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Large square baling and bale handling efficiency—A case study

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ABSTRACT

Large square baling is currently recognized as a high efficiency biomass harvesting system. Baling, bale collecting, and storing at a commercial wheat straw farm was studied as a typical large square bale harvesting system. Factors that affect large square bale production and handling logistics were quantified. Field operations of a large square baler, two bale handlers, and three bale trucks were observed in a full day field operation. System performance was analyzed and material capacities of all machines used in this system were determined based on field measurements. System limitations were quantified, and means to increase system efficiency or reduce production costs were discussed. Results showed that 340 wheat straw bales at a density of $116 \text{ kg} \cdot \text{m}^{-3}$ (wet matter) were made with a single large square baler during 8 h field operations. The number of bales produced was the system limitation when one baler, two bale handlers and three bale trucks were used. Adding a baler or reduce the number of operators can increase system efficiency. The large square baler used in this study had a material capacity of $13 \text{ Mg} \cdot \text{h}^{-1}$. Similar baling trials were conducted in a switchgrass field and results indicated that the baler had the same material capacity.

KEYWORDS

Biomass; Logistics; Material Capacity; Harvest

Cite this paper

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