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Resilient Modulus of Unbound Aggregate Base Courses from Senegal (West Africa)

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ABSTRACT

This paper presents the results of research conducted to investigate the Resilient Modulus (Mr) of unbound aggregates used as pavement layer in Senegal (West Africa) as well as the effect of water content and density on the Resilient Modulus of the materials tested. Four different aggregates was collected from different sites within Senegal and then subjected to repeated load triaxial tests. Test results showed that the Bandia limestone is around 44% stiffer than the basalt, and 71% to 104% stiffer than the Black and the Red quartzites (GNB and GRB). The basalt is 21% to 43% stiffer than the GNB and the GRB. Basalt specimens compacted at Wopt- 2% were 30% stiffer than basalt specimens compacted at Wopt and 40% stiffer than those compacted at Wopt+ 2%. The Summary Resilient Modulus (SRM) at Wopt- 2% is 22% higher than SRM at Wopt and 35% higher than SRM at Wopt+ 2% for the GRB and the GNB. The SRM at Wopt- 2% is 30% higher than SRM at Wopt and 40% higher than SRM at Wopt+ 2%, for the Basalt. For the Bandia limestone, the SRM at Wopt- 2% is 81% higher than SRM at Wopt and 126% higher than SRM at Wopt+ 2%. Results show also that the Resilient Modulus increases around 25% when relative density increases from 77% to 119% and the variation is more significant at high stress states than at low stress state. Results of statistical analysis and coefficients of determination (R²) showed that the Uzan and NCHRP models are more suitable to predict the Resilient Modulus of the aggregates tested.

KEYWORDS

Resilient Modulus, Summary Resilient Modulus, Quartzite, Basalt, Bandia Limestone, Un-bound Aggregates

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References

- [1] E. J. Yoder and M. W. Witzak, " Principles of Pavement Design," 2nd Edition, Wiley, New York, 1975.
- [2] M. Fall, A. Sawangsuriya, C. H. Benson, T. B. Edil and P. J. Bosscher, " On the Investigations of Resilient Modulus of Residual Tropical Gravel Lateritic Soils from Senegal (West Africa)," *Geotechnical and Geological Engineering Journal*, Vol. 26, No. 1, 2008, pp. 13-35.
- [3] R. G. Hicks and C. L. Monismith, " Factors Influencing the Resilient Properties of Granular Materials," Ph.D. Thesis, University of California, Berkeley, 1970.
- [4] F. Lekarp, U. Isacsson and A. Dawson, " State of the Art. I: Resilient Response of Unbound Aggregates," *Journal of Transportation Engineering*, Vol. 126, No. 1, 2000, pp. 66-75.
- [5] H. B. Seed, F. G. Mitry, C. L. Monismith and C. K. Chan, " Prediction of Flexible Pavement Deflections from Laboratory Repeated Load Tests," *National Academy of Sciences-National Academy of Engineering*, Washington, 1967.

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