Abstract
Stabilization of soils means improving the engineering properties of the soils to achieve the specified requirements. Stabilization was carried either by method of compaction or by adding admixtures. Recent studies showed that certain waste products having pozzolonic property from different industries were used to stabilize the soils. This proved an advantageous method, as the disposal of the waste materials was causing problem to the environment. Keeping in view the above intension, literature review was undertaken to understand recent studies undertaken for stabilization of soils and the same is presented below.

I. INTRODUCTION
Stabilization is a method where the stabilizer acts as a stabilizing agent that alters the properties of a soil chemically to meet the specified engineering requirements based on its field application. Some soils are always susceptible for settlement and consolidation. Stabilization of such type of soil results in increased strength, reduced compressibility and shrinkage. In this paper a review of the stabilization of plastic soils for different structural applications are studied.

1.1 M. Adams Joe and A. Maria Rajesh in July 2015 studied the stabilization of soil using industrial waste sand copper slag cement and lime. They conducted various experiments like specific gravity, sieve analysis, proctor compaction UCS test and CBR test. These results showed the considerable change in the engineering properties of soil that is there was appreciable improvement in the maximum dry density and optimum moisture content and
enhancement in the UCS of soil in subbase than normal soil. It can reduce the construction cost by adopting the stabilization method.

1.2 Aniculaesi Mircea, Lungu Irina and Stanciu Anghel in May 2014 studied the effect of Eco-cement (GGBS) on the expansive soil strength. Here the soil was classified as CH and the engineering properties of clayey soil were found. When the soil was tested for its liquid limit it showed 86.03% and plastic limit as 28.2% which displayed it as a very high degree of expansion leading to serious problems in geotechnical design. The soil was treated with 10% eco-cement and Portland cement. The test determined the strength development of compacted cylinders at different curing periods such as 1.7, 14, 24, 30 days. The results showed that 50% replacement of Portland cement with eco-cement, the UCS reached 50% of maximum strength. The effect of soaking was less significant. The addition of cement increased plasticity index which the soils show better workability. The compression index Cc, decreased with increasing curing time and consolidation pressure.

1.3 Divya Krishna. K V Janani, P.T.Ravichandran, R Annadurai and Manisha Gunturi in March 2014 conducted experimental study on soil stabilization using Phosphogypsum and flyash. Here the percentage of Phosphogypsum was varied from 2% 4% and 6% with fixed quantity of flyash as 5%. The unconfined compressive strength test and microstructure analysis of the soil with different percentage of additives were determined for the curing period of 3 days and 7 days. The UCS soil samples were prepared at their MDD achieved in compaction test. The strength of stabilized soil increased with increase in amount of phosphogypsum in addition to flyash content of 5%. The strength increased with increase in the curing period. The minimum increase in UCS was 1.72 and 2.25 times for two different soil on addition of 5% flyash and 2% phosphogypsum at curing period of 3 days.

1.4 Prakash Chavan and Dr. M.S. Nagakumar. Here the black cotton soil was treated with Bagasse ash with different percentages and UCS and CBR test was performed. The test results showed the reduction in plasticity Index of Bagasse Ash treated soil from 24% to 17.40%. It was also observed that by addition of 9% bagasse ash for black cotton soils, the density has significant increases from 1.57 to 1.78 gm/cc. But OMC decreases from 17.20 to 15.00%. Further addition of Bagasse Ash decreases the density and increases the OMC. It was observed, improvement of CBR value from 1.16% to 6.8% for addition of 9% bagasse Ash. The UCS of specimens increased from 93 KN/m$^2$ to 429 KN/m$^2$ at 9% bagasse ash then later it decreases.

1.5 Norazlan Khalid, Mazidah Mukri, Faizah Kamarudin, Mohd Fadzil Arshad carried the experimental study on the clay soil, stabilized using Waste Paper Sludge Ash (WPSA). WPSA considered as finely waste product resulting from the combustion of wastepaper sludge in paper recycling factories waste paper. The WPSA used in this study has been tested and based on ASTM C618, WPSA classified as Class-C fly ash because WPSA containing more than 20% lime (CaO) and possesses cementitious properties and pozzolanic properties that resulting in the self-cementing characteristics. This Class-C WPSA is self-cementing; activators such as lime or cement are not required. The slightly sandy CLAY of high plasticity of clay soil sample has been used in this study. The first objective of this
study was to determine the optimum concentration percentage of WPSA as additives based on the compressive strength. The second objective is to determine the strength development of clay soil stabilized at the optimum percentage of WPSA at 0 days, 14 days and 28 days of curing periods. The third objective is to determine the CBR value of clay stabilized with the optimum percentage of WPSA for soaked and unsoaked conditioned. This study involved the testing of unconfined compressive strength test (UCT) to determine the optimum percentage of WPSA and strength development clay soil stabilized at the optimum percentage of WPSA. The second testing of California Bearing Ratio (CBR) test to determine the CBR value for clay stabilized with optimum percentage of WPSA. Result shows that the optimum concentration of WPSA to stabilize the clay soil was about 10% at the maximum compressive strength of 737kPa. Addition of 10% WPSA has increased the value of compressive strength compared to the control (unstabilized soil) from 0 days to 28 days of curing periods respectively. Furthermore, the CBR value of clay soil after stabilized with 10% WPSA was increased about 1.5 times the untreated for unsoaked condition and 3.6 times the unstabilized sample for soaked condition. This study shows that the clay soil can stabilized using WPSA and WPSA effective to enhance clay soil strength for long periods.

1.6 Dr. Robert M. Brooks studied Stress strain behavior. The unconfined compressive strength showed that failure stress and strains increased by 106% and 50% respectively when the flyash content was increased from 0 to 25%. When the RHA content was increased from 0 to 12%, Unconfined Compressive Stress increased by 97%. When the RHA content was increased from 0 to 12%, CBR improved by 47%. The optimum RHA content was found at 12% for both UCS and CBR tests. The swelling potential of expansive soil decreases with increasing swell reduction layer thickness ratio. The vertical movement of clay soils with cushioning material stabilizes after 3 cycles of swelling and shrinkage. An RHA content of 12% and a flyash content of 25% are recommended for strengthening the expansive subgrade soil while a flyash content of 15% is recommended for blending into RHA to form a swell reduction layer.

II. CONCLUSION

From all the above papers it’s clear that the industrial wastes used in the soil stabilization helps in improving the strength and CBR value. The results of the above investigation have shown beneficial effects are obtained by the addition of lime and waste to soil. Hence to conclude,

1. Fly ash can be used to stabilize soil in different civil works such as in road construction by reducing the layer thickness, in development of low permeability etc.

2. It was observed that the agricultural waste i.e. Rise Husk ash was used in soil stabilization along with cement or lime as additive.

3. The use of WPSA in soil stabilization proved to be effective in enhancing the strength of clayey soil for longer period.

4. By the use of Bagasseash for black cotton soil stabilization had increased the CBR value and UCS value.
5. The above papers showed that the stabilizers/admixtures are used in combination of any two or sometime only one. No where, either the stabilizers or the admixtures are blended.

III. REFERENCES


FOR CITATION