

Master Scheduling and RCCP

TRAINING GUIDE



70-2857A
Database: Train eB2
July 2003

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Contents

ABOUT THIS COURSE	7
Course Description	8
Who Should Attend This Course	8
Prerequisites	8
Approximate Length of Course	8
Certification Preparation	9
Using This Training Guide	9
General Training Facilities Information	10
 CHAPTER 1 INTRODUCTION TO MASTER SCHEDULING AND RCCP	11
Course Overview	12
Planning and Scheduling Overview	13
Planning Levels Supported by MFG/PRO	14
Product Line and Resource Planning	14
End-Item Planning	15
Component Planning	15
Enterprise Resource Planning (ERP)	16
Planning and Scheduling Phases	17
Planning and Scheduling Areas of Concern	21
Master Schedule	21
Rough-Cut Capacity Planning (RCCP)	22
RCCP Compared to CRP	22
Statement of Production	23
Benefits of a Master Schedule	24

IV MFG/PRO TRAINING GUIDE — MRP AND CRP

Terminology	26
Rough-Cut Capacity Planning (RCCP)	29
Master Schedule and RCCP Uses	30
Course Objectives	31
Related Courses	32
Course Overview	33
 CHAPTER 2 BUSINESS CONSIDERATIONS	35
Planning Overview	38
Items to Master Schedule	40
Multilevel Master Schedule	42
Production Forecast in MFG/PRO	43
Determine What Resources Need RCCP	45
Seasonal Build Requirements	46
MRP Horizon	48
Time Fence	50
Features and Options	52
Production Constraints	54
Review	56
Course Overview	57
 CHAPTER 3 SET UP MASTER SCHEDULING AND RCCP	59
Balance Demand and Supply	61
Identify Master Scheduled Items	65
Item Planning Maintenance	66
Item-Site Planning Maintenance	74
Approaches to Master Scheduling	75
Computer Assisted Approach (Recommended)	76
Fully Automatic Approach	78
Fully Manual Approach	79
Multilevel Master Scheduling	80
Planning Bills	82
Top-Level Items	83
Family-Level Item Values	84

MRP Control	86
Holiday/Calendar Maintenance	89
Rough-Cut Capacity Planning	93
Resource Maintenance	95
Item Resource Bill Maintenance	100
Creating the End-Item Load	102
Summary	105
Setup Exercises	106
Enter and Review Item Data	107
Enter and Review a Forecast	107
Create a Labor Resource	110
Add a Family Item	111
Create an Item Resource Bill	113
Course Overview	114

CHAPTER 4 USING MASTER SCHEDULING AND RCCP 115

Processing Demand and Supply in MFG/PRO	117
Master Schedule Order Maintenance	120
RCCP Process	122
Abnormal Demand	127
Seasonal Build	130
Order Promising	139
Available-to-Promise (ATP)	139
Calculation	140
Selective Materials Plan	145
Summary	155
Processing Exercises	156
Review a Seasonal Build Forecast	157
Rough-Cut Capacity Planning	158
Course Overview	159

APPENDIX A WORKSHOPS AND STUDY QUESTIONS 161

Master Schedule Setup	162
RCCP	163

VI MFG/PRO TRAINING GUIDE — MRP AND CRP

Answers to Master Schedule Setup Study Questions	165
Answers to RCCP Study Questions	166
APPENDIX B REPORTS, INQUIRIES, BROWSES	167
INDEX	171

About This Course

Course Description

QAD designed this course to cover the basics of preparing to implement Master Scheduling and Rough-Cut Capacity Planning (RCCP) in MFG/PRO. The course includes:

- An introduction to Master Scheduling and RCCP
- An overview of key business considerations
- Setting up Master Scheduling and RCCP
- Using Master Scheduling and RCCP
- Activities and exercises throughout the course
 - Students practice key concepts and processes in Master Scheduling and RCCP

Students learn how to:

- Analyze some key business issues before setting up Master Scheduling and RCCP
- Set up and use Master Scheduling and RCCP

Who Should Attend This Course

- Materials managers and analysts
- Planners, schedulers, and master schedulers
- Implementation consultants, members of implementation teams, and key users

Prerequisites

- Recommended training courses:
 - Initial MFG/PRO Setup
 - Product Structures and Formulas
 - Work Orders
 - Work Centers, Routings, and WO Subcontracting
 - Forecast Simulation
- General knowledge of the manufacturing industry
- Working knowledge of MFG/PRO as it is used in the business

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, online help, for example), and acquire industry and field experience.

Using This Training Guide

Students can use this guide in instructor-led classes. Knowledgeable consultants can use this guide for self-study.



General Training Facilities Information

- Telephone or fax
- Messages
- Restrooms
- Class hours: start and finish times, 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 Master Scheduling and RCCP

Course Overview

- ♦ Introduction to Master Scheduling and Rough-Cut Capacity Planning (RCCP)
- ♦ Business Considerations
- ♦ Set up Master Scheduling and RCCP
- ♦ Use Master Scheduling and RCCP

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Course 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
Forecasting, Master Scheduling, and RCCP	Master Schedulers	Cumulative Lead Time
MRP and CRP	Planners, Shop Floor Managers	Cumulative Lead Time

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Planning and Scheduling Overview

All plans set expectations about how resources are used and provide reality checks to determine if plans can be implemented. Planning is done by different people at many levels throughout a corporation and MFG/PRO provides an integrated toolset that is useful at most of these levels.

Note Students unfamiliar with the planning process described by the American Production and Inventory Control Society (APICS) may find it useful to look at planning level integration.

Strategic Planning

Strategic plans set guidelines for production and sales. Because they are done for the longest term, they are the least integrated and least precise of the planning levels. Chief Executive Officers and

Chief Financial Officers look beyond the immediate year's demands to set expectations for growth. Strategic plans set out the overall mission, goals, and initiatives for an organization, largely in terms of gross sales or overall income.

Planning Levels Supported by MFG/PRO

The following planning levels are supported by MFG/PRO:

Product Line and Resource Planning

Production planning is done in the Product Line Planning module of MFG/PRO. The check against resources is done in the Resource Planning module.

This tool enables you to:

- Balance sales forecasts, production forecasts, and income forecasts for an entire product line
- Determine whether you have enough resources, in aggregate, to meet the plans

The production plan sets expectations for a:

- Factory
- Site
- Division, or
- Department

Sales forecasts, production forecasts, and income expectations are produced by different people. Various sets of expectations must be balanced to determine the plan's feasibility.

Production plans:

- Define manufacturing output and other activities to satisfy current planned levels of sales
- Incorporate and coordinate all activities
- Provide guidance for producing individual items that make up the product line
- Support the corporate objectives of increasing:
 - Net profit
 - Return on investment (ROI)
 - Cash flow

Product line plans are broken out into end items, planned in the master schedule, and exploded to component plans by MRP.

End-Item Planning

End-item planning is done in the Forecast/Master Plan module of MFG/PRO. This tool enables you to set production levels in response to actual and forecast demand over a period roughly equivalent to the cumulative lead time.

The cumulative lead time is the longest length of time it takes to produce and ship an item, assuming that nothing is in stock or production.

At this stage, you can develop a rough-cut capacity plan to determine if critical resources will be available. For example, if you want to make 50 items next week but your fabricator only makes 25 in a week, you cannot meet the plan.

The end-item plan sets the number of priority items (end items, level 1 items, service parts, and so forth) that are going to be produced and sets the schedule to produce them.

End-item plans are usually done by master schedulers who:

- Estimate demand for a product
- Determine how many items to produce

Master schedulers modify factory plans to accommodate current situations. The horizon tends to be at least as long as the cumulative lead time.

Component Planning

Component planning is done in the Material Requirements Plan (MRP) module and the plans are checked against capacity in the Capacity Requirements Plan module of MFG/PRO.

This tool enables you to schedule and issue orders for the items and work that will be needed to support the master schedule. You can use Capacity Requirements Planning (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 capacity to meet the schedule.

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

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

Enterprise Resource Planning (ERP)

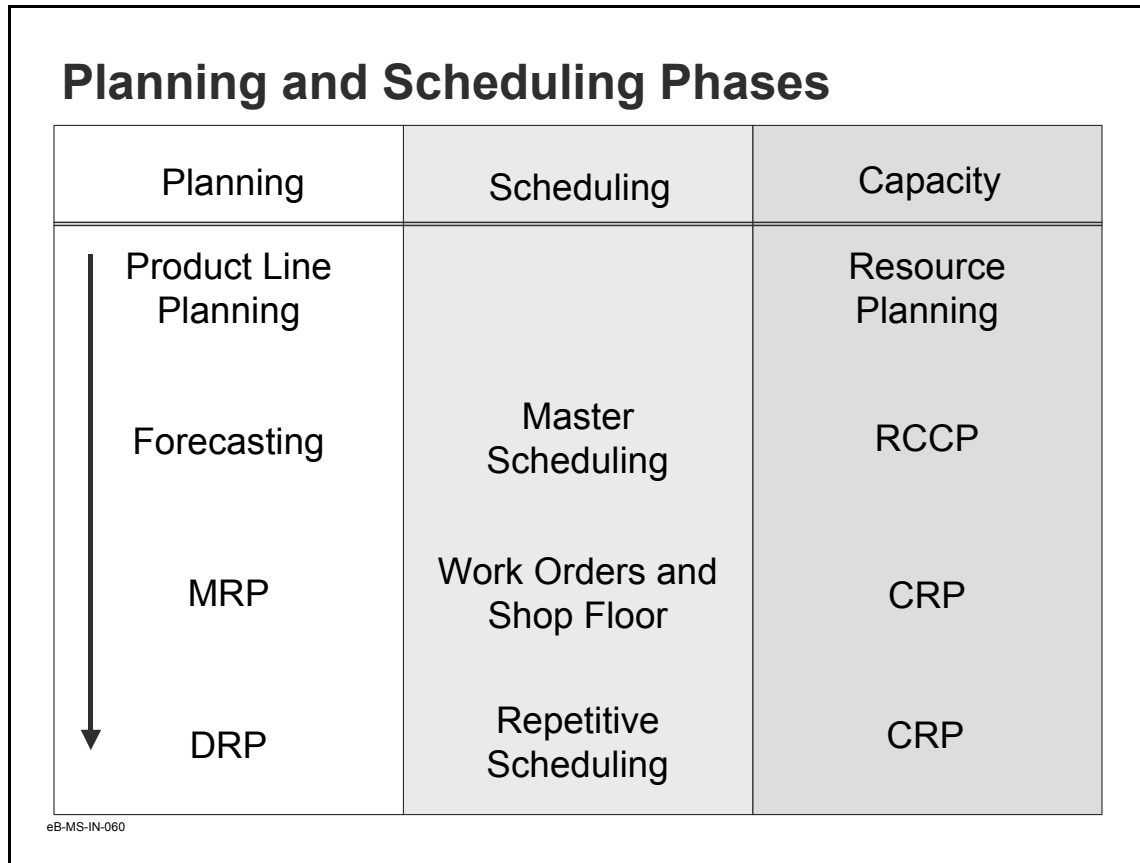
In companies that use Enterprise Resource Planning (ERP), operations planning is the key link between long-term business planning and medium- to short-term planning and execution activities.

ERP calculates target inventory levels that support company objectives for:

- Profitability
- Inventory reduction
- Lead time reduction
- Customer service

ERP also calculates corresponding production demands. These demands eventually pass into:

- Production
- Purchasing
- MRP



Planning and Scheduling Phases

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

The Product Line

Product line plans generally cover 1 to 3 years, usually shown by months and quarters. They are composed of aggregate forecasts that are converted into end-item forecasts. These detailed forecasts provide input that the master scheduler uses to create a statement of production.

The purpose of a product line plan is to:

- Aggregate forecasts
- Establish aggregate production goals (aligned to corporate goals)

18 MFG/PRO TRAINING GUIDE — MASTER SCHEDULING AND RCCP

- Plan efficient and cost effective use of production resources, such as machines and manpower
- Outline the level of planned manufacturing output
- Convert demand into a master schedule and rough-cut capacity plan
- Balance sales forecasts, production forecasts, and income forecasts for an entire product line
- Determine whether there are enough resources, in aggregate, to meet the plan

Product line plans are broken into:

- End items planned in the master schedule
- Component plans by MRP

The Forecast

Forecasting and sales orders introduce independent demand into MFG/PRO.

Independent demand is demand for an item that is unrelated to demand for other items. These demands serve as the primary reason for establishing the master schedule in MFG/PRO.

