

INVESTIGATION OF DIFFERENT DOWEL AND PAVEMENT PARAMETERS ON JOINT LOCKUP

B.H. AL-Humeidawi *

Research student, University of Manchester.

P. Mandal

University Lecturer, University of Manchester.

* School of Mechanical Aerospace and civil engineering, University of Manchester, UK, Basim.shnawa@Postgrad.Manchester.ac.uk

ABSTRACT

The jointed plain concrete pavement (JPCP) is one of the most widely used pavement types in highways and airports. Dowel bars are provided for its transverse joints to allow for the axial movements during expansion and contraction due to temperature and moisture changes. Misalignment or misallocation of dowels during construction process could resist this thermal movement and cause joint lockup, which leads to damages, uncomfortable riding, and distresses for pavements and its foundation (cracking, spalling, corner breaking etc.).

Dowel bars and pavement specifications differ according to the local Highways Agencies. This variation affects the load required to open the joints when dowel misalignment exists due to wrongly placing the dowels during the construction.

A numerical analysis is carried out to assess the effect of the pavement system parameters (the concrete's compressive strength, dowel bar length and diameter) on the pullout force required to open the joints at different cases of dowel misalignment.

The results showed a good agreement with the experimental results and also gave a comprehensive knowledge about the effect of the aforementioned parameters on the pullout load needed for axial movement of slabs in different cases of dowel misalignment.

KEY WORDS: Dowel misalignment, pavement, concrete, joints, finite element