

A new quality control method for investigation formulation of a tread compound for passenger radial tires using ultrasonic wave propagation velocity

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Abstract

Pattern matching is a method that used for quality control in production lines. In this study, the pattern of ultrasonic wave propagation in rubber compounds was used. Ultrasonic test is a non-destructive test. In addition to identifying defects, non-destructive tests are used to study material characteristics such as the mechanical and structural properties. The main advantage of non-destructive tests is detecting defects and characteristics of materials without changing the test piece. In this research, this method was used to investigate passenger radial tire tread compound formulation. To investigate the radial passenger tire tread compound formulation at first 14 samples with different formulations were prepared and for each of the samples the propagation velocity of the longitudinal sound waves was measured. Another sample with a new formulation was developed and longitudinal wave velocity was measured for validation of proposed method. The validation results show that the proposed method can accurately predict longitudinal wave propagation velocity in radial passenger tire tread compounds. Thus, this method can be used for validation of compound formulation in rubber production lines.

Keywords: Non-destructive test, Ultrasonic, Rubber formulation.

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