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IMPLEMENTATION THE RAMCODES DESIGN CURVES OF UNSATURATED SUBGRADE SOILS IN THE DESIGN OF FLEXIBLE PAVEMENTS

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ABSTRACT

The pavement structure design process in Peru is based on a simple but costly assumption considering that subgrade soils become saturated at some point during their service time. However, the saturation of the subgrade depends on the region in which it is located. Design conditions for partially saturated subgrade need to be studied. The present research aims to implement the RAMCODES design curves of unsaturated subgrade soils to the design of flexible pavements considering the environmental and traffic conditions of the Oyon-Ambo highway. To build the RAMCODES design curves, CBR tests had to be carried out where not only the compaction energies were varied but also the moisture contents and with the help of the OriginPro 2019 program the curves mentioned were obtained, also by means of a mathematical model it was possible to predict the variation of the degree of saturation in the subgrade. After this, the seasonal CBR's were obtained and through a correlation the resilient modules were estimated. Finally, two flexible pavement designs were made, in the first the traditional methodology of characterization of the subgrade was considered and in the second the methodology proposed in the present investigation was considered. The results obtained show that considering the unsaturated behavior of the subgrade optimizes the design of the pavement, since the bearing capacity of the subgrade increased by 28.8% and the thickness of the subbase layer was reduced by 25%.

Keywords: Unsaturated soils, RAMCODES, pavement design, subgrade

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