

USE OF UHMWPE AS AN ADDITIVE IN ASPHALT MIXTURE

Final Project Report

As one of the requirements to obtain a bachelor's degree from

University of Atma Jaya Yogyakarta

By:

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INTERNATIONAL CIVIL ENGINEERING PROGRAM

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MARCH 2021

STATEMENT

I, the undersigned, declare truly that the Final Project is under the title

USE OF UHMWPE AS AN ADDITIVE IN ASPHALT MIXTURE

It's really my own work and not the result of plagiarism from another people's work. Ideas, research data, direct and indirect quotations from other people's writings or ideas are stated in writing in this Final Project. If it is proven later that this Final Project is the result of plagiarism, then the certificate I obtained was declared null and void and I will return it to the Chancellor of University of Atma Jaya Yogyakarta.

Yogyakarta, March 2021

The one who make the statement,

A handwritten signature in black ink is written over a yellow revenue stamp. The stamp features the Garuda Pancasila emblem and the text '10000', 'METRAL TEMPEL', and '4A3CEAJX064600192'.

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MIXTURE

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PREFACE

Praise the presence of God Almighty for His gift and declaration so that the author can complete the final task titled use of UHMWPE as an additive in asphalt mixture

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At the end of the word, author realizes that the final task report is not yet perfect, so the authors need constructive criticism and advice and the author also hopes that this task is beneficial for everyone.

