Inventory management: Best practices and new realities

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Background

Parts inventory control has been a subject of much discussion and wringing of hands since the advent of computers. In the “old days” when the inventory was managed manually, everyone seemed to be at peace with the results. You looked at a “Kardex card” and you saw everything you needed to know about any part.

With the arrival of large batch style computer systems in the early 1950s, the computer was fed with a different type of card: One that had been created from a form submitted by the parts department to “data processing.” That is when the trouble started. The information available to the parts department was no longer current and the employees in the parts business lost trust in the system. To go further, the inventory control systems were driven by mathematical statistics. Putting statistics into a parts department made the problem even worse because hardly anyone understood what was happening. This continues to be true today and this lack of trust and understanding is the source of many problems.

We have gone full circle and are now back to an interactive dealer business system where the information is again up to the second. Yet there are still troubles managing the parts inventory. The truth is that we haven’t changed much in how we operate from a process perspective, nor have we truly regained trust in what a modern “system” does or proposes is correct.

We still use statistical forecasting systems, but with sophisticated forecasting systems there is little trust. Many suppliers have recognized this, and as a result, they influence or direct their dealers on which inventory control model to use. CAT® believes in Poisson; Volvo® in MMI; Deere® in Order Formula Codes; Komatsu® in ASL, and so on. Then we have the demand management system providers, who also offer a range of different approaches. However, the majority of employees in an equipment parts business still don’t understand how their systems work.
The uncomfortable reality

The following table will shed some light on the main issue. The table uses information compiled from my work over the past 35 years from over 700 dealers of varied equipment brands around the world. It shows quite plainly that over 85% of the parts that are sold by dealers have 12 sales per year, or less. This demand pattern has a “goodness of fit” with the Poisson Statistical Model.

This table exposes the uncomfortable reality that the forecasting models used have serious limitations when applied to the capital equipment industries. This is because the demand per unique part is less than 13 times a year, i.e. slow moving parts. Forecasting with such a small activity base is extremely difficult. All forecasting methods rely on historical activity that is both frequent and large enough to be predictable.

What this does, however, is open the door to a different branch of mathematics—probability theory—that can be applied to managing slow moving inventory within a dealership.

Gaming future events

Probability theory is based on the time interval between events. This is the approach that some forecasting methods utilize, as well. More specifically, you can predict the probability of a future event, a sale, based on the time between the last two events. Most people would find this to be intuitively true. For example, if we had a sales call on the first day of the month and another one on the second day of the month, the probability of a future sales call would be larger than if we had a sales call on the first day of the year and the second sales call on the last day of the year.

<table>
<thead>
<tr>
<th></th>
<th>$0.01 - $1.00</th>
<th>$1.01 - $10.00</th>
<th>$10.01 - $100.00</th>
<th>$100.01+</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 12</td>
<td>23%</td>
<td>28%</td>
<td>28%</td>
<td>7%</td>
<td>86.00%</td>
</tr>
<tr>
<td>13 - 24</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
<td>5.00%</td>
</tr>
<tr>
<td>25 - 48</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>3.00%</td>
</tr>
<tr>
<td>49 - 60</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>1.00%</td>
</tr>
<tr>
<td>61+</td>
<td>4%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
<td>5.00%</td>
</tr>
<tr>
<td>Total</td>
<td>32%</td>
<td>32%</td>
<td>29%</td>
<td>7%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
Using this theory, we can make a clear determination on stocking strategies, as well as ordering strategies. It is all based on the time between the last two calls. The following table, which is based on traditional statistical probability, exposes some interesting truths. The columns are the number of calls that will occur in a 12-month period. When the last two calls are 3 months apart the probability of 0 sales in the coming 12 months is 2%. Similarly, if the last 2 calls are 6 months apart, then the probability of 0 sales in the next 12 months is 13%. The columns represent 0 sales, 1 sale, 2 sales, 3 sales, 4 sales, and 5 and more sales—each in the coming 12 months.

