

Implementation Plan

Evaluation of the Engineering Characteristics of RAP/Aggregate Blends

MDT's Geotechnical Section asked Robert Mokwa to study the engineering characteristics of Recycled Asphalt Pavement (RAP)/aggregate blends in June 2004. This study was undertaken based on the fact other states limit the amount of RAP they allow to be blended with virgin aggregates to as little as 10%. These states are limiting the RAP content based on concerns the RAP/Aggregate blends are not as permeable or do not provide the structural support of virgin aggregates. In the past MDT has routinely specified RAP/aggregate blends utilizing 50% or more RAP.

The results of the study are summarized in the report Evaluation of the Engineering Characteristics of RAP/Aggregate Blends. The report findings indicate permeability actually increases with increased RAP content, while the findings regarding the strength were mixed. Some strength measures decrease with increased RAP content, while others stay the same or increase slightly.

These findings are based solely on laboratory tests. MDT's Pavement Analysis Section has compiled a list of projects dating back to 1988 where a RAP/Aggregate blend was used for construction of the surfacing section. A review of how the projects over 5 years old are performing will provide a true measure of the performance of these mixtures. Personnel from the Materials Bureau will work with District personnel familiar with the projects to evaluate the performance of these projects. This evaluation will be used to determine whether the reduced strength characteristics shown in the study are translating into problems on the roadway. Problems with overall performance of these roadways have not been documented to this point. Based on this fact it has been determined the use of the RAP/aggregate blends will continue, as before, until the evaluation can be completed. Once the evaluation has been completed, a determination will be made whether further modifications to MDT practices other than those listed below are necessary.

At the time this study was initiated there was no guidance to MDT designers on allowable RAP percentages. This lack of guidance led to at least one project designed to use approximately 90% RAP/ 10% virgin aggregate, which resulted in a claim. The revised Surfacing Design Guidelines Memorandum issued by Matt Strizich in April 2005 established a maximum percentage of RAP at 60%. Further clarification establishing 50% RAP or less as the desirable percentage will be provided to designers through memorandum. This memo will also be used to make the designers aware of the concerns associated with the use of higher percentages of RAP. This memo will be issued once the field evaluation has been completed.

The issue of what strength value to assign these RAP blends also needs to be addressed in MDT's surfacing designs. MDT's current practice is to treat these blends as equivalent to virgin aggregate. Currently MDT's surfacing design assigns a relatively conservative structural value to the aggregate surfacing so it is believed there is not an issue with our surfacing design methodology at this time. The evaluation of the existing roadway conditions will indicate whether there is a problem with this assumption. Surfacing Design is currently in the process of implementing a new Mechanistic – Empirical design methodology and as part of the implementation process they will be evaluating the strength values used for RAP blends, rather than treating them as equal to virgin surfacing aggregates.