AIMS/ERP ™

Training

**Purchased Material Requirements Planning
(P/MRP)**

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NOTICE

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Overview

The AIMS P/MRP reporting subsystem uses certain concepts and performs a number of key functions, which may be summarized as follows:

- All demand is defined as a purchased part that is shown as required on a work order material record.
- All supply is a remaining delivery quantity on an open, production material type purchase order, or available inventory (not in MRB).
- All demand is linked ultimately to a work center via the routing operation link. Some work centers are outside manufacturing work center, indicated by a Vendor ID in the Work Center record.
- Production material purchase orders are identified either as In-Bound or Drop Ship, based on the Vendor ID's in their Ship To Vendor ID field.
- Demand & Supply is matched for P/MRP purposes by splitting all demand and supply into two groupings; In-Bound and Drop Ship. These are processed by AIMS into two separate tables.
- In-Bound demand is demand that will be fulfilled by issuing from warehouse inventory within the company. It is matched with In-Bound PO data.
- Drop Ship demand is demand that must be fulfilled by ordering material and having it shipped directly to an outside manufacturing vendor. It is identified by the work center's vendor ID, and matched with equivalent Ship To Vendor ID's. Inventory in the warehouse is not used to potentially satisfy these types of demand. Demand & Supply data, defined in this way, is separated by outside manufacturing vendor ID, because a demand at one vendor cannot be satisfied by a shipment going somewhere else.
- These tables are generated nightly, making demand & supply data available for selective listing on reports and/or interactive inquiries.
- The table generation process performs the exception analysis process, which characterizes each record in the table as having one exception condition, identified by Exception Codes.
- All exception analysis steps use the calculated Projected Inventory values to characterize each part number's demand & supply condition. The question is simple: when does the Projected Inventory figure become negative, indicating that the planned production requirement will not be fulfilled unless procurement action is taken.
- The Exception analysis process makes integral use of three variables, the Expedite Window, Late Days Filter, and Ordering Window. These variables are global (apply to all part numbers in the same way), and in combination with the part number specific Purchasing Lead Time are used to calculate the three dates that appear on the demand & supply reports for each part number: Expedite Window Date, Purchase Lead Time Date, and Order Lead Time Date. For items with a very short purchase lead time, this date could be inside of the Expedite Window Date.
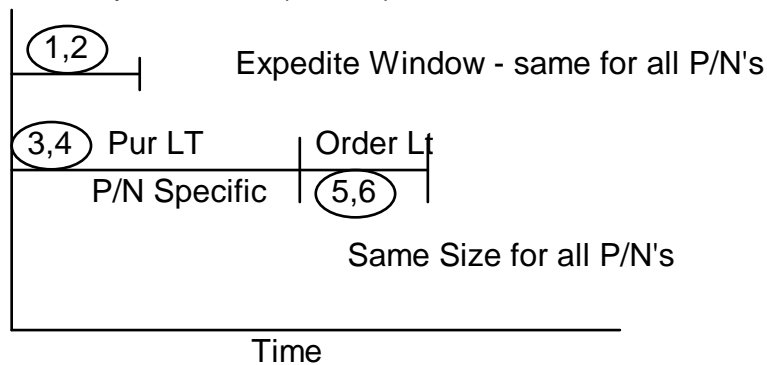
- The Expedite Window date is that time period purchasing management feels is the time frame to focus on insuring that current and near-term production requirements will be met.
- The Days Late Filter is the number of calendar days that Projected Inventory can be negative before again turning positive and still not trigger what would otherwise be an Exception Condition associated with that date. Its function is to filter out minor differences in demand & supply dates.
- The Ordering Lead Time Window is the extra lead time to add for a normal procurement action, and is added onto the Purchase Lead Time.

The diagram below illustrates the general relationship of these Windows and how the Exception logic works to identify D&S situations with varying degrees of urgency.

If Projected Inventory is negative within these dates, then
Exception Code (circled) is shown:

(1,2)   Expedite Window - same for all P/N's

(3,4) Pur LT   Order Lt
       P/N Specific | (5,6)

          Same Size for all P/N's

          Time

Using the P/MRP Reports

Normal operation of the AIMS P/MRP reporting and exception system uses the following standard steps:

1. Nightly, the programs to generate the In-Bound Purchase Demand and Supply and the Drop Ship Demand & Supply tables are run.

2. The P/MRP Exception reports are run, which list in Exception Code sequence, (in various other sorts), which part numbers to "pay attention to" first, second, etc.

3. Using either selectively printed Demand & Supply reports or interactive inquiry screens, review the detailed demand & supply data that generated the exception condition.

4. Take procurement action that is appropriate depending on the condition.

5. Continue the cycle daily, always working part numbers with the lowest exception codes (1, 2, etc.) first, working farther into the less urgent conditions each day.

6. When the system is used properly, buyers will spent most of their time placing purchase orders or rescheduling those already placed, and minimal time expediting inside lead time situations.

The resulting system is designed to enhance buyer productivity by systematically focusing on demand & supply imbalances in a logical, priority-based sequence.

It is specifically designed to prevent the frustration situation of focusing all of one's expediting efforts on one or two seemingly critical part numbers, only to discover too late that there are others not quite as late. Since one didn't know of all potential shortages, it therefore turns out that in spite of all the expediting effort, the other shortages will prevent meeting the production schedule anyway.

Besides the exception logic, the P/MRP reports bring together all information needed to efficiently manage the procurement situation for each part number.

