

LIVE MRP (Material Requirements Planning) Impact on Supply Chain

Manikandan Natarajan

Supply Chain Architect, Denken Solutions

Abstract:

Live Material Requirements Planning (Live MRP) refers to an advanced, real-time approach to managing and optimizing inventory, production, and procurement processes. Unlike traditional MRP systems that update periodically (e.g., daily, weekly), Live MRP integrates dynamic data from across the supply chain and production processes, providing instantaneous updates to material needs, production schedules, and procurement activities. This capability allows companies to respond more swiftly to market fluctuations, production disruptions, and changing customer demands, enhancing operational efficiency, reducing lead times, and improving decision-making.

This white paper explores the evolution of MRP systems, the functionality of Live MRP, the benefits it provides to manufacturers and supply chain managers, and the challenges to its adoption. It also examines the technological trends driving Live MRP adoption and its future implications.

Introduction to Material Requirements Planning (MRP) :-

In today's globalized manufacturing landscape, businesses face increasingly complex challenges. Customers demand faster delivery times, lower costs, and higher-quality products. At the same time, supply chains are becoming more unpredictable due to factors such as fluctuating raw material prices, transportation bottlenecks, geopolitical uncertainties, and labor shortages.

Traditional Material Requirements Planning (MRP) systems, which rely on batch updates (e.g., daily or weekly), are not equipped to handle such volatility. By updating information in real-time and dynamically adjusting schedules and procurement activities, Live MRP offers manufacturers the flexibility and responsiveness needed to maintain efficiency, meet customer demands, and minimize operational risks.

Live MRP enables businesses to achieve a seamless flow of information across production floors, suppliers, inventory, and sales channels, leading to better planning, smarter decision - making, and faster response times.



Material requirements planning (MRP) is a software-based integrated inventory and supply management system designed for businesses.

Companies use MRP to estimate quantities of raw materials, maintain inventory levels, and schedule production and deliveries.

Key Takeaways

- Material requirements planning (MRP) is the earliest computer-based inventory management system.
- MRP helps develop a production plan for finished goods by defining inventory requirements for components and raw materials.
- MRP assures that materials and components will be available when needed, minimizes inventory levels, reduces customer lead times, and improves customer satisfaction.
- MRP relies on data accuracy, has a high cost to implement, and maintains a strict production schedule.

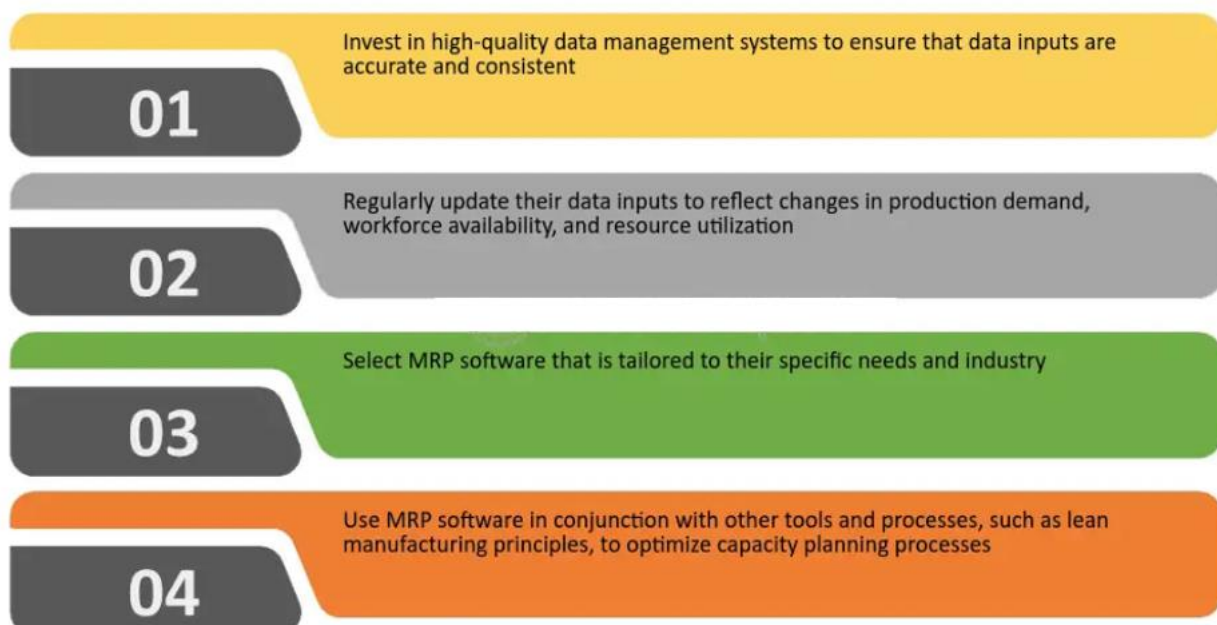
Limitations of Traditional MRP Systems:

Traditional MRP systems operate on a batch-processing model, where data updates are typically performed periodically—often daily or weekly. This means that production schedules and material requirements are based on static data, and the system does not account for real-time changes in demand, inventory levels, or production disruptions.

The primary limitations of traditional MRP systems include:

- **Inflexibility:** Static data updates make it difficult to respond to sudden changes in customer orders, material availability, or supply chain disruptions.
- **Data Latency:** Because the system relies on periodic updates, decisions are based on outdated information, leading to inefficiencies, stock outs, or overstocking.
- **Limited Visibility:** Traditional MRP systems often lack integrated visibility across the entire supply chain, hindering timely decision-making.

