

EFFECT OF AGGREGATE TYPE AND RATE OF TEMPERATURE CHANGE ON FRACTURE STRENGTH OF ASPHALT CONCRETE

A. Qadir

Graduate Student, Middle East Technical University, Ankara, Turkey

M. Guler *

Associate Professor, Middle East Technical University, Ankara, Turkey

* Department of Civil Engineering, Inonu Blvd., 06531 Ankara, Turkey, Tel:

+90 (312) 210-2464, E-mail: gmurat@metu.edu.tr

ABSTRACT

One of the main distress types in asphalt concrete pavements is the low temperature cracking due to large variation of daily temperatures. Even though researchers around the world studied the effect of a number of mix design variables on the fracture strength of asphalt concrete, the rate of temperature change and the aggregate type have not been well elaborated in the previous researches and need further investigations. Several test methods have been suggested to study the low temperature behaviour of asphalt concrete, out of which the Thermal Stress Restrained Specimen Test (TSRST) is one of the most common methods used by the researchers. An investigation was carried out to know the influence of aggregate type and different cooling rates on the fracture strength of asphalt concrete specimens. Test specimens were prepared using two aggregate types while the other design variables such as gradation, asphalt binder grading, air voids and specimen size were kept constant. The optimum asphalt content was determined using the Superpave mix design methods and a number of slab specimen were compacted to 4% air voids using a pneumatic tire rolling equipment. The specimens were then sawed to make prismatic beam sections and subjected to TSRST testing. The statistical analysis of the results suggests that the aggregate type has a significant effect on the fracture strength of specimens while the effect of using varying cooling rates was not found to be statistically significant.

KEY WORDS: Asphalt, aggregate, low temperature cracking, fracture strength