

Chemical Stabilization of Black Cotton Soil

Patil Atul Ajit, Choudhary Vinod Ruparam, Sarkar Samrat Ashok,

Shaikh Sahir Akhtar, Prof. S.R. Navdurge

Department of Civil Engineering

Dr . D.Y. Patil College of Engineering and Innovation, Pune, Maharashtra, India

Abstract: *This research work presented the efficiency of a nano technology based chemical named Terrasil as a modifier in improving the engineering properties of Black Cotton Soil. It discussed general details, methodology, theory, and experiments etc. involved in the project. In India about 51.8 million hectares of the land area are covered with Expansive soils (Black Cotton Soil). The Black Cotton Soils are very hard when dry, but lose its strength completely when in wet condition. Expansive soils are a worldwide problem that possess several challenges for Civil Engineers. Various methods are adopted to improve the engineering characteristics of expansive soils. The problematic soils are either removed and replaced by good and better quality material or treated using additive. By studying the literature on black cotton soil. The effectiveness of Terrasil is tested by conducting various test like UCS, proctor test etc. on Black Cotton Soil samples treated with different percentages of Terrasil 0.9%, 1.1% & 1.3%. It was found that compressive strength of soil treated by Terrasil increased to 40% approximately. Terrasil had a great influence on swelling behaviour of Black Cotton Soil. It reduced the free swell index from 59% to 33%. Terrasil provide to a worthwhile as a versatile stabilizer in case of expansive soil as it enhances almost all important geotechnical properties of Black Cotton Soil.*

Keywords: Black Cotton Soil

REFERENCES AND BIBLIOGRAPHY

- [1]. Lekha B M, Goutham S and Ravi Shankar A U (2013); "Laboratory investigation of soil stabilized with nano chemical" Indian Geotechnical Conference, Roorkee, India.
- [2]. Johnson R and Rangaswamy K (2015); "Improvement of soil properties as a road base material using nano chemical solution" 50th Indian Geotechnical Conference, Pune, Maharashtra, India.
- [3]. Patel N A, Mishra C B, and Pancholi V (2015), "Scientifically Surveying the Usage of Terrasil Chemical for Soil Stabilization", International Journal of Research in Advent Technology, Vol.3, No.6, June 2015.
- [4]. Punmia B.C (2011); Soil mechanics and foundation Engineering, 16th Edition, New Delhi.
- [5]. Zydex Industries pvt ltd works in chmical stabilization of soil through different chemicals
- [6]. Amit S. Kharade et.al (2014) "Waste Product "Bagasse Ash" from Sugar Industry Can Be Used As Stabilizing Material for Expansive Soil", International Research Journal of Engineering and Technology, Vol. 03, Issue 03, e-ISSN: 2319-1163, pp. 506-512
- [7]. Amu, O. O., Fajobi, A.B. and Afekhuai, S.O. (2005) "Stabilizing Potential of Cement
- [8]. Hy Ash Mixture on Expansive Clay Soil," Journal of Applied Sciences, 59), 1669- 1673. Ashish Mehta etal (2013) "effect of stabilization on black cotton soil using lime", International Journal of Application or Innovation in Engineering and Management, Special Issue for National Conference on Recent Advances in Technology and Management for Integrated Growth 2013, ISSN: 2319-4847.
- [9]. TAN Ramakrishna and A V Pradeep Kumar (2006), "Stabilization of Black Cotton Soil Using Rice Husk Ash and Cement", In Proceedings of National conference Civil Engineering meeting the challenges of tomorrow, pp. 215-220.
- [10]. A.V. Narasihma Rao etal (2014), "Compressibility Behavior of Black Cotton Soil admixed with Lime and Rice Husk", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 3, Issue 4, ISSN: 2319-8753, pp 11473-11480

