

Small Study on Comparing the Presence of Asphaltenes and Maltenes in VG-30 Bitumen With RTFOT (Rolling Thin Film Oven Test)

S.Akhil Tej^{#1}, S.Sudheer^{*2},

^{#1} Assistant Professor, Department of Civil Engineering, G.Pullaiah College of Engineering and Technology, Andhra Pradesh India

¹akhiltej147@gmail.com

^{*2} Assistant Professor Department of Civil Engineering, Dr.K.V.Subba Reddy Institute of Technology, Andhra Pradesh India
²chinna.sudheer10@gmail.com

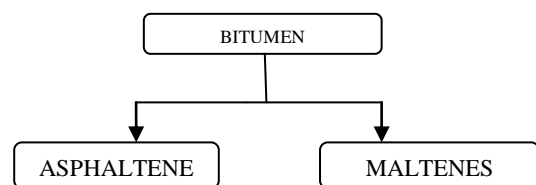
Abstract- India is a developing country and has large transport network with flexible pavements containing Bitumen on its top. The transport network is the life blood of new society, for this the bitumen ageing is the key factors for determining the life time of a pavement. process of ageing involves chemical and physical properties, the changing properties of bitumen makes the bitumen brittle and it leads to failure so knowing bitumen ageing is necessary. The present study is an attempt to focus on main properties of bitumen i.e.(Asphaltenes and Maltenes) by short term ageing by RTFOT (Rolling Thin Film Oven Test).The outcome of this study leads the comparison of bitumen properties of VG-30 aged bitumen and VG-30 un-aged bitumen with the presence of asphaltenes and maltenes with some basic tests.

Keywords— Asphaltenes, Maltenes, RTFOT

Introduction

The flexible pavements, with top bituminous layers, are more preferred in India. Bituminous binders commonly used in surface courses are unmodified binders such as VG-30 and VG-10 bitumen (depending on the climatic conditions hot or cold)

Bitumen is a result of the refining procedure of the unrefined petroleum in refineries. It is a sleek, thick and combustible material. Bitumen is a blend of for the most part hydrocarbons whose structure is all around portrayed by the colloidal model: strong particles (the asphaltenes) with a range of a couple of nanometers scattered in a slick fluid grid (the maltenes). The most important parameter describing the structure of a bitumen are thus its maltenes and its solid fraction content (or effective asphaltenes content), proportional to its asphaltenes content. Richardson recognized that hydrocarbons.



ASPHALTENES:

Asphaltenes are dark brown friable solids with highest polarity and insoluble in non-polar solvents. Bitumen with higher Asphaltenes content will have more viscosity and lower penetration. Asphaltenes represent between 5 and 20 wt. % of paving grade bitumen.

MALTENES:

Maltenes are the combination of Saturates, Aromatics, Resins. This structure generates two main mechanical transitions: reducing the temperature from the Newtonian liquid state, micelles. Lessening increasingly the temperature would create a progress to the flexible polished state as an outcome of the vitrification of the maltenes.

From the most recent couple of years the examination into bituminous materials has concentrated on low and high temperature execution, on the grounds that the mechanical properties of bituminous fasteners assume a vital part in the execution of the relating black-top blend. Bitumen must be sufficiently hard at high and sufficiently delicate at low temperatures to maintain a strategic distance from breaks because of an absence of adaptability (splitting). It is usually difficult to obtain materials that could work properly in a wide temperature range; therefore there is a different paving grade, suitable for specific applications.

EXPERIMENTATION

Bitumen is available in a variety of types and grades in this report bitumen sample of VG-30 grade is chosen and basic tests are performed along with RTFOT (Rolling Thin Film Oven Tests)

TESTS CARRIED ARE: Penetration test, Ductility test, Softening point test, Flash and Fire point test, Rolling thin film oven test.

BITUMEN AGEING

As a rule, bitumen maturing happens in two phases, to be specific here and now maturing at high temperature amid black-top blending, stockpiling and laying, and long haul maturing at surrounding temperature amid in-benefit. The instruments of maturing incorporate oxidation, vanishing and physical solidifying.

The maturing of bituminous covers is one of the key components deciding the lifetime of a black-top asphalt. The way toward maturing includes synthetic as well as physical property changes that make bituminous materials harder and more fragile, in this manner expanding danger of asphalt disappointment. The maturing related asphalt disappointment modes incorporate breaking (warm or movement initiated) and raveling. Breaks on asphalt surface may build maturing of the fastener as a result of expanded introduction zone to barometrical oxygen.

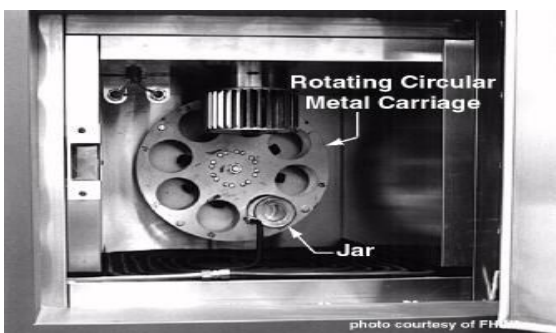


FIG: RTFOT

TABLE : 1 BASIC TESTSON BITUMEN

S.No	TEST	BEFORE AGEING	AFTER AGEING
1	PENETRATION VALUE	64	36
2	SOFTENING VALUE	47	49
3	DUCTILITY	95	32

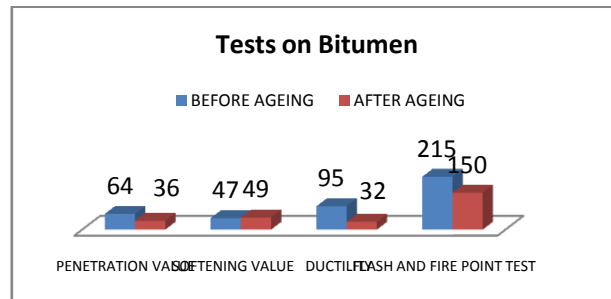
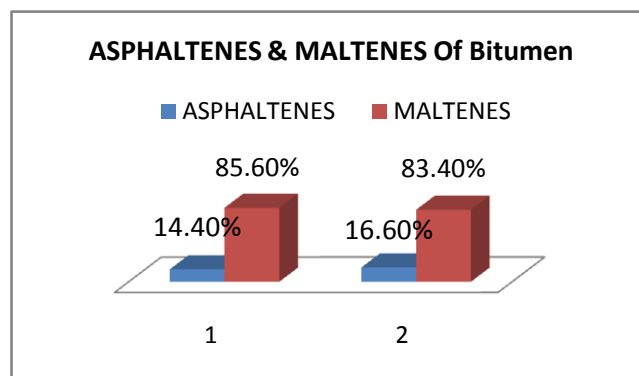


TABLE : 2 ASPHALTENES AND MALTENES

S.No	SAMPLE	BEFORE AGEING	AFTER AGEING
1	ASPHALTENES	14.40%	16.60%
2	MALTENES	85.60%	83.40%



CONCLUSION:

In this report we can conclude that ,due to ageing process of bitumen grade VG-30there is drastic change in values of penetration, softening point and flash and fire point test. Here we can absorb Asphaltenes and Maltenes have a less percentage change ,if we increase the percentage of asphaltens then strength of the bitumen will increase, so to increase the asphaltenes we need to go for modification of bitumen by physical and chemical methods.



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