

Kopchai Kerdjuntrong 2014: Research of Mixture Natural Rubber Ratio in Asphalt Cement. Master of Engineering (Civil Engineering), Major Field: Civil Engineering, Department of Civil Engineering. Thesis Advisor: Associate Professor Watcharin Witayakul, M.Eng. 243 pages.

Road constructions have nowadays caused environmental pollutions, such as air pollution, because of dust particles at the toxic substance mixing factories drifting through the air from the asphalt concrete mixing process. With global warming caused by the use of comparatively high temperature in mixing asphalt and the fact that the rubber market prices have been in a declining trend and highly volatile, that is a new trial idea to mix road pavement rubber at a low temperature called “Warm Mix.”

This research presents the mechanical properties of Para Asphalt Concrete produced through Hot Mix and Warm Mix methods. The mix was based on Marshall Mix design method, with mechanical properties tested based on the Department Of Highway's, (DOH) Standards. The aggregate used was limestone from Suphan Buri Province, with bitumen as Para asphalt cement grade AC 60/70 mixed with natural rubber. In the conducted experiment, the mixing ratio for natural rubber in the form of Masterbatch was 3, 4, 5, 6 and 7 percent of asphalt cement respectively. For Hot Mix Asphalt of Para asphalt cement, the temperature at which mixing and compacting were made was 140 °C. It was found that the natural rubber percentage at 3-5 percent is with stability, strength index, air voids, and flow value in accordance with the DOH's Standards. Natural rubber at 3 percent gives better mechanical properties than other cases. For warm mix, Advera® WMA was used as an admixture. It was found that Advera® at 0.20% by mass results in better stability of the sample with reduced air voids, low than the standard. The mixing and compacting temperature at 130 °C positively affects the sample stability with reduced air voids, low than the standard too. If the percentage of Para asphalt cement was reduced, the air voids would pass the standard, but the stability would reduce lower not pass the Standard. Over all, the use of natural rubber in road pavements is suitable for hot mix asphalt process more than warm mix process.

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