

AMAPS+PLUS provides a major breakthrough in material requirements planning. MRP is no longer a major process that spews out massive reports on a weekly or daily basis; rather, MRP is an on-going process that is integrated into the user's normal planning throughout the day. The MRP recommendations that are created by MRP+PLUS are displayed in the Planning Window of MCS+PLUS where action can be taken.

### State-of-the-Art MRP

The MRP+PLUS module offers three modes of processing:

- Regenerative**
- Net Change**
- Event-driven**

**Regenerative MRP** is the oldest method of material requirements processing. Regenerative replans all of the parts that are controlled through the MRP system. With AMAPS+PLUS, this method is used on system start-up after converting from another MRP system, or when major changes have been made to the Master Production Schedule.

**Net change MRP** was the next improvement in MRP processing. Net change replans only those parts that have had activity since the last MRP processing run. This technique reduced processing time and costs which allowed users to run MRP daily or several times a week. By running MRP more frequently, the system responsiveness was increased significantly from regenerative systems.

**Event-driven MRP** is the latest and most effective technique in material planning. With today's pressures for fast response, processing MRP on a daily, overnight basis is not responsive enough. Event-driven MRP processes throughout the day in small net change bursts on a set schedule, e.g., every ten minutes, or upon user request, e.g., after entering a new sales order or receiving a new delivery schedule from a vendor. This means that users can see the impact of changes within minutes instead of the next day. Exception conditions are analyzed as they occur, rather than days or weeks later. This allows corrective actions to be taken in time and to have correct priorities in the shop.

### Action Notification Elimination of MRP Reports

Traditional MRP systems produce massive reports because that was the only method available to communicate reschedule recommendations. Besides being massive and hard to use, these reports were usually out of date as soon as they are printed. MRP+PLUS provides for continuous planning. The MRP rescheduling recommendations are graphically identified in the Planning Window within MCS+PLUS. The responsible planners are notified immediately of what actions are required to maintain the optimum replenishment order plan.

### "Bucketless" Day/Quantity Detail Planning

MRP+PLUS and MCS+PLUS maintain the detailed requirements (demand) by required day and required quantity rather than being summarized into arbitrary periods of time and quantities. Since each demand has a corresponding required date, there is no limitation on the planning horizon. Each demand is maintained in required-date sequence and can represent planned requirements as far into the future as you desire. Each unique demand is considered on its specific required date relative to open replenishment orders. This provides the most accurate analysis of material availability and exception condition reporting.

Good manufacturing planning always provides the flexibility to replan. Because MRP+PLUS is a "bucketless" system, the frequencies of the planning and replanning horizons are not constrained by the size or number of periods (buckets). Changes to planning information are recognized instantly and require

## **Material Requirements Planning (MRP+PLUS)**

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only the replanning of affected items. These capabilities support just-in-time (JIT) inventory management and let you direct MRP replanning as frequently as necessary for your specific manufacturing conditions.

### MRP Keeps the Material Plan Current

When evaluating the effectiveness of an MRP system, you need to determine how accurately it simulates events within your manufacturing environment. Using the event-driven approach in conjunction with day/quantity detail provides you with an accurate and timely display of the most current manufacturing information.

The replanning triggers that causes MRP+PLUS to reanalyze an item are set by MCS+PLUS and BMS+PLUS. As a result of processing changes within these systems, messages are automatically created directing the planning activities of MRP+PLUS.

### Sensitivity Filters

MRP+PLUS can detect even the slightest exception conditions. Therefore, sensitivity filters let each planner/buyer specify which conditions are important to them and how great the exception should be in order to be notified, e.g., don't tell me to reschedule an order out unless it is greater than five days. This allows planners to weed out insignificant exceptions to focus on the important work to be done.

