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ABSTRACT

The current mechanistic-empirical pavement design guide does not directly consider longitudinal cracking in concrete pavement design. However, longitudinal cracking has been widely observed on joint plain concrete pavements, sometimes even more significant than transverse cracking, which adversely affect the performance and service life of concrete pavements. The objective of this study was to determine the possible causes for the longitudinal cracking problem in joint plain concrete pavements so that effective actions can be taken in future design and construction. Both field project survey of severe longitudinal cracking and numerical simulations were conducted. Results confirmed that construction problems such as inadequate longitudinal joint forming and inadequate base support are among the contribution factors, in particular for premature and localized longitudinal cracks. However, field survey indicated that the amounts of longitudinal cracking increased with widened slabs and tied concrete shoulders. Results from numerical simulation further demonstrated that the geometry of a slab could greatly influence the

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