1. THE USE OF SAND COLUMNS IN THE REINFORCEMENT OF WEAK LAYERS IN ROAD ENGINEERING

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Abstract: It is an established fact that when roads are planned and constructed, consideration needs to be given to ensuring the strength of the road surface. It is, however, also the case that when an existing road is being rebuilt or is under maintenance, its base may need to be fortified to increase the road's vehicle-carrying capacity. The base may, for example, contain a high proportion of weak soil that would be difficult, time-consuming, and costly to remove. This paper aims to investigate the efficacy of using sand-filled piles to reduce road deformation. Experiments conducted on sponge samples confirm that there is a relationship between the total area of sand-filled piles and relative reduction in deformation. It finds that the relationship is non-linear, but that the relationship can be made linear by adjusting the area of sand-filled piles. When the area of sand-filled piles increases from 7.8% to 19.4%, the deformation module can change by up to 100%. Relative reduction in deformation can change from 14% to 45.5% when the area of sand-filled piles increases from 7.8% to 11.7%. The maximum reduction in deformation – 92.4% - occurs when the area of sand-filled piles exceeds 19.5%. Changing the loads borne also affects the deformation module. This paper found that when there was a 10 to 15kg load, and the number of sand-filled piles was increased, there was a change in the deformation module by 380-470%. When there was only a 5kg load on the sample, and the number of sand-filled piles was increased, there was a change in the deformation module by up to 1217%.

Keywords :Sand-filled piles, relative deformation, rebuilding, roads.