

Designs of Optimal Layout and Storage Location Assignment for Warehouse Efficiency Improvements with Considering of Item-Associated Customer Groups in a Logistics Service Provider

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Abstract. The objective of this research is to design an optimal layout and storage relocation assignment for warehouse efficiency improvement with considering of item-associated customer groups in a logistics service provider. As surveyed, the problem background of this case reveals that there are two warehouses where different storage policies have. The first is a dedicated policy for main customers; while when there are not enough spaces, the random policy is implemented. The second is a shared storage for the rest. Because of ineffective strategies, it causes wastes in both unproductive travel distances of pickers and unnecessary time of picking processes. To address these issues, this research collected the data on SKUs' picking frequency and total frequency aggregated by each customer for analyzing the appropriate warehouse layout and storage location. Three main techniques employed in this study are class-based, association-based and storage location assignment model. The result from a simulation analysis of performance evaluations with 54,693 picking lists shows that the optimal warehouse layout derived by storage location assignment-based model with considering of total frequency-associated customer groups is the best design. With the new layout, the case can gain benefit of better efficiency in terms of the decrease of travel distance from 20,207,733 to 15,453,872 meters (24%) and the time of picking processes deducts from 19,646 to 15,025 hours per 12 man a year (24%). Both reductions in distance and time help the case can effectively minimize costs of over time by 52% or 577,726 Baht per year.

Keywords: Applications of Association Analysis, Storage Re-location Assignment Problem, Warehouse Design, Warehouse Improvement, Case Study