

**STORAGE STABILTY AND EFFECT OF MINERAL SURFACE ON
POLYPHOSPHORIC ACID (PPA) MODIFIED ASPHALT BINDERS**

Authors

Codrin Daranga¹
Cristian S. Clopotel¹
Adekunle Mofolasayo¹
Hussain U. Bahia¹

¹University of Wisconsin – Madison
Department of Civil and Environmental Engineering
2205 Engineering Hall
1415 Engineering Dr.
Madison WI, 53706
(608) 265-4481

Word count: 2826 + (10 figures)x250 = 5326

Paper submitted for consideration for

Transportation Research Board
88th Annual Meeting
January 11-15, 2009
Washington, D.C.

ABSTRACT

Polyphosphoric acid (PPA) is a commonly used modifier for asphalt binders. Successful modification of an asphalt binder with PPA is intended to improve the high temperature stiffness of the material without negatively affecting the low temperature properties. The overall mechanism of reaction between asphalt and PPA it is not very well understood, although it seems to be generally accepted that the PPA reacts with the asphaltene fraction of the binders. This study investigates two different asphalt binders, one with high asphaltene content, and one with low asphaltene content. The selected binders are modified with PPA and mixed with two different fillers to measure the rheological properties of both the modified and unmodified binders using the Dynamic Shear Rheometer. The surface area of the samples, the high-temperature storage time, the asphaltene content of the binders, and contact with mineral surface are all important factors examined in this study. By varying these parameters, the changes in rheological behavior of the liquid binder during storage are measured and analyzed. In addition, the effect of contact with mineral surface is investigated to reflect the possible interactions that could take place in asphaltic mixtures during processing and handling at high temperature. The results indicate that surface to volume ratio can have significant effects on aging of unmodified and modified binders. The PPA modification, however, can result in more stability during storage at high temperature. There also appears to be an important influence of contact with mineral surface on the changes in rheological properties induced by the addition of PPA.