PENENTUAN RUTE DISTRIBUSI UNTUK MEMINIMALKAN BIAYA MENGGUNAKAN METODE *ALGORITMA CLARKE AND WRIGHT SAVINGS*, DAN *SEQUENTIAL INSERTION* DI PABRIK ROTI AZHARI

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Abstrak

Efisiensi distribusi merupakan aspek krusial dalam operasional Pabrik Roti Azhari untuk menekan biaya dan meningkatkan kepuasan pelanggan. Penelitian ini bertujuan mengoptimalkan rute distribusi dengan membandingkan dua metode yaitu *Clarke and Wright Savings* dan *Sequential Insertion*, pada 20 titik pengiriman. data pengiriman real menunjukkan rute awal memiliki jarak tempuh 140 km yang dianggap kurang efisien. dengan menerapkan metode *Clarke and Wright Savings*, jarak tempuh berhasil dikurangi menjadi 131 km menghasilkan penghematan sebesar 9 km atau sekitar 6,43%, sedangkan metode Sequential Insertion menghasilkan jarak 134,1 km. menghasilkan penghematan distribusi sebesar 5,9 km atau sekitar 4,21%. Selain itu, optimalisasi rute ini juga berdampak positif pada pengurangan konsumsi bahan bakar, hasil dari konsumsi bahan bakar awal sebesar Rp. 41.000 maka penerapan dengan metode *Clarke and Wright Savings* berhasil menurunkan konsumsi bahan bakar menjadi Rp. 38.400 sedangkan untuk metode *Sequential Insertion* mengurangi konsusmsi bahan bakar sebesar Rp. 39.400 sehingga meningkatkan efisiensi operasional dan kepuasan pelanggan. Hasil penelitian ini memberikan kontribusi penting bagi Pabrik Roti Azhari dalam pengambilan keputusan distribusi dan dapat dijadikan acuan bagi industri sejenis dalam mengelola logistik secara lebih efektif dan efisien.

Kata kunci : Efisiensi distribusi, *Clarke and Wright Savings*, *Sequential Insertion*

DISTRIBUTION ROUTE DETERMINATION TO MINIMIZE COST USING ALGORITHM OF CLARKE AND WRIGHT SAVINGS AND SEQUENTIAL INSERTION METHOD AT AZHARI BREAD FACTORY

Abstract

Distribution efficiency is a crucial aspect in the operation of Azhari Bread Factory to reduce costs and increase customer satisfaction. This study aims to optimize distribution routes by comparing two methods, namely Clarke and Wright Savings and Sequential Insertion, at 20 delivery points. The real delivery data show the initial route was 140 km, which is considered less efficient. By applying the Clarke and Wright Savings method, the distance is successfully reduced to 131 km resulting in savings of 9 km or around 6.43%, while the Sequential Insertion method results in 134.1 km. It results in distribution savings of 5.9 km or around 4.21%. In addition, the optimization of this route also has a positive impact on reducing fuel consumption. The initial fuel consumption was Rp. 41,000, then the application of the Clarke and Wright Savings method manages to reduce fuel consumption to Rp. 38,400. While the Sequential Insertion method reduces fuel consumption by Rp. 39,400, thereby it increases operational efficiency and customer satisfaction. The results of this study provide an important contribution to the Azhari Bread Factory in making distribution decisions and can be used as a reference for similar industries in managing logistics more effectively and efficiently.

Keywords*: Distribution efficiency, Clarke and Wright Savings, Sequential Insertion*

DAFTAR PUSTAKA

Afandy, F. R., & Fayaqun, R. (2023). Optimasi Pendistribusi Barang Dengan Metode Clarke And Wright (Saving Heuristic) Dan Metode Nearest Neighbour. *Jurnal Locus Penelitian dan Pengabdian*, *2*(8), 833-845.

Aina, N., & Marbun, J. P. (2023). Penyelesaian Vehicle Routing Problem Dengan Algoritma Clarke And Wright Savings Di Perumahan Umum Bulog Medan Amplas. *Jurnal Riset Rumpun Matematika Dan Ilmu Pengetahuan Alam*, *2*(1), 87-101.

Anjarwati, S. A. D., & Rahmi, D. (2024). Optimalisasi Rute Ristribusi Depot Aisuke Dengan Algoritma Clarke & Wright Savings. *Matematika Sains*, *2*(1), 1-8.

Arifin, R., & Liputra, D. T. (2023). Pemecahan Asymmetric Capacitated Vehicle Routing Problem With Time Windows (Acvrptw) Dengan Algoritma Sequential Insertion (si) Dan Ant Colony Optimization (Aco). *Jurnal Rekayasa Sistem Industri*, *12*(2), 273-280.

Dahniar, T. (2020). Khairunnisa, "Optimalisasi Distribusi Menggunakan Vehicle Routing Problem (Vrp) Dengan Pendekatan Nearest Neigbour Studi Kasus Produk Salad," Pros.

Damayanti, D. K., Purnamasari, I., & Wasono, W. (2021). Penentuan Rute Terpendek dengan Menggunakan Metode Algoritma Clarke and Wright Savings. Eksponensial, 12(1), 65-72.

Delecluse, A., Schaus, P., & Van Hentenryck, P. (2022). Sequence Variables For Routing Problems. In *28th International Conference On Principles And Practice Of Constraint Programming (cp 2022)* (pp. 19-1). Schloss Dagstuhl–leibniz-zentrum für informatik.

Fitriani, N. A., Pratama, R. A., Zahro, S., Utomo, P. H., & Martini, T. S. (2021, february). Solving Capacitated Vehicle Routing Problem Using Saving Matrix, Sequential Insertion, And Nearest Neighbor Of Product 'x'in Grobogan District. In *Aip Conference Proceedings* (vol. 2326, no. 1). Aip Publishing.

Hariati, A., Prasetya, N. H., & Cipta, H. (2021). The Effectiveness Of Clarke Wright And Sequential Insertion Algorithm In Distribution Routing Aqua. *Quadratic: Journal Of Innovation And Technology In Mathematics And Mathematics Education*, *1*(1), 15-22.

Kiefer, D., Grimm, F., Bauer, M., & Van Dinther, C. (2021). Demand Forecasting Intermittent And Lumpy Time Series: Comparing Statistical, Machine Learning And Deep Learning Methods.

Kurniawan, R. D., & Nugroho, Y. A. (2022). Optimasi Distribusi Alat Kesehatan Steril Dan Non Steril Menggunakan Metode Saving Matriks And Algoritma Clarke Studi Kasus: Pt Multitama Sarana Indonesia (Msi). Jurnal Cakrawala Ilmiah, 1(6), 1429-1452.

Kusuma, R. P., Kurniawati, D. A., Kristanto, D., Yusof, N. M., & Wong, K. Y. (2021). Optimizing Distribution Route Of Packed Drinking Water With The Clarke And Wright Savings And Nearest Neighbor Methods (Case Study Of pt. Gsi). *Journal Of Industrial Engineering And Halal Zindustries*, *2*(2), 77-84.