One of the main challenges of capacity planning with MRP software is the need for accurate data. MRP software relies heavily on data inputs, and any errors or inconsistencies in the data can lead to inaccurate results. For example, if production demand forecasts are incorrect, the MRP software may generate incorrect recommendations for workforce utilization or resource allocation, which can lead to overproduction or underproduction.



What is Live MRP:

Live MRP represents a paradigm shift from traditional MRP systems by continuously updating material requirements and production schedules in real-time. This enables manufacturers to respond instantly to changes in demand, production rates, supplier delays, or disruptions in inventory levels. A Live MRP system integrates various data streams, including sales orders, production data, inventory updates, and supply chain metrics, to calculate material needs on a continuous basis.

Key characteristics of Live MRP include:

- **Real-Time Data Integration:** Live MRP continuously pulls data from various sources (e.g., ERP, inventory management, CRM systems) and updates material planning processes without manual intervention.
- **Dynamic Demand Planning:** Unlike traditional MRP, which relies on forecasted data, Live MRP can dynamically adjust production plans based on actual customer orders and real-time demand signals.
- **Advanced Analytics:** Live MRP leverages machine learning, AI, and predictive analytics to provide insights and recommendations for optimal inventory management, demand forecasting, and production scheduling.

Benefits of Live MRP:

MRP depends on accurate inputs, including sales forecasts and customer orders to understand demand, a bill of materials (BOM), a real-time view of inventory, and a master production schedule. Using these inputs, professionals working with the software understand their inventory requirements and can keep supply and demand in balance. Because these systems automate time-consuming processes such as pulling historical sales, your business can maintain this balance without spending hours with manual data entry. These are five of the most critical benefits your business should achieve with an integrated MRP system:

1. Improved production efficiency

Improved production efficiency is a significant benefit of MRP software in the supply chain. By effectively tracking and utilizing raw data, such as bills of lading and the shelf life of stored materials, MRP enables businesses to determine precise labor and supply requirements. This is particularly valuable for complex orders that involve multiple sub-assemblies, as MRP helps managers avoid timing miscalculations.

2. Implementation of just-in-time or just-in-case strategies

The implementation of just in time or just-in-case strategies is another valuable benefit of MRP software in the supply chain. Excessive inventory can tie up capital and lead to inefficient ordering practices. MRP addresses this challenge by aligning with your production plan and schedule, providing an accurate analysis of what is needed, in what quantities, and on specific dates. It leverages historical data to calculate upcoming requirements, continuously monitors inventory levels, and initiates timely orders for new components and materials.

3. Reduced purchasing costs

Reducing purchasing costs is a significant advantage offered by MRP software in the supply chain. By automating searches for the most cost-effective options for materials and components, MRP eliminates the need for manual and time-consuming price comparisons. The software takes into account various factors, including the cost of materials, components, and delivery, to identify the optimal purchasing options.

4. Control over inventory

Control over inventory is one of MRP's greatest advantages in the realm of supply chain management. With its robust capabilities, MRP enables businesses to maintain a comprehensive view of their inventory and exercise precise control over stock levels. Utilizing real-time data and sophisticated algorithms, MRP accurately monitors and displays the status of in-stock supplies, ensuring transparency and visibility across the organization. It allows businesses to determine exactly what materials and components are available, what is needed to meet demand, and the associated supply costs. By cross-referencing stock levels with order requirements, MRP identifies specific materials that need to be replenished and automatically initiates the ordering process.

5. Prevention of production bottlenecks

Preventing production bottlenecks is a critical benefit offered by MRP software, empowering businesses to maintain a smooth and uninterrupted flow of production. Production bottlenecks, often stemming from issues within the supply chain, can severely hinder a manufacturer's ability to meet customer demand and adversely affect its overall operational efficiency.

Future Trends in Live MRP :-

The future of Live MRP is closely tied to advances in technology. Key trends likely to shape its development include:

- **AI and Machine Learning Integration:** As AI technologies become more sophisticated, Live MRP systems will incorporate increasingly advanced predictive analytics, optimizing material requirements and production schedules with greater accuracy.
- **Block chain for Supply Chain Transparency:** Block chain can provide secure and transparent tracking of materials and production processes, further enhancing the effectiveness of Live MRP systems by improving trust and data integrity across the supply chain.
- **Edge Computing:** As Iot devices proliferate, edge computing—processing data closer to where it's generated—will enable even faster data processing and real-time decision-making without overloading central systems.
- **Autonomous Supply Chains:** The rise of autonomous robotics, drones, and vehicles will enable fully autonomous supply chains, with Live MRP systems orchestrating material flows and production schedules in real-time with minimal human intervention.

Conclusion:

Live MRP represents the future of manufacturing and supply chain management. By integrating real-time data from across the enterprise and supply chain, Live MRP enables organizations to be more agile, efficient, and responsive to market demands. While the initial investment and integration challenges may be significant, the benefits of enhanced decision-making, reduced inventory costs, and improved production efficiency make Live MRP an increasingly attractive option for businesses seeking to maintain a competitive edge in the modern marketplace.

As technology continues to evolve, Live MRP systems will likely become more sophisticated, offering even greater opportunities for cost reduction, efficiency gains, and customer satisfaction improvements. The future of manufacturing will be faster, smarter, and more responsive—powered by Live MRP.

Reference:

1. <https://www.investopedia.com/terms/m/mrp.asp>
2. <https://fastercapital.com/topics/challenges-and-limitations-of-capacity-planning-with-mrp-software.html>
3. <https://www.ecisolutions.com/blog/manufacturing/5-benefits-of-material-requirements-planning-mrp-for-the-supply-chain/>
4. <https://www.slideshare.net/slideshow/14-mohsin-dalvi-mrp-ii-presentation/46563275>