

Marshall Stability of Combination of Perlis Limestone and Granite in Hot Mix Asphalt

Abstract

Limestone is used in many countries for road pavement, such as Poland, USA and France. However, there are limitations in terms of mechanical and surface properties, but it has been used in some regions for years, particularly in Perlis, Malaysia, due to the need for a local source. The reason is that of caution of fear, in spite of wanting to explore the opportunities of Perlis limestone being used and understand the advantages and disadvantages of that aggregate. This study focused on the stability, flow, and volumetric by using a combination of Perlis limestone and granite in hot mixed asphalt (HMA) mixtures. The combination of Perlis Limestone and granite was analysed and tested to specification for roadworks by PWD, Malaysia. Furthermore, there will be a cost increment in road construction due to logistic and transportation problems in delivering imported granite aggregate from Kedah state. The result showed that HMA with less Perlis limestone aggregate showed a higher value of stability, flow and stiffness. As for the conclusion, HMA with more granite aggregate has better strength with less deformation compared with HMA with more Perlis limestone aggregate. HMA with more granite aggregate was also was stiffer, mainly due to the interlocking and frictional resistance of the aggregate due to the angularity and rougher surface of granite. However, since all the samples complied with the PWD specification, Perlis limestone proved it can be an alternative aggregate to be used in HMA.