

## Bitumen Emulsions as a Stabilizer for Substandard Soil

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### Abstract

Sri Lankan road construction sector is dealing with an ever depleting construction material problem, specially finding good quality soil is becoming more and more difficult for projects over the past few years. The accelerated development demands a lot of natural resources and the extraction of resources like soil in mass scale also poses a great threat to the environment. Improving the substandard materials which are otherwise disregarded, can be a viable solution for the material shortage and may help environment conservation.

Stabilizing the soil is a well-known practice used to improve the engineering properties of the soil. There are many ways from which the stabilization can be achieved. But a reluctance to implement it has been developed because of the time consumption, expenses, the need for expert knowledge and the need of special machinery has developed. The research is to find the possibility of using bitumen emulsions, a product which can be handled and applied rather easily as a stabilizing agent for soil. The bonding characteristics of bitumen are expected to facilitate the extra cohesion between particles, inhibit permeability and result in improved engineering properties. The idea is to find out the viability of bitumen emulsion as a soil stabilizer for Sri Lankan road projects and whether materials marked as unusable can be used for road shoulders, sub base or embankment construction after improving.

To determine the characteristics of bitumen emulsion as a soil stabilizer, trial mixes, mixing bitumen contents varying from 2% to 6%, have being carried out, and the outcomes were observed. First the compaction was done soon after the mixing was finished and CBR was determined after 4 days of soaking. Since the results were not promising, the samples of the next approach were kept for five hours under normal conditions, and then compaction was done and 4 day soaked CBR was determined. The strength improvement characteristics may vary with the soil type and the construction steps followed. The curing time and the curing stage (after compaction or before compaction) has a significant effect on the strength gain. Also analysing the soil matrix at a micro level also should be done in order to get an idea about the strengthening mechanism.

Emulsion is not new to road construction. It is being used extensively for other purposes such as priming and cold mixes and is a very familiar substance for the industry. Using it on the site has many advantages over other stabilizers. Therefore, finding the possibility of the applicability of bitumen emulsion as a soil stabilizer is important.

**Key words:** Soil, Stabilization, Bitumen Emulsion

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