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COMPARISON OF SOIL PROPERTIES COLLECTED FROM NALGONDA, RANGA REDDY, HYDERABAD AND CHECKING ITS SUITABILITY FOR CONSTRUCTION

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ABSTRACT

The occurrence and distribution of soils in nature varies from location to location. The type of soil depends on the rock type, its mineral constituents, and the climate regime of the area. Soils are used as construction materials. Geotechnical properties of soils influence the stability of civil engineering structures.

So, soil sampling and testing is one of the most important steps to attain success in construction projects. Soil testing provides information on type of soil, bearing capacity of soil, compaction, etc. An unprecedented amount of construction projects has been delayed amount of construction projects has been collected from the proposed areas to check suitability for the construction.

Tests such as natural moisture content, particle size analysis, soil fraction retained on 4.75mm ISS, soil fraction passing 4.75mm ISS, Atterberg's limits, specific gravity, shear test, direct shear test, consolidation test and different free swell test are done for testing the suitability and stability of soil for the construction.

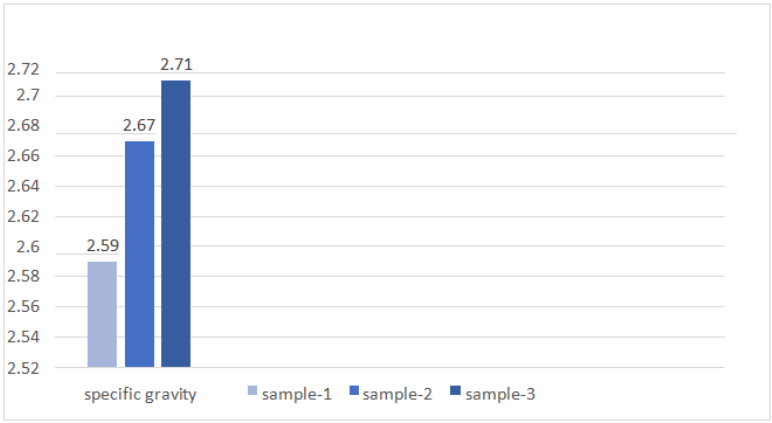
KEYWORDS: *Shear Strength, Consolidation, Bearing Capacity, Permeability*

INTRODUCTION

Materials and Methods

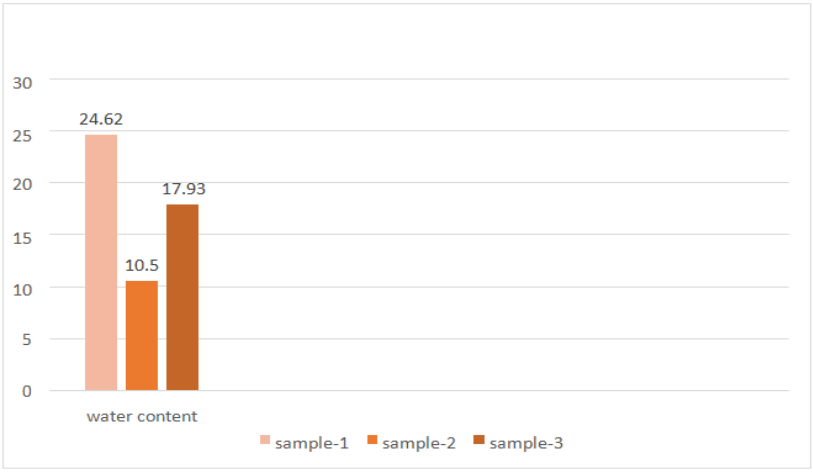
Soil samples are collected from 3 different places and the experiments like Specific gravity, water content, sieve analysis, Atterberg limits, compaction test, permeability test, unconfined compressive test and CBR test conducted on three different samples for checking its suitability for construction.

