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KARAKTERISTIK TEKNIK PEMANENAN SAWIT DAN PEMANFAATAN ENERGI POTENSIAL TANDAN BUAH SEGAR (TBS) SEBAGAI SUMBER ENERGI PENGANGKUTAN TBS

(Engineering Characteristic of Oil Palm Harvesting and Its Potential Energy for FFB Evacuation)

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ABSTRAK

Dalam panen kelapa sawit, tandan buah yang jatuh memiliki energi potensial yang cukup besar, yang dapat ditangkap dan digunakan sebagai daya penggerak angkong dalam mengevakuasi tandan buah segar (TBS). Penelitian ini dilakukan untuk mengukur karakteristik teknik panen TBS, menentukan bahan landasan terbaik untuk penangkap TBS, menganalisis potensi energi potensial TBS yang jatuh, dan merancang desain konseptual dari mesin penangkap dan pengangkut TBS. Pengukuran karakteristik panen dilakukan di perkebunan kelapa sawit. Empat jenis bahan landasan tangkapan diuji, yaitu: pelat baja, papan kayu, pelat baja *expanded* dan lembaran karet. Hasil penelitian menunjukkan bahwa, tandan jatuh pada jarak antara 0,6–1,4 m dari pohon. Berat TBS berkisar antara 16–32 kg. Bahan karet paling baik untuk penangkap TBS dalam mengurangi jumlah buah tercecer dan buah memar. Energi potensial TBS jatuh berada di kisaran 0,44–4,44 kJ. Jarak tempuh teoritis dari angkong yang menggunakan energi potensial yang ditangkap, berada di kisaran 2,27–22,98 m. Berdasarkan data pengukuran, sebuah desain konseptual mesin penangkap dan evakuasi TBS telah dirancang.

Kata kunci: Panen kelapa sawit, karakteristik teknik, energi potensial, landasan tangkapan, desain konseptual.

ABSTRACT

In oil palm harvesting, falling fruit bunches have a considerable potential energy, which can be captured and used to power the wheelbarrow in evacuating the fruit bunches. This study was conducted to measure the engineering characteristics of fruit bunches harvesting, determine the best fruit bunches catchment platform material, analyze the potential energy of falling fresh fruit bunch, and design a conceptual design of the catchment platform and evacuation machine. Measurements of the characteristics of the harvesting were done in an oil palm plantation. Four types of fruit catchment platform materials were tested, namely: steel plate, wood board, expanded steel plate and rubber sheet. The results showed that, bunches fell at a distance between 0,6–1,4 m from the tree. Fruit bunches weight was in the range of 16–32 kg. The rubber catchment platform was superior to the other materials in reducing the scattered loose fruits and bruised fruits. Potential energy of falling fruit bunches were in the range of 0,44–4,44 kJ. Theoretical traveling distance of the wheel barrow powered by the captured potential energy was in the range of 2,27–22,98 m. A conceptual design of catchment platform and evacuation machine was designed.

Keywords: Oil palm harvesting, engineering characteristics, potential energy, catchment platform, conceptual design.