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EFFECT OF SAWDUST ON COHESION OF SAND-SAWDUST MIXTURE

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Abstract— Shear stress is one of important factor in any geotechnical design. Application of sawdust into soil recently being emphasized by researcher in this area. This study, considers the effect of sawdust addition into cohesion value of sand.

Keywords— Cohesion, Sawdust, Shear

I. INTRODUCTION

Shear stress at failure and its relevant parameters are surely those of importance in design of geotechnical infrastructure. Based on mohr-coulomb theory the shear stress at failure depends on cohesion and friction angle. Sand alone being investigated by researcher's example [1,2]. The idea of stabilization technique then comes to effect to see different potential of waste and by-product applications. The by-product such as fly ash [3-7]. Some other research has been done on application fibre into soil [8-12]. Tire application into soil also was studied by [13-17]. Lime as one of the common stabilization technique also being applied in soils [18-21]. There have been other aspects as outlined in [22-32] which all proved that importance application of sawdust into soil. Therefore, this study investigates the effect of sawdust on the cohesion and friction angle of soils.

II. MATERIALS

The employed materials can be listed as:

a) Sand:

The sand which was used in this study referred as yellow sand. The SG was 2.65. The mediana size of particle was 1.2mm.

b) Sawdust

The bentonite was expansive, and the median size was 36 μ m.

C) cement

Portland cement was used in this study.

III. COMPACTION TESTING

In the first stage, the compaction values were derived. The results of compaction can be seen in the table 1:

Table 1 OMC and MDD values of mixes

Sample Id	Sawdust	PC%	OMC %	MDD
S-PC-SW3	3	5	17	1.49
S-PC-SW5	5	5	18.2	1.45
S-PC-SW7	7	5	18.7	1.34
S-PC-SW10	10	5	21	1.31

Figure1 shows that MDD values of samples were decreased by addition of SW percentage.

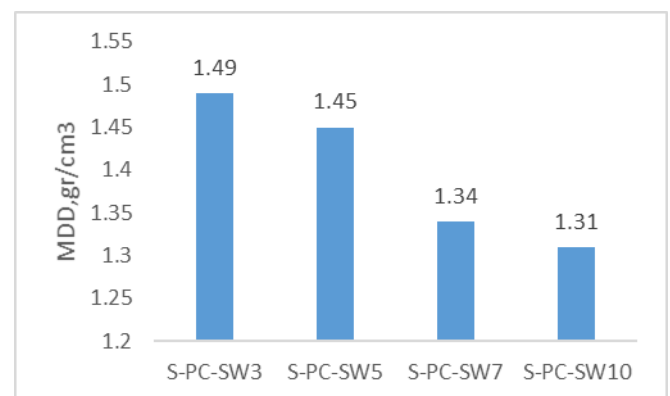


Figure 1 MDD values for each mixture

Figure 2 shows that increasing in SW percentage increases the OMC values.

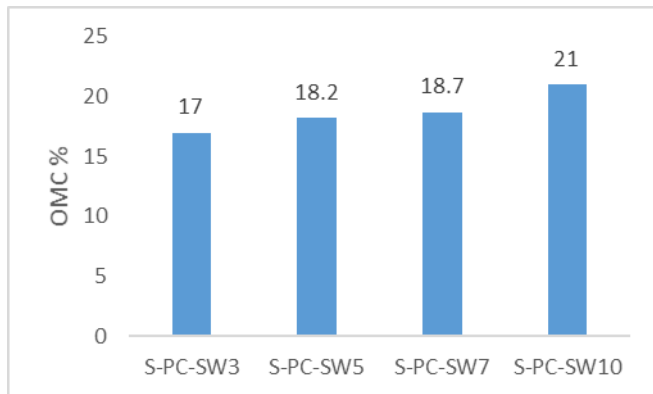


Figure 2 OMC values of mixes

IV. SHEAR TEST

Direct shear test run with 0.1mm/min. The sample were prepared in accordance with OMC and MDD of mixes. Cohesion of mixes were recorded and presented in figure 3. As can be seen, with increasing in sawdust percentage the cohesion of mixes was increased.

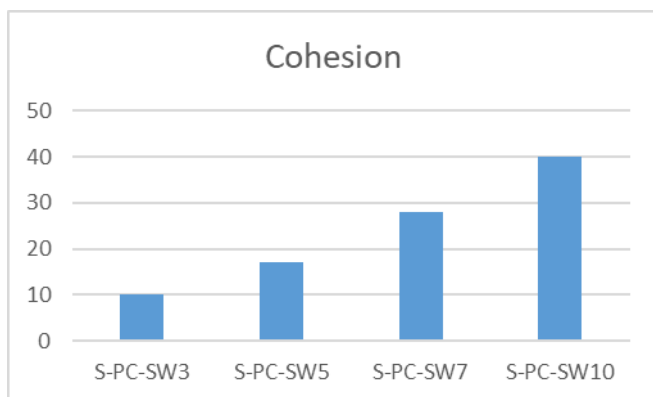


Figure 3 Cohesion of mixes varying SW

The friction angle is recorded and can be seen in figure 4.

The friction angle is decreased with increasing in sawdust percentage.

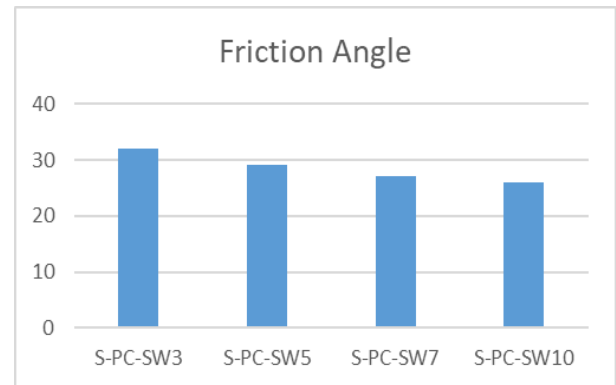


Figure 4 Friction angle of mixes varying SW

V. CONCLUSION

A series of shear tests conducted to investigate effect of sawdust on cohesion behavior of the sawdust sand mixtures. The results showed that increasing the sawdust increased the cohesion and reduced the friction angle.

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