

Physical, leaching, and toxicity characteristics of PG76 binder modified with Rediset

ABSTRACT

Asphalt binder, as one of pavement component is exposed to heat and rainfall. Polymer modified asphalt binder is a good alternative to withstand the weather in tropical countries. By utilizing warm mix asphalt additive, the high compacting and mixing temperature can be reduced. However, the impact to the environment and its characteristic towards high temperature need to be evaluated before putting it to use. In the study, the physical properties, thermal characteristics, and leaching and toxicity of PG76 incorporated with Rediset LQ were investigated. The Tank Leaching Test was carried out to mimic the worst scenario of flood event effect on the asphalt binder. The results of physical tests denote that the new material has relative consistency while the thermal analysis indicates that the materials are stable beyond their mixing and compaction temperature. The decomposition starts at temperature $> 360^{\circ}\text{C}$ and ends at temperature $< 500^{\circ}\text{C}$ for all samples. The tank leaching test also found that the materials are safe to be used as pavement material because the heavy metal elements from the leachate are below the maximum allowable volume by the World Health Organization and the United States Environmental Protection Agency.