

1st Global

GEOTECHNICAL AND WATER RESOURCE ENGINEERING SUMMIT

September 18-19, 2017 Hong Kong

Performance, problems and remedial measures for roads constructed on expansive soil in Ethiopia: A review

Bantayehu Uba

Hawassa University, Ethiopia

Construction of lightly loaded building and other civil engineering structures such as pavement on weak or soft soil is highly risky because such soil is susceptible to differential settlements, poor shear strength and high compressibility. In developing countries like Ethiopia transportation facilities such as roads, railroads and airfields are very important for sustainable development. However, a better performance of the agricultural sector in particular as Ethiopia's economic growth is highly dependent on it and the sustainable economic growth of the country at large would be achieved through an improvement of the basic infrastructure. Consequently, the road network has been identified as a serious bottleneck for the economic development of the country. An appreciable part of Ethiopia is covered by expansive soil. Most of the roads constructed and proposed as well as substantial amount of the newly planned railway routes in the country pass through in the heart of expansive soils. The roads on this type of soils fail before their expected design life, in some cases after few months of completion. It has been reported in 2004 that Addis Ababa City Roads Authority had annual expenditure of around 300 million Birr for road construction and maintenance out of which more than 30 million Birr was expended for routine maintenances which is too big and require special attention. The current maintenance and rehabilitation practice also depends more on visual observation and functional evaluations such as surface roughness and visual survey at network level rather than detail pavement evaluation at project level. Major trunk and lower class universal rural access roads failed with in liability period where subgrade soil is black clay soil, but researches show that various treatments such as mechanical, lime and chemical stabilization has been implemented. Moreover, based on the pavement survey, the CBR criteria could not result in reliable solution in case of pavement on expansive subgrade. Thus additional stability criteria should be adopted to resist the heaving condition. Finally, emphasis should be given to the importance in construction in this kind of soil of strictly applying engineered design of geometric, drainage, pavement thickness, material selection and proportioning. Thus, the client, policy makers and other concerned bodies shall decide to accept and control the risk associated with construction on this soil or not or to decide that more detail study is required to allow for extra design and construction pre-emptive measures once the potential problem has been identified and the end user convinced of the cost-savings in adopting a pro-active approach.

Biography

Bantayehu Uba has received his BSc degree in Civil Engineering and MSc degree in Civil Engineering (Geotechnical Engineering) from Mekelle University and Addis Ababa University, respectively. Presently, he is a Lecturer in the Institute of Technology, School of Civil Engineering, Hawassa University. He has also served as part-time Lecturer in Institute of Urban Development Studies, Ethiopian Civil Service University and as Assistant Lecturer at Civil Engineering Department of Technology Faculty, Arba Minch University, Ethiopia. He has worked with contractor and consulting private firms in road and building construction and he is serving as a Project Manager at Santamaria Construction PLC.

bantayehuu@hu.edu.et
ubabanti@gmail.com

Notes: