

A Dual Filler System for Low Speed Tire Base Compound

T.D.I.K. Gunasekara¹, R.R.M.S.K. Ranatunga², H.G.I.M. Wijesinghe¹ and A.M.W.K. Senevirathna¹

¹*Department of Export Agriculture, Uva Wellassa University, Badulla, Sri Lanka*

²*Elastomeric Engineering Co. Ltd, Horana, Sri Lanka*

The effects of the dual filler system of Carbon Black (CB) and Chopped Tire Cord (CTC) were investigated on the mechanical properties and cure characteristics of low speed tire base compound made out of Natural Rubber (NR) and Reclaim Rubber. Chopped tire cord is a cost effective filling material which is derived from the rejected pneumatic tires. To determine the composition of materials, Thermo Gravimetric Analysis (TGA) was carried out for two CTC grades as weight percentages and the grade having high amount of CB (25%) was selected and used during the study. Compounds were prepared keeping CB to CTC ratios at 65:35, 55:45, 45:55 and 35:65 in parts per hundred parts of rubber (pphr) filler loading levels. Then curing and physico-mechanical properties were investigated according to ISO standards. Mooney viscosity of the compounds was within the accepted levels of 60-85 Mooney Units. Scorch time (T_{s2}) and optimum cure time (T_{90}) have increased due to the reduction of CB content when increasing the CTC content in the compounds. However, it has improved the processing safety of the newly developed base compound. Hardness was within the accepted levels of 87-92 (Shore A) and the tensile strength was greater than 6 MPa. Tear strength and rebound resilience have improved along with the increase of CTC content. In conclusion, it is highly possible to use CTC in Base compounds of low speed tires as a cost effective filler at 65 pphr level with improved properties because the cost of CTC is well below the cost of CB.

Keywords: Carbon black, Chopped cord, TGA, Physico-mechanical properties