

# ROAD SCIENCE

by Tom Kuennen, Contributing Editor

## Modifiers a Must in a World of High-Performance Asphalt



Enhanced durability and the defeat of rutting, such as this on a Los Angeles street, are the main goals of asphalt modification

Photo courtesy of Tom Kuennen

**The universe of modifiers has expanded far beyond polymer modifiers of yesterday; phosphoric and polyphosphoric acids get look.**

**M**ore and more, modifiers are a must in producing the high-performing, durable asphalts — such as the performance graded (PG) binders used with Superpave — that can be predicted to behave in a certain way throughout time.

Asphalt modifiers are used principally to optimize durability and rut resistance in hot-mix asphalt (HMA). It is the menace of rutting and age-related ills that most actively motivates the use of asphalt modifiers in hot mix asphalt.

The more familiar polymer modifiers mix with the liquid binder to help it perform bet-

ter. Mineral modifiers perform physically to enhance adhesion of binder to aggregate, or keep liquid asphalt binder from draining from an aggregate structure, as with stone matrix asphalt.

But in the new millennium, a new breed of modifiers is going beyond making asphalt perform better, to making it easier to place by reducing the heat or energy required to produce the mix. These waxy or water-yielding modifiers make low-energy asphalt mixes — such as warm mix asphalt (WMA) and cold mixes — possible. The use of low-energy asphalt mixes offers significant environmental benefits the asphalt industry may need if it going to survive the environmental onslaught now building on the horizon.

At the same time use of conventional polymer modifiers is being

expanded to make more durable and versatile surface treatments, including chip seals, fog seals, an microsurfacing, with new research on the way from the pavement preservation community.

And a new bunch of modifiers, including phosphoric acid and polyphosphoric acid, are getting a close look by researchers in an effort to determine whether they do more good than harm in asphalt mixes.

### **Polymer modifiers in asphalt**

Why modify?

“Improvement in resistance to rutting, thermal cracking, fatigue damage, stripping, and temperature susceptibility have led polymer modified binders to be substituted for asphalt in virtually all paving and maintenance applications, including hot-mix,

