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16. Abstract <p>This research focused on development of a comprehensive field instrumentation program to measure the in-situ responses of a concrete pavement system subjected to Falling Weight Deflectometer (FWD) loading and various environmental conditions. Responses measured were slab stresses, vertical slab deflection, temperature gradient through the slab thickness, base and subgrade soil moisture content, and load transfer pressures at the slab-base interface.</p> <p>Moisture content was found to increase up to 50% once an expansion crack develops. The temperature gradient through the slab was not linear. Deflections were greatest at the joints for environmental and FWD testing. Significant stresses and deflections developed in all lengths of slabs tested. Lowest stresses were recorded in the 21 foot slabs. Strain measuring sensors were able to detect stress relief due to cracking. Load transfer pressures at the slab-base interface and the moisture level of the base and subgrade did not appear to be significant.</p> <p>Three-dimensional finite element modeling was shown to be effective for calculating deflections and stresses that develop due to changes in environmental factors and non-destructive testing.</p>					
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