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, thanks to its economic and environmental advantages. 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 are collaboratively working to better understand the physical properties and strength of RSB materials. Benefits and optimum range of stabilizing agents, namely, cement, asphalt emulsion and calcium chloride to be used with local aggregates are being investigated.

(a) (b) (c)

Figure1. (a) RAP field samples, (b) Stow-Morristown RSB Project, (c) Wirtgen WR250 Reclaimer

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) cold room testing, (iii) Finite Element Analysis (FEA) of reclaimed stabilized pavement to maximize the benefits of laboratory experiments.

(a) (b) (c)

Figure 2. (a) Sieve analysis (b) Soil-cement sample curing (c) Soil-cement unconfined compressive strength test

Results

I. The effectiveness of cement stabilization has established indicating that in all subbase soils 3% soil-cement samples were of highest ultimate compressive strength.

II. The preliminary results for a specimen with 3 % asphalt emulsion indicated the stability and flow values of 19.34 kN and of 1.76 mm, respectively.

III. Cement seems to be a proper stabilizing agent for low-fine-content soils and the suitability of asphalt emulsion /calcium chloride are to be examined for these soils.

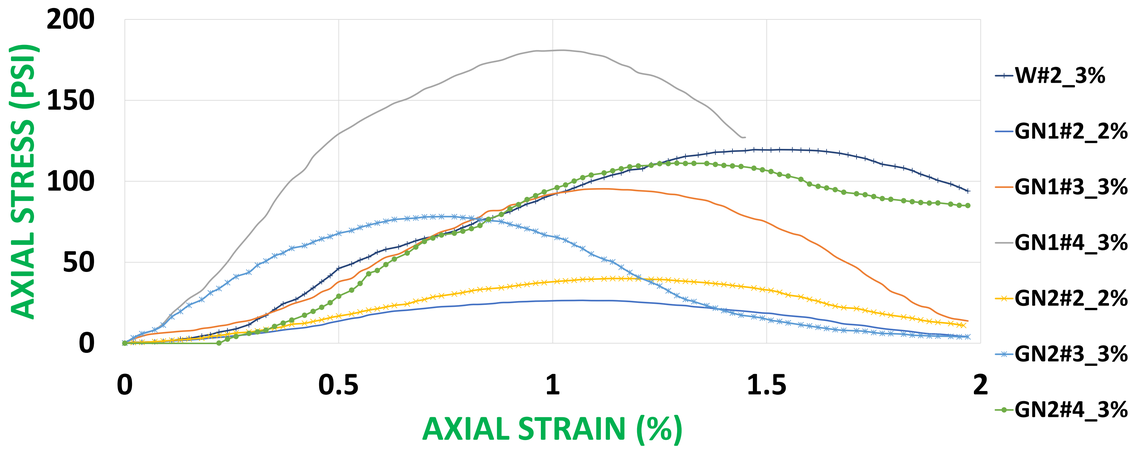

Figure 3. Stress-strain curves for cement-stabilized specimens

Conclusions

The compressive strength gain with cement-stabilization up to 3% has ben determined. Effect of liquid calcium chloride and asphalt emulsion on soils containing clay and RAP are to be examined and the optimum percentages to be established.

Acknowledgments

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References

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