

ABSTRACT

Due to the hazardous nature of chemical asphalt extraction agents, nuclear gauges have become an increasingly popular method of determining the asphalt content of a bituminous mix.

This report details the results of comparisons made between intended, tank stick, extracted, and nuclear asphalt content determinations. A total of 315 sets of comparisons were made on samples that represented 110 individual mix designs and 99 paving projects. All samples were taken from 1987 construction projects.

In addition to the comparisons made, seventeen asphalt cement samples were recovered for determination of penetration and viscosity. Results were compared to similar tests performed on the asphalt assurance samples in an attempt to determine the amount of asphalt hardening that can be expected due to the hot mix process.

Conclusions of the report are:

1. Compared to the reflux extraction procedure, nuclear asphalt content gauges determine asphalt content of bituminous mixes with much greater accuracy and comparable precision.
2. As a means for determining asphalt content, the nuclear procedure should be used as an alternate to chemical extractions whenever possible.

3. Based on penetration and viscosity results, softer grade asphalts undergo a greater degree of hardening due to hot mix processing than do harder grades, and asphalt viscosity changes caused by the mixing process are subject to much more variability than are changes in penetration.

4. Based on changes in penetration and viscosity, the Thin Film Oven Test provides a reasonable means of estimating how much asphalt hardening can be anticipated due to exposure to the hot mix processing environment.