by Taylor (1942) and Bent Hansen's (1969) specification, is my equation (10). The corresponding rate of void ratio change \dot{e} has been given by my equation (12). The main question I raised was whether or not in equation (12) the second member, which expresses the dependence of \dot{e} on the rate of effective stress increase, should be taken into account. If not, equation (12) reduces to the equation of isotaches (16).

Whether the speed of effective stress change $\dot{\sigma}'$ influences the rheological relationships of a viscous body depends on the viscous properties of the body. The deformability of viscous bodies whose rheological models are composed of elements connected in parallel is not governed by the speed of effective stress increase which, however, does influence the stress-strain-time behaviour of bodies whose rheological elements are connected in series. When utilizing, for consolidation analysis of thick layers, isotache sets deduced from the secondary branches of settlement-time curves of saturated samples, the eventual influence of the speed $\dot{\sigma}'$ on the consolidation speed \dot{e} is taken into account where $\dot{\sigma}'$ values do not surpass those which appear during the secondary consolidation of saturated samples. As the time-lines presented in Garlanger's Fig. 1 have also been obtained from observations during the secondary consolidation at small $\dot{\sigma}'$ values, they do not give any experimental support either for considering or for neglecting the second term in my equation (12) when the speeds $\dot{\sigma}'$ have greater values.

Taylor (1942), who initiated the use of time-lines, did not consider this term when expressing the corresponding stress-strain-time relationships in his Theory B by a linear Kelvin body.

The straight line $-\log e/e_0 = a \log \sigma'/p_0$ (Fig. 1, Discussion) represents, inside the set of time-lines, a consolidation path corresponding to special conditions concerning the length of the seepage path and the loading speed. The slope of this line, depending on the above special conditions, cannot represent the compressibility of the soil governing the entire consolidation process with arbitrary boundary conditions. At a sudden load application, one can always imagine a layer whose thickness is small enough for the consolidation path to approach the paths OFA or OGD (Fig. 1, Discussion). Along such a path the soil deforms, from the very beginning, with decreasing speeds corresponding to the given set of time-lines and is far from being rigid as interpreted by Garlanger in his comments on my discussion.

Skempton's coefficient B is not related to the viscous soil properties and cannot explain the possibility of an important immediate effective stress increase appearing at a sudden load application to a saturated layer of viscous soil. Examples of the corresponding pore-pressure dissipation plots are Taylor's (1942), Stroganov's (1963) and Barden's (1965) plots and several similar plots presented in my own publications (see References in the Discussion).

REFERENCES

- Barden, L. (1965). Consolidation of clay with non-linear viscosity. *Géotechnique* **15**, No. 4, 345-362.
 Hansen, Bent (1969). A mathematical model for creep phenomena in clay. *Advances in consolidation theories for clays*. Proc. Speciality Session No. 12, 7th Int. Conf. Soil Mech., Mexico City.
 Stroganov, A. S. (1963). One-dimensional deformation of soil as a non-linear visco-elastic medium. *Proceedings of the European Conference on Soil Mechanics and Foundation Engineering, Wiesbaden 1*, 55-60.
 Taylor, D. W. (1942). *Research on consolidation of clays*. Department of Civil and Sanitary Engineering, M.I.T., Publication No. 82, 1-147.

CORRIGENDA

Géotechnique **22**, No. 4, 670-673. Discussion by Šuklje (1972).

p. 670, Equation (3): $-\frac{\partial e}{\partial p} = \frac{be}{p}$

p. 671, Fig. 1: 'instant line' $a \log p_c/p_0 + b \log \sigma'/p_0$

p. 672, line 23: $-be^{1/n}$

p. 672, line 26 . . . does not influence the isotache set.

Undrained plane-strain expansion of a cylindrical cavity in clay: a simple interpretation of the pressuremeter test

PALMER, A. C. (1972). *Géotechnique* **22**, No. 3, 451-457.

C. P. Wroth and J. M. O. Hughes, Cambridge University, England

Dr Palmer has used his method of analysis of pressuremeter tests to interpret results of data obtained in London Clay at a site at Bradwell. The data were obtained by use of a Ménard pressuremeter which cannot be inserted into the ground without causing considerable disturbance to the soil before it is tested. This disturbance, together with the uncertainty of the value of the initial in situ lateral stress σ_h may seriously affect the accuracy of the interpreted results, as discussed by Palmer.