

RESEARCH POSTER

THE EFFECT OF LATERITE STONE AS FILLER ON MARSHALL STABILITY HOT MIX ASPHALT AC-WC

AUTHORS

Rahmat , Maslina, M Kencanawati

AFFILIATIONS

Department of Civil Engineering, Balikpapan University

INTRODUCTION

The highway is the main transport infrastructure in Indonesia and the total road length is 523,974 kilometres. Three hundred one thousand and three hundred eighty five of 523,974 kilometres road length had paved. So, there are still more than 40 percent of road length in Indonesia had not paved. The island of Borneo has large laterite material deposits. The Laterite Stone of Borneo is a hardened soil resembling a stone from the deposition of nickel and iron substances. Laterite stone is formed naturally in which many contain basic solutions. The organic material content is lost due to the weather and leaves the nickel and iron substances that form a layer of soil and harden like a stone. In Borneo, laterite stones are used as subbase pavement layer because the material is easy to obtain and the quality is also strong. Based on the above background it is necessary to research about laterite stone as filler on asphalt mixture.

OBJECTIVE

The experiment was aimed to find out whether laterite could be used as filler material on Asphalt Concrete Wearing Course (AC-WC).

METHODOLOGY

The method and technical specification of experiment referred to Asphalt Pavement Specification, that published by Public Work Ministry of Indonesia. The experiment had another objective. The experiment would be examine whether laterite percentage variation on filler material that mixed with Portland Cement, would effect on Marshall Stability value.

RESULTS/FINDINGS

The experiment result showed, Marshall Stability was greater than 800 kilograms as asphalt concrete wearing course (AC-WC) specification requirement. Analysis of Variance (ANOVA) test results using Minitab 16 software showed no difference in Marshall stability value on all specimens. Because, P-value of Laterite and compaction combination were less than 0.05.



Figure 1. Laterite Stone

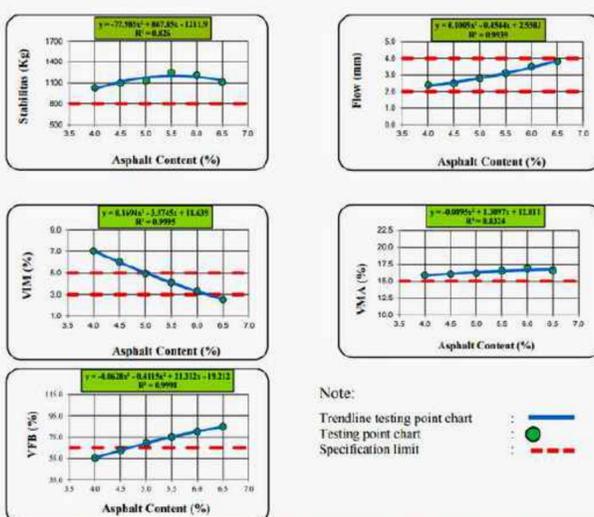


Fig 2.. Correlation Charts between Asphalt Content with Stability, Flow, Void in Mixture (VIM), Void Filled with Bitumen (VFB), and Void in Mineral Aggregate (VMA)

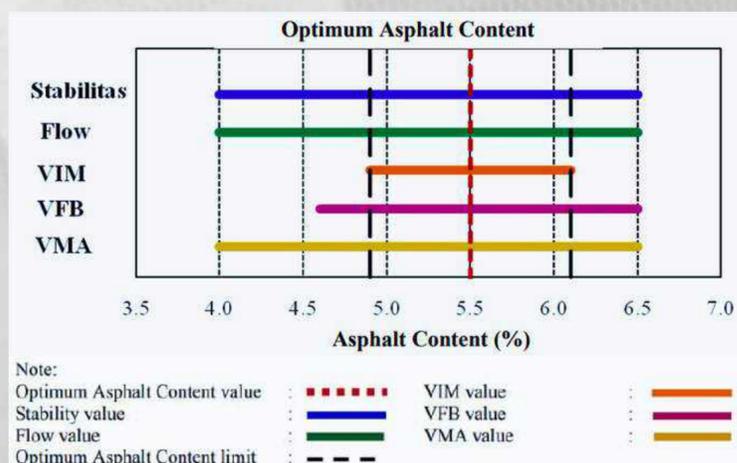


Fig. 3. The Chart of Optimum Asphalt Content Procedure

ANALYSIS

The experiment would be examine whether laterite percentage variation on filler material that mixed with Portland Cement, would effect on Marshall Stability value. The filler material was a mixture of laterite and Portland Cement, which the proportion of each were 0:100, 50:50, and 100:0. Each proportion of filler material compacted with 75 and 400 blows. There were 3 samples of each combination of the proportions of the filler material. The total number of specimens were 18. Furthermore, the Marshall stability value of each specimen would be tested using ANOVA test. And ANOVA test used Software Minitab 16.

CONCLUSION

Conclusion of the experiment were:
 a. Optimum asphalt content that used on asphalt concrete wearing course (AC-WC) was 5.5%.
 b. Laterite can be applied as filler on asphalt concrete wearing course (AC-WC).
 Because, Marshall Stability value was greater than 800 kilograms as specification requirement.
 c. Marshall Stability value did not depend on percentage Laterite content and compaction energy.

References :

- _____, Chapter VII, 6th Division, Asphalt Pavement Specification. Public Work Ministry, Jakarta, (2010).
- Diez, David M; Barr, Christopher D; Cetinkaya Rundel, Mine. Open Intro Statistics (3rd ed.). Open Intro. Retrieved 11 November 2017, (2017)
- Sukirman, Silvia, Highway Pavement. Bandung, Nova, (2003)
- Suryadharna, Hendra; Susanto, Benidiktus (2008), Highway Engineering, Yogyakarta, Universitas Atma Jaya Yogyakarta, (2008)