ABSTRAK

PENENTUAN RUTE DISTRIBUSI LOGISTIK PASCA BENCANA PADA *HETEROGENEOUS FLEET VEHICLE ROUTING PROBLEM* MENGGUNAKAN *PARTICLE SWARM OPTIMIZATION*

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ABSTRAK- Indonesia merupakan negara yang sering mengalami bencana alam khususnya gempa bumi. Meskipun sering terjadi bencana alam, belum ada penelitian distribusi logistik pasca bencana di Indonesia dengan model *Heterogeneous Fleet Vehicle Routing Problem* yang menggunakan metede metaheuristik. Penelitian ini bertujuan mendapatkan rute distribusi logistik pasca bencana gempa bumi di Kabupaten Bantul dengan mempertimbangkan armada kendaraan yang heterogen (*Heterogeneous Fleet* VRP) menggunakan *Particle Swarm Optimization*. Pada penelitian ini dilakukan penentuan rute distribusi logistik pasca bencana gempa bumi di provinsi Yogyakarta dengan batasan distribusi untuk Kabupaten Bantul. Skenario pada penelitian ini adalah status tanggap darurat dimana BPBD Kabupaten Bantul akan mendistribusikan bantuan logistik pasca bencana kepada 75 kelurahan/desa yang terdampak bencana gempa bumi. Persentase permintaan bantuan logistik didasarkan pada stok standar logistik kesiapsiagaan yang tersedia di provinsi Yogyakarta. Pada penyetelan parameter *Particle Swarm Optimization* maka didapat parameter yang memberikan rata-rata hasil biaya distribusi paling minimum adalah program dengan jumlah partikel sebanyak 70 partikel, faktor c*ognitive learning* (c_1) yaitu 1.5 dan faktor *social learning* (c_2) yaitu 1.5. Dari hasil run program dengan parameter terbaik didapat rute distribusi dengan total biaya distribusi yaitu Rp1.868.973,75 dengan penggunaan sebanyak 15 kendaraan yang terdiri dari 4 truk tronton dan 11 truk engkel. Konvergensi dicapai pada iterasi ke 29 dengan *CPU time* atau waktu komputasi yaitu 0.51 detik dengan total jarak tempuh kendaraan adalah 614.35 KM.

Kata Kunci – HFVRP, Logistik Pasca Bencana, *Particle Swarm Optimization*

ABSTRACT

DETERMINATION OF POST-DISASTER LOGISTIC DISTRIBUTION ROUTES IN HETEROGENEOUS FLEET VEHICLE ROUTING PROBLEM USING PARTICLE SWARM OPTIMIZATION

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ABSTRACT- *Indonesia is a country that often experiences natural disasters, especially earthquakes. Although natural disasters often occur, there has been no research on post-disaster logistics distribution in Indonesia with the Heterogeneous Fleet Vehicle Routing Problem model that uses the metaheuristic method. This study aims to obtain logistic distribution routes after the earthquake disaster in Bantul Regency by considering heterogeneous fleets of vehicles (Heterogeneous Fleet VRP) using Particle Swarm Optimization. In this study, a logistics distribution route was determined after the earthquake disaster in Yogyakarta province with distribution limited for Bantul Regency only. The scenario in this study is an emergency response status where BPBD Bantul Regency will distribute post-disaster logistical aid to 75 sub-district / village affected by the earthquake. The percentage of requests for logistical aid is based on the standard stock of preparedness logistics available in Yogyakarta province. In the Particle Swarm Optimization parameter tuning, the parameters that give the minimum average distribution cost results are a program with a total of 70 particles, the cognitive learning factor (c_1) of 1.5 and the social learning factor (c_2) of 1.5. From the results of the run program with the best parameter, the distribution route is obtained with a total distribution cost of Rp1.868.973,75 with the use of 15 vehicles consisting of 4 tronton trucks and 11 engkel trucks. Convergence is achieved in the 29th iteration with a CPU time of 0.51 seconds with a total vehicle mileage of 614.35 KM.*

Keywords *- HFVRP, Particle Swarm Optimization, Post-Disaster Logistics*