ANALYSIS AND PERFORMANCE OF WASTE STEEL SLAG PAVEMENT MATERIAL FOR CONSTRUCTION

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ABSTRACT
Roads are built up in several layers: sub-grade, sub-base, base and surface layer. The pavement can be constructed from a wide variety of materials and mixtures of materials consisting of gravel, stone, bitumen, concrete or improved soils. The choice of materials and thickness of the pavement layers are determined by the expected traffic density. Weak foundation soils subgrade are a common problem in road construction.

INTRODUCTION
Roads are an integral part of the transport system. A country's road network should be efficient in order to maximize economic and social benefits. They play a significant role in achieving national development and contributing to the overall performance and social functioning of the community. It is acknowledged that roads enhance mobility, taking people out of isolation and therefore poverty. Weak foundation soil subgrade is a common problem in road construction. Whether it is a temporary access road or a permanent road built over a soft subgrade, a large deformation of the subgrade will lead to the deterioration of the paved or unpaved surface. Some methods are available for improvements of subgrade are given as follows:

METHODOLOGY
Following Approach is adopted for the study:

1. Selection of Topic
2. Collection of Research Paper
3. Study various Types of Soil
4. Experimental Work
5. Expected Conclusion

SCOPE OF THE WORK
The steel slag shows good technical and ecological properties, thus being used for the manufacturing of aggregates required by road construction. Slags are by-products of metallurgical processes. There will be a substantial reduction in environmental pollution

due to changes in current practice, whereby the existing material is disposed of by dumping and stockpiling. The use of such material will supplement, or replace, the need for using natural materials.

MATERIAL

The material used is Soil and Steel Slag. For material, various tests are followed to the determination of their strength.

TEST TO BE DONE

The following tests were carried out on the soil and steel slag to test their properties.

1. **For Subgrade Soil**

   The tests carried out for finding the basic properties of soil are as follows:

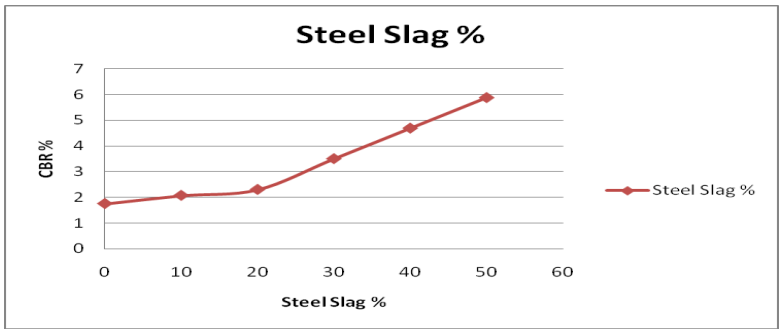
- Grain size analysis
- Determination of consistency
- Specific gravity
- Standard Procter test for obtained Maximum dry density &optimum moisturecontent
- California Bearing Ratio (CBR)

2. **For Steel Slag**

- Grain-Size Distribution
- Specific Gravity
- Compaction Characteristics
- Shear Strength

RESULTS

Effect of Steel Slag Addition on California Bearing Ratio for subgrade soil



The main aim of the project is to study the utilization of steel slag in road construction as sub-grade material along with black cotton soil. Different tests on soil were performed like – Specific gravity, liquid limit, plastic limit, proctor test, and CBR test. And tests performed on steel slag were – specific gravity and fineness test. Tests performed on soil

and Steel slag with different percentages were the proctor test and CBR test. The combinations of steel slag – soil were – 0% - 100%, 10% - 90%, 20 % - 80%, 30 % - 70%, 40% - 60 %, and 50 % - 50 %.

CONCLUSION

The Conclusions made from the experimental analysis are as follows.

- The CBR value obtained for Sample 1 having a combination of 0 % steel slag and100 % soil is 1.75%, for 2.5 mm penetration and 1.69 % for 5 mm penetration.
- The CBR value obtained for Sample 2 having a combination of 10 % steel slagand 90 % soil is 2.07 %, for 2.5 mm penetration and 2.01 % for 5 mm penetration.
- The CBR value obtained for Sample 3 having a combination of 20 % steel slagand 80 % soil is 2.30 % for 2.5 mm penetration and 2.28 % for 5 mm penetration.
- The CBR value obtained for Sample 4 having a combination of 30 % steel slagand 70 % soil is 3.5 % for 2.5 mm penetration and 3.39 % for 5 mm penetration.
- The CBR value obtained for the Sample 5 having a combination of 40 % steel slagand 60 % soil is 4.69% for 2.5 mm penetration and 4.56 % for 5 mm penetration.
- The CBR value obtained for the Sample 6 having a combination of 50 % steel slagand 50 % soil is 5.88 % for 2.5 mm penetration and 5.83 % for 5 mm penetration.

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