

ABSTRACT

Conventional bitumen is widely used in most countries where it hardens at the early stages during handling, mixing and in service. The level of performance of service life has a close relationship with the properties of bitumen used in the asphaltic concrete. This rheological weakness of the conventional bitumen has generated an increasing interest in the use of polymer modifiers to enhance properties of conventional bitumen. The study investigated the comparison of bitumen 60/70 and 80/100 penetration grades in terms of physical properties before aging and after aging. Bitumen is thermo-visco-elastic material where temperature and rate of load application have a great influence on their performance. In this the fundamental rheological and mechanical tests were conducted, which include penetration test, softening point, the rolling thin film oven test (RTFOT), and pressure age vessel (PAV). The effects of aging on the rheological and physical properties of bitumen binders were studied by conducting the penetration and softening point test after aging. The results obtained from the laboratory tests conducted shown that, bitumen grade penetration 60/70 is suitable to be apply and use in Malaysia. Based on the test conducted and comparison of the results, it shows that the penetration value after aging grade 60/70 got lower penetration compared to grade 80/100. It has been observed and analyzed that bitumen grade 80/100 has higher penetration value after long aging. It can be concluded that the lowest penetration aging ratio, will led to reduce the degree of aging. In addition, if the penetration after aging (60/70) is lower, the value of softening point will increase. The higher penetration value after aging is not suitable to be used because of the penetration will be higher if the temperature increased. Higher temperature will turn the bitumen soften and this will reduce the stiffness and make the bituminous mixture more susceptible to rutting. Hence, when the temperature is lower, the stiffness will increase and it will reduce the flexibility and tend to fatigue failure.