

MRP and CRP

TRAINING GUIDE



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About This Course

Course Description

QAD designed this course to cover the basics of preparing to implement Material Requirements Planning (MRP) and Capacity Requirements Planning (CRP) in MFG/PRO. The course includes:

- An introduction to MRP and CRP in MFG/PRO
- An overview of key business issues
- Setting up the MRP module
- Operating the MRP module
- Processing CRP
- Activities and exercises throughout the course
 - Students practice key concepts and processes related to MRP and CRP in MFG/PRO

Students learn how to:

- Analyze some key business decisions before setting up the MRP module
- Set up and operate MRP and CRP in MFG/PRO

Who Should Attend This Course

- Implementation consultants
- Members of implementation teams
- Operators

Prerequisites

- *Initial MFG/PRO Setup* training course
- Basic knowledge of:
 - American Production and Inventory Control Society (APICS) theory
 - Theory of MRP and CRP
 - MFG/PRO as it is used in the business
- Working knowledge of the manufacturing industry in general

Approximate Length of Course

- This course is designed to be taught in one day

Certification Preparation

This course is one of several courses designed to assist students in preparing for QAD certification examinations. However, QAD does not guarantee anyone a passing grade as a result of having taken this course.

Students preparing for certification examinations should study all available materials (user guides, training guides, on-line help, for example) and acquire industry and field experience.

Using This Training Guide

Implementation consultants, members of implementation teams, and operators can use this guide in instructor-led classes, while knowledgeable consultants can use this guide for self-study.



General Training Facilities Information

- Telephone or fax
- Messages
- Restrooms
- Class hours: start and finish times, and punctuality
- Breaks: frequency, approximate times
- Parking considerations; carpooling
- Emergency procedures: location of first aid, contact person for assistance
- Exit locations, building hours
- Location of approved smoking area

CHAPTER 1

Introduction to MRP and CRP

Course Overview

- ♦ Introduction to Material Requirements Planning (MRP) and Capacity Requirements Planning (CRP)
- ♦ Business Considerations
- ♦ Set up MRP and CRP
- ♦ Use MRP and CRP

eB-MRP-IN-040

Overview

Planning and Scheduling Overview

Activity	Personnel	Planning Horizon (varies with industry)
Strategic Planning	CEO, CFO, VPs, etc.	3-5 years
MFG/PRO Planning and Control Modules		
Product Line Planning	Senior VPs, Plant Managers	Varies (1 Month is typical)
Forecasting, Master Scheduling, and RCCP	Master Schedulers	Cumulative Lead Time
MRP and CRP	Planners, Shop Floor Managers	Cumulative Lead Time

eB-MRP-IN-050

Planning and Scheduling

Component planning takes place in the Material Requirements Plan (MRP) module and the plans are checked against capacity in the Capacity Requirement Plan (CRP) module.

This tool enables you to schedule and issue orders for the items and for the work that will be needed to support the master schedule. You can use CRP to determine at a fairly precise level how this plan will load the resources you have at your site.

Component planning enables you to determine which work centers and components will be used to meet the plan. The check is to determine whether the work centers have the capacity to meet the schedule.

Items that are not master scheduled will be planned using MRP with master schedule as input. Master schedules generate demand for components. MRP uses this demand to schedule orders for components.

Planning and Scheduling Phases

Planning	Scheduling	Capacity
Product Line Planning		Resource Planning
Forecasting	Master Scheduling	RCCP
MRP	Work Orders and Shop Floor	CRP
DRP	Repetitive Scheduling	CRP

eB-MRP-IN-060

Phases

Planning and execution generally move down and to the right through the matrix shown above.

MRP is a time-phased priority planning system that calculates material requirements using:

- Product structures
- Inventory status
- The master schedule
- Open order dates

MRP plans orders, what to order, when to order, and how much to order. Supply is scheduled and rescheduled to meet changing demand and maintain valid due dates.

Planning and Scheduling Areas of Concern

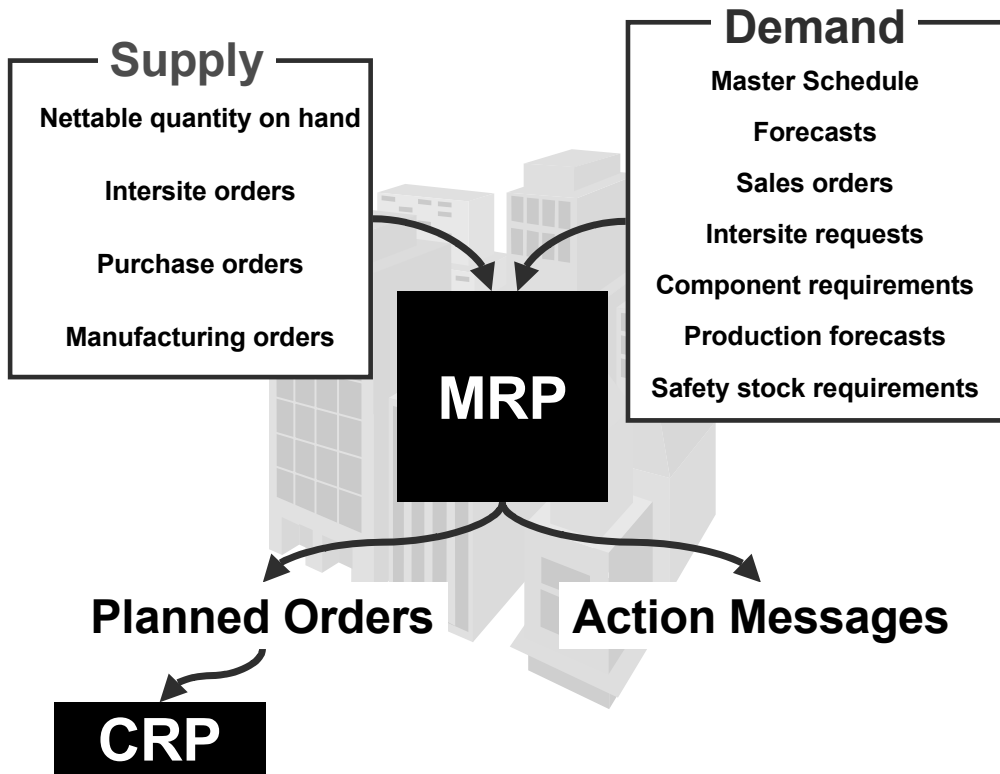
Activity	Concerns	Expectations vs Feasibility
Strategic Planning	 Sales and Profitability	Income vs Outlays
Product Line Planning	 Factories	Gross Sales vs Gross Production
Forecasting, Master Scheduling and RCCP	 End Items	Units vs Resources
MRP and CRP	 Departments, Work Centers, and Components	Planned Production vs Actual Production

eB-MRP-IN-070

Areas of Concern

MRP and CRP deal with departments, work centers, and components.

Planners and shop floor personnel use MRP results to determine manufacturing schedules which have the same time horizon as master schedules.



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Materials Requirements Planning

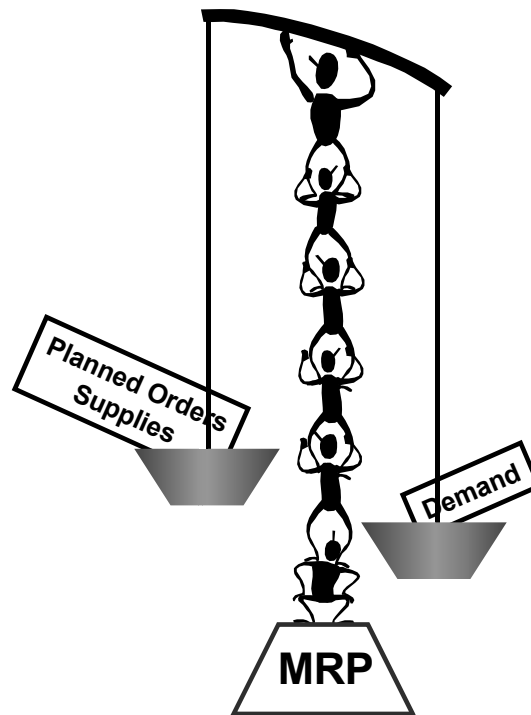
MRP balances supply and demand for purchased and manufactured items. Given a set of demands or requirements, MRP automatically calculates a time-phased schedule of planned supply orders or replenishments to satisfy those demands.

It also generates action messages to alert you to any problems such as shortages and late receipts.

- MRP looks at demand for finished items and uses product structure information to calculate demand for component items
- For each item, MRP looks at the:
 - Ordering information
 - Amount currently on hand
 - Lead times

- MRP then generates planned orders suggesting how many of each item to buy or make and when to do so
- MRP's planning activity is performed by site
 - Each site's material plan is completely independent from inventory, demand, and supply at other sites
 - To plan for multiple sites, you run MRP for each site separately
- Reliable MRP processing depends on accurate:
 - Inventory data
 - Product structures and formulas
 - Manufacturing and purchasing lead times

Balancing Supply and Demand

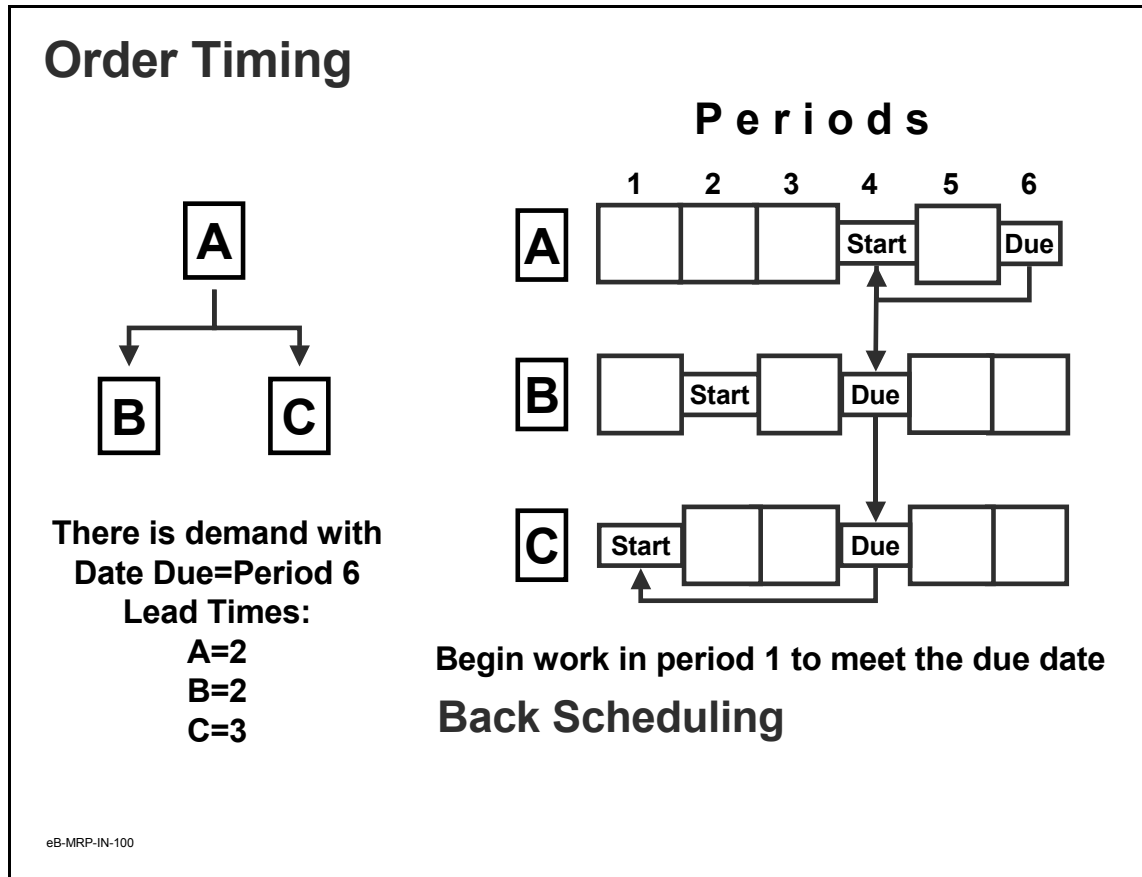


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Balancing Supply and Demand

MRP attempts to balance supply and demand. It detects imbalances in the plan and makes recommendations to restore the balance.

- It tries to drive inventory to zero, never planning more than it needs
- It plans without respect to capacity



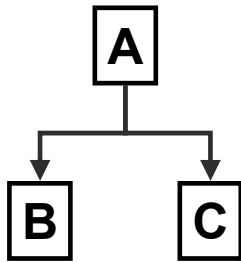
Order Timing

The master schedule sets the overall plan on which MRP bases the timing.

MRP uses backward scheduling:

- Subtract the lead time from the due date to arrive at the start date
- MRP performs this calculation for all planned orders
- A component due date is generally the parent item's release date
 - However, lead time offsets adjust the component due date
- For all non-purchased items, MRP counts only work days defined in the Shop Calendar.
- For purchased items, MRP uses regular calendar days
 - If the release date is a non-workday, MRP uses the prior workday

Calculations



Gross Requirements = 100

– Quantity on Hand = 54

– Scheduled Receipts = 17

Net Requirements (MRP Orders) = 29

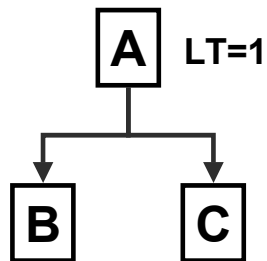
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MRP Calculations

MRP uses this calculation for each period.

- Maintaining the balance across the planning horizon complicates the calculations

Calculations



**Demand for item A
in period 4 is 100**

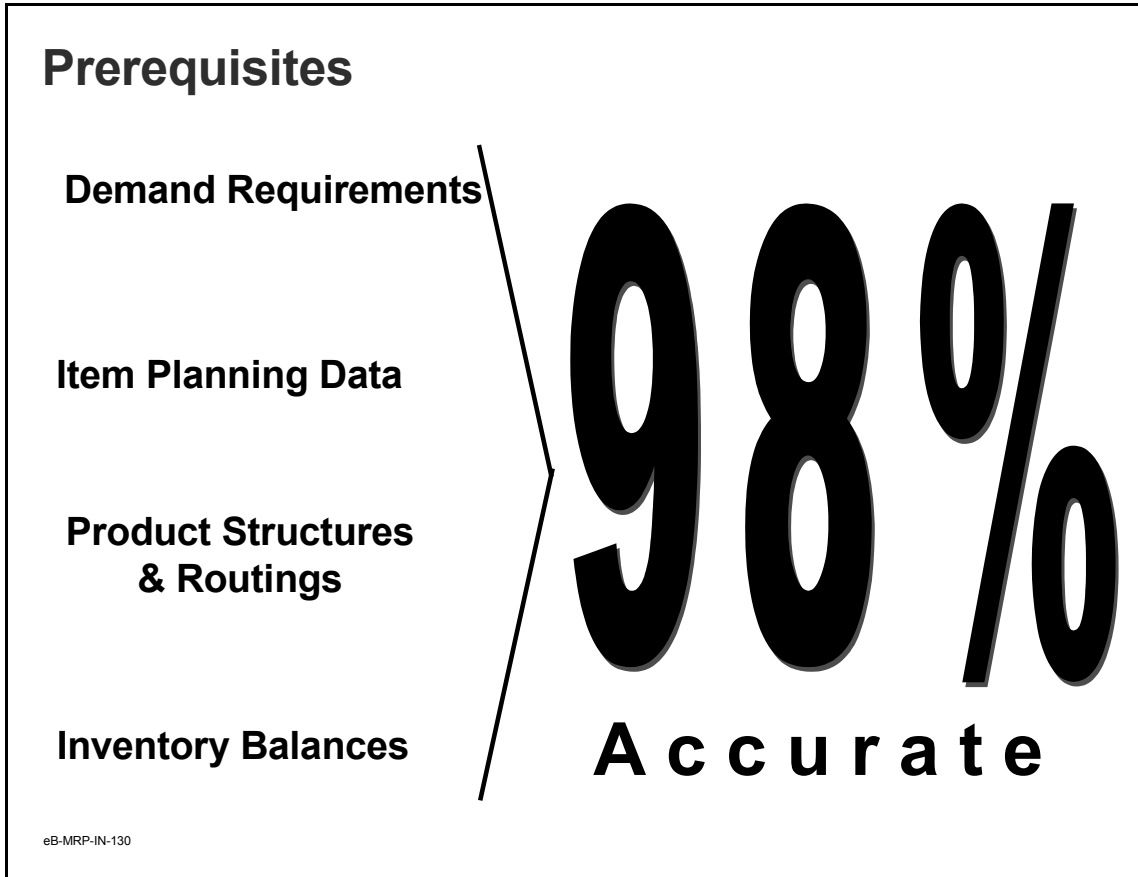
	Past Due	1	2	3	4
Gross Requirements		70	150	50	100
Net Requirements		0	0	0	70
Scheduled Receipts		250			
On-Hand Inventory	50	230	80	30	0
Planned Orders Due					70
Planned Order Release				70	

MRP also calculates the requirements for components B and C

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The illustration above shows the calculations for end item A.

- MRP also calculates the requirements for all components



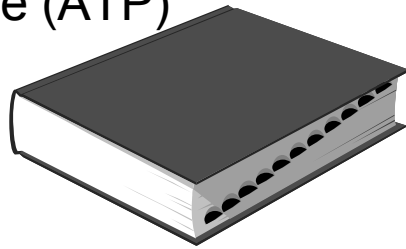
MRP Prerequisites

MRP is as accurate as its input allows it to be.

For useful output, the inputs should be more than 98% accurate.

Terminology

- ♦ Action messages
- ♦ Available to promise (ATP)
- ♦ Low-level code
- ♦ Pegging
- ♦ MRP horizon



eB-MRP-IN-140

Terminology

Action Messages

MRP Output

Recommend actions to balance supply with demand

Supply exceeds demand

Demand exceeds supply

Action Messages
De-expedite those orders Cancel that order

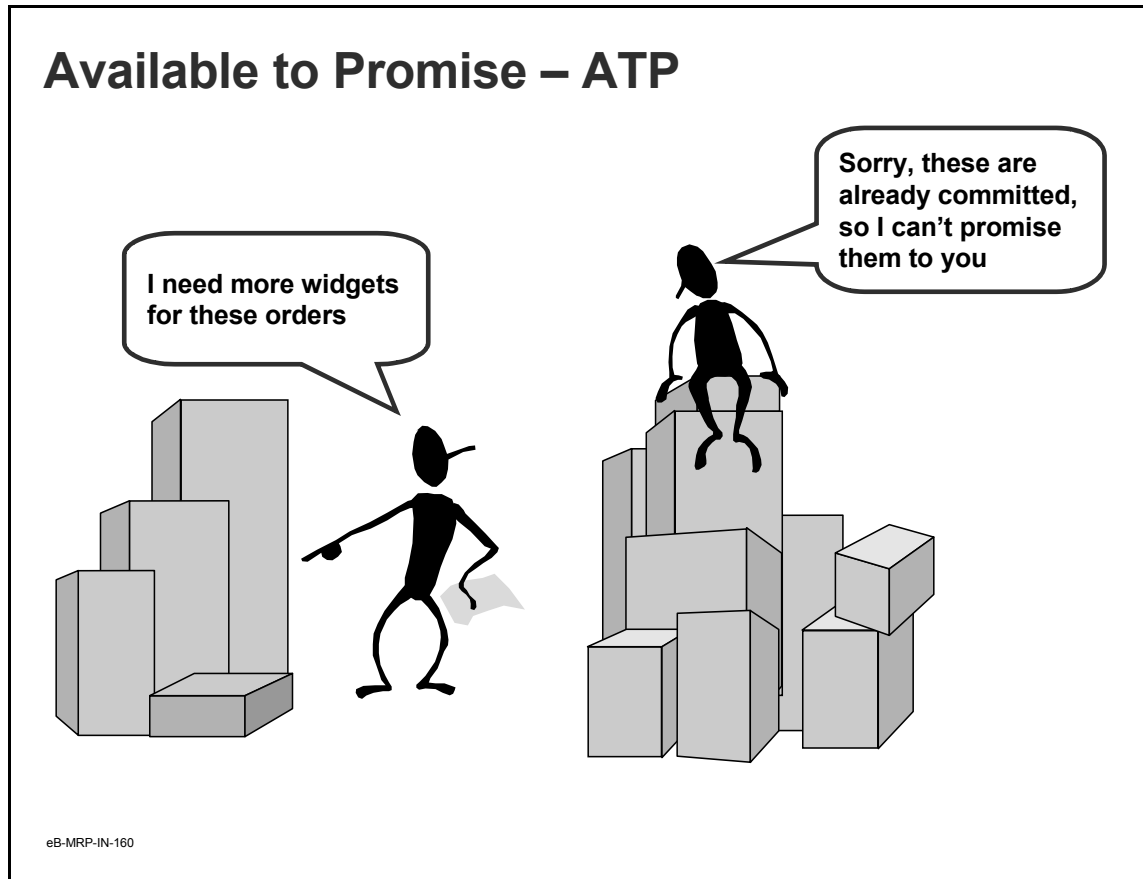
Action Messages
Expedite those orders Create these orders

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Action Messages

Action messages recommend the actions a planner should take to balance supply with demand, such as rescheduling, canceling, or releasing orders.

- MRP generates action messages for all items with non-blank order policies
 - Non-existent order policies are planned as LFL



Available to Promise

Available-to-promise (ATP) is the uncommitted portion of inventory or planned production which is available to be promised to new sales orders. The system displays ATP quantities on master schedule reports and inquiries.

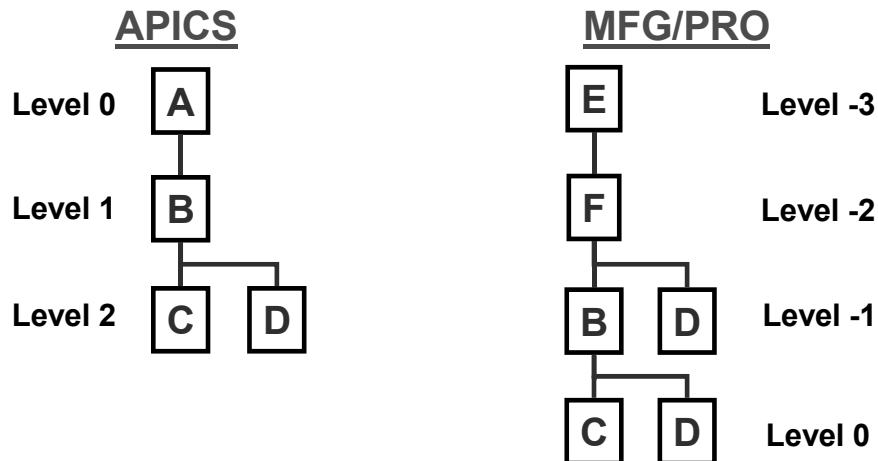
ATP can be used to verify whether a sales order can be filled within a specific time frame given other demands and currently scheduled supply orders.

