Reclaimed Stabilized Base: Stabilization Agent Selection and Design

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Introduction

Reclaimed Stabilized Base (RSB) is a frequently used method of roadway rehabilitation. Tailored to local aggregate resources and climatic conditions, chemical or bituminous stabilizing agents are utilized to achieve the desired pavement(NCHRP, 2009). Vermont Agency of Transportation (VTrans) and researchers at the University of Vermont collaboratively explored suitability of additives considering the type and gradation of the soils encountered in VT.

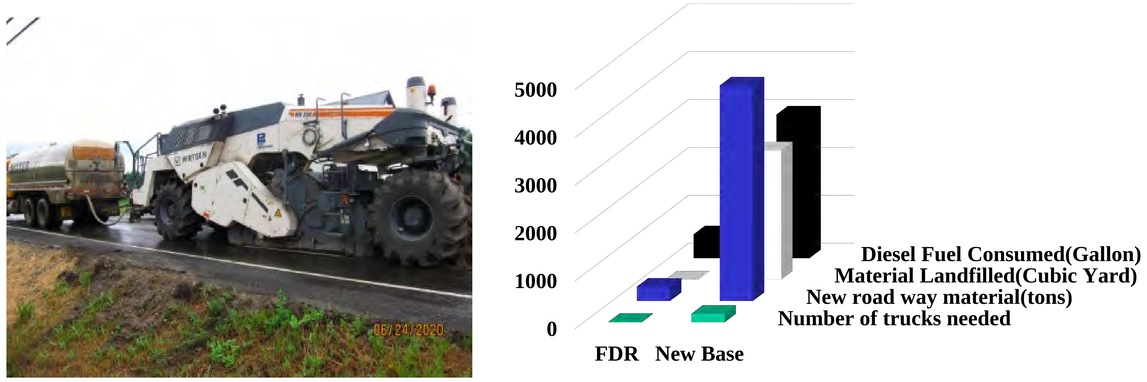

Figure1. (left) Reclaimer machine, and (right) Benefits of RSB vs new base construction

Methodology

The research methodology consists of: (i) laboratory testing of prepared specimens with different combinations of aggregates (virgin or mixed with RAP) and various types and percentages of stabilizing agents (i.e., cement, calcium chloride, asphalt emulsion), (ii) surveying the RSB projects and (iii) Finite Element Analysis (FEA) of Reclaimed Stabilized Pavement to maximize the benefits of laboratory. experiments.

Figure 2. (a) Evaluation of additives, (b) Marshall Stability Test on asphalt emulsion specimens (c) Curing and testing of the Liquid Calcium Chloride Stabilized specimens

Results

I. The effect of aggregate size on the strength properties of the stabilized sections were explored and subbase materials with 45% gravel showed the highest Unconfined Compressive Strength (UCS) values.

II. The range of strength gain for cement, Liquid Calcium Chloride and Asphalt emulsion and the optimum additive content (2-3% for cement, 4% for LCC and 4% for AE) were stablished and standard sample preparation and curing procedures for Liquid Calcium Chloride were proposed.

III. A Finite Element Analysis model to predict the optimum stabilizing agent content were developed.

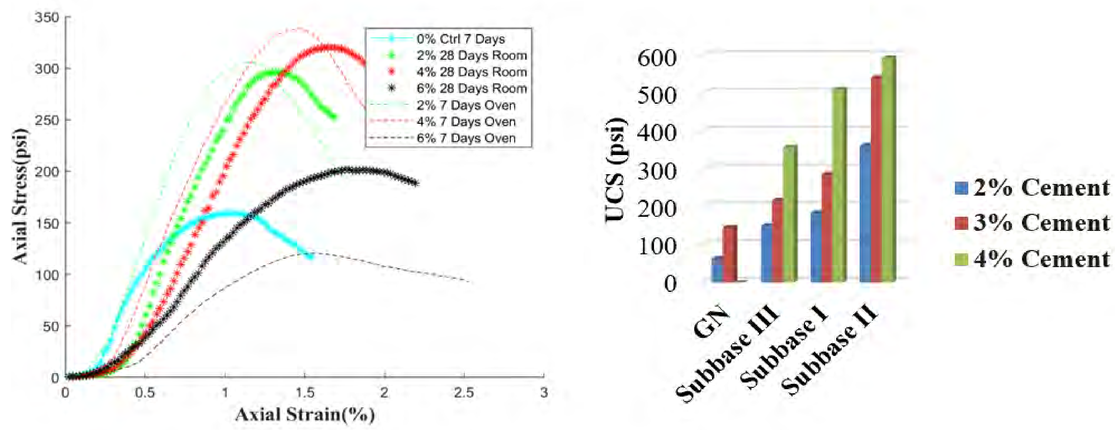

Figure 3. (left) UCS curves of Liquid Calcium Chloride specimens and (right) UCS plots of Cement Stabilized specimens

Conclusion

The results of this research project indicated that hat the aggregate size, optimum moisture content of the mix and the optimum quantity of the stabilizing agents dramatically contribute to the properties of the stabilized pavement. The optimum additive content and the range of strength corresponding to the type of additive and soil gradation were established.

Acknowledgments

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References

NCHRP144 2009. Recommended Practice for Stabilization of Subgrade Soils and Base Materials (2009)