

CHAPTER V

DISCUSSION

5.1 Result Discussion

This research has objective to find the set of a routes for HFFVRP that minimize the summation of fixed cost and variable cost of vehicles used. Holmes and Parker algorithm is used to determine the routes that appropriate with research object.

The result from the data processing and analyzing in chapter IV, the total cost that produced from summation of fixed cost (driver wages, maintenance, and insurance) and variable cost (the fuel consumption of each vehicle) in a month that must be spent by the company for implements current routes is IDR 3.701.590 per month.

The optimization process begins with converting the data collected so that can be formulated into mathematical formulation of HFFVRP. Then the Holmes and Parker algorithm then applied by using Microsoft Excel 2007. The route generation by Holmes and Parker algorithm has three times of improvement. First improvement is initial solution with total cost that spent by the company IDR 3.641.586 per month. Then initial solution is improved by the eight suppression which produced total cost IDR 3.640.978 per month. The last improvement is in the sixteenth suppression which improved the eight suppression solution with total cost IDR 3.628.187 per month. The best solution that can be reached by Holmes and Parker algorithm is in the sixteenth

suppression with the routes are; Truck: Depot- Taji Nasrudin- Budi Sondakan- Agus- Maju Mapan- RS Yarsis- Londo- Bandara- Depot, Panther: Depot- Palang Kereta Hotel Agas- Iskak- Kendali- Matahari- Teguh- Muhammad dkk- Indomet- Prasasti- ABC-Sendang Mulia- Surya- Hadi S- Depot.

The Holmes and Parker algorithm used the lowest vehicle first to build the route until the capacity is full. It will affect the last vehicle chosen usually the largest vehicle capacity one will get low of utilization, as in this research the utilization of panther is 100 percents while the truck is only 48,6 percents. It happens because the ration of the total demands and total vehicle capacity is not 1 but 0,71 (46:64). If the ration of total demand and total vehicle capacity is 1, it will give a hundred percents of vehicle utilization. But when the ratio is 1, there is also probability of infeasible solution occurs especially if the demands of customers are in vary number, not in homogeny number. The balancing of vehicle utilization can be achieved by modified the constraint capacity (equation 3.6) from a hundred percents becomes only 90 or 80 percents of capacity utilization so that the ration of total demands with total vehicle capacity is closely to 1. The effect of this modification will lead to the different result produced (from the hundred percents of capacity utilization) because capacity can influence the vehicle route making.

The Holmes and Parker algorithm can solve a HFFVRP in designing routes that minimized the total cost. The result shows that by using Holmes and Parker algorithm the vehicle routes is better than the current routes implemented by the company. The difference between two routes is IDR 73.403 per month with the new vehicle routes total cost is IDR 3.628.187 per month. The new vehicle routes created

by Holmes and Parker algorithm are: Truck: Depot- Taji Nasrudin- Budi Sondakan- Agus- Maju Mapan- RS Yarsis- Londo- Bandara- Depot, Panther: Depot- Palang Kereta Hotel Agas- Iskak- Kendali- Matahari- Teguh- Muhammad dkk- Indomet- Prasasti- ABC-Sendang Mulia- Surya- Hadi S- Depot. The impact of difference total cost between two routes also gives difference in distance travelled by every vehicles. The current route gives distance to the truck 26.092 meters in a day and panther 29.725 meters in a day. The new route gives distance to the truck 24.755 meters in a day and panther 25.959 meters in a day. The differences are 1.337 meters for truck and 3.766 meters for panther.

