

Oregon Asphalt-Concrete B-Mix Improvement Study

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The Oregon Department of Transportation (ODOT) has experienced rutting and/or ravelling pavements in Oregon Class "B" asphalt concrete in the last two decades. Some of these pavement problems have evolved from material changes or changes in construction practices.

The typical agency reaction to these problems has been to make adjustments in paving mixture components and mixture characteristics without thorough study. These changes to mixtures have sometimes created unexpected pavement problems. Consequently, ODOT conducted a study to determine which mix properties could be adjusted to achieve the highest probability of long-term performance.

Test mixtures composed of five different aggregate gradations and up to seven asphalt cement types were fabricated in the laboratory. Several tests were performed on each mixture including those for specific gravity, stability, index of retained strength, and index of retained resilient modulus. These test results were compared to current ODOT paving mixture design criteria to determine the potential effect on performance.

This study concluded that a gradation slightly coarser than the maximum density gradation in the 1 inch - 1/4 inch fraction, and significantly coarser than the maximum density in the 1/4 inch - 0 inch fraction should improve mixture performance. ODOT standard specifications for stockpile gradations and AC mixture broadband gradations have been modified to accommodate the coarser gradations. These new gradations provide a wider range of asphalt contents over which adequate mix stability and resistance to stripping is achieved.

This study also concluded that conventional asphalt is satisfactory unless environment or construction conditions dictate a need for a modified asphalt. It was found that the asphalt grade, including polymer modified asphalt grades, did not have a significant effect on mix stability or resistance to stripping. Stability problems must be solved by the use of aggregate with proper gradations, size, and fracture. Stripping problems must be solved by the proper selection of asphalt brand, or the use of antistripping additives such as liquid antistripping additives and/or lime treatment of the aggregate.

ODOT has implemented the recommended gradations from this study. In addition, the use of component-based modified asphalt specifications (recipe specifications) for most paving projects has been discontinued. Instead, ODOT now uses the Performance Based Asphalt (PBA) specifications which were adopted in 1991. On projects with harsh environmental conditions, PBA-3 and PBA-6 modified paving asphalts are used.

Recently, the results of this study were published in a final report titled, "Oregon Asphalt-Concrete B-Mix Improvement Study." To obtain a copy of this report or any additional information on this topic, please contact:

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