

ABSTRACT

Distribution is the steps used to move and store products from suppliers to customers in the supply chain. The distribution of vegetables in Indonesia is still constrained by the guarantee of continuity between product quality, the minimum amount of supply, and the timeliness of delivery. Time is a very crucial factor in the distribution of vegetables because vegetables are commodities that experience a rapid decline in quality, so they must reach consumers at the right time.

PT ABC is a company engaged in the distribution of fresh fruit and vegetables. In running its business, PT ABC plays a role in post-harvest handling where PT ABC will receive and sort fresh harvested vegetables from various suppliers and then distribute them to various regions according to consumer demand. The problems faced by PT ABC in distribution activities lies in the existence of delays in the delivery of goods which results in losses for the company because the types of commodities distributed have a fast shelf life. This delay problem can be minimized by optimizing the distribution network so that delivery delays do not occur again.

In this final project, a delivery route design will be carried out to deliver or distribute vegetables or fruit to customers spread across West Java. Characteristics of the problems contained in this final project are *Vehicle Routing Problem with Heterogeneous Fleet and Time Window*. The model that will be used to solve this problem is the *Mixed Integer Linear Programming* model with the main objective to minimize transportation costs and minimize delivery delays.

The result of this final project is the proposed route along with the selected fleet to carry out distribution activities. The proposed route obtained shows a decrease in the number of delays and the total cost of transportation. The decrease in the number of delays on the proposed route has an average value of 0% of the total shipments for one month, this percentage is lower than the average delay using the existing route which has a value of 5% of the total shipments for one month. The proposed route also shows a reduction in the total cost of transportation. By using

the proposed route, the total transportation cost can be reduced by 4% of the total cost by using the existing route.

Keywords: Distribution, *Mixed Integer Linear Programming*, *Vehicle Routing Problem*, Transportation.