

Experimental Study on Moisture Sensitivity of Some Bituminous Mixes

Sandeep KR. Yadav¹ Maaz Allah Khan² Shailendra Prasad³ Sarfraz Ahsan Ahmad⁴

^{1,2,3,4} Azad Institute of Engineering and Technology, India

Abstract— Bituminous concrete mix is the most common material used for flexible pavement road construction. As 98% highways constructed in flexible pavement road. These Bituminous concrete mix is the most common material used for flexible pavement road construction, it is available easily as compare to another forms of resources and provide durability to roads.

Key words: Moisture Sensitivity, Bituminous Mixes

I. INTRODUCTION

In India most of the road constructed with flexible pavement having surfacing course with bituminous mixes also known as Asphalt Concrete. Asphalt is a highly viscous liquid or semi-Solid form of petroleum and the use of asphalt is about 70% in road construction where it is used as glue or a binder mixer to bind the aggregates particles and to create a bituminous mixes which laid down on Concretes so as to form asphalt concrete.



A. Composition

There are different components having four main compounds:

1. Naphthalene, consist of partially hydrogenated polycyclic aromatic compound
2. Polar aromatics, consisting of high molecular weight of phenols and carboxylic acid
3. Saturated hydrocarbons
4. Asphaltenes consisting of high molecular weight phenols and heterocyclic compound

II. EFFECT OF ASPHALT THICKNESS ON MOISTURE SENSITIVITY

Temperature, air and water are the common factors that affect the durability of asphalt concrete mixtures. In different weather condition problems may occur such as permanent deformation and cracking on pavement occur so as to minimize such problems we perform some different test to get exact thickness of asphalt film which help in preventing roads from atmospheric problems.

The modified Lottman Test is performed for preparing and testing asphalt concrete specimens for the purpose of measuring the effect of water on the tensile strength of the paving mixture. It evaluate the effect of

moisture with or without anti stripping additives including liquids and pulverulent solids like Portland cement, and the result obtained which is used to predict t long term stripping susceptibility of bituminous mixtures.

III. FACTORS INFLUENCING MOISTURE DAMAGE

Moisture susceptibility is a complex phenomenon of distressing in pavement and there are some factors Such as aggregate characteristics, asphalt binder characteristics, air voids, weather, climate, traffic, etc. to prevent moisture damage aggregate selection pretreat aggregate and anti-strip additives used such as chemicals and limes works.



Mostly in lime works replacement of negative ions by positive calcium ion which result in better asphalt binder aggregates adhesion and also react with molecules like asphalt binder and aggregate which result in molecules readily absorbed in on aggregate surface.

Standard test for effect of moisture on bituminous mixtures:

A. Boiling test:

Adding loose HMA to boiling water and measure the percentage of total visible area of aggregate surface that retains its asphalt binder coating.

B. Static-Immersion:

HMA sample is immersed in water for 16 to 18 hr. measure the percentage of total visible area of aggregate surface that retains its asphalt binder coating.

C. Lottman test:

This test method is used to test mixture produced in field plants and to determine the effects of additives on the mixtures under the condition of imposed field

Summary of test methods:

A. Potential for moisture damage

In this tensile splitting test is done to determine tensile strength of each subset. The potential for moisture damage is indicated by the damage in plant-producer mixtures is determined on specimen that are laboratory compacted

B. Additive effect

Anti-stripping additive is determined on a set of specimen containing an additive prepared and tested.

C. Plant-produced mixtures

The potential for moisture ratio of the tensile strength of the wet subset to that of dry subset.

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