

Staff No. : 11797
Salutation : DR.
Project Leader Name : MOHD KHAIROL IDHAM BIN MOHD SATAR
Research Alliance : INNOVATIVE ENGINEERING
Faculty / PTJ : FAKULTI KEJURUTERAAN AWAM
School : JABATAN GEOTEKNIK DAN PENGANGKUTAN
Research Classification : PAVEMENT AND TRANSPORTATION RESEARCH GROUP (PTRG) - SD -
Category : Science Technology (ST)
Staff Classification : Major Research

Title :

Relationship between asphaltene and bitumen-aggregate adhesion property of bituminous mixture

Maximum Duration : 36 month

Start Date :

01/11/2022

End Date :

31/10/2024

Duration :

2 years 0 months 0 days

Type of Grant :

UTM Fundamental Research

Grant Category :

Internal Grant

RMK :

12

EXECUTIVE SUMMARY

Modification of bitumen used in bituminous mixture has become common among the industrial players. Initially, studies on the modification of bitumen usually conducted by examined the physical and mechanical properties of the bitumen. Nowadays, with the development of new technology, researchers were looking extensively on the rheological, microstructural and chemical properties of modified bitumen. However, most of the studies were conducted separately among the bitumen properties. There is very limited study correlate between chemical properties and mechanical properties of modified bitumen in order to predict the performance and durability of the mixture. Therefore, this study aims to address the relationship between asphaltene content (chemical property) and the adhesion property (mechanical property) of bitumen-aggregate. Asphaltene is a chemical component of relatively large molecules of bitumen. The understanding on how the asphaltene content affected the adhesion property of bitumen-aggregate can be an initial indicator for better improvement in mixture. This study will be organized into three main stages. First stage involves production and characterization of asphaltene. It will be extracted from bitumen/aged bitumen in the laboratory and will be used in the following stage. Stage two involves the modifying the 60-70 PEN bitumen using asphaltene. Bitumen will be incorporated with several percentages of asphaltene before being tested for their fraction content, physical, rheological and morphological properties. The adhesion property tests between bitumen and aggregate will be performed in the stage three. The tests are pull-out test for bitumen, and coating and stripping test for loose mixture. Based on the result in stage three and stage two, the relationship between asphaltene content and bitumen-aggregate adhesion property can be established. This finding is expected to become an initial indicator for better improvement in pavement material selection.