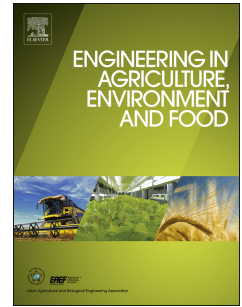


# Accepted Manuscript

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# Effect of metering device arrangement to discharge consistency of sugarcane billet planter

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## Abstract

At present, farmers who own a sugarcane harvester are becoming more interested in purchasing a sugarcane billet planter. However, the planting consistency of this type of planter is still low. Thus, its metering device should be improved. The objective of this study is to develop the shape and arrangement of the metering device of the billet planter and study its effect to the discharge consistency. The original billet metering device consists of a rubber conveyor belt with flat steel cleats that have a length equal to the conveyor width, while the developed metering device uses 20-degree inclined-edge cleats. The cleats were shortened to  $\frac{2}{3}$  of the conveyor width and aligned in left-right alternation. The developed metering device was evaluated compared with the original device, considering the precision of billet discharging during the stationary tests. The linear speed of the conveyor was controlled at 0.189 m/s. The test results showed that developed metering devices gave a precision index of 50.67%, which is 9.66% higher compared with that of the original. The developed metering device had higher torque than the first metering device and higher fluctuation.

[Keywords] planter, sugarcane, metering device, discharge consistency

## 1. Introduction

Sugarcane (*Saccharum officinarum* L.) is an important economic crop of Thailand. Referring to 2014–2015 reports, there are approximately 1.62 million ha of sugarcane in Thailand, with an average yield of 70.25 tons/ha and total sugarcane production of 113.3 million tons (Office of the cane and Sugar Board, 2015). A major problem affecting sugarcane cultivation is the shortage of labour, especially in the harvesting and planting seasons (Tangwongkit, 2003). Hence, the semiautomatic sugarcane planter was developed, and it was widely used by middle- to large-scale farmers in Thailand (Chanhorm, 2006). However, the seed cane used by this kind of planter still needs to be prepared by a large number of labourers, as its preparation process includes cutting the stalks, removing leaves, gathering, and conveying the seed cane to the semiautomatic planter. Thus,

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