

A Study of Polymer Additive in Crushed Rock Soil Aggregate Improvement for Highway Construction in Suphan Buri

Thanatip Jarearnsiri¹, Sideth Prum², Thattep Wattanaphrayapa¹, Gerard Duggan³, Nalinee Jumnonpol⁴

¹Suphan Buri, Rural Road Office
Bureau of Rural Roads 18 (Suphan Buri), Thailand
thanatip_na@hotmail.com; thattep19@gmail.com

²Suvannaphum Investment Co., Ltd
Sangkat BoengKak II, Phnom Penh, Cambodia
sidethprum@gmail.com

³Civil Engineering Technical Advisor, KBR
Perth, Australia

Duggan.Gerard@jkc-Ing.com

⁴Metropolitan Waterworks Authority
400 Prachachuen Road, Laksi, Bangkok, Thailand
nalinee.j@mwa.co.th

Extended Abstract

Presently, material problem is an important factor for highway construction, especially the material that does not meet required specifications for Department of Highway (DH) Standard and Department of Rural Road (DRR) Standard, Thailand. Bureau of Rural Road 18 (Suphan Buri) also face problems with soil aggregates. Those materials meet required specifications for subbase layers are rarely available in close proximity to construction areas[1]. They can be found in provinces such as Sara Buri and Kanchana Buri central and western part of Thailand, respectively. These provinces are far from the construction site which will impact the cost and the control of material standard. Material choice is an important consideration for highway construction agencies, including the Bureau of Rural Road 18 (Suphan Buri).

This paper aims to study the physical properties and compressive strength of crushed rock soil aggregate (CRS) improved with polymer additives, which is to be used as a highway construction material [2]. The samples were prepared based on the optimum moisture content (OMC) and the maximum dry density from the modified proctor test by ASTM standard. Each sample was prepared using cylindrical mold with inner diameter of 101.5 mm and height of 116.5 mm. CRS samples were mixed with a cement content of 2%, 4% and 6% by weight and Chem Road binder added at 0%, 2%, 4% and 6% rate by concentration of solution. The ASTM standard D2166-850, D1883, and D5084 were used in the physical property studies of the samples.

The results show that strength development of crushed rock soil aggregate using cement at the ration of 2%, 4% and 6% are significantly increased due to the presence of Chem Road (Chem) concentration binder. The maximum 28 days strength of CRS-Cement with Chem is 7.25 MPa for a cement ratio of 6% and a Chem concentration of 6%. The Chem Road concentration is a predominant factor in the increase in compressive strength of CRS development compared to others. The permeable properties and Modulus of Elasticity are also significantly improved by the Chem Road additive. Additionally, it is shown that Chem Road improved the flexibility of the pavement. Finally, results show that all sample mixtures with a cement content of 4% and 6% and with any Chem Road concentration above 0% can give higher strength than that specified by DH-s204/2533 & DRR 244-2556 (Thailand) for a soil cement layer in highway construction.

References

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