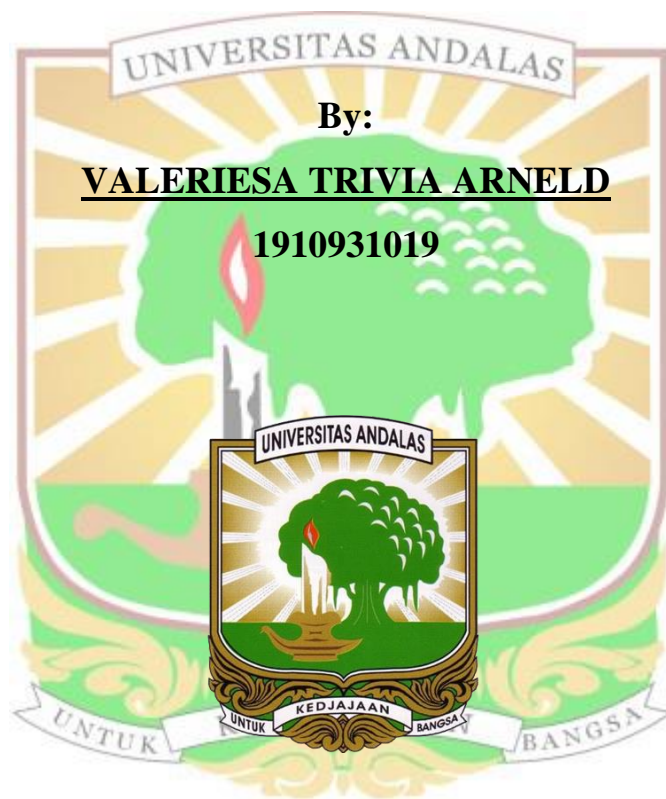


**COMPONENT REPLACEMENT PLANNING
FOR THE DIGESTER AND SCREW PRESS MACHINE
AT PT SMART TBK PADANG HALABAN MILL**

FINAL PROJECT



By:

VALERIESA TRIVIA ARNELD

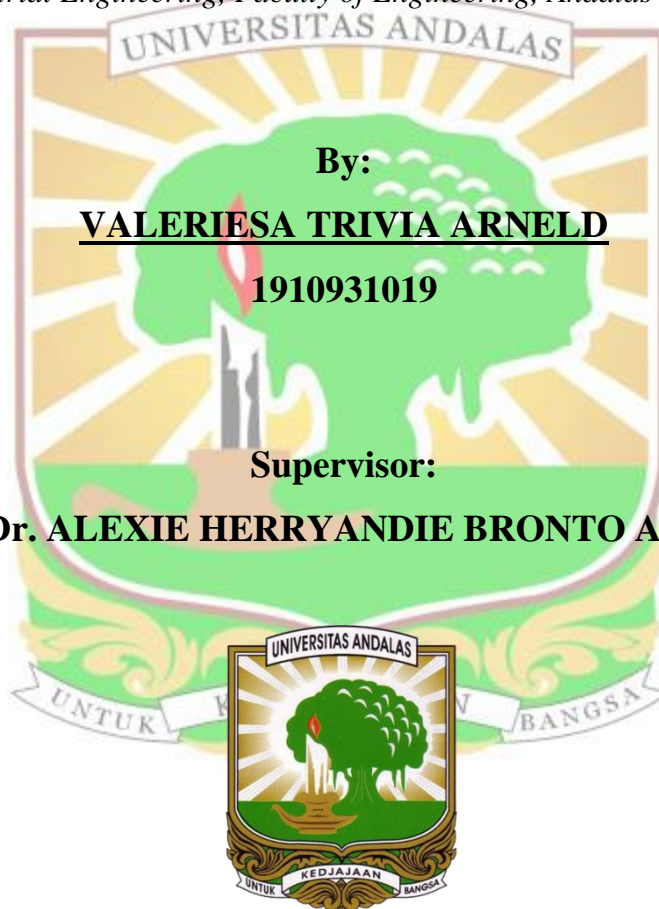
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**DEPARTMENT OF INDUSTRIAL ENGINEERING
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*Submitted to Fulfill One of the Requirements for Obtaining a Bachelor's Degree
in Industrial Engineering, Faculty of Engineering, Andalas University*



