

The Role of Additives in Soil-Cement Subjected to Wetting-Drying Cycles

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Abstract

This study aimed to explore the use of additives in soil–cement mixtures that have undergone a wetting-drying cycle. In total, two types of soil were used, granitic and lateritic, which are widely used in road base construction in the Katingan area, Central Kalimantan, Indonesia. The cement used was the ordinary Portland type I, while the additive utilized was for commercial purposes, and predominantly contained CaCl_2 . This research was conducted by testing the optimum cement content for each soil to determine the shear strength according to Indonesian standards (i.e., minimum Unconfined Compressive Strength of 2400 kPa). The optimum cement contents of granitic and lateritic soils were deduced to be 5.5% and 5% on a dry weight basis, respectively. The utilization of 0.8% additive resulted in a 0.5% reduction in the optimum cement content of granite-like soil. The results showed that the optimum additive content for granitic soil was higher than that without supplementation, while for lateritic, no changes occurred. The advantage of using supplements, however, was more pronounced in the samples when they had been subjected to wetting–drying cycles. Additionally, at the optimum additive level, the moisture content and soil-cement loss during wetting was always lower than without supplements.

Keywords: lateritic soil; granitic soil; additive; soil stabilization; soil-cement