

## Optimasi rute distribusi produk perusahaan cat menggunakan metode vehicle routing problem = Optimization of paint company products distribution routes using vehicle routing problem method

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### Abstrak

Saat ini Indonesia menjadi pasar terbesar bagi industri cat di wilayah Asia Tenggara sejak periode tahun 2021, dengan tingkat urbanisasi sebesar 57,3%. Kondisi backlog rumah di Indonesia saat ini tergolong masih sangat tinggi, yaitu mencapai 11,4 juta berdasarkan kepemilikan rumah, adapun rasio angka pernikahan baru yang tinggi serta pertumbuhan middle class menyebabkan jumlah permintaan rumah serta kepemilikan properti pun semakin bertambah. Tren positif peningkatan jumlah permintaan rumah dan kepemilikan properti ini menjadi suatu kabar baik bagi banyak industri yang menyokong keberlangsungan pembangunan infrastruktur, termasuk industri cat. PT X merupakan salah satu perusahaan produsen cat yang memiliki fasilitas cabang (depot distributor) di Kota Cirebon yang masih menggunakan sistem pengiriman langsung dan belum menggunakan model optimasi, sehingga seringkali proses distribusi melebihi dari waktu operasional yang tersedia. Selain itu, PT X Cirebon juga mengalami kendala seperti terbatasnya jumlah kendaraan, waktu pendistribusian yang terbatas, serta lokasi pelanggan yang tersebar dan berjauhan. Dalam penelitian ini, peneliti menggunakan pendekatan Vehicle Routing Problem (VRP) dengan tujuan menghasilkan rute distribusi yang memiliki total jarak dan waktu perjalanan terpendek dalam memenuhi permintaan pelanggan serta menggunakan kendaraan yang seminimal mungkin, sehingga dapat meminimalkan biaya transportasi secara keseluruhan. Hasil dari perhitungan optimasi yang dijalankan yaitu terdapat beberapa perubahan; diantaranya dapat menurunkan jarak tempuh dan waktu tempuh kendaraan masing-masing hingga 23% dan 22%, serta menghasilkan total penghematan hingga Rp3.682.311 pada beberapa skenario yang telah ditentukan.

Currently, Indonesia is the largest market for the paint industry in the Southeast Asia region since 2021, with an urbanization rate of 57.3%. The condition of the home backlog in Indonesia is currently still very high, reaching 11.4 million based on home ownership, while the ratio of the high number of new marriages and the growth of the middle class has caused the number of demand for houses and property ownership to increase. This positive trend of increasing the number of demand for houses and property ownership is good news for many industries that support the sustainability of infrastructure development, including the paint industry. PT X is one of the paint manufacturing companies that has a branch facility (distributor depot) in Cirebon City that still uses a direct delivery system and has not used an optimization model, so often the distribution process exceeds the available operational time. In addition, PT X Cirebon also experienced obstacles such as the limited number of vehicles, limited distribution time, and customer locations that scattered and far apart. In this study, researchers used a Vehicle Routing Problem (VRP) approach with the aim of producing distribution routes that have the shortest total distance and travel time in meeting customer demand and using vehicles to a minimum, so as to minimize overall transportation costs. The result of the optimization calculations carried out is that there are several changes; among other things, it can reduce the mileage and travel time of vehicles by 23% and 22%, respectively, and result in total savings of up to Rp3,682,311 in several

predetermined scenarios.</span><br style="font-variant-numeric: normal; font-variant-east-asian: normal; line-height: normal; text-align: -webkit-auto; text-size-adjust: auto;" /> </p>