

**A STUDY ON VARIATIONS IN PROPERTIES OF
RUBBER BLENDS WITH DIFFERENT
ACCELERATORS**

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by

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ABSTRACT

Rubber compounds are normally used in industry for producing automobile tyres, gaskets, hoses, personal protective equipment, etc. The demands for rubber based products are increasing rapidly and therefore in economical point of view, it is very much important to reduce the unnecessary expenses in the production. There is a need to produce better quality products to satisfy the consumers' expectation. Accelerators which are used to accelerate the crosslinking reaction, influence much in the properties of compounds. It is expected that by finding the optimum accelerator for given rubber compounds such as rubber blends RSS+BR, and SBR+BR would not only reduce the unnecessary cost of materials but also provide the product a better quality.

The current research was carried out to select a suitable accelerator for the rubber blends of Ribbed Smoked Sheets (RSS) and Butadiene Rubber (BR) and Styrene butadiene rubber (SBR) and BR. The study was conducted by formulating the rubber compounds and the tests were carried out using different types of accelerators namely, N-tert-butyl-2-benzothiazyl sulfonamide (TBBS), 2-(4-Morpholiniothio) benzothiazole (MOR) and Tetramethyl thiuram monosulfide (TMTM). For each type, the tensile strength, elongation, hardness, 300% elongation, the time needed for 90% curing (t_{c90}), time required for complete curing of compound and maximum torque (MH) were measured. Higher torque is an indication of the cross-linking density of the fully vulcanized rubber. From the results it is concluded that, for the rubber blend RSS + BR, MOR shows high values for t_{c90} , tensile strength and elongation. High t_{c90} value indicates that it takes long time to reach 90% curing and with this rubber blend MOR is best to produce solid products because it takes higher curing time. But the hardness,

MH and the modulus is higher in RSS + BR with TMTM. Therefore, the accelerator must be selected by looking at the end purpose. In the case of SBR+BR, MH, modulus and hardness is higher with TMTM but the elongation and tensile strength is higher with TBBS and t_{c90} is higher with MOR. Therefore the end use matters when selecting accelerators. It can be suggested that in future, the research can be carried out by applying accelerators as a mixture for example TMTM with MOR.

Key words: Accelerators, rubber blend, curing time, vulcanize, crosslink