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Thevaka**

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Cost Effective Transport Arrangement and Its Distribution of Water Supply in Sri Lanka

S. Thevaka¹

theva19870610@gmail.com

A. Thayaparan²

aruppillaithayaparan@yahoo.com

^{1,2}Vavuniya Campus,
University of Jaffna, Sri Lanka

Abstract

The objectives of the study are to find the optimal solution that minimizes transportation cost by choosing economical route for transportation the pipes for water supply from different stores to the sites and to find the efficient route that make optimal transportation schedule in Sri Lanka. The transportation data related to length of pipe required for eleven site locations, availability of pipes at stores, number of truck loads which need to be transported, required truck load for sites and available truck loads at stores and transport cost per truck load were calculated from the national water supply and drainage board report in 2020. The data was modelled as mathematical form using linear programming of transportation type and represented as transportation tableau which was done by Excel Solver to generate its initial basic feasible solution and optimal solution as well as for further improvement like sensitivity analysis in the study. The experimental results show that, the optimum solution of the transportation problem is Rs 79,363/= and at the real situation, number of trucks hired should be an integer value. Based on this aspect, actual minimum total cost for transport is Rs 91,175/=. Further, based on the solver solution material transport arrangement, most cost effective route of transporting materials from national water supply and drainage stores to the relevant sites also were identified. In addition to the above results, sensitivity analysis including reduced cost, allowable increase and decrease in current coefficient and constraints as well as shadow prices also estimated in the study. The findings of the may useful to the managers and engineers who involve on water supply and drainage to provide the effective water distribution systems to the various locations at a minimum transportation cost in the country.

Keywords: *Economical route for transportation, excel solver, linear programming, sensitivity analysis, transportation cost*