

Theerayut Udomsinprasert 2012: Application of Asphalt Concrete Mixture using AC 40-50 in Truck Route. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Associate Professor Watcharin Witayakul, M.Eng. 173 pages.

The objective of this research is to study the engineering properties of asphalt concrete mixtures using asphalt binder penetration grade 40-50 (AC 40-50) that are used in a real construction. All samples for this study, including loose-mix samples from mixing plant and cored samples from the construction site, were obtained during construction of the test section on highway No. 352. The test section was a rehabilitated flexible pavement with asphalt concrete mixture using Polymer Modified Asphalt (PMA) as the asphalt wearing course and asphalt concrete mixture using AC 40-50 and AC 60-70 as the asphalt binder course. Various laboratory tests were conducted in this study including indirect tensile resilient modulus test, indirect tensile fatigue test, and SPT dynamic creep test. In addition, field performance and conditions of the test section were regularly monitored by Falling Weight Deflectometer (FWD) machine and visual condition survey.

The engineering properties of the asphalt concrete mixture using AC 40-50 obtained in this study were found to be in the same ranges as those obtained from the other studies conducted by the Department of Highways (DOH). Further, the result of the FWD test and visual condition survey of the test section also showed that the part of the test section having asphalt concrete mixture using AC 40-50 as the asphalt binder courses had lower surface deflections and less pavement distresses than the other parts. These findings are consistent with the laboratory test results of prior studies by DOH that the asphalt concrete mixture using AC 40-50 have higher modulus and better performance than those using AC 60-70. Since the construction costs of two asphalt mixtures are almost the same, the author agrees with the prior conclusions of DOH that for flexible pavements with medium to medium-high amounts of traffic, DOH should consider changing the asphalt binder from AC 60-70 to AC 40-50.

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Thesis Advisor's signature