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Sustainable Alternatives to Road Building in Zimbabwe

Lenon Nyagura, Quantity Surveyor, Ministry of Transport & Infrastructure Development (Department of Roads), Zimbabwe

Summary

This case study has been designed to inform, inspire and share good sustainability practice. It provides an account of the Department of Roads' Construction and Rehabilitation of Harare Masvingo Road using alternative soil stabilising agents. This case study explores both the rationale and opportunities that exist for embedding sustainability into the built environment and analyses the impact of alternative soil stabilisers thus far on environmental, social and economic contexts.

Context

The Department of Roads in the Ministry of Transport and Infrastructure Development is responsible for construction and maintenance of all state roads in the country. Sustainability in the built environment has not been part of our objectives in our operations. Knowledge and awareness of sustainability gained from my studies with UCEM influenced me to advocate for sustainability in the Department of Roads operations. The rehabilitation of Harare Masvingo Project gave an opportunity to minimise carbon emissions and embodied energy in construction activities.

Aims

- ➜ Inspire road authorities, and contractors to take similar steps in sustainability
- ➜ Reduce material costs in construction projects
- ➜ Reduce carbon emissions from transportation of gravel
- ➜ Minimise construction time
- ➜ Minimise land degradation

The Project

It was the aim of Ministry of Transport and Infrastructure Development when constructing Harare Masvingo road (Beatrice section) to embed sustainability into the operations. It was important that the road, its materials, and operations, were sustainable such as recycling the existing pavement material and using Anyway Natural Soil Stabiliser (ANSS) instead of the traditional cement stabilising agent. The ANSS soil stabiliser reduced the amount of cement used in construction activities and used recycled plastic with low carbon footprint. Reclamation of the existing pavement minimised gravel extraction thereby reducing carbon emissions embodied in the ground. Reduced gravel mining results in minimum destruction of trees which absorb carbon from the air. Reclamation of the existing pavement also reduced carbon emissions from hauling gravel from gravel pits to site. The ANSS stabiliser results in a stabilised soil which exhibits greater shear strength, stiffness and bearing capacity. Expansive soils which were previously discarded during construction owing to their poor bearing capacity, and poor shear strength, amongst other factors, were now recycled.

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Personal Impact

UCEM promoted sustainability in the built environment through their programmes and this inspired me to focus on this important subject which has prompted me to find ways to incorporate it in our operations. Sustainability was not considered in our operations in the past, but reclamation works are becoming more popular in our operations.

Results

Significant costs have been saved by recycling the existing pavement layers and the construction period has also been significantly reduced. Land degradation was minimised due to most of the pavement material being recycled.