The Efficiency of Solid Waste Logistics Management: A Prominent Case Study of Banped Subdistrict, Municipality Mueang Khon Kaen District, Khon Kaen Province

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ABSTRACT

Solid waste is a significant issue worldwide, and it is concerned by many countries worldwide. Local government has a substantial role in managing solid waste. Solid waste is increasing yearly because of several causes, such as the rapidly rising population and the massive city's expansion into suburban areas. The Municipal takes responsibility to collect and dispose of the solid waste in their responsible area. This article aims to forecast solid waste in the future using four methods: static methods, exponential smoothing, Holt's model, and Winter's model. Then, compare all methods to find the optimal ones with the most accurate forecasting. By determining the criteria, the forecast error measures are the absolute deviation (MAD) and the mean of the absolute percentage error (MAPE), which have a minimum error. One of the other purposes is to develop an optimization route that provides the possibility of decreasing distances and reducing transportation expenses. Typically, the most common methods are the Traveling Salesman Problem (TSP) and Vehicle Routing Problem (VRP) to solve the problems. This article will use two algorithms for two steps. The first step is to set the routes with the nearest neighbor heuristic (NN) to generate the routes MSW from point to point until all are reached and return to the origin point. In the second step, improve the routes by using the 2-Opt heuristic. The results found that the 2-Opt can decrease transportation distances, which is optimal and saves costs. In addition to that, it can make process management more effective.

Keywords: Forecasting, Nearest Neighbour Heuristic, 2-Opt Heuristic, Travelling Salesman Problem