ABSTRACT

Gudang Persediaan PT XYZ Yogyakarta is a warehouse that stores supplies needed by the railway transportation sector for both facilities and infrastructure. This warehouse operates in Operational Area VI, Yogyakarta City. One of the inventory items stored is spare parts for the repair and replacement of components on trains. Types of Spare Parts The spare parts stored are those for rolling stock components, including locomotive spare parts, railway carriages, and KRD/E. Locomotive spare parts are stored in a special section of the warehouse, known as Gudang Los I. The stored spare parts are distributed to user units, including the Balai Yasa and Yogyakarta Locomotive Depot, which are primarily responsible for maintaining and repairing railway vehicles on both a small and large scale. The current issue faced by Gudang Los I is the lack of optimal implementation in managing spare part storage, where frequently ordered or simultaneously issued spare parts are placed on storage racks that are far apart from each other. This results in longer order retrieval times because pickers must travel greater distances between shelves, and the time required for searching and retrieving ordered items increases. This is indicated by a incompability between the target time set and the average actual cycle time. Given this issue, a solution is needed in the form of a proposed spare parts storage allocation design through grouping based on the relationships between spare parts, while considering the minimum travel distance. This final project research uses Association Rules Mining calculations and mathematical model formulation through Mixed-Integer Linear Programming to generate an optimal solution for spare parts storage allocation design. Based on the results, the design achieved a total reduction in travel distance of 22,80% and a reduction in picking time of 35,33%.

Keywords: ***Warehouse, Spare parts, Picking Time, Association Rules Mining (ARM), Mixed-Integer Linear Programming (MILP)***