- Forecasts
 - Estimate future demand for an item
 - Are typically a sales function
 - Can be an integral part of master scheduling
 - Represent one point of input to the master schedule
- Source of independent demand can be created for any item, but is usually created for:
 - End items
 - Critical subassemblies
 - Service parts

The Master Schedule

Developed by site and item, a master schedule is the key plan that provides primary input to MRP. A master schedule is a statement of production determining:

- Which items to schedule
- When orders are needed
- How much to produce

Master scheduling can be done to:

- Anticipate sales as entered in MFG/PRO
- Control production when no sales orders are used
 - In inventory replenishment or build-to-stock environments, for example

Using master scheduling and MRP is an effective method to:

- Set production levels in response to actual and forecast demand
 - Over a period roughly equivalent to the cumulative lead time
- Determine in a rough way (RCCP) whether critical resources will constrain supply

Qualifications and Responsibilities of A Master Scheduler

A master scheduler must have:

- Expertise in manufacturing
- Comprehensive product knowledge
- General business insight
- The ability to:
 - Reduce lead time to bring new products to market
 - Sell ideas and negotiate compromises
 - Resolve conflict
 - Minimize impact of changing requirements
 - Meet customer goals

A master scheduler must know how to prepare data quickly and verify its accuracy in order to deal effectively with:

- Management (overall goals)
- Marketing and sales (available-to-promise)
- Engineering (changing bills of materials)
- Finance (cash flow)
- Distribution (scheduling)
- Customers (demands)
- Vendors (reliability)

The master scheduler is responsible for providing:

- Manpower
- Materials
- Manufacturing capability
- Money (cash flow)
- Management of all logistical activities

Material Requirements Planning (MRP)

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

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

Supply is scheduled and rescheduled to:

- Meet changing demand
- Maintain valid due dates

Capacity Requirements Planning (CRP)

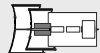
- Determines how much labor and how many machine resources are required for production
 - Calculates workload for a department, work center, or machine
- Used for medium-range capacity management to:
 - Determine and provide the resources required to meet MRP's detailed item schedules

Distribution Requirements Planning (DRP)

- Balances supply and demand for items transferred between sites. It is done by:
 - Calculating item requirements
 - Creating planned orders
 - Managing shipment schedules and transportation

DRP is the extension of distribution requirements planning into the planning of the key resources contained in a distribution system, such as warehouse space, workforce, money, trucks, and freight cars.

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	 Work Centers and Components	Planned Production vs Actual Production

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Planning and Scheduling Areas of Concern

Master Schedule

The objective of the master schedule is to:

- Enable implementation of the production plan
- Manage demand and resources
 - Keep priorities in line
 - Plan resources and capacity requirements
 - Ensure good communication between marketing and manufacturing
- Minimize inventory and maximize resource usage

Rough-Cut Capacity Planning (RCCP)

RCCP provides an early warning for schedule problems. It:

- Provides mid- to long-range capacity planning
- Identifies key material shortages
- Determines labor shortages for critical skills
- Validates the production plan and assists in developing a valid master schedule
- Helps stabilize MRP
- Checks capacity at critical work centers, not at each work center
 - A work center is a specific production area with one or more resources with identical capabilities. It can be considered as one unit for CRP and detailed scheduling.

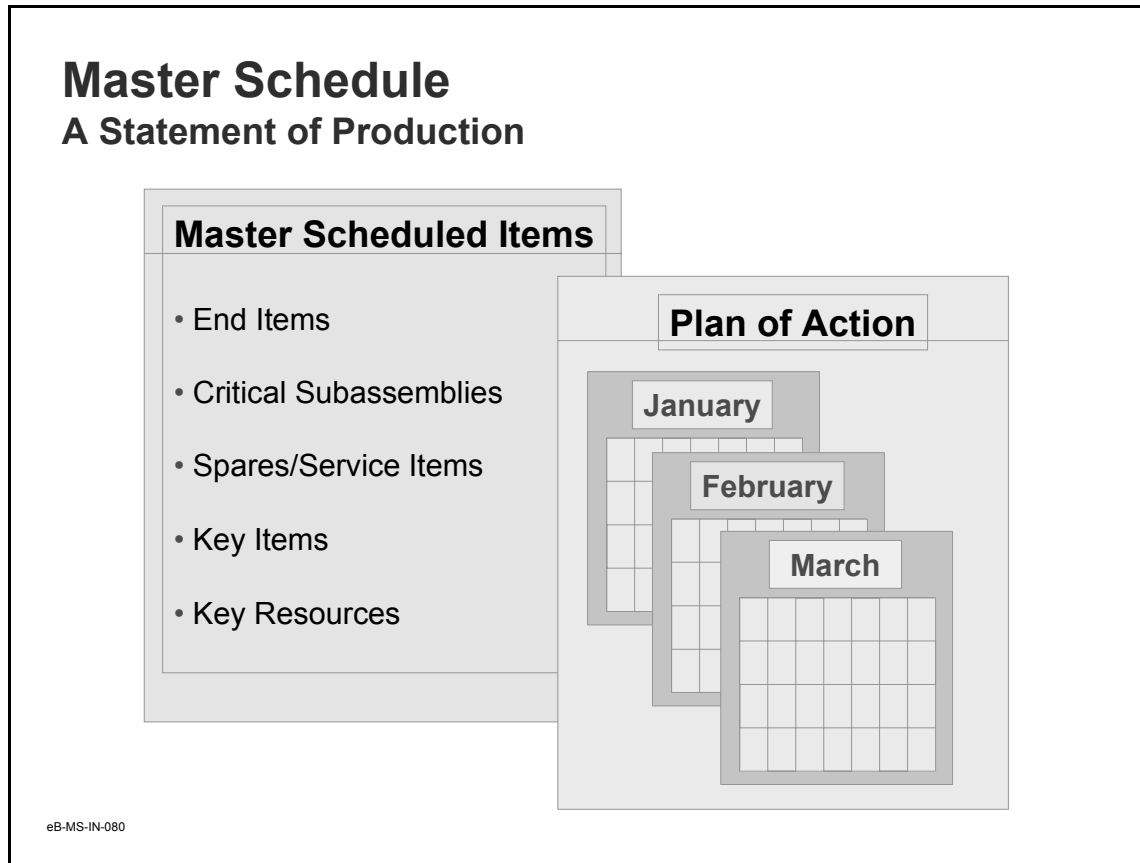
RCCP Compared to CRP

CRP differs from RCCP by taking inventories, orders, lot sizes, and lead time offsets into account. Even though RCCP indicates that sufficient capacity exists to execute the master schedule, CRP may show that capacity is insufficient during specific time periods. CRP:

- Provides the load by work center (detailed capacity)
- Offers detailed work center planning
- Indicates if capacity is sufficient to execute the master schedule
 - Department and work center levels
- Explodes the routings and processes for MRP planned and firm planned orders
 - Updates or creates work order routings
- Determines 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)

Coordination of planning activities at different levels within a corporation is essential to meeting a company's overall goals. At the plant level, effective coordination of plans will result in:

- Increased throughput
- Decreased inventory
- Reduced operational expense



Statement of Production

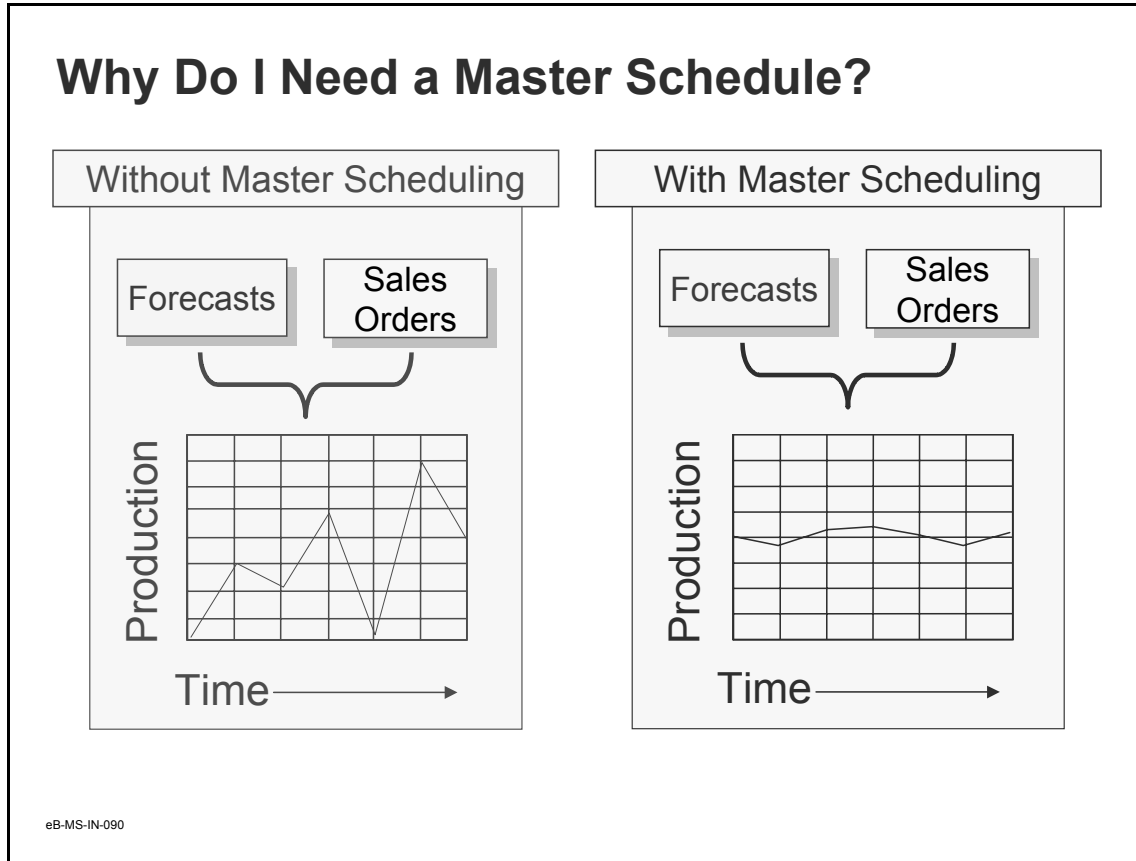
A master schedule is a statement of production set by the master scheduler. It is the key plan that drives results on the factory floor. Developed by site and item, it provides primary input to MRP.

A valid master schedule provides the foundation for effective:

- Customer delivery
- Use of plant capacity
- Implementation of the production plan
- Trade-offs between the marketing and manufacturing organizations

Master scheduled items require human judgment to evaluate the implications for capacity, material, cost, and customer service.

Why Do I Need a Master Schedule?



Benefits of a Master Schedule

The master schedule acts as a buffer between sales and forecast fluctuations and production. In MFG/PRO forecasts, along with any confirmed sales orders, are used as input to the master schedule and MRP.

Forecasts and sales orders establish a source of independent demand and are used in calculating the gross requirements for an item. For example, if 100 units per week are forecast, MRP will plan orders to cover this forecast.

As long as actual sales orders due in any period are less than or equal to the forecast in that week, the orders already planned by MRP will cover the requirements.

However, if 100 units have been forecast but there are sales orders for 150 units, MRP needs to plan an extra 50 units.

What MRP will plan in any period is the amount of the sales orders plus any net remaining forecast amount.

Independent Demand

- Demand for an item that is unrelated to demand for other products
 - Finished goods
 - Service parts
 - End items
 - Spare items

Dependent Demand

- Directly related to or derived from the bill of material structure for other items or end products
 - Components
 - Raw materials

Planning Issues

Nervousness

- Fluctuations in MRP would result if forecasts and sales orders were modified or canceled

Overstated Demand

- Total demand would be overstated if:
 - The forecast quantity were added to the sales order quantity

These issues are resolved in MFG/PRO by:

- Use and application of forecast consumption rules
- Creation of a master schedule which:
 - Anticipates sales
 - Stabilizes production
 - Calculates gross requirements

Note Available-to-promise (ATP) in Master Schedule Summary Inquiry gives visibility to customer service.

Terminology

Available-to-promise (ATP)

Available-to-allocate

Gross requirements

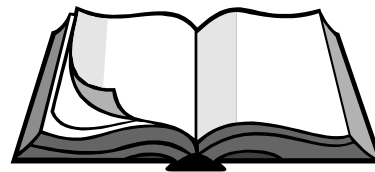
Net requirements

Order policies

Planning bill of material

Seasonal build

Time fence



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Terminology

Available-to-promise (ATP)

ATP is the uncommitted portion of inventory or planned production.

It equals the Master Schedule less customer orders due in the period and all subsequent periods before the next Master Schedule scheduled receipt.

Available-to-allocate

- Based on the calculation specified in the Sales Order Control program
- The quantity on hand less what has already been promised to other orders
 - Sales orders due to ship in the very near future

- Manufacturing orders which have been released to the shop floor

Note Future requirements or sources of supply are not considered by this calculation.

Gross Requirements

A gross requirement is the total of independent and dependent demand for a component before the netting of on-hand inventory and scheduled receipts.

Net Requirements

In MRP, the net requirements for a part or an assembly are derived as a result of applying gross requirements and allocations against:

- Inventory on hand
- Scheduled receipts
- Safety stock

Net requirements, lot-sized and offset for lead time, become planned orders.

Order Policies

Order policies are sets of procedures for determining the lot size and other parameters related to an order.

Planning Bill of Material

A planning bill of material is an artificial grouping of items or events in bill-of-material format. It is used to facilitate master scheduling and material planning.

Seasonal Build

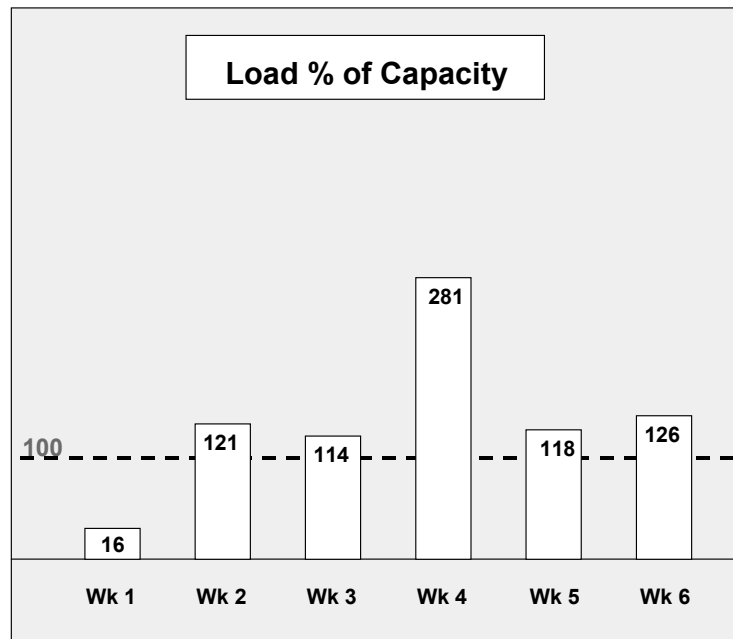
- An item's inventory buildup prior to expected demand, for example:
 - Christmas
 - Fall
 - Winter
 - Spring

Time Fence

A time fence is a policy or guideline established to note where various restrictions or changes in operating procedures take place.