Comparison of Specific Gravity of Soils



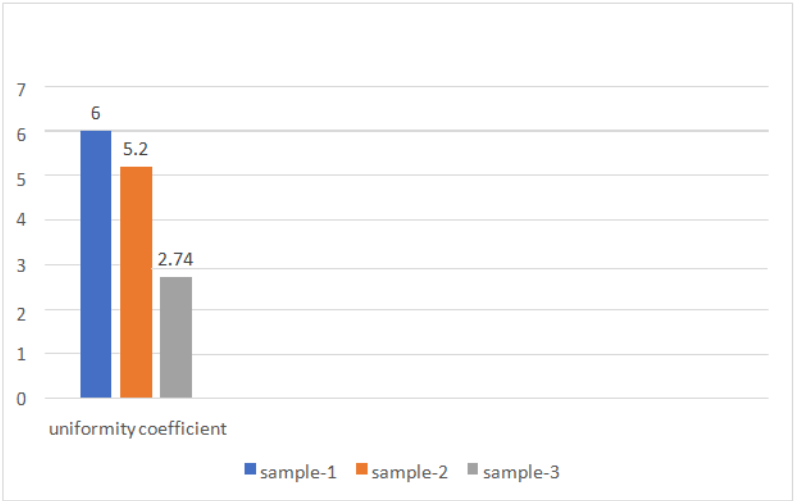
Graph 1: Specific Gravity Comparison.

Comparison of Water Content of Soils

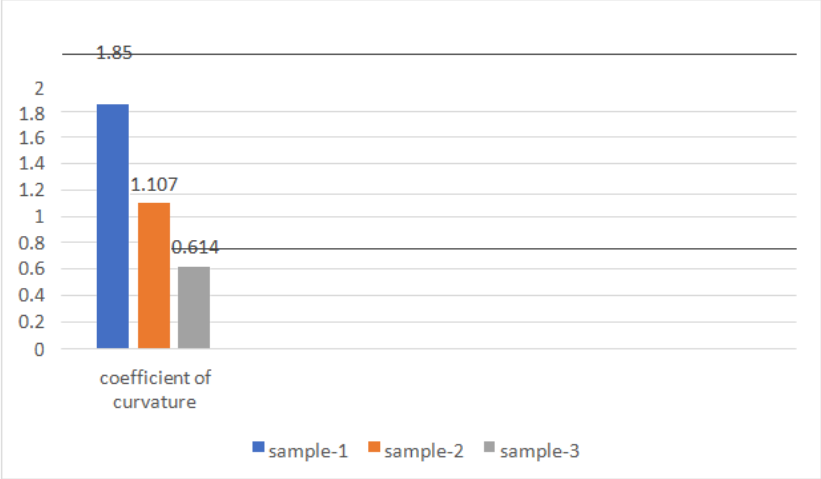


Graph 2: Water Content Comparison.

Comparison of Sieve Analysis of Soils

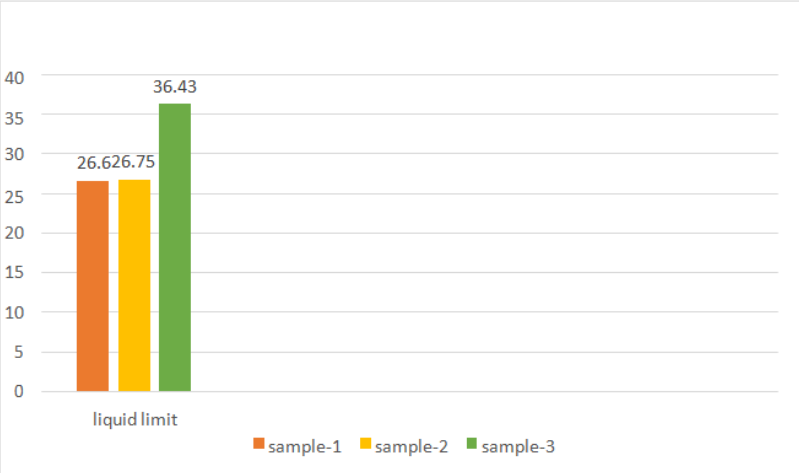


Graph 3: Uniformity Coefficient of Soils.



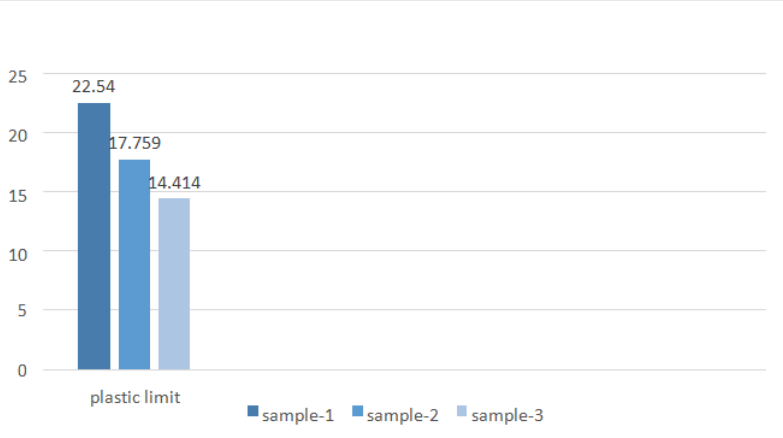
Graph 4: Coefficient of Curvature of Soils.

