EFFECT OF BIOMASS BOILER WOOD ASH ON THE PHYSICAL PROPERTIES OF RUBBER COMPOUND IN THE PNEUMATIC TIRE MANUFACTURING PROCESS.

Hewa Batagodage Sameera Prabuddha Madhuranga

(199619K)

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Department of Material Science and Engineering

University of Moratuwa

Sri Lanka

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The above candidate has carried out research for the master's thesis under my supervision.

Supervise by Mr. S.V. Udayakumara

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Abstract

Processing and materials recovery of waste is an important aspect of environmental policy. Ash is waste in terms of legislation, but it is also a material that can be reused. Varius works proposed with wood ash (WA) from biomass as an inorganic fertilizer. In this study, the effect of adding biomass WA on the mechanical properties of TSR/SBR type rubber material that is used for the industrial pneumatic tire manufacturing process was investigated. The particle size of WA was observed to be 30 to 50 μm. The composition of WA was characterized by Elemental analysis, Energy-dispersive X-ray spectroscopy (EDS), and Fourier-transformed infrared spectroscopy (FTIR). Five different compounds were prepared by adding 3, 5, 8, and 10 phr WA to the filler and additive materials in the general composition. Influence of the addition of WA on the cure characteristics (minimum torque – M_L, maximum torque – M_H, Optimum cure time t_{90}, scorch time t_{S2},), mechanical properties (tensile strength at break – TS_b, elongation at break – E_b and hardness), physical, dynamic properties, and resistance to aging were investigated. The fracture surface of the compound and the shape and morphological distribution of the fillers in the rubber matrix were examined using Scanning Electron Microscopy (SEM). Production costs of the new compound proposed were compared between themselves.

As a result of experimental studies, it was found that the new compound has a good level of mechanical properties and can be used as a partial replacement of filler in the tire industry.

Key words: wood ash, Mechanical properties, compound

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