For example, changes to the master schedule can be accomplished easily beyond the cumulative lead time, while changes inside the cumulative lead time become increasingly more difficult (to a point where changes should be resisted). Time fences can be used to define these points.

Rough-Cut Capacity Planning



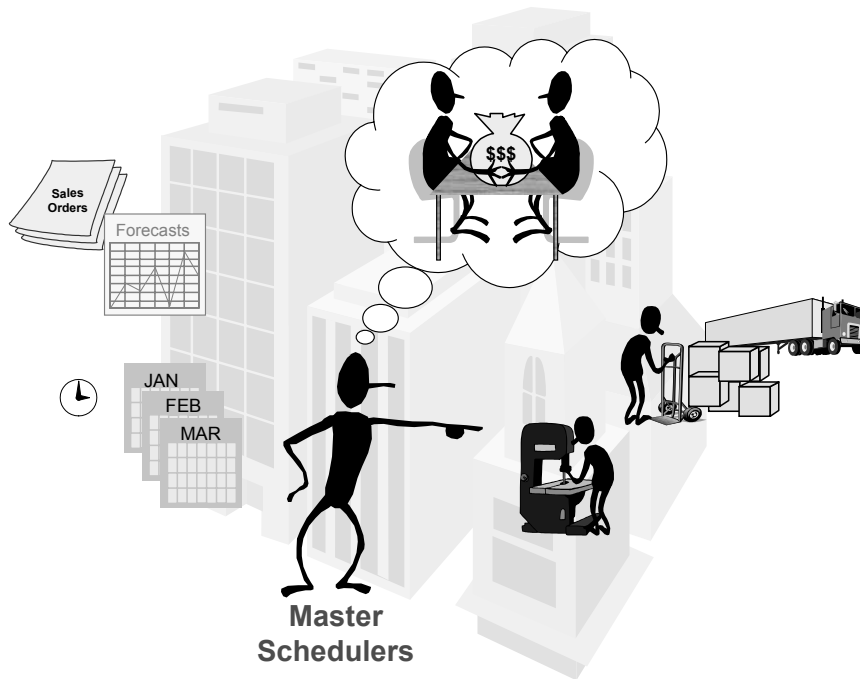
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Rough-Cut Capacity Planning (RCCP)

The rough-cut capacity plan provides a tool for:

- Careful evaluation of changes to the master schedule and their impact on material and capacity
- Rough evaluation of potential capacity problems
- Proper balancing of customer needs and manufacturing needs
- Effective stabilization of MRP

Master Schedule and RCCP Uses



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Master Schedule and RCCP Uses

Normal uses of a master schedule include driving RCCP and MRP and planning future production.

- The production plan broken down into buildable units with specific dates for completion
 - The production plan will be met if the master schedule is developed to support it

RCCP provides a high-level planning process for key resources which may constrain the execution of the manufacturing plan.

Master scheduling and RCCP should remove most of the capacity constraints before MRP is run.

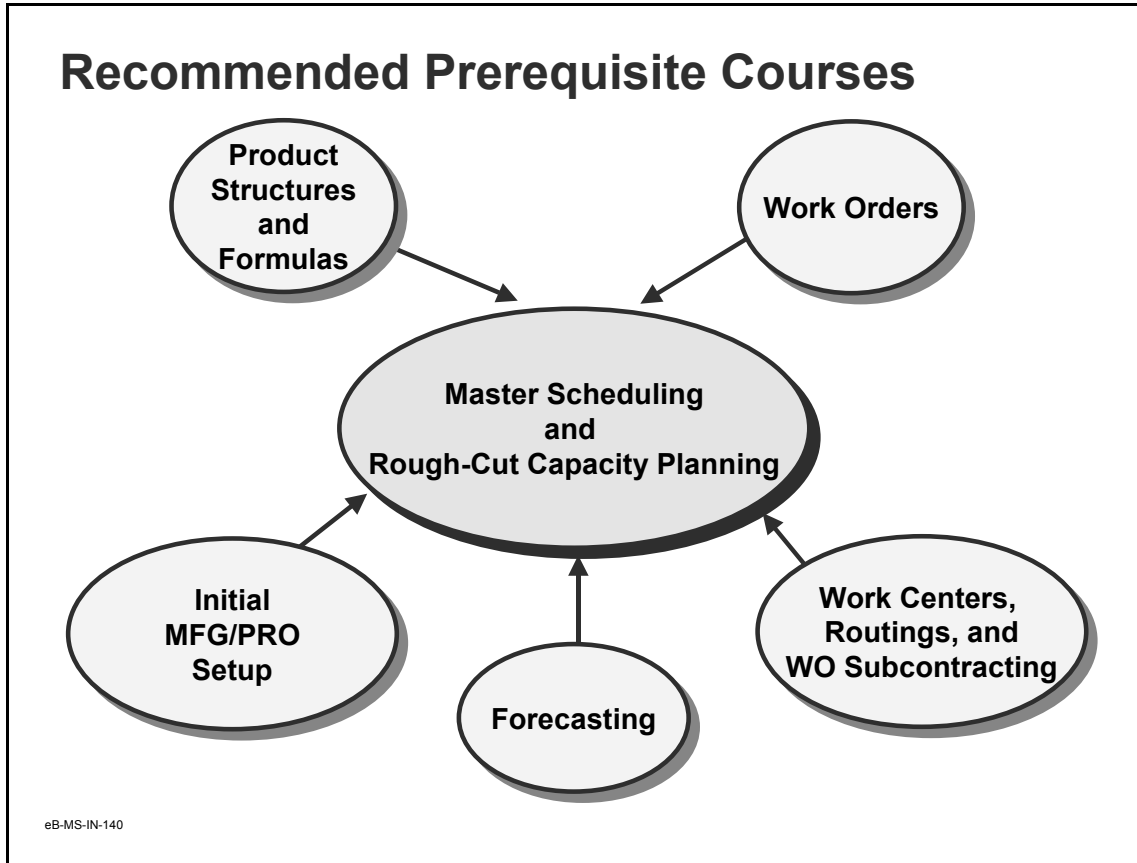
Course Objectives

In this class you learn how to:

- ♦ Identify some key business considerations before setting up Master Scheduling and RCCP in MFG/PRO
- ♦ Set up Master Scheduling and RCCP in MFG/PRO
- ♦ Use Master Scheduling and RCCP in MFG/PRO

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Course Objectives



Related Courses

The courses listed above are recommended prerequisites for this course.

Course Overview

- ✓ Introduction to Master Scheduling and RCCP
- ♦ Business Considerations
- ♦ Set up Master Scheduling and RCCP
- ♦ Use Master Scheduling and RCCP

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Course Overview

CHAPTER 2

Business Considerations

Business Considerations

In this section you learn how to:

✓ Identify some key business considerations before setting up Master Scheduling and RCCP

- ♦ Set up Master Scheduling and RCCP in MFG/PRO
- ♦ Use Master Scheduling and RCCP in MFG/PRO

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Business Considerations



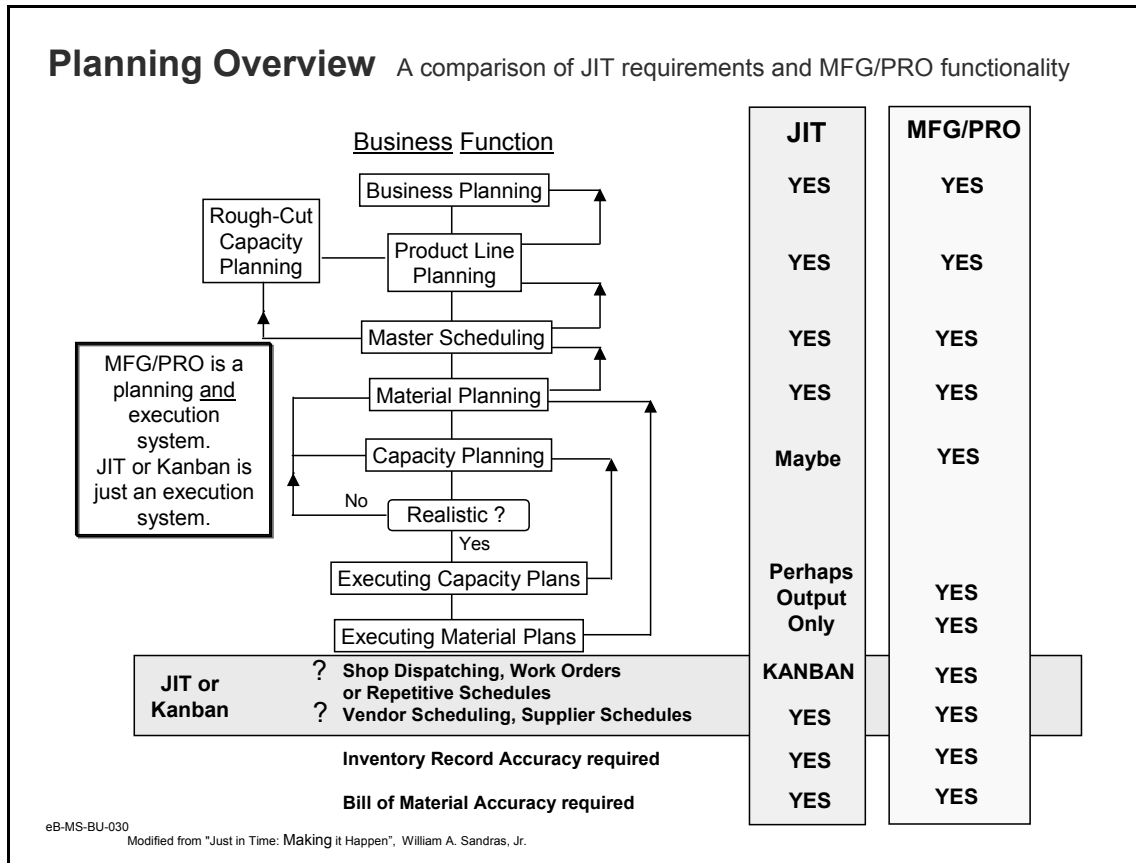
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- ✓ Planning
- ✓ Items to Master Schedule
- ✓ Multilevel Master Schedule
- ✓ Production Forecasts
- ✓ Resources That Need RCCP
- ✓ Seasonal Requirements
- ✓ Planning Horizon
- ✓ Time Fence
- ✓ Features and Options
- ✓ Production Constraints

Pre-Setup Business Considerations

There are several business issues to take into consideration before setting up Master Scheduling and RCCP in MFG/PRO.

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



Planning Overview

Set planning parameters in:

- Item Planning Maintenance
- 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

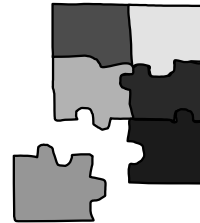
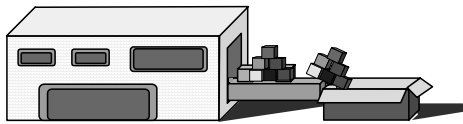
The item planning data is the most used information in your database.

Setup Implications

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

Items to Master Schedule

- End items
- Critical subassemblies
- Spare/service items
- Key items
- Key resources



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Items to Master Schedule

Definition

Determining which items to master schedule is a reflection of the industry, the products, and the manufacturing processes used in a particular company and requires the expertise of an experienced master scheduler.

Why Consider?

Sometimes, demand for an item is dependent on demand for another item. This is a common occurrence when the master schedules for several sets of items are related through planning bills or product structures.

Functionality in MFG/PRO

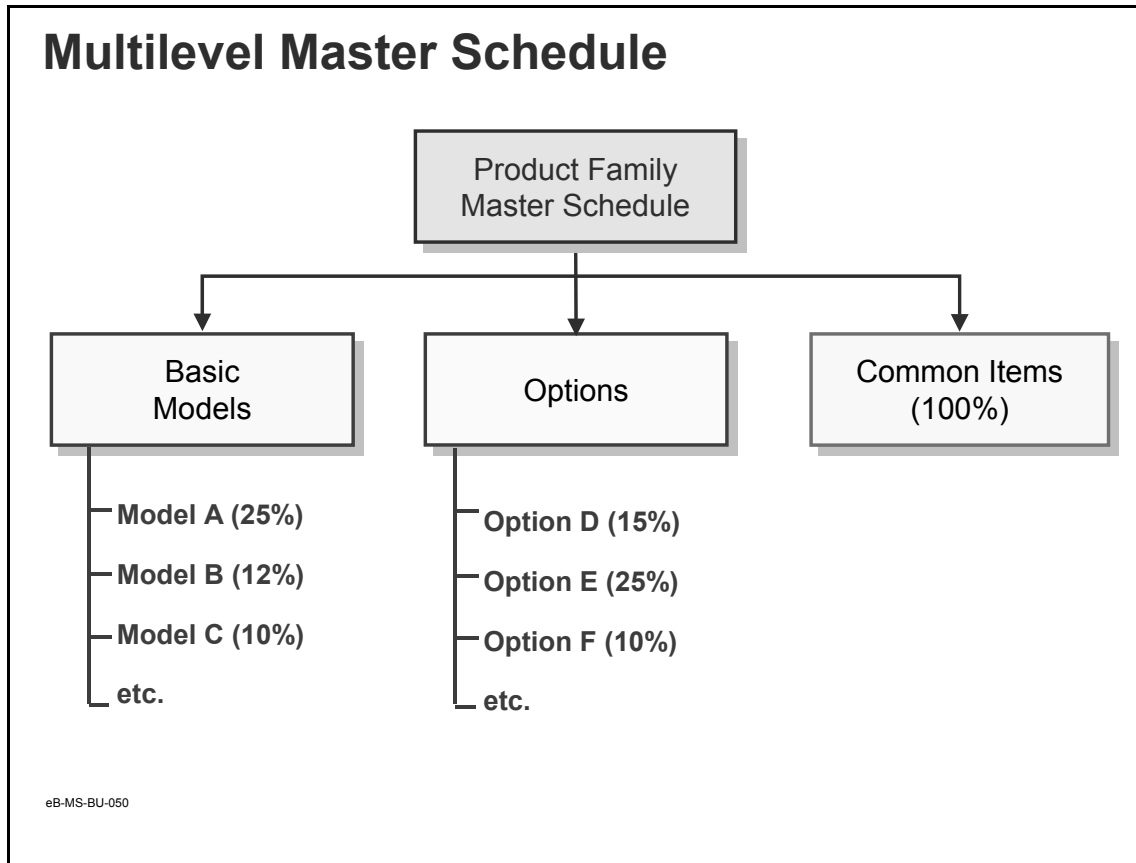
Set the master schedule flag = yes in Item Planning Maintenance or Item-Site Planning Maintenance for multisite.

