

**STUDY ON THE CURE CHARACTERISTICS OF SOLID
TYRE MIDDLE COMPOUND PREPARED WITH
DIFFERENT TECHNICALLY SPECIFIED RUBBER
GRADES**

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Thesis submitted in partial fulfilment of the requirements for the degree Master of
Science in Polymer Technology

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Sri Lanka

January 2020

DECLARATION

I declare that this is my own work and this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any other University or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgment is made in the text.

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ABSTRACT

Cure characteristics of solid tyre middle compounds are critical as it combines the heel and the tread compounds. Also middle compound is subjected to have high heat build-up due to continuous deflection. In this study cure characteristics of solid tyre middle compound were investigated by preparing the middle compounds with different TSR grades. Three different grades of technically specified rubbers TSR-5L, TSR-10 and TSR-20 were used for the study. All the grades were tested for raw properties such as dirt content, ash content, nitrogen content, plasticity, plasticity retention index and viscosity. Molecular weight and molecular weight distribution of TSR grades were also compared by the frequency sweep test using rubber processing analyzer. Solid tyre middle compounds were mixed using laboratory Banbury mixer and laboratory mill machine in controlled laboratory conditions. The effect of raw rubber properties, molecular weight and molecular weight distribution of three different TSR grades on cure characteristics of solid tyre middle compound were evaluated. It can be concluded that the significant effect can be observed on cure characteristics of middle compound against TSR grades. Also molecular weight of TSR can be positively correlated with middle compound M_L value.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to my project supervisor Prof. Chandima Jayasuriya, Department of Chemistry, University of Kelaniya for the supervision of my works, guidance, support and continuous encouragement throughout the research.

I would also like to thank Prof. Shantha Walpalage, Department of Chemical and Process Engineering, University of Moratuwa for the guidance and support throughout the research.

I am also thankful to Prof. Jagath Pemachandra, Department of Chemical and Process Engineering, University of Moratuwa for the encouragement and support given as the course coordinator.

I would like to extend my sincere thanks to Mr. Susantha Rathnayake, Quality Assurance Manager-Incoming Materials in Camso Loadstar for coordinating with Thai Hua Rubber Public Company Limited and Rubber Research Institute, Sri Lanka to get relevant information and test facilities. I also thank Mr. Prageeth Madushan Fernando, Laboratory Specialist in Camso Loadstar for providing test facilities in Camso Technical Center.

I am grateful to my family members and my parents for encouraging throughout and supporting me to complete this thesis successfully.

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LIST OF ABBREVIATIONS

NR	Natural Rubber
TSR	Technically Specified Rubber
USS	Unsmoked Sheet
MW	Molecular Weight
MWD	Molecular Weight Distribution
TBBS	N-tert-butyl-2-benzothiazole sulphenamide
PVI	Pre vulcanization inhibitor
CTP	4-Chloro-3-[[3-nitrophenyl)amino]sulfonyl]-benzoic acid
ASTM	American Society for Testing and Materials
Phr	parts per hundred rubber
MDR	Moving Die Rheometer
ODR	Oscillating Disc Rheometer
M _L	Momentum Low (Minimum Torque)
M _H	Momentum High (Maximum Torque)
t _{s2}	Induction Time (Scorch Time)
t ₉₀	Optimum Cure Time
RPA	Rubber Processing Analyzer