

8ICEG Invited Lecture



Dr. Devendra Narain Singh

Civil and Environmental Engineering Graduate Program,
University of Passo Fundo, Brazil

Invited Lecture Title

Centrifuge Modeling of Contaminant Transport in
Geomaterials

[14:40 - 15:10 , Monday 29th Oct. 2018]

Biography

Dr. D. N. Singh was born in 1965 at Shahjahanpur, UP, India. He has been a faculty member of Civil Engineering at Indian Institute of Technology Bombay, since 1994. Before joining IIT Bombay he has served Central Road Research Institute, New Delhi, and Indian Institute of Technology Kharagpur, for short durations. His early education was completed at Lucknow, UP, India. He obtained his bachelor's, masters and Doctoral degrees from IIT Kanpur in 1986, 1989 and 1993, respectively.

His teaching, and research and developmental activities are in quite diversified areas of geotechnical engineering (viz., soil mechanics, foundation engineering, environmental geotechnology, mechanics of unsaturated soils, soil characterization based on thermal and electrical properties, contaminant transport in porous media, mineralogical characterization, utilization and recycling of industrial waste, geotechnical centrifuge modeling, etc.). He has published 285 technical articles of which 199 are in the refereed journals. He has supervised 36 Doctoral (and 7 ongoing) dissertations and 35 Masters theses. He has been successful in filing 19 (Indian) and 1 US patents and 3 have been granted.

Apart from teaching and research, Dr. Singh has been very actively associated with some of the most prestigious business houses, as an in-house instructor and retainer consultant. He has taken up sponsored projects from Bhabha Atomic Research Centre (BARC), Indian Council of Agricultural Research (ICAR), Department of Science and Technology (DST-TIFAC), All India Council of Technical Education (AICTE) and Atomic Energy Regulatory Board (AERB). With financial aids received from these and several other organizations, he has established a state-of-the-art Environmental Geotechnology Laboratory in the department.

Dr. Singh has founded Environmental Geotechnics, ICE Publishing, London, UK, and has been its Editor-in-chief. He has been 'Editorial Board Member' of several journals of repute. He is recipient of Young teachers' award instituted by the AICTE, New Delhi and JUNIOR/SENIOR Paper Award from the International Association for Computer

Methods and Advances in Geomechanics (IACMAG) for the year 2005. He was Chairman, 12th IACMAG, GOA, India, 1-6 October 2008.

He is recipient of Excellent Contributions Award 2008, which is given by the IACMAG to individuals who have a record of significant contributions in research, academic activities and professional service in different regions of the globe. He is recipient of John R. Booker Excellence Award-2011, which is given by the IACMAG for advancement of research, education and practice of Environmental Geotechnology and development of novel techniques to simulate contaminant transport in geomaterials, under laboratory and in-situ conditions. He is recipient of Richard Feynman Prize 2014, for the best paper published by the ICE journal.

Dr. Singh is Fellow of:

1. Indian National Academy of Engineering, New Delhi
2. American Society of Civil Engineers (ASCE) and
3. Institution of Civil Engineers (ICE), London, UK

Abstract

Ever-growing population and unplanned urbanization, in some parts of the globe, have led to contamination of the geoenvironment. To counter this situation, and to remediate the geoenvironment, one of the options is the application of immobilizing agents. However, selection (or sometimes even synthesis) of the most appropriate immobilizing agent is a treacherous task that requires estimation of sorption- and desorption- characteristics of various geomaterials and immobilizing agents. To achieve this, usually ‘batch sorption- and desorption- tests’ and/or ‘column flow-through tests’ are conducted. It has been demonstrated by earlier researchers that the column tests simulate ‘geomaterial-contaminant-immobilizing agent interaction’ in a much realistic way as compared to the batch tests. However, as the hydraulic conductivity of the geomaterials and immobilizing agents, in their compacted form, is quite low, column tests would require a large interaction time to yield appropriate sorption- and desorption- characteristics of these materials. Under these circumstances, and based on the extensive studies conducted by the researchers at IIT Bombay, India, the utility of a geotechnical centrifuge for modeling contaminant transport in geomaterials has been demonstrated successfully and its details are presented in this manuscript.