

## Documents

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**COMPARISON OF THE MECHANICAL PERFORMANCE OF DENSE GRADING AND POROUS GRADING MIXTURE UTILIZED WITH CRUMB RUBBER MODIFIED BINDER**

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**Abstract**

Pavement and road networks play a very huge role in everyone's daily lives to connect from one point to another point. With globalization, growth in the economy, and development, the number of vehicles traveling each day on the road increases rapidly over the years. Thus, the constant application of heavy loads together with Malaysia's climatic factors lead the pavement to be susceptible to deterioration such as potholes and cracking. The service life and resistance of the pavement to deterioration can be improved with the incorporation of crumb rubber modified binder (CRMB) for asphaltic pavement. Hence, the objective of this research is to do a comparative evaluation of the mechanical performance of the CRMB that is utilized in dense grading and porous grading mixtures with varying percentage of crumb rubber replacement. The experimental portion of the research was done by substituting the crumb rubber at the replacement percentages of 12%, 14%, 16% and 18% (from the weight of asphalt binder) in preparing the modified binder that was further evaluated by conducting physical testing (penetration and softening point test). Then, the mechanical evaluation of dense and porous grading asphalt mixtures incorporating the crumb rubber was performed with Marshall stability and flow prior to comparing the strength performance for both asphalt mixtures. Based on the result obtained, it was found that the highest percentage of crumb rubber replacement, which is 18%, would give the highest level of stiffness and softening point on the binder. Furthermore, from the Marshall test, it was established that 16% of crumb rubber replacement on asphaltic binder is the most optimum for a porous mixture, given that the CRMB is 5% of the total mix. Nonetheless, at the same 16% of crumb rubber replacement, the value for Marshall test on the dense mixture shows an adverse result when compared to the control. Hence, it was concluded that the mechanical performance of CRMB utilized with porous mixtures shows more impressive results compared CRMB utilized with dense mixtures. © (2024), (International Islamic University Malaysia-IIUM). All Rights Reserved.

**Author Keywords**

crumb rubber modified binder (CRMB); dense grading; porous grading mixture

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