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Tesis

**Subgrade Stabilization for Flexible Pavements  
Employing Recycled Asphalt and Pozzolana**

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# Subgrade Stabilization for Flexible Pavements Employing Recycled Asphalt and Pozzolana

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**Abstract** In the study carried out by the National Institute of Statistics and Informatics (INEI), construction works generated 41.9% of Peru's GDP. 9% of the GDP in Peru, of which provinces such as Huancayo allocated 50 million to the execution of 172 road infrastructures, but for construction and maintenance, asphalt binders are required which produce high emissions of carbon dioxide. In the fight against pollution and the rise of using sustainable materials in the construction of subgrades, a literature review of the materials used to improve the mechanical and physical properties, which is based on this experimental work was carried out. The research carried out the analysis of the stabilisation of subgrade for flexible pavements using recycled asphalt binder (RAP) and pozzolan in the city of Huancayo, for which 10 soil samples were obtained from Ocopilla Avenue. 3 tests were carried out per sample, Moisture content, dry density, California Bearing Ratio (CBR) that were added to the soil samples, RAP percentages of 0, 10, 30% and pozzolana of 0, 5, 15%. These tests were evaluated according to the manual of the Ministry of Transport and Communications (MTC). Finally, after carrying out the respective tests, it was obtained that the dosage of 15% pozzolan and 10% RAP optimised the % CBR and the combination of 15% pozzolan and 30% RAP improved the dry density; while the sample with 30% RAP was able to reduce the moisture content. It is concluded that the use of recycled asphalt and pozzolan has a favourable influence on the bearing capacity of the subgrade for flexible pavements, which is why this research provides researchers with sustainable

materials that reduce the cost of construction and have a positive impact on the area of asphalt pavements.

**Keywords** Reclaimed Asphalt Pavement (RAP), Dry Density, California Bearing Ratio (CBR), Flexible Pavement, Subgrade, Pozzolan, Subgrade Stabilisation

## 1. Introduction

According to the National Institute of Statistics and Informatics (INEI), the construction sector produces 41.9% of the gross domestic product in Peru which is supported by the major execution of road infrastructure, including streets and highways. However, ongoing maintenance is required, which involves the production of asphalt binders and aggregates that generates significant carbon dioxide emissions [1], [2]. Given the current emphasis on resource conservation, the construction sector is increasingly adopting circular economy practices to reduce these pollutants, minimize production costs, and manage material disposal more efficiently [3]. This is why the use of RAP is being promoted, in which its use has been shown to reduce raw material production costs and reduce disposal and transport costs [4], [5]. However, it is not only necessary to reduce material costs in the pavement sector, since the mechanical and physical properties are necessary for the good performance of the pavement during its useful