

# Container assignment optimization considering overlapping amount and operation distance in rail-road transshipment terminal

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## ABSTRACT

Container assignment strategy is crucial to the operation efficiency of rail-road container transshipping system. An effective container assignment approach can markedly improve integral operation efficiency of rail-road container transshipping system. In this paper, the container assignment problem in rail-road transshipment terminal was described and formulated as a two-stage optimization model considering overlapping amount and operation distance of crane. The first stage optimization model was to optimize container assigning positions for minimizing the total overlapping amount caused by container assigned in the considered block at one planning period, and an iterative solution procedure was proposed to obtain container assignment sets. Based on the container assignment sets obtained by the first stage, the second stage optimization model was to optimize the container assigning sequence for decreasing the total operation distance of crane, and a genetic algorithm was designed to obtain the optimal container handling sequences in container assignment process. Computational experiments on the data from a rail-road transshipment terminal in China were implemented to test efficiency of the proposed approach. Computational results showed that the proposed approach was effective to reduce overlapping amount and operation distance in container assignment process. The proposed approach is significant for the production and management of rail-road container transshipping terminals.

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# Optimizacija razporejanja kontejnerjev v železniško-cestnem tovornem terminalu z upoštevanjem prekrivanja in obratovalne razdalje

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## POVZETEK

Strategija razporejanja kontejnerjev je ključnega pomena za učinkovitost obratovanja pretovarjanja kontejnerjev v pristaniških železniško-cestnih terminalih. Učinkovit pristop pri razporejanju kontejnerjev lahko bistveno izboljša učinkovitost delovanja takšnega sistema. V tem prispevku je opisan problem pri razporejanju kontejnerjev v terminalu za pretovarjanje. Problem je preoblikovan v dvostopenjski optimizacijski model, ki upošteva prekrivanje in obratovalno razdaljo žerjava. V prvem koraku se izvede optimizacija razporejanja kontejnerjev z namenom minimiziranja prekrivanja, ki ga povzroči kontejner, razporejen na določeno mesto za določeno časovno obdobje. Za razporeditev skupine kontejnerjev je uporabljen iterativni postopek. Na podlagi razporeditve skupin kontejnerjev iz prvega koraka se v drugem koraku z genetskim algoritmom optimizira zaporedje razporejanja kontejnerjev za zmanjšanje skupne obratovalne razdalje žerjava. Za računske preizkuse so bili uporabljeni realni podatki iz kitajskih tovornih terminalov, rezultati pa so potrdili učinkovitost algoritma pri zmanjšanju stopnje prekrivanja in obratovalne razdalje žerjava v procesu razporejanja kontejnerjev. Predlagan pristop je pomemben za proizvodnjo in vodenje železniško-cestnih pristaniških terminalov.

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## PODATKI O ČLANKU

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