

ABSTRAK

SUSTAINABLE AGGREGATE PLANNING DENGAN TABU SEARCH ALGORITHM UNTUK MEMINIMALKAN BIAYA OPERASIONAL, PENGGUNAAN LISTRIK, PERUBAHAN TENAGA KERJA, DAN MENINGKATKAN SERVICE LEVEL

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Aggregate Planning menjadi salah satu tahapan perencanaan yang bertujuan dalam mengoptimalkan efisiensi penggunaan sumber daya yang diperlukan untuk memenuhi permintaan pelanggan. Seiring dengan perkembangannya, *Aggregate Planning* dirasa dapat mengatasi masalah perencanaan produksi yang meliputi upaya perusahaan dalam membentuk kemampuan *sustainable* melalui perspektif yang lebih baik, yaitu dengan menerapkan konsep *sustainability* yang mencakup tiga aspek, yakni ekonomi, lingkungan, dan sosial. Pada penelitian ini, aspek *sustainability* dipertimbangkan ke dalam model *Aggregate Planning* dengan tujuan untuk meminimalkan kerugian pada aspek *sustainability* melalui upaya meminimalkan biaya operasional, penggunaan energi listrik, perubahan tenaga kerja, dan memaksimalkan *Service Level*. Model dikembangkan dalam bentuk *Goal Programming* untuk memodelkan beberapa fungsi tujuan sehingga dapat diselesaikan secara bersamaan dan mempertimbangkan permintaan bersifat *fuzzy* serta diimplementasikan menggunakan metode *Tabu Search Algorithm* untuk menghasilkan solusi terbaik. Model diimplementasikan pada PT HEW yang merupakan produsen berbagai macam obat dan suplemen kesehatan herbal. Hasil implementasi perencanaan agregat pada dua *family product* menghasilkan penurunan biaya sebesar 5,54% dan 4,34%, penurunan penggunaan energi listrik sebesar 5,76% dan 3,54%, serta meminimasi perubahan tingkat tenaga kerja dan memaksimalkan pemenuhan permintaan.

Kata kunci : *Aggregate Production Planning, Metaheuristic Optimization, Sustainability, Tabu Search Algorithm*

ABSTRACT

SUSTAINABLE AGGREGATE PLANNING WITH TABU SEARCH ALGORITHM TO MINIMIZE OPERATIONAL COSTS, ELECTRICITY USAGE, LABOR CHANGES, AND IMPROVE SERVICE LEVELS

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Aggregate planning is one of the planning stages aimed at optimizing the efficient use of resources needed to meet customer demand. Along with its development, Aggregate Planning is considered to be able to overcome the problem of production planning, which includes the company's efforts in shaping sustainable capabilities through a better perspective, namely by applying the concept of sustainability which includes three aspects, namely economic, environmental and social. In this study, the sustainability aspect is considered in the aggregate planning model with the aim of minimizing losses in the sustainability aspect through efforts to minimize operating costs, electrical energy consumption, labor changes, and maximize the Service Level. The model was developed in the form of Goal Programming to model multiple objective functions so that they can be solved simultaneously and take into account fuzzy demand, and implemented using the Tabu Search Algorithm method to produce the best solution. The model was implemented at PT HEW, which is a manufacturer of various medicines and herbal health supplements. The results of the implementation of aggregate planning on two Family Products resulted in a decrease in costs by 5.54% and 4.34%, a decrease in electrical energy consumption by 5.76% and 3.54%, as well as minimizing changes in labor rates and maximizing demand fulfillment.

Keywords : *Aggregate Production Planning, Metaheuristic Optimization, Sustainability, Tabu Search Algorithm*