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## **Application of Rice Straw Ash as a Cheaper Filler in Rubber Compounds**

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### **ABSTRACT**

Sri Lanka is an agricultural country since ancient times and rice is the most cultivated food crop. As a result, rice straw is generated in larger quantities annually. In most cases, rice straw is discarded without using effectively. Rice straw ash contains 62% to 82% of silica. Silica is a major reinforcing filler that is used in the rubber industry. In this research, the incorporation of rice straw ash into natural rubber (NR) by using a laboratory scale two roll mill. Different ratios of rice straw ash have been incorporated with selected rubber compounds replacing the silica filler loading. Curing characteristics were determined by a dynamic rubber process analyzer. Tensile and tear strengths, hardness, and compression set properties of NR vulcanizates were determined to analyze the effect of rice straw incorporation. According to tensile test data, the sample which contains an equal amount of silica and rice straw ash filler shows the highest tensile strength of 26.09 MPa. All experimental samples have higher tensile strength values than the reference sample. The tear strength of all the rice straw ash (RSA) incorporated samples are lower than the control sample. Hardness values of rice straw ash loaded samples are lesser values compared with the reference sample and the least value is accounted for by the sample of 20phr rice straw ash filler loading. Compression set values get drastically decreased with rising the rice straw ash filler until 30 phr and again shows a slight increase of the compression set at 40 phr. The 10 – 20 phr rice straw filler loading gives optimum properties. When considering the overall results, RSA can be utilized as a cheaper filler for rubber products where tensile properties are essential such as conveyor belts. The incorporation of RSA reduced the filler cost by reducing silica filler. Rice straw ash-filled rubber product gave cost reduction and this will prevent the damage to the environment caused by burning straw.

**Keywords:** *filler, rice straw ash, rubber compounding, silica.*