DAVIS, E. H. (1968). Theories of plasticity and the failure of soil masses. *Soil mechanics selected topics* (ed. Lee, I. K.). London: Butterworths.
HANSEN, J. BRINCH (1953). *Earth pressure calculation.* Copenhagen: Danish Technical Press.
JAMES, R. G. (1965). *Stress and strain fields in sand.* Ph.D. thesis, Cambridge University.
JAMES, R. G. & BRANSBY, P. L. (1971). A velocity field for some passive earth pressure problems. *Géotechnique* **21**, No. 1, 61–83.
KING, G. J. W. & DICKIN, E. A. (1970). Comparison of stress-dilatancy theories. *Jnl Soil Mech. Fdns Div. Am. Soc. Civ. Engrs* **96**, No. SM5, 1697–1714.
NARAIN, J., SARAN, S. & NANDAKUMARAN, P. (1969). Model study of passive pressure in sand. *Jnl Soil Mech Fdns Div. Am. Soc. Civ. Engrs* **95**, No. SM4, 969–983.
ROSCOE, K. H. (1970). Tenth Rankine Lecture. The influence of strains in soil mechanics. *Géotechnique* **20**, No. 2, 129–170.
ROWE, P. W. & PEAKER, K. (1965). Passive earth pressure measurement. *Géotechnique* **15**, No. 1, 57–78.

THE CORRELATION OF CONE SIZE IN THE DYNAMIC CONE PENETRATION TEST WITH THE STANDARD PENETRATION TEST

(MOHAN, D., AGGARWAL, V. S. & TOLIA, D. S. (1970). *Géotechnique* **20**, No. 3, 315–319; Discussion (1971) **21**, No. 2, 184–190)

D. Mohan, V. S. Aggarwal and D. S. Tolia

It is noticed that Professor Meardi, in his technique for dynamic cone penetration tests, uses a 48 mm dia. casing in which a 51 mm dia. cone with 34 mm dia. shaft is made to slide. The Authors are not surprised that the Writer is getting very erratic behaviour in clayey and silty soils since their own experience is similar. It is quite reasonable to expect a good correlation of the SPT with a 51 mm dia. cone in sandy soils *provided a casing is used* which would eliminate the side friction on the shaft carrying the cone.

Professor Meardi has missed the main point in the Paper, which mentions that *no casing* is used with the cone. In this case the side friction on the shaft becomes important and this would increase with depth. However, up to 9 m depth the Authors obtain a fair relationship with SPT. For design of shallow foundations the normal depth of exploration does not normally exceed 9 m. The Authors have also found that with the standard A rods (41·5 mm dia.), out of all the cone series varying between 43·75 and 75 mm dia., the cone of 62·5 mm dia. gave the most consistent results. It should also be conceded that driving a cone without casing is simpler and more economical than driving one with casing.

For soil exploration with the dynamic cone to a greater depth, a technique where friction on the shaft is eliminated by circulating the bentonite slurry has already been suggested (Mohan and Sen Gupta, 1970). The Authors have found that this technique is also simpler than using a casing pipe for eliminating side friction.

REFERENCE

MOHAN, D. & SEN GUPTA, D. F. (1970). The dynamic cone penetration test. *Civ. Engng–ASCE*, **40**, Feb., 49–50.

THE DYNAMIC PENETRATION TEST: A STANDARD THAT IS NOT STANDARDIZED

(IRELAND, H. O., MORETTO, O. & VARGAS, M. (1970). *Géotechnique* **20**, No. 2, 185–192; Discussion **20**, No. 4, 452–456 and (1971) **21**, No. 2, 183–184)

R. F. Bartholemew and H. G. Clapham, Ground Engineering Ltd, Hertfordshire

Mr Serota discusses the current British methods of carrying out the so-called standard penetration test. The Writers would agree with him that the practices adopted in Britain for many years, involving the use of casing having a minimum diameter of 6 in. and bailers or shells in drilling through granular soils, depart from the American practice of carrying out site investigation work, in which the SPT has its origins.

However, the Writers have always regarded the test as rough and ready and its correlation with the bearing capacity and settlement of granular soils as wholly empirical. They believe this view is widely accepted because of the general utility of the test.

When Mr Serota's firm introduced the trigger mechanism or trip monkey some years ago, the Writers felt that this would eliminate from the test procedure possible variations between different operators and different types of drilling rig. They are certainly not in favour of abandoning the use of trip monkeys, which they believe is the most widespread method used in this country at the present time.

A new quantitative relationship between the British SPT N-values and relative density and allowable soil pressures could be established, if a less conservative approach to foundation design were required. In this event, it would be desirable to distinguish between coarse gravelly granular soils and sands and silts.

BOOK REVIEWS

Traité de construction des tunnels. Károly Széchy. 701 pp. Dunod, Paris 1970. Fr. 185.

The author, who is professor of foundation engineering and tunnelling at the University of Budapest, published the original edition of this book in Hungarian in 1961. In 1966 it was published in English by Akadémi Kiakó Budapest as *The art of tunnelling.* The English edition ran to 891 pages and was mainly a straight translation of the Hungarian version.

The present French edition is practically the same as the English edition, except that two chapters, one on tunnel surveying and another on the maintenance and repair of tunnels and surface subsidence, have been omitted, and a brief last chapter added on modern methods of designing tunnel linings. English readers will not wish to bother with the French version, since its only new chapter deals quite cursorily with the finite element method and the limiting equilibrium method according to G. Lombardi.

Since the English edition has not been reviewed before in *Géotechnique* it seems appropriate to do so now.

The introductory chapter discusses the various uses of tunnels and gives a brief history of the development of tunnel construction. The second chapter deals with preliminary studies and general design problems in relation to economic, geological, hydrological, and many other factors that influence the route and cross section of tunnels. The next chapter on the analysis of loadings on underground structures gives a detailed description of the causes and types of ground pressure, presents various theoretical methods of estimating the pressures on tunnels and describes techniques of pressure measurement. Before studying this chapter in detail the student should note a conclusion on p. 159 'only a very approximate estimate of loads can be expected' and also read the section on a critical treatment of rock pressure theories. The long chapter on the design of tunnel linings starts with the warning 'It is a generally recognized fact that stresses and deformations measured in existing tunnels usually do not agree with those predicted on the basis of certain assumed loads and/or accepted design methods.' The chapter nevertheless presents in very great detail, but rather uncritically, the application of various theories, including 'elastic' ground/structure interaction, to the structural design of horseshoe-shaped, circular and rectangular linings. Some considerations of the effects of anisotropy, stratification and structural defects in the ground, which are the rule rather than the exception, might have been included here. The final section of this chapter deals with the design of various ancillaries, such as waterproofing and ventilation. After a short chapter on