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Development of new master batch mixing cycle for a track producing extrusion compound with lower rejection rate

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As rubber shows inherent viscous and elastic properties, mixing of compounding ingredients is the first and most important step in rubber manufacturing. If mixing does not properly happen, many problems will be appeared in the end product leading to higher rejection. Currently, Rubber compounding industry produces track producing extrusion compounds to make continuous band of tread for military, agricultural and construction vehicles around 98% rejection, due to viscosity. Therefore, the focus of this research was to develop a new master batch mixing cycle by modifying the present conditions maintained during mastication phase, carbon black incorporation phase and dispersion phase to reduce the rejection level of track producing extrusion compound. Hence, the mastication phase rotor speed (30 rpm, 40 rpm, 50 rpm), mastication phase masticate time (60s, 80s, 100s), carbon black incorporation phase rotor speed (30 rpm, 40 rpm, 50 rpm) and dispersion phase rotor speed (30 rpm, 40 rpm, 50 rpm) were changed separately to obtain the optimum conditions for each phase giving better viscosity properties of the compound. The results revealed that, the best batches could be obtained under 50 rpm rotor speed and 80s masticate time in mastication phase; 50 rpm rotor speed in carbon black incorporation phase and 40 rpm rotor speed in dispersion phase. Therefore, the new master batch mixing cycle could be considered as 50 rpm rotor speed and 80s masticate time in mastication phase; 50 rpm rotor speed in carbon black incorporation phase and 40 rpm rotor speed in dispersion phase to reduce the present rejection rate of track producing extrusion compound TR-5237.

Keywords: Master batch mixing cycle, optimum conditions, rejection rate, track producing extrusion compound, viscosity

Acknowledgement: This research was supported by Department of Export Agriculture, Uva Wellassa University of Sri Lanka and Central Mixing plant, Camso Loadstar (Pvt.) Ltd.