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SHEAR RATE EFFECT ON CEMENTED-SAND STRENGTH

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***Abstract*— rate of shear is always important issue to proceed in terms of analysis of geotechnical matters. Shear rate in the laboratory can be well controlled by using appropriate procedure. The aim of this study is to investigate the effect of shear rate on the shear stress of sand at failure.**

Keywords— **Shear rate, Cement, Sand**

I. INTRODUCTION

Rate of shear and direction of forces and stresses applied to soil is very important [1-12]. The application of cement is very important matter given the importance of getting a proper strength for the soil [13-20]. Most of the time clay materials due to its low strength is more toward the stabilization [21-32] Yet, sand also require sometime stabilization to accommodate a higher strength. There is example of stabilization in literature relevant to fly ash, slag and fibre and cement as stated in [33-41].

II. MATERIALS

The materials, which was used in this study, can be outlined in the following order:

a) Sand:

Perth sand was employed in this study. The sand had GS of 2.65 and Cu=0.6.

b) Cement

The cement, which was employed in this study, was Portland cement which was supplied from a local supplier.

III. COMPACTION TESTING

Table 1 shows the compaction characteristics of the mixes.

Table 1 Compaction characteristics of mixes

Sample Id	PC%	OMC %	MDD
S-PC	3	14	1.58
S-PC	5	15.2	1.51

IV. SHEAR TEST

The direct shear device was used to derive the shear stress at failure. The process was applying 100,150 and 200 kPa. The rate was changed from 0.1 mm/min to 1 mm/min.

The outcome of the test can be seen in the following figures. Figure 1 and 2 shows the effect of cement on peak shear at 0.1 mm/min.

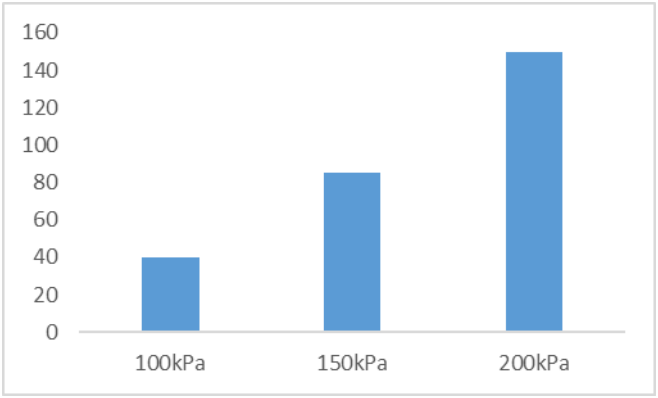

Figure1 : Shear at failure at 0.1 mm/min , cement 3%

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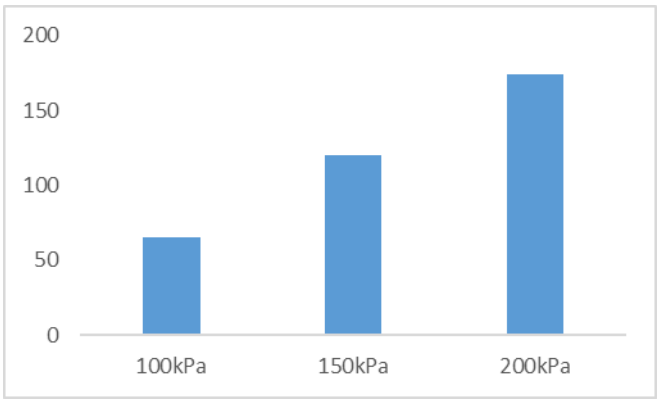

Figure2 : Shear at failure at 0.1 mm/min, cement 5%

Figure 3and 4 shows the shear stress at failure at 0.5 mm/min.

