

ABSTRACT

Transportation can be defined as the movement of goods from one location to another. In other words, it describes the goods' flow until the goods reach the hands of the customer. Transportation has an essential role in the supply chain process because it determines whether the goods arrive at customers. The distribution process is also inseparable from the transportation process. The distribution process has a vital role in the process of distributing goods to customers. There are types of last-mile delivery in the distribution process, which play an important role in the transportation process.

XYZ is a distribution company engaged in food distribution, especially in the rice sector, located in Cimahi City, West Java. XYZ company has 31 customers scattered in Bandung. The activity carried out by XYZ company are transporting and distributing goods from their distribution center (DC) to end customers daily. While transporting products to customers, several delays reduce the customer service level.

In this study, it will be determined the route that will be used in distributing goods to customers with the characteristics of the problem is the Vehicle Routing Problem with Heterogeneous Fleet and Time Window by applying the Mixed-integer Linear Programming model to minimize delays and transportation costs.

Based on the several-day delivery plan experiment, the proposed delivery plan generated mechanism can reduce the delivery lateness to zero. Furthermore, it also reduces 16.75% of overall travel time in average and transportation cost by about 4.14% in overall.

For further research, it is possible to develop a real system approach, namely by considering congestion, weather conditions to get optimal results. Research can also be developed by using another algorithm and software that is better at processing data with many variables with a shorter computation time.

Keywords— Vehicle Routing Problem, Time Window, Heterogeneous Fleet, Mixed-integer Linear Programming.