Review of: "Effective use of Waste Materials: A Case Study of Utilization of Fly Ash in Flexible Pavement Structures"

Dr. Fahad Rehman Abro[1]

1 Sungkyunkwan University

Potential competing interests: No potential competing interests to declare.

Introduction

- The introduction provides a good overview of fly ash, its production, composition, and potential applications. However, it could be more focused on introducing the specific topic of using fly ash in pavement structures.
- The research significance section justifies the importance of the review well but could provide more details on the specific gaps or limitations in current knowledge that this review aims to address.

Use of Fly Ash in Asphalt Concrete

- This section is quite comprehensive in covering the various ways fly ash has been used in asphalt concrete (as filler, fine aggregate replacement, asphalt binder extender, etc.).
- The review of studies is thorough but lacks a critical analysis synthesizing the key findings, contradictions, and limitations across the different studies.
- The authors could consider organizing this section into subsections based on the different applications of fly ash in asphalt concrete for better clarity.
- More discussion on the practical implications, challenges, and standardization efforts related to using fly ash in asphalt concrete would strengthen this section.

Use of Fly Ash in Base Layers

- The review of studies in this section is quite detailed, covering the use of fly ash with different activators and proportions for base layer stabilization. However, the organization of this section could be improved by grouping the studies based on factors such as fly ash class, activator type, or base layer material.
- The authors could provide a more critical analysis of the factors influencing the effectiveness of fly ash in base layer stabilization, based on the findings from the reviewed studies.

Use of Fly Ash in Soil Stabilization and Improvement

- This is a comprehensive section covering various aspects of using fly ash for soil stabilization, including effects on strength, compaction, and resilient modulus. The organization of this section could be improved by grouping the studies based on factors such as soil type, fly ash class, or stabilization mechanism.
- While the review of studies is thorough, the authors could provide a more critical analysis of the factors influencing the

effectiveness of fly ash in soil stabilization, based on the findings from the reviewed studies.
- The discussion on the effects of fly ash on the resilient modulus of soil could be expanded, as this is a crucial parameter for pavement design.

Summary and Recommendations

- The summary section effectively highlights the key findings and observations from the literature review. The recommendations section could be more specific and actionable, with clearer recommendations for future research directions, standardization efforts, and practical implementation guidelines.
- The authors could consider including a separate section or subsection dedicated to discussing the potential challenges, limitations, and environmental considerations associated with using fly ash in pavement structures.

Overall Structure and Presentation

- The overall structure of the article is logical, with sections dedicated to the different applications of fly ash in pavement layers. However, the transitions between sections could be improved to provide better flow and coherence.
- The referencing style and formatting should be double-checked for consistency and adherence to the journal's guidelines.