Optimizing MRO inventory management

Implementing best practices managing spare parts inventory with IBM Maximo Inventory Optimization

Highlights

Continuous optimization with automation

Sustainably planning and balancing inventory levels

Ensure correct parts on hand

Reduce inventory

Synchronizing supply with demand

To optimize MRO management, companies need an approach that supports the distinct management requirements of MRO inventory, including:

- High criticality
- Long lead time
- High price
- Generally infrequent and highly variable usage
- Low data quality

Make no mistake—achieving and maintaining inventory optimization is complicated and challenging. But it's also transformative. That's why best in class organizations take it on —the business transformation benefits, including increased service and safety levels, reductions in inventory holdings and stock-out risk, far outweigh the costs.

With the right tools and technology, supported with the right MRO processes and best practices, successful companies are making that transformation and reaping substantial rewards.

Inventory optimization technology
Optimizing inventory requires frequently obtained data points and evolution of the inventory in question based on those measurements in real time. A decision support system that incorporates best practice methodologies gives inventory managers a powerful tool to manage their business objectives and make their teams significantly more effective. By leveraging technology tools, automated processes and inventory management best practices to optimize MRO spares and consumables, asset-intensive organizations can consistently:

- Reduce unplanned downtime related to parts
- Lower inventory costs
- Provide savings in maintenance budgets
- Increase in service levels

The 12 best practices in MRO inventory optimization

These demonstrated best practices developed by IBM are fundamental to achieving the significant inventory reductions and substantial bottom-line savings that are the hallmarks of inventory optimization.

"MRO is really about getting the maintenance, inventory, and supply chain groups to work better together to make sure spare part service levels are maximized while balancing cost and risk."

Frost Sullivan, Sankara Narayanan, Senior Analyst

1. Criticality Analysis – Generate a recommended criticality (business impact code) for each stock item by analyzing:

- Application (where used and fitted)
- Commodity classifications
- Practical "real-world" considerations or "workarounds"
- Supplier or Original Equipment Manufacturer
- Price
- Other factors and business rules

2. Demand Forecasting – Demand forecasting capabilities should include:

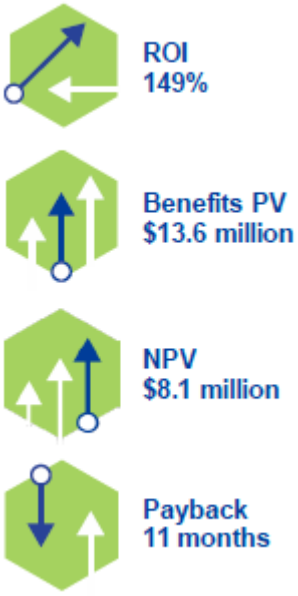
- Selection of appropriate forecasting algorithms
- Automatic selection of algorithms for each stock item
- Use of forecasting and statistical distributions that are appropriate for a wide range of spares items including slow moving and lumpy demand (e.g., Poisson, Negative Binomial, Binomial, Normal)
- Clipping and filtering techniques to manage abnormal data
- The ability to isolate planned maintenance and project demand from unplanned demand
- Capabilities to use knowledge of expected future events or trends to apply demand profiles to future forecasts

3. Lead Time Forecasting – Forecast lead time is a key factor in determining optimal safety stocks—aspire to achieve these capabilities:

- Forecast average lead time using purchase order and receipts history
- Filtering and clipping techniques to eliminate abnormal data
- Override lead times as required
- Calculation of lead time variance and use of this variable in calculating expected service level

4. Issue Size Forecasting – The number of units typically required for an application (the issue size) is also a key factor in determining stock levels—a good inventory optimization solution will provide:

- The ability to forecast average issue size using issues history
- Appropriate filtering and clipping techniques to eliminate abnormal data
- Capabilities to override forecast issue size as required
- Calculation of issue size variance and use of this variable in calculating expected service level



Forrester Total Economic Impact Study commissioned by IBM May 2019*

5. Economic Modeling – Economic modeling capabilities should allow for "what-if" modeling of inventory trade- off decisions:

