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COMPLEX MODULUS OF BITUMINOUS MIXES: HOW TO INTERPRET MEASUREMENTS

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ABSTRACT

The determination of mechanical properties of bituminous mixes in the laboratory is important to provide parameters for pavement design. Among them, the complex modulus is of main importance. It allows obtaining an evaluation of the stress and strain fields in the structure.

This paper deals with some characteristics and biased effects observed when measuring the complex modulus of bituminous mixes. Three properties observed during the complex modulus test are considered:

1- Decrease of complex modulus when increasing strain amplitude: This decrease is due to the non-linearity of the behavior.

2- Decrease of complex modulus with increase of the number of cycles: This decrease is partly due to heating created by viscous dissipated energy.

3- Increase of complex modulus with increase of the average stress value for cycles having the same strain amplitude: This increase is explained by the stress dependency of modulus as it is observed for other granular materials.

The results presented in this paper are obtained with a tension compression test on cylindrical samples, which is a homogenous test. As measurements are made in the non-linear domain, the use of a homogenous test is necessary to interpret simply the results.

KEY WORDS: Complex modulus, tests, modeling, bituminous mixes