SCC Inventory Consulting, LLC *eZine*

Optimizing Inventory for On-Time Delivery

The Case for Data Cleansing

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Optimizing inventory investment to achieve desired levels of on-time delivery or material availability is among the greatest challenges for inventory managers. One thing is certain: the quality of data going into an inventory optimization process has a direct and profound impact on the quality of the resulting output. Sanitizing data on the front end helps to ensure that the optimization process is in fact optimized.

One method of sanitizing data is to determine the presence of "statistical outliers" in the data, then eliminating or replacing those data points. This process eliminates non-representative data that result from outright errors (bad data), that are accurate but unlikely to recur, or that are deemed to be so large that they should simply be ignored. For example, a major recall or sales event may create a spike in demand that is not expected to recur. If the spike is allowed to remain in the data stream, safety stock investment may be elevated beyond what is actually needed to optimize on-time delivery and inventory levels.

To determine the statistical outlier threshold for each part, several calculations are needed:

- Mean: The average of all daily usage values for the item.
- Standard Deviation (SD): The standard deviation of all daily usage values for the item.
- Sigma Level (N): A good starting point is 4 Sigma, which covers 99.997% of a normal distribution.
- Outlier Threshold = Mean + (N x SD).

Applying the concept, any daily usage value for an item which exceeds the threshold is *suspect* and should be examined, replaced or eliminated. Manually examining all potential outliers is not always practical. An alternate approach is to apply an algorithm which replaces outliers with a calculated value such as the average, 4^{th} largest daily value, or other appropriate value. An automated technique such as this can save considerable analysis time and provide repeatable results.

Using this technique on all items in a warehouse can significantly reduce safety stock levels required to provide a desired level of service. The process can be applied equally well to a finished goods warehouse where demand represents sales to customers, as to a raw material warehouse where demand represents consumption by a manufacturing process. Cleansing the data stream on the front end of an inventory optimization process can dramatically reduce inventory investment while maintaining or even improving delivery performance, boosting inventory turns and improving your bottom line.

For a more thorough discussion of this subject please visit our website's Publications page and look for the white paper with the same title as above. Or contact us to discuss our Demand Analysis tool set; a low-cost highly customizable product designed to perform the data cleansing process on your data!

About the Author

Steve Cimorelli is President of SCC Inventory Consulting, LLC. He is a Certified Fellow in Production and Inventory Management (CFPIM), a published author and educator. Steve holds a BS in Engineering with more than 25 years of experience in aerospace, industrial equipment and commercial manufacturing, distribution and supply chain management. He can be reached at 321-269-3407 or by email at Steve.Cimorelli@SCCInventory.com.