

WESTJET INVENTORY CONTROL OPTIMIZATION PROJECT

EXECUTIVE SUMMARY

WestJet's supply chain team has noticed increased shipping of aircraft parts and is concerned with the increased costs of its inventory replenishment model. This project addressed the problem by focusing on the expendables and consumables inventory replenishment process and the min/max levels determined by the Inventory Control team. The goal of this report was to use quantitative analysis to study the current operations and recommend changes for cost optimization of the process. The scope of this project included three items that represented high, medium and dangerous goods usage as well as four locations that represented larger (Tier 2) and smaller (Tier 3a and Tier 3b) locations.

By using Operations Management (OPMA) skills such as an ABC analysis and ARENA software, it was determined that each item category and location had different usage behavior and statistical distributions and needed to be evaluated separately. High usage items such as engine oils reflect an Exponential distribution; medium usage items such as hardware show a Gamma distribution and low usage items shows a Poisson distribution.

A Monte Carlo simulation model was then created to model the yearly inventory replenishment process and the related costs. Each item was separated by location and run through the Monte Carlo simulation 10,000 times using cost and ordering constraints. This was done to compare annual average ordering costs for weekly, bi-weekly and tri-weekly review period options. The min/max levels were then recalculated to reflect the distribution of each item and the model was rerun.

The results show that a tri-weekly review period is the best option from a total cost perspective. Additionally, recalculating the min-max levels using the appropriate distribution equation also significantly lowers the total annual inventory related costs while maintaining a high service level. Furthermore, the service level tends to stay the same or improve at the tri-weekly level. However, each category should be evaluated separately, considering the different usage amounts, category distribution patterns and the base specific restrictions. These recommendations will allow WestJet to decrease shipping costs and optimize shipping schedules to better serve their customers.