A GRASP algorithm for the container stowage slot planning problem

This work presents a generalization of the Slot Planning Problem which raises when the liner shipping industry needs to plan the placement of containers within a vessel (stowage planning). State-of-the-art stowage planning relies on a heuristic decomposition where containers are first distributed in clusters along the vessel. For each of those clusters a specific position for each container must be found. Compared to previous studies, we have introduced two new features: the explicit handling of rolled out containers and the inclusion of separations rules for dangerous cargo. We present a novel integer programming formulation and a Greedy Randomized Adaptive Search Procedure (GRASP) to solve the problem. The approach is able to find high-quality solution within 1 s. We also provide comparison with the state-of-the-art on an existing and a new set of benchmark instances. (C) 2016 Elsevier Ltd. All rights reserved.