

**DETERMINATION OF THE EFFECT OF FILLER
TYPE AND LOADING ON TEAR RESISTANCE OF
SOLID TYRE TREAD COMPOUND**

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ABSTRACT

This study aims to investigate the effect of carbon black structures on the mechanical properties mainly the tear strength of solid tire tread compounds containing Natural Rubber (NR), Styrene Butadiene Rubber (SBR) and Butadiene Rubber (BR). Different carbon black structures were used and characterized with respect to their rheological and physical properties. Experiments were performed to determine the tear strength of rubber using angle and delft tear specimens. It was found that the compounds containing high structure black, i.e., N375 showed higher tear strength and optimum physical properties such as tensile properties, hardness, abrasion resistance, rebound resilience and specific gravity. In contrast, the compounds containing N326 did not show the optimum levels of mechanical properties such as tensile properties, abrasion resistance and hardness. It was found that the carbon black grades of N375, N330 and N326, despite of different carbon black structures showed optimum rheological properties such as scorch time, cure time and cure rate index in NR/SBR/BR blend compounds. It was revealed that there is a relationship among the carbon structure, loading and the tear strength of rubber compounds. In conclusion, the best carbon black structure suitable for solid tire tread compounds is N375 with the loading of 55phr.

Key words: carbon black, solid tire tread, tear strength, rheological properties, mechanical properties.