HR-157 EVALUATION OF GAP-GRADED ASPHALT CONCRETE MIXTURES

Key Words: Asphalt concrete, Gap-graded aggregate, aggregate gradation

Abstract

This report presents the results of a comparative laboratory study between continuous and gap-graded aggregates used in asphalt concrete paving mixtures. A total of 424 batches of asphalt concrete mixtures and 3,960 Marshall and Hveem specimens were examined.

There is strong evidence from this investigation that, with proper combinations of aggregates and asphalts, both continuous and gap-graded aggregates can produce mixtures of high density and of qualities meeting current design criteria. There is also reason to believe that the unqualified acceptance of some supposedly desirable, constant, mathematical relationship between adjacent particle sizes of the form such as Fuller's curve p = 100(d/D)n is not justified. It is recommended that the aggregate grading limits be relaxed or eliminated and that the acceptance or rejection of an aggregate for use in asphalt pavement be based on individual mixture evaluation.

Furthermore, because of the potential attractiveness of gap-graded asphalt concrete in cost, quality, and skid and wear resistance, selected gap-graded mixtures are recommended for further tests both in the laboratory and in the field, especially in regard to ease of compaction and skid and wear resistance.