



Professor D M Potts  
BSc PhD DSc FREng CEng FICE  
FCGI  
Senior Consultant

**Areas of expertise**

Numerical analysis, Constitutive modelling, Offshore geotechnics, Piled Foundations, Tunnelling, Dams and Embankments, Slopes, Retaining Walls.

**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 at Imperial College since 1979 responsible for teaching the use of analytical methods in geomechanics and the design of slopes and earth retaining structures, both at undergraduate and postgraduate levels. Prof Potts became Professor of Analytical Soil Mechanics in 1994, 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 research 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 coupled consolidation and for dealing with both saturated and unsaturated soil behaviour. ICFEP has been the key analysis tool in a number of offshore projects, starting with the first gravity and tension leg platforms in the North Sea in the 1980's (e.g. Gullfaks C, Hutton TLP), to more recent applications to pile foundations for platforms in the Caspian Sea, spud can penetration problems in the North Sea, underwater slopes in the Gulf of Mexico and hydrocarbon developments offshore Angola and monopile foundations for offshore wind turbine generators in the Irish Sea as well as the German and UK Sectors of the North Sea. Prof Potts is part of a team from Imperial College and sits on the Academic Work Group for the PISA JIP investigating new design approaches for monopile foundations.

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His 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 300 technical publications and is the lead author of the widely acclaimed two-volume monograph titled *Finite Element Analysis in Geotechnical Engineering (Theory and Applications)*. Prof Potts was co-editor of the international journal *Computers and Geotechnics* from 2011 to 2013 and served on the Geotechnique advisory panel. He has also 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. He delivered the 42<sup>nd</sup> Rankine lecture in 2002.

### **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.

### **Education/Research**

DSc, Imperial College, London, 1996  
PhD (Cantab), Cambridge University, 1976  
BSc (1<sup>st</sup> Class), Kings College, London, 1973

### **Scholarships/Awards**

BGA Medal, British Geotechnical Association, 2008 & 2012  
Outstanding Contributions Award, International Association for Computer Methods and Advances in Geomechanics, 2008  
Bill Curtin Medal, UK Institution of Civil Engineers, 2008  
John Booker Medal, Int. Ass. Computer Methods and Advances in Geomechanics, 2005  
John Henry Garrood King Medal, UK Institution of Civil Engineers, 2003  
Telford Medal, UK Institution of Civil Engineers, 1991, 1998 & 2002  
Crampton Prize, UK Institution of Civil Engineers, 1998  
Telford Premium, UK Institution of Civil Engineers, 1997  
Coopers Hill War Memorial Medal, UK Institution of Civil Engineers, 1985  
George Stephenson Medal, UK Institution of Civil Engineers, 1983

### **Professional Qualifications & Memberships**

Fellow of the City and Guilds Institute, 2011 – present  
Fellow of the Royal Academy of Engineering, 2001 – present  
Fellow of the Institution of Civil Engineers (ICE), 1997 – present (Member since 1988)  
Member of the British Geotechnical Association (BGA)