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Late-Life Low-Cost Deck Overlays

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Abstract

The Iowa Department of Transportation (Iowa DOT) uses low-slump dense concrete overlays (LSDC) as a maintenance strategy to extend the service life of bridge decks. However, these overlays are not the optimal option for late-life bridge decks that are scheduled for replacement and only require a short service life extension due to their relatively high costs and long curing requirements. As such, the Iowa DOT sponsored this research project to investigate alternative overlay options that can provide a short service life extension while reducing the cost and construction time compared to their conventional overlays. A literature review of other state DOTs practices was completed and seven types of overlays were selected for comparison to the LSDC overlay as follows: LMCVE overlays, PPC overlays, thin polymer overlays, HMA overlays, PMA overlays, and HMA overlays with waterproofing membranes. In addition to the selected overlays, the study also considered a reduced construction procedure that does not require partial-depth repairs to compare it with the standard construction practices. The results of the study show that significant savings in construction time and traffic closures can be achieved by using the alternative overlays. Several overlay-construction procedure combinations can also significantly reduce the cost compared with the LSDC overlay. A decision-tree including inputs of overlay types, construction practices, construction time, cost information, and estimated service life was developed to aid in the selection of optimal late life overlays. Recommendations for future research to verify the outcomes of this study were provided.