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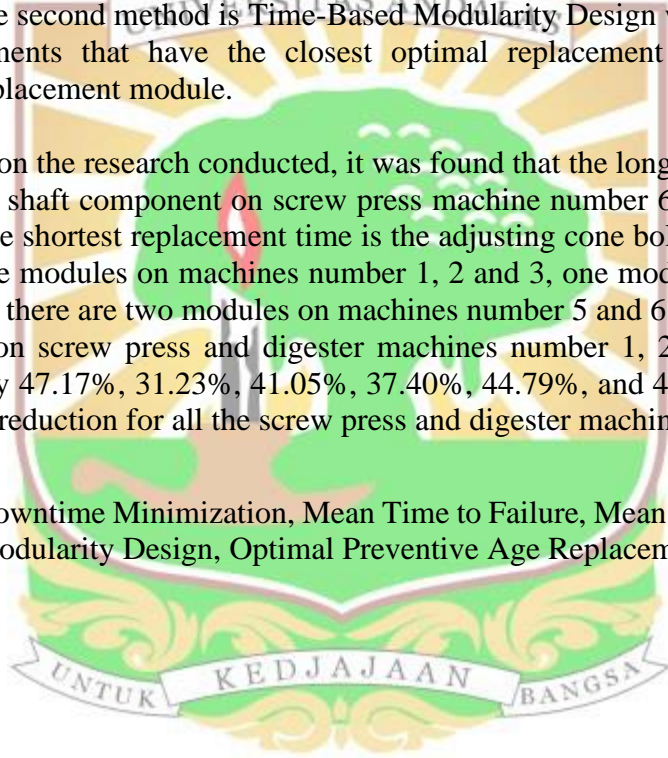
ABSTRACT

PT SMART Tbk Padang Halaban Mill (PHLM) is one of the palm oil mills owned by PT SMART Tbk which is engaged in the processing of Fresh Fruit Bunch (FFB) into Crude Palm Oil (CPO) and Palm Kernel (PK) with production capacity as 60 tons/hour. Machine failures when the machine is operating which causes PHLM to have to carry out corrective maintenance still often occur, especially on digester machines and screw press machines. Therefore, this research aims to obtain a preventive replacement plan that can minimize downtime.

There are two methods used in this research. The first method is Optimal Preventive Replacement Age to Minimize Downtime which is used to determine the optimal component replacement time with the aim of minimizing machine downtime. The second method is Time-Based Modularity Design which is used to group components that have the closest optimal replacement time into one component replacement module.

Based on the research conducted, it was found that the longest replacement time is for the shaft component on screw press machine number 6 as 4400 hours. Meanwhile, the shortest replacement time is the adjusting cone bolt for 240 hours. There are three modules on machines number 1, 2 and 3, one module on machine number 4, and there are two modules on machines number 5 and 6. The reductions in downtime on screw press and digester machines number 1, 2, 3, 4, 5 and 6 respectively by 47.17%, 31.23%, 41.05%, 37.40%, 44.79%, and 42.96%. Overall, the downtime reduction for all the screw press and digester machine is 40.83%.

Keywords: Downtime Minimization, Mean Time to Failure, Mean Time to Repair, Modularity Design, Optimal Preventive Age Replacement



ABSTRAK

PT SMART Tbk Padang Halaban Mill (PHLM) merupakan salah satu pabrik minyak kelapa sawit milik PT SMART Tbk yang bergerak dalam bidang pengolahan Tandan Buah Segar (TBS) menjadi Crude Palm Oil (CPO) dan Palm Kernel (PK) dengan kapasitas produksi 60 ton/jam. Kegagalan mesin pada saat mesin beroperasi yang menyebabkan PHLM harus melakukan pemeliharaan korektif masih sering terjadi terutama pada mesin digester dan mesin screw press. Oleh karena itu, penelitian ini bertujuan untuk mendapatkan rencana penggantian preventive yang dapat meminimasi downtime.

Terdapat dua metode yang digunakan dalam penelitian ini. Metode pertama yaitu Optimal Preventive Replacement Age to Minimize Downtime yang digunakan untuk menentukan waktu penggantian komponen yang optimal dengan tujuan meminimasi downtime mesin. Metode kedua yaitu Time-Based Modularity Design yang digunakan untuk mengelompokkan komponen-komponen yang memiliki waktu penggantian optimal terdekat menjadi satu satu modul penggantian komponen.

Berdasarkan penelitian yang dilakukan didapatkan adanya waktu penggantian terlama yaitu pada komponen shaft pada mesin screw press nomor 6 selama 4400 jam. Sedangkan waktu penggantian terpendek yaitu baut adjusting cone selama 240 jam. Terdapat tiga modul pada mesin nomor 1,2 dan 3, satu modul pada mesin nomor 4, dan terdapat dua modul pada mesin nomor 5 dan 6. Pengurangan downtime pada mesin screw press dan digester nomor 1, 2, 3, 4, 5 dan 6 masing-masing sebesar 47.17%, 31.23%, 41.05%, 37.40%, 44.79%, dan 42.96%. Secara keseluruhan, pengurangan downtime pada seluruh mesin screw press dan mesin digester adalah sebesar 40.83%.

Kata Kunci: Mean Time to Failure, Mean Time to Repair, Minimasi Downtime, Modularity Design, Optimal Preventive Age Replacement