Optimization of Municipal Solid Waste Collection Routes in City of Depok

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ABSTRACT

An increasing number of population in Depok causes an increase in the amount of municipal solid waste (MSW) generation. To transport this ever increasing waste, it needs to be balanced with the provision of adequate waste collection transportation. Among sub-districts in Depok, Cimanggis and Sukmajaya Sub-districts have the highest point of waste collection services. The limitation of the number of waste vehicles and existing waste collection routes cause waste hauling inefficiency. This thus causes the large pile of waste surrounding the neighborhood. This research aims to determine the optimal collection route on both the sub-districts so that it can minimize the time, distance and cost. For the purpose, vehicle routing problem (VRP), a model to get the best routes for vehicles to serve all customer, is used. The Model then solved using algorithms Tabu Search. The results show the increase of routing efficiency for Cimanggis Sub-district routes of 10.85%. With this new route, the MSW can be transported by 44.26% or increased by 12.26%. As for Sukmajaya Sub-district route the calculation result was less efficient than existing route, the result added two additional routes. However, although the route is longer, the MSW can be transported is 55.78%. This improves services of 19.78%.

Key words: Route optimization, MSW collection, Tabu Search, vehicle routing problem