WAHYU KRISTIAN SUGANDI. Design and Performance of The Unit Sugarcane Trash Cutting With Cutter Reel Type. Supervised by RADITE P.A SETIAWAN and WAWAN HERMAWAN.

The problem of sugarcane trash after harvesting is experienced by the world's sugarcane plantations, including those in Indonesia. Large amount of sugarcane trash left in the field makes difficulties in soil management and plant maintenance. Current practice done by the sugarcane plantations was “burning before soil tillage”. However, the practice of burning cause unwanted impact to the environment and human health. Meanwhile, sugarcane trash still rich of nutrients for the land. Widely studied and has been proven that many sugarcane trash is very useful to increase the soil fertility. The trash size is still long so that it should be reduced to improve composting process. A prototype of reel type trash chopper has been designed and constructed with dimensions of 240 cm width, 268 cm length, and 133 cm height. The prototype was tested on 4 levels of reel rotational speeds (400, 450, 500, and 550 rpm) and 4 levels of trash densities (8, 16, 24, and 32 kg/m³). During the tests, cutting torque and rotational speed of the reel were measured using a torque-meter and a digital tachometer. The output of trash chopping were measured to know the quality of the chopping process. The prototype chopped up sugarcane trash of about 1.7 - 3.2 cm length, with chopping capacity of 398 kg/hour. Results of the tests showed that cutting torque was in the range of 1.75 to 4.03 kg.m with the average of 2.88 kg.m, and average cutting power was 1.87 hp. Higher trash density caused a higher cutting torque and cutting power, while higher rotational speed caused a lower cutting torque and a higher cutting power. The highest cutting torque was 4.03 kg.m, when chopped sugarcane trash of 32 kg/m³ in trash density on 400 rotational speed. Increasing the rotational speed caused a shorter trash size.

Keyword : sugarcane trash cutting, rotational speeds, trash density, cutting torque, cutting power