

Evaluation of the Durability of a Low Carbon Asphalt Pavement Containing Carbonated Aggregates in Extreme Weather Conditions

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Abstract : Climate change's extreme weather patterns significantly affect the durability and maintenance costs of existing asphalt Road Pavement Systems (RPS). Moreover, the current RPS imposes a considerable environmental burden, as its production involves the large-scale extraction of bitumen and the dredging of Virgin Sand and Gravel (VSG). Recent studies suggest that more sustainable alternatives, such as incorporating carbonated aggregates to reduce the use of virgin materials content in asphalt, can enhance asphalt performance while offering an effective cost management strategy. However, the impact of extreme weather conditions on the durability and maintenance requirements of these green solutions remains unexplored. This paper reports on the results of comprehensive durability tests conducted on a novel asphalt pavement to assess the effects of anticipated extreme winter and summer weather conditions. Preliminary findings indicate that the new asphalt pavement system made from carbonated aggregates demonstrates greater stability and fatigue resistance in comparison to traditional asphalt mixes.

Keywords : climate change, carbonated aggregates, green solution, asphalt

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