
Methods for solving multiple depots split deliveries vehicle routing problems

Andréa Cynthia Santos*¹

¹Université de Technologie de Troyes (ICD-LOSI, UMR CNRS 6281, UTT) – Université de Technologie de Troyes – 12, rue Marie Curie, CS 42060, 10004, Troyes CEDEX, France

Abstract

In post disaster relief, two main levels in the distribution process are distinguished to provide aid to the population. The macro-distribution that consists of transferring supplies (e.g. food, drugs and water) from big hubs (e.g. airports and ports) to intermediate depots; and the last-mile distribution that aims at achieving supplies to the population. If the two levels are coupled, it results in a location-routing problem. However, in the context of humanitarian logistics, several organizations provide aid according to their own protocols, without any global policies. Thus, it is reasonable and realistic to handle those problems independently. This study focuses on characteristics not still well addressed for the macro-distribution in the context of crisis management. It concerns the huge demands which imply visiting a delivery point several times, as well as servicing each delivery point by different vehicles in a shared way. This problem is modeled in this study as a Multiple Depots Split Delivery VRP (MDS-D-VRP) coupling the Multiple Depots VRP (MD-VRP) and the Split Delivery VRP (SD-VRP). A mathematical formulation, bi-criteria constructive heuristics and multi-start based metaheuristics have been developed to the MDS-D-VRP. Experiments are addressed for instances from the literature and scenarios of Port-au-Prince (Haiti) earthquake in 2010.

*Speaker