- Output for the master schedule is a plan for all items using MRP and product structures
- Input for the master schedule can come from:
 - Forecast Maintenance (automatic link)
 - A product line plan

Note In MFG/PRO, there is no link between the master schedule and the product line plan

Setup Implications

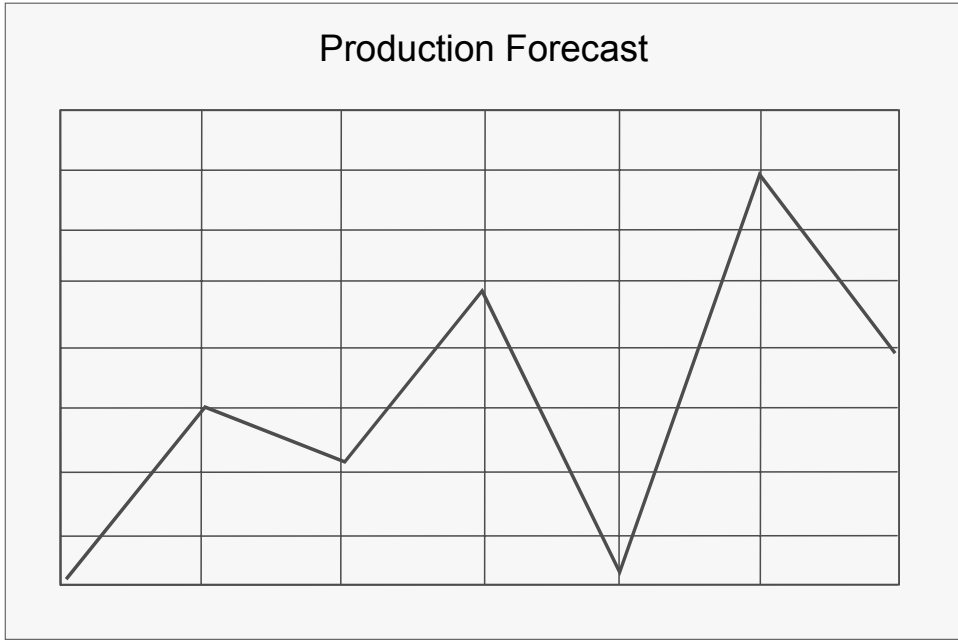
An item can be master scheduled at one site and not another.



Multilevel Master Schedule

Multilevel master scheduling is an approach where a planning bill of material is used to master schedule an end product or family, along with selected options and accessories.

Production Forecast



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Production Forecast in MFG/PRO

Definition

A production forecast is a system-calculated forecast resulting from a planning bill of material and occurs when using multilevel master scheduling. It estimates the projected level of customer demand for a feature (options, accessories) of a make-to-order or an assemble-to-order product.

When you establish planning bills and forecast and master schedule at the family-item level, the system automatically calculates the derived demand for components of the family or upper-level item. These calculations are based on the available-to-promise quantities for the family-level item and the quantity per and forecast percentage for the components of that family item.

Why Consider?

As forecast for the family-level item is consumed, the available-to-promise quantity for that item changes, resulting in revised calculations for the production forecast the next time MRP is run.

Functionality in MFG/PRO

- The production forecast derives from:
 - The master schedule and forecast percentage specified in the planning bill
- Production forecast amounts:
 - Display in master schedule reports and inquiries
 - Contribute to the total demand that MRP regards as input
- Production forecasts are only created for components with structure codes:
 - (P)lanning
 - (O)ption

Setup Implications

- Production forecasts only consume at the higher level

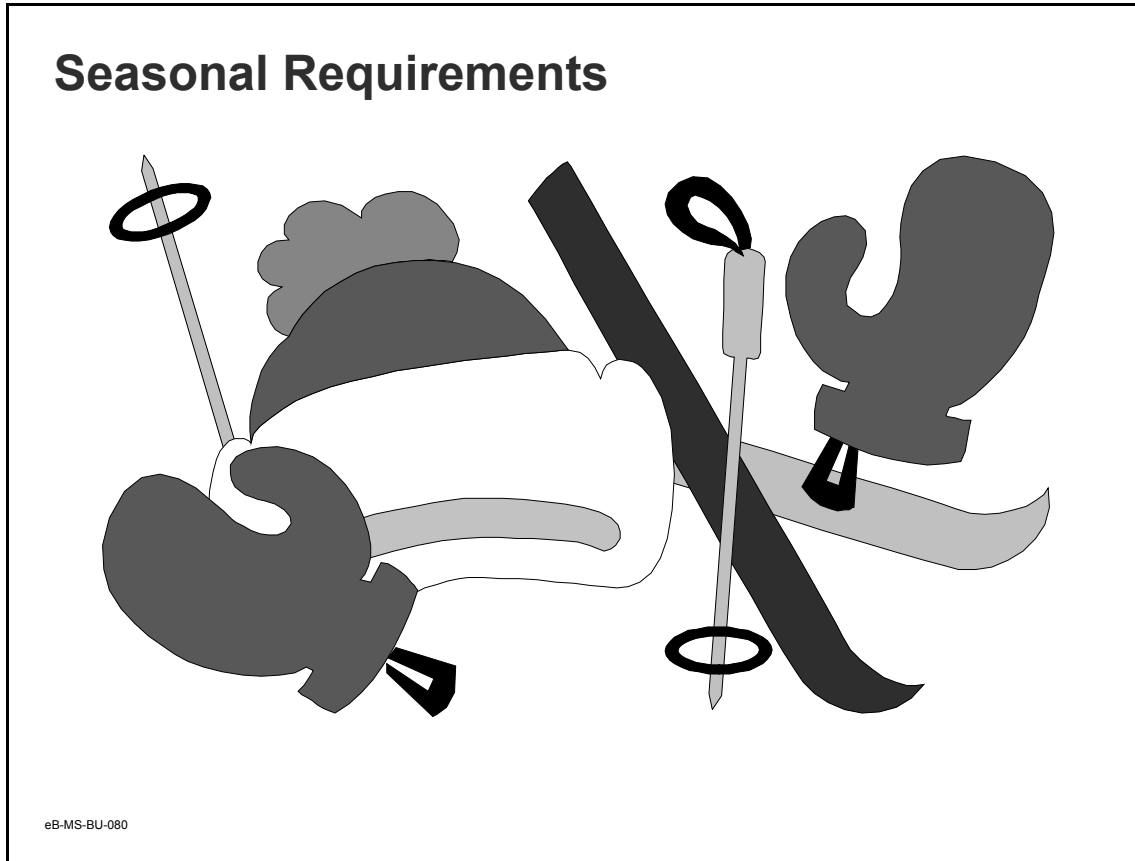
Resources That Need RCCP

Key Resources	Product Groups			
	A	B	C	D
Labor	8.0	6.0	4.1	2.0
Work Center	4.3	7.0	4.8	5.0
Warehouse	6.7	6.7	2.0	0.0
Testing	4.0	1.7	3.8	6.0

eB-MS-BU-070

Determine What Resources Need RCCP

- Develop a resource profile to identify critical resources



Seasonal Build Requirements

Definition

Seasonal demand items require a buildup of an item's inventory prior to its expected demand.

Why Consider?

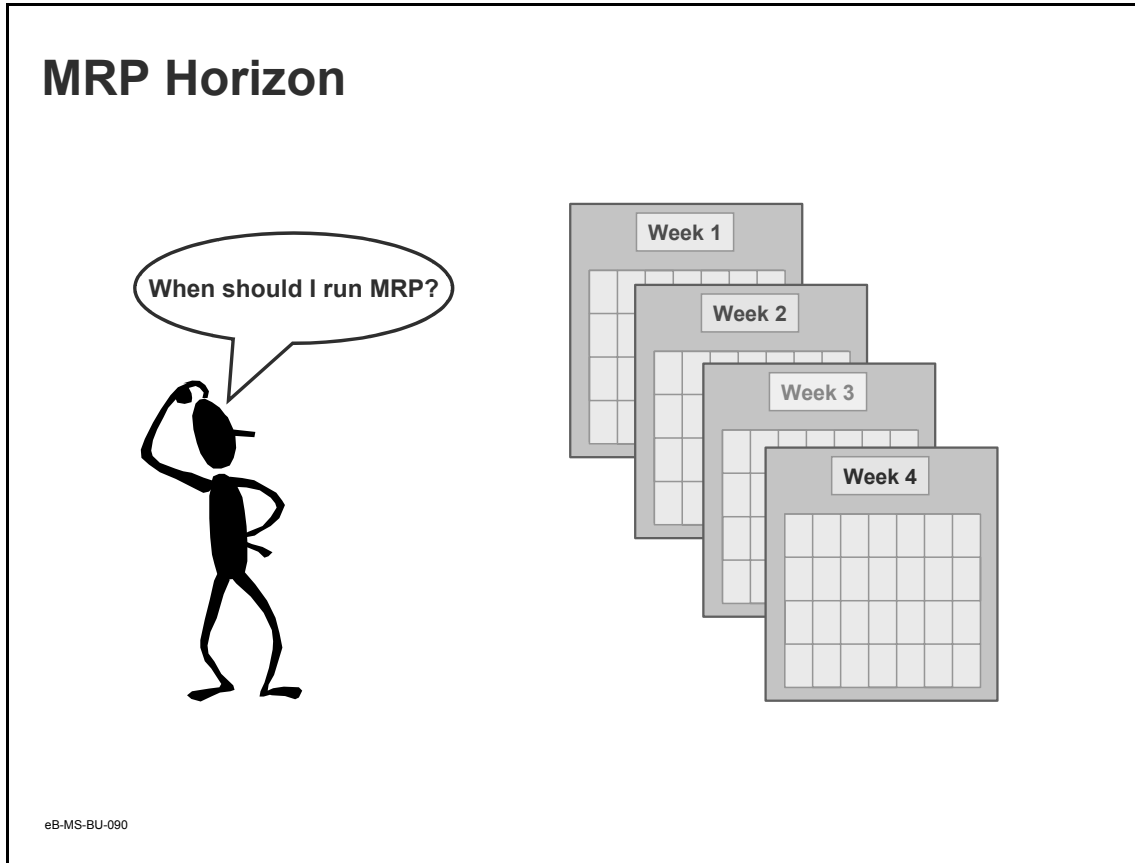
Although you could enter master schedule orders to adjust to seasonal requirements, identifying a demand as seasonal build prevents MRP from issuing action messages to cancel or delay orders for those items whose demand is not yet apparent.

Functionality in MFG/PRO

In MFG/PRO, seasonal build inventory is entered into the system using Seasonal Build Maintenance.

Setup Implications

Setting inventory to zero enables the items to be promised.



MRP Horizon

Definition

- Amount of time the master schedule extends into the future

Why Consider?

MRP only processes material requirements within this horizon and ignores activity outside this horizon.