Exception Condition Identification

The exception analysis section of the program is designed to identify the exception conditions and assign a code value (the number of the paragraph below), indicating their relative importance and the order in which they should be worked by a buyer. The codes form a hierarchy of importance. A part number identified with a code of 3, for example, may also have an exception condition elsewhere in its demand & supply data, but the condition identified by the 3 is the most serious, so further analysis and identification is not done. It is assumed that the buyer will review the entire demand & supply condition while acting on the condition identified by the 3. There, each part number's record will have only one Exception Code associated with it. The Exception Code structure is as defined below:

Code   Description

Negative Projected Inventory condition occurs:

1. Within the Expedite Window limit, and there is no PO to be rescheduled (expedited) in, therefore one must be placed.

2. Within the Expedite Window limit, and there is at least one PO that can (potentially) be rescheduled/expedited to an earlier date.

3. Within the Purchase Lead Time for the Part Number, and there is no PO to be rescheduled in, therefore one must be placed.

4. Within the Purchase Lead Time for the Part Number, and there is at least one PO that can (potentially) be rescheduled to an earlier date.

5. Within the Total Lead Time for the part number, and there is no PO to be rescheduled in, therefore one must be placed.

6. Within the Total Lead Time for the part number, and there is at least one PO that can (potentially) be rescheduled to an earlier date.

Excess Projected Inventory conditions occur:

7. Within the Total Lead Time for the part number, and there are at least one Activity line with a negative projected inventory quantity beyond the Total Lead Time, so the PO causing the excess can be rescheduled out.

8. At any point in time, and all subsequent Activity Lines continue to indicate excess projected inventory, so PO delivery quantities must be canceled.

Filtering of temporary negative or positive projected inventory conditions is supported via the Late Days filter. This is a value that is added to the activity date where the negative or positive value occurs, to determine if there is a scheduled PO delivery with a sufficient quantity to fill the negative condition, or the excess condition is consumed within the time period represented by the Early/Late Days filter interval period.

9. If all Activity Lines for the part number have either a zero condition (neither negative or positive), or fall within the Late Days filter range, it is assigned an exception code of 9, which means no exception condition exists for the part number.

10. If inventory in <u>any</u> category (including MRB status/quantity) is present, but no demand or PO supply data is present.

These codes form a hierarchy of importance in which meeting current production schedules is the most urgent requirement, followed by supporting future production schedules. Of lower priority is canceling or deferring over-supply situations.

The AIMS P/MRP exception reporting system is designed to provide effective tools to planner/buyers to support this relative importance of activities.

Program Functions - For Reference Only

The steps the program uses to develop these Exception Codes is as follows:

1. Retrieves the P/MRP Parameter record and calculates the following dates, storing them in the new P/DS record for the part number:

   Expedite Window Date
   = Current System Date + Expedite Window Days

   Purchasing Lead Time Date
   = Current System Date + Purchasing Lead Time Days for Part Number

   Ordering Lead Time Date
   = Purchasing Lead Time Date + Ordering Lead Time Days

2. Scans the Activity Lines in the DS array, testing for Negative or Positive Conditions:

   If a line is Negative, read subsequent lines to determine if the period of negative value is within the Early/Late Days filter interval. If it is, continue scanning the DS array.

   If it is not, then set the Activity Line Exception Flag to Y, (indicating that it is this Activity Date which triggered the Exception condition) and determine which period the negative value occurs within by performing the Activity Date comparison.

   If all lines in the array with Activity Dates within Total Lead Time are scanned without encountering a Negative condition, then one of the following is determined to select the appropriate Exception Code for the Part Number:

   If there is a Negative condition in an Activity Line with a date greater than the Total Lead Time date, then the Exception code is set to 7.

   If there is no negative condition in an Activity Line beyond the Total Lead Time Date, then the Exception Code is set to 8.

   If all Projected Inventory values for all Activity Lines in the array are either zero, or have negative or positive variations that occur within the Early/Late Days filter, then the part number is considered to have no exception conditions. This is identified with an Exception Code of 9.

NOTE: A Negative Condition is calculated by subtracting either the Safety Stock Quantity for the part number, or if absent, zero, from the Projected Inventory Quantity. If the result is a negative number, -1 or a greater negative value, then a Negative Condition exists for that line. An Excess Condition is calculated by the same process, but the result is a positive number, of +1 or greater positive value.

3. Determine the Exception Window - Perform Activity Date comparison for the Activity Line where the negative condition occurred is as follows:

If Activity Date is less than or equal to the Expedite Window Date, then the Preliminary Exception Codes are 1 or 2.

If Activity Date is less than or equal to the Purchase Lead Time Date, then the Preliminary Exception Codes are 3 or 4.

If Activity Date is less than or equal to the Ordering Lead Time Date, then the Preliminary Exception Codes are 5 or 6.

4. PO Available to Reschedule? - Refine the Preliminary Exception Code selection for Negative conditions by reading subsequent Activity Lines to determine whether there is a PO available to be rescheduled . This is done by reading Activity lines that have later Activity dates than the one where the exception occurred, and determining one of the following conditions:

If all remaining Activity Lines do not have any PO data, then the Exception Code will be 1, 3, or 5.

If, during this scan process, a PO is encountered, then the Exception Code will be 2, 4 or 6.

5. The results of the Determine Exception Window process and the PO Available to Reschedule? process are combined to identify the final Exception Code selection, which is written to the record with the other data, and which will meet the Exception Condition code list defined above.