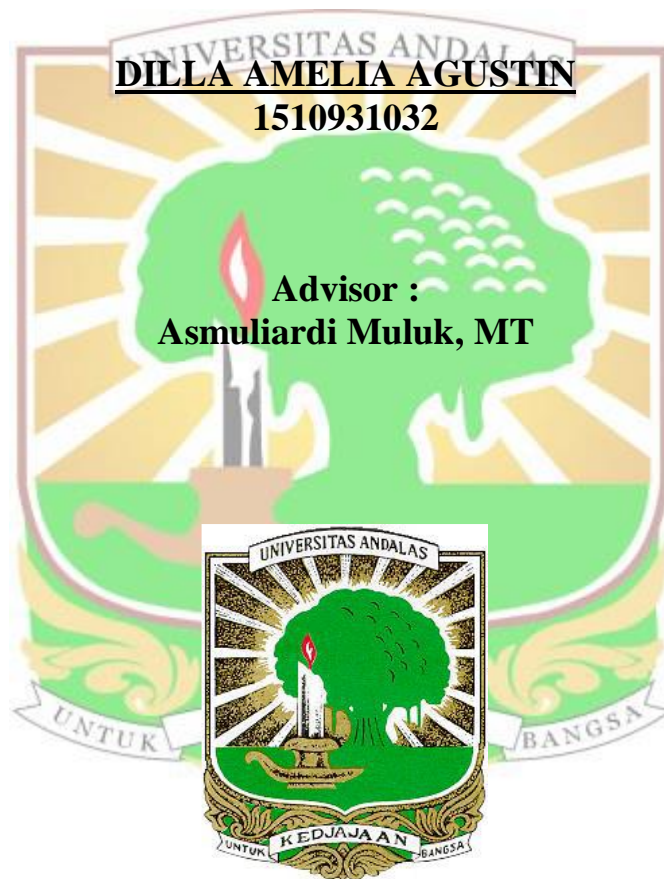# VEHICLE ROUTING FOR RASKIN DISRIBUTION IN PADANG PARIAMAN REGENCY

FINAL PROJECT REPORT

As a requirement to fulfill bachelor degree in Industrial Engineering Department, Faculty of Engineering, Andalas University

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PADANG
2019

ABSTRACT

Bulog Divre West Sumatera is operational Divre, which has two Subdivre, i.e. Subdivre Bukittinggi dan Subdivre Solok. Bulog Divre West Sumatera has five working areas, and these are Padang, Padang Pariaman, Pariaman, Pesisir Selatan, and Mentawai. Bulog Divre West Sumatera has a warehouse located in Bypass Pampangan. GBB Pampangan has a responsibility to distribute Raskin in Padang, Pariaman and Padang Pariaman. In Padang Pariaman Raskin distributed to 17 distribution point using three units of trucks with capacity 15 and 17 tons. Raskin distributed once a month during 6-7 days with the same interval, and total Raskin distributed is 196.150 kg/month. The research problem, Bulog Divre West Sumatera does not have a fixed vehicle route determination system to distribute Raskin. The previous route was determined based on vehicle capacity and the sequence customer to be visited determined based on the proximity of the distribution location according to salesman intuition. So, it causes long mileage and fuel cost.

This problem known as the Vehicle Routing Problem, So, variant VRP used to solve this problem is the Capacitated Vehicle Routing Problem (CVRP). Capacitated Vehicle Routing Problem (CVRP) used to determine vehicle routes with minimum cost to serve a set of customers whose geographical coordinates with vehicle capacity as an additional constraint. CVRP problems can be solved using the Clarke-Wright Saving Algorithm. Then, sorting the route using the Nearest Neighbor method. Data collection includes primary data and secondary data. The data collected are Raskin demand data, Raskin distribution point data, distribution time, and the vehicle used to distribute Raskin in Padang Pariaman.

Based on data processing, the proposed route using the Clarke and Wright Saving Algorithm method result in 16 distribution routes. The proposed route will be completed in 7 days using two units of trucks so that this proposed route can save the procurement cost for one vehicle. Besides, the proposed route using the Clarke and Wright Saving Algorithm method can save mileage by 6.5% with a travel time of 4634.35 minutes. It is shown that the proposed route can minimize distance and distribution time to optimize vehicle use.

Keywords: CVRP (Capacitated Vehicle Routing Problem), Clarke-Wright Saving Algorithm Method, Nearest Neighbor

ABSTRAK

Bulog Divre Sumbar adalah Divre operational yang memiliki dua subdivre yaitu sudivre bukittinggi dan subdivre solok. Bulog Divre West Sumatera memiliki lima daerah kerja yaitu, Padang, Padang Pariaman, Pariaman, Pesisir Selatan dan Mentawai.Bulog Divre West Sumatera mempunyai gudang Raskin yang berlokasi di Jln By Pass Pampangan. GBB Pampangan bertanggung jawab untuk mendistribusikan Raskin di Padang dan Padang Pariaman.. Pendistribusian Raskin di Padang Pariaman dimulai dari gudang Bulog (GBB Pampangan) menuju 17 titik distribusi menggunakan tiga unit truk dengan kapasitas 15 dan 17 ton. Waktu yang dibutuhkan Bulog Divre Sumbar untuk mendistribusikan Raskin kira-kira yaitu 6-7 hari kerja dan jumlah Raskin yang didistribusikan setiap bulan adalah 196.150 kg/ bulan . Permasalahan yang diteliti yaitu Bulog Divre Sumbar belum memiliki sistem penentuan rute untuk mendistribusikan Raskin. Penentuan rute sebelumnya ditentukan berdasarkan kapasitas kendaraan dan pengurutan rute ditentukan berdasarkan kedekatan lokasi distribusi menurut intuisi supir yang mengakibatkan jarak tempuh dan biaya bahan bakar yang besar.

Masalah ini dapat diselesaikan dengan menentukan rute distribusi Raskin menggunakan pengembangan model VRP (Vehicle Routing Problems) yaitu Capacitated Vehicle Routing Problem (CVRP). Metode penyelesaian CVRP yang digunakan untuk pemilihan rute adalah Clarke-Wright Saving Algorithm. Kemudian dilakukan pengurutan rute menggunakan metode Nearest Neighbour. Pengumpulan data meliputi data primer dan data sekunder seperti Data permintaan Raskin, data titik distribusi Raskin, data waktu pendistribusian Raskin, dan data alat angkut pendistribusian Raskin di Kabupaten Padang Pariaman.

Berdasarkan hasil pengolahan data, rute usulan yang dirancangan menggunakan metode Clarke and Wright Saving Algorithm menghasilkan 16 rute distribusi yang dapat diselesaikan dalam 7 hari menggunakan 2 unit truk, sehingga rute usulan ini dapat menghemat biaya pengadaan satu unit truk. Selain itu, rute usulan menggunakan metode Clarke and Wright Saving Algorithm dapat menghemat jarak tempuh sebesar 6.5% dengan waktu tempuh sebesar 4634.35 menit. Hal ini menunjukkan bahwa rute usulan dapat meminimalkan jarak tempuh dan waktu distribusi sehingga dapat mengoptimalkan penggunaan kendaraan.

Kata Kunci: CVRP (Capacitated Vehicle Routing Problem), Clarke-Wright Saving Algorithm Method, Nearest Neighbor