Yogyakarta, March 2021

Author

Benediktus Angga Adi Nugroho

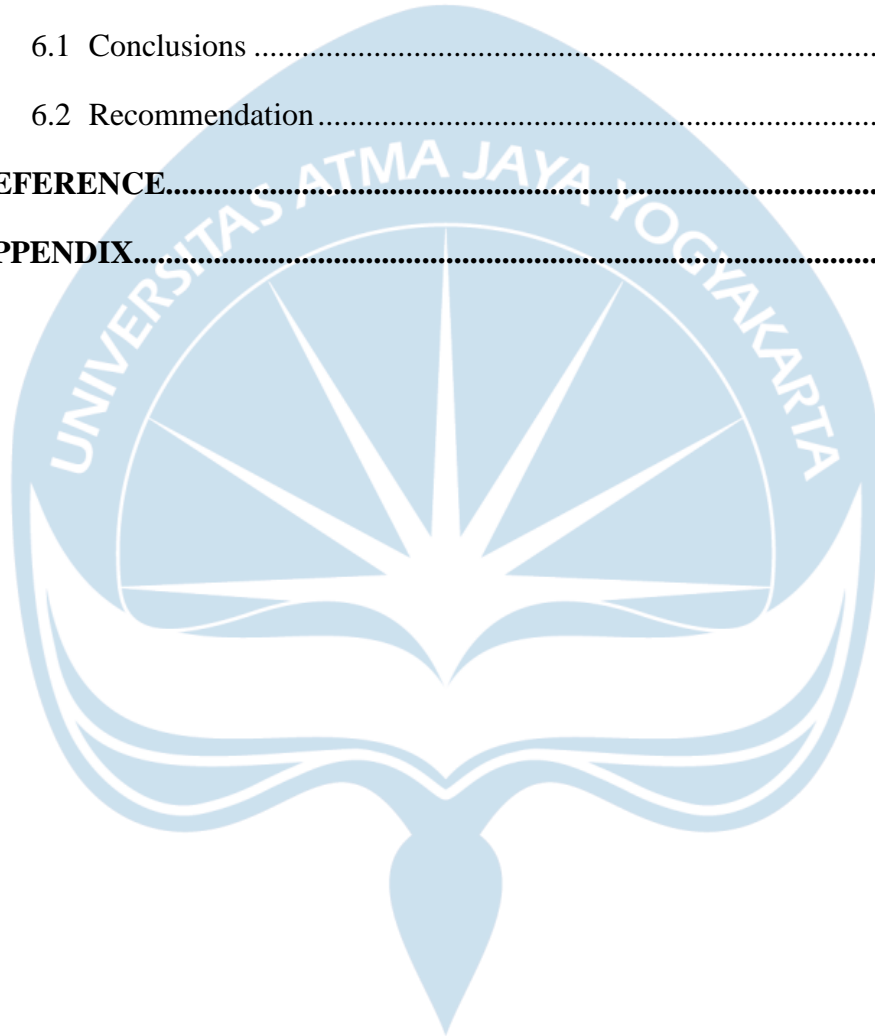
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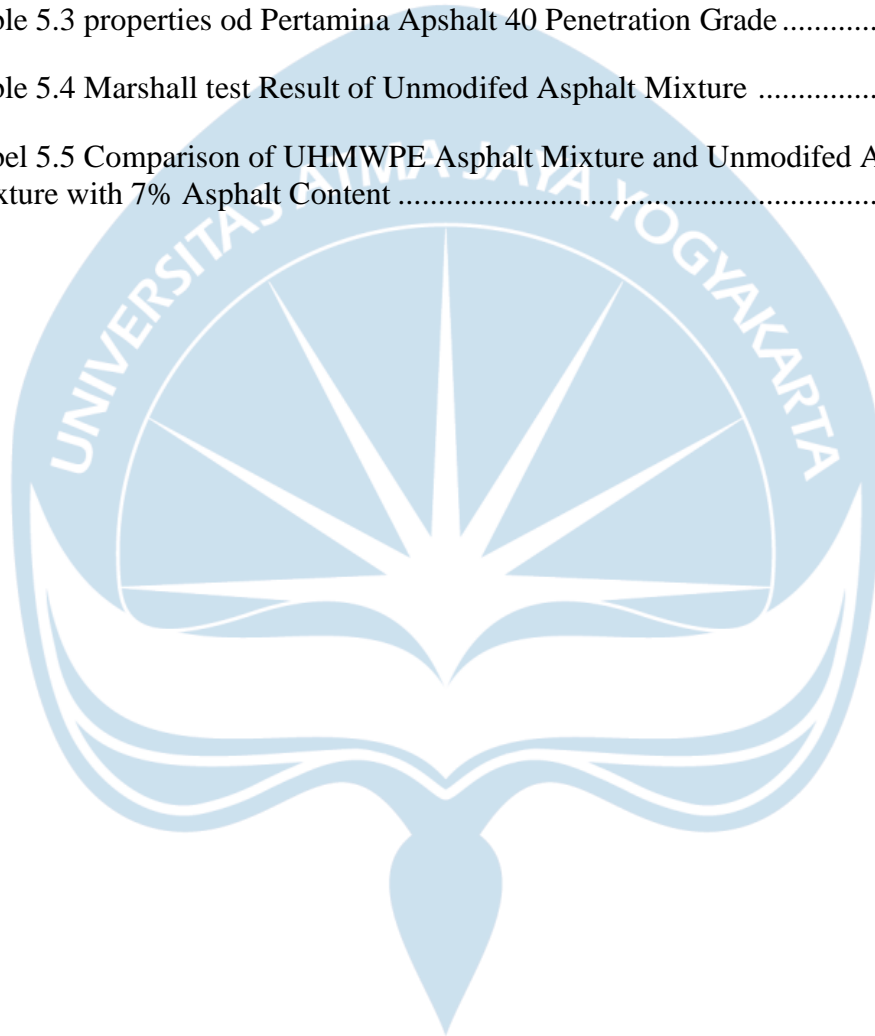
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ABSTRACT

USE OF UHMWPE AS AN ADDITIVE IN ASPHALT MIXTURE, Benediktus Angga Adi Nugroho Student ID Number 16 13 16662, year of 2021, Transportation Engineering, International Civil Engineering Program, Department of Civil Engineering, Universitas Atma Jaya Yogyakarta.

Indonesia is the fourth most populated country in the world. Total vehicles in Indonesia is 154,376,369 units in 2018-2020, which means there are around 232 units' vehicles every km. However, many roads in Indonesia can't provide minimal conditions for preventing destructions due to failure of the road.

The purpose of this study was to investigate the Marshall Test's properties effect (such as: Marshall Stability, Flow, Marshall Quotient, Density, VFWA, and VITM) of adding crumb of Ultra High Molecular Weight Polyethylene (UHMWPE) into asphalt mixture, as UHMWPE is a polymeric material that known as the strongest. In this study, two different UHMWPE's crumb contents (1% and 2% by weight of aggregate's total weight) and two different UHMWPE's crumb sizes (#50 and #3/4") were investigated. A comparative study was done among the unmodified and modified asphalt mixture.

The results showed that UHMWPE is recommended as an additive in asphalt mixture, as all the results are within the standard requirements. The addition of UHMWPE tends to increase the strength, higher durability and quality of mixture.

Keywords: UHMWPE, Modified asphalt mixture, Marshall Test properties.