- Need to allow time for:
 - Ordering components
 - Capacity changes of primary work centers or key suppliers
 - Minimum cumulative lead time

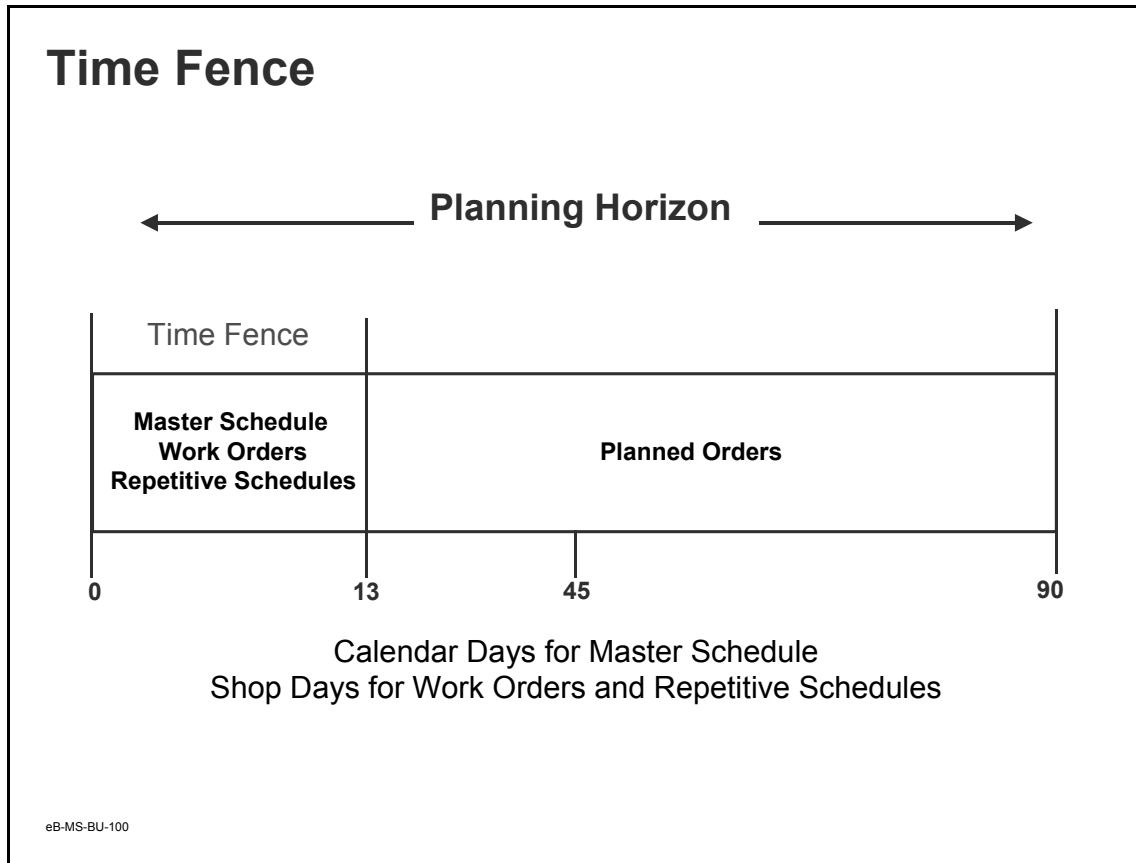
Functionality in MFG/PRO

- Set the planning horizon in the MRP Control program
- Ensure that all items are replanned by running the Regenerate Materials Plan

Since MRP ignores activity outside of the planning horizon, make the horizon at least one day longer than the longest cumulative lead time (30 days is recommended).

Setup Implications

- If the horizon is changed, items are not automatically flagged for net change replanning
 - Run Regenerate Materials Plan



Time Fence

Definition

The number of calendar days inside of which MRP should not automatically make changes. To manually control the schedule for a period of time set the time fence to *nn* days and MRP:

- Adds the number of days time fence to the system date
- Does not create any planned orders within this time period

Note Time fence is most often used with master scheduled items.

Why Consider?

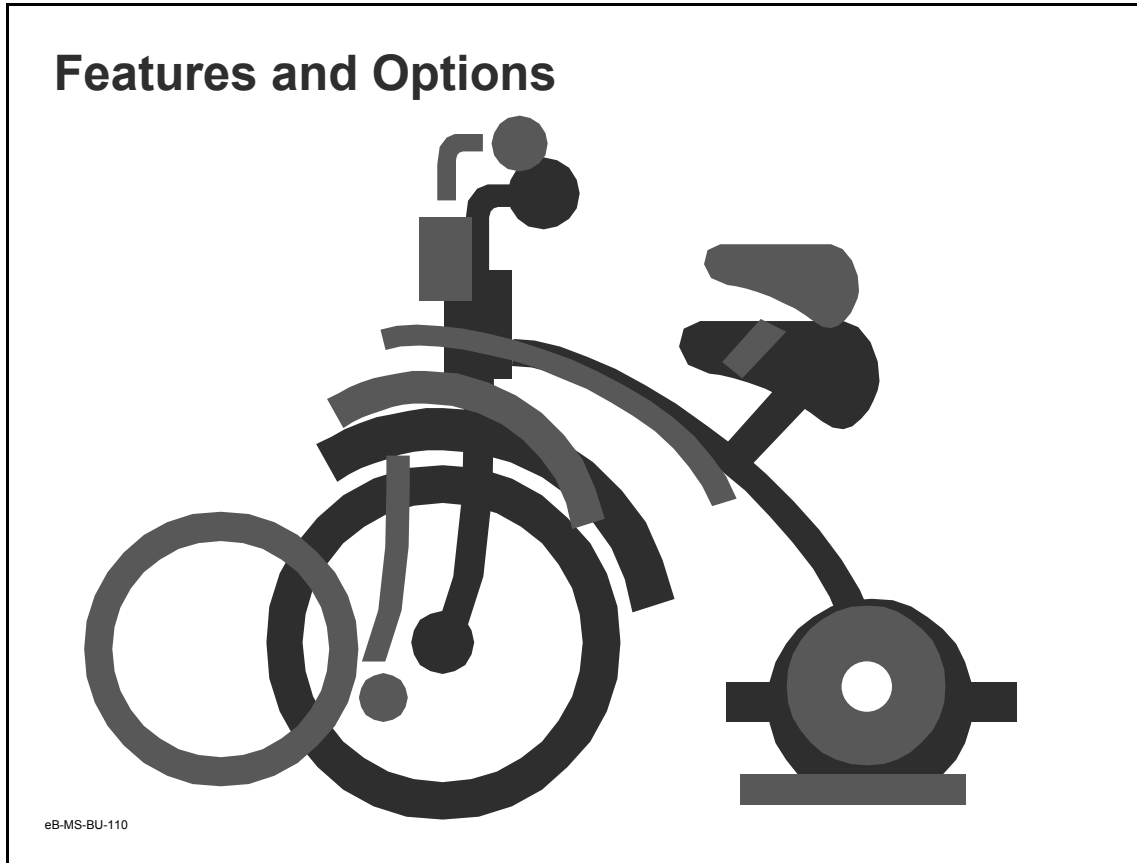
The time fence gives the master scheduler manual control within the time fence period. MRP is allowed to create planned orders automatically outside of the time fence.

Functionality in MFG/PRO

The value entered in Item Master Maintenance is used as the default for all sites. It may be changed manually for any site as needed.

Setup Implications

The time fence designates a period of calendar days from the system date inside of which MRP will not create or change existing planned orders. Order action messages, however, will be generated if necessary. MRP will provide action messages over the near-term horizon.



Features and Options

Definition

Components of the family item in the planning bill can be either the actual manufactured items or configured products, or item groups representing common components or selected features and options.

Why Consider?

Directly forecast the family/models and forecast options by percent of family.

Functionality in MFG/PRO

The top-level item of a multilevel master schedule product structure represents the family of buildable products that can be configured from a set of available models and options.

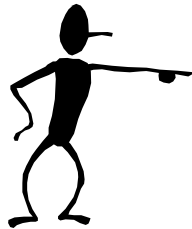
Setup Implications

For master scheduling purposes, it is not possible to forecast accurately the detailed combinations of potential products that can be manufactured and sold. Forecasting at the family-item level or the option-item level is accurate and can drive the master scheduling process.

Production Constraints



- Machine capacity
- Work center capacity
- Labor capacity
- Material



- Policies and procedures

eB-MS-BU-120

Production Constraints

Definition

A production constraint is any element or factor that prevents a system from achieving a higher level of performance with respect to its goal.

A priority item plan will help resolve production issues. It sets the number of priority items (end items, level 1 items, service parts, etc.) that are going to be produced and plans the schedule to produce them. The check on this plan is the availability of critical resources.

If you want to make 150 items next week, but your machine only makes 125 in a week, you cannot meet the plan. A component plan determines 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.

Why Consider?

A master scheduler must consider and remove potential production constraints when preparing the master schedule and rough-cut capacity plan. A constraint could be physical (machine capacity or lack of material) or managerial (policies and procedures).

Functionality in MFG/PRO

The master scheduler makes the best use item-level RCCP by considering constraints. RCCP is implemented in MFG/PRO using Item Resource Load Summary Inquiry.

Setup Implications

The master scheduler tests scheduled production quantities against available resources. This rough-cut capacity plan tests end-item production.

Review

- ♦ Processes and Procedures
- ♦ Reporting Requirements
- ♦ Customer Expectations
- ♦ Product Configuration

eB-MS-BU-130

Review

Course Overview

- ✓ Business Considerations
- ♦ Set up Master Scheduling and RCCP
- ♦ Use Master Scheduling and RCCP
- ✓ Introduction to Master Scheduling and RCCP

eB-MS-BU-140

Course Overview

CHAPTER 3

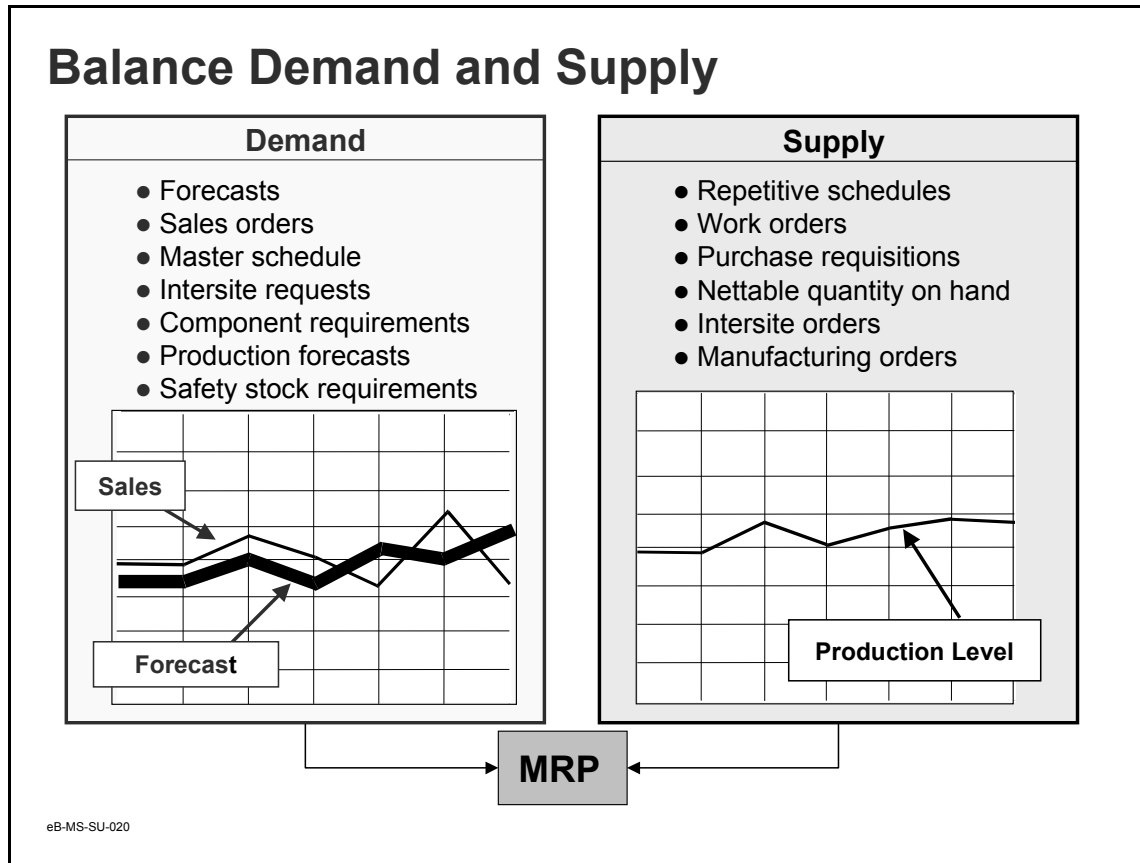
Set Up Master Scheduling and RCCP

Set up Master Scheduling and RCCP

In this section you learn how to:

- ✓ Identify some key business considerations before setting up Master Scheduling and RCCP in MFG/PRO
- ✓ **Set up Master Scheduling and RCCP in MFG/PRO**
 - ♦ Use Master Scheduling and RCCP in MFG/PRO

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Balance Demand and Supply

The master schedule represents supply which then creates component demand for MRP. Master scheduled items require human judgment to evaluate the schedule and its effects on capacity, material, cost, and customer service. The master scheduler creates required supply orders to meet demand after considering requirements for:

