



Investigating Effects of Coal Flotation Waste on Aged Hot Mix Asphalt Performance

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Abstract

The present study was an attempt to investigate the effect of fresh and old coal flotation waste (coal waste), used as asphalt filler and additive, on the properties of hot asphalt mixtures in aged and un-aged condition. In this experimental study, fresh and old coal flotation waste, obtained from the Central Alborz Coal Washing Plant, were used to produce filler specimens (100% Wt.) as substitutes for limestone powder and asphalt additive (7% w.t). Finally, the performance of the asphalt mixture containing flotation waste was evaluated using Marshall Stability and indirect tensile tests. The aforementioned compounds were used to produce specimens under short-term aging conditions and the results were compared with other results obtained under un-aged condition. The results indicate that flotation waste improved performance of hot mix asphalt under short-term aging conditions.

Keywords: Flotation Waste; Coal Waste; Aging; Asphalt Performance.

1. Introduction

The increasing demand for traffic and licit axial load calls for improvements in the materials used in pavement construction. One of the main goals of pavement designers is to construct a safe, cost-effective, durable and smooth pavement that can withstand expected traffic and loads. In order to achieve this goal, experts, researchers and engineers seek pavement materials to minimize failures and enhance pavement performance [1]. Considering the high cost of road construction, studies need to be focused on accurate designs and selection of cost effective materials that can increase the efficiency and life cycle of the roads at the same time [2]. Fillers, as one of the most important components of asphalt mixtures, play an important role in determination of asphalt mixtures' properties and performance in general, and the viscosity, aggregate interlock and filling the gap between aggregates in particular. Moreover, Fillers can affect liquidity, moisture susceptibility, stiffness, durability, fatigue life, and rutting of asphalt mixing [3]. Due to reduction of natural resources, increasing development of construction and civil activities, need for energy saving and environmental impacts, researchers are looking for a good alternative for road construction materials.

Asphalt pavements are exposed to a variety of destructive factors which lead to reduction of their shelf life over time. Considering the high cost of pavement building operations, some necessary measures should be taken to avoid asphalt destruction and mitigate pavement failures.

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