### Multiple Lot-sizing Techniques

After calculating net demands, MRP+PLUS uses this information to plan orders and recommend actions to implement the inventory policy for the item. Order planning is based on the order policy and related modifiers assigned to each item. Order policies can be:

- Discrete
- Fixed
- Part Period Balancing
- Period Order Quantity
- Least Unit Cost

### Level-by-Level Explosion and Offset

In the process of developing material requirements, MRP+PLUS performs a level-by-level bill of material "explosion." The explosion process is always performed in product structure "level" sequence (high-level items followed by low-level items). MRP+PLUS automatically recognizes the low-level code for each item, which represents the lowest level in which the part is used in any bill of material. This ensures that all requirements are planned in the proper sequence for netting, lot sizing and explosion

During the bill of material explosion process, MRP+PLUS performs lead time offsetting to determine the critical dates such as pick date, start date, and complete date for orders. The "MRP Lead Time Off-set" example describes the method of determining the pick date of each component. The order complete (due) date and lead time information for Assembly A is used to calculate the required pick date for A's component parts (in our example, B). The resulting dependent demand for Part B is then analyzed and a supply order can be generated, if required, for Part B with a complete date corresponding to the date Part B is needed to be picked for Assembly A. In turn, demand for B's components (in our example, purchased part C) is generated. A purchase order is planned to cover this requirement.

Individual component lead time offset adjustments can also be specified in the bill of material for each different use of a component. MRP uses this capability to schedule the components that are used later in a production process to arrive at the time they are needed, not when the process starts. For example, most components are usually required on the "normal" pick date. However, certain components may not be required until several days later in the process. If the component offset is specified for components, then a unique pick date is calculated to be the specified number of days after the normal pick date. This supports the JIT concept of material management and reduces the amount of inventory you have queued up on the shop floor and, consequently, lowers your working capital investment in inventory.

### Summary

To compete in today's dynamic manufacturing environment you need to reduce lead times and improve on-time customer delivery. Yet the only constant in today's environment is constant change. MRP+PLUS event-driven and net change ability enables planner and buyer to react quickly to changes and new customer orders. With AMAPS+PLUS, MRP processing is not a big weekly or daily event that overloads users with massive reports, but is part of the continuing process of planning and monitoring their material plans.

The screenshot displays the 'Planner+PLUS' software window. At the top, there is a menu bar with 'File', 'Window', 'Actions', 'Sort', 'Options', 'Inquire', and 'Help'. Below the menu bar, a status bar shows 'Projected' (green bar), 'Coverage' (green bar), and 'Orders' (yellow bar with '333333 0 0 3 0 3'). A 'Reschedule to' section contains four calendar icons. An 'Exceptions' bar shows a multi-colored bar chart. Below this, a table displays summary statistics: 'Past Due' (0), 'Date' (empty), 'Excess' (0), 'Count' (30), and 'Weighted' (273). The main area features a table with columns 'Item Number', 'ABC Lic', and 'Commoc'. The table lists 13 items, with 'OMSITEM1' selected. To the right of the table is an 'Action Options' panel with buttons for 'Supply Inquiry', 'Demand Inquiry', 'Supply/Demand', 'Item Data', 'Multi-Plant S/D', 'Stock Status', 'Components', 'Secondary Supplies', 'Customer Orders', 'MSS Orders', 'Change All', 'Split Supplies', 'Combine Supplies', 'Cancel Supplies', 'Maintain Supplies', 'Maintain SMP', 'Order Shortages', 'Item Shortages', 'Dmd Mass Change', 'Item Demand Maint', 'Firm Orders', 'Cut Orders', 'Place Orders', 'Release Orders', 'Auto Status Change', 'UnFirm Orders', 'UnCut Orders', 'PORD Maintenance', and 'Full Level Pegging'. At the bottom, a status bar shows 'Ready', 'Total Items: 16', 'Completed: 0', 'Horizon: 04/01/2010', and 'Width: 5 Shop Days'.

Item Number	ABC Lic	Commoc		
1	R	102-OMS	A	0
2	Y	LTS-CM-COMP1	A	2
3	R	LTS-CM-COMP2	A	1
4	Y	LTS-CM-PARENT	A	0
5	R	LTS-CM-SERPAR	A	0
6	Y	LTS-ITEM1	A	0
7	R	LTS-S-COMP1	A	1
8	R	LTS-S-SERPAR	A	0
9	R	OMSITEM1	A	0
10	Y	OMSITEMA	A	0
11	R	OMSITEMB	A	0
12	R	OMSITEMC	A	0
13	R	PPSITITEM	A	0