This uncomfortable reality has caused good practice parts management processes to change. But very few businesses have changed to adapt to this new reality.

<table>
<thead>
<tr>
<th>Time between the last two sales calls</th>
<th># calls in the next 12 months</th>
<th>Probability of at least one call in the next 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>3 months</td>
<td>2%</td>
<td>7%</td>
</tr>
<tr>
<td>4 months</td>
<td>5%</td>
<td>15%</td>
</tr>
<tr>
<td>5 months</td>
<td>9%</td>
<td>21%</td>
</tr>
<tr>
<td>6 months</td>
<td>13%</td>
<td>27%</td>
</tr>
<tr>
<td>7 months</td>
<td>18%</td>
<td>31%</td>
</tr>
<tr>
<td>8 months</td>
<td>22%</td>
<td>33%</td>
</tr>
<tr>
<td>9 months</td>
<td>26%</td>
<td>35%</td>
</tr>
<tr>
<td>10 months</td>
<td>30%</td>
<td>36%</td>
</tr>
<tr>
<td>11 months</td>
<td>34%</td>
<td>37%</td>
</tr>
<tr>
<td>12 months</td>
<td>36%</td>
<td>37%</td>
</tr>
<tr>
<td>15 months</td>
<td>44%</td>
<td>36%</td>
</tr>
<tr>
<td>18 months</td>
<td>51%</td>
<td>34%</td>
</tr>
</tbody>
</table>
Inventory rules

The supply chains in the world have been through radical changes over the past few decades. Most supply chains have taken a “just in time” (JIT) approach. This has created positive changes in many areas. For instance, the new reality has new re-stocking orders being placed every day. Compare this to the once a week or twice a month standard that was in place not that long ago. This has had a dramatic impact on lead times. Lead time is the total time from when a part reaches the order point in the bin, to when the stock order arrives and the bin is replenished.

Significantly lower lead times are the new reality. The new normal is a lead time of less than five days. That means we can have an order point of one month and have a cushion, a safety stock, of three weeks to cover any back order issues. What does that mean for an equipment dealer or service provider? It means that many dealers and service providers should be able to achieve an inventory turnover of 12 times a year. Imagine what that does to the working capital you have tied up in parts and your return on capital employed (ROCE). This is an extremely important aspect of inventory management that many people overlook.

Effective inventory management can influence price points. Currently, most dealers have inventory turnover in the range of four times a year. Let’s examine an example where a dealer achieves a gross margin of 25% and has an inventory turnover 4.0 times. The calculated return on capital employed, at the gross margin level, is 25% times 4.0 or 100%. So you get back 100% of your invested capital within 12 months. However, with a turnover of 12.0, that return on capital goes to 25% times 12.0 or 300%.

That is very strong return. If we look at the price point with that level of ROCE, it would allow for the reduction of the gross margin on some of the more competitive parts. This is an extremely important consideration in the spare parts business, especially when competing with the gray market.

One of the many positive consequences of managing spare parts inventory well is that it will allow to reduce the price of specific competitive parts, while maintaining or increasing your overall ROCE. In addition, you free up working capital to invest in other areas of your business and can maintain less storeroom space in your depots for parts.

The question then becomes “why don’t we have an order point equal to one month sales for every vendor with a lead time of one or two weeks?” There is no reason that is logical. We should have such an order point. We need to become great at inventory management. Let’s explore yet another element of inventory management that has slipped in unnoticed.

The new normal is a lead time of less than five days.
The trap of familiarity

Since 1905, the order quantity used in most inventory control systems, manual or automated, has been based on the Kerr-Norton formula. These two men developed a formula that was aimed at balancing the cost of placing orders with the cost of carrying inventory. They called this the Economic Order Quantity (EOQ).

