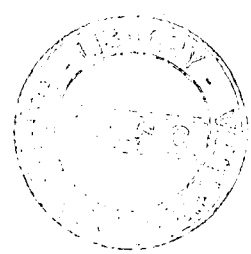
GROUND PADDY HUSK ASH AS A FILLER

FOR RUBBER COMPOUND



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M.J.F.M Fernando

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A B S T R A C T

The conversion of paddy husk an agricultural waste product at the farm level into thermal energy has become a subject of growing interest, particularly in deveoping country like Sri Lanka. The process generates thermal energy by burning the organic matter in the husk and giving substantial quantities of residual ash which is essentially silica. Depending on the conditions of burning silica in the ash can exist either in the amorphous or in crystalline form. Silica in amorphous form is known to rubber technologists as a reinforcing filler material. It was thought that this ash may be used as a reinforcing filler. Investigations were therefore carried out with the ash generated as a by-product from the husk fired furnace developed by Mr. H.I. Fernando for the curing of tobacco leaves. The dynamic burning of paddy husk in this gasification process generated white ash. X-ray diffraction studies has revealed that the silica in the white ash is in active amorphous form. The present project is aimed at determining the suitability of this ash of paddy husk as a reinforcing filler material for rubber. Visual examination of the ash indicated that a reduction of the particle size may be necessary. Therefore the ash was ball milled for 8 hrs. Particle size determination has shown that 8 hrs. grinding is inadequate and

a longer period of grinding with a dispersing agent is necessary to obtain a reinforcing filler from paddy husk ash.(PHA). Time was not adequate to do this. This ash ground for 8 hrs. was incorporated into natural rubber compounds to test its suitability as a reinforcing filler. Vulcanizate of this compound was compared with vulcanizates containing HAF, precipitated silica and industrial kaolin. The results of physical testing showed that vulcanizate containing PHA as a filler had a better resilience than vulcanizates containing precipitated silica and HAF Black. Modulus at 300% alongation was found to be superior to that given by vulcanizate containing industrial kaolin, and comparable to that given by vulcanizate loaded with precipitated silica. Tensile strength and abrasion resistance are poor. This may be due to the large particle size as revealed by the particle size analysis and hence a longer wet ball milling time is necessary.

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I wish to make a special mention that Mr.H.I Fernando the Inventor-patentee of the new husk fired furnace technology acceded to my request adjusting the furance to my temperature requirement to obtain the required amorophous

form of white ash. Infact he accompanied me to Thalagodapitiya and spent one full day of his valuable time guiding and educating me on the scope of the new technology.

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