ALTERNATIVE RAPID GROUND TREATMENT SOLUTION USING POLYURETHANE PREFABRICATED FLATBED

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OBJECTIVES

The objectives of this research are:
- To simulate the existing condition of the soft ground for embankment and approach construction.
- To simulate the deformation and stress distribution for the proposed solution applied to remediate and reinforced the embankment and approach during consolidation process.
- To determine the physical, chemical and engineering properties of the materials proposed for the solutions i.e. physical characteristics, chemical morphology, strength, stiffness, compressibility and permeability.
- To conduct a trial embankment and test facilities to evaluate and monitor the performance of the proposed PU flatbed solution.
- To evaluate the in situ performance of the solution in the field by monitoring settlement and lateral movements of the embankments and approach.

INTRODUCTION

Long-term settlements in soft soil constitute an engineering challenge in road design and construction in areas with deep deposits of soft soil. Soil improvement to strengthen the soil can be quite complicated, expensive monitoring and predicting long-term settlement is not an easy task. Today there are numerous different numerical tools to help the engineer to predict the long-term settlement. Even though the numerical tools have become more refined and involve more detailed soil behavior, the engineer needs to balance this, when using them, against the quality of the soil properties that have been determined. It is of interest to investigate whether, with programs normally used, it is possible to predict the long-term settlement in deep deposits of soft clays (Olsson, 2010)

METHODOLOGY

a. Numerical simulation of the existing embankment to predict deformation of lightweight polyurethane prefabricated flatbed reinforced embankment, approach and structural aprons.
b. Laboratory testing of the physical and engineering behavior of the lightweight polyurethane foam/resin as chemical grout material for prefabrication of PU flatbed and in situ cast for embankment and approaches.
c. Site evaluation and monitoring in situ performance of the lightweight polyurethane flatbed reinforced embankment, approach and structural aprons.

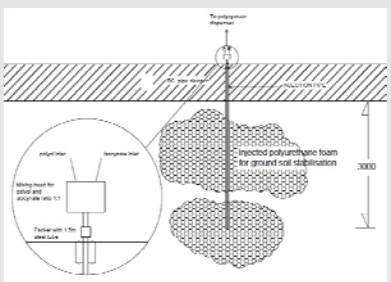
OUTPUT

New method of treatment and remediation with rapid setting offering advantages in terms of technical superiority, robust and economic. Development of new system and product to improve the construction of embankment and approach over soft deposits Publish high impact journal papers and specialized conference proceedings. Produce human resource capital and knowledge enhancement based within the UiTM-JKR Collaboration.

IMPACT & OUTCOME

Established new method will reduce cost in infrastructure and save tax payer's money. Minimize the time of construction and primary consolidation, thus long term consolidation issues of post construction.
***Preliminary* (Cawangan)** = To equip the technical staff with knowledge and skill in monitoring settlement of embankment and predicting settlement using numerical tools.
***Intermediate* (Pelanggan/Organisasi) =** To produce post graduate and research staff with new specialization (in lightweight polyurethane foam/resin and soil settlement monitoring)
***Tertiary* (Negara) =** Economic contribution – cost and time saving

Polyurethane foam injection using two parts hydraulic powerpacks



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