Comparison of Liquid Limit of Soils



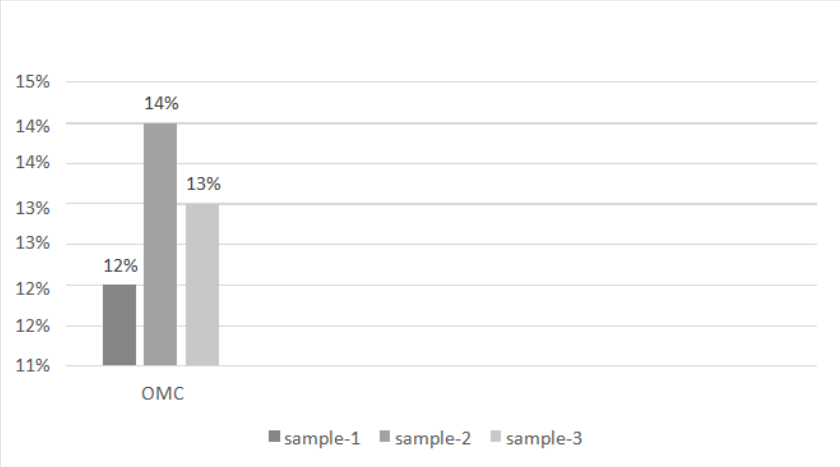
Graph 5: Comparison of Liquid Limit.

Comparison of Plastic Limit of Soil

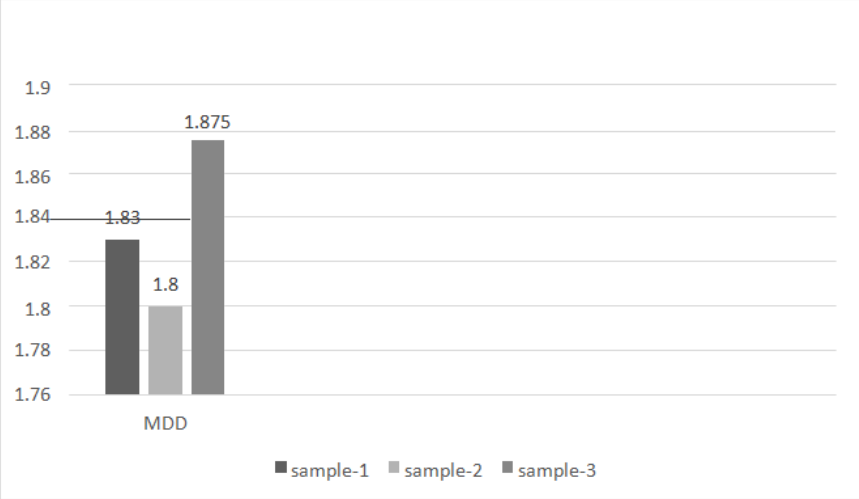


Graph 6: Comparison of Plastic Limit.

Comparison of Standard Proctor Compaction Test of Soils



Graph 7: Comparison of Optimum Moisture Content.



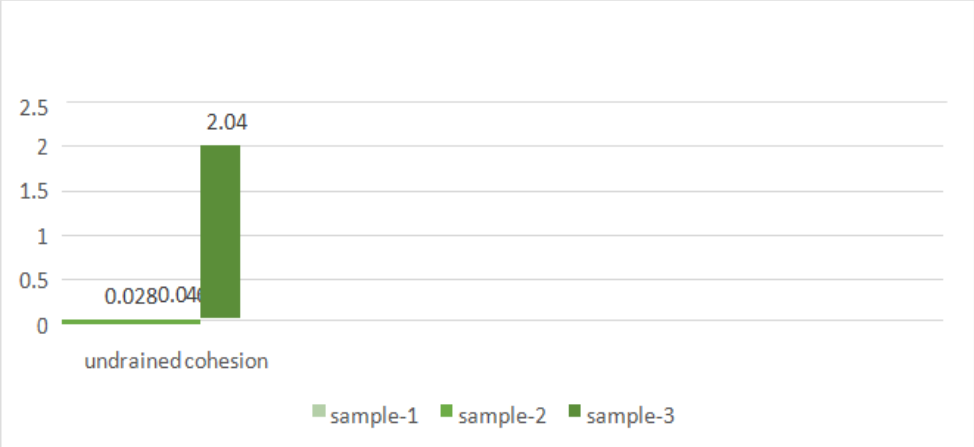
Graph 8: Comparison of Maximum Dry Density.

