Generating a 3D model for evaluation of dowel bars misalignment and their effects on horizontal movements of concrete pavements, using Abaqus/Standard and Abaqus/Explicit FE simulation

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A 3D FE model is generated to evaluate dowel bars misalignment and their effects on horizontal movements of concrete pavements, using Abaqus/Standard and Abaqus/Explicit. The modeling method details are presented as well. For dowel and concrete modeling, 8-node solid-brick elements are used. The concrete damage plasticity model is used for concrete plastic behavior. The interaction between dowel and surrounding concrete is simulated by surface to surface hard contact model without separation after contact. Various degrees of dowel bars misalignment is evaluated. The analysis is implemented with Abaqus/Standard and Abaqus/Explicit and the results are compared. The obtained results show that the Explicit and Standard Abaqus solvers have similar results. However, Explicit solver is more efficient than Standard solver.

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