

## Effect of Unbound Granular Materials Nonlinear Resilient Behaviour on Pavement Response and Performance of Low Volume Roads

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**Abstract :** Structural analysis of flexible pavements has been and still is currently performed using multi-layer elastic theory. However, for thinly surfaced pavements subjected to low to medium volumes of traffics, the importance of non-linear stress-strain behaviour of unbound granular materials (UGM) requires the use of more sophisticated numerical models for structural design and performance of such pavements. In the present work, nonlinear unbound aggregates constitutive model is implemented within an axisymmetric finite element code developed to simulate the nonlinear behaviour of pavement structures including two local aggregates of different mineralogical nature, typically used in Algerian pavements. The performance of the mechanical model is examined about its capability of representing adequately, under various conditions, the granular material non-linearity in pavement analysis. In addition, deflection data collected by falling weight deflectometer (FWD) are incorporated into the analysis in order to assess the sensitivity of critical pavement design criteria and pavement design life to the constitutive model. Finally, conclusions of engineering significance are formulated.

**Keywords :** FWD backcalculations, finite element simulations, Nonlinear resilient behaviour, pavement response and performance, RLT test results, unbound granular materials

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