

# WEBINAR TALK ON POLYURETHANE FLATBED: AN INGENIOUS SOLUTION TO RESOLVE SETTLEMENT OF SOFT GROUND

**SPEAKER**

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# SYNOPSIS

Construction on soft soil deposits has been considered as one of the most challenging in the area of geotechnical engineering. According to statistic carried out by Public Works Department of Malaysia from 2010 to 2015, ground settlement was the major issues among other geotechnical problems. Geotechnical engineers deal with complex ground sensitivity issues and are aware that the changes could cause immediate or long term effect to the weak foundation soil. This research initiative presents the performance of Polyurethane (PU) foam in the form of 'flatbed' as an alternative for ground improvement solution. The idea of integrating consolidation and buoyancy is the key in designing polyurethane (PU) flatbed to support the platform above and provide buoyancy, hence reduces the consolidation settlement of soft ground. Polyurethane flatbed is a lightweight mattress technique for ground remediation of existing depressed road embankments and development of new road embankments and platforms. In addition, the lightweight properties help to reduce the development of excess pore water pressure from the overburden pressure, which in turn becomes buoyant force to support the lightweight material. Finite element modelling using PLAXIS 2D was executed to predict the magnitude of deformation, development of excess pore pressure and embankment stability for untreated and treated ground condition throughout the construction stages. Material properties tests executed in the laboratory include expansion rate test, consolidation test using modified Rowe's cell and buoyancy test. The settlement monitoring procedure was executed after the installation of the PU flatbed at Jalan Kampung Paya Redan, Melaka. The research work was funded by JKR CREaTE to develop new ideas in solving continuous consolidation settlement, hence develop system to be applied in the real world.

## SPEAKER'S BIODATA

Ir. Dr. Ismacahyadi Bagus Mohamed Jais obtained his Bachelor's Degree in Civil Engineering, Universiti Teknologi MARA, Malaysia in 2001. He then, obtained his Master's Degree in Geotechnical Engineering/Engineering Geology from University of Newcastle upon Tyne, United Kingdom in 2004 where his dissertation specializes in finite element analysis of geotechnical problems relating to Muar Trial Embankment using PLAXIS Finite Element Code. He finally obtained his Ph.D in Civil Engineering from Universiti Teknologi MARA, Malaysia in 2014 focusing on wetting collapse behaviour of saturated and unsaturated soils. He is a professional engineer with the Board of Engineers, Malaysia and Member of the Institution of Engineers, Malaysia from 2021. His interests include numerical modelling of geotechnical problem, geoforensic engineering, alternative ground treatment and ground engineering, slope engineering and rehabilitation, embankment dam engineering and tunnelling. Currently, he is a senior lecturer in the Faculty of Civil Engineering, UiTM and has involved in research and consultations relating to numerical simulation and physical modelling of geotechnical problems. His projects include assessment of tilting retaining wall in Semenyih for Castmet Sdn Bhd, temporary geotechnical support structure at Pulau Indah for TH Heavy Engineering Bhd, stability assessment of new bulkhead and wharf at Pulau Indah for TH Heavy Engineering Bhd, detail design of ground repair and remediation at MTBE Petronas Chemicals, Gebeng, Kuantan for Petronas Chemicals Bhd, dam stability analysis at Wadi Al Asla, Jeddah for the government of Saudi Arabia, ground rehabilitation and approach treatment at various JKR, PLUS Expressway Bhd, SKVE Holdings Sdn Bhd and MTD Prime Sdn Bhd projects. He is also involved in the MS2038 Malaysian Code of Practice for Site Investigation with Standards Malaysia, Standard Specification for Road Works JKR, Section 18: Soil Stabilisation, Section 2: Earthworks, Section 20: Ground Improvement and Section 10: Piling Works and Construction Industry Development Board (CIDB) for guidelines in Best Practice for Subgrade Stabilisation. He has also served with Bahagian Pakar dan Forensik, Cawangan Kejuruteraan Geoteknik (CKG), Jabatan Kerja Raya Malaysia (JKR) as advisor for geoforensic investigation and solution.