

Title The Effect of Blanket Thickness on Extraction Energy in Sugarcane Rolling Mills: A Finite Element Investigation

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Abstract

Extraction of juice from shredded sugar cane is commonly performed using sets of counter-rotating rolls. Increases in crushing rate through factory mills have traditionally been achieved by increasing blanket thickness rather than roll surface speed due to loss of extraction efficiency at higher rolling speeds. Recent factory experience has shown that good extraction performance can be achieved at higher speeds than previously thought, provided that adequate drainage of expressed juice away from the rolls is provided. This study uses finite element (FE) methods to predict internal energy dissipation levels due to solid matrix deformation and liquid flow during rolling of prepared sugarcane, and to compare milling parameters for thick blanket, low-speed rolling *versus* thin blanket, high-speed rolling. The FE results suggest that higher roll speeds and thinner blankets (than those currently used in industry practice) would maintain crushing rates and juice extraction levels while reducing roll load, torque, and power consumption, and decreasing frictional sliding between rolls and cane blanket.