- Inventory holding costs for different types of items
- Total replenishment costs for different purchasing methods
- Expediting or emergency freight costs
- Stock-out costs, based on criticality and duration of stock-out
- Comparing existing and optimized results for metrics such as:
  - Inventory value
  - Service level
  - Turnover
  - Annual inventory costs

6. Optimization Of Reordering Parameters – The reordering parameters—minimum and maximum levels (MIN/MAX) —used by the enterprise resource planning (ERP) and enterprise asset management (EAM) materials management systems to generate replenishment orders are the main determinants of inventory outcomes. Reordering parameters should be optimized periodically to reflect changes in usage, lead time, criticality and other factors. The optimization process addresses:

- Selection of appropriate algorithms to optimize minimum and maximum stocking levels
- Use of an economic cost model that considers costs of holding inventory, replenishment, expediting and stock-outs as a preferred alternative to a fixed service level approach
- Analysis of groups of items rather than one-by-one, one at a time
- The ability to perform "what-if" modelling and compare optimized results against current inventory performance
- Consideration of "real-world" constraints including:
  - Maximum bin capacity
  - Storage capacity
  - Standard pack sizes
  - Set sizes

7. Inventory Segmentation – Inventory segmentation provides a management framework for inventory that recognizes that a number of different management techniques are required for various item profiles:

- Segment the inventory based on characteristics such as:
  - Usage value
  - Holding value
  - Movement frequency
  - Availability
  - Criticality
  - Commodity
  - Stock holding method

- Apply structured policies or business rules to the management of each inventory segment, such as:
  - Manual control of special items
  - Review of potentially obsolete items
  - Items suitable for statistical optimization
  - Items that can be made non-stocked
  - Surplus and obsolete for disposal

8. Exception Management – For large, complex MRO inventories, a "management by exception" approach ensures that inventory review time is focused on high value or problem items. Exception management capabilities include:

- Tools for users to define any number of exception conditions with related alert thresholds
- The ability to search, sort and filter by exceptions
- Mechanisms to exclude changes to reordering parameters for items with exception conditions

9. Spares Risk Assessment – Some MRO inventories will include a high proportion of spares that are high cost, critical, have little or no expected usage and require long lead times to receive. Managing these items requires specific techniques:

- Risk modelling of the effect of holding zero, one or two sets
- The ability to perform sensitivity analysis around expected mean-time-between-demand and stock-out cost
- The ability to model or override all inputs to the stocking decision
- Decision-support tools to assist in new stock purchasing or deferred replacement decisions
- The ability to model the repairable item replenishment cycle

10. Spares Pooling – Significant reductions in overall safety stock investment are possible through the pooling or sharing of high value, infrequent items (insurance spares) across multiple sites. To facilitate such arrangements, asset-intensive companies need to:

- Identify common spares that are suitable for sharing
- Establish the optimal number of pooled spares to be held
- Determine the optimal location for holding the spares