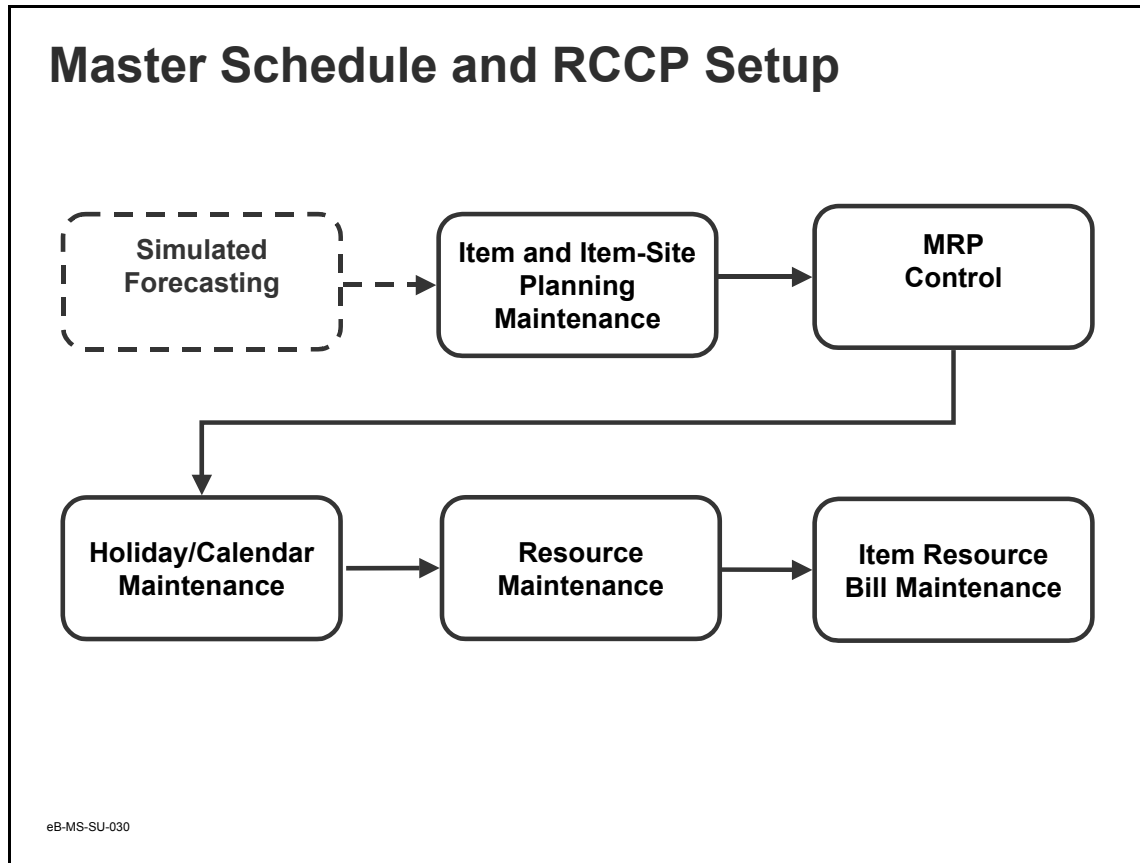
- Independent demand (forecasts and sales orders)
- Dependent demand (related to or derived from the BOM structure for other items or end products), especially when scheduling for important spare parts
- Abnormality
- Seasonality
- Consumption

Sales order demand is the quantity of an item sold, as recorded on confirmed sales orders or required ship schedules. The system recognizes item quantities ordered as demand when a sales order has been confirmed.

- Confirmed = Yes in Sales Order Maintenance, or
 - A customer planning or shipping schedule has been changed to a required ship schedule using Required Ship Schedule Update, or
 - Selective Required Ship Schedule Update

Sales order demand:

- Consumes shipment forecasts based on the item number, site, quantity, and due date recorded on the sales order or customer schedule
- Is abnormal if the quantity or source of demand is not characteristic of quantities anticipated by the current forecast and should not be used to plan future forecasts



Reading the illustration:

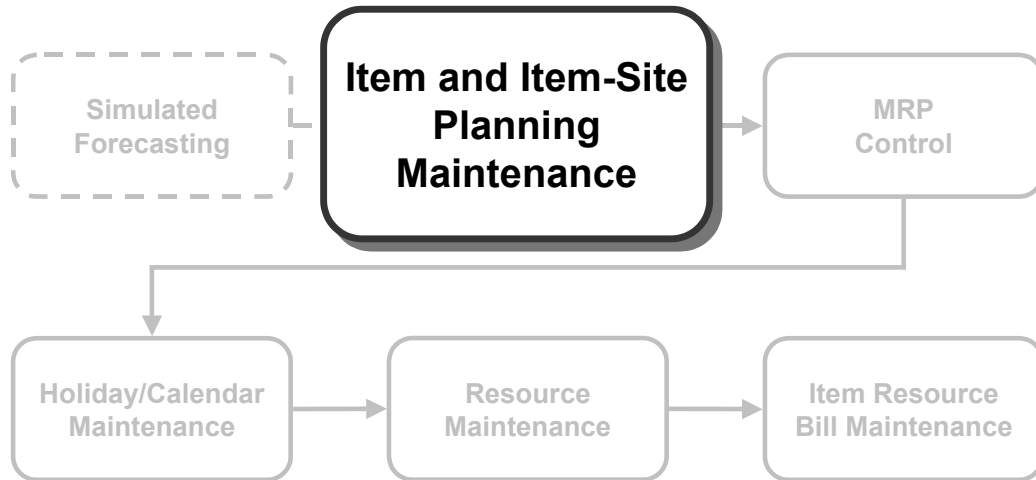


Boxes with solid lines are required for set up and are covered in this course.



Box with dotted lines is optional and is covered at length in another course.

Master Schedule and RCCP Setup



eB-MS-SU-040

Identify Master Scheduled Items

The screenshot shows two overlapping SAP windows. The background window is 'Item Planning Maintenance' and the foreground window is 'Item-Site Planning Maintenance'. Both windows are for Item Number 44-100 and Unit of Measure EA.

Item Planning Maintenance (Background):

- Item Number: 44-100
- Unit of Measure: EA
- 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-Site Planning Maintenance (Foreground):

- Item Number: 44-100
- Unit of Measure: EA
- Site: 12000
- Description: CONTROL UNIT, HOME USE

Item Planning Data (Foreground):

- 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: ☒
- Buyer/Planner: qad
- Supplier: 5003000
- PO Site: 12000
- Purchase/Manufacture: M
- Configuration Type:
- Inspect:
- Ins LT: 0
- Mfg LT: 3
- ATP Enforcement: NONE
- Family ATP:
- Run Seq 1:
- Run Seq 2:
- Phantom: ☐
- Minimum Order: 0
- Maximum Order: 0
- Order Multiple: 0
- Op Based Yield: ☐
- Yield Percent: 100.00%
- Cum LT: 0
- Pur LT: 1
- Run Time: 0.000
- Setup Time: 0.000
- EMT Type: NON-EMT
- Auto EMT Processing: ☐
- Network Code:
- Routing Code:
- BOM/Formula:

Buttons at the bottom right: Add Link, Cancel, Back, Forward.

eB-MS-SU-050

Identify Master Scheduled Items

To define an item as master scheduled, set Master Schedule = Yes for that item in:

- Item Master Maintenance
- Item Planning Maintenance or
- Item-Site Planning Maintenance (for multisite environments)
 - Most items are set up with Plan Order = Yes
 - Sometimes master schedule items have this flag set to No

If criteria at each site are the same, use Item Planning Maintenance (the default for all sites). The system looks at item master data only when no site-specific data has been entered, or when dealing with the item at the default site established in Item Master Maintenance.

Note Master schedules can be created and maintained entirely by master schedulers entering firm planned orders using Master Schedule Order Maintenance or Work Order Maintenance.

Item Planning Maintenance

Item Number: 44-100 Description: CONTROL UNIT, HOME USE
Unit of Measure: EA

Item Planning Data

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

Add Link

eB-MS-SU-060

Item Planning Maintenance

Master Sched

This flag = Yes for master scheduled items. These items may be planned separately using Selective Materials Plan. This allows development of the master schedule for:

- Independent demand items
- Planning for dependent demand items

Plan Orders

Most items are set up with Plan Order = Yes.

Sometimes master scheduled items have this flag set to No, allowing manual interaction with the system.

Indicates whether Material Requirements Planning (MRP) should create planned orders for this item. Planned orders are orders with a suggested order quantity and due date calculated by MRP to meet planned future demand.

The Plan Orders flag operates in combination with the Order Policy. If Order Policy is blank, MRP does not plan this item, regardless of the Plan Orders flag. No requirements or action messages are generated.

Time Fence

Time fence is most often used with master scheduled items. It is the number of calendar days inside of which MRP should not automatically make changes to the plan.

- MRP adds the number of days time fence to the system date and does not create any planned orders within this time period
- MRP will delete any planned order (either inside or outside of the time fence) if there is no demand generated for the item
- On firm orders, if change is needed, MRP creates an action message alerting you to what must be done
 - The message “Time Fence Conflict” reminds you why MRP didn't make the change
- To control the schedule manually for a period of time (the next two weeks, for example), set the time fence to 14 days

MRP Required

- A system maintained flag indicating whether an item needs to be replanned
- Net Change Materials Plan determines which items to include using this flag
 - Does not replan all items; only items flagged MRP Required = Yes
- An item is automatically flagged for replanning whenever a change is made that affects order timing or quantity, such as:
 - Planning data
 - Inventory balance
 - Product structure
 - Purchase requisitions and orders
 - Sales orders
 - Work orders
 - Master schedule
 - Repetitive schedule

- Forecast
- If MRP Required = Yes, it reflects changes made after the item was planned by MRP

Order Policy

A code controlling the MRP process for this item/product. Values may be:

- Period Order Quantity (POQ)
 - A planned order is created to cover the requirements for a specified number of calendar days, as specified in Order Period.
- Fixed Order Quantity (FOQ)
 - Planned orders are created with the order quantity specified in the Order Qty field
 - If the value for Min Ord is greater than Order Qty, planned orders are created with the order quantity specified in the Min Ord field instead
 - Order Qty must be greater than zero (even if Min Ord is greater than zero) for creating planned orders
- Lot for Lot (LFL)
 - A separate MRP planned order is created to satisfy each net requirement
 - If there are many sources of demand, MRP creates many planned orders
- One Time Only (OTO)
 - A single order is created with an order quantity of one
 - Could be used to plan project activities and milestone events that happen only once
- Blank
 - Obsolete parts, reorder parts, Kanban
 - MRP will not calculate

Note Any other non-blank value is processed as LFL.

Whenever a net requirement exists, MRP creates a planned order to fill it. The quantity and due date of the order are determined by the order policy, lead time, and order modifiers.

- If the Order Policy is not blank and the Plan Orders flag = Yes, MRP plans the item
- If the Order Policy is not blank and the Plan Orders flag = No, then MRP plans the item but does not create planned orders
 - Only action messages are created, suggesting what orders should be entered manually
- If Order Policy is blank, MRP does not plan this item, regardless of the Plan Orders flag
 - No requirements or action messages are generated

The traditional technique for managing the master schedule is to enter and maintain master schedule orders manually, using action message reports.

This process becomes unwieldy if you have a large number of master scheduled items, but may work quite well in some situations. To do this, master scheduled items should be set up with the following:

- Master Schedule = Yes
- Plan Orders = No
- Order Policy = any value but blank

Order Qty

- The normal order quantity for this item or base process
- If this item has an Order Policy of FOQ, all MRP planned orders are created with this quantity
- For manufactured items, order quantity has another use
 - Identifying the normal or average order quantity of the item
- When manufacturing costs are calculated using Routing Cost Roll-Up
 - Setup costs are divided by this order quantity
- When manufacturing lead times are calculated, they are stated in terms of this order quantity
- If this quantity = zero, the system assumes an order quantity of 1 for cost calculations only
- Not used for co-product or by-product items when planned from a base process
- In a process environment, item Order Quantity should always be the same as the formula Batch Quantity
 - Must be done manually

Warning This value affects both cost and lead time calculations and can significantly impact scheduled due dates. Order due dates are determined using the standard manufacturing lead time (for the standard order quantity). If orders are entered for a much different quantity, due dates must be adjusted manually.

Batch Qty

- A system maintained field recording the normal batch quantity for an item
 - Used only with formula/process functions
- Ingredient quantity per and process operation run times are stated in terms of batch quantity
- This quantity is updated by the Batch Quantity Change function

Whenever you change the formula Batch Quantity, make sure that you also change the item Order Quantity. These should always be the same. This must be done manually.

Order Period

This field operates only if the Order Policy is set to POQ. Then MRP looks ahead this number of days when calculating net requirements. One planned order is created to cover the requirement for this period.

- Validated against predefined values, if any, entered in Generalized Codes Maintenance
- Number of calendar days to cover by one MRP planned order (default is 7)

Safety Stk

Safety stock is the quantity of this item to be maintained in inventory as protection against fluctuation in demand and/or supply. Safety stocks may be particularly important for critical items, a shortage of which can shut down production.

- MRP processing considers safety stock a requirement and schedules planned orders to cover it
- As soon as quantity on hand falls below the safety stock quantity, MRP plans an order
- Safety stock and safety time can inflate inventory levels
 - Safety stock can trigger MRP planning an order even if there is no “real” demand
 - Safety time consistently plans to have inventory on hand before it is actually needed

Note Reorder Report is the only report in the system that shows safety stock.

Safety Time

- MRP schedules planned orders to be received this many days early
- A hedge against late deliveries

Reorder Point

- The inventory level at which this item should be reordered

PO Site

The PO site entered on the requisition determines which purchasing department takes action on this requisition.

Pur/Mfg

- Purchase/manufacture code controls how the system:
 - Explodes forecasts
 - Plans and creates orders
 - Calculates costs for the item
- Code options include:

- Purchased (P), DRP (D), manufactured (M), routable (R), configured (C), line manufactured (L), flow scheduled (W), and family (F)

Configuration

Allows users to determine if a configured item is assemble-to-order (ATO) or a kit (KIT).

- ATO
 - A discrete end item in itself, produced from a combination of various components
 - The configuration defines components or ingredients of a finished product
- KIT
 - A set of items that are picked for shipment
 - No real assembly takes place
 - Not a physical entity in and of itself; it only exists as a logical superset of its components

Mfg LT

- The normal or average number of working days it takes to manufacture this item

Pur LT

- Normal number of calendar days it takes to complete a purchasing cycle for this item

Inspect

- Indicates whether this item is to be inspected after receipt

Ins LT

- The normal or average number of working days needed to inspect this item after it is received

Cum LT

- The longest possible length of time it would take to have this item/product available if you started today with no components in stock
- MFG/PRO looks at the manufacturing lead time of this item and its subassemblies, and the purchasing lead time of the raw materials to determine the critical path

Example You are making washing machines from all purchased components. Most components have a purchasing lead time of 4 days or less, except motors which have a purchasing lead time of 20 days. If it takes 2 days to assemble the machine, the cumulative lead time for a washing machine is 22 days, the longest possible time.

Network

- A code used to identify a set of sourcing relationships
 - Only works if Pur/Mfg Code = D (DRP)

Routing Code

- A code identifying the routing or process normally used in the manufacture of this item
- Operates only for manufactured items
- Accesses the routing operation steps to:
 - Calculate product cost
 - Plan for material and capacity

BOM/Formula

- A code identifying the product structure, formula, and/or co-product/by-product structure normally used to manufacture this item
 - For co-products/by-products, this is the base process code

Issue Policy

- A code indicating whether this item should be issued on work order picklists

Phantom

- Indicates if this item is normally stocked or is put together as part of a higher level assembly

Min Ord

- The minimum quantity of this item to be ordered on a single order
- MRP uses Min Ord to determine the quantity of planned orders, regardless of the Order Policy
 - If net requirement is below this amount, MRP creates an order for this minimum quantity
 - If an existing order is below this minimum, MRP creates an action message

Max Ord

Zero (default) means there is no maximum of this item to be ordered on a single order.

- If MRP calculates a requirement greater than this, it creates a planned order for the amount needed
- However, any time MRP sees an order for more than this quantity, it creates an action message

Ord Mult

- The multiple in which orders for this item are placed
- Used only when Order Policy = POQ or LFL
 - Then MRP uses it to determine the quantity of planned orders
 - The net requirement is rounded up to a multiple of this number

Example If the order multiple is 50 and the net requirement is 432, MRP creates a planned order for 450.

Yield %

- The percentage of any order expected to be in usable condition
- Applies to both purchased and manufactured items
- If the yield is less than 100%, then MRP plans orders for more than needed

Example If the net requirement is 100 and the item yield is 50% then the planned order quantity is set to 200.

Run Time

- Standard time in decimal hours (excluding setup time) required to make one unit of this item
 - The sum of all the operation run times
 - This field is for reference only and may appear on some selected reports and inquiries

Setup Time

- Standard time required in decimal hours to set up for one lot of this item
 - The sum of all the operation setup times divided by the item Order Quantity
 - This field is for reference only and may appear on some selected reports and inquiries

EMT Type

This field is used in the Enterprise Material Transfer (EMT) order processing environment.

Auto EMT Processing

This field is used in the multilevel Enterprise Material Transfer (EMT) order processing environment.

Item-Site Planning Maintenance

Item Number: 44-100 Description: CONTROL UNIT, HOME USE
Unit of Measure: EA
Site: 12000

Item Planning Data

Mstr Sched: ☒	Buyer/Planner: qad	Phantom: ☐
Plan Orders: ☒	Supplier: 5003000	Minimum Order: 0
Time Fence: 0	PO Site: 12000	Maximum Order: 0
MRP Required: ☒	Purchase/Manufacture: M	Order Multiple: 0
Order Policy: LFL	Configuration Type:	Op Based Yield: ☐
Order Qty: 10	Inspect: ☐	Yield Percent: 100.00%
Batch Qty: 1.0	Ins LT: 0	Run Time: 0.000
Order Period: 0	Mfg LT: 3	Pur LT: 1
Safety Stock: 0		Setup Time: 0.000
Safety Time: 0	ATP Enforcement: NONE	EMT Type: NON-EMT
Reorder Point: 0	Family ATP: ☐	Auto EMT Processing: ☐
Rev: AC	Run Seq 1:	Network Code:
Issue Policy: ☒	2:	Routing Code:
		BOM/Formula:

Add Link

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Item-Site Planning Maintenance

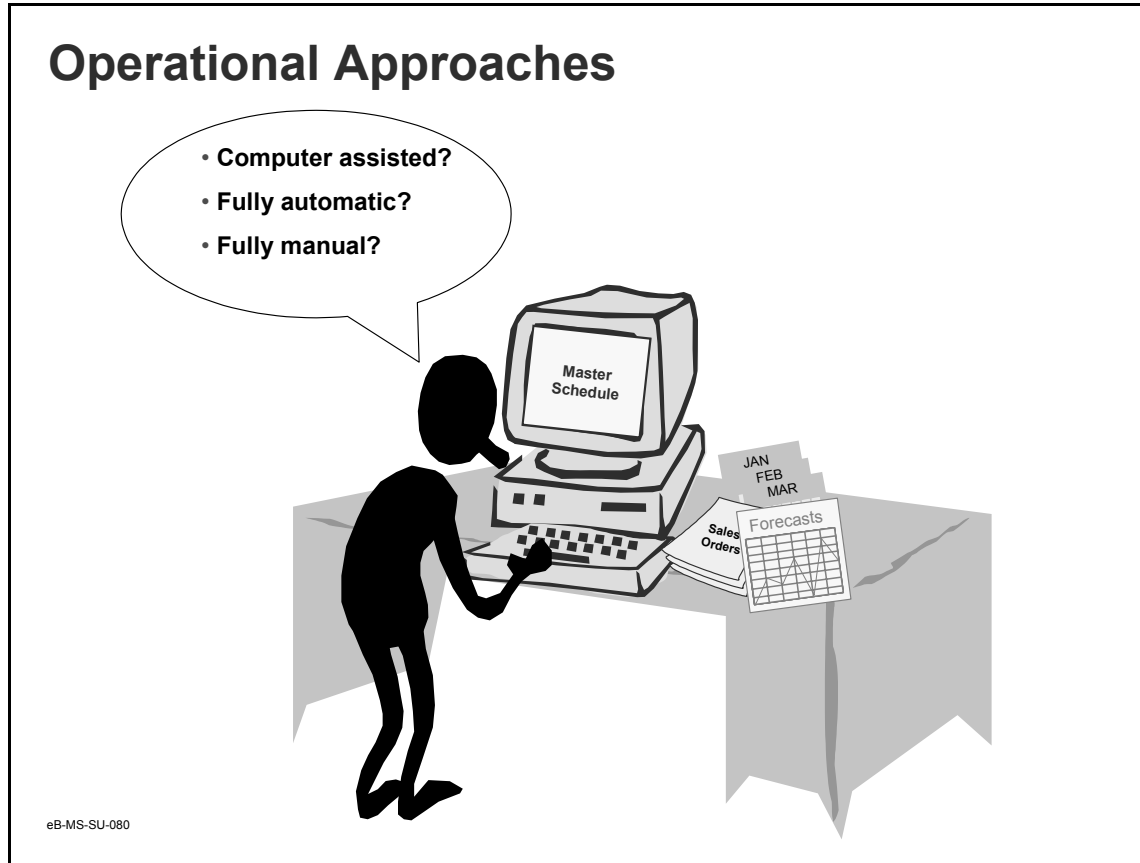
Multisite Environments

Warning Takes precedence over Item Planning Maintenance.

Item planning data controls MFG/PRO planning and manufacturing functions. If an item is used at multiple sites, planning data can be set up differently for each site.

If an item is used at multiple sites, planning data can be set up differently for each site.

- To define an item as master scheduled, set Master Schedule = Yes in Item-Site Planning Maintenance
- An item can be master scheduled at one site and not at another



Approaches to Master Scheduling

There are three approaches to master scheduling in MFG/PRO:

- 1 Computer assisted (recommended)
- 2 Fully automatic
- 3 Fully manual

Item Planning Maintenance

Time Fence = 17 Cum LT = 17 (No activity)

Item Planning Maintenance

Item Number: 02-0005 Description: MECHANICAL PENCIL
Unit of Measure: EA (5MM) BLISTER PACKED

Item Planning Data

Mstr Sched: ☒	Buyer/Planner: PL	Phantom: ☐
Plan Orders: ☒	Supplier:	Minimum Order: 0
Time Fence: 17	PO Site: train	Maximum Order: 0
MRP Required: ☒	Purchase/Manufacture: M	Order Multiple: 1,000
Order Policy: POQ	Configuration Type: ATO	Op Based Yield:
Order Qty: 1,000	Inspect: ☐	Yield Percent: 100.00%
Batch Qty: 1.0	Ins LT: 0	Run Time: 0.010
Order Period: 7	Mfg LT: 1	Setup Time: 1.000
Safety Stock: 0		EMT Type: NON-EMT
Safety Time: 0	ATP Enforcement: NONE	Auto EMT Processing: ☐
Reorder Point: 0	Family ATP: ☐	Network Code:
Rev:	Run Seq 1:	Routing Code:
Issue Policy: ☒	2:	BOM/Formula:

Cum LT: 17 Pur LT: 0

Add Link

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Computer Assisted Approach (Recommended)

To use the computer-assisted approach for master scheduling, set the following values for each master scheduled item:

- Master Schedule = Yes
- Plan Orders = Yes
- Time Fence = cumulative lead time
- Order Policy = any option but blank

Time Fence

Defining time fences for master scheduled items allows MRP to control orders outside of a specified time period and allows the master scheduler to control orders within that time period.

Specify a planning horizon, in calendar days, for each master scheduled item. When MRP plans orders for these items, it will not schedule order due dates within this time fence.

MRP will plan orders to:

- Cover future requirements
- Provide action messages over the near-term horizon
 - In the near term, the master scheduler maintains the master schedule

Note The time fence is where manual control is exerted in computer-assisted planning.

Selective Materials Plan

Selective Materials Plan allows planning for master scheduled items separately from MRP items. If you use the computer-assisted approach to master scheduling, you may want to:

- Run Selective Materials Plan for master schedule items only
- Adjust the master schedule and rerun Selective Materials Plan as needed
- Run Selective Materials Plan for MRP-scheduled items only

Item Planning Maintenance – Fully Automatic Approach

The screenshot shows the 'Item Planning Maintenance' window for Item Number 44-100, Description: CONTROL UNIT, HOME USE, and Unit of Measure: EA. The 'Item Planning Data' section is divided into three columns. The left column contains checkboxes for 'Mstr Sched' (checked), 'Plan Orders' (checked), 'MRP Required' (checked), and 'Issue Policy' (checked), along with a text field for 'Order Policy' set to 'LFL'. The middle column contains fields for 'Buyer/Planner' (qad), 'Supplier' (5003000), 'PO Site' (10000), 'Purchase/Manufacture' (M), 'Configuration Type', 'Inspect', 'Ins LT' (0), 'Mfg LT' (3), 'ATP Enforcement' (NONE), 'Family ATP', 'Run Seq 1', and 'Run Seq 2'. The right column contains checkboxes for 'Phantom', 'Minimum Order' (0), 'Maximum Order' (0), 'Order Multiple' (0), 'Op Based Yield', 'Yield Percent' (100.00%), 'Cum LT' (0), 'Run Time' (0.000), 'Pur LT' (1), 'Setup Time' (0.000), 'EMT Type' (NON-EMT), and 'Auto EMT Processing'. A box labeled 'Fully Automatic' with an arrow points to the 'Mstr Sched' checkbox. At the bottom right, there is an 'Add Link' button.

eB-MS-SU-100

Fully Automatic Approach

The master schedule can be generated entirely by MRP. This means that the system has complete control over master scheduled items with no distinction between master scheduled and MRP items. When this approach is used, material plans may change dramatically each time MRP is run. A master schedule order may be expedited one day and canceled the next for example.

To use the fully automatic approach to master scheduled items, set the following values:

- Master Schedule = Yes
- Plan Orders = Yes
- Time Fence = 0
- Order Policy = any option but blank

Item Planning Maintenance – Fully Manual Approach

The screenshot shows the 'Item Planning Maintenance' window for Item Number: 02-0010, Description: ERASER REFILL PACK, and Unit of Measure: EA. The window is divided into two main sections: 'Item Planning Data' and a left-hand configuration panel. The left panel contains checkboxes for 'Mstr Sched' (checked), 'Plan Orders' (unchecked), 'MRP Required' (checked), and 'Issue Policy' (checked). Other fields in the left panel include 'Order Policy: POQ', 'Order Qty: 0', 'Batch Qty: 1.0', 'Order Period: 7', 'Safety Stock: 0', 'Safety Time: 0', 'Reorder Point: 0', 'Rev:', and 'ATP Enforcement: NONE'. The 'Item Planning Data' section contains fields for 'Buyer/Planner: PL', 'Supplier:', 'PO Site: train', 'Purchase/Manufacture: P', 'Configuration Type: ATO', 'Inspect: []', 'Ins LT: 0', 'Mfg LT: 0', 'Phantom: []', 'Minimum Order: 0', 'Maximum Order: 0', 'Order Multiple: 120', 'Op Based Yield: []', 'Yield Percent: 100.00%', 'Cum LT: 2', 'Run Time: 0.000', 'Pur LT: 2', 'Setup Time: 0.000', 'EMT Type:', 'Auto EMT Processing: []', 'Network Code:', 'Routing Code:', and 'BOM/Formula:'. An arrow points from the 'Fully Manual' label to the 'Mstr Sched' checkbox. The 'Add Link' button is at the bottom right.

Item Planning Maintenance

Item Number: 02-0010 Description: ERASER REFILL PACK
Unit of Measure: EA

Item Planning Data

Buyer/Planner: PL Supplier: Phantom: []
PO Site: train Minimum Order: 0
Purchase/Manufacture: P Maximum Order: 0
Configuration Type: ATO Order Multiple: 120
Inspect: [] Op Based Yield: []
Ins LT: 0 Cum LT: 2 Run Time: 0.000
Mfg LT: 0 Pur LT: 2 Setup Time: 0.000
EMT Type:
ATP Enforcement: NONE Auto EMT Processing: []
Family ATP: [] Network Code:
Run Seq 1: Routing Code:
2: BOM/Formula:

Mstr Sched: ☒
Plan Orders: ☐
Time Fence: 0
MRP Required: ☒
Order Policy: POQ
Order Qty: 0
Batch Qty: 1.0
Order Period: 7
Safety Stock: 0
Safety Time: 0
Reorder Point: 0
Rev:
Issue Policy: ☒

Add Link

Fully Manual

eB-MS-SU-110

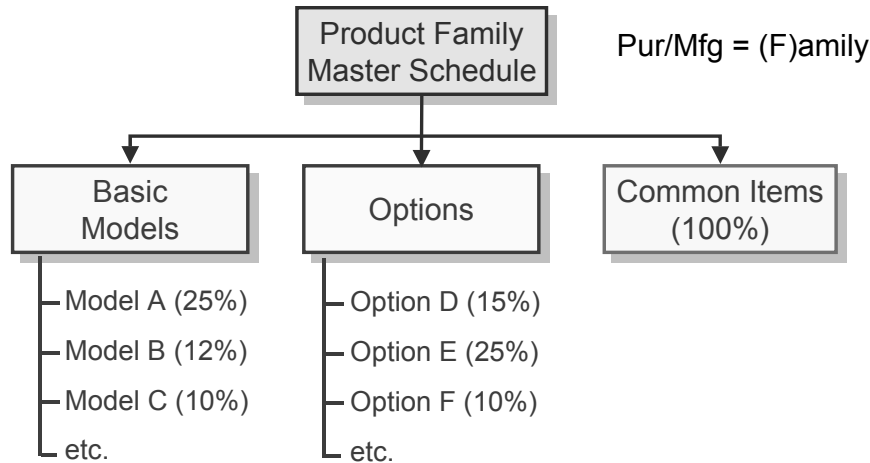
Fully Manual Approach

Fully Manual Scheduling

- Master Schedule = Yes
- Plan Orders = No
- Order Policy = Any option other than blank

Enter all master scheduled orders manually. MRP will not generate any planned orders, but will issue action messages suggesting that orders be created if none exist.

Multilevel Master Scheduling



eB-MS-SU-120

Multilevel Master Scheduling

- Plan family-level items using either the fully automatic or computer-assisted technique
- Use MRP to plan orders to generate production forecasts for the components of family items

Sometimes, demand for an item is dependent on demand for another item. This is a common occurrence when the master schedules for several sets of items are related through planning bills or product structures.

- Typical in assemble-to-order environments (automotive, computer manufacturers, etc.)
- Unrealistic to stock all of the possible combinations of end items
- Impossible to accurately forecast all possible combinations of end items for master scheduling

For master scheduling purposes, it is not possible to accurately forecast the detailed combinations of potential products that can be manufactured and sold.

Forecasting at the family-item level or the option-item level is more accurate and can be used to drive the master schedule process.

Typically, the top-level item of a multilevel master scheduled product structure represents the family of buildable products that can be configured from a set of available models and options. It represents an item that is itself never manufactured or stocked.

In MFG/PRO, such an item is assigned the Pur/Mfg code of [F]amily.

Planning Bills

The screenshot displays two overlapping windows from the MFG/PRO software. The 'Item Planning Maintenance' window (top left) shows data for Item Number 44-0000, Description: Control Unit Family, and Unit of Measure: EA. It includes various planning parameters like Mstr Sched, Plan Orders, Time Fence, MRP Required, Order Policy, Order Qty, Batch Qty, Order Period, Safety Stock, Reorder Point, Issue Policy, Buyer/Planner, Supplier, PO Site, Phantom, Configuration Type, Inspect, Ins LT, Mfg LT, ATP Enforcement, Family ATP, Run Seq 1, and Run Seq 2. The 'Product Structure Maintenance' window (bottom right) shows the Parent Item: 44-0000, Description: Control Unit Family, and Component Item: 44-100, Description: CONTROL UNIT, HOME USE. It includes fields for Rev, Reference, Start Effective, Quantity Per, End Effective, Scrap, Lead Time Offset, Operation, Sequence Number, Forecast Percent, Option Group, and Process. Arrows indicate the flow of data from the 'Item Planning Maintenance' window to the 'Product Structure Maintenance' window, specifically from the 'Purchase/Manufacture' field to the 'Structure Type' field and from the 'Configuration Type' field to the 'Forecast Percent' field.

eB-MS-SU-130

Planning Bills

Having identified a family item for multilevel master scheduling, the next step is to identify the component items. In such a product structure the components are the actual:

- Manufactured model
- Manufactured configured product
- Item groups representing common parts or selected options

Using Product Structure Maintenance in MFG/PRO, items within the family product structure are assigned a:

- Structure code of [P]lanning or [O]ption
- Forecast percentage

The Structure Code settings of P or O dictate how MFG/PRO will handle the dependent demand forecast driven off of the parent item.

Production Forecasts

As a result of establishing a family planning structure and then forecasting and master scheduling at the family level, MFG/PRO will calculate the demand for the component items. This derived demand resulting from the family or upper-level independent demand is a Production Forecast.

- The production forecast derives from the:
 - Master production schedule, and
 - Forecast percentage specified in the planning bill
- Production forecast amounts:
 - Display in master schedule reports and inquiries
 - Contribute to the total demand that MRP regards as input

When planning bills, forecasts and master schedules are established at the family-item level, MFG/PRO automatically calculates the derived demand for components of the family or upper-level item.

These calculations are based on the available-to-promise quantities for the family-level item and the quantity per and forecast percentage for the components of that family item.

As forecast for the family-level item is consumed, the available net forecast for that item changes, resulting in revised calculations for the production forecast the next time MRP is run.

Top-Level Items

Usually, the top-level item of a multilevel master scheduled product structure or planning bill represents the entire family of products that can be configured from a set of available models and options.

- Define family items with a Pur/Mfg code of Family (F) in:
 - Item Planning Maintenance or Item-Site Planning Maintenance
- Components of the family item in the planning bill can be either:
 - The actual manufactured items or configured products, or
 - Item groups representing common components or selected options

Family-Level Item Values

Set Master Schedule = Yes and Plan Orders = Yes for family-level items.

- MRP calculates net requirements and creates or adjusts planned orders accordingly
- Manually control the schedule for a period of time by setting the time fence appropriately

Time Fence (Optional)

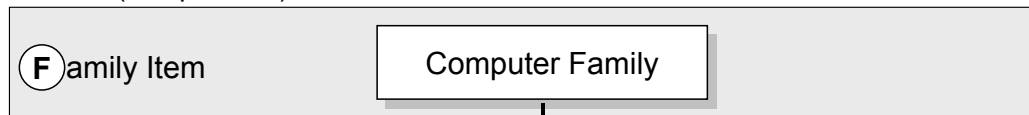
- MRP adds the time fence to the system date
 - MRP does not create any planned orders within that time period
 - MRP will delete any planned order if there is no demand generated for the item
 - If change is needed on firm orders, MRP creates an action message

Order Policy

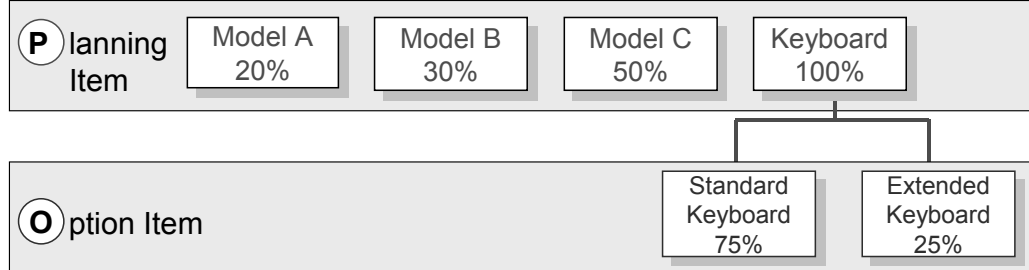
Any option other than blank

Multilevel Master Scheduling Example

Forecast (Independent)



Production Forecast
(Dependent)



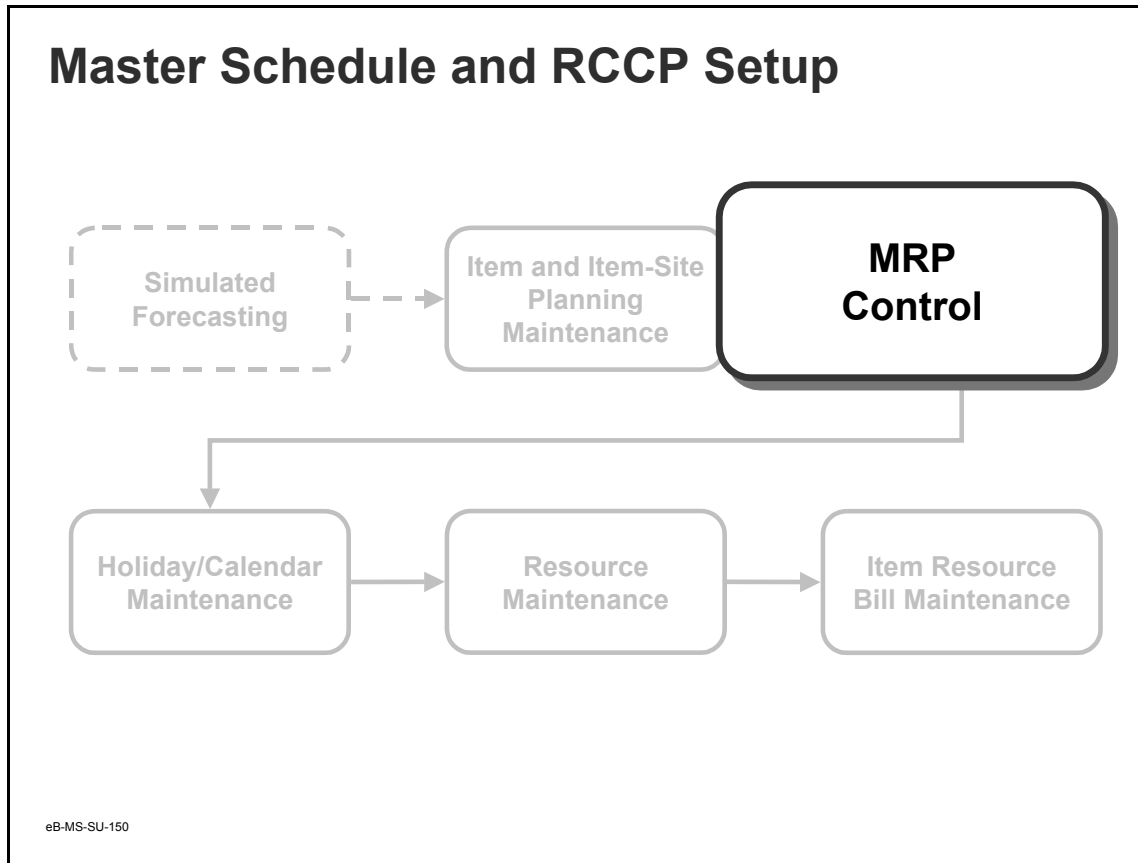
eB-MS-SU-140

Example

The multilevel schedule consists of forecasts that are exploded by MRP.

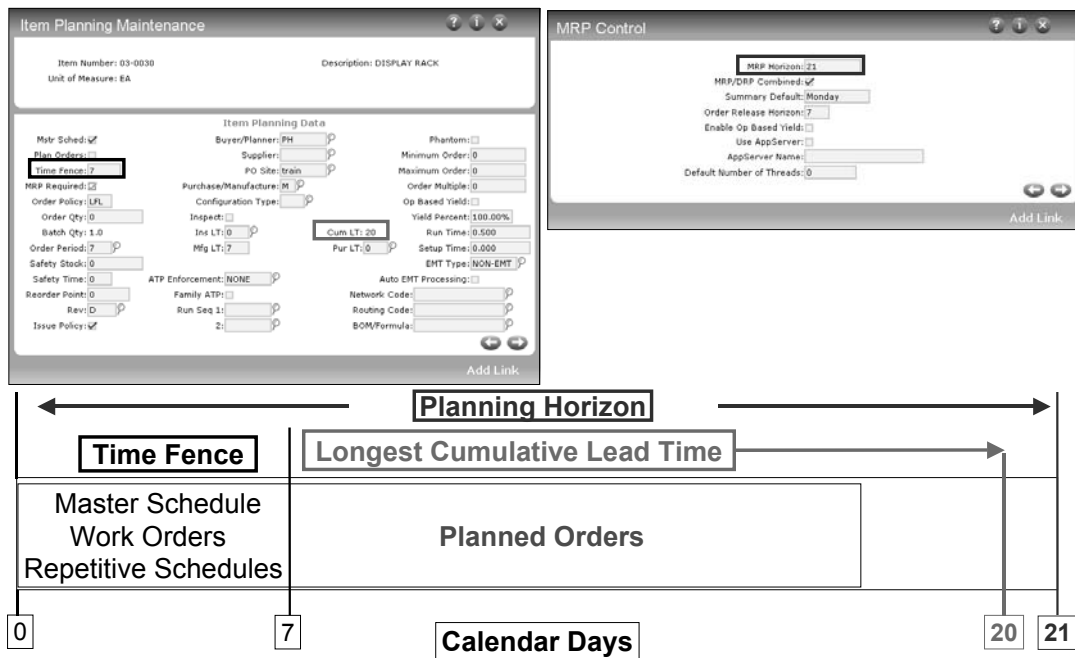


Discussed in the following Training Guide: Product Structures and Formulas



MRP Control

MRP Control – Planning Horizon



eB-MS-SU-160

Time Fence

