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Laboratory Mix Design Assessment and Field Implementation of 2021 Page County Otta Seal Project

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Abstract

Otta Seal, a low-cost bituminous surfacing technique, has been implemented in many European, African, and Asian countries to enhance the riding quality and longevity of low-volume roads. Empirically-based guidelines for the design of Otta Seal were developed by the Norwegian Road Research Laboratory (NRRL). However, the NRRL method was derived by optimizing the performance of this surfacing technique with regional materials. Therefore, a robust design technique for Otta Seal based on the fundamental material properties could promote the use of local materials while augmenting its performance. This study has modified the McLeod method to rationally determine the application rates for aggregates and asphalt binders for Otta Seal. Laboratory sweep tests were performed on Otta Seal specimens prepared with the modified McLeod, and NRRL recommended doses. Test results indicated that aggregate loss of Otta seal specimens prepared with the modified McLeod method was 5-25% less compared to specimens prepared with NRRL methods depending on gradation and type of aggregates. In addition, full-scale implementation was considered to evaluate the field performance of the Otta Seal sections designed with modified McLeod and NRRL methods and constructed at Page County in 2021. After 7-days and 1-month of the Otta seal construction, the modified McLeod method proposed in this study showed better performance on the aggregate loss, international roughness index, skid resistance, and dust generation. The long-term field performance of the Otta Seal will be evaluated to justify the initial findings of this study.