Comparison of Permeability of Soils

Graph 9 Comparison of Permeability.

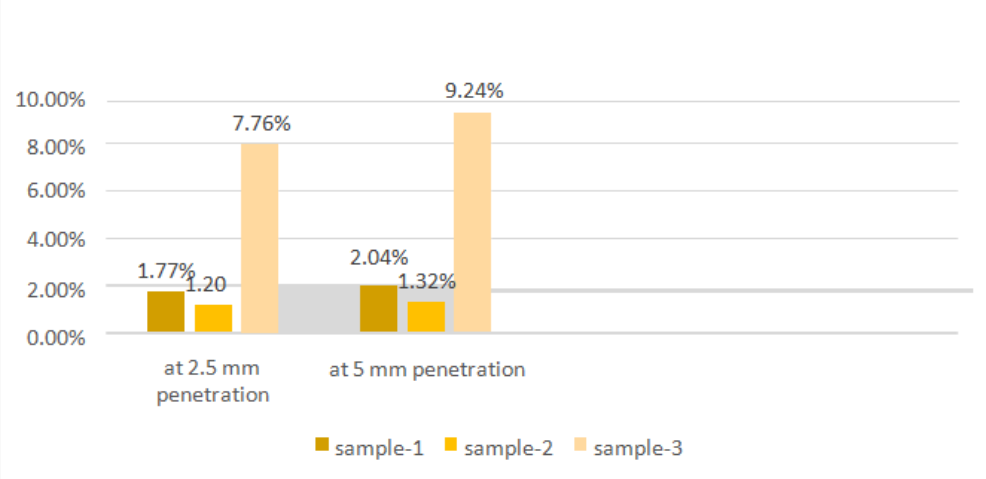
Comparison of Unconfined Compressive Stress of Soils

Graph 10: Comparison of Compressive Stress Failure.



Graph 11: Comparison of Undrained Cohesion.

Comparison of CBR Test of Soils



Graph 12: Comparison of CBR Test.

CONCLUSION

- From specific gravity test sample-1=2.59, sample-2=2.67 and sample-3=2.71, the sample-3 have greater specific gravity gives more strength to the construction of road and foundation.
- From sieve analysis sample-1 and sample-2 are well graded soils which are best suitable for construction.
- Moisture content determines the shrink and swell characteristics, soil with greater moisture content can uplift the structure and lower moisture content can cause settlement. So, sample-2=10.50 have the optimum moisture content is suitable for construction.
- From liquid limit and plastic limit, the sample-1 and sample-2 have less compressibility which are best suitable for construction. Less compressibility decreases the settlement problems.
- From compaction, the samples-1=1.83g/cc and sample-3=1.875g/cc have greater MDD, they have good compaction that increases shear strength and bearing capacity of soil.
- The sample-1=0.143cm/sec have greater permeability. The high permeable soils have stable foundations and greater seepage.
- From unconfined compression test the three soil samples have soft consistency. The hard consistency is required for stability of the structure.
- So, this soils need to be stabilized with different materials like plastic, jute fibre, fly ash etc.
- From CBR test the sample-3 has higher CBR value i.e., at 2.5mm and 5mm penetration CBR values are 7.76% and 9.24%. The higher is the CBR value and harder the material.
- CBR value is used to determine the thickness of pavements and its component layers.
- By analysing all the above results, sample-1(Nalgonda) is more suitable with required geotechnical properties when compared to other two samples.
- For improving some geotechnical properties of sample-1 like CBR value, soil consistency we need to stabilize by using fly ash, plastic, jute fibre.
- For achieving optimum moisture content we need to use drying agents like quicklime, lime kiln dust etc.

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