Report 2011-Oversea activity of Fudo Tetra Corporation

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International Department
Fudo Tetra Corporation

1. Our oversea activity and future forecast of construction market

We specialize in the soft ground improvement work such as Deep Mixing, Gravel Compaction Pile and Sand Drain method, which is our best field of construction, and we intend to receive both public works and private sector issue as Sub-contractor base. Ground improvement works of eight projects (Deep Soil Mixing) in Vietnam, the ten (Sand Compaction Pile; SCP and Deep Soil Mixing) in U.S.A., one (Offshore SCP) in South Korea and one (Offshore Deep Soil Mixing) in Hong Kong have been already carried out so far until the end of 2011.

In Vietnam, Hong Kong and Singapore, it seems that the situation where the demand of new construction of infrastructure, especially high grade road, railroad and harbor facilities, and airport will continue successively and the needs of ground improvement are still expanding.

2. Oversea activity and market in each area

(1) South-East Asia

Southeast Asia area has many soft grounds, and therefore it is one of the important business areas for Fudo Tetra Corporation. In this area, since clay particles are too small and it is necessary long time to finish the consolidation, we consider that Deep Mixing method without having consolidation times is rather effective than Drain method.

(2) U.S.A.

Fudo Tetra Corporation has established the subsidiary company "Fudo Construction Inc." (URL:http://www.fudo-const.com) at San Mateo, California in 2005, and has been performed liquefaction countermeasure using the Sand Compaction Pile (SCP) and non-vibratory sand compaction pile method (called as SAVE-Compozer) for urban-facilities foundations. SCP and SAVE are both quite effective to mitigate liquefaction during the Great East Japan Earthquake 11 March 2011.

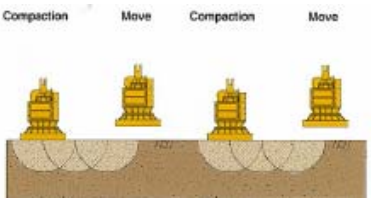
Furthermore, in connection with the new infrastructure projects, we have completed the huge amount of ground improvement (640,000m3) by Deep Soil Mixing method to the levee improvement work in New Orleans, Louisiana without troubles. Please see Annual report 2010 and page 5 of
http://www.issmge.org/en/issmge-bulletins-newsletters-la-lettre-en/issmge-bulletin/vol-5-issue-1-feb-2011 .

In addition, there are some expected airport runway expansion projects in U.S.. In that case, we are considering our MVT (Mammoth Vibro-Tamper) is rather effective than conventional Dynamic Compaction method, since MVT has higher energy level, high productivity and low vibration.

(3) Other area

In East European countries, Oceania, and South Asia (India), we expect the increased demand of ground improvement for the new infrastructures.

3. Ground Improvement method for oversea project

Method	Features	Machine
Deep Mixing	Diameter 1,000-1,600mm soil-cement mixing column is installed by mixing blades, which has been developed since 1970's in Japan. Laboratory mixing test and check boring are both required to keep its quality. It is not necessary to wait long time to make hard ground as drain method. Recently, special design technique called ALiCC method which is possible to be low DM improvement ratio (12-20%) has been developed so that we enable to propose more economical design. In Vietnam, container terminal construction projects, we have assembled the DM special barge with using local flat barge. It is rather convenient for increasing stability of river dike slope with the DM method. In 2011, we have small amount of offshore Deep Soil mixing project in Hong Kong marine side.	 
Sand/Gravel Compaction Pile (SCP,GCP)	Diameter 700-900mm, strong sand/gravel pile is installed in both clayey and sandy ground. It is effective for increasing stability of clayey ground and mitigating liquefaction of loose sandy ground. Recently, no-vibration (static) sand compaction pile machine has been developed and used in U.S. for mitigation liquefaction in urban area.	
Off-shore Sand Compaction Pile	Diameter 1600-2000mm, large scale sand pile is installed by special barge. It is useful for many harbor structures such as breakwater and many type of quay-wall. Construction speed is much faster than other method. Gravel and sand is available for used material, however around 2,500m3 material is required in one day.	
MVT	Only local crawler crane and attachments are used and it is not necessary to raise up 15m, since we use vibrated plate with strong vibrator. Then we could have higher energy, higher productivity and lower noise/vibration than conventional Dynamic Compaction.	

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