

## **Technical Seminars by Profs. Meegoda and Reddy**

Jointly organised by the Environmental Division of the Hong Kong Institution of Engineers and the Research Centre for Environmental Technology and Management of the HK Polytechnic University

Date: 29/5/2008 (Thu)

Time: 6:30 to 8:00p.m.

Venue: Lecture Theatre PQ 304 of the Hong Kong Polytechnic University

### **Registration & Enquiries**

This seminar is free of charge and prior registration is required. The number of participants is limited to 100. For registration, please return the completed Standard Reply Form to Ir Anthony Kwan Email: [akwanhkie@yahoo.com](mailto:akwanhkie@yahoo.com) or Fax: 8108 2687. For enquiries, please contact Ir Anthony Kwan at Tel: 2835 1238.

## **Innovation and Research for Water Infrastructure for the 21<sup>st</sup> Century**

**Synopsis:** Across North America water infrastructure managers are starting to find out that the costs to repair catastrophic failures continues to uncontrollably escalate with tremendous social consequences. These repair often cost up to 20 times more than the cost of developing rational infrastructure rehabilitation programs. The only solution to solving this management and financial problem is to develop a rational and defensible water infrastructure management plan. Recent US Governmental Accounting Standards Bureau (GASB) requirements also highlight the need for such plan. The potential benefits of such system will include long-term savings from adopting optimized preventive maintenance strategies. The Condition States of Infrastructure are used to express the extent of deterioration, and the use of variety of different rehabilitation options. These options can be incorporated in to such system, which uses survival probabilities based on the condition state during the previous year and then to determine whether it is appropriate to inspect, rehabilitate/replace or do nothing at both project and network levels. At the project level this can be achieved by comparing inspection and/or rehabilitation/replacement costs with risks and costs associated with failure. At the network level, the associated costs may be optimized to meet annual maintenance budget allocations by prioritizing infrastructure needing inspection, rehabilitation and replacement.

**Speaker:** Dr. Jay N. Meegoda has been working in the civil and environmental engineering area for over 25 years. He utilizes scientific concepts and engineering technologies in his research to provide solutions to real world problems. Dr. Meegoda has worked with state and local governments, and foreign governments to provide technical input for broad range of problems. At New Jersey Institute of Technology, Dr. Meegoda as PI has successfully concluded several multidisciplinary research projects with broader impact to the society. Some of those technologies are now extensively used while others are to be commercialized. He received the best practice paper award from the Environmental and Water Resources Institute of ASCE in May 2001 for the paper describing the results of one USEPA SITE demonstration project (Meegoda et al., 2000).

## Containment Wall Construction at DNAPL-Contaminated Site

**Synopsis:** A water-bearing granular soil layer within the subsurface of a former manufactured gas plant (MGP) site was impacted with tarry dense non-aqueous phase liquid (DNAPL). A containment wall was constructed with the vibrated beam method to prevent the migration of DNAPL to offsite properties. Prior to construction, different self-hardening slurry materials were evaluated for their compatibility with the DNAPL. Specifically, the study simulated the emplacement of slurry material in the granular unit that was impacted with DNAPL and determined the effect of DNAPL interaction with the slurry material on permeability and shear strength of hardened slurry. Four different types of slurry materials, namely cement-sodium bentonite-dispersant, cement-sodium bentonite, cement-calcium bentonite, and IMPERMIX (slag cement and Attapulgate clay mix) were evaluated under different simulated emplacement conditions (mixing or pouring with site DNAPL) and were cured. Both permeability and unconfined compression tests were conducted on the cured slurry samples. Groundwater and DNAPL were used as permeants in permeability testing. Overall, the results showed that the IMPERMIX slurry possesses low permeability (less than  $10^{-8}$  cm/s) and high shear strength for all of the simulated test conditions. Because of good chemical compatibility and ease to use with the vibrated beam construction method, IMPERMIX slurry mix was used for the construction of the containment wall at the site. The completed containment wall measured 488 m with an average depth of 6.7 m and an average thickness of 10 cm. The containment wall was completed within three weeks. The entire project was completed under the budget (US\$400,000) and 2 months ahead of schedule.

**Speaker:** Dr. Krishna Reddy is a Professor of Civil and Environmental Engineering at the University of Illinois at Chicago, USA. Dr. Reddy received his Ph.D. from the Illinois Institute of Technology, Chicago. Dr. Reddy is a professional engineer in the State of Illinois and he worked as civil engineer and project manager in consulting engineering companies. Dr. Reddy's consulting, teaching and research expertise includes subsurface exploration and testing, foundations, earth structures, contaminated sites, landfills, and waste recycling. Dr. Reddy has published over 150 technical papers on various topics in geotechnical and geoenvironmental engineering. He is also the co-author of the book "Geoenvironmental Engineering: Site Remediation, Waste Containment, and Emerging Waste Management Technologies" published by John Wiley. Dr. Reddy is the Editor of *Land Contamination & Reclamation* journal, and he serves on the editorial boards of the *Journal of Soil and Sediment Contamination*, *Journal of Geotechnical and Geoenvironmental Engineering*, and *Journal of Hazardous Materials*. He has received several awards and honors for excellence in teaching, research, and professional service, including the prestigious University of Illinois Scholar Award. See [www.uic.edu/~kreddy](http://www.uic.edu/~kreddy) for more information.