Obituary

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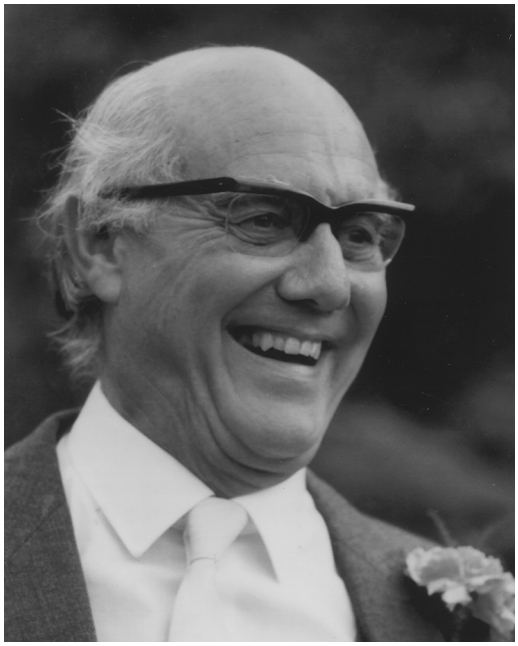
Peter Walter Rowe, 1922–1997



Peter Walter Rowe, 1922–1997

Peter Rowe, emeritus professor of soil mechanics at Manchester University, died on 28 April after a brief illness. He was one of that very rare breed who successfully combine the rigours of fundamental academic research with the pragmatic necessities of professional engineering.

Peter Walter Rowe spent the first part of his life in Bristol. He attended Bristol Grammar School and University where he took a first-class honours degree. His first appointment, which was during wartime, was at the Royal Aircraft Establishment at Farnborough. It was there that he began to develop his innate scientific skills that were to serve him so well throughout his career.

After Farnborough he spent two years with Sir Robert McAlpine and Sons. However, his appetite for research led him to St Andrews University as an assistant lecturer under Professor Marshall. It was here that Rowe started work on his first major contribution to geotechnical engineering. His doctoral thesis concerned the behaviour of flexible sheet pile-walls. The essence of his work was to conduct scale-model experiments, paying careful attention to the precision of his observations and to the governing scaling laws. This led to Rowe producing a design method that became internationally recognized. The culmination of his achievements in this field came with publication of his paper *Anchored Sheet Pile Walls* in the *Proceedings of the Institution of Civil Engineers*. Not only did this paper receive the award of the Telford Premium but it also warranted correspondence from Karl Terzaghi. Terzaghi expressed fulsome praise for Rowe's work and predicted that it would form the basis of future design techniques.

In 1952 Rowe was appointed to a lectureship at Manchester University where he continued with his experiments on sheet piling. The opening of the Simon Engineering Laboratories in 1962 gave him the opportunity to construct a large sand flume to produce uniform beds of sand over a large range of relative densities. This allowed Rowe to increase the size of his walls to 1 m in height. He also extended his work to investigate walls in clay and different support conditions. It is perhaps appropriate that a year later he was appointed to the first chair of soil mechanics at Manchester University.

In the late 1950s Rowe embarked on two further important research projects. The first was theoretically based and concerned the interrelationship between effective stress and strain rate ratios for frictional materials. This became known as Rowe's 'stress-dilatancy theory', published in the *Proceedings of the Royal Society* in 1962. This relationship is recognized as a first step towards formulating constitutive relationships for soils.

The second project was experimentally based and concerned measurements of the coefficients of consolidation and permeability of natural clays, starting with a lacustrine clay from the Derwent Reservoir site. He realized how a clay soil's detailed macro-structure could dominate its drainage and consolidation characteristics. He concluded that conventional laboratory equipment was, in many cases, inadequate and so developed the 'Rowe cell', a hydraulic oedometer which could test specimens up to 0·5 m in diameter. By studying clay soils from different geological periods, he concluded that reliable laboratory data can only be obtained from a 'representative' sample. Such a sample must be sufficiently large to contain an adequate representation of all the major 'fabric' features present. He argued that a small number of properly conducted tests on representative samples selected from critical positions on site is better than a large number of small size random tests. This was the essential thesis of his Rankine Lecture delivered in 1972. Few who were present on that occasion will forget this tour de force, which involved the daring

innovation of using two slide projectors, one to show the natural soils at normal scale, the other to show the same material magnified fifteen times.

His work on the consolidation behaviour of clay soils coincided with his association with Edgar Morton, a reader in applied geology who had been a practising consultant engineering geologist for many years. Thus it was that Rowe began to forge a reputation in the worlds of civil engineering design and construction. He acted as a consultant on embankment dams such as Staunton Harold, Ardleigh, Kielder, Grimwith, Bewl Bridge and many others. He gave advice on major foundations such as those at Oldbury and Torness power stations and at Immingham Docks.

In 1973, Rowe was commissioned by the Italian Government to advise on the settlement of Venice. He performed consolidation tests on 250 mm diameter undisturbed samples. Rowe designed a 260 mm diameter piston sampler for the purpose which enabled 900 mm long consecutive sampling to a depth of 100 m, claimed as a world record at the time. His advice, which was to limit water abstraction from the underlying aquifers, proved successful in preventing further settlement.

The secret of Rowe's success as a geotechnical consultant lay in his painstaking approach and on his insistence that an acceptable engineering solution could only be assured once the true nature of the soils had been discovered and their response to the proposed works properly investigated. He also had a phenomenal ability to recall and research similar projects and to learn the full lessons they had to offer.

By the early 1970s, Rowe's work on large embankment dams had led him to appreciate the limitations of the analytical methods available at that time. He realized that there was a need to observe the behaviour of these structures using physical modelling. Thus he generated funding through agencies such as the Water Resources Board to build a geotechnical centrifuge, which at 7 m diameter and 600 g tonne, is still one of the largest machines in the world today. By constantly up-grading the machine, Rowe was able to investigate a wide variety of other problems. These ranged from advising on the Oosterschelde Barrage in Holland to the foundations of many large North Sea oil and gas production platforms, including the Brae, Beryl and Frigg Fields and the Hutton Field Tension Leg Platform.

In 1982 Rowe retired from Manchester University after 30 years at the age of 60. This did not spell the end of his career, quite the contrary. For the next 15 years he maintaned an active consultancy practice, often putting in a six- or seven-day working week. The quantity and variety of the work he undertook is proof of his consummate knowledge of geotechnics and the high regard in which he was held in the industry. He was frequently retained as an expert witness and one project which he found particularly satisfying was to solve the problem of some 180 000 tonne grain silos, founded on coral which had developed a dangerous tilt.

Peter Rowe was totally dedicated to the advancement and practice of his subject. He could not understand people who were less enthusiastic than himself. To those who shared his passion and were privileged to work with him, he was a great source of ideas and encouragement, of unstinting friendship and, if the need arose, a doughty champion.

In recent years he reduced his workload and enjoyed family holidays in Switzerland and especially in the Lake District, which he had come to love through his cottage above Windermere. He is buried in Troutbeck, overlooking some of his favourite walks.

He is survived by his wife Ann, a son Andrew and by the three daughters Jennifer, Carol and Hazel of his previous marriage to Dorothy Watson Bracewell.

D. C. PROCTER