ABSTRACT

Indonesian Aerospace (IAe) is one of companies in aircraft industry which currently produces an aircraft and parts of aircraft from the kind of Spirit, Paragon, Aircraft, Eurocopter, and various Subcontract programs. To support the process of packaging parts, IAe has a warehouse as a storage box before used for packaging. In current condition, there is no procedures for placement of box in the warehouse. It causes worker take a long time for order picking activitity. In addition, irregular placement of the box causes a lot of honeycombing areas in the storage area. In current condition, the used floor area of Spirit program is 10.73 sq meters and the travel distance of workers is 913.219 meters. While the used floor area of Aircraft program is 57.14 sq meters and the travel distance of workers is 228.453 meters. Therefore, the aim of this research is to make proposed layout of the box placement that can minimize the used floor area and minimize travel distance of workers in performing storage/retrieval activities so that the order picking time becoming fast.

Dedicated Storage Method and Genetic Algorithms are combined to looking for the solution of proposed layout of the box placement. The data which are required to solve this problems is storage box data, shipping data, and box dimension. Dedicated Storage is used to calculate the ratio of T_j/S_j, which is box with the largest T_j/S_j ratio would be the greatest priority to be placed in position near of input/output point. Value of T_j/S_j is used to find the best solution of the box placement layout using Genetic Algorithm based on the fitness criteria, which is minimum the used floor area and minimum the travel distance of workers in performing storage/retrieval activities. The layout solution of the box placement for the Spirit program is 10.13 sq meters of the used floor area and 870.8675 meters of the travel distance of workers. It means that the layout solution of the box placement for the Spirit program can minimize the used floor area as much as 0.6 sq meters or 5.6% and minimize the travel distance of workers as much as 42.35 meters or 11.5%. While The layout solution of the box placement for the Aircraft program is 51.8 sq meters of the used floor area and 125.8125 meters of the travel distance of workers. It means that the layout solution of the box placement for the Spirit program can minimize the used floor area as much as 5.34 sq meters or 9.35% and minimize the travel distance of workers as much as 102.64 meters or 45%.

Keywords: Warehouse, Dedicated Storage, Genetic Algorithm