The EOQ is the square root of 2 times the order cost divided by the carrying charge multiplied by the annual demand divided by the landed cost.

\[
EOQ = \text{Square Root of } (2 \times \frac{OC}{CC} \times \frac{AD}{LC})
\]

The order cost is what we have become familiar with over time. As the cost of computers, storage, and data transmission have dropped precipitously, the cost to place an order per part number on your stock order is near zero. This is indisputable if we trust the inventory system and order what is recommended without review. If we place a zero in the square root formula the result will also be zero. That seriously impacts the use of the EOQ to calculate the order quantity.

Inventory values

Let me present an example to you of how you should calculate your standard inventory value. The standard inventory value calculation can be employed across many different asset classes to determine investment-required levels for an inventory.

**Note:** You will need to do these calculations for your own business, for each of your stores and each of your major brands.

The example follows:

- We have a lead time of one week.
- We have an order point of one month (three weeks safety stock).
- The order point inventory will be equal to one month of your annual cost of sales.
- The order quantity will be fixed at one month’s sales as well. That will take you to a maximum of two months of inventory of your annual cost of sales.

The inventory value theory says that standard inventory will be equal to the value of the order point plus half the value of your order quantity.

- Four weeks is the order point inventory value.
- Two weeks is one half of the order quantity inventory value.
- That is a total of six weeks of inventory.

Take the last 12 months sales at cost and divide it by 52 weeks and then multiply the answer by 6. As an example, use sales at a cost of $25,000,000 divided by 52, which equals $480,769.23. Multiply that by 6 and you arrive at $2,884,615.38.

We should pause here and talk about two other aspects of parts inventory management—protective parts and nonproductive parts.
Protective parts

Even though we have followed all of the logic above and we use probabilities and common sense inventory rules, we will still have parts that we need to have in inventory that don’t meet any of the rules. The approach here is to plan for protective parts and to have an acceptable budgeted value. My rule of thumb is that the protective parts should never exceed 10% of the standard inventory.

Nonproductive parts

There will be parts that are in your inventory that you should not have because they do not meet your stocking criteria. They are there because the sales activity has declined dramatically and we weren’t able to dispose of the parts in time, or a part was returned to you that you did not stock. But we need a financial standard here as well. Nonproductive parts should never exceed 10% of your standard inventory.

Back to our example:
- Add the protective at 10% of $288,461,54
- Then the 10% for the nonproductive at 10% of another $288,615.38

The total parts inventory is $3,461,538.43

This produces a parts inventory turnover that is 7.2 times turnover

Do I have your attention yet? Once you get to 7 plus times turnover, start tuning your system. A high turnover does not cause lower parts availability, as long as the order point is greater than the replenishment time. So, until your inventory value is close to the lead time, you are not at any risk for availability. However, you have freed up working capital and reduced the risk of obsolete and non-productive parts inventory.

Conclusion

Dealerships and service providers need to have skilled people who understand how a business system can be exploited to drive business performance improvements, as well as the theory of inventory management. This will help spare parts employees learn to trust the business system. With this combination, you can reduce the investment required to support your spare parts business while maximizing availability. You can use the reduction in unnecessary buffer inventory to make smart investments to:

- Improve your inventory availability and your business effectiveness.
- Increase your market capture rates.
- Adjust your retail pricing to be more competitive.
- Increase your ROCE.
- Make more net income.

All of these positive results come from managing the spare parts inventory with process and IT improvements to match the new realities of the equipment marketplace. The time is now.
Ron Slee is President of R.J. Slee & Associates, a management consulting firm specializing in the operational aspects of businesses in the heavy equipment, material handling and data processing services industries. The company, an AED sustaining member, is headquartered in Rancho Mirage, California. In nearly thirty years in the industry, R.J. Slee & Associates has worked with several hundred dealerships, distributors and manufacturers located in Canada, the United States, Europe, Asia Pacific, the Middle East, Russia and Latin America.

Between his work with dealerships representing most of the major manufacturers and his management experience in dealerships, Ron has gained first-hand direct knowledge of the challenges and opportunities most dealerships confront in the parts and service operations. He has written numerous articles and monthly columns for Industry publications for over twenty years.