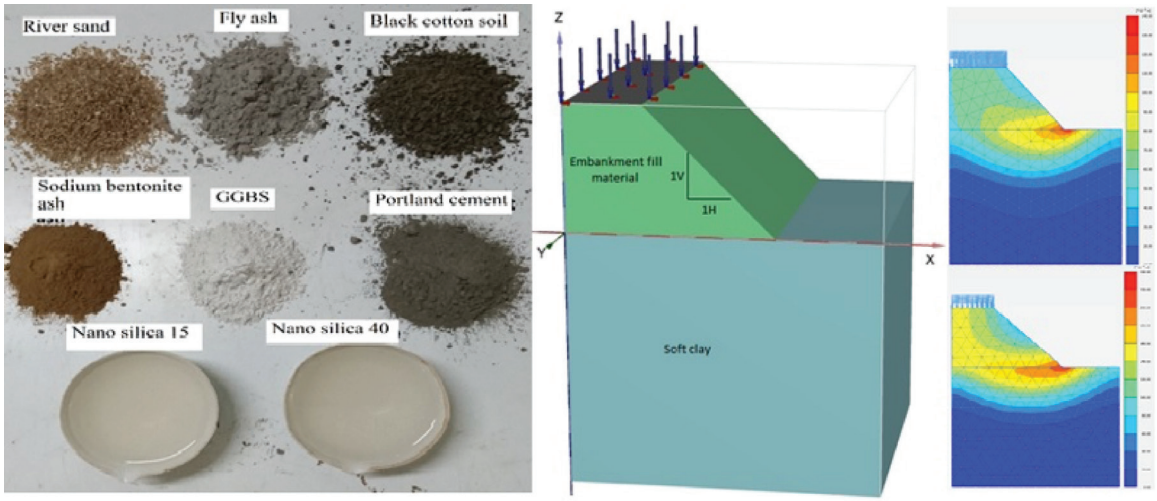
Numerical Analysis On Designed Mixes Using GGBS and Sodium Bentonite as a Highway Construction Material



Modelling of embankment using mechanically and chemically optimised mixes on soft clay (10m depth) under undrained conditions was done. River sand, fly ash, black cotton soil, sodium bentonite ash, and ground granulated blast furnace slag (GGBS). The sand, fly ash and GGBS are non-plastic and non-swelling material. River sand is uniformly graded medium sized sand while fly ash (Class-F) is silt with low compressibility. The sodium bentonite ash and black cotton soil have plastic and swelling character. They are classified as clay with high plasticity. The plasticity of sand and fly ash mixes increases with the increase in sodium bentonite ash content. The mix gains sufficient plasticity and moulding capacity below 30% sodium bentonite ash content afterwards more plasticity, reduces the dry density or changes are negligible. The influence of increasing sodium bentonite content on plasticity characteristics was more on fly ash as it is silt. The black cotton soil decreases its plastic character with increase in GGBS content.

The factor of safety (FOS) of all mix models decreases with increase in height of embankment. The FOS for geotextile case is higher than non-geotextile case. The fly ash mixes showed highest FOS than other mixes. The total deformation increases with increase in height of embankment.

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