

## **KEYNOTE SPEECH**

### **The time-dependent performance of dredged marine sediments reused for backfilling: Initial rest period**

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#### **ABSTRACT**

Dredged marine sediments (DMS) are usually disposed of in open sea, inadvertently causing contamination and destruction of the marine ecosystem. Some of these adverse effects are long term, far-reaching and irreversible. However the DMS, if suitably assessed and managed, can be potentially reused as a backfill material with sufficient soundness and safety. Applications include reclamation and shoreline rehabilitation works, where artificial land is created using the DMS. Due to the very soft or slurry form of the material, significant subsidence is expected in a backfilled embankment, as the soil undergoes sedimentation and self-weight consolidation. This would be followed by time-dependent regain of hardness, hence strength and stiffness, under constant water content or volume condition, also known as 'thixotropic hardening'. It is imperative to know this time-dependent characteristic of the DMS for efficient reuse, where the time required for sufficient strength and stiffness regain can be estimated, and the necessary measures to facilitate strength as well as stiffness gain can be introduced. The present study simulates and examines the post-consolidation hardening of DMS compared to being lightly solidified with small amounts of cement. It aims to provide insights to the ageing effect contributing to long term strength and stiffness gain, and potential acceleration of the improvement processes with induced solidification. The DMS samples were retrieved from Malaysian waters, and remoulded in the laboratory to form a simulated backfilled soil bed. Measurements included the vane shear and cone penetration tests. The findings serve as a preliminary guide to the estimation of rest period required for reclaimed grounds backfilled with DMS left to settle by itself, or accelerated with slight cement solidification.

*Keywords*— dredging, sediments, solidification, geomaterials, time