ABSTRACT

SYAFRIANDI. Design and Working Performance of Sugar Cane Stubble Shaver Powered by Four Wheel Tractor. Under supervision of WAWAN HERMAWAN as chairman, RADITE P. A. SETIAWAN as member of the advisory committee

Cutting of sugar cane stubbles is an important activity in ratoon sugar cane production system. Stubble shaver powered by four wheel tractor, has been used in several sugar plantation in Indonesia. However, there were some problems encountered the application such as high power consumption; excessive blade tip wear; and low cutting quality of the stalks. The objectives of this research were: 1) to design a stubble shaver powered by PTO of four wheel tractor and 2) to analyze the influences of blade tip design, forward speed, rotation speed and tilt angle of the rotary cutting unit on cutting power and cutting quality. A sugar cane stubble shaver consisting of a rotary cutting unit with 8 blades rotated by tractor PTO, was designed and constructed. The prototype was tested to measure its working performance. The test was conducted using two types of blade tip design, on two levels of working speed (0.3 and 0.5 m s\(^{-1}\)), two levels of rotational speed (500 and 850 rpm), and two levels of blade tilt angle (45° and 60°). The test result showed that the blade tip design with increased tip radius provided a lower working torque than the conventional blade tip design with constant tip radius. The lowest working torque was provided by operating condition of working speed of 0.5 m s\(^{-1}\), blade rotating speed of 850 rpm and tilt angle of 60°. The average working torque on that condition was 22.46 Nm. However, 0.3 m s\(^{-1}\) working speed, at 850 rpm rotating speed and 45° tilt angle provided a better stubble cutting quality than the other working condition.

Keywords: cutting quality, stubble shaver, sugar cane, working condition, working torque.