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The Pickup and Delivery Problem with 3D Loading Constraints.

This page contains material of the following publication:

Männel, D.; Bortfeldt, A. (2016):
    A hybrid algorithm for the vehicle routing problem with pickup and delivery and three-dimensional
    loading constraints.
    In: *European Journal of Operational Research* (in press).

Männel, D.; Bortfeldt, A. (2015):
    A hybrid algorithm for the vehicle routing problem with pickup and delivery and 3D loading
constraints.
    Working Paper No. 15/2015, Fakultät für Wirtschaftswissenschaft, Otto-von-Guericke Universität
    Magdeburg.

Abstract: In this paper, we extend the classical Pickup and Delivery Problem (PDP) to an integrated routing and three-dimensional loading problem, called PDP with 3D loading constraints (3L-PDP). A set of routes of minimum total length has to be determined such that each request is transported from a loading site to the corresponding unloading site. In the 3L-PDP, each request is given as a set of 3D rectangular items (boxes) and the vehicle capacity is replaced by a 3D loading space. We investigate which constraints will ensure that no reloading effort will occur, i.e. that no box is moved after loading and before unloading. A spectrum of 3L-PDP variants is introduced with different characteristics in terms of reloading effort. We propose a hybrid algorithm for solving the 3L-PDP consisting of a routing and a packing procedure. The routing procedure modifies a well-known large neighborhood search for the 1D-PDP. A tree search heuristic is responsible for packing boxes. Computational experiments were carried out using 54 newly proposed 3L-PDP benchmark instances.

Typ	› Titel	Content
	› 3L-PDP-instances	This file contains all data files for the Vehicle Routing Problem with Pickup and Delivery and 3D Loading Constraints.