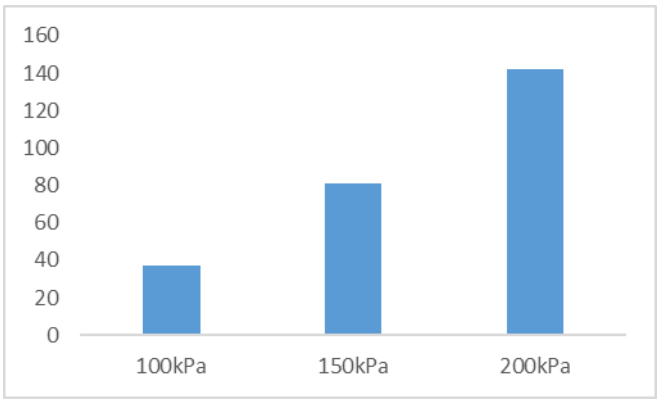

Figure3 : Shear at failure at 0.5 mm/min , cement 3%

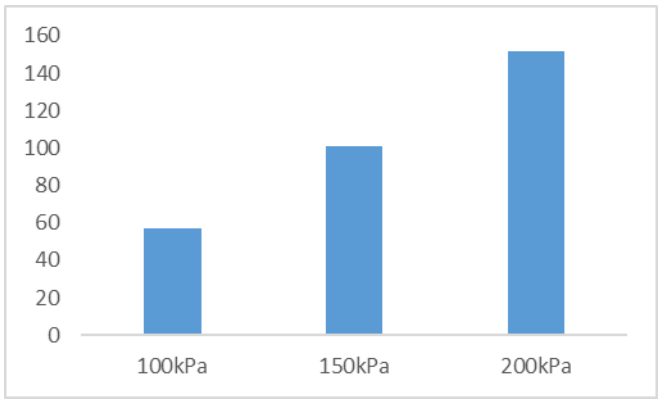

Figure4 : Shear at failure at 0.5 mm/min, cement 5%

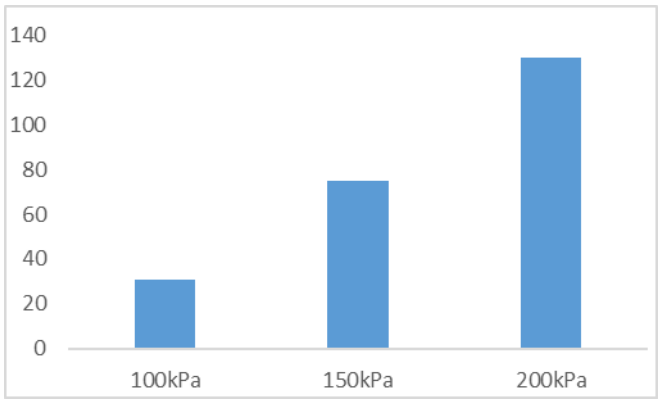

Figure3 : Shear at failure at 1 mm/min , cement 3%

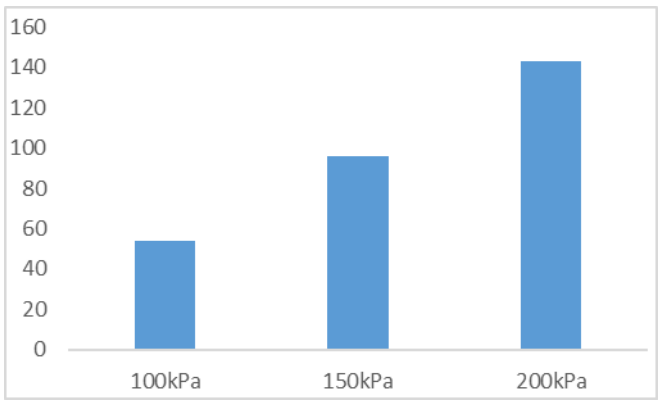

Figure3 : Shear at failure at 1 mm/min , cement 5%

V. CONCLUSION

The rate was increased from 0.1 mm/min to 1 mm/min. The results showed that shear stress at failure slightly decreased with increasing in shear rate.

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