



Impact of Rejuvenators Type on Physical Properties of Aged Asphalt Cement

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Abstract

Recycling can be considered as one of the measures of sustainable methods. The physical traits of the asphalt mixture under the influence of accelerated aging (Long and Short-Term) for asphalt concrete were assessed. Asphalt cement (40-50), aggregate with 12.5 mm nominal extreme size and limestone dust as filler of the mineral was used for the preparation of asphalt concrete mixture. At the optimum content of the asphalt and asphalt of 0.5 percent below and above the optimum value, specimens were prepared by using Marshall Method. Two types of polymers as recycling agents were used (Polyethylene of Low Density and Crumb Rubber) with (0.5, 1 and 1.5) % by weight of the binder. The indirect tensile test was used for the mixtures at 25 °C and double punch test at 60 °C. It was determined that the use of (asphalt binder mixed with rubber) as the agent of recycling showed improved performance than the other kind of recycling agent. The indirect tensile strength at 40 °C of the recycled mixture was higher than that the control mixture. Punching shear strength was decreased by 84 %, temperature susceptibility was decreased by 69.6 % and the resistance to moisture damage increases by 3.3 % at optimum asphalt content.

Keywords: Recycling; Short and Long -Term; Crumb Rubber; Polyethylene.

1. Introduction

The rheological traits of binders for the aged asphalt restoring, Recycling agents are yield with physical, chemical features by increasing molecular mobility, asphaltene to maltene ratio to be reached, improving dispersive power of the continuous maltene phase, and. Thus decreases the viscosity, stiffness, and embrittlement of the recycled asphalt, and rises the ductility [1]. The advantages derived when using recycled materials are to reduce the demand for natural resources such as aggregate and asphalt and to be cost-effective, for this reason, recycling of aged asphalt concrete pavements has been demonstrated [2]. Liquid antistripping agents was added to asphalt, and this was used to decrease the susceptibility of AC mixes to damage of moisture and at the same time reduce the interaction of the material with water and reported the effects of Liquid antistripping agents (LAS) on surface tension of bitumen, which is provided reduction in surface tension due to increase in (LAS) concentration [3]. Tran et al. (2016) studied the effect of recycling agent (RA) on performance of asphalt pavement by preparing three mixture consisted of: (a) reference mixture containing 30% RAP with an SBS-modified PG 70-22 binder with no RA; (b) 40% RAP combine with the similar PG70-22 binder with RA; and (c) 25% RAP with 5% RAS mix using an efficient PG 64-22 with RA. The volumetric traits of the three mixes and their gradations were extremely comparable, the dosages of RA were determined for the 40% RAP and 25% RAP/5%

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