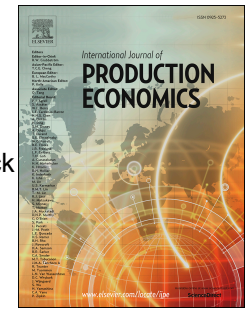
# Accepted Manuscript

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# Scheduling of truck arrivals, truck departures and shop-floor operation in a cross-dock platform, based on trucks loading plans

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## Abstract

The extended international development of the automotive industry has been supported in a part by crossdocking platforms set up between distant manufacturing plants and nearby first-tier suppliers. A cross-dock centre is an intermediate consolidation point in a supply chain linking a set of suppliers with a set of customers. Main advantages are a reduced lead time, a decrease of stock level and economies in transportation. At shop-floor, packages from inbound trucks are unloaded, moved across, sorted by destination and loaded onto outbound trucks. A case of study at Renault company is presented in this paper. Two important points are observed for this Renault crossdock center: (1) repacking operations are performed for some products and (2) due to the high diversity of packages' dimensions and stacking rules, scheduling of inbound, repackaging and loading outbound trucks is a complex problem. We propose a mixed integer linear programming model to schedule inbound trucks' arrival times (considering given soft time windows), shop-floor repackaging operations and outbound trucks' departure times. Capacitated temporary storage zones and a capacitated repack workshop are considered at crossdock shop-floor. The model seeks to minimize penalty costs related to inbound trucks' arrival times and consequently unbalanced workload of the repack workshop. Implemented in CPLEX and tested on some instances provided by Renault, results of numerical experiments show the efficiency and pertinence of the model in the given industrial context.

*Keywords:* Automotive industry, Supply chain management, Cross-dock scheduling, Mixed integer linear program.