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**Numerical Investigation of the Effect of Using  
Base Materials Containing Recycled Concrete  
Aggregates on the Performance of Asphalt  
Pavements Considering Nonlinear Behavior of  
Materials**

*In this study, the effect of adding different percentages of recycled concrete aggregates to aggregate base layer materials on the fatigue and rutting life of pavement has been investigated. In the performed analyzes, nonlinear analysis by NonPAS software has been used. To this end six four-layered pavement sections with different layers thickness were analyzed for three types of very soft, soft and medium clay subgrade soil. The behavior of asphalt layer materials was considered as linear elastic and the behavior of base, subbase and subgrade materials was considered as nonlinear elastic. In all sections of pavement, the use of 0 to 100% of recycled concrete aggregates for all subgrades, at least 61.6% and maximum 198.5% increases the fatigue life and at least -22.6% and maximum 88.4% increases rutting life. In very soft clay subgrade, in thicknesses above 20 cm for the base layer and thicknesses above 30 cm for the subbase layer, it is possible to use recycled concrete materials. In medium clay subgrades, in thicknesses above 15 cm for the base layer, thicknesses above 20 cm for the subbase layer and also thicknesses above 15 cm for the asphalt layer, it is possible to use recycled concrete materials. In hard subgrades, there is no special considerations in terms of the thickness of pavement layers for the use of recycled concrete materials.*

**Keywords:** Granular base, Recycled concrete aggregate (RCA), Pavement analysis, Fatigue and Rutting.

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