ABSTRACT

PT. XYZ is a company engaged in providing supply chain solutions, with a primary focus on the logistics sector. One of the key areas in the company's operations is the warehousing division, particularly the distribution and transportation department, which is responsible for managing and delivering goods to various customer locations. This study focuses on the distribution of battery products, which are among the company's main commodities. The main issue in the current distribution process lies in the lack of accurate planning for delivery routes. This leads to increased operational expenses, especially in terms of fuel consumption. Deliveries are carried out to 10 customers located in the Jabodetabek area using three delivery trucks. All vehicles are homogeneous in type, each with a load capacity of 5 tons. Based on the delivery data recorded between November 4 and 8, 2024, the total fuel cost incurred by the company reached Rp5,249,600. This amount exceeded the budget or cost limit set by the company, which was Rp4,500,000. The difference between the actual cost and the target cost amounted to 16.66%. This shows that the company is spending considerably more than expected during the distribution process. To address this problem, this study applies the Capacitated Vehicle Routing Problem (CVRP) modeling approach, combined with the Saving Matrix method. CVRP is a planning approach for vehicle routing that takes into account the load capacity constraints of each vehicle. The Saving Matrix method is used to identify combinations of delivery points that can be grouped together based on the reduction in travel distance between customer locations. In the proposed routing, each vehicle is designed to depart from the depot, visit several customers according to its maximum load capacity, and return to the depot. The goal of this approach is to build a delivery path that reduces the total number of trips and the overall travel distance, thereby lowering fuel consumption. The results show that fuel costs can be reduced from the initial condition. From the original fuel cost of Rp5,249,600, the new total cost after applying the CVRP model and Saving Matrix method is Rp3,950,800. This figure is not only below the company's budget of Rp4,500,000 but also results in a saving of Rp1,298,800, or approximately 24.74%, compared to the original condition. Based on these results, it can be concluded that the implementation of this method can

assist the company in developing a better delivery route plan. The newly designed delivery paths help reduce fuel expenses and support the company in achieving its distribution goals with lower resource usage.

Keywords: *Delivery Route Optimization, VRP, CVRP, Saving Matrix, Cost Minimization, Distance Minimization.*