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# The Green Load Dependant Vehicle Routing Problem with Backhauls: A Revisited Case Study

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## Abstract

Environmental management principles are gaining interest in today's highly competitive environment. Green logistics improvements presented in this paper are twofold. As a general framework, we consider the Vehicle Routing Problem with Backhauls (VRPB), where delivery and pick-up customers are to be served from a central depot. At the same time, the minimization of the CO<sub>2</sub> emissions is included into the objective function as well as minimization of distance. Load factor is considered into the minimization objectives through the new introduced model: Load Dependant Vehicle Routing Problem with Backhauls (LD-VRPB). Our methodology will be constructed taking this variant as a basis. The resolution procedure uses a multi-start approach designed to avoid the local minima. The algorithm employs a biased-randomized version of the classical savings heuristic, together with some local search processes. The savings list of edges is randomized using a skewed probability distribution. In order to validate our methodological approach we have revisited a real case of a company working in the food distribution sector in Spain. The obtained results show improvements above 7% in both distances and CO<sub>2</sub> emission reductions.

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