- [11]. Bhasin, N. K., Goswami, N. K., Oli, P., Krishan N. and Lal, N.B. (1988) "A Laboratory Study on the Utilization of Waste Materials for the Construction of Roads in Black Cotton Soil Areas," Highway Research Bulletin, 36, 1-11.
- [12]. Baytar, A. (2005). "Effects of fly ash and desulpho gypsum on the geotechnical properties of çayirhan Soil". A Master of Science thesis submitted to the graduate school of natural and applied sciences Of Middle East technical university
- [13]. B M Lekha, S Goutham and A U Ravi (2013) "Laboratory Investigation of Soil Stabilized with Nano-Chemical", Proceedings of Indian Geotechnical Conferences, pp. 1- 7.
- [14]. Chandrasekhar, B.P., Raju, G.V.R.P. and Phani Kumar, B.R. (2001). "Investigations on the relative performance of stabilizing additives in black cotton soil sub grades". Highway Research bulletin, Number 65, Dec., pp. 37-49.
- [15]. International Journal of Advance Technology in Engineering and Science, Vol. 3, Issue 2, ISSN: 2348-7550, pp. 596-604.
- [16]. H.N. Ramesh, A.J. Krishnaiah and S. Shilpa shet (2013), "Effect of Lime on the Index Properties of Black Cotton Soil and Mine Tailings Misnures", Volume 3, Issue 4, ISSN: 22788719. Determination of water content- dry density relation using Standard Compaction, Bureau of Indian Standards.
- [17]. Determination of free swell index, Bureau of Indian Standards. 14. Kavish S. Mehta et.al (2014) "Analysis of Engineering Properties of Black Cotton Soil and Stabilization Using By Lime", Miss K S. Gaikwad et.al Int. Journal of Engineering Research and Applications, Vol. 4, Issue 5, Version 3, ISSN: 2248-9622, pp.25-32.
- [18]. Kiran R. G and Kiran.L (2013) "Analysis of Strength Characteristics of Black Cotton Soil using baggase ash and additive as stabilizer", Vol. 2, Issue 7, e-ISSN: 2278- 0181.
- [19]. Kilabanur et.al (2015) "Stabilization of Black Cotton Soil Using Envirobase and Sodium Silicate with Lime", International Journal of Scientific & Technology Research Volume 4, Issue 06, ISSN 2277-8616.
- [20]. Nadgouda, K.A. and Hegde, R.A. (2010) "The Effect of Lime on Properties of Black Cotton Soil", Indian Geotechnical Conference-2010, GEO trends, pp. 511-514.
- [21]. Manjunath K.R. and Rohit L. (2015) "Effect of Stone Dust on Strength Characteristics of Black Cotton Soil Stabilized with Rice Husk Ash", International Research Journal of Engineering and Technology, Vol. 02, Issue 06, e-ISSN: 2395-0056, pp. 155-159.
- [22]. M.K. Gueddouda et.al (2011), "Chemical Stabilization of Expansive Soil from Algeria", Global Journal of Researches in Engineering, Volume 11, Issue 5, ISSN: 0975- 5861.
- [23]. Nandan A. Patel et.al (2015) "Scientifically Surveying the Usage of Terrasil Chemical for Soil Stabilization", International Journal of Research in Advent Technology, Vol. 3, No. 6, E-ISSN: 2321-9637, pp. 77-84.
- [24]. Pandian, N. S., Krishna, K.C. and Sridharan, A. (2001) "California Bearing Ratio Behavior of Soil/Fly ash Mixtures," Journal of Testing and Evaluation, 29(2), 220-226.
- [25]. Phani kumar, B.R and. Sharma, R.S. (2004) "Effect of Fly Ash on Engineering Properties of Expansive Soils," Journal of Geotechnical and Geo-environmental Engineering, 130 (7), 764-767.
- [26]. Praveen Patel and Dr. H.K. Mahiyar (2014) "A Experimental Study of Black Cotton Soil Stabilized with Rice husk ash, Lime and Fly ash", International Journal of Engineering Research & Technology, Vol 3, Issue 11, ISSN: 2278-0181, pp. 660-665.
- [27]. Sabat A K and Nanda R P (2005), "Effect of Marble Dust on Strength and Durability of Rice Husk Ash Stabilized Expansive Soil" International Journal of Civil and Structural Engineering, Vol. 1, No. 4, pp. 939-948.
- [28]. Shailendra Singh and Hemant B. Vasaikar (2013), "Stabilization on Black Cotton Soil using lime", International Journal of Science and Research, Volume 4, Issue 4, ISSN: 2319 7064, pp. 2090-2094.