- The system calculates ATP by time period by deducting real demand from real supply
 - Real demand includes requirements for work order components, sales orders, and required ship schedules
 - Real demand excludes forecast and production forecast

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- Real supply includes quantity-on-hand, purchase orders, work orders, and repetitive schedules
- A net decrease in demand increases ATP, while a net increase in demand decreases ATP

Low-Level Codes



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Low-Level Codes

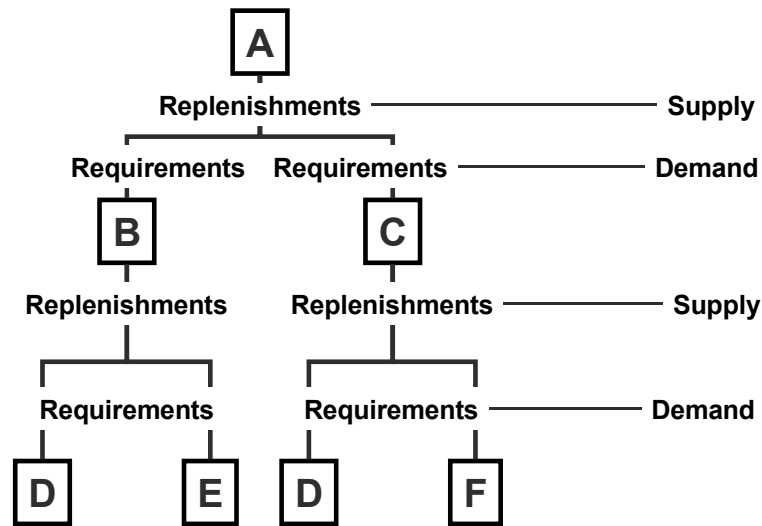
- Low-level codes indicate the relative position of each item within the product structures
- MRP uses low-level codes to ensure that all dependent demands from parent items are included
 - In the diagram above, item C's low-level code is determined by the product structure for item E, not by item A
- MRP stops searching for occurrences of the item when it reaches the lowest level in each product structure, thus saving time
- MFG/PRO and APICS number the levels differently, but the process is the same: search for the item from the top down in each structure and stop searching after the lowest-level code for the item

- MFG/PRO automatically updates the low-level codes when you enter or modify product structures

Low-level codes can be inaccurate if you import data without testing it, or if you modify structures directly from PROGRESS.

If you believe that the codes are incorrect, you should run Low Level Code Update.

Pegging



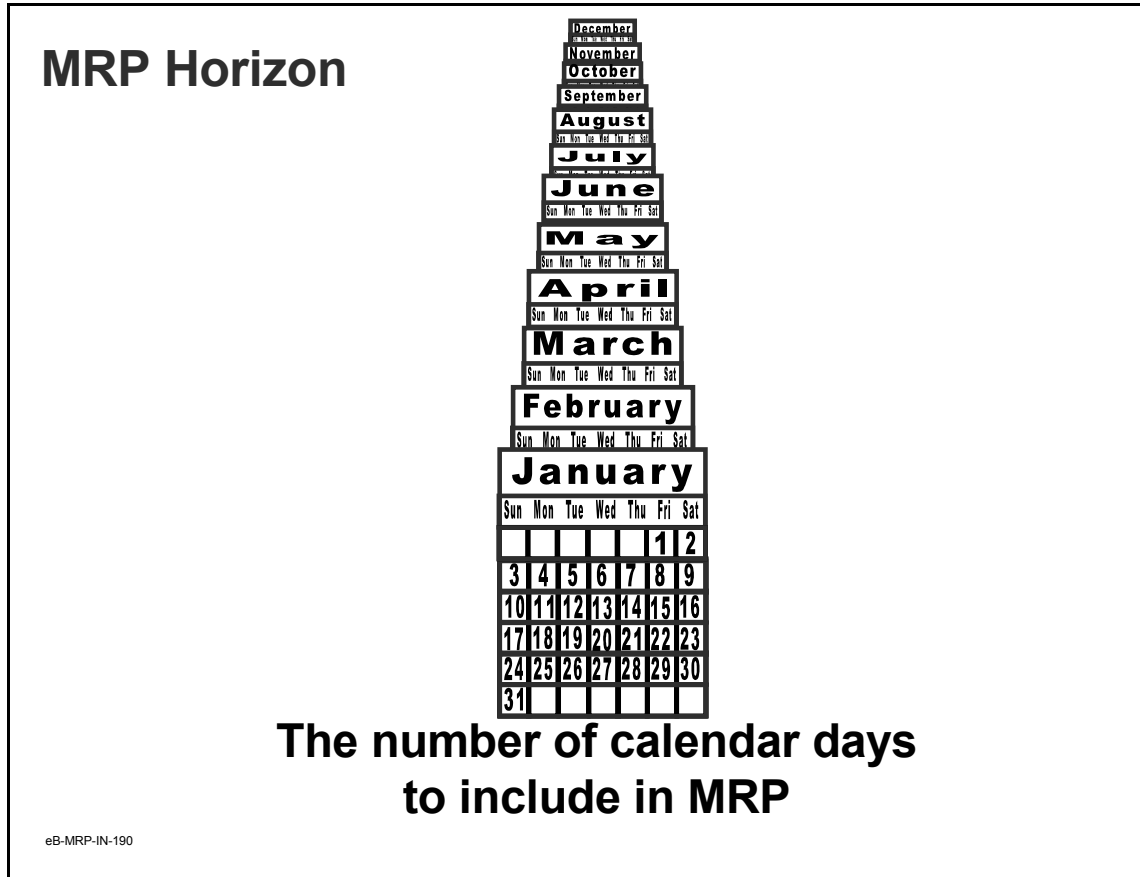
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Pegging

Pegging identifies the source of the requirements. For example, pegging identifies the sales order or forecast creating the need for an item.

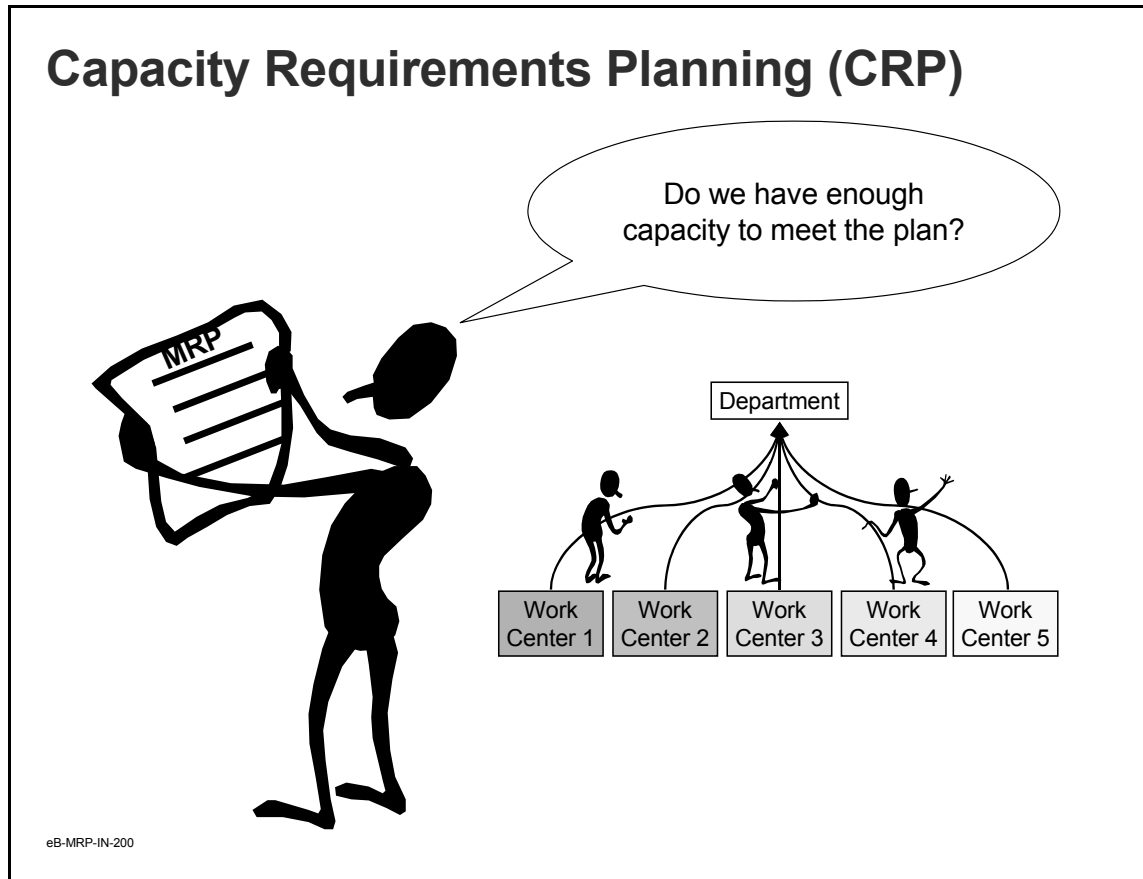
Pegging is made possible by the low-level codes.

- Pegging is maintained for one level
 - In the above example, you can see that the requirement for E came from B, and the requirement for B came from A, but you cannot inquire about E and see that its requirement comes from A



MRP Horizon

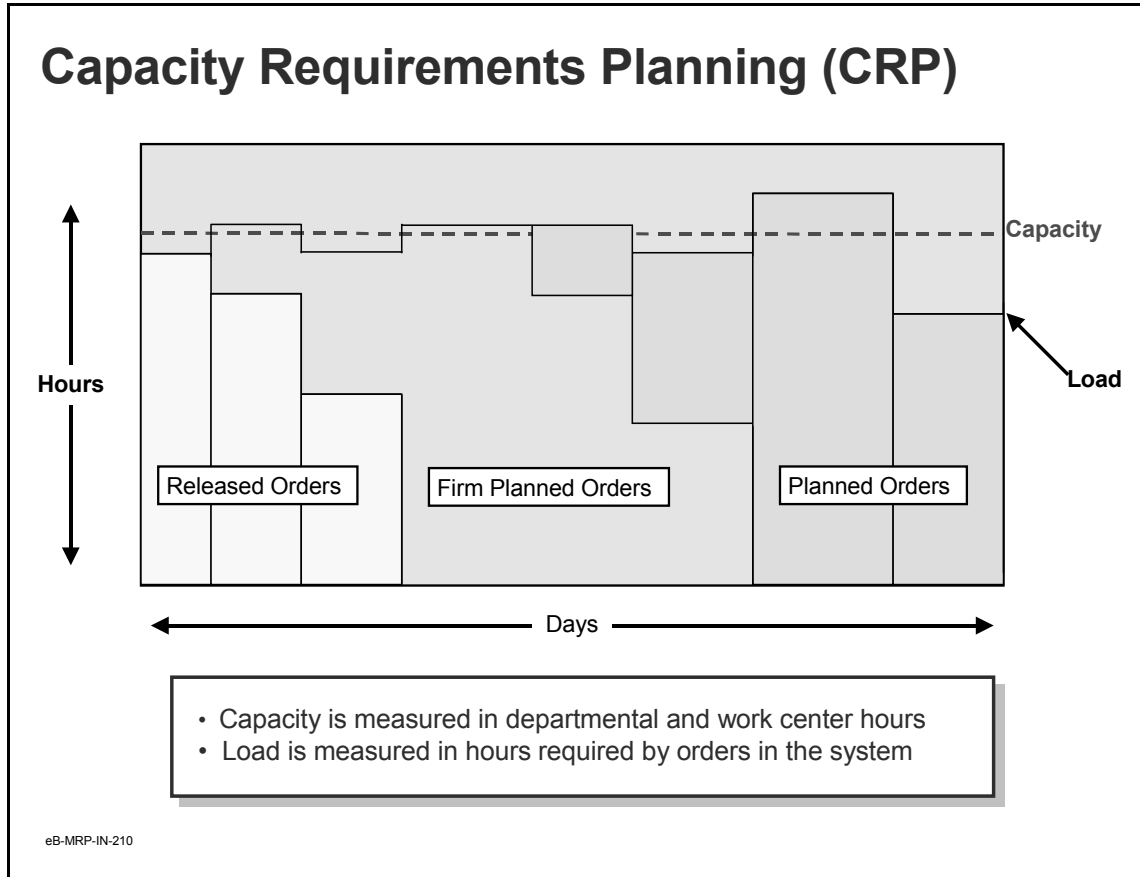
- The number of calendar days to include in the MRP planning horizon
 - MRP only processes material requirements within this planning horizon, ignoring activity outside this horizon
 - This horizon should be at least one day longer than your longest cumulative lead time
 - If you change the MRP planning horizon, replan all items by running Regenerate Materials Plan.



Capacity Requirements Planning

CRP calculates the workload in a given department or specific work center or machine by:

- Exploding the routings and processes for MRP planned and firm planned orders
 - Updates or creates work order routings
- Determining the start/due dates for each operation using:
 - Work center and shop calendars
 - Back scheduling (start date of the last operation is the due date of the previous operation)



The Foundation for CRP

MRP provides the foundation for calculating CRP, a tool used to complete the master schedule.

Master scheduling and rough-cut capacity planning (RCCP) should have removed most of the capacity constraints before MRP is run.



Discussed in the following Training Guide: Master Scheduling and Rough-Cut Capacity Planning (RCCP)

- MRP looks at the inventory and at orders
- CRP uses routings and work centers
- RCCP uses resources and resource bills

Back Scheduling

When CRP back schedules orders, it takes the due date of an order or repetitive schedule and schedules each of its operations from the last operation in the order routing or process backward to the first one.

CRP assigns each operation a start date and a due date, using the operation lead time components—queue, setup, run, wait, and move—to calculate operation start dates.

- The start date of an operation is the same as the due date of the previous operation
- CRP calculates run times based on the actual order quantity
 - Order quantity less the quantity completed

Departments and Work Centers

- Resources used to process orders on the shop floor, from subassembly to end item, are:
 - Departments
 - Work centers
 - Number of machines

Departments

The capacity of a department is the:

- Total number of available labor hours per day for all work centers in the department
 - Defined in Department Maintenance

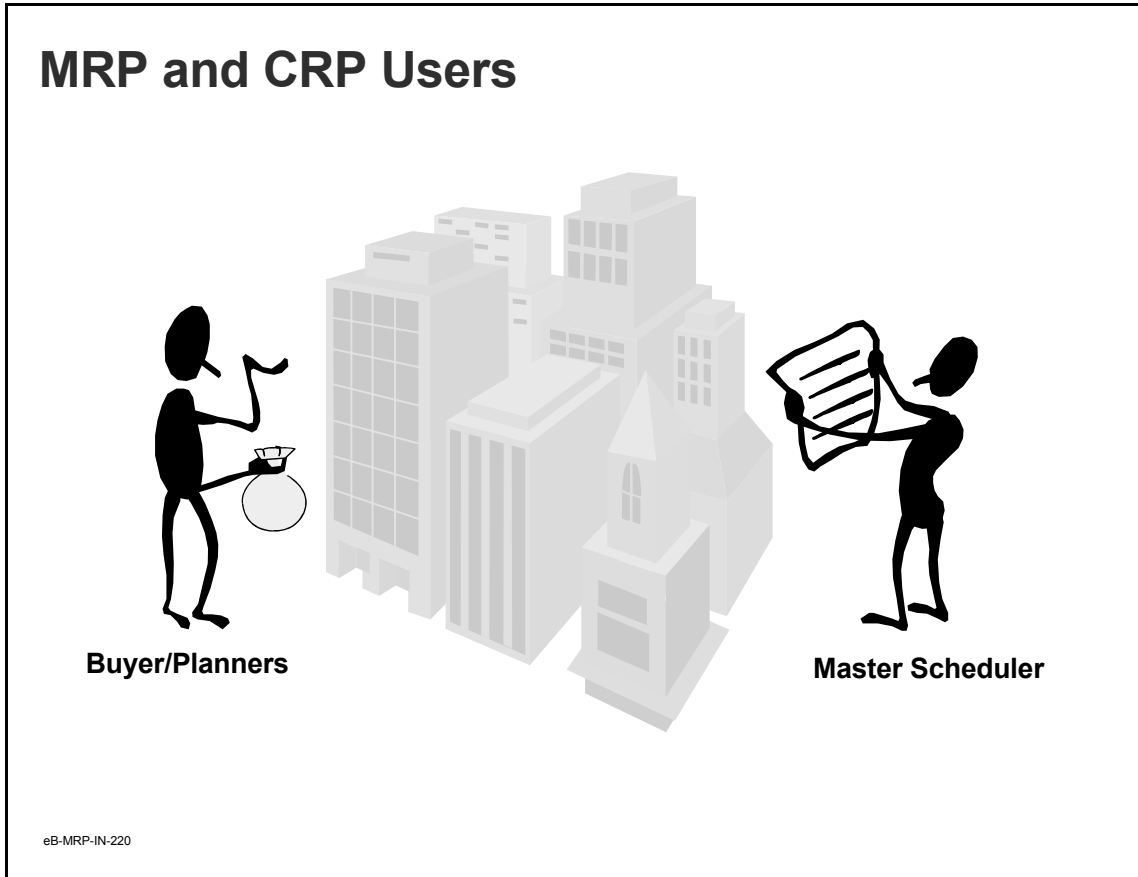
Work Centers

The capacity of a work center is the:

- Number of machines and personnel available multiplied by work hours in a period
 - Defined in Work Center Maintenance and Calendar Maintenance

CRP loads (or simulates) the expenditure of work center and department hours using orders as production demand.

- Work order routings provide data about what orders will be using what work centers and when



MRP and CRP Users

MRP and CRP are high-level operations that should be password protected and used only by qualified employees.

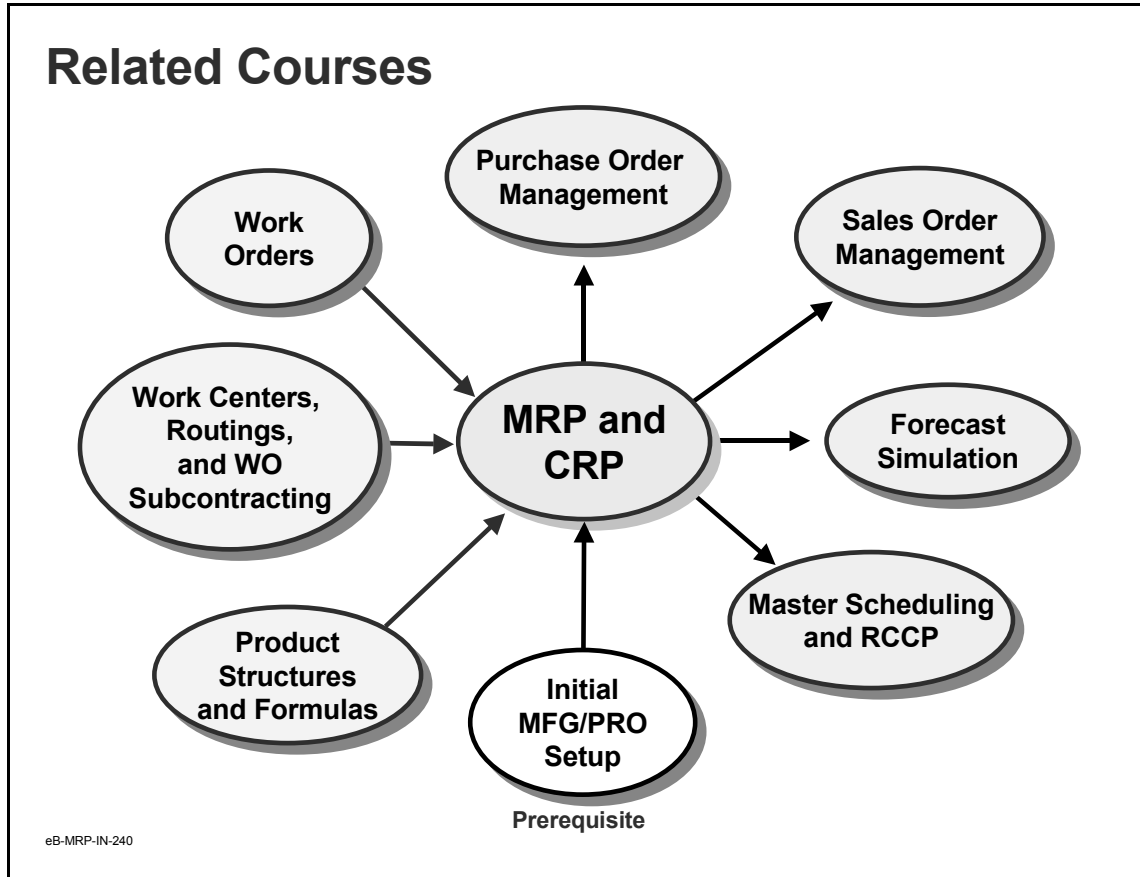
Course Objectives

In this class you learn how to:

- ♦ Identify some key business considerations before setting up MRP and CRP in MFG/PRO
- ♦ Set up MRP and CRP in MFG/PRO
- ♦ Use MRP and CRP in MFG/PRO

eB-MRP-IN-230

Course Objectives



Related Courses

Course Overview

- ✓ Introduction to MRP and CRP
- ♦ Business Considerations
- ♦ Set up MRP and CRP
- ♦ Use MRP and CRP

eB-MRP-IN-250

Course Overview

CHAPTER 2

Business Considerations

Business Considerations

In this section you learn how to:

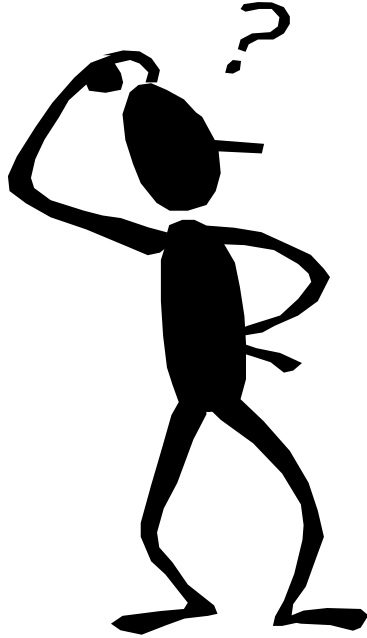
✓ **Identify some key business considerations before setting up MRP and CRP in MFG/PRO**

- ♦ Set up MRP and CRP in MFG/PRO
- ♦ Use MRP and CRP in MFG/PRO

eB-MRP-BU-010

Objectives

Business Considerations



eB-MRP-BU-020

- ✓ **Planning parameters**
- ✓ **Kanban**
- ✓ **Batch processing**
- ✓ **Cumulative lead times**

There are several business issues to take into consideration before using MRP and CRP.

