

An Optimal Design of Man-On-Board Storage and Retrieval Warehousing System

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Abstract

This paper deals with the design problem of a man-on-board storage and retrieval warehousing system which is suitable for storing the items of small size and light weight. In the man-on-board system, an operator works on the storage/retrieval truck which adopts for its movement rectilinear travel above a predetermined rack height and Chebyshev travel below the height. Also, a number of storage or retrieval requests are usually carried out between successive returns to the input and output point. We propose an optimal design model in which the investment and maintenance costs of the man-on-board system is minimized over a time horizon satisfying the dimensional constraints. The model is formulated as a nonlinear integer program and an algorithm is proposed to find an optimal solution. The effects of the storage volume and throughput requirements and the predetermined height are investigated on the total cost.