

THE AASHTO PROCEDURE VERSUS A NEW PROPOSED TECHNIQUE FOR INVESTIGATING THE SOIL EROSION EFFECT ON RIGID PAVEMENTS BEHAVIOR

Said A. EL-Kholy¹ and Sameh A. Galal²

¹Assistance Prof., Fayoum University, e-mail: said.elkholy@gmail.com

²Associate Prof., Fayoum University, e-mail: samehgalal2001@yohoo.com

Abstract

The AASHTO Method for rigid pavement (RP) design considers the influence of the localized soil erosion under the rigid pavement by reducing the stiffness of subgrade under the pavement to a certain constant value over the whole area. A reduced modulus of subgrade reaction is generally obtained in this method of design by considering the Loss of Support (LS) which is included in the AASHTO design of concrete pavements to account for the potential loss of support arising from subbase erosion and/or differential vertical soil movements. However, the effect of soil erosion is localized beneath certain parts of the RP (generally beneath the edges of pavements). Therefore, damage generally occurs at these edges. In addition, the ultimate responses of the rigid pavement under the actual soil erosion scenarios may be affected by several other parameters such as percentages and location of soil erosion occurred, the value of subgrade stiffness, slab dimensions, and slab thickness which almost are neglected in the AASHTO design method. Therefore, in this research the ultimate RP responses obtained using the AASHTO design method are evaluated and compared with those obtained from a new proposed technique for modeling the soil erosion. In this technique the different parameters mentioned above are considered in evaluating the RP behavior and their significance in predicting the responses is examined. The proposed technique is conducted using a non-linear finite element procedure considering the Soil Structure Interaction (SSI) under different soil erosion scenarios. Finally, the importance of considering these parameters in the rigid pavement design procedures is highlighted.