Geotechnical Properties of substitutes of Bentonite

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Abstract

Over the years, with increasing development activities of the country, demand for bentonite has reached to an exceptionally high level. Montmorillinitic clay is also using the industry as raw material source. In Sri Lanka, bentonite used in the commonly;

- Drilling Industry
- Construction Industry.

Control of the physical properties of drilling mud systems is important in enabling the development of new wells and maintaining well operation. Initially mud was used to cool and lubricate the drill bit, and remove debris from the drill well. Control of the rheological properties and density of the mud system ensured debris removal could be achieved whilst also controlling the hydrostatic pressure in the well. The solids particle size within the mud system was carefully regulated relative to the pore size within the geological formation being drilled, mud could also help maintain well stability and prevent formation damage through fluid invasion into permeable rocks. The engineering of different mud for drilling operations requires access to routine particle size analysis capabilities. In combination with other physical property measurements, such as rheological and density measurements, the system can enable the development of high performance water based drilling mud, allowing the mud characteristics to be matched with the nature of the formation being drilled.

Representative lake sediment clay samples were collected from Vavuniya district and water treatment plant sludge samples were collected from different locations in Sri Lanka to undergo property test analysis. Weight of the clay sample was measured and packed using by polythene cover, as collected samples from Vavuniya, Badulla, Bandarawella, Ampara and Hanwella (Colombo District). Its GPS co-ordinates too were recorded. The collected samples were tested to determine, its determination of mechanical grain size analysis, determination of specific gravity value, determination of Plastic limit, determination of Liquid limit.

Key words: - Rheological, Plastic limit, liquid limit and clay.