

ROUTE OPTIMIZATION TO INCREASE ENERGY EFFICIENCY AND REDUCE FUEL CONSUMPTION OF COMMUNAL VEHICLES

by

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Collection and transportation within the system of solid waste management may account more than 60% of the overall budget, most of which is for fuel costs. Furthermore, municipal vehicles have great environmental impact through exhaust gases emissions. The aim of this research was to estimate the potential for reduction of fuel consumption and thus the emission of CO₂ through the communal vehicles route optimization. General methodology for route optimization is also presented. For the area under study, detailed field experimental research in the City of Kragujevac was conducted. Using GIS and GPS technology, whole municipally infrastructure for waste collection was scanned and all paths of communal tracks was recorded and allocated in developed database. Based on experimental and numerical results, one typical municipal vehicle route was analyzed by using ArcGis software. The obtained result indicates 2700 km of possible savings per year concerning one communal vehicle. In addition, the most fuel-economical route was extracted and compared with the original route, and with the routes extracted from criterions concerning the traffic time and shortest distance. According to available information for the City of Kragujevac and the results from this study, it was estimated that the total savings could be 20% in costs and the associated emissions.

Keywords: *solid waste management, route optimization, street classification, fuel consumption.*

Introduction

At this level of development of human society, without making any difference between rich and poor, urban and rural areas, environmental degradation is one of the greatest problems and it is the result of increased solid waste generation. In order to find a solution for

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