Performance of Dense Graded Asphalt Incorporating Cellulose Fiber

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ABSTRACT

In past years, cellulose fiber has been increasingly used on pavement asphalt and has become one of the causes that increases pavement strength and reduces environmental challenges, as it provides a key, sustainable alternative to other technical materials. Cellulose fiber is utilized to increase asphalt binding qualities and on-the-ground paving performance. One of the main challenges affecting dense grade asphalted surface and quality performance is the high cargo weights, which increase road usage, owing to different difficulties such as fatigue cracking and other deformations due to overload on roads. The primary objective and goal of this study is to explore the efficacy of adding cellulose fiber to asphalt utilizing a dry approach. In this study, five different percentages of cellulose fiber content were employed, which are as follows: (0%, 0.2%, 0.3%, 0.4%, and 0.5% from the total weight of aggregate). In addition to this investigation, an asphalt grade of 60/70 penetration is chosen. In order to discover the optimal modifier, the predicted performance of the modified binder is compared to that of the unmodified binder. The study is carried out utilizing Marshall stability, resilient modular tests, dynamic creep, and abrasion tests to compare the findings obtained from changed and unmodified asphalt samples. The results achieved in this research have proclaimed cellulose fiber to be an effective material to be employed as an addition to the asphalt binder because it enhances performance by enhancing paving strength and rigidity for future development.

KEYWORDS

Natural materials, Crack initiation and detection, Graded Asphalt, Cellulose Fiber

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