

**DETERMINATION OF FACTORS AFFECTING TO
THE HARDNESS OF THE COMPOUND USED FOR
APEX OF BEAD OF INDUSTRIAL PNEUMATIC
TYRE**

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By
**WICKRAMASINGHAGE SUMUDU SASIKA
DHARMATHILAKA**

**Palm & Latex Technology and Value Addition Degree
Programme**

Faculty of Animal Science and Export Agriculture

Uva Wellassa University of Sri Lanka

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ABSTRACT

The market for industrial pneumatic tyres created a demand for high hardness compounds for bead filler (apex) and sidewall support applications to increase the performance and load bearing capacity of the tyre. A number of different approaches have been used to increase the hardness of bead filler compounds. To obtain additional hardness for the bead filler compound phenolic reinforcing resins are used and mixing conditions are changed.

The study was conducted to find out the factors affecting to the hardness of bead filler compound and identify their appropriate values. Through that hardness was improved to the expected limit. Effect of dumping temperature and maturation time and the interaction between maturation time and dumping temperature were checked. For that intermediate mixing was done under three different dumping temperatures and kept under three different maturation time.

Obtained results were analyzed using two factor factorial analysis. There is no significant effect of dumping temperature and maturation time and also the interaction between dumping temperature and the maturation time. But 18hrs of maturation time and 110°C dumping temperature are given the highest mean hardness values.

As the second experiment HMT incorporation stage has been changed. Generally HMT is incorporated in to 2nd stage mixing but here it was incorporated in to intermediate mixing stage. Previously founded maturation time (18 hrs) and dumping temperature (110°C) were used for the 2nd experiment. Two sample t-test was applied to analyze obtained data. According to the analysis, there was a significant effect of HMT incorporation stage for the hardness of bead filler compound.

It is concluded that if there is not a significant effect of dumping temperature and maturation time there is a considerable effect of dumping temperature and maturation time for the hardness of the compound.

Key words: Bead filler, Dumping temperature, Maturation time, intermediate mixing, 2nd stage mixing.