This section does not discuss all potential issues, but presents some issues to generate thought and discussion.

Planning Parameters

Phantom: ☐

Minimum Order: 0

Maximum Order: 0

Order Multiple: 0

Mstr Sched: ☒

Plan Orders: ☒

Time Fence: 0

MRP Required: ☐

Order Policy: POQ

Order Qty: 0

Batch Qty: 1.0

Order Period: 7

Item Planning Data

Buyer/Planner: qad

Supplier: 5003000

PO Site: 15000

Purchase/Manufacture: M

Configuration Type:

Inspect: ☐

Ins LT: 0

Cum LT: 0

Mfg LT: 0

Pur LT: 0

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Planning Parameters

You set these in Item Planning Maintenance and Item-Site Planning maintenance.

Definition

Planning parameters are established for each item in your database; they govern the way MRP handles the items.

Why Consider?

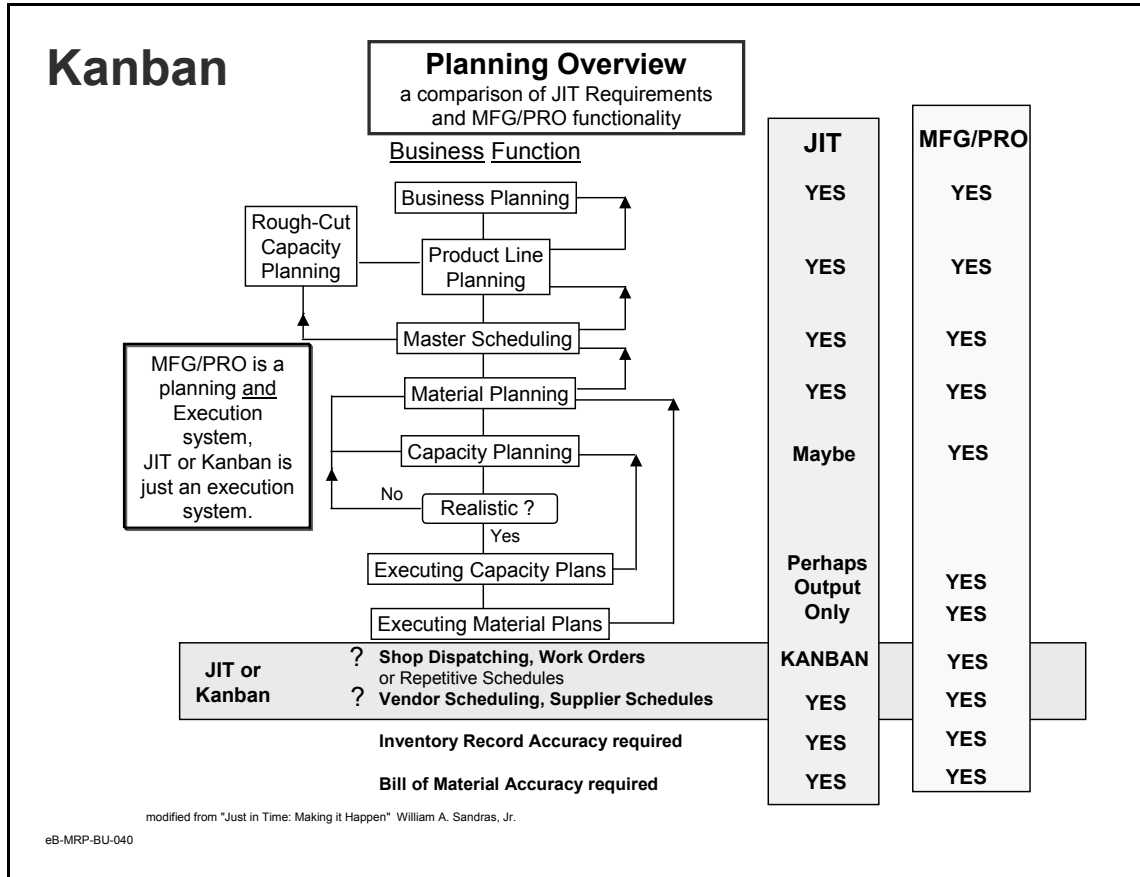
MRP is only as accurate as the data it processes; your planning parameters should have 98% plus accuracy.

Functionality in MFG/PRO

The item planning data is the most used information in your database.

Setup Implications

- Inaccurate data can be catastrophic
- A good clean-up of the database is always worthwhile



Kanban

Definition

A Japanese method of production and inventory control first developed and used at Toyota.

- Designed for day-to-day, on-floor control of production and inventory, it relies on a series of control triggers, typically a visual one in the form of cards
- Kanban is the predecessor of Just in Time

Kanban is an appropriate way to schedule a plant if:

- You use advanced repetitive with single-step routings or multiple steps with a milestone at the last operation

- Otherwise, you need a repetitive exploded schedule in place to net the work in process

Why Consider?

Many companies use it. Some QAD customers use kanban in their plants and MRP to create supplier schedules.

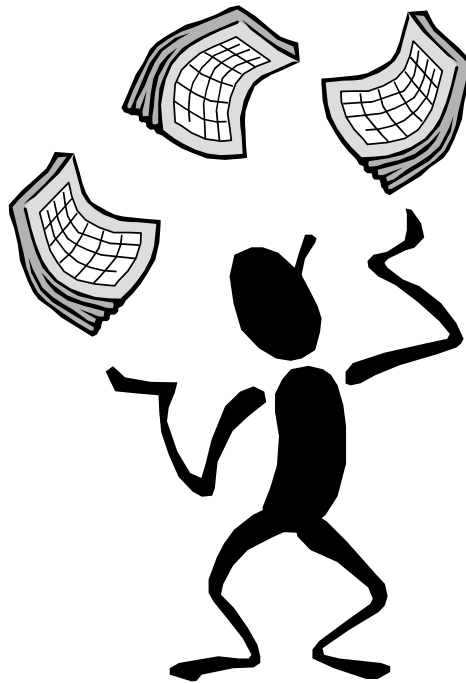
- You can set up separate Buyer/Planner codes to apply to kanban and non-kanban items

Setup Implications

Planning parameters in Item Planning Maintenance can be set to conform with kanban needs.

- Set Order Policy to POQ with a period of 1 or 2 days
- Avoid order modifiers

Batch Processing



eB-MRP-BU-050

Batch Processing

Definition

A computer technique where transactions are accumulated and processed together.

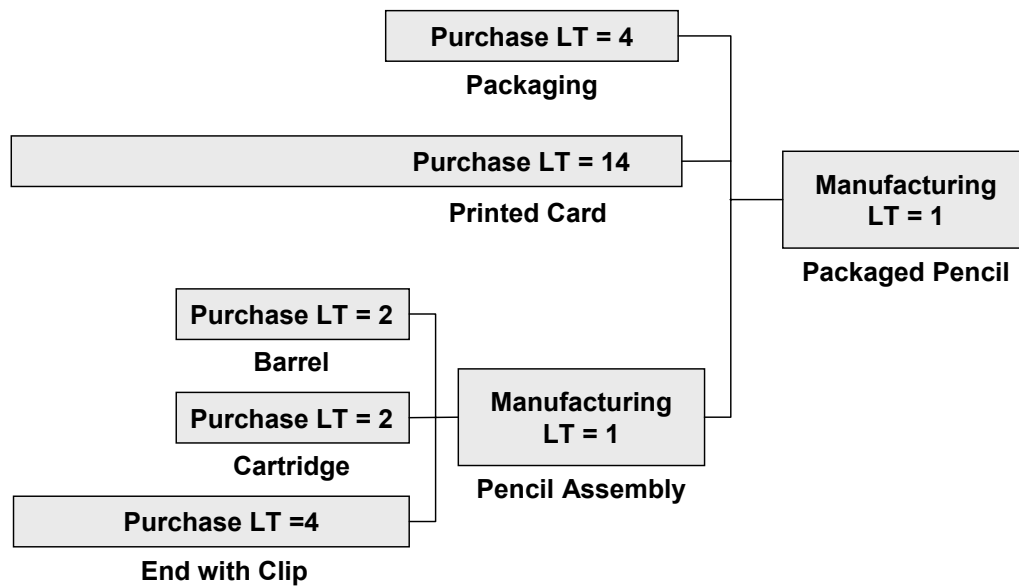
Why Consider?

MRP runs can take a long time.

- You should schedule MRP at reasonable intervals, depending on:
 - How often you require change, how often your suppliers need updates, and the length of your MRP horizon

Cumulative Lead Times

Longest Lead time in the process is 15 days (14 Pur LT + 1 Day Mfg LT)



eB-MRP-BU-060

Cumulative Lead Times

Definition

The time required to produce an item, based on component lead times.

Why Consider?

- MRP considers component lead times in generating its plan
- Inaccurate lead times result in faulty plans



Discussed in the following Training Guide: Product Structures and Formulas

Course Overview

- ✓ Introduction to MRP and CRP
- ✓ Business Considerations
 - ◆ Set up MRP and CRP
 - ◆ Use MRP and CRP

eB-MRP-BU-070

CHAPTER 3

Set Up MRP

Set up MRP and CRP

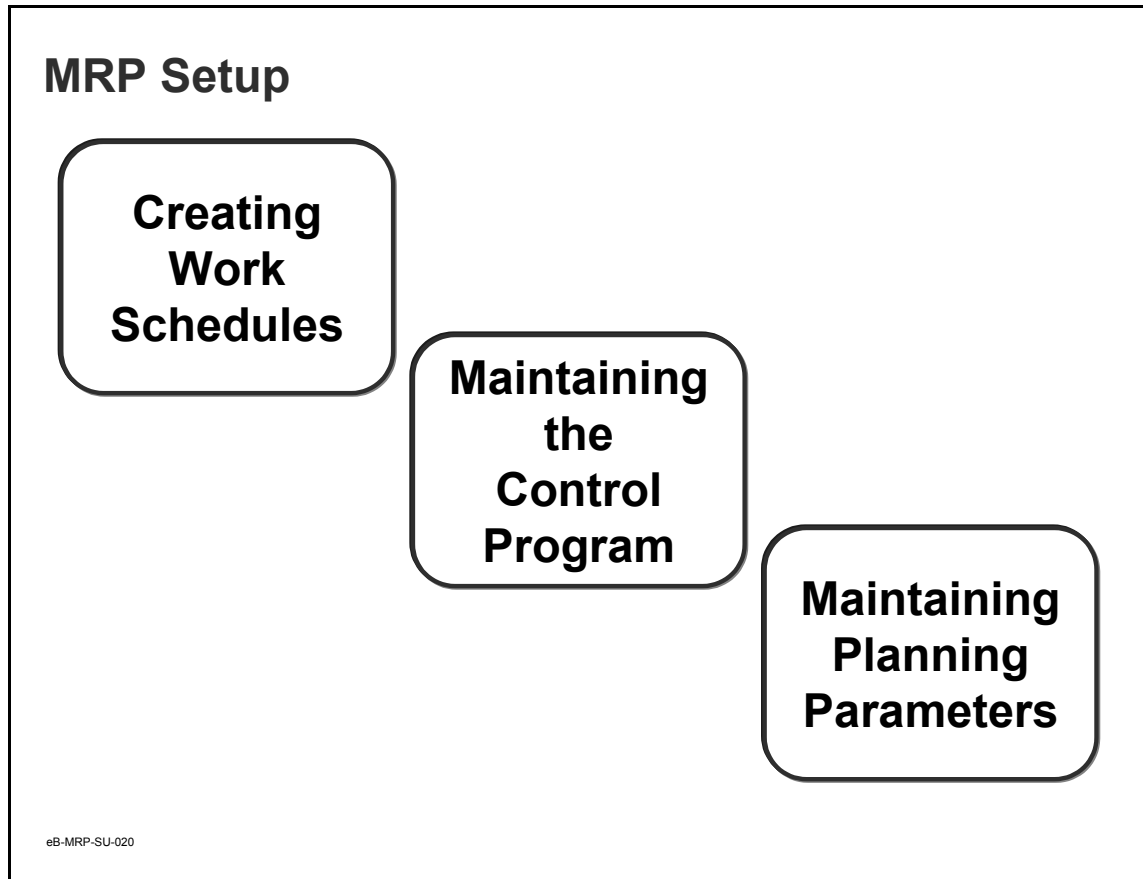
In this section you learn how to:

- ✓ Identify some key business considerations before setting up MRP and CRP in MFG/PRO
- ✓ **Set up MRP and CRP in MFG/PRO**
 - ♦ Use MRP and CRP in MFG/PRO

eB-MRP-SU-010

Lesson Objectives

This lesson covers the data you need to enter or configure for a successful MRP implementation.



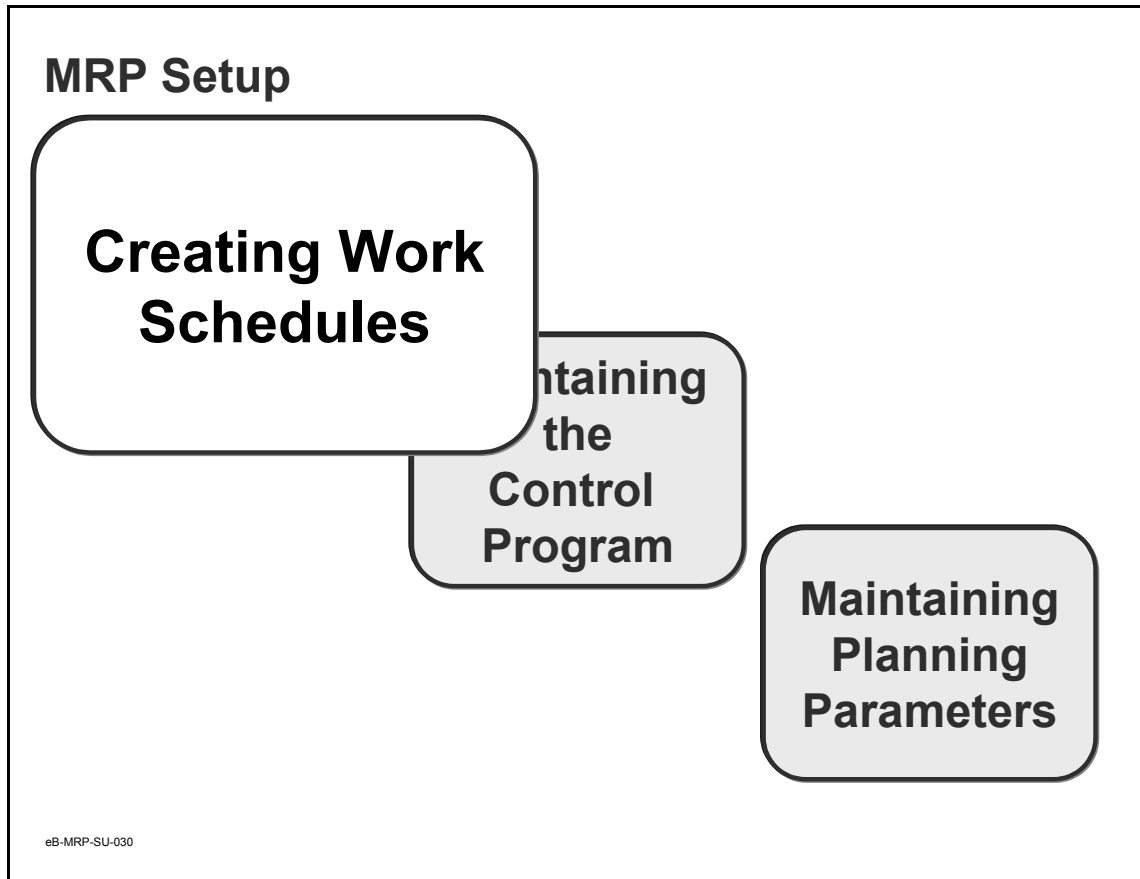
Introduction

This illustration is a suggested setup sequence for MRP.

The first step is to verify the accuracy of your work schedules and holidays so that MRP can properly plan your activities.

The second step is to set up or maintain the MRP control program.

The third step is to verify the planning parameters of your items so that MRP can properly process them.



Creating Work Schedules

Here you look at how to create calendars and holidays in MFG/PRO.

Holiday Maintenance

Site	Date		Holiday
12000	01/01/2003	Wednesday	New Years Day
12000	12/25/2003	Thursday	Christmas Day

Holiday Maintenance

This program schedules nonwork days; MRP ignores these dates in planning work.

Site

The site to which the holiday applies.

Date

The holiday date.

Holiday

A brief, reference-only description.

Calendar Maintenance

Work Day	Hours
Sunday: ☐	0.00
Monday: ☒	8.00
Tuesday: ☒	8.00
Wednesday: ☒	8.00
Thursday: ☒	8.00
Friday: ☒	8.00
Saturday: ☐	0.00

eB-MRP-SU-050

Calendar Maintenance

Calendars provide the basis for MRP scheduling functions. You can create calendars for individual work centers or for the entire site.

At least one calendar must be defined. Calendars define the standard work week for a site and the work centers in it. They also define exceptions to the normal calendar, such as scheduled overtime or shutdown periods.

- For each site, set up at least one calendar without specifying work centers or machines
 - This sets the default for the site

Site

This field contains the site code to which this shop calendar applies.

Work Center

The work center to which this shop calendar applies.

Machine

The machine to which this shop calendar applies.

A work center is uniquely identified by a work center code and a machine code.

Work Day / Hours

Shows which days are work days and how many hours are available for work.

When calculating schedule due and release dates, the system only looks at scheduled work days, ignoring exceptions and holidays.

- If you set work day to [N] on a Sunday, the system will never schedule a work order or purchase order due date that day
- If you sometimes work on a Sunday, you should enter *Yes* in work day and set the scheduled hours to zero, allowing due dates to fall on a Sunday, which you can reschedule manually

Exceptions to the Calendar

Exceptions to the normal calendar are identified by a reference code and a start and end date. Use these fields to schedule overtime, increased shifts, reduced shifts, preventative maintenance or shutdowns. The number of hours specified is added (or subtracted) from the normal work day for each day in the range of dates specified.

Reference

A reference code identifying an exception to the shop calendar, usually describing the type of exception, such as *Overtime* or *Shutdown*.

Exceptions only record holidays if the holiday only applies to some work centers. If the holiday applies to all work centers, use Holiday Maintenance.

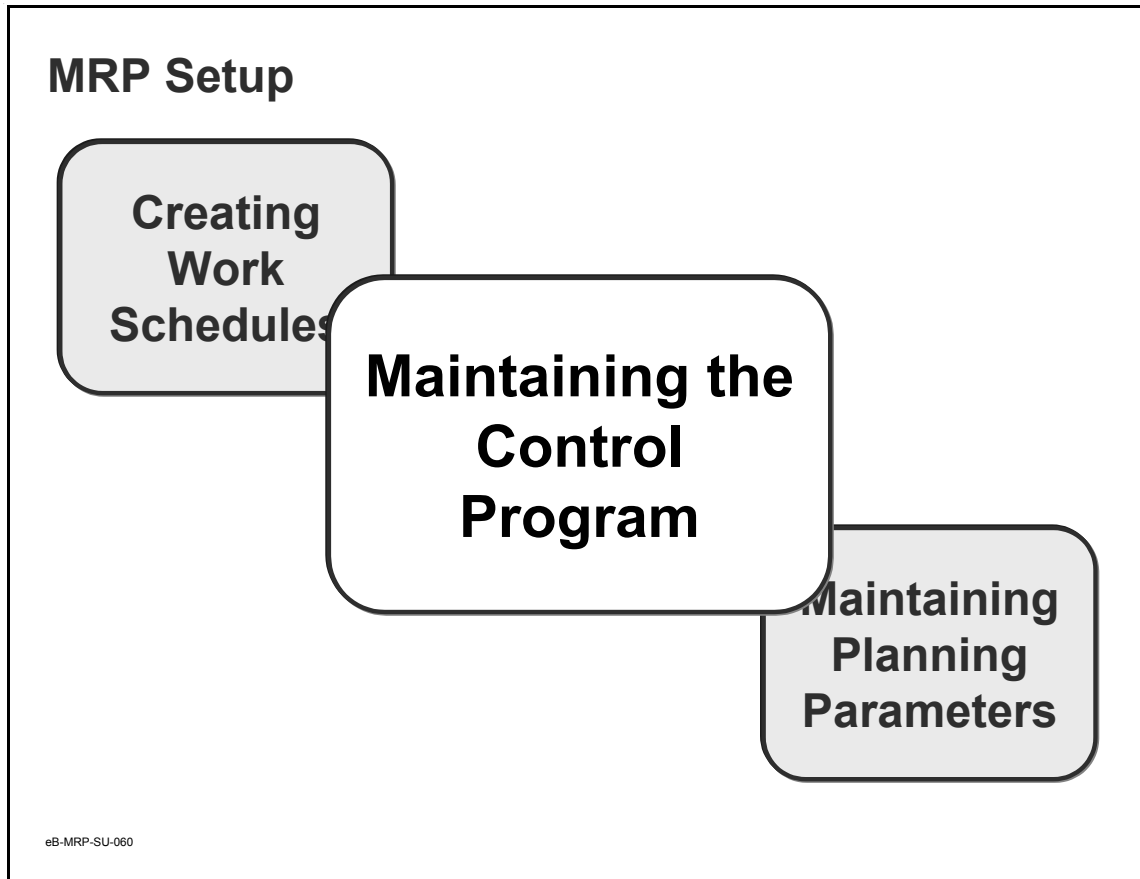
Start / End

The start and end dates of the exception.

Enter start and end dates carefully. The exception applies to all work days in the range of dates specified.

Daily Hours

Daily hours may be positive or negative. A positive number increases scheduled work hours; a negative number decreases them.



Maintaining the Control Program

The MRP control program sets some basic parameters.

MRP Control

MRP Control

MRP Horizon: 21

MRP/DRP Combined: ☒

Summary Default: Monday

Order Release Horizon: 7

Enable Op Based Yield: ☐

Use AppServer: ☐

AppServer Name:

Default Number of Threads: 0

Add Link

MRP Control

MRP Horizon

The period of time, in calendar days, which MRP should plan.

- MRP calculations ignore data outside this time period
- The horizon should be at least one day longer than the longest item cumulative lead time in the database to avoid planning it late

Note If you change the MRP planning horizon, impacted items are not automatically replanned when you run Net Change Material Plan. Ensure that all items are replanned by running Regenerate Materials Plan.

MRP/DRP Combined

Indicates whether MRP planned items can be planned by the Distribution Requirement Planning (DRP). DRP is the balancing of supply and demand for items transferred between sites.

