

**OPTIMIZATION OF MIXING PARAMETERS USING
MOONEY VISCOSITY OF
TOP & BOTTOM PROFILES IN OFF THE ROAD
RUBBER TRACK COMPOUNDS**

A dissertation submitted to the
Faculty of Animal Science and Export Agriculture
Uva Wellassa University

In partial fulfilment of the requirements for the award of
Bachelor of Science in Palm & Latex Technology and Value Addition

by

USHETTIGE DONA DANUSHSHI BHAGYA MALSHANI

**Department of Export Agriculture
Faculty of Animal Science and Export Agriculture
Uva Wellassa University of Sri Lanka**

2017

ABSTRACT

Rubber tracks are used in off-the-road heavy duty vehicles. The tread of tracks consists of two layers namely top profile and bottom profile. Rubber Compound ATR 6112 (A) & Compound ETR 5271 (B) are used to manufacture top profiles, Compound TR 5237 (C) is used in bottom profile. The high Mooney Viscosity of such compounds leads to reject the batches of compounds. Therefore, compound mixing parameters were optimized during the study using Mooney Viscosity (MV). Also cure time, scorch delay and hardness of compounds were evaluated. Mixing cycle (s) defined as the time for pre-mastication and mixing of curatives. The Mixing cycle & number of mill turns were selected as the major parameters and assessed separately for compounds. Number of mill turns were varied as 3, 2 & 1 for all three compounds. Mixing cycle(s) for Compound A (40,60), (20,60), (0,50,50) & (30,70), and Compound B (20,90), (40,60), (0,50,50) & (30,80) while Compound C at (20,80), (30,70), (0,50,60), & (40,60). Complete Randomized Design with 10 replicates were used. The best mixing cycle for Compounds A & B was (0,50,50) where mixing of curatives and rubber compound together using internal mixer without allowing pre-mastication time. The best mixing cycle was achieved at (30,70) for Compound C with a lower MV. Number of mill turns has not significantly affected on MV, scorch delay, curing time & hardness of all three compounds. The scorch delay was affected by mixing cycle only in Compound B. The curing time was affected by mixing cycle in only Compound A & C. Hardness of the compounds has not significantly affected by mixing cycle. Finally, better cure characteristics of the compounds could be obtained along with reduced Mooney Viscosity by adjusting the mixing cycle.

Keywords: Mixing cycle, Mill turns, Mooney Viscosity, Rubber track