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Black Cotton Soil: Results of an Experimental Study

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Abstract: *After performance standards, economic feasibility and serviceability are the most crucial requirements for any project in developing nations like India. Time-consuming and costly, conventional approaches are no longer viable options. Consequently, it's important to identify different approaches to meet the performance and cost requirements that exist. The efficiency and low cost of these enzymes have been repeatedly demonstrated. The bioenzyme's eco-friendliness provides a further benefit. Dosage, soil type, and time allowed for cure all affect how effective bio enzymes are. Black cotton soils cover a considerable portion of our country. With the growing depletion and rising cost of traditional soil stabilisers like gravel, sand, and others, it is imperative that we find suitable, environmentally friendly alternatives. Soil stabilisation with bio-enzymes has become increasingly common and popular as a result of their low cost in recent years. Terazyme is one such bio-enzyme that has been utilised here. Unconfined compressive strength and atterberg limits were investigated as a result of Terazyme. Values for unconfined compressive strength have increased noticeably in soil that has been treated with enzymes. In its natural state, the soil has a compressive strength of 71 kN/m2. The soil's strength increased noticeably after being treated with Terazyme. The strength improves as time passes for cure. It was determined that there was a 300 percent increase in strength. Terazyme enzyme treatment did not result in a statistically significant increase in the liquid and plastic limit values. After being treated with enzymes for a short time prior to curing, both the compression index and the coefficient of consolidation decrease.*

Keywords: Black cotton soil

REFERENCES

[1] Agarwal, P. & Kaur, S., 2014. Effect of Bio-Enzyme Stabilization on Unconfined Compressive Strength of Expansive Soil. International Journal of Research in Engineering and Technology, 03(05), pp.2319–2322.
[2] Ali, F., 2012. Stabilization of residual soils using liquid chemical. Electronic Journal of Geotechnical Engineering, 17 B, pp.115–126.
[3] Aye, N.T. & Than M.S, 2015. Experiemental research on the strength behavior ofEnzyme –Treated soils. International Journal of Scientific Engineering, Technology Research, 3(10), pp.1990–1995.
[4] Dandin, S. &Hiremath, S., 2014. A Study on Some Geotechnical Properties of BioEnzyme. Proceedings of Indian Geotechnical Conference, pp.20–26.
[5] Greeshma, N.E., Lamanto, T.S., chandrakaran, S. & Sankar, N., 2014. Enzyme Stabilization of high Liquid Limit Clay. Electronic Journal of Geotechnical engineering, 19(2014), pp.6990–6994.
[6] Isaac, K.P., Biju, P.B. &A.Veeraragavan, 2003. Soil Stabilization Using Bio-enzymesfor Rural Roads. IRC Seminar: Integrated Development of Rural and Arterial RoadNetworks for Socio-Economic development, New Delhi, (December).
[7] Khan, T.A. &Taha, M.R., 2015. Effect of Three Bioenzymeson Compaction, Consistency Limits, and Strength Characteristics of a Sedimentary Residual Soil. Advances in Materials Science and Engineering, pp.2-7.
[8] Mgangira, M.B., 2009. Evaluation Of The Effects Of Enzyme-Based Liquid ChemicalStabilizers On Subgrade Soils . (July), pp.192–199.

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[9] Milburn, J.P. & Parsons, R.L., 2004. Final Report Performance of Soil StabilizationAgents K-Tran a Cooperative Transportation Research Program Between : KansasDepartment of Transportation Kansas State University.

[10] Narasihma, A.V., penchalaiah, B., chittaranjan, M., & Ramesh, P., 2014. Compressibility Behaviour of Black Cotton Soil Admixed with Lime and Rice-Husk Ash. International Journal of innovative Research in science, engineering and technology , 3(4), pp.11473–11480.

[11] peng, H., Haitao, S.U., Xinping, Z. & Jun, W., 2011. An Experiemental Comparsion Of Compressive Strengths Of soils Stabilized with enzyme and quick lime. Advanced materials research, vol 280, pp.9-12.

[12] Rajoria, V. & Kaur, S., 2014. A Review on Stabilization of Soil Using Bio-Enzyme.45International Journal of Research in Engineering and Technology, 03(01), pp.75–78.

[13] Raju, M.N.V.S.N., Prasad, D.S. V & Kumar, M.A., 2015. Evaluation of the Properties of Fly Ash on Strength and Swelling Aspect of an Expansive Soil. International Journalof Applied Research, 1(6), pp.34–39.

[14] Ramesh, H.N., Krishnaiah, A.J. &Shet, S.S., 2013. Consolidation Behaviour of Black Cotton Soil and Mine Tailings Mixtures Treated With Lime. Proceedings of Indian Geotechnical Conference , pp.1–4.

[15] Ramesh, H.N. &sagar, S.R., 2015. Effect of Drying On the Strength Properties of Terazyme Treated Expansive and Non-Expansive Soils. Proceedings of Indian Geotechnical Conference, pp.20–26.

[16] Saini, V. & Vaishnava, P., 2015. Soil stabilization by using terazyme. International Journal of Advances in Engineering & Technology, 8(4), pp.566–573.

[17] Sen, J. & Singh, J.P., 2015. Stabilization of Black Cotton Soil using Bio- Enzyme for a Highway Material. International Journal of innovative Research in science, engineering and technology, 4(12) pp.12453–12459.

[18] Shankar, A.U.R., Rai, H.K. &Mithanthaya, R.I., 2009. Bio-Enzyme stabilised laterite soil as a highway material. Journal of the Indian Roads Congress. Paper No. 553, (553),pp.143–151.

[19] Stan, C. &Ciobanu, V., 2012. Using enzymatic emulsions to reinforce road layers. Bulletin of the Transilvania University of Brasov, Series II: Forestry, Wood Industry, Agricultural Food Engineering, 5(1), pp.109–114.

[20] sureka, N. &Gangadhara**,** S., 2010. Swelling properties of bioenzyme treated expansivesoil. International Journal of Engineering Studies, 2(2), pp.155–159.

[21] Taha, M.R. & A. Khan, T., 2013. Recent Experimental Studies in Soil Stabilization with Bio-Enzymes – A Review. Ejge, 18, pp.3881–3894.

[22] Velasquez, R., Marasteanu, M.O., Hozalski, R. & Clyne, T., 2005. Final Report on Preliminary Laboratory Investigation of Enzyme solutions as a soil stabilizer ,University of Minnesota

[23] Venkatasubramanian, C. & Dhinakaran, G., 2011. Effect of bio-enzymatic soil stabilisation on unconfined compressrve strength and California Bearing Ratio. Journal of Engineering and Applied Sciences, 6(5), pp.295–298.