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IN-SITU EVALUATION AND LABORATORY TESTING OF ASPHALT CONCRETE FULL-DEPTH RECLAMATION

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ABSTRACT

Rehabilitating an old pavement by pulverizing and stabilizing the existing pavement is a process referred to as Full Depth Reclamation (FDR). The stabilized layer becomes either the base or sub-base of the new pavement structure. This process has been used widely for over 20 years in Texas to strengthen and widen structurally inadequate pavement sections. However, there is little success incorporating more than 50 percent recycled asphalt pavement (RAP) material in typical FDR design, so approaches to dealing with thick localized HMA layers must be developed. This study focuses on implementation of test protocol on successful FDR practice, in-situ evaluation of existing asphalt pavement (FM 1887), and determination of optimum mix design of a 50/50 combination of RAP and flexible base materials. In order to accomplish the objective of study, characterization of existing asphalt pavement structure and laboratory mix design test were conducted on the basis of FDR practice protocol. The evaluation of the in-service performance of current flexible pavement section was carried out using ground penetrating radar (GPR), dynamic cone penetrometer (DCP), and coring of asphalt concrete sample for the selected field test sections. To assess the performance characteristics of FDR in base-course mix design, the determination of optimum moisture content, triaxial compression test, capillary suction test, seismic property test, and unconfined compressive strength test were conducted. The in-situ pavement analysis results indicate that the current pavement distresses are related primarily to the stripped gravel layer, but secondary problems are caused by high plasticity index (PI) soils and edge drying, causing longitudinal cracks and roughness. To rehabilitate this road, FDR could be considered. Laboratory testing to select the optimal type and amount of stabilizer indicates that the suggested mix design would be a 50/50 blend of existing base and recycled asphalt pavement (RAP) materials containing 3% cement which satisfied the necessary strength and moisture susceptibility requirement.

KEYWORDS: Full Depth Reclamation, High Plasticity Index Soil, Ground Penetrating Radar, Recycled Asphalt Pavement, Cement Stabilization

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