

## Moisture susceptibility of porous asphalt mixture with Nano silica modified asphalt binder

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### ABSTRACT

This paper presents the mechanical properties of porous asphalt (PA) with nanosilica (NS) modified asphalt binder in terms of its Moisture Susceptibility. This test is essential to evaluate the performance of NS-PA towards the resistance of moisture induced damage. Moisture susceptibility can be defined as the loss durability, strength and stiffness of PA due to the existence of moisture, causing the adhesive loss of binder and aggregate. It is interesting to know that the existence of nanoparticle with different proportion can affect the moisture susceptibility behavior of NS-PA. Three different percentages of nanosilica were mixed with PEN 60-70 type of binder in this study. Then, all these blended modified binder were used to prepare PA Grading B specimens using Marshall Mix Design Method. Nanoparticle used in this study was Nanosilica with the average size of 10 to 15 nanometer. In addition, Moisture Susceptibility of NS-PA was evaluated using Indirect Tensile Strength Test, based on Modified Lottman Test. From the result, the maximum TSR value obtained at 2% NS-PA, which was 91%. Meanwhile, for conventional PA (0% NS), TSR value was only 74%. In accordance to AASTHOT283, TSR value should be equal or more than 80% to withstand moisture induced damage. However, for PA, 70% TSR value is consider acceptable due to porous nature of PA that permit water to flow inside the mix. From this result, it was concluded that the optimum amount of NS required for PA to withstand moisture induced damage was 2%. Thus, with proper NS concentration, the performance of PA with NS modified binder in terms of moisture susceptibility can be enhanced.

### KEYWORDS :

Moisture; porous asphalt