Fair Traders Management Team,

As Fair Traders has recently seen growth in their direct to customer department, they have communicated a desire to increase the throughput and efficiency of that department.

This project team, consisting of three Masters students at Oklahoma State University, was asked to evaluate and recommend improvements for the DTC department's storage and fulfilment strategies using concepts learned in their IEM 5203 course. The team analyzed the provided data on DTC's operations and policies using Excel PivotTables, VBA, and various storage policy equations to assist in their evaluation.

Based on the available data, the team decided that items should be sorted by their throughput to storage (T:S) ratio, so that frequently ordered items were placed closer to the fulfillment areas, thus minimizing the travel time needed based on the DTC's current layout. This led to the team developing a class-based storage policy, with the top priority items stored on the mezzanine and the lower priority items stored on the lower level. Furthermore, the lower level has two item classes so that items on the lower level are roughly sorted such that higher T:S items are closer to the elevator.

Since this system has fixed storage space for each class, the classes are assigned such that a roughly 95% service level can be maintained in Classes A and B, while Class C's service level varies based on expected inventory level.

Once the storage policy and layout were known, the team investigated order picking strategies. After considering the two-level layout, the team recommended a dual strategy: zone picking on the mezzanine level via a bucket brigade system, and a batch picking strategy on the lower level. This system allows work to be balanced on the busy mezzanine and minimized potential points of failure from material handling device handoffs on the lower level and reduces elevator usage. Additionally, the team believes that implementing a voice-pickup management system to communicate order requirements and guide workers to locations could further increase picking efficiency.

Implementation of this design is expected to require two weeks of closure in DTC department in order to move items, train workers, and update the warehouse management system. The team believes that if this is done during a low demand season, this will only require 2% of annual orders to be delayed.

If Fair Traders chooses to implement this design in their DTC department, the team has provided an algorithm to assign part classes that can be re-evaluated over time, in case of volume growth or changes in demand patterns. Furthermore, the team's recommended solution shows that Class C items will drop below a 50% service level in about 2 years if the predicted forecast is accurate. This shortfall can be remedied by adding storage shelves in the open space of the mezzanine level near the spiral package chute.

The team believes that, upon successful implementation of the recommended design, Fair Traders will be able to increase order fulfillment efficiency, increase worker productivity, reduce elevator usage, and increase storage efficiency, which allows the existing storage space to be utilized for higher growth than under the current system. Additionally, the clear, simple system of the mezzanine level should reduce required worker training if temporary labor is used.