

3<sup>rd</sup> INTERNATIONAL CONFERENCE  
BITUMINOUS MIXTURES AND PAVEMENTS  
Thessaloniki, Greece, 21-22 November 2002

## **A COMPARISON OF TESTING VARIABILITY FOR BULK SPECIFIC GRAVITY OF HOT MIX ASPHALT**

**Kevin D. Hall \***

Professor, University of Arkansas, USA

**Frances Griffith**

Director, Center for Training Transportation Professionals, USA

**Stacy G. Williams**

Assistant Research Professor, University of Arkansas, USA

\* Dept. of Civil Engr., 4190 Bell Engineering Center, Fayetteville, AR 72701  
kdh3@uark.edu

### *ABSTRACT*

The increasing use of coarse-graded asphalt mixes has placed new emphasis on methods for determining the density (bulk specific gravity --  $G_{mb}$ ) of compacted cores. Traditional SSD-based methods, as outlined in AASHTO T166 and ASTM D2726, are susceptible to high degrees of operator variability when used for open-graded mixes. New methods for determining  $G_{mb}$  have been developed and show potential for reducing testing variability.

The  $G_{mb}$  of over 300 compacted asphalt specimens, representing eight coarse-graded Superpave mixes – including four 12.5 mm and four 25.0 mm blends – was determined using four methods, including SSD (by AASHTO T166); vacuum sealing (Corelok); direct measurement of specimen height and diameter; and a direct nuclear method (CoreReader). Testing trials were conducted in triplicate for each of the testing methods.

In general, statistically significant differences were noted in  $G_{mb}$  values determined using the height/diameter method versus those determined using the SSD, Corelok, and CoreReader methods. Overall the Corelok and CoreReader methods each exhibited both lower “multi-operator” and “single operator” variability than the SSD and height/diameter methods. Based on these results, vacuum sealing and nuclear methods appear to offer viable alternatives for determining the bulk specific gravity of compacted hot-mix asphalt concrete.

**KEY WORDS:** asphalt, density, specific gravity, superpave, testing