

Investigation on the chemical and mechanical effects of paper sludge ash as a replacement of stabilizer in soft cohesive soil with seasonal variability

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ABSTRACT

Soft cohesive soil which includes a high percentage of clayey soil is problematic when it has to be used as a subgrade soil. It can cause excessive settlement due to low bearing capacity and strength. The typical remediations for soft cohesive subgrade soil are replacement of soft cohesive soil, addition of lime, and utilization of stabilizers. In this study, paper sludge ash (PSA) was investigated as a replacement of stabilizer. Different percentages of PSA (0% to 10%) were used to replace the stabilizer and find the optimum mixture design ratio. To evaluate the chemical and mechanical effects of PSA as a replacement of stabilizer in soft cohesive soil, a series of laboratory tests were made. PSA was characterized with scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS) and X-ray diffraction (XRD). Unconfined compressive test, California bearing test (CBR), and wheel tracking test were performed to determine the performance of PSA-stabilized soft cohesive soil. In addition, to evaluate the seasonal variability of PSA-stabilized soft cohesive soil, soil frost heave test was performed. The results show that 6% of PSA was the optimum design mixture ratio as a replacement of stabilizer. With the optimum ratio of PSA, PSA-stabilized soft cohesive soil meets the quality requirements of subgrade fill materials.

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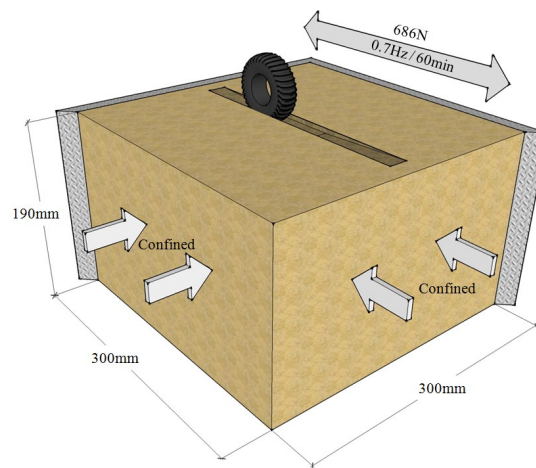


Fig. 1 Wheel tracking test

REFERENCES

Jeong-Jun Park, In-Hwan Lee, Eun-Chul Shin, Gigwon Hong. (2019), "A Study on Unconfined Compressive Strength of CLSM with Paper Sludge Ash", *J. Korean Geosynthetics Society*, **18**(4), 253-262.