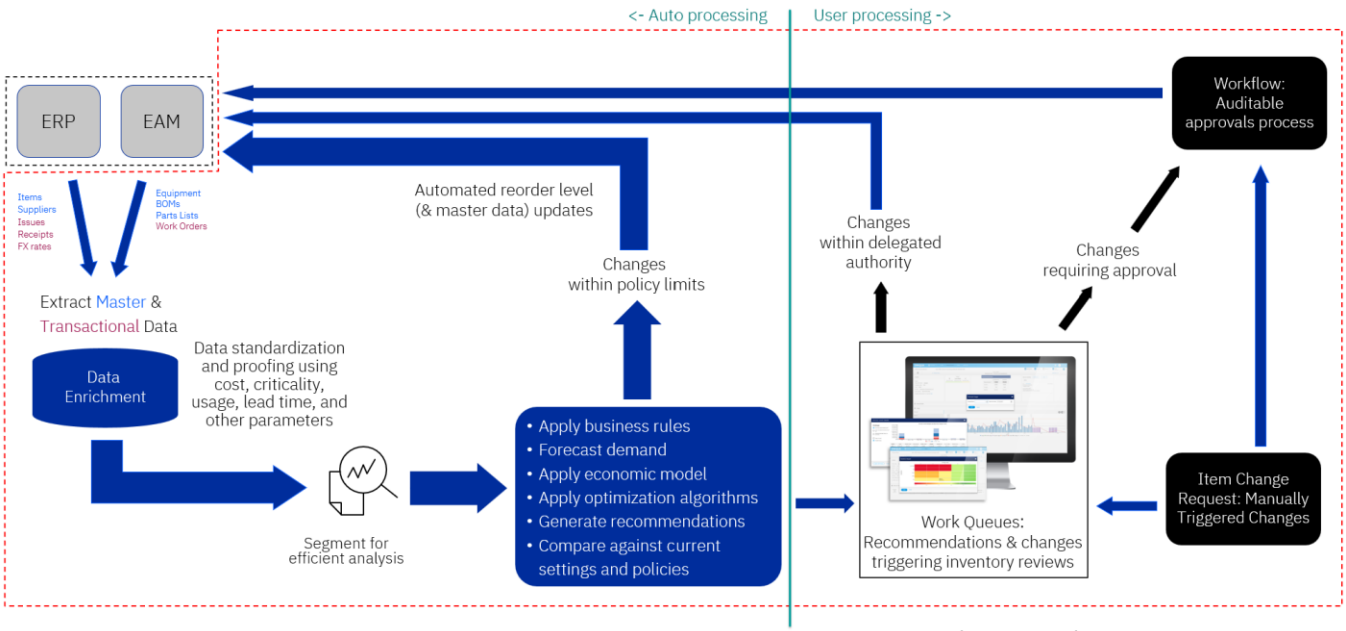
11. Knowledge Capture – Capturing organizational knowledge relating to inventory items is an important business process in preventing mistakes and re-investigation; the inventory optimization solution should:

- Capture notes and commentary about inventory items
- Provide an audit trail for decisions
- Ensure high data quality for input parameters and classification codes
- Provide reminders when reviews are due

12. Reporting Inventory Key Performance Indicators (KPIs) – Inventory KPI reporting is important to allow progress in improving inventory to be tracked. KPI reporting should include:

- A selection of pre-defined inventory management reports
- The ability to automatically capture a large selection of pre-defined inventory KPIs
- The ability for users to customize reports and statistics

How IBM Maximo Inventory Optimization works: Continuous, Automated Optimization



Conclusion

For today's asset intensive companies, competitive advantage requires a positive mindset towards innovation and technology. Without technology solutions and best practices, companies are left to struggle with manual processes, standard ERP system functionality, and ad hoc databases or spreadsheets. These manually intensive approaches are prone to error and impossible to sustain on a repetitive basis.

Automated continuous MRO inventory optimization is just good business. Achieving and maintaining inventory optimization is possible and profitable, with the right tools and the right type of help. IBM's unique functionality expertise, combined with proven MRO inventory optimization capabilities, helps our clients fulfill the 12 business requirements outlined here.

Furthermore, advances in asset optimization including predictive capabilities depend on accurate stock levels to execute recommended tasks. IBM Maximo Inventory Optimization solution and services form part of a set of asset management and optimization capabilities available from IBM.

In fact, many leaders in asset intensive industries throughout the world complement and extend the value of ERP/EAM systems such as IBM Maximo, SAP, Oracle, Ellipse and others with IBM's inventory optimization capabilities and best practices. By optimizing their MRO inventories, IBM's clients can achieve levels of inventory efficiency, asset performance and bottom-line savings that can make their executives and stakeholders very happy.

For more information
To learn more about Maximo Inventory Optimization, contact your IBM representative or book a live demo.

*Forrester's interviews with five existing customers and subsequent financial analysis found that an organization with a profile based on these interviewed companies experienced benefits of $13.6 million over three years versus costs of $5.5 million, adding up to a net present value (NPV) of $8.1 million and an ROI of 149%. Given the rollout and adoption assumptions used by Forrester, IBM Maximo Inventory Optimization investment pays back quickly, within 11 months.

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Produced in the
United States of America
2025