Geotechnical Consulting Group

Professor David Potts

BSc PhD DSc FREng CEng FICE FCGI

Senior Consultant

Proven experts in a geotechnical world

Professional summary

Professor David Potts, a Fellow of the Royal Academy of Engineering (FREng), is a geotechnical engineer and academic with nearly 50 years of experience in research and practice in the UK and around the world. David is a world-renowned authority in the development and application of numerical analysis methods to geotechnical structures and soil-structure interaction problems. The finite element code ICFEP, developed under David's leadership at Imperial for over 40 years, is widely acclaimed as one of the leading specialist geotechnical programs which incorporates many unique features enabling the realistic assessment of complex soil-structure interaction problems.

Education and Career

Since 2006: GCG Professor of Geotechnical Engineering, Imperial College London

1996: DSc, University of London

Since 1979: Imperial College London

1976-79: Shell Research Laboratories, Netherlands

1973-76: PhD (Cantab), Cambridge University

1973: BSc (1st Class), Kings College London

Professional Qualifications and Memberships

Since 2011: Fellow of the City and Guilds Institute (FCGI)

Since 2001: Fellow of the Royal Academy of Engineering (FREng)

Since 1997: Fellow of the Institution of Civil Engineers (FICE)

Member of the British Geotechnical Association (BGA)

Service on technical / professional bodies

2017-20: Honorary editor, *Geotechnique*

Experience with Imperial College and GCG

Professor Potts is a Senior Consultant at GCG and holds the GCG sponsored chair as Professor of Geotechnical Engineering at Imperial College London since 2006. He has been a member of the academic staff in the Department of Civil and Environmental Engineering at Imperial College since 1979 and became Professor of Analytical Soil Mechanics in 1994. David was Head of the Soil Mechanics Section from 1998 to 2006, Deputy Head of Department between 2002 and 2012 and Head of the Geotechnics Section from 2012 to 2014.

Professor Potts has worked extensively on the development of computer methods of analysis and, more particularly, on the application of numerical analysis to the design of real geotechnical structures. His consulting work has been concerned with the design of piles, including tension piles for offshore anchored structures, the response of offshore gravity platform foundations to cyclic loading, retaining structures of various types, cut-and-cover tunnels, bored tunnels, culverts subject to mining subsidence, the stability of embankments on soft ground, the stability and deformation of earth dams, the behaviour of reinforced earth structures, the prediction of ground movements around deep excavations and the role of progressive failure in embankment and cut slope problems.

Professor Potts has advised several oil companies, consultants and a government research laboratory on the use of computational methods in geotechnics. He is the main developer of the bespoke finite element software ICFEP which is used commercially by GCG. This software can perform both static and dynamic two- and three-dimensional analyses. It has options for performing large displacement analyses, analyses incorporating thermo hydro-mechanical coupling and for dealing with both saturated and unsaturated soil behaviour. ICFEP has been the key analysis tool in a large number of projects, including the first skirted gravity and tension leg platforms in the North Sea in the 1980's (e.g. Gullfaks C, Hutton TLP), underwater slopes in the Gulf of Mexico and hydrocarbon developments offshore Angola and monopile

2011-13: Co-editor, *Computers and Geotechnics*

Scholarships / Awards

2008, 2012, 2019 & 2020: BGA Medal

1991, 1997, 2001, 2017 & 2019: Telford Gold Medal, ICE

2017: Fleming Award, BGA

2017: Editor's Choice Award, Canadian Geotechnical Journal.

2016: Geotechnical Research Medal, ICE

2015: President's Medal and Award for Outstanding Research Team, Imperial College London.

2008: Outstanding Contributions Award, Int. Ass. for Computer Methods and Advances in Geomechanics.

2008: Bill Curtin Medal, ICE

2005: John Booker Medal, Int. Ass. for Computer Methods and Advances in Geomechanics.

2003: John Henry Garrood King Medal, ICE

2002: 42nd Rankine Lecturer, BGA

1998: Crampton Prize, ICE

1997: Telford Premium, ICE

1989: 1st BGS/Geotechnique Lecturer

1985: Coopers Hill War Memorial Medal, ICE

1983: George Stephenson Medal, ICE

foundations for offshore wind turbine generators in the Irish Sea, the German and UK Sectors of the North Sea and the Taiwan Straits.

David's research played a pivotal role in understanding why Carsington Dam failed in 1984 and in its redesign and subsequent reconstruction. The techniques developed during this research have been used to analyse and design other dams and to investigate the stability of cut slopes and offshore submarine slopes. He also performed finite element analyses of the foundations of the leaning Tower of Pisa for the Commission tasked with its stabilisation. The analyses were used to establish the cause of the towers settlement and rotation and to investigate and advise on both the temporary and permanent stabilisation methods finally employed. His research related to tunnelling has been extensive and has addressed issues related to tunnel construction, their long-term behaviour and their effect on adjacent structures and services. It has also investigated the effects of adjacent construction on the behaviour of existing tunnels.

Professor Potts has been author and co-author of more than 400 technical publications and is the lead author of the widely acclaimed two-volume monograph titled *Finite Element Analysis in Geotechnical Engineering (Theory and Applications)*. In 2002, he delivered the 42nd Rankine lecture. David has served on various committees for the International Society of Soil Mechanics and Geotechnical Engineering, the Institution of Civil Engineers, the Institution of Structural Engineers, and the British Standards Institution.

Previous experience

After graduation from Kings College, London, Professor Potts undertook research at Cambridge University into the collapse of shallow tunnels, which involved extensive experimental (both 1g and centrifuge tests) and analytical studies. From Cambridge he went to the Shell Research Laboratories, Rijswijk, Holland where he worked on experimental and theoretical problems involved in the cyclic loading of clay, on the development of numerical methods for analysing the foundation behaviour of marine gravity structures, on the estimation of stresses in oil well casings, and on the stability of offshore pipelines.