is assumed that the pavement is subjected to a design number of fast, transient loads. For the high temperature design situation, controlled by specified properties relating to permanent deformation, the speed of loading has an additional effect on performance. Superpave requires an additional shift in the selected high temperature binder grade for slow transient and standing load applications. For slow moving design loads, the binder would be selected one high temperature grade higher, such as a PG 64 instead of a PG 58. For standing design loads, the binder would be selected two high temperature grades higher, such as a PG 70 instead of a PG 58.

Also, an additional shift is needed for extraordinarily high numbers of heavy traffic loads. If the design traffic is expected to be between 10,000,000 and 30,000,000 equivalent single axle loads (ESAL), then the engineer is encouraged to consider selecting one high temperature binder grade higher than the selection based on climate. If the design traffic is expected to exceed 30,000,000 ESAL, then the binder is required to be selected one high temperature grade higher than the selection based on climate.

It should be emphasized that proper or conservative binder selection does not guarantee total pavement performance. Fatigue cracking performance is greatly affected by the pavement structure and traffic. Permanent deformation or rutting is directly a function of the shear strength of the mix, which is greatly influenced by aggregate properties. Pavement low temperature cracking correlates most significantly to the binder properties. Engineers should try to achieve a balance among the many factors when selecting binders.

Mineral Aggregate

SHRP researchers surveyed pavement experts to determine which aggregate properties were most important. There was general agreement that aggregate properties played the central role in overcoming permanent deformation. Fatigue cracking and low temperature cracking were less affected by aggregate characteristics. SHRP researchers used these survey results to identify two categories of aggregate properties that needed to be used in the Superpave system: consensus properties and source properties. In addition, a new way of specifying aggregate gradation was developed – the design aggregate structure.