

Overview

Asphalt emulsions are widely used because of the many advantages they offer to the paving industry. Only simple application and compaction equipment are required for chip seals, as described by Stroup-Gardiner et al. in the Nevada study, "Laboratory Test Methods and Field Correlations for Predicting the Performance of Chip Seals." This study compares laboratory and field methods for predicting the performance of chip seals. The success of these seals is dependent upon several variables. Four emulsions were applied at different rates, and three sources and three gradations were selected for the five types of aggregates. The aggregates and emulsions were applied at various spread rates using two construction techniques. The results from the laboratory are compared to corresponding field projects.

Mixing grade emulsions have been used for many years. In Spain and France a cold bituminous mixture called grave emulsions has been used for over 30 years. This is a dense mixture for medium-traffic roads that is being used more and more. Greater demand has called for increased research on the material. Grave emulsions are a particular type of mixture. Brennen et al. offer results of the studies of the Laboratoire Central des Ponts et Chaussées (LCPC) Paris, France. The study shows that stiffness of the mixture depends on the voids content.

At some point in the life of a pavement, reconstruction becomes necessary. Recycling may be the best method of correcting the problem. Muncy describes a classification of emulsified recycling agents (ERA). Recycling has been an important reconstruction method for about ten years. In this short time new equipment has been designed and emulsions have been developed to apply to each process. Techniques of hot and cold, in-situ and off-site recycling include emulsions, rejuvenators, and polymer-modified emulsions.

Scholz et al. have analyzed four years of recycling in Oregon. Cold in-place recycling (CIR) using a single unit or a recycling train can produce a suitable base course or wearing surface. Pavement ratings taken during 1988 indicated that the structural contribution of properly designed and constructed CIR mixtures were nearly equivalent to that of conventional asphalt mixtures. Of the 52 projects completed over this four-year period, 92% are performing very well.

Baker reports in "Asphalt Emulsion Slurry Seal and Wheelpath Inlay" that slurry seal can be cost effective on moderately traveled pavements for three to four years longer. Reinke et al. likewise observed that proper consideration given to the design of microsurfacing materials will preserve and extend the life of existing surface ("Studies of Polymer-Modified Microsurfacing Materials in Highway Maintenance").

A phenomenon with all emulsified asphalts is that point at which the water-in-oil emulsion changes to the oil-in-water emulsion. The emulsion inversion point (EIP) technology is described by Marchal. The filtration-evaporation test (EFT) determines the breaking point. This test aids in understanding emulsion stability and early chip seal cohesion.

These papers present a montage of emulsified asphalt technology. The laboratory methods, mix designs, and application of materials using emulsified asphalt only scratch the surface. Continued use and research will expand the knowledge of this versatile material.

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