- *No*=MRP planned items may be recalculated only using the MRP functions
- *Yes*=MRP planned items may be recalculated using DRP planning functions
- When to run DRP and MRP depends on where in the structure your DRP items are:

- If you are distributing finished products, you can usually run DRP followed by MRP
- If you are supplying component items between sites, you can usually run MRP followed by DRP
- You would normally only need to run a combined MRP/DRP when you have DRP items at multiple levels of the product structure

Summary Default

Indicates the day of the week all MRP summary reports and inquiries should start.

Order Release Horizon

The number of calendar days before planned order release that an action message should appear.

- MRP assigns *Release Due* action messages to orders with release dates within this release horizon
 - For example, if you set the release horizon to 7 days, all orders due to be released within the week have a *Release Due* action message
- This gives planners time to take appropriate actions
- The release horizon setting should reflect your normal paperwork leadtime and how often you run MRP
 - If you run MRP once a week, the release horizon should be at least 7 days
 - If you run MRP daily, you can leave this field at zero

Enable Op Based Yield

This field determines how the system calculates yield for component items when product structures and routings are exploded in material requirements planning (MRP) programs, work orders, repetitive, advanced repetitive, and configured products.

- *No*=The system uses the Yield % field associated with the parent item in Item Planning Maintenance or Item-Site Planning Maintenance to calculate component requirements.
- *Yes*=The system derives the yield percentage amount for components from operations on the parent item's routing. The Yield % field associated with the item is used for the parent item only, not the components.

Note Even when Enable Op Based Yield is Yes, this calculation method is only used for parent items with Operation Based Yield set to Yes in either Item Planning Maintenance or Item-Site Planning Maintenance.

Use AppServer

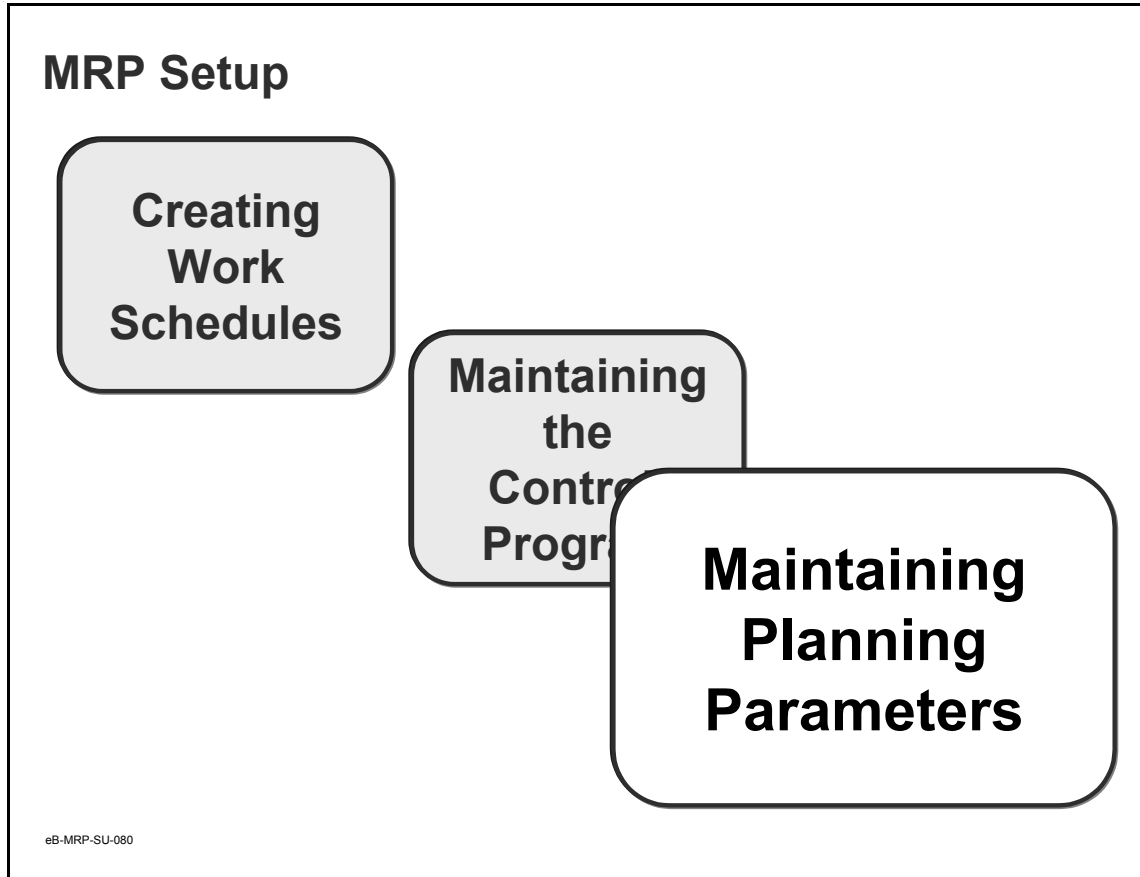
Specify whether your system uses a Progress application server to run MRP/DRP processes on a Symmetric Multiple Processor (SMP) computer.

AppServer Name

When Use AppServer is Yes, enter the name of the application server that is configured to run the MRP/DRP programs.

Default Number of Threads

When your system uses an AppServer for MRP/DRP processing, enter the default number of processing threads, or agents, that the AppServer can create. This can be any integer up to 99.



Maintaining Planning Parameters

The material planning department uses item planning data to determine how and when to replenish inventory. This data affects MRP, purchasing, manufacturing, configured products, and costing. Most of the fields are used in MRP.

Buyer/Planners need to understand the planning parameters for the items. These parameters must be set appropriately for your company.

Item Planning Maintenance

The screenshot shows the 'Item Planning Maintenance' window for Item Number 44-100, Description: CONTROL UNIT, HOME USE, and Unit of Measure: EA. The window is divided into several sections:

- Item Planning Data:**
 - Buyer/Planner: qad
 - Supplier: 5003000
 - PO Site: 10000
 - Purchase/Manufacture: M
 - Configuration Type:
 - Inspect:
 - Ins LT: 0
 - Mfg LT: 3
 - Cum LT: 0
 - Pur LT: 1
 - Phantom:
 - Minimum Order: 0
 - Maximum Order: 0
 - Order Multiple: 0
 - Op Based Yield:
 - Yield Percent: 100.00%
 - Run Time: 0.000
 - Setup Time: 0.000
 - EMT Type: NON-EMT
 - Auto EMT Processing:
 - Network Code:
 - Routing Code:
 - BOM/Formula:
- Master Schedule:**
 - Mstr Sched: ☒
 - Plan Orders: ☒
 - Time Fence: 0
 - MRP Required: ☒
 - Order Policy: LFL
 - Order Qty: 10
 - Batch Qty: 1.0
 - Order Period: 0
 - Safety Stock: 0
 - Safety Time: 0
 - Reorder Point: 0
 - Rev: AC
 - Issue Policy: ☒
- ATP Enforcement:**
 - ATP Enforcement: NONE
 - Family ATP:
 - Run Seq 1:
 - 2:

At the bottom right, there is an 'Add Link' button.

eB-MRP-SU-090

Item Planning Maintenance

MRP uses item planning data to plan items. You define this data in Item Planning Maintenance. If an item is used at multiple sites, you can set up planning data differently for each site using Item-Site Planning Maintenance. Data not defined in Item-Site Planning Maintenance defaults from Item Planning Maintenance.

Independent demand items can be identified in the Master Production Schedule (MPS) and planned by a master scheduler, whereas dependent demand items are planned by MRP except items replenished according to a reorder point policy.

- MPS represents what the company plans to produce expressed in specific configuration, quantities, and dates

Master Schedule Item Parameters

- Master Schedule: Yes
- Plan Order: Yes
- Time Fence: Management policy
- Order Policy Any policy except blank

MRP Items

- Master Schedule: No
 - Yes if there is spare part or other independent demand usage to be master scheduled
- Plan Orders: Yes
- Time Fence: Optional
- Order Policy: Any policy except blank

Reorder Point Items

- Master Schedule: No
- Plan Orders: No
- Time fence: 0
- Order Policy: <blank>
- Reorder Point: Non-zero quantity, such as demand during lead time
- Issue Policy: No (Optional)



See in this training guide: *Order Policies and Modifiers* on page 64

Item-Site Planning Maintenance

Item Number: 44-100

Description: CONTROL UNIT, HOME USE

Unit of Measure: EA

Site: 12000

Mstr Sched:☒

Plan Orders:☒

Time Fence:0

MRP Required:☒

Order Policy:LFL

Order Qty:10

Batch Qty:1.0

Order Period:0

Safety Stock:0

Safety Time:0

Reorder Point:0

Rev:AC

Issue Policy:☒

Item Planning Data

Buyer/Planner:qad

Supplier:5003000

PO Site:12000

Purchase/Manufacture:M

Configuration Type:

Inspect:

Ins LT:0

Mfg LT:3

Cum LT:0

Pur LT:1

ATP Enforcement:NONE

Family ATP:

Run Seq 1:

2:

Phantom:

Minimum Order:0

Maximum Order:0

Order Multiple:0

Op Based Yield:

Yield Percent:100.00%

Run Time:0.000

Setup Time:0.000

EMT Type:NON-EMT

Auto EMT Processing:

Network Code:

Routing Code:

BOM/Formula:

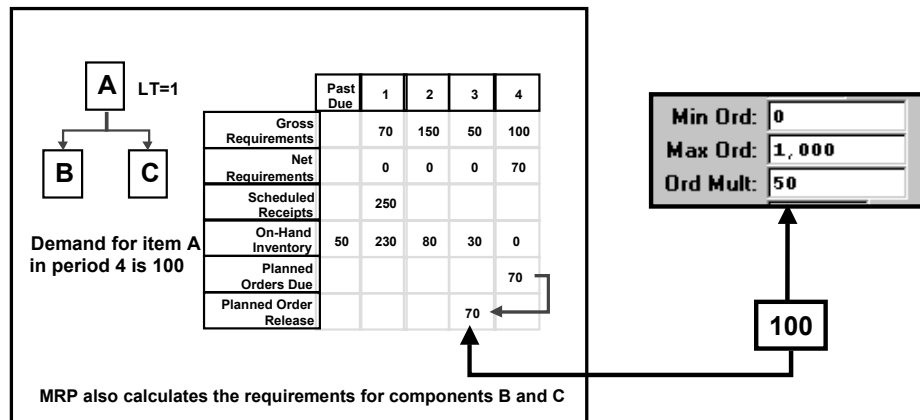
Add Link

eB-MRP-SU-100

Item-Site Planning Maintenance

Use this function to set planning data for item on a site-by-site basis.

Order Policies and Modifiers



Order policies and modifiers control the type and quantities of MRP-generated orders

eB-MRP-SU-110

Order Policies and Modifiers

The graphic shows the MRP calculation from the introduction and how it would change if the Order Multiples field were set to 50.

Order Policy

Lot-for-Lot (LFL)

Planned orders will be created for the net requirement quantities for each demand. LFL consumes on hand available and on order available prior to creating a supply order to cover this demand.

Period Order Quantity (POQ)

Planned orders will be created to satisfy requirements for the number of calendar days specified in the Order Period field each time an order is created. Orders are only created when needed.

Fixed Order Quantity (FOQ)

Planned orders will be created for the quantity specified in the Order Quantity field.

One Time Only (OTO)

A planned order will be made for a quantity of one only. As long as one (1) order exists, another will not be created. This can be used for prototypes.

No Order Policy (blank)

MRP does not plan the item even when the Plan Orders flag is set to Yes.

Order modifiers

Order modifiers change planned order quantities.

Order Quantity

A specified quantity used in conjunction with the Fixed Order Quantity (FOQ) order policy. It is also used for all item cost and lead time calculations as the standard order quantity.

Safety Stock Quantity

A specified quantity used as inventory reserve to compensate for unexpected demand and to maintain desired service levels. This applies to all order policies, including a blank.

Minimum Order Quantity

This is the smallest order quantity that will be planned. Minimum quantities should only be used with items that have continuing demand, since the minimum order quantity could exceed the actual current demand. Items that have decimal demand values from yield or scrap calculations can be forced to whole numbers by setting this to 1 or to any whole number.

Maximum Order Quantity

MRP generates a warning message in the event a planned order quantity is larger than the specified maximum order quantity. Excessively large lot sizes may tie up a resource so that other orders may be delayed unnecessarily. Further, setting a quantity limit can uncover data entry errors (i.e., entry of 1,000 instead of 100).

Order Quantity Multiple

Planned orders will be created in multiples of this quantity. That is, if the order multiple is 100, planned orders will only be created for quantities of 100, 200, 300, etc. Order multiples are appropriate for multiple cavity molding applications, packaging, etc.

Course Overview

- ✓ Introduction to MRP and CRP
- ✓ Business Considerations
- ✓ Set up MRP and CRP
- ♦ Use MRP and CRP

eB-MRP-SU-120

CHAPTER 4

Use MRP and CRP

Use MRP and CRP

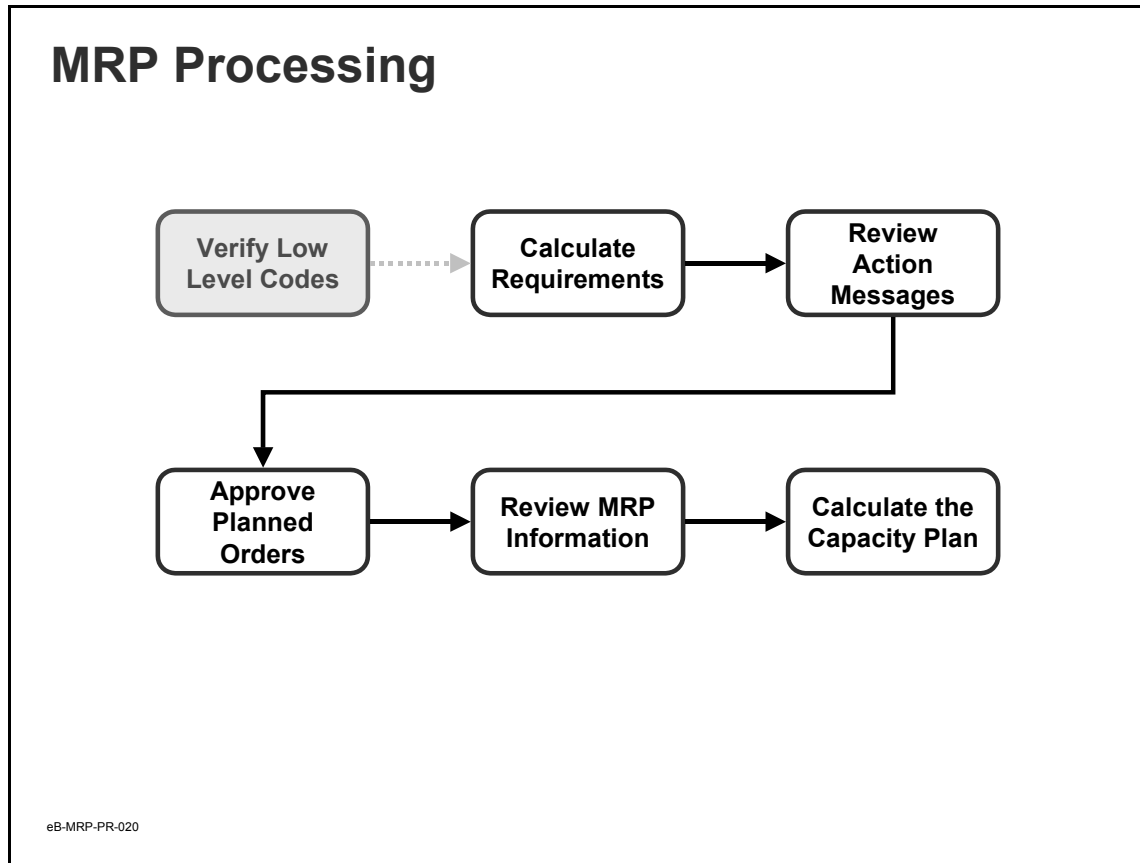
In this section you learn how to:

- ✓ Identify some key business considerations before setting up MRP and CRP in MFG/PRO
- ✓ Set up MRP and CRP in MFG/PRO
- ✓ **Use MRP and CRP in MFG/PRO**

eB-MRP-PR-010

Objectives

This section covers MRP processing.



MRP Processing

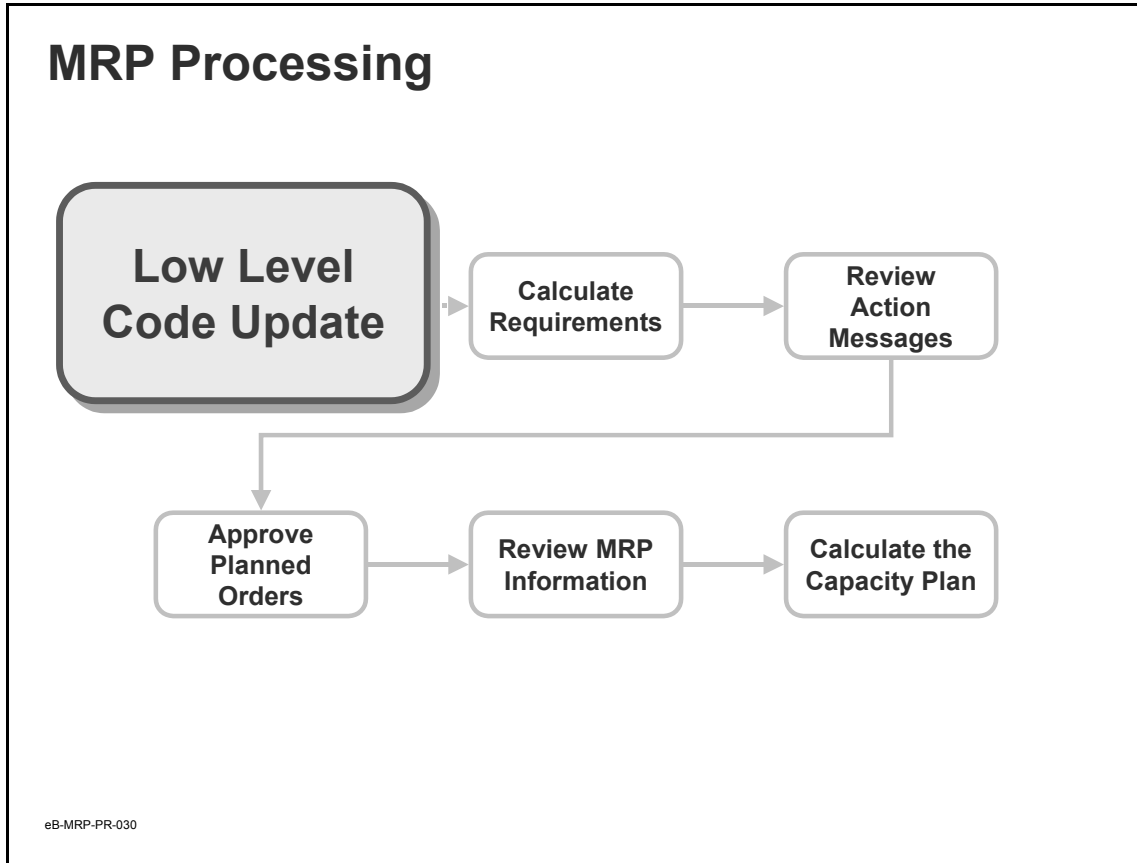
This illustration is a suggested processing sequence of master files for processing MRP which is based on information that flows from one master file to another and prerequisites that need to be accomplished. Reading the illustration:



Boxes with solid lines are required to process MRP and are covered in this course.



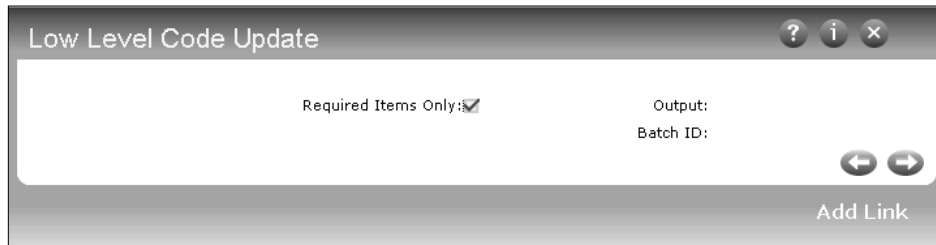
Shaded boxes reflect optional steps, but are covered in this course.



Verifying Low-Level Codes

Low-level codes maintain a numeric value for each item relative to its parent item. This accelerates MRP processing time.

Low Level Code Update



Low Level Code Update

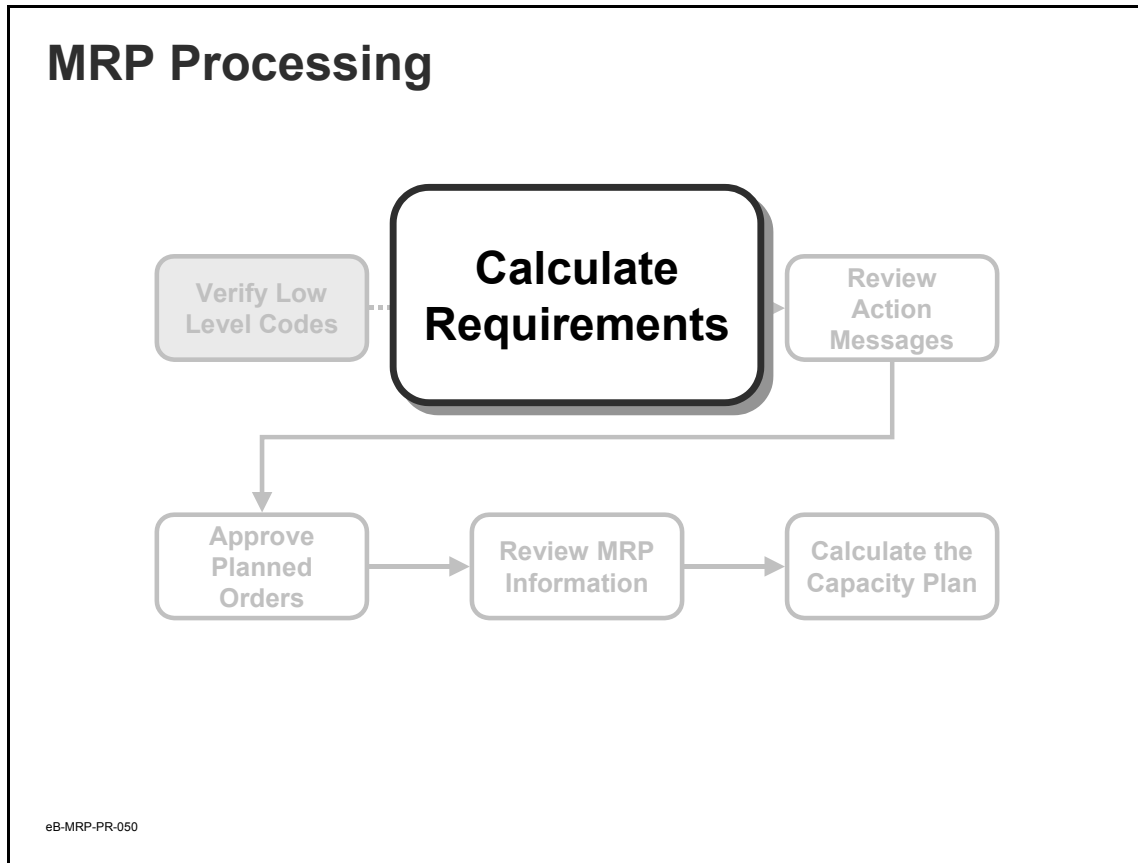
Normally, MFG/PRO automatically updates these codes through item planning, BOM, MRP, and DRP transaction.

- You can update them anytime with Low Level Code Update
- You can also do this through Selective Materials Plan

This program can take a long time to run depending on the number of items in your database.

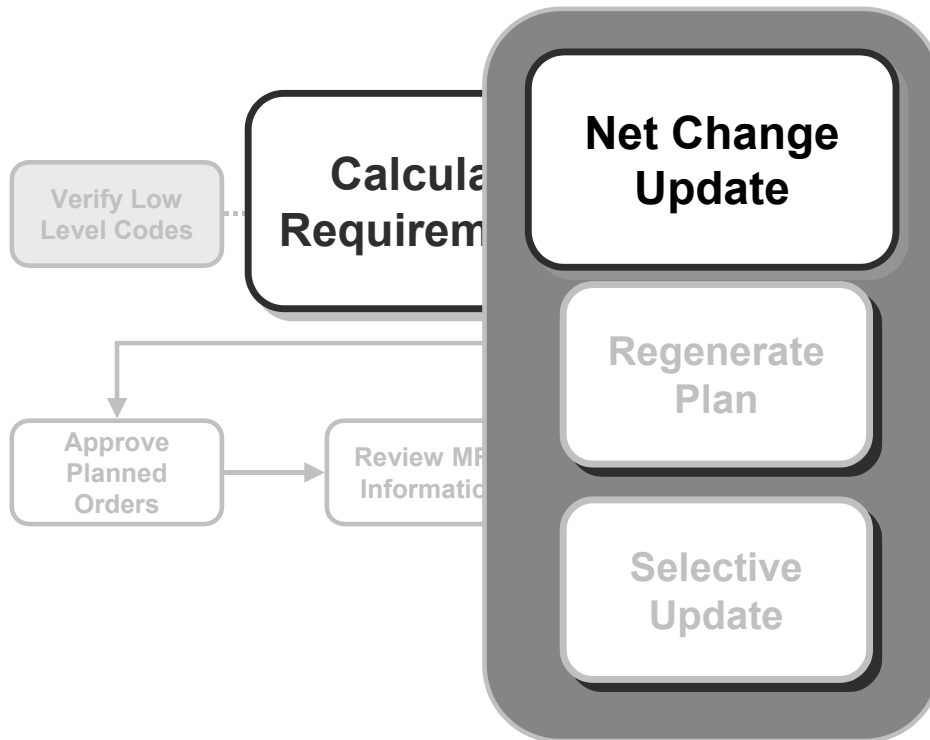


Discussed in the following Training Guide: Product Structures and Formulas



Calculate Requirements

Calculate Requirements



eB-MRP-PR-060

MFG/PRO offers you three ways to run MRP.

- Net Change Materials Plan calculates requirements only for those items that have changed since the last update
- Regenerate Materials Plan updates the entire database
- Selective Materials Plan updates selected items only

MRP ignores items with an order policy of blank.

Net Change Update

Net Change Materials Plan calculates demand and plans supply only for items that have changed since MRP was last run.

Net Change Materials Plan

Net Change Materials Plan

Site: 12000 To: 12000

Synchronized Calculation: ☒

Synchronization Code:

Number of AppServer Threads: 0

Output:

Batch ID:

← →

Add Link

Net Change Materials Plan

This function may take some time to process.

- You may wish to submit it in batch

Net Change Materials Plan calculates demand and plans supply only for items that have changed since MRP was last run. These changes could involve any of the following:

- Item or item-site planning data
- Product structures
- Sales or purchase orders
- Work orders or repetitive schedules
- Inventory
- Forecasts
- Master production schedule
- Intersite demand

This function does not see demand or forecast for items moving into the MRP horizon as time passes.

Many companies use this option for their normal MRP runs.

If more than 50% of items have changed since the last MRP, then generally, a full regen takes no more time than net change.

Site / To

Enter the sites to plan for.

- One site's material plan is completely independent from inventory, demand, and supply in other sites

Synchronized Calculation

Determines whether this MRP/DRP calculation is to be run simultaneously with other calculations sharing the same synchronization code.

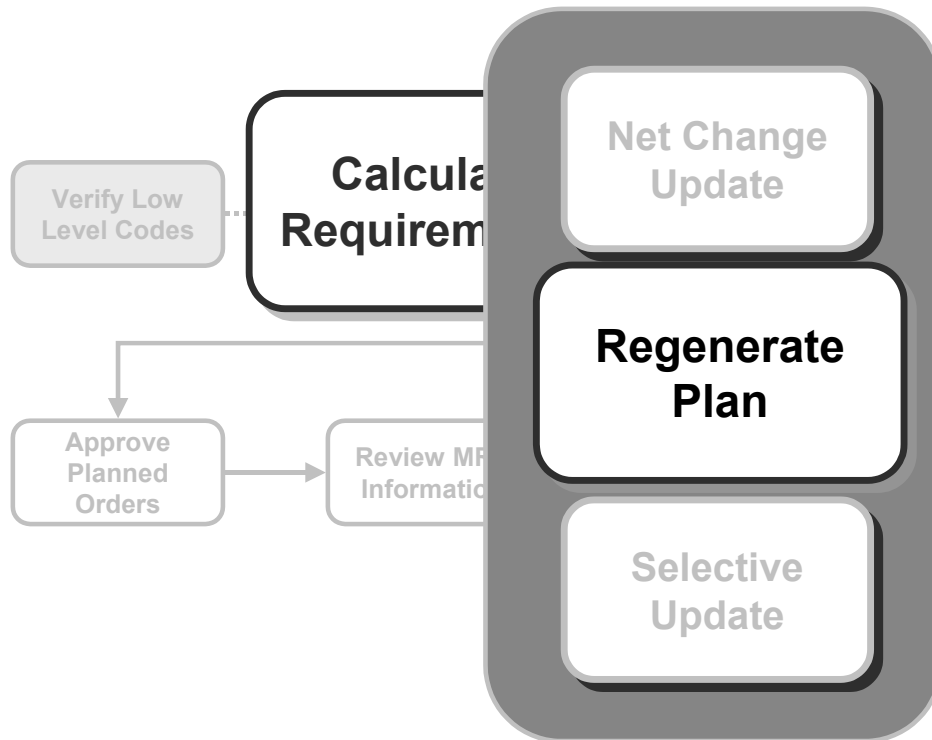
- Synchronized calculations benefit you if you have Symmetric Multiple Processor (SMP) computers

Synchronization Code

A user-defined alphanumeric code that is shared by multiple, concurrent synchronized MRP/DRP calculations.

- Blank is also valid

Calculate Requirements



eB-MRP-PR-080

Regenerate Plans

This method generates a plan for all items, not just those that have changed since the last run.

Regenerate Materials Plan

Regenerate Materials Plan

Regenerate Materials Plan recalculates demand and plans supply for all items in the site. The outputs of net change and regenerative MRP are the same. However, net change MRP generally runs faster than regenerative, since it only plans for items that changed since MRP was last run.

- The first time you run MRP, it should be regenerative
- You should always schedule periodic regenerative MRP runs, even if you primarily use net change MRP, since net change MRP does not consider demand or forecast for items entering the MRP horizon over time
- For forecasting, you may want to run this at 12:01 a.m. Monday

Synchronized Calculation

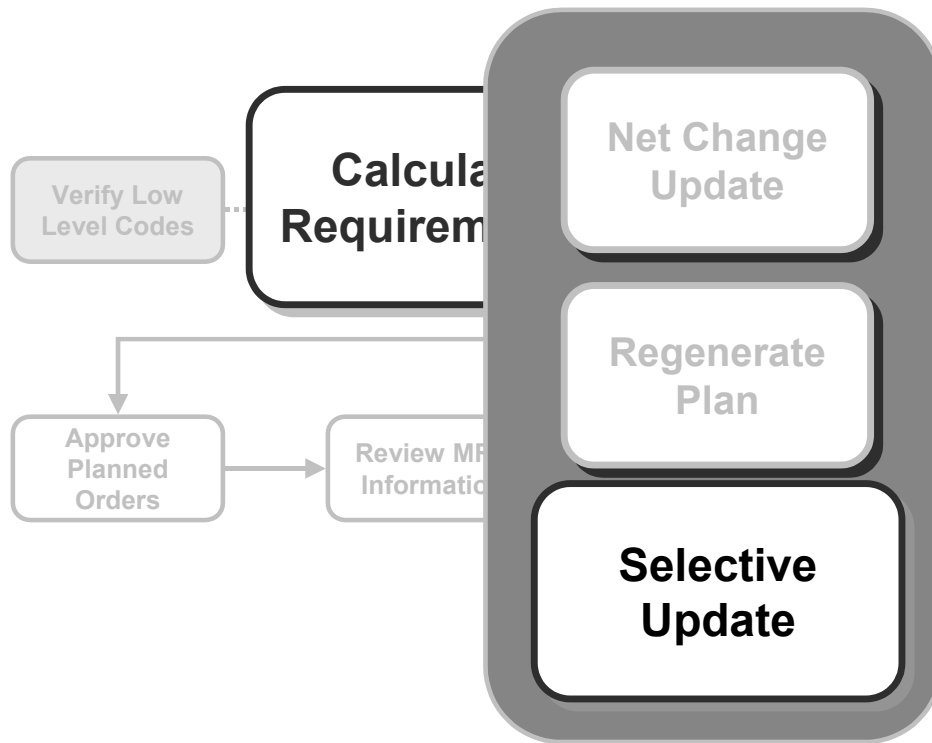
Determines whether this MRP/DRP calculation is to be run simultaneously with other calculations sharing the same synchronization code.

- Synchronized calculations benefit you if you have Symmetric Multiple Processor (SMP) computers

Synchronization Code

A user-defined alphanumeric code that is shared by multiple, concurrent synchronized MRP/DRP calculations.

Calculate Requirements



Selective Update

This function enables you to select items for updating.

Selective Materials Plan

Selective Materials Plan

Item Number: 44-0000 To: 44-2000
 Site: 12000 To: 12000
 Master Scheduled Items: ☒ Buyer/Planner:
 Non Master Scheduled Items: ☒ Product Line:
 MRP Items: ☒ Group:
 DRP Items: ☐ Item Type:
 Required Items Only: ☒ Supplier:
 Resolve Low Level Codes: ☒ Pur/Mfg:
 Synchronized Calculation: ☒
 Synchronization Code:
 Number of AppServer Threads: 0

Output:
 Batch ID:

Add Link

eB-MRP-PR-110

Selective Materials Plan

This function plans only for items and sites you select.

- Only master schedulers should use this program
- This program plans down one level only
- It can be run in net change mode by setting the Required Items Only field to *Yes*, or in regenerative mode by setting Required Items Only to *No*
- You can use Selective Materials Plan to plan master schedule items separately from other items, or to plan small groups of items by using buyer/planner, product line, group, type, supplier, or any combination of these, as selection criteria

Item Number / To

Site / To

Enter the range of item numbers and sites you want to update.

Selection Criteria

Enter data in the fields for the criteria relevant to your needs.

- Bypass fields by leaving them blank

Master Scheduled Items

Yes: Replan those items flagged Master Sched = *Yes* in Item Planning Maintenance.

No: Ignore these items.

Non Master Scheduled Items

Yes: Replan those items flagged Master Sched flag = *No* in Item Planning Maintenance.

No: Ignore these items.

MRP Items

Yes: Replan items flagged as Plan Orders = *Yes* in Item Planning Data Maintenance.

No: Ignore these items.

DRP Items

Yes: Replan distribution items.

- Distribution items are flagged as Pur/Mfg = *D* in Item Planning Data Maintenance
- This flag may only be set to *Yes* if the DRP/MRP Combined flag in the DRP Control File is set to *Yes*
- Normally these items are planned using DRP calculations

No: Ignore these items.

Required Items Only

Yes: Include only items flagged for replanning.

- The system flags replanning whenever a change is made affecting order timing or quantity, including changes to:
 - Planning data, inventory balance, product structure, purchase requisitions and orders, sales orders, work orders, master schedule, repetitive schedule, or forecast

No: include all selected items.

Resolve Low Level Codes

Yes: Analyze and resolve all low level codes.

No: Ignore the low level codes.

Note If low level codes are unresolved when MRP is run, the results of the MRP run may not be totally accurate.

Synchronized Calculation

Determines whether this MRP/DRP calculation is to be run simultaneously with other calculations sharing the same synchronization code.

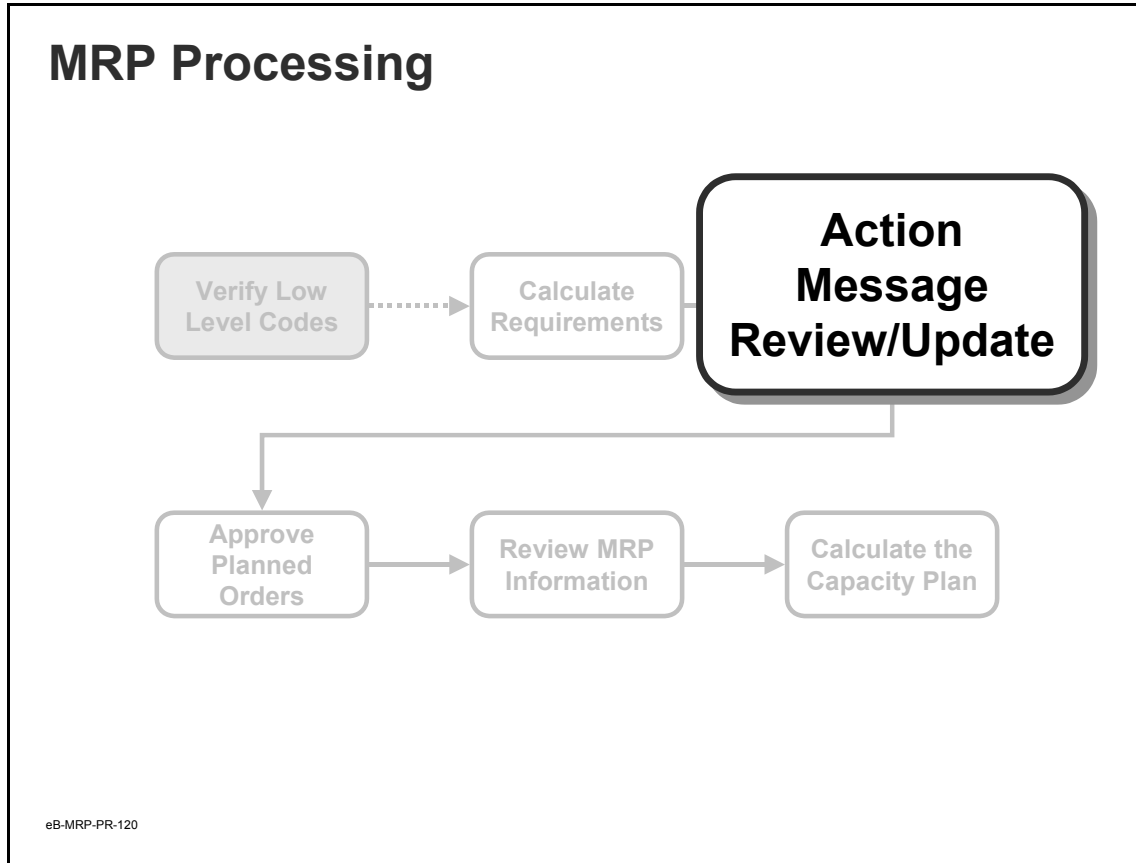
- Synchronized calculations benefit you if you have Symmetric Multiple Processor (SMP) computers

Synchronization Code

A user-defined alphanumeric code that is shared by multiple, concurrent synchronized MRP/DRP calculations.

Buyer/Planner, Prod Line, Group, Item Type, Supplier, Pur/Mfg fields

If you enter a code in any of these fields, MRP limits planning to items so flagged.



Review Action Messages

Action messages suggest courses of action to resolve problems found by MRP.

MRP Action Messages -- To obtain further information, see the eB2 User Guide.

Message	Meaning
Beginning Quantity Less Than Zero	Indicates that the initial nettable quantity on hand is negative.
Beginning Available Less Than Zero	Indicates that the quantity on hand less safety stock is negative.

Message	Meaning
Create	Indicates that a supply order should be created to satisfy a negative projected on hand balance. This message is only generated if Plan Orders is No or if a new requirement appears within the time fence.
De-Expedite	Indicates that a scheduled supply order is due before it is needed and should be delayed, or demand rescheduled to an earlier date.
Expedite	Indicates that a scheduled supply order is due after it is needed and should be rescheduled to an earlier date, or demand rescheduled to a later date.
Cancel	Indicates that a scheduled supply order is no longer needed and should be deleted.
Release Due For	Indicates that a supply order should be released. If it is a planned order, it must also be approved. Use the Order Release Horizon field in the MRP Control File (23.24) to specify the number of days prior to the order release date for this action message to display.
Release Past Due For	Indicates that a supply order was not released when it was due, and should be either released or expedited now, or the demand rescheduled for a later date.
Quantity Less than Minimum	Indicates that a supply order was created for a quantity less than the minimum quantity set in the item planning data.
Quantity Exceeds Maximum	Indicates that a supply order was created for a quantity greater than the maximum quantity set in the item planning data.
Past Due	Indicates that a scheduled supply order receipt is past due.
Time Fence Conflict	Indicates that there is an unsatisfied material requirement inside the planning time fence for this item. You should either manually schedule and expedite orders to fill this demand or delay fulfillment of the requirement that created the demand.
Shipment Due	Indicates that a shipment for an intersite request item is due. Action should be taken at the source site to ensure that the order is received on time.
Shipment Past Due	Indicates that a shipment for an intersite request item is past due. You should either delay the orders that created the requirement for the item or expedite them when the item does arrive.

Message	Meaning
No Source Of Supply	Indicates that the planning data for an intersite request item does not specify a valid source network for the date an intersite request is required.
Planned Order Count Exceeds Maximum	Indicates that the maximum allowable number of 1000 planned orders has been generated by an item-site. Calculation for other items is not affected.

Action Message Review/Update

The top screenshot shows the 'Action Message Review/Update' window with the following data:

To Date	Action Message Detail	Order	Action Qty
06/19/03	Release past due for Planned Order Due Date: 06/24/03	06190001 Line/ID: 2	600.0
06/19/03	Release past due for Planned Order Due Date: 06/24/03	06190002 Line/ID: 3	340.0
06/20/03	Release past due for Planned Order Due Date: 06/25/03	06190003 Line/ID: 4	1,000.0

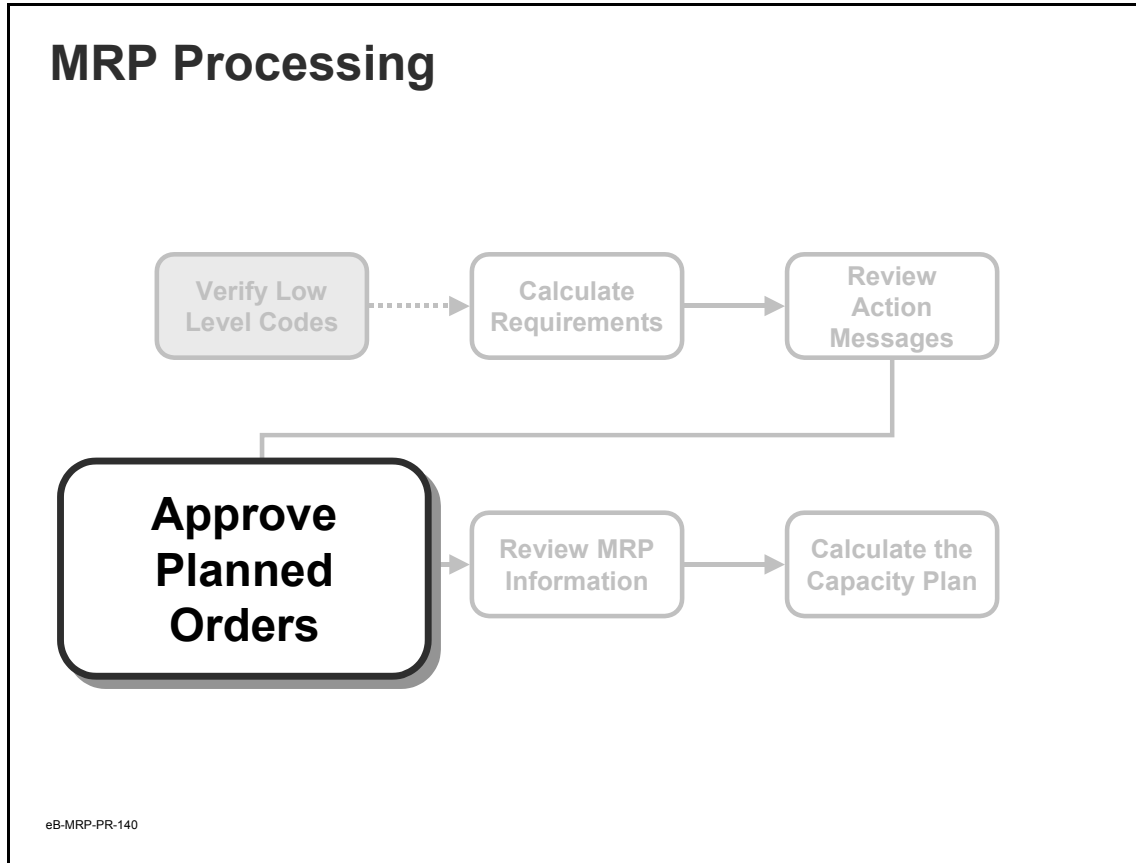
The bottom screenshot shows the input fields for the report:

Starting Item Number: 44-100 CONTROL UNIT, HOME USE
 BOM/Formula Code:
 Site: 12000
 Buyer/Planner: qad
 Show Phantom Items: No
 Include Base Process Orders: Yes

eB-MRP-PR-130

Action Message Review/Update

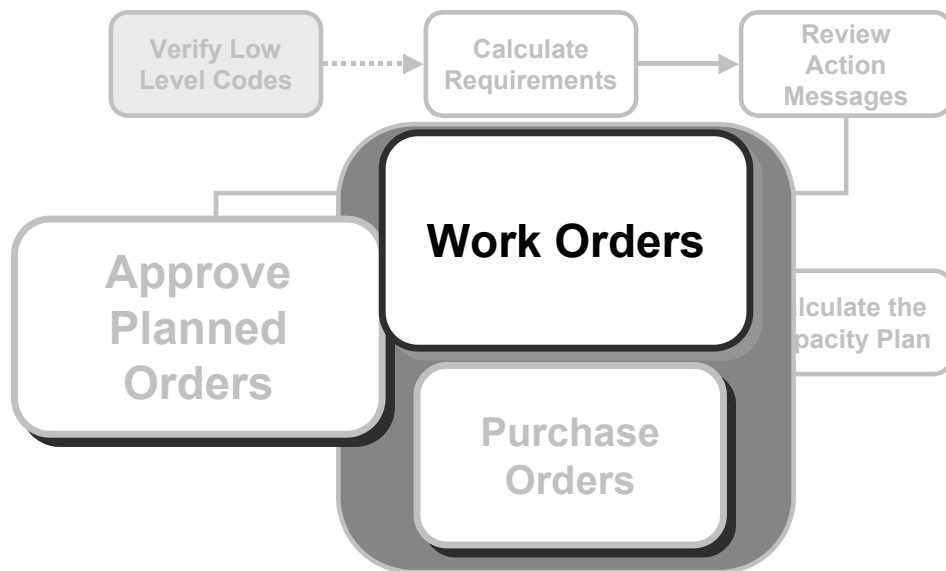
Action Message Review/Update reports on action messages using various selection criteria. Select the messages you want using the criteria.



Approving Planned Orders

MRP produces orders based on demand. The status of these orders is *planned*. Planned orders can be changed by subsequent MRP runs. To move these orders out of MRP's control, you approve them.

Approve Planned Orders



eB-MRP-PR-150

MRP creates planned orders for manufactured and purchased items and work orders.

- You release the orders for manufactured items as work orders
- You release the orders for purchased parts as requisitions

Planned Work Order Approval: Screen 1 of 2

Planned Work Order Approval

Item Number: 44-100

BOM/Formula:

Site: 12000

Release Date:

To: 44-100

To:

To: 12000

To:

Default Approve: ☒

Buyer/Planner:

Include Phantoms: ☐

Include Line Manufactured Items: ☐

Include Purchased Items: ☐

Add Link

Planned Work Order Approval

Planned Work Order Approval approves the MRP plan, generating a firm order for the amount of each planned order, changing the status from *P* to *F*. After this step, items are ready for release.

- The new status prevents MRP from changing the order dates and quantities
- Select orders for approval with the criteria displayed

Planned Work Order Approval: Screen 2 of 2

Ln	Work Order	ID	Item Number	Qty Ordered	Rel Date	OK
1	06190001	2	44-100	600.0	06/19/2003	☒
2	06190002	3	44-100	340.0	06/19/2003	☒
3	06190003	4	44-100	1,000.0	06/20/2003	☒
4	06190004	5	44-100	300.0	06/25/2003	☒
5	06190005	6	44-100	250.0	07/02/2003	☒
6	06190006	7	44-100	600.0	07/02/2003	☒
7	06190007	8	44-100	60.0	07/09/2003	☒
8	06190008	9	44-100	600.0	07/09/2003	☒
9	06190009	10	44-100	102.0	07/16/2003	☒
10	06190010	11	44-100	600.0	07/16/2003	☒

Ln	Work Order	ID	Item Number	Qty Ordered	Rel Date	OK
1	06190001	2	44-100	600.0	06/19/2003	☒

Enter the appropriate line number here

Add Link

eB-MRP-PR-170

The screen displays the relevant work orders in the top half. In the bottom, you select orders by line number for processing.

Ln

- Enter the line number of the work order, shown in the top half of the screen

Work Order

- The number assigned by MRP

ID / Item Number / Qty Ordered / Release

- Display-only fields

OK

- Yes to release the order

- *No* to prevent its release

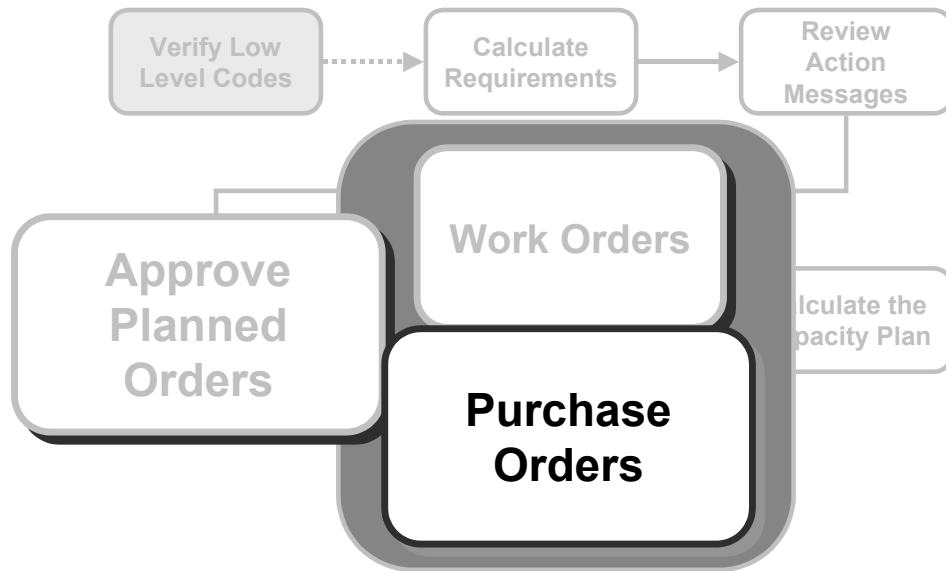
Is all information correct?

- *Yes*: Process
- *No*: Correct the data
- *Cancel*: Cancel the function



Discussed in the following Training Guide: Work Orders

Approved Planned Orders



eB-MRP-PR-180

Planned Purchase Order Approval: Screen 1 of 2

Planned Purchase Order Approval

Item Number: 44-2000 To: 44-2000

Site: 12000 To: 12000

Release Date: To: 12000

Default Approve: ☒

Buyer/Planner:

Include Phantoms: ☐

Include Manufactured Items: ☐

← →

Add Link

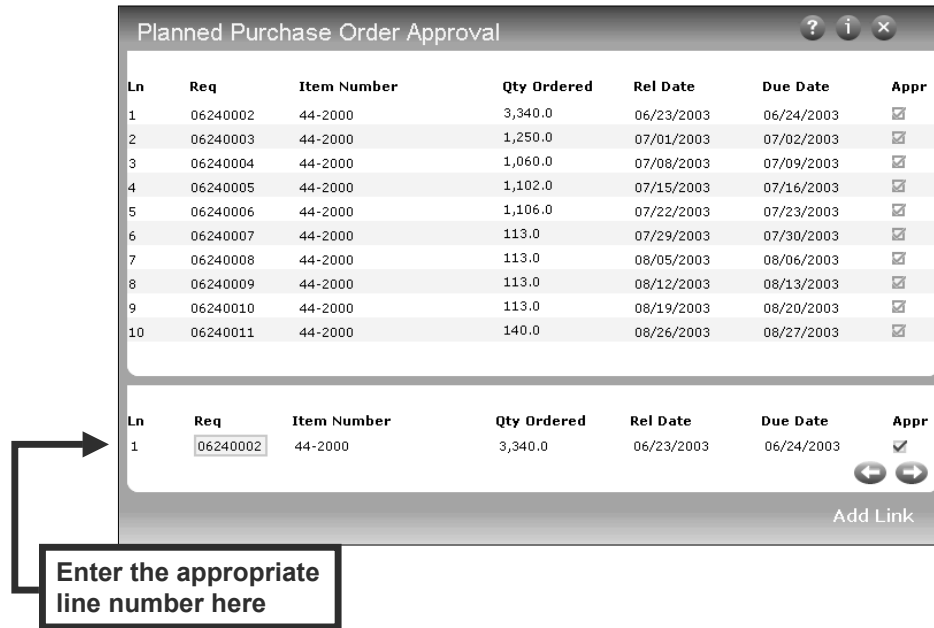
Planned Purchase Order Approval

Planned Purchase Order Approval approves the MRP plan, generating purchase requisitions for the amount of each planned order. From here, the requisitions are ready to print.

This moves the purchase orders out of the MRP module and into the purchasing module.

On the first screen, select the planned orders to be approved, usually for a range of items and release dates. To approve the entire group, set Default Approve to *Yes*.

Planned Purchase Order Approval: Screen 2 of 2



Planned Purchase Order Approval

Ln	Req	Item Number	Qty Ordered	Rel Date	Due Date	Appr
1	06240002	44-2000	3,340.0	06/23/2003	06/24/2003	☒
2	06240003	44-2000	1,250.0	07/01/2003	07/02/2003	☒
3	06240004	44-2000	1,060.0	07/08/2003	07/09/2003	☒
4	06240005	44-2000	1,102.0	07/15/2003	07/16/2003	☒
5	06240006	44-2000	1,106.0	07/22/2003	07/23/2003	☒
6	06240007	44-2000	113.0	07/29/2003	07/30/2003	☒
7	06240008	44-2000	113.0	08/05/2003	08/06/2003	☒
8	06240009	44-2000	113.0	08/12/2003	08/13/2003	☒
9	06240010	44-2000	113.0	08/19/2003	08/20/2003	☒
10	06240011	44-2000	140.0	08/26/2003	08/27/2003	☒

Ln	Req	Item Number	Qty Ordered	Rel Date	Due Date	Appr
1	06240002	44-2000	3,340.0	06/23/2003	06/24/2003	☒

Add Link

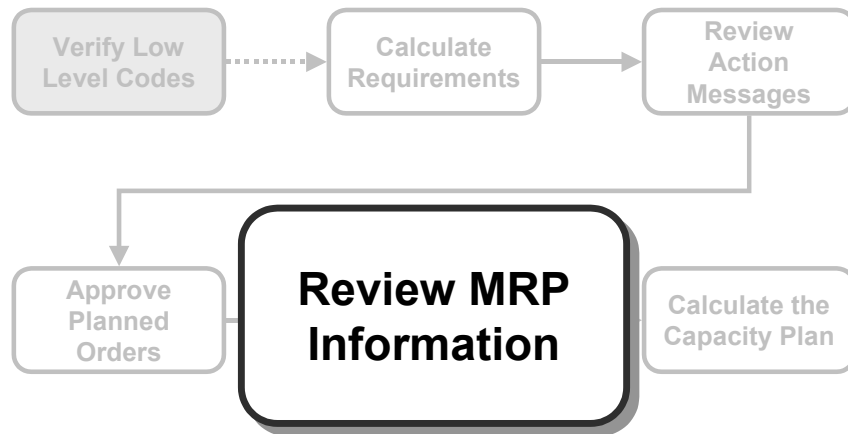
Enter the appropriate line number here

eB-MRP-PR-200

This screen displays outstanding MRP-generated purchase requisitions and enables you to modify them.

- Enter the line number in the indicated field to access the appropriate data

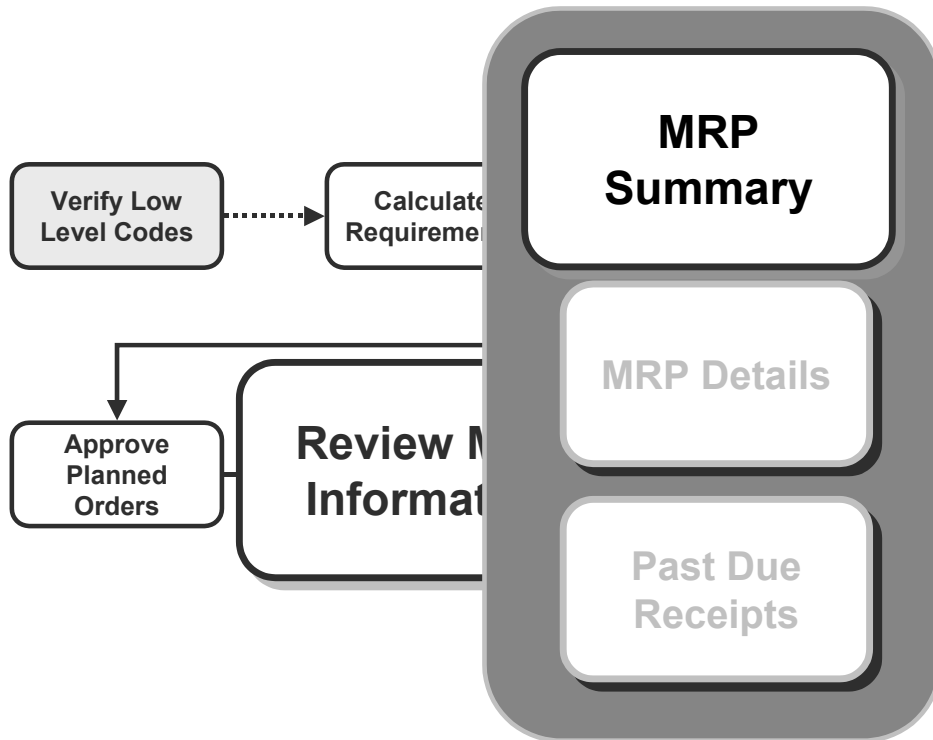
MRP Processing



eB-MRP-PR-210

Review MRP Information

Review MRP Information



eB-MRP-PR-220

MRP Summary

MRP Summary Inquiry

MRP Summary Inquiry

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Item Number: 44-100

Site: 12000

CONTROL UNIT, HOME USE

Qty on Hand: 0.0

UM: EA

Pur/Mfg: M

Buyer/Planner: qad

Ord Pol: LFL

Mfg LT: 3

Min Order: 0

Mstr Sched:☒

Order Period: 0

Purchase LT: 1

Max Order: 0

MRP Required:☐

Time Fence: 0

Ins LT: 0

Ord Mult: 0

Plan Orders:☒

Safety Time: 0

Inspect Req:☐

Order Qty: 10

Issue Policy:☒

Safety Stock: 0

Cum LT: 0

Yield%: 100.00%

Past	06/23/2003	06/30/2003	07/07/2003	07/14/2003	07/21/2003	07/28/2003
06/22/2003	06/29/2003	07/06/2003	07/13/2003	07/20/2003	07/27/2003	08/03/2003

Gross Reqs	200	1740	300	850	660	706
Sched Receipt	0	0	0	0	0	0
Projected QOH	-200	0	0	0	0	0
Plan Ords Due	0	1940	300	850	660	706
Plan Ords Rel	1940	300	850	660	706	113

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Add Link

eB-MRP-PR-230

MRP Summary Inquiry

This inquiry gives you a brief view of the MRP outlook for specified date buckets.

MRP Summary Report

eB-MRP-PR-240

MRP Summary Report

This report gives you summary information on MRP for specified date buckets. Information appears in columns, with one column per time period. Activity prior to the start date appears in the first column under the label *Past*.

Select the data according to the criteria displayed.

Print Detail

Allows to print order details following the summary.

- Useful to help resolve shortage situations

Use Cost Plans

Allows you to print a summary of production costs for each period.

- Normally production costs are based on the GL cost of the item, but if a cost plan is in place costs are based on these planned future costs
 - Costs plans are entered in the Cost Management module and allow you to project future cost changes, particularly useful for commodities or seasonal items

Print Action Messages

Allows you to print action messages following the summary report.

- Useful to help resolve shortage situations

Day / Week / Month

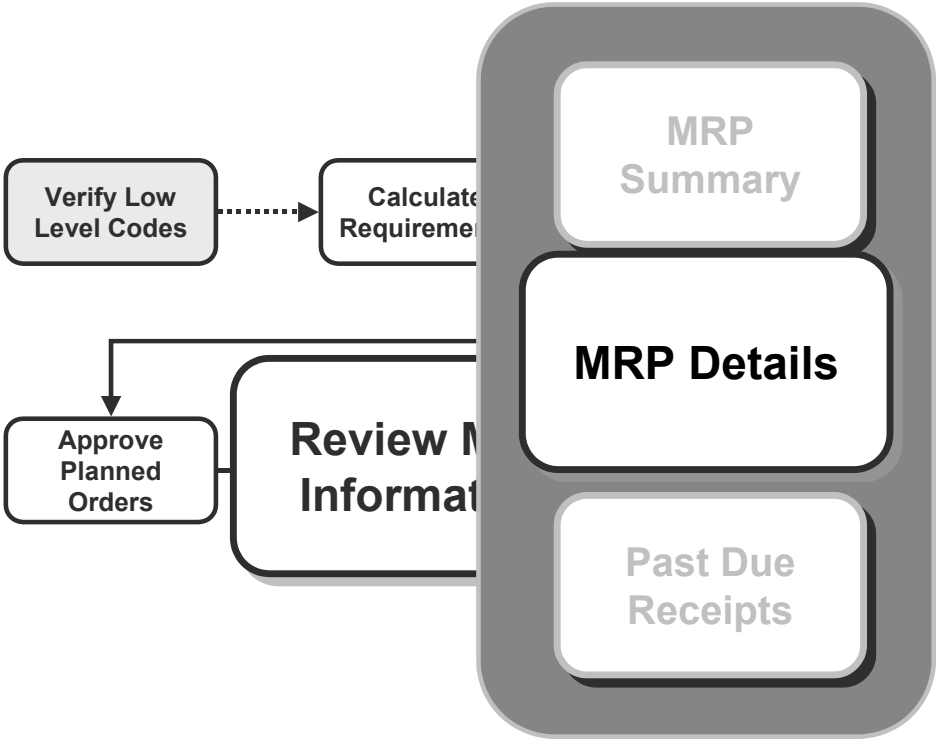
Indicates the length of each column period.

- D for Day, W for Week, M for Month, P for GL calendar period.
 - *P* works only if you are using the general ledger module
 - *M* requires that you set the *Per Column* field to *1*

MRP Summary Report: Sample

Item Number: 44-110		CONTROL UNIT, AUTOMOTIVE						Buyer/Planner: gad		Site: 12000		
Qty on Hand: 0.0		UM: EA		Time Fence: 0		Manufacturing Lead Time: 0		MRP Required: No				
Order Policy: POQ	Minimum Order: 0		Safety Time: 0		Pur/Mfg: M	Purchase LT: 0		Mstr Sched: Yes				
Order Period: 7	Maximum Order: 0		Safety Stk: 0		Inspect: No	Inspect LT: 0		Plan Orders: Yes				
Order Qty: 0	Ord Mult: 0		Yield%: 100.00%		Cumulative Lead Time: 0			Issue Policy: Yes				
					BOM/Formula Code:							
Past	06/23/03	06/30/03	07/07/03	07/14/03	07/21/03	07/28/03	08/04/03	08/11/03	08/18/03	08/25/03	09/01/03	09/08/03
06/22/03	06/29/03	07/06/03	07/13/03	07/20/03	07/27/03	08/03/03	08/10/03	08/17/03	08/24/03	08/31/03	09/07/03	09/14/03
Gross Reqs	0	400	700	400	400	400	400	0	0	0	0	0
Sched Receipt	0	0	0	0	0	0	0	0	0	0	0	0
Projected QOH	0	700	0	0	0	0	0	0	0	0	0	0
Plan Ords Due	0	1100	0	400	400	400	400	0	0	0	0	0
Plan Ords Rel	0	1100	0	400	400	400	400	0	0	0	0	0

Review MRP Information



eB-MRP-PR-260

MRP Detail Inquiry

MRP Detail Inquiry

Item Number: 44-110 Qty on Hand: 0.0 Site: 12000
CONTROL UNIT, AUTOMOTIVE UM: EA Pur/Mfg: M
Buyer/Planner: qad Ord Pol: POQ Min Order: 0 Mfg LT: 0
Mstr Sched: Yes Order Period: 7 Max Order: 0 Pur LT: 0
MRP Required: No Time Fence: 0 Ord Mult: 0 Ins LT: 0
Plan Orders: Yes Safety Time: 0 Order Qty: 0 Inspect: No
Issue Policy: Yes Safety Stock: 0 Yield%: 100.00% Cum LT: 0

Due Date	Gross Reqs	Sched Rcpt	Proj QOH	Plan Ords	Details
		0			Beginning Available
06/24/03	400	-400			Prod F/C 44-0000
06/24/03		700	1,100		W/O: 06190041 ID: 42
					Release Date 06/24/03
06/30/03	200	500			Prod F/C 44-0000
06/30/03	500	0			SO: SO20015 Line: 1
07/07/03	400	-400			Prod F/C 44-0000

Add Link

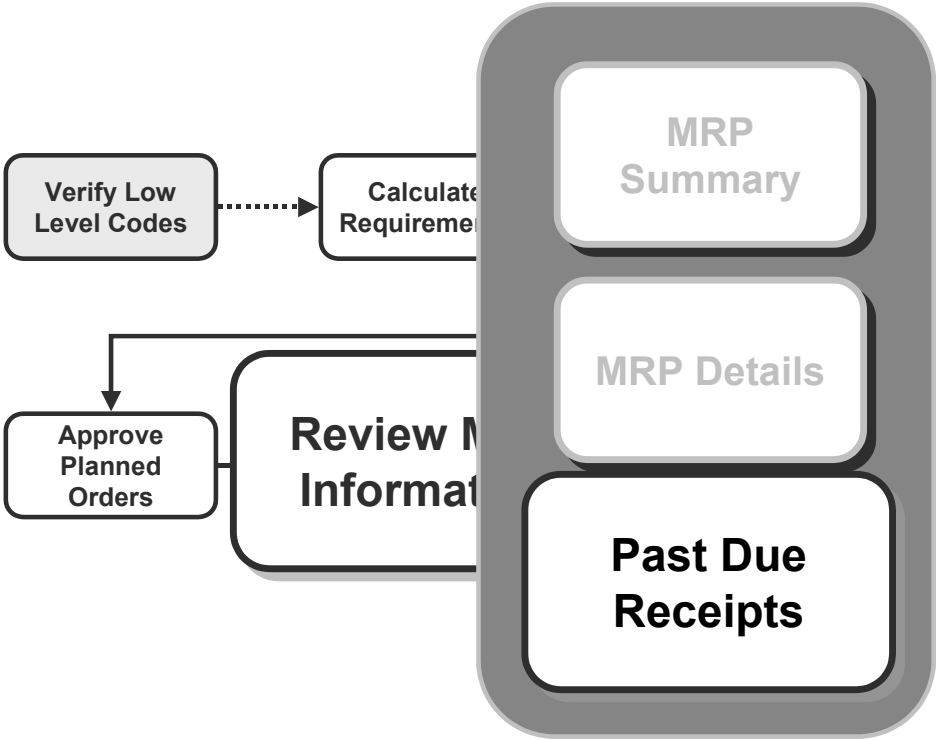
eB-MRP-PR-270

MRP Detail Inquiry

This inquiry gives you a detailed look at MRP for specified date buckets.

- Buyer/Planners use this inquiry often

Review MRP Information



eB-MRP-PR-280

Past Due Receipts Inquiry

Past Due Receipts Inquiry

Item Number: 44-100 Buyer/Planner: qad Site: 12000
CONTROL UNIT, HOME USE

Due Date Release	Quantity UM Detail
06/24/03 06/19/03	340.0 EA Planned Order Past Due W/O: 06190002 ID: 3
06/24/03 06/19/03	600.0 EA Planned Order Past Due W/O: 06190001 ID: 2
06/25/03 06/20/03	1,000.0 EA Planned Order Release Past Due W/O: 06190003 ID: 4
06/30/03 06/25/03	300.0 EA Planned Order Release Due W/O: 06190004 ID: 5

← →

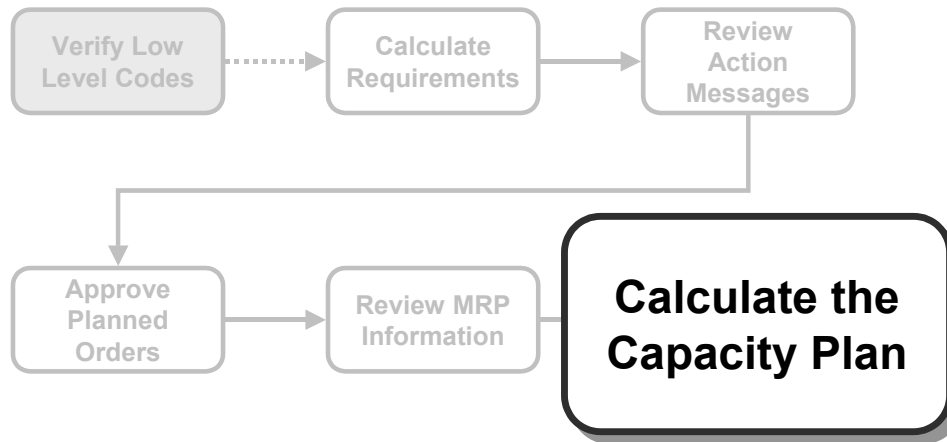
Add Link

eB-MRP-PR-290

Past Due Receipts Inquiry

This inquiry shows you past due receipts.

MRP Processing: CRP Processing



eB-MRP-PR-300

CRP Processing

Recalculate Capacity Plan

Recalculate Capacity Plan

Site: 12000 To: 12000

Work Order: To:

Item Number: To:

Release Date: To:

Due Date: To:

Sales/Job: To:

ID: To:

Supplier: To:

Planned Orders ☒

Firm Planned Orders ☒

Exploded Orders ☒

Allocated Orders ☒

Released Orders ☒

Output:

Batch ID:

Add Link

The capacity requirements recalculation includes any or all orders in the system

eB-MRP-PR-310

Recalculating the Capacity Plan

Capacities and Load

- The capacity plan is usually recalculated after an MRP run
- CRP looks at the available hours or machines for departments and work centers



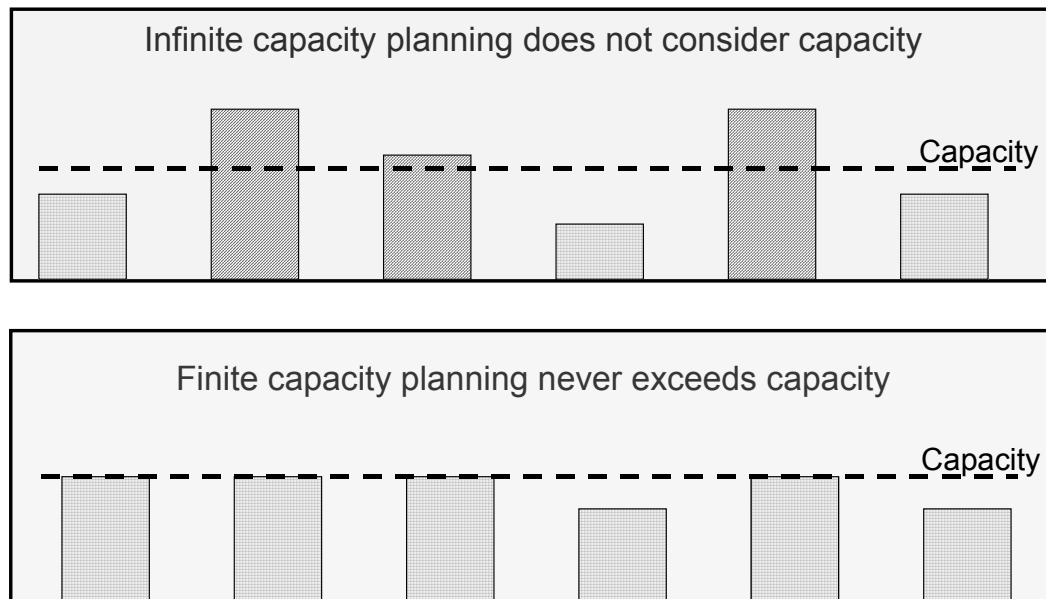
Discussed in the following Training Guide: Work Centers, Routings, and WO Subcontracting

CRP then loads the work center by locating all orders that meet the selection criteria and applies them to operations by start date, using backward scheduling from the orders' due dates.

Wait, queue, setup, and move times are included, as well as the run time multiplied by order quantity.

Note This may take some time to process; consider submitting it in batch mode.

Infinite and Finite Capacity Planning



eB-MRP-PR-320

Infinite (Unfixed) Capacity Planning

MFG/PRO uses infinite loading to schedule operation and work center production loads based on work order due dates.

- No work order routing dates are changed to accommodate insufficient capacity
 - Loading continues into the future without regard to capacity

Finite (Fixed) Capacity Planning

Finite capacity planning assigns no more work to a work center than the work center can be expected to execute in a given time period. MFG/PRO uses infinite loading only.

Loading to finite capacity will extend deliveries. As a result the Master Schedule will have to be changed.

Finite capacity looks at capacity and determines how much to produce, or how long it will take to produce it.

The Plan

The capacity plan is sorted by:

- Work order and item
- Work order due and release dates
- Quantity ordered and quantity completed
- CRP-scheduled start and last operation dates

The CRP indicates:

- *No Routing* for orders that cannot be exploded
- *Op Conflict* difference between operation start date and work order release date

Department and Work Center Capacities

The image shows two overlapping software windows. The 'Department Maintenance' window (top) has a 'Labor Capacity: 7' field highlighted with a red box. The 'Work Center Maintenance' window (bottom) has a 'Mach/Op: 1' field highlighted with a red box. A red arrow points from the 'Labor Capacity' field to the 'Mach/Op' field. Another red arrow points from the 'Mach/Op' field to a text box at the bottom.

Department Maintenance

Department: 30
 Default Sub-Account:
 Default Cost Center:
 Description: Inspection
 Labor Capacity: 7
 Cost of Production: 6300
 Labor: 6500
 Burden: 6400
 Labor Usage Variance Acct: 6850
 Labor Rate Variance Acct: 6800
 Burden Usage Variance: 6470
 Burden Rate Variance: 6460

Work Center Maintenance

Work Center: 1030
 Description: INSPECTION
 Department: 30
 Queue Time: 1.0
 Wait Time: 0.0
 Mach/Op: 1
 Setup Crew: 0.00
 Run Crew: 1.000
 Machines: 1.000
 Mach Bdn Rate: 0.00

Setup Rate: 10.00
 Labor Rate: 10.00
 Labor Burden Rate: 0.00
 Labor Bdn %: 200.00%

Capacities on the shop floor are the departmental labor capacity and the work center hours

eB-MRP-PR-330

Define Capacities

The resources used to process orders on the shop floor are work centers, departments, and machines. The capacity of a department or work center is the time available for production in that location.

Departments

The capacity of a department is the total number of available labor hours per day for all work centers in that department, defined in Department Maintenance.

Work Centers

The capacity for a work center is the number of machines or personnel available for that work center (defined in Work Center Maintenance) multiplied by work hours (defined in Calendar Maintenance).

If a work center or machine is over- or under-loaded, you can modify either its capacity or the timing or amount of the load.

Adjusting Capacity/Load

Capacity

- Adjust capacity using one of the following functions:
 - Calendar Maintenance
 - Holiday Maintenance
- Add or subtract workday hours as needed for work center or shop calendars

Adjusting Load

- Adjust the timing or amount of load by modifying:
 - Work order due dates
 - Operation lead time components
 - Repetitive schedules

Note If you manually adjust operation start and stop dates, CRP reschedules them the next time it is run.

Input/Output Inquiry

Input/Output Inquiry

Work Center: 1010 Machine: ASSEMBLY
 Start Date: 07/24/2003 Day/Week/Month: W Per Column: 1 Output: terminal

	Past	07/24/2003	07/31/2003	08/07/2003	08/14/2003	08/21/2003	08/28/2003
	07/23/2003	07/30/2003	08/06/2003	08/13/2003	08/20/2003	08/27/2003	09/03/2003
Input Plan	31	0	13	54	51	0	0
Input Actual	0	31	0	0	0	0	0
Cumulative Dev	-31	0	-13	-67	-118	-118	-118
Output Plan	31	0	13	23	31	51	0
Output Actual	0	0	0	0	0	0	0
Cumulative Dev	-31	-31	-44	-67	-98	-149	-149
Queue Plan	0	0	0	31	20	-51	0
Queue Actual	0	31	0	0	0	0	0

Add Link

eB-MRP-PR-340

Input/Output Analysis

Input/Output Inquiry

In order to provide control and auditable shop floor data about planned versus actual results, compare the planned load input and output for a work center/machine with the actual load incurred and the actual output hours against that load.

Input/Output Inquiry and Report help evaluate a work center or machine's response to planned loads by:

- Displaying planned and actual input and output in daily, weekly, or monthly periods

Input/Output Report

Input/Output Report

Work Center: 1010 To: 1010
 Machine: Machine: To: To:
 Start Date: 07/24/2003
 D/W/M/P: W
 Per Column: 1

Output: page
 Batch ID:

sfiorp.p b+ Input/Output Report Date: 07/24/03
 Page: 1 MFG/PRO Training DB Time: 16:13:24

Work Center: 1010 ASSEMBLY		Mach/Op: 1											
Machine: Machine:		Mach/Wk Ctr: 1.000											
Department: 10 Assembly		Run Crew: 1.000											
Queue Time: 1.0													
Wait Time: 0.0													
Past	07/24/03	07/31/03	08/07/03	08/14/03	08/21/03	08/28/03	09/04/03	09/11/03	09/18/03	09/25/03	10/02/03	10/09/03	
07/23/03	07/30/03	08/06/03	08/13/03	08/20/03	08/27/03	09/03/03	09/10/03	09/17/03	09/24/03	10/01/03	10/08/03	10/15/03	
Input Plan	31	0	13	54	51	0	0	0	0	0	0	0	
Input Actual	0	31	0	0	0	0	0	0	0	0	0	0	
Input Cum Dev	-31	0	-13	-67	-118	-118	-118	-118	-118	-118	-118	-118	
Output Plan	31	0	13	23	31	51	0	0	0	0	0	0	
Output Actual	0	0	0	0	0	0	0	0	0	0	0	0	
Output Cum Dev	-31	-31	-44	-67	-98	-149	-149	-149	-149	-149	-149	-149	
Queue Plan	0	0	0	31	20	-51	0	0	0	0	0	0	
Queue Actual	0	31	0	0	0	0	0	0	0	0	0	0	

eB-MRP-PR-350

Input/Output Report

- Spots “bottlenecks”
- Gives a perspective apart from traditional load reports

Planned Input

- Load on a work center or machine represented by:
 - Work order operations scheduled to start in a reporting period
- Determined using the following calculation:

$$\text{Standard Setup} + (\text{Standard Run} \times \text{Quantity Ordered})$$

Actual Input

- Load that has been moved to the first and subsequent order operations
- Calculated for a reporting period based on move transactions entered using:
 - Work order release and shop floor control functions
- Determined using the following calculation:

Standard Run Hours x Quantity Moved

Planned Output

- Load calculated based on order operations scheduled to be completed in a reporting period
- Determined using the following calculation:

Standard Setup + (Standard Run x Quantity Ordered)

Actual Output

- Load calculated for a reporting period based on operation quantity completed transactions for:
 - Work orders
 - Repetitive schedules
- Report completed quantities for order operations using labor feedback transactions in:
 - Shop Floor Control
 - Advanced Repetitive
 - Repetitive
 - Work Order Accounting Close
- Determined using the following calculation:

Actual Setup + (Standard Run x Quantity Completed)

Planned Queue

- Difference between planned input and planned output

Actual Queue

- Difference between actual input and actual output

Note Shop Floor Control must be used in order for this to be useful.

Load Summary and Detail Inquiries/Reports



eB-MRP-PR-360

Summary and Detail Inquiries and Reports

You can generate load reports by department, work center, or machine using the work center and department load inquiries and reports.

CRP determines load hours for a work center based on setup and run times. Queue, wait, and move times are excluded from load calculations. To include queue times in load calculations, set up separate operations for queue. CRP then considers these operations when calculating load.

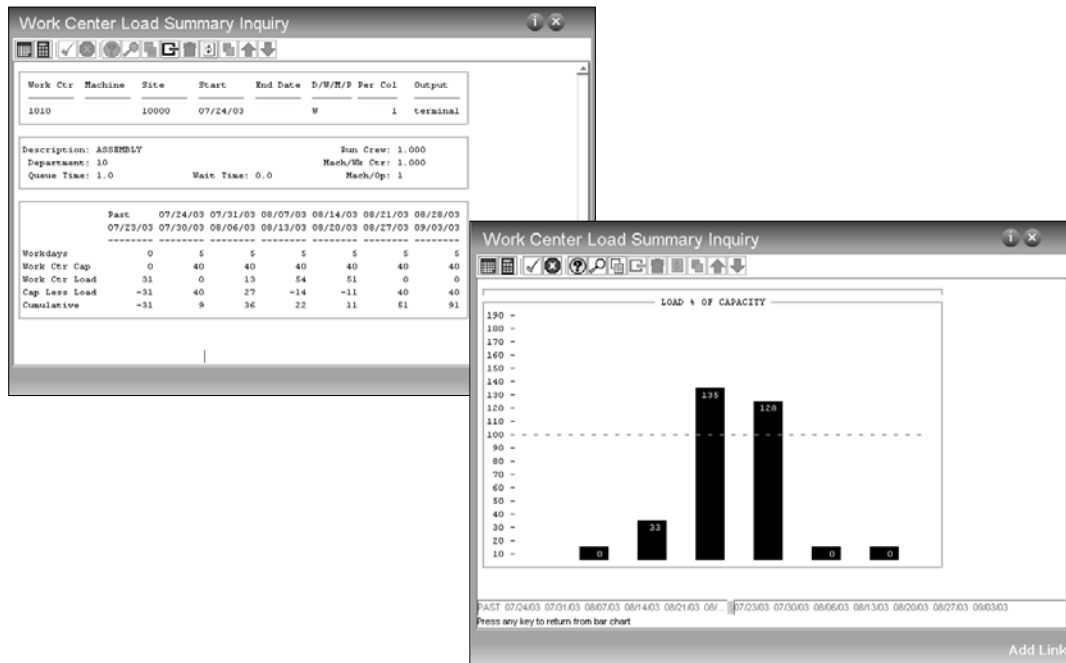
CRP determines the load an operation exerts on a work center using the following calculation:

$$\text{Operation Load} = \text{Setup Time} + (\text{Run Hours/Unit} \times \text{Quantity Open})$$

The quantity open for an operation is the order quantity minus any quantities reported complete.

The system assigns the entire load for an operation to its scheduled start date. Even for operations with run times longer than one day, load is not spread between operation start and due dates.

Work Center Load Summary Inquiry



eB-MRP-PR-370

Work Center Summary Load Inquiry

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crwcrp01.p b+		Work Center Load Summary Report										Date: 07/24/03	
Page: 1		MFG/PRO Training DB										Time: 16:26:10	
Site: 10000													
Work Center: 1010		ASSEMBLY		Queue Time: 1.0						Run Crew: 1.000			
Machine:								Mach/Wk Ctr: 1.000					
Department: 10		Assembly		Wait Time: 0.0						Mach/Op: 1			
Past		07/24/03	07/31/03	08/07/03	08/14/03	08/21/03	08/28/03	09/04/03	09/11/03	09/18/03	09/25/03	10/02/03	10/09/03
07/23/03		07/30/03	08/06/03	08/13/03	08/20/03	08/27/03	09/03/03	09/10/03	09/17/03	09/24/03	10/01/03	10/08/03	10/15/03

Workdays	0	5	5	5	5	5	5	5	5	5	5	5	5
Work Ctr Cap	0	40	40	40	40	40	40	40	40	40	40	40	40
Work Ctr Load	31	0	13	54	51	0	0	0	0	0	0	0	0
Cap Less Load	-31	40	27	-14	-11	40	40	40	40	40	40	40	40
Cumulative	-31	9	36	22	11	51	91	131	171	211	251	291	331

Work Center Load Summary Report

Work Center Load Detail Inquiry

Work Center Load Detail Inquiry

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Work Ctr

Machine

Output

1010

ASSEMBLY

terminal

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Work Center: 1010

ASSEMBLY

Machine:

Queue Time: 1.0

Department: 10

Mach/Op: 1

Wait Time: 0.0

Assembly

Mach/Wk Ctr: 1.000

Run Crew: 1.000

Work Order	ID	ST	Op St Start	Load Hours	Qty	Open
07230001	89	R	10 Q 07/18/03	31.0	30,000	
04-0005						
07230002	90	R	10 08/01/03	13.0	12,000	
04-0005						

Add Link

eB-MRP-PR-390

Work Center Load Detail Inquiry

120 MFG/PRO TRAINING GUIDE — MRP AND CRP

crwcrp02.p b+		Work Center Load Detail Report						Date: 07/24/03	
Page: 1		MFG/PRO Training DB						Time: 16:34:16	
Work Center: 1010		ASSEMBLY		Department: 10		Assembly			
Machine:		Mach/Wk Ctr: 1.000		Run Crew: 1.000		Queue Time: 1.0		Wait Time: 0.0	
								Mach/Op: 1	
Work Order	ID	Due Date	Op	Operation Description	Start	Setup	Run Time	Load Hrs	Open Qty Status
07230001	89	07/23/03	10	PENCIL ASSEMBLY	07/18/03	1.0	30.0	31.0	30,000.0 QUEUE
				Item: 04-0005					
07230002	90	08/04/03	10	PENCIL ASSEMBLY	08/01/03	1.0	12.0	13.0	12,000.0
				Item: 04-0005					
07230003	91	08/11/03	10	PENCIL ASSEMBLY	08/07/03	1.0	22.0	23.0	22,000.0
				Item: 04-0005					
07230004	92	08/18/03	10	PENCIL ASSEMBLY	08/13/03	1.0	30.0	31.0	30,000.0
				Item: 04-0005					
07240001	105	08/25/03	10	PENCIL ASSEMBLY	08/15/03	1.0	50.0	51.0	50,000.0
				Item: 04-0005					

Work Center Load Detail Report

Department Load Summary Inquiry



eB-MRP-PR-410

Department Load Summary Inquiry

Department Load Summary Report

crdprp01.p b+		Department Load Summary Report												Date: 07/24/03	
Page: 1		MFG/PRO Training DB												Time: 16:41:08	
Department: 10		Assembly		Site: 10000											
Past		07/21/03	07/28/03	08/04/03	08/11/03	08/18/03	08/25/03	09/01/03	09/08/03	09/15/03	09/22/03	09/29/03	10/06/03		
07/20/03		07/27/03	08/03/03	08/10/03	08/17/03	08/24/03	08/31/03	09/07/03	09/14/03	09/21/03	09/28/03	10/05/03	10/12/03		
-----		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		
Workdays	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Dept Capacity	0	28	70	70	70	70	70	70	70	70	70	70	70	70	70
Dept Load	31	0	13	23	82	0	0	0	0	0	0	0	0	0	0
Cap Less Load	-31	28	57	47	-12	70	70	70	70	70	70	70	70	70	70
Cumulative	-31	-3	54	101	89	159	229	299	369	439	509	579	649	649	649

Department Load Summary Report

Department Load Detail Inquiry

Department Load Detail Inquiry

Department: 10

Assembly

Starting:

Ending:

Output: terminal

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Work Order	Work Ctr	Machine	Op	Start	Dept Load	Open Qty
07230001	1010		10	07/18/2003	31.0	30,000
Item: 04-0005	ID:	89				
07230002	1010		10	08/01/2003	13.0	12,000
Item: 04-0005	ID:	90				
07230003	1010		10	08/07/2003	23.0	22,000
Item: 04-0005	ID:	91				
07230004	1010		10	08/13/2003	31.0	30,000
Item: 04-0005	ID:	92				
07240001	1010		10	08/15/2003	51.0	50,000
Item: 04-0005	ID:	105				

Add Link

eB-MRP-PR-430

Department Load Detail Inquiry

Department Load Detail Report

Department Load Detail Report

Department: 10 To: 10
Output:
Batch ID:
Add Link

ordprp02.p b+
Page: 1

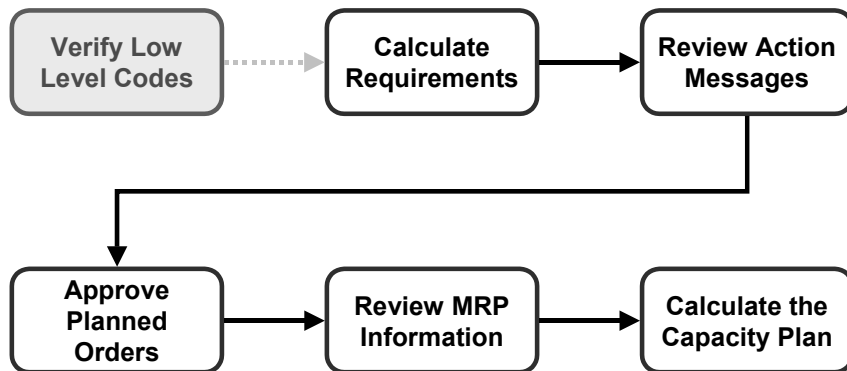
Department Load Detail Report
MFG/PRO Training DB

Date: 07/24/03
Time: 16:44:31

Work Order	ID	Op	Operation Description	Work Ctr	Machine	Start	Std Setup	Run Time	Load Hours	Open Qty	St
07230001	89	10	PENCIL ASSEMBLY	1010		07/18/03	1.0	30.0	31.0	30,000	Q
			Item: 04-0005								
07230002	90	10	PENCIL ASSEMBLY	1010		08/01/03	1.0	12.0	13.0	12,000	
			Item: 04-0005								
07230003	91	10	PENCIL ASSEMBLY	1010		08/07/03	1.0	22.0	23.0	22,000	
			Item: 04-0005								
07230004	92	10	PENCIL ASSEMBLY	1010		08/13/03	1.0	30.0	31.0	30,000	
			Item: 04-0005								
07240001	105	10	PENCIL ASSEMBLY	1010		08/15/03	1.0	50.0	51.0	50,000	
			Item: 04-0005								

Department Load Detail Report

MRP/CRP Processing Summary



eB-MRP-PR-450

Processing Exercises

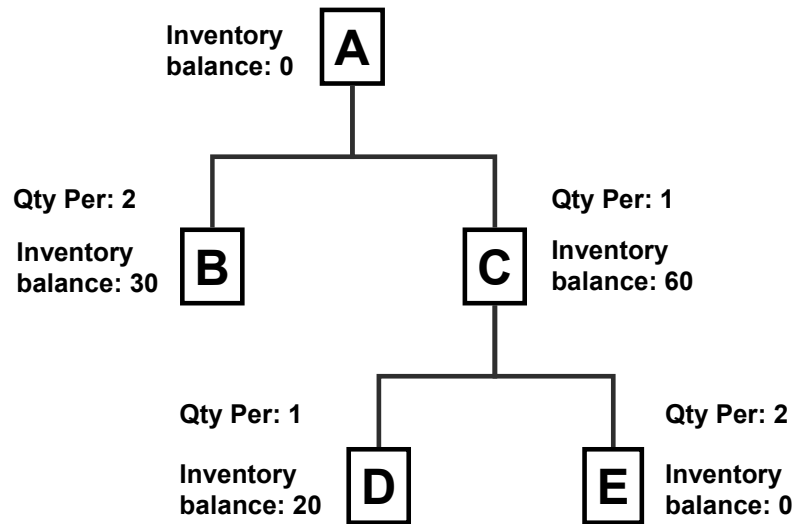


eB-MRP-PR-460

Exercises

Important The data used in these exercises may not be the same as the data shown in the screen captures in this lesson.

Component Requirements



eB-MRP-PR-470

Component Requirements

Instruction: In this activity, you describe the determination of gross requirements (product structure explosion) and the subsequent determination of net requirements.

Using the product structure above, determine the net requirements for items B, C, D, and E to make 100 of item A.

- There are no item As or item Es in inventory, but there are on-hand inventory balances of 30 Bs, 60 Cs and 20 Ds

Order Policies and Modifiers

Period	1	2	3	4	5	6	7	8	9	10
Demand	25	30	20	35	25	30	25	35	30	25
LFL										
FOQ=35										
POQ 2 Periods										
POQ - 2 Periods Min Qty=60										
POQ - 2 Periods Multi Qty=25										

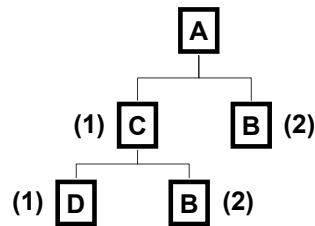
eB-MRP-PR-480

Order Policies and Modifiers

Instruction: This activity tests your knowledge of order policies and modifiers.

Using this table, determine in which periods orders are required and for what quantities. Assume that there is no on-hand inventory.

Order Calculation



Each period = 1 week (7 days)

A	Lead time = 1 wk Min = 200	Period				
		1	2	3	4	5
Gross requirements						
Scheduled receipts						
On hand	0					
Planned order receipt						
Planned order release						

B Lead time = 1 wk Mult = 250		Period				
		1	2	3	4	5
Gross requirements						
Scheduled receipts						
On hand	30					
Planned order receipt						
Planned order release						

C	Lead time = 2 wks Mult = 50	Period				
		1	2	3	4	5
Gross requirements						
Scheduled receipts						
On hand	60					
Planned order receipt						
Planned order release						

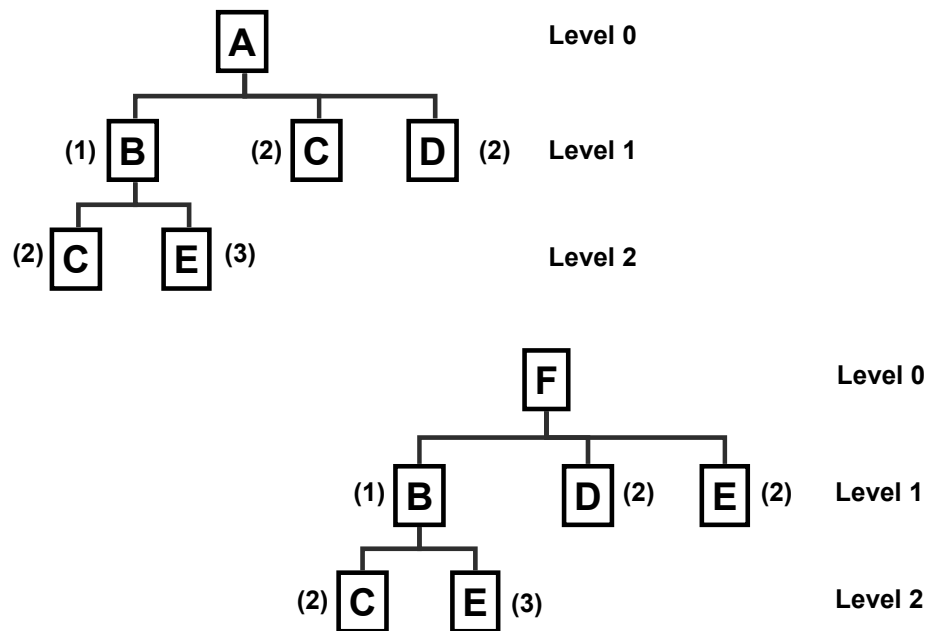
eB-MRP-PR-490

Order Calculation

Instruction: This activity gives you an opportunity to determine how MRP plans orders.

Using the product structures and the information in these tables, determine the planned order releases for items B and C to satisfy a demand for 100 of item A in period 5.

Order Calculation



eB-MRP-PR-500

Order Calculation

Instruction: This activity demonstrates how MRP plans orders.

Using these product structures and the data on the following worksheets, determine the required order releases.

Order Calculation (Continued)

MRP PLANNING SHEET						PT206350							
Lot Size	Lead Time	Safety Stock	Low Level Code	Item No.		Period							
						1	2	3	4	5	6	7	8
LFL	2	0	0	A	Gross Requirements				10		100		10
					Scheduled Receipts								
					Projected On-Hand								
					Net Requirements								
					Planned Order Receipts								
					Planned Order Releases								
LFL	1	0	0	F	Gross Requirements					20	20		10
					Scheduled Receipts								
					Projected On-Hand								
					Net Requirements								
					Planned Order Receipts								
					Planned Order Releases								
LFL	1	0	1	B	Gross Requirements								
					Scheduled Receipts								
					Projected On-Hand								
					Net Requirements								
					Planned Order Receipts								
					Planned Order Releases								

eB-MRP-PR-510

Order Calculation (Continued)

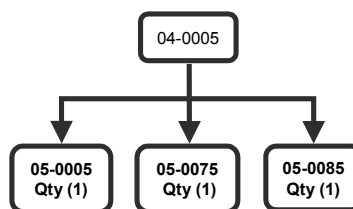
MRP PLANNING SHEET							PT206360							
Lot Size	Lead Time	Safety Stock	Allocated	Low Level Code	Item No.		Period							
							1	2	3	4	5	6	7	8
FOQ 100	1	0	120	1	D	Gross Requirements								
						A								
						F								
						Total								
						Scheduled Receipts	100							
						Projected On-Hand	150							
						Net Requirements								
						Planned Order Receipts								
Planned Order Releases														
POQ 3 Pds.	2	15	0	2	C	Gross Requirements	10	10	10	10	10	10	10	10
						A								
						B								
						Total								
						Scheduled Receipts								
						Projected On-Hand	110							
						Net Requirements								
						Planned Order Receipts								
Planned Order Releases														
POQ 2 Pds.	1	0	0	2	E	Gross Requirements								
						F								
						B								
						Total								
						Scheduled Receipts								
						Projected On-Hand	120							
						Net Requirements								
						Planned Order Receipts								
Planned Order Releases														

eB-MRP-PR-520

Running MRP

Instruction: In this activity, you review the product structure of an item, create a forecast for that item, review MRP Control, run MRP, and review and act on the results.

- 1 Review the product structure for item 04-0005, using Product Structure Inquiry. The structure should look like this:



- 2** Use Forecast Maintenance to enter a forecast, starting next week for the following 3 weeks for item 04-0005 at site 10000:

Item : 04-0005

Site : 10000

Next Week : 30000

Week + 1 : 40000

Week + 2 : 60000

Week + 3 : 80000

- 3** Set the MRP horizon to 120 days in the MRP Control program.
- 4** Run MRP at site 10000 using Regenerate Materials Plan.
- 5** Review the Master Schedule Summary Inquiry items 04-0005 and 05-0005.
- 6** Review the MRP Detail Inquiry for each of these items.
The program displays pegging information, such as the scrap requirements, seasonal builds, forecasts, and product structure requirements.
- 7** Using Action Message Inquiry/Browse, examine the action message details for items 04-0005, 05-0005, 05-0075, and 05-0085.

Calculating Work Center Load

Item Number	44-100
Site	12000
Work Center	1030
Total Workers	2
Worker Hours	8 hrs/day
Worker Days	Monday-Friday

WO Number	Qty	Status	Oper	Setup	Run Hours Per Unit	Sch. Start
1000	25	Planned	10	2.0	1.0	Week 2
1001	1000	Planned	10	0.5	0.001	Week 1
1002	50	Firm	30	0.0	0.1	Week 2
1003	5000	Firm	10	1.5	0.01	Week 1
1004	200	Released	30	0.0	0.05	Week 2
1005	6000	Planned	20	4.0	0.02	Week 3
1006	4000	Allocated	10	0.0	0.01	Week 1

eB-MRP-PR-530

Calculating Work Center Load

Instruction: This activity is intended to help you learn how to calculate work center load and compare it to capacity. For this activity, use item number 44-100 at site 12000, work center 1030. There are 2 workers, working 8 hours a day, Monday through Friday for a combined total of 80 hours a week. Use the graphic above for calculating your answers.

- 1 Determine the load represented by each work order.

WO Number	Total Run Time	Total Setup Time	Total Load
1000	25	2	27
1001	1	.5	1.5
1002	5	0	5

WO Number	Total Run Time	Total Setup Time	Total Load
1003	$5000 \times .01 = 50$	1.5	51.5
1004	$200 \times .05 = 10$	0	10
1005	$6000 \times .02 = 120$	4	124
1006	$4000 \times .01 = 40$	0	40

- 2 Determine the cumulative load for weeks 1 through 3

	Week 1	Week 2	Week 3
Load	93	42	124
Capacity	80	80	80
Over/Under Capacity	-13	38	-44

- 3 What might be deduced from these results? What should be done?
- 4 Two hours of overtime for each worker is added. How does this affect the cumulative load calculations?

	Week 1	Week 2	Week 3
Load	93	42	124
Capacity	$80 + (2 \times 5 \times 2) = 100$	100	100
Over/Under Capacity	-7	58	-24
Cumulative	-7	65	41

- 5 What would be a more optimal solution to this resource problem?

Recalculating the Capacity Plan

Instruction: In this activity, you recalculate the capacity plan and then review the changes in the work center resulting from the recalculation.

- 1 Run Recalculate Capacity Plan using the following information:

Site: 10000	To: 10000
Item Number: 04-0005	To: 04-0005
Release Date: Next Monday	To: <blank>

Accept the defaults for all remaining fields.

Note You would not usually recalculate the capacity plan based on a range of items. The capacity plan usually is run for a site, a work center, or some range of sites and work centers. We are specifying the item number so that we can narrow the scope of data that goes into this calculation.

- 2 Review the Work Center Load Summary Browse/Inquiry for work center 1010 at site 10000. Use today as the start date. Press the space bar to view the data as a bar graph.

Note You may need to use the scroll bar on the side to see the dates on the graph.

- a How is the work center capacity calculated?
 - b How is the work center load determined?
 - c Why is the Cumulative row so important?
- 3 Use Work Center Load Detail Inquiry to review the work center load detail for work center 1010 starting today.
 - 4 Can you tie these work orders to the work center load from Work Center Load Summary Browse/Inquiry?
 - 5 What can you do to rebalance the load at this work center? Spend some time balancing the work center.

Approving MRP Suggestions

- 1 Use Planned Work Order Approval to approve work orders for item 04-0005 that need to be released before the end of this week.

Item Number: 04-0005	To: 04-0005
Site: 10000	To: 10000
Release Date: <blank>	To: Friday of this week

- 2 Use Planned Purchase Order Approval to approve purchases for the components associated with item 04-0005 that need to be released before the end of this week.

Item Number: 05-0005	To: 05-0085
Site: 10000	To: 10000
Release Date: <blank>	To: Friday of this week

- 3 Go to Work Order Browse/Inquiry to see if the status of the planned order changed from P (Planned) to F (Firm Planned) when you did the approval of the Planned Work Order.
Your selection criteria should be:

Item Number: 04-0005	To: 04-0005
Site: 10000	To: 10000

You should see that the work order(s) you approved now have a status of “F” (Firm). The work orders you did not approve should still have a status of “P” (Planned).

- 4 Go to Purchase Requisition Browse/Inquiry to see the Purchase Requisition that was created when the planned purchase orders were approved. These requisitions would then be used to create purchase orders for these items.
Your selection criteria should be:

Item Numbers: 05-0005	To: 05-0085
-----------------------	-------------

Answers to the Exercises

Component Requirement Calculation

B=170 C=40 D=20 E=80

Order Policies and Order Modifiers

Period	1	2	3	4	5	6	7	8	9	10
Demand	25	30	20	35	25	30	25	35	30	25
LFL	25	30	20	35	25	30	25	35	30	25
FOQ = 35	35	35	35	35	---	35	35	35	35	---
POQ 2 periods	55	---	55	---	55	---	60	---	55	---
POQ - 2 periods Min. Qty. = 60	60	---	60	---	60	---	60	---	60	---
POQ - 2 periods Multi. Qty. = 25	75	---	---	75	---	50	---	75	---	25

Order Calculation

Each period = 1 week (7 days)

A	Lead time = 1 wks Min = 200		Period				
			1	2	3	4	5
Gross requirements							100
Scheduled receipts							
On hand		0					100
Planned order receipt							200
Planned order release						200	

C	Lead time = 2 wks Mult = 50	Period				
		1	2	3	4	5
Gross requirements					200	
Scheduled receipts						
On hand	60				10	
Planned order receipt					150	
Planned order release			150			

B Lead time = 1 wks Mult = 250		Period				
		1	2	3	4	5
Gross requirements			300		400	
Scheduled receipts						
On hand	30		230		80	
Planned order receipt			500		250	
Planned order release		500		250		

PT206300

MRP PLANNING SHEET														PT206355
Lot Size	Lead Time	Safety Stock	Allocated	Low Level Code	Item No.		Period							
							1	2	3	4	5	6	7	8
LFL	2	0	0	0	A	Gross Requirements				10		100		10
						Scheduled Receipts								
						Projected On-Hand			0		0		0	
						Net Requirements			10		100		10	
						Planned Order Receipts			10		100		10	
						Planned Order Releases		10		100		10		
LFL	1	0	0	0	F	Gross Requirements					20	20		10
						Scheduled Receipts								
						Projected On-Hand				0	0		0	
						Net Requirements				20	20		10	
						Planned Order Receipts				20	20		10	
						Planned Order Releases				20	20		10	
LFL	1	0	0	1	B	Gross Requirements								
						A		10		100		10		
						F				20	20		10	
						Total		10		120	20	10	10	
						Scheduled Receipts								
						Projected On-Hand	100	90		0	0	0	0	
						Net Requirements				30	20	10	10	
						Planned Order Receipts				30	20	10	10	
						Planned Order Releases			30	20	10	10		

MRP PLANNING SHEET														PT206365
Lot Size	Lead Time	Safety Stock	Allocated	Low Level Code	Item No.		Period							
							1	2	3	4	5	6	7	8
FOQ 100	1	0	120	1	D	Gross Requirements								
						A		20		200		20		
						F				40	40		20	
						Total		20		240	40	20	20	
						Scheduled Receipts	100							
						Projected On-Hand	150	130	130	90	50	30	10	10
						Net Requirements				110				
						Planned Order Receipts				200				
						Planned Order Releases			200					
POQ 3 Pds.	2	15	0	2	C	Gross Requirements	10	10	10	10	10	10	10	10
						A		20		200		20		
						B			60	40	20	20		
						Total	10	30	70	250	30	50	10	10
						Scheduled Receipts								
						Projected On-Hand	110	80	295	45	15	35	25	15
						Net Requirements			5			50		
						Planned Order Receipts			285			70		
						Planned Order Releases	285			70				
POQ 2 Pds.	1	0	0	2	E	Gross Requirements								
						F				40	40		20	
						B			90	60	30	30		
						Total			90	100	70	30	20	
						Scheduled Receipts								
						Projected On-Hand	120		30	70	0	20	0	0
						Net Requirements				70		30		
						Planned Order Receipts				140		50		
						Planned Order Releases			140		50			

Calculating Work Center Load

1.

WO Number	Total Run Time	Total Set Up Time	Total Load
1000	$25 \times 1.0 = 25$	2.0	$25 + 2 = 27$
1001	$1000 \times 0.001 = 1$	0.5	$1 + .5 = 1.5$
1002	$50 \times 0.1 = 5$	0.0	$5 + 0 = 5$
1003	$5000 \times 0.01 = 50$	1.5	$50 + 1.5 = 51.5$
1004	$200 \times 0.05 = 10$	0.0	$10 + 0 = 10$
1005	$6000 \times 0.02 = 120$	4.0	$120 + 4 = 124$
1006	$4000 \times 0.01 = 40$	0.0	$40 + 0 = 40$

PT212075

2.

	Week 1	Week 2	Week 3
Load	93	42	124
Capacity	80	80	80
Over / Under Capacity	- 13	38	- 44
Cumulative	- 13	25	- 19

PT212085

- 3 There appears to be a capacity shortage, although in real life it would be prudent to verify this by reviewing data collected over a longer period.

There is a capacity shortage in the first period and it may be necessary to increase short-term capacity or reschedule some operations. This may impact delivery for work orders 1001, 1003, and 1006.

4

	Week 1	Week 2	Week 3
Load	93	42	124
Capacity	$80 + (2 \times 5 \times 2) = 100$	100	100
Over / Under Capacity	- 2	58	- 24
Cumulative	- 7	65	41

PT212086

5 Adjust overtime more exactly or release work order 1005 early.

Recalculating the Capacity Plan

- a Workdays * Hours available at the work center.
These hours come from the shop calendar.
- b The work center load is determined by the operation start date and the number of hours the work order is to spend at that operation.
- c The cumulative row is important because the work center load is not spread over multiple time buckets (days, weeks, months). For example, if there are 40 hours available in a work center per week, and a work order is scheduled to spend 200 hours at the work center, the 200 hours will appear in the first time bucket. The 200 hours are not spread over the next 5 weeks. Therefore, it is important to look closely at the cumulative load to make sure that the following weeks have not been overloaded.

Course Overview

- ✓ Introduction to MRP and CRP
- ✓ Business Considerations
- ✓ Set up MRP and CRP
- ✓ Use MRP and CRP

eB-MRP-PR-540

APPENDIX A

Study Questions

Study Questions

- 1 Explain the difference between the three MRP planning modes available in MFG/PRO.
- 2 Give an example of what types of items would have the following setups:

Item Planning Maintenance

Set A

Master Sched: Yes
Plan Orders: No
Time Fence: 0

Set B

Master Sched: No
Plan Orders: Yes
Time Fence: 0

- 3 What MRP Item Planning data field would ensure a planned order would never be less than 100 units?
- 4 What MRP order policy ensures a planned replenishment for every requirement after netting?
- 5 A sales order, for MRP purposes, is treated as dependent demand.
True False
- 6 MRP calculates the release or start date of a planned order by subtracting the appropriate lead time from the order due or need date.
True False
- 7 Accuracy in the BOM is not of critical importance since MRP is a planning tool.
True False
- 8 MRP will automatically reschedule firm planned orders as long as the regenerative mode is selected.
True False
- 9 Specifying a yield percentage for an item will have no effect on MRP planning activity.
True False

Answers to Study Questions

- 1 *Net Change* plans only those items that has changed since the last MRP run. *Regenerative* replans all items. *Selective* allows you to specify which items to plan.
- 2 Set A represents independent demand items (MPS). Set B represents dependent demand items (MRP).
- 3 Minimum Order Quantity.
- 4 Lot-for-Lot (LFL).
- 5 False. Sales orders and forecasts are independent demand.
- 6 True.
- 7 False.
- 8 False. MRP does not reschedule firm orders; MRP generates action messages.
- 9 False. MRP increases the order quantity for items with less than 100% yield.

APPENDIX B

Reports, Inquiries, Browsers

MRP and CRP Reports, Inquiries, and Browsers

Name	Function / Purpose
Action Message Browse	Displays Action messages
Action Message Report	Prints action messages
Planned Order Browse	Displays planned orders
Planned Order Report	Prints planned orders
MRP Summary Inquiry	Displays summary MRP data
MRP Summary Report	Prints summary MRP data
MRP Detail Inquiry	Displays detailed MRP data
MRP Detail Report	Prints detailed MRP data
Past Due Receipts Inquiry	Displays past due receipts
Past Due Receipts Report	Prints past due receipts
Input/Output Inquiry	Compares planned load input and output for a work center/machine with actual load and actual output hours against that load.
Input/Output Report	Provides a report on input/output analysis; helps to spot bottlenecks.

The following summary and detail inquiries and reports display load information by work center, machine, and department.

Work Center Load Summary Inquiry	
Work Center Load Summary Report	
Work Center Load Detail Inquiry	
Work Center Load Detail Report	
Department Load Summary Inquiry	
Department Load Summary Report	
Department Load Detail Inquiry	
Department Load Detail Report	

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