**Utilising Iron Ore-sand for Sustainable Mine Haul Road Construction**

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**ABSTRACT**

The mining industry produces large amounts of tailings, which are typically deposited in tailings dams. However, this method overlooks the potential value of silicate minerals, posing economic, social, and environmental risks. Utilizing iron ore-sand, a byproduct of iron ore processing, in the construction of mine haul roads presents a promising solution to the challenges of sustainable construction and resource management in mining operations. Additionally, adopting iron ore-sand aligns with sustainable mining practices and promotes the efficient use of resources by preventing and reducing mine waste generation and generating an alternative source of sand at scale. This study investigates the feasibility and potential benefits of utilizing ore-sand sourced from iron ore mine in the Iron Quadrangle region in Minas Gerais, Brazil. as an embankment material for mine haul roads. A series of laboratory tests were performed to understand the physical properties, compaction behavior, shear strength, and stability characteristics of the ore-sand. This material exhibits high shear strength and favorable compaction properties. Moreover, the stability of iron ore-sand embankments is further enhanced by its stiffness. These properties make it particularly suitable for use in areas under the heavy loads and dynamic conditions typical of mine haul roads. The aim is to promote the use of ore-sand as a viable and sustainable alternative for constructing mine haul roads. Future research should focus on assessing the material's brittleness and optimizing the mix design and construction techniques to further enhance the performance and stability of iron ore-sand in various mining environments. Furthermore, the material is readily available at mining sites, reducing transportation costs and the need for external sourcing, which can lead to significant cost savings for mining companies.