STANDARDIZATION OF FRICTION CORDS AND ITS APPLICATION IN RUBBER FORMULATION TECHNOLOGY

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Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree
Master of Science

Department of Chemical Engineering

University of Moratuwa
Sri Lanka

July 2017

DECLARATION

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ACKNOWLEDGEMENTS

It is with a great pleasure and gratitude that I acknowledge my supervisor, Dr. Olga Gunapala for giving me the correct guidance in spite of her busy schedule and tasks.

My special thanks goes to Dr.Shantha Egodage, course coordinator for her great encouragement by giving us a good guidelines on this dissertation.

My sincere thanks to the staff of the polymer processing laboratory and the physical testing laboratory of the chemical and process engineering department in University of Moratuwa.

Board of directors of US Lanka Rubber Solutions Private Limited, Seeduwa in Sri Lanka for their permission to carry out this reaserch.

The staff of the Research and Development Department at US Lanka Rubber Solutions Private Limited for their support in conducting this research.

Mr. Kishan Jayawardena from Samjay and Sons, LLC, Ohio in USA for proving me the required information for this research.

My special gratitude and thanks to my parents and all those who helped and encouraged me in numerous ways.

Abstract

Dramatic growth in both the use and manufacturing of pneumatic tires including car, bus, truck and airplane tires have led to the accumulation of calendering scraps referred to as unvulcanized rubber friction in junkyards where they pose a fire threat and breeding sites for animals including rodents and insects spreading various diseases. These scraps appeared in bulky nature were subjected to a size reduction process in order to produce friction cords. Since calender scraps cannot undergo natural degradation, piling up of them causes definitely a huge environmental problem. Environment is benefited greatly by reusing these materials as friction cords. Additionally, rubber products manufacturers use friction cords in blends by incorporating them into their rubber compounds. Friction cords are manufactured from leftover materials and as a result they are definitely a cheap product at the market. This results in lowering the final cost of products manufactured by blending friction cords. Six samples of friction cords collected from each bulky material were tested for basic physical properties including specific gravity, hardness, tensile strength, elongation at break, moisture content and rheological properties such as t_{s2}, t_{c90}, M_L and M_H. Results obtained showed that each and every property of each bulky material varied and that variation occurred from one material to the other. Therefore the main objective of this study was to standardize friction cords by physically mixing one material with the other in different weight proportions. Results obtained for each blend/mixer showed that all tested properties including specific gravity, hardness, tensile strength, elongation at break and moisture content could be controlled within the required range and it was concluded that friction cords can be standardized by mixing them at different weight ratios. In addition, variation in rheological, physical and mechanical properties of fiber filled rubber compounds were studied by replacing nylon flocks partially and completely with friction cords. Results obtained showed that minimum torque, scorch time (t_{10}), optimum cure time (t_{c90}) decreased with the addition of increased quantity of friction cords. However, maximum torque increased with increased loading of friction cords. There was no significant change in specific gravity and elongation at break. But hardness modulus at 100 % elongation, tensile strength gradually increased with the addition of friction cords.

Keywords:

Friction cords, short fibers, standardization, rheological, physical and mechanical properties

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