

**ON THE VARIATION OF THE REQUIRED ASPHALT  
THICKNESS WITH SUBGRADE MODULUS:  
A REALITY OR AN ILLUSION?**

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*ABSTRACT*

In Israel, the Flex-Design program is used for determining the thicknesses of flexible pavement layers. In this program, the thickness of the upper bound (asphaltic) layers is calculated by means of the modified Finn et al. fatigue mechanism for asphaltic mixtures, the number of applications to failure being a function of (a) the tensile strain developed at the bottom of the asphalt layers, (b) the asphalt modulus of elasticity at the asphalt design temperature, and (c) the thickness of the asphalt layers. In this procedure, the values of the calculated asphalt layers decrease considerably with the increase in subgrade modulus values for the same traffic volume. Being based on old relationships, however, the validity of this finding deserves further examination. Thus, to corroborate the finding, the present paper explores the methods used to calculate the granular layer moduli that lead to the calculated tensile strain developed at the bottom of the asphalt layers. To this end, several methods were employed, including the current Israeli Flex-Design software and the Asphalt Institute's 1983 DAMA, the latter serving as an example of the recently developed MEPDG method. The present exploration also includes the influence of granular-layer thickness. The conclusion is that subgrade modulus is almost a non-influencing parameter in the calculation process for asphalt-layer thickness, whereas granular-layer thicknesses do have some minor influence.

*KEY WORDS:* Asphalt-thickness, granular-modulus, pavement-design.