

Dredged soils, with a little treatment, can be used as a fill material for land reclamation. It is usually available nearby and thus has the potential to be economical as a result of lower transportation cost. One way to treat this soil is to mix it with a small amount of stabilizing agent prior to filling.

The key challenge is the variability of the soil properties to be expected and how to incorporate this in the design to further improve the economics of the method. Key issues involved include the modeling of the strength gain, the ability to know the behavior during the early stage and methods of investigating the soil using the radioisotope cone penetrometer (RI-CPT). These issues will be discussed in this seminar.

### Seminar details

**Date** : 23<sup>rd</sup> September, 2009 (Wednesday)  
**Time** : 1:30 pm – 5:20 pm  
**Venue** : Engineering Auditorium,  
 Faculty of Engineering,  
 National University of Singapore  
**Fees** : Free

Time	Activity
13:30 – 14:00	Registration
14:00 – 14:10	Opening Remarks
14:10 – 14:50	Lecture by Prof. Tan Thiam Soon
14:50 – 15:30	Lecture by Prof. Hiroyuki Tanaka
15:30 – 16:00	Tea Break
16:00 – 16:40	Lecture by Associate Prof. Mimura Mamoru
16:40 – 17:20	Lecture by Dr. Muthusamy Karthikeyan

*Attendance at the Seminar will carry PDU points and 3 STU points also.*

**1<sup>st</sup> speaker** Professor Tan Thiam Soon,  
 Dept. of Civil Engineering,  
 National University of Singapore, SINGAPORE.

#### Behaviour of cement mixed soils

**Abstract:** A number of models have been proposed to describe the behavior of cement mixed soils to account for its variation with a number of parameters such as amount of cement added, the water content and the time for curing. In the effort to describe the variability of cement mixed soils, an understanding of this is important. An examination of these models is presented using hypothetical data as well as data from a site in Singapore

**3<sup>rd</sup> Speaker** Associate Professor Mimura MAMORU; (D. Eng.),  
 Disaster Prevention Research Institute,  
 Kyoto University, JAPAN

#### Possibility of application of RI-CPT to cement improved soils

**Abstract:** RI-CP is a versatile tool for measuring the wet density and natural water content of foundations together with the conventional triple components of CPTU. It is found that RI-CP can detect the wet density and natural water content of very soft soils such as clay mud to stiff sandy soils. In the present presentation, the possibility of the application of RI-CP to cement improved soils at various conditions such as time will be discussed. Penetration to improved foundations gives the trend of the increase in strength with time together with the change in water content and wet density. Those monitored results should be validated by comparing them with the laboratory experiments.

**2<sup>nd</sup> Speaker** Professor Hiroyuki Tanaka; (D. Eng.),  
 Division of Solid waste, Resources and  
 Geoenvironmental  
 Engineering, Graduate School of Engineering,  
 Hokkaido University, JAPAN

#### Increase in stiffness of cement treated soil at very early stage by means of bender element

**Abstract:** Due to difficulty in obtaining filling material, dredged soft soils are used as reclamation material in Japan. This material has also another advantage, i.e., its weight is light so that settlement and earth pressure become small. Dredged soil with high water content is mixed with cement and transformed through a pipe, and its distance sometime exceeds more than 2 km. If the amount of cement is too much and the treated soil gets too much strength, then the material cannot be transported due to large resistance. On the other hand, if it is too soft, the material cannot get desired strength. Using the bender element, the shear wave velocity is measured at very early stage. Before the cement treated soil is solidified, the shear wave cannot be propagated. However, the shear wave can be observed after a certain time. The minimum shear wave velocity observed in this study is around 5m/s.

**4<sup>th</sup> Speaker** Assistant Vice President, Muthuswamy KARTHIKEYAN; (Dr.),  
 Surbana International Consultants Pte Ltd., SINGAPORE

#### Profiling of Heterogeneous Soil Using Radioisotope Cone Penetrometer (RI Cone)

**Abstract:** Unwanted non-pollutive soil generated from marine/coastal and land-based construction activities make a good fill material. But the ground formed with such fills is highly heterogeneous. Using RI-CP, a major site characterization was carried out as an innovative research project in which NUS, HDB and Surbana were involved. A series of experimental studies were conducted in Singapore to investigate and interpret the density profiles obtained by RI Cone. Backscatter and linear mixture theoretical models were adapted and applied to the RI Cone to provide a frame work for interpretation of the signatures of wet density profiles. A back analysis of a set of lumpy fill results obtained from the actual field tests will also be presented.

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