

OPTIMIZATION THE PHYSICAL PROPERTIES OF CARBON BLACK FILLED TREAD COMPOUND BY REPLACEMENT WITH SILICA

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ABSTRACT

In tire industry, carbon black (CB) is known to be widely used filler all over the world. Being a product made out of petroleum, there would be scarcity issue with the time, if use to continue CB in which it is being used today. It is high time to look at feasibility of replacing CB with silica partially/fully with silica as a solution for foreseen scarcity. Compared to CB, there won't be scarcity as due to the fact it is made out of quartz (SiO_2) which is readily available in earth crust. In this research, an attempt has been made to study the feasibility to go for possible replacement with silica while meeting the physical property requirement of a tread compound.

Total filler amount was kept at 50 phr of constant level. Physical properties such as: tensile strength, tear strength, abrasion resistance, rebound resilience 300 % modulus, hardness and elongation were determined. Results reveal that, to optimize 100 % silica replacement need adjustment in the formulation. However overall better physical properties were resulted in 25 phr of silica/CB incorporated compound. Effective silica type was *Hi Sil 243*.

Key words: Silica, Carbon black, Vulcanizate, Tread compound, Physical properties