

A REVIEW ON SOIL STABILIZATION USING RBI GRADE-81

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ABSTRACT

Soil is the essential component for any civil engineering structures. Soil stabilization is one of the procedures used for enhancing engineering properties of soil. A variety of materials used as stabilizing agents. The RBI grade 81 is more efficient in improving stability different types of soils including clay and silt soils. The RBI GRADE-81 is a component which enabled soil to bear the loads. The foundation and types of soil is dissimilar at different places and according its morphology it may be weak and cannot resist the oncoming loads. For strengthening of soil stabilization is necessary. So stabilization can be elucidate the physical and chemical properties of soil in order to improve the engineering qualities of soil as well as to decrease the effect of weathering process and permeability of soil. Consequently soil stabilization techniques are required to ensure the high-quality strength of soil in order that it can effectively maintain the load of the structure particularly in case of soil which is extremely vigorous. Abbreviation: RBI Grade 81, Soil stabilization, permeability, stabilization.

INTRODUCTION

In the emergent Countries like India the majority factors bothered during construction of road with nearby available soil effectually, no matter what type of soil may be present; the soil may be incapable due to its poor engineering properties & characteristic (Chen, 1975). Therefore for enhancing its engineering properties, at the present time this kind of soils will be restored to health by making use of few of the stabilizers like lime Class C Fly ash, Portland bond, Pond Ash & RBI Grade 81 for enhancing the engineering properties (Alhassan, 2008) The RBI Grade 81 is an inorganic soil stabilizer and concrete material. The advantages of RBI GRADE-81 are it is economic and time saving, amplify the strength of construction material, it is a water proof material and water resistant along with durability which reduces maintenance (Avinash et. al., 2014) declared that “The enhancement of engineering properties of soil by using inorganic chemical stabilizer.

PROPERTIES OF RBI GRADE 81:

RBI Grade -81 is Cement like stabilizer with non- toxic properties. It is a Grey Color, Odourless, Non-freezing, Non-flammable with 12 months Shelf life. It stored as a Dry form having Bulk density 700 kg/m and pH 12.5. The Chemical Properties of RBI Grade 81 as in % by mass are Ca (Cao : 52-56%) , Si (SiO₂: 15-19%, S (SO₃: 9-11%), Al (Al₂O₃: 5-7%), Fe (Fe₂O₃: 0-2% and Mg (MgO: 0-1%), Mn, K, Cu, Zn: 0.1-0.3%, H₂O 1-3, Fibers 0-1% and Additives It is eco-friendly material which evades the subsidence of naturally available resources. It can also be used in every climatic conditions and also saved majority of natural resources. By minimizing the energy consumption it also increases the climatic resistance and reduced carbon emission facilitating, Carbon credits.

MECHANISM OF SOIL STABLIZATION USING RBI GRADE-81

Soil stabilization is a collection of earth work technology which enhances the soil characteristics in order to development of mechanical & load bearing properties throughout technological methods like Soil improvement & Soil strengthening. Soil stabilization method is appropriate for heavily saturated soils, it is not suitable for road or traffic manufacture since required rate of compaction cannot be achieved. Soil substitute the ions and producing ionic bonds connecting the stabilizer as well as soil particles. The reaction with soil particles produces an inter particle matrix that combines soil particles simultaneously into a rigid mass. The barrenness of soil particles are filled with “crystalline rejoinder products”, creating a mechanical bind involving the stabilizer and soil particles. The binding of the soil particles from end to end chemical bonds and frictional forces provides the aperture dimensions of created rigid stabilized soil system. This chemical process is continues over a period of time and in that way increasing the soil strength with time.

LITERATURE REVIEW

Patil B.M. *et. al.* (2012) corroborated a study on application of Industrial Waste similar to Pond ash, Fly Ash, Stone dust, Foundry Sand and Steel Slag for Soil Stabilization. This inferred that the industrial waste materials like fly ash and pond ash can be used as stabilizer with clayey soil. Madurwar, K.V. *et. al.* (2013) accomplished a study on outcome of sodium silicate and RBI

Grade 81 on black cotton soil to enhance its engineering properties, when the RBI Grade-81 was combining to the soil the free swell index value was decreased but with the accumulation of sodium silicate it was increased. Patil, B.M. and Patil, K.A. (2013) studied the effect of RBI Grade-81 and moorum to stabilize the soil. The conclusion made on the basis of test results was that the CBR value of soil can be improved by using moorum and RBI Grade-81 as stabilizer. Lekha B.M. and A.U. Ravi Shankar, (2014) conducted an experiment on performance of RBI Grade-81 in laboratory to stabilize the soil for pavements. The soil and stabilizer RBI 81 had mixed in different proportion and tested for Atterberg's limit, OMC, MDD, UCS and CBR. The CBR value of soil showed good improvement when treated with 6% stabilizer. Manisha Gunturi *et. al.*, 2014 carried out a study on CBR and swelling behavior of expansive soil when treated with RBI Grade-81. The soaked CBR value and free swell index of untreated soil and soil treated with 2%, 4% & 6% RBI Grade-81 at 3 days, 7 days and 14 days curing period were established. The authors had tested the soil samples for Atterberg's limit, compaction and UCS and Field Emission Scanning Electron Microscopy of untreated and treated soil with 6% RBI Grade-81 at 7 days curing period was conducted. K.V. Madurwar (2013) rolled out a try to improve properties of black cotton soil with RBI-81 and sodium silicate. After then Atterberg limit, CBR and UCS test were directed out on the sample of soil with RBI-81 in extent of 2% & 6% with curing time of 7, 14 & 28 days. Which at long last made them to reach the conclusion that the ordinary soil which was having 2.33% CBR & 2.69% UCS has been increased to 10.03% & 3.62% at 14 days adding so as to cure 2% RBI-81 & 8.03% & 2.97% with 7 days curing. B.M. Patil, (2012) controls the alter in properties of sub grade soil by the use of soil stabilizer and provincially available poor materials. Where they completed standard proctor test on treated and untreated soil test and assessment of MDD and OMC were discover. This shows that the CBR value of sub grade soil can improved by using moorum along RBI 81 and development expenditure can be reduced to definite limit.

FIELD APPLICATION

The RBI Grade-81 is used in Parking & Hard standing, Military & Paramilitary, Advance Landing Ground, Heliports, Hard Standing Grounds, Highways and High Altitude Roads. Various roads have been constructed in India by using RBI Grade-81. Some of successful projects using RBI Grade-81 are as follows:- Construction of Approach Road to BBH Mines by

PWD, SH-48, Chitradurga, Karnataka, Construction of Kashipur -Thakurdwara Road by PWD, SH-45 Haldwani , Utrakhand, Construction of Road at Devasar near Jodhpur in Rajasthan by BRO, Construction of a stretch of state Highway in J&K (Reasi Pauni Road near Katra) by BRO in 2008, Construction of Road and Parking area at Siri Fort Sports Complex during common wealth games (2010) in Delhi, Construction of Airfield at Nyoma (Leh) by Indian Army in 2009, Construction of City Road and Parking area at Oil India Limited, Assam (2010), Mawali Tali Bhuria Dhora Desert Road, Mahajan Ranges, Suratgarh, Rajsthan.

CONCLUSION

The RBI Grade-81 is a effective stabilizer for the majority of soils types. The supplementary chemical like sodium silicates, pond ash, fly ash, moorum and sand stone can also be used with RBI grade-81 to improve the value of construction material. On the foundation of studies reported by numerous researches the following conclusions can be drawn: With the addition of RBI Grade-81 the plastic limit of soil increases and liquid limit of soil decreases and thus plasticity index of soil also decreases. When the quantity of stabilizer is increased there is a tremendous change in optimum moisture content in addition to maximum dry density. The geotechnical properties of clayey soil are enhanced to a great extent by adding RBI Grade 81 stabilizer. Swelling property of Clay type soil is decreased by the use of this product (Gunturi et. al. 2014) Naturally obtainable Granular material can be saved by using regionally available clayey soils. From the above said we can conclude that RBI Grade 81 is suitable for any type of soils & also it can be concluded that CBR value varies based on soil texture and improvement of strength.

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