Research Need for Pavement Design, Management & Materials Technical Advisory Group

Effective/Updated: August 14, 2015

ISSUE: Impact of Stabilized Subbase on Performance of Jointed Plain Concrete Pavement

SUMMARY OF PROBLEM: The Illinois design policy in Chapter 54 of the Bureau of Design and Environment Manual requires the use of stabilized subbase under most jointed plain concrete pavements (JPCP) to address concerns with erodibility of the improved subgrade. The only exceptions are for low-volume routes or urban sections containing curb and gutter and a storm sewer system, in which case the stabilized subbase may be omitted. Reclaimed asphalt pavement (RAP) has been incorporated into aggregate-improved subgrade, which may help reduce the erodibility potential. Districts have raised concerns about long-term performance when omitting the stabilized subbase in curb and gutter sections with heavy truck volumes.

Additionally, two main types of stabilized subbase are currently used with JPCP—hot-mix asphalt (HMA) and cement aggregate mixture II (CAM II). Continuously reinforced concrete pavements (CRCP) require HMA stabilized subbase. Some districts have commented on the poor performance of JPCP projects with CAM II subbase and question why HMA wouldn’t also be required for JPCP. Other districts have reported poor performance on projects with HMA subbase.

This study aims to assess the performance of JPCP sections constructed in Illinois in the past 20 years with respect to the following areas: (1) omission of stabilized subbase under curb and gutter sections with heavy truck volumes, (2) type of material (HMA vs CAM II) used for stabilized subbase, and (3) type of capping aggregate used (RAP vs. granular). Work activities anticipated for this project include visual distress surveys, joint faulting measurements, coring, and falling weight deflectometer testing.

EXPECTED IMPLEMENTABLE OUTCOME: On the basis of the findings of the study, IDOT can update policy to ensure use of the most appropriate subbase type so as to realize longer-lasting pavements with lower life-cycle costs. Better-performing pavements with few signs of deterioration provide the traveling public with a smoother, safer, and better-quality ride. Appropriate choice of subbase type can lead to cost savings and environmental benefits without compromising the structural integrity of the pavement.

To submit a research idea for consideration at the spring 2016 Executive Committee meeting, prepare and submit a Proposed Research Idea form to IDOT (DOT.BMPR.RESEARCH@illinois.gov) no later than October 1, 2015.