

**USE OF SAW DUST AS AN ALTERNATIVE FILLER  
MATERIAL IN SHOE SOLE PRODUCTION**

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## ABSTRACT

Shoe sole is one of the most common natural rubber based product in footwear industry. Natural rubber is mixed with fillers (mostly clay) to improve mechanical properties of the compound to obtain the desired properties in shoe sole. Use of these clay fillers increases the cost of production in footwear industry. So, the use of low cost material as a filler to produce similar or better quality products up to the customer's expectation is more economical. In this context, saw dust is a low cost material which is locally available and biodegradable. In shoe sole production, particle size and the loading level of filler are crucial factors in continuity of adhesion of upper sole to the outer sole and sole bending. Therefore, this study was carried out to determine the mechanical properties of sawdust added shoe sole compound with respect to different particle sizes and different loading levels. The experiment was conducted as two experiments. In the first experiment, three different (fine, medium, coarse) saw dust particle size filled compounds and clay filled (control) compound were prepared. The properties, such as cure characteristics, hardness, specific gravity, tensile strength, tear strength, flexing, modulus, elongation at break and abrasion were measured. Then, the most effective particle size was selected by comparing them with the accepted standard properties of shoe sole compound. In the second experiment, the foresaid properties were measured in six different loading levels (0/75, 25/50, 30/45, 35/40, 40/35 and 45/30phr) of saw dust with selected particle size from experiment 1 and clay, to identify the most effective loading level. According to the results, fine saw dust particle size in 25/50 phr filler loading level has obtained all the desired properties of shoe sole compound. Cost analysis shows that, by incorporating fine saw dust in 25/50 phr to the shoe sole compound as a filler material can reduce the total filler cost from 25%. So, it can be concluded that, the fine saw dust particle size in 25/50 phr filled compound is the most cost effective particle size and the loading level for shoe sole compound production.

**Key words:** Filler, Saw dust, Particle size, Loading level, Mechanical properties