*ABSTRACT*

# A sustainable method of soil stabilization using waste glass in road construction

Sara Bayandor

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Concerns about the production of Greenhouse Gases (GHG) are increasing dramatically. The climate is changing considerably and affecting people and their well-being adversely. Most human-caused GHG emissions come from burning fossil fuels in industry, buildings and the transport sector. In the construction industry, concrete is known as the most consumed man-made material on the planet [1]. Cement, which is the key constituent of concrete, has a massive carbon footprint with a contribution of about 8% of the world's carbon dioxide ($CO_2$) emissions [2]. One of the potential replacements for cement is alkali-activated binders (AABs). In this method glass waste is utilized in an environmentally friendly, sustainable manner for stabilisation of volcanic soil in road construction. The waste glass could be a great candidate as aggregate, precursor and activator in the alkali activation process. To avoid using cement due to environmental concerns, AABs could be employed to stabilize volcanic soils in a sustainable method in road construction. This technology is relatively recent and numerous ongoing research is investigating the behavior of such binders. Using AABs not only decreases $CO_2$ emissions and air pollutants, but also due to incorporating waste in their composition, has a tremendous environmental impact. Life cycle studies quoted 30% to 80% $CO_2$ saving by substituting Alkali activated material for Portland cement [3]. This study aims to deepen the knowledge about the usage of AABs in road construction by performing an extensive literature review. This review will summarize recent progress in the field of sustainable roads, and review plans to evaluate the feasibility of using glass waste in road construction in New Zealand. This could stabilise the soil and sustainably capture $CO_2$ in a step toward New Zealand's Net-Zero goal.

## References

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