

ABSTRAK

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(Perencanaan)

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Pemotongan tulang sapi merupakan proses yang masih banyak dilakukan secara manual pada usaha pengolahan daging dan rumah potong hewan. Metode tersebut membutuhkan tenaga besar, waktu yang relatif lama, serta memiliki risiko kecelakaan kerja yang tinggi. Selain itu, hasil pemotongan sering kali kurang rapi dan tidak seragam sehingga menurunkan efisiensi kerja. Oleh karena itu, diperlukan suatu alat yang mampu meningkatkan efektivitas, keamanan, dan kualitas hasil pemotongan. Penelitian ini bertujuan merancang alat pemotong tulang sapi berbasis motor listrik sebagai solusi terhadap keterbatasan metode manual. Metode yang digunakan meliputi identifikasi kebutuhan pengguna, penentuan konsep desain, pemilihan material dan komponen, pembuatan gambar teknik menggunakan SolidWorks, serta perhitungan teknis pada motor listrik, sistem transmisi sabuk-puli, dan poros. Hasil perancangan menunjukkan bahwa alat menggunakan motor listrik 1 phase 2 HP dengan putaran 1400 rpm, sistem transmisi pulley dan V-belt, poros baja, mata pisau stainless steel, serta rangka besi siku berdimensi 920 mm × 620 mm × 800 mm. Perhitungan menghasilkan torsi motor sebesar 10,24 N·m, kecepatan linier pulley 5,58 m/s, momen puntir poros 1042,86 kg·mm, dan diameter minimum poros 14,73 mm. Alat juga dilengkapi pelindung mata pisau, pendorong tulang, dan mistar ukur untuk meningkatkan keselamatan serta ketelitian pemotongan. Dapat disimpulkan bahwa rancangan alat pemotong tulang sapi ini berpotensi mempercepat proses pemotongan, menghasilkan potongan yang lebih rapi, serta mengurangi risiko kecelakaan kerja dibandingkan metode manual.

Kata kunci: alat pemotong tulang sapi, motor listrik, perancangan mesin, poros, transmisi daya, V-belt.

ABSTRACT

Design And Development Of A Beef Bone Cutting Machine (Planning)
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Beef bone cutting is a process still largely performed manually in meat processing businesses and slaughterhouses. This method is labor-intensive, time-consuming, and carries a high risk of workplace accidents. Furthermore, the resulting cuts often lack neatness and uniformity, thereby reducing operational efficiency. Consequently, there is a need for a device capable of enhancing effectiveness, safety, and the quality of the cuts. This study aims to design an electric motor-driven beef bone cutter as a solution to the limitations of manual methods. The methodology employed includes identifying user requirements, determining the design concept, selecting materials and components, creating technical drawings using SolidWorks, and performing technical calculations for the electric motor, belt-pulley transmission system, and shaft. The design features a 2 HP single-phase electric motor (1400 rpm), a pulley and V-belt transmission system, a steel shaft, a stainless steel blade, and an angle iron frame measuring 920 mm × 620 mm × 800 mm. Calculations yielded a motor torque of 10.24 N·m, a pulley linear speed of 5.58 m/s, a shaft torsional moment of 1042.86 kg·mm, and a minimum shaft diameter of 14.73 mm. The device is also equipped with a blade guard, a bone pusher, and a measuring guide to enhance safety and cutting precision. It is concluded that this beef bone cutter design has the potential to accelerate the cutting process, produce neater cuts, and reduce the risk of workplace accidents compared to manual methods.

Keywords: beef bone cutting tool, electric motor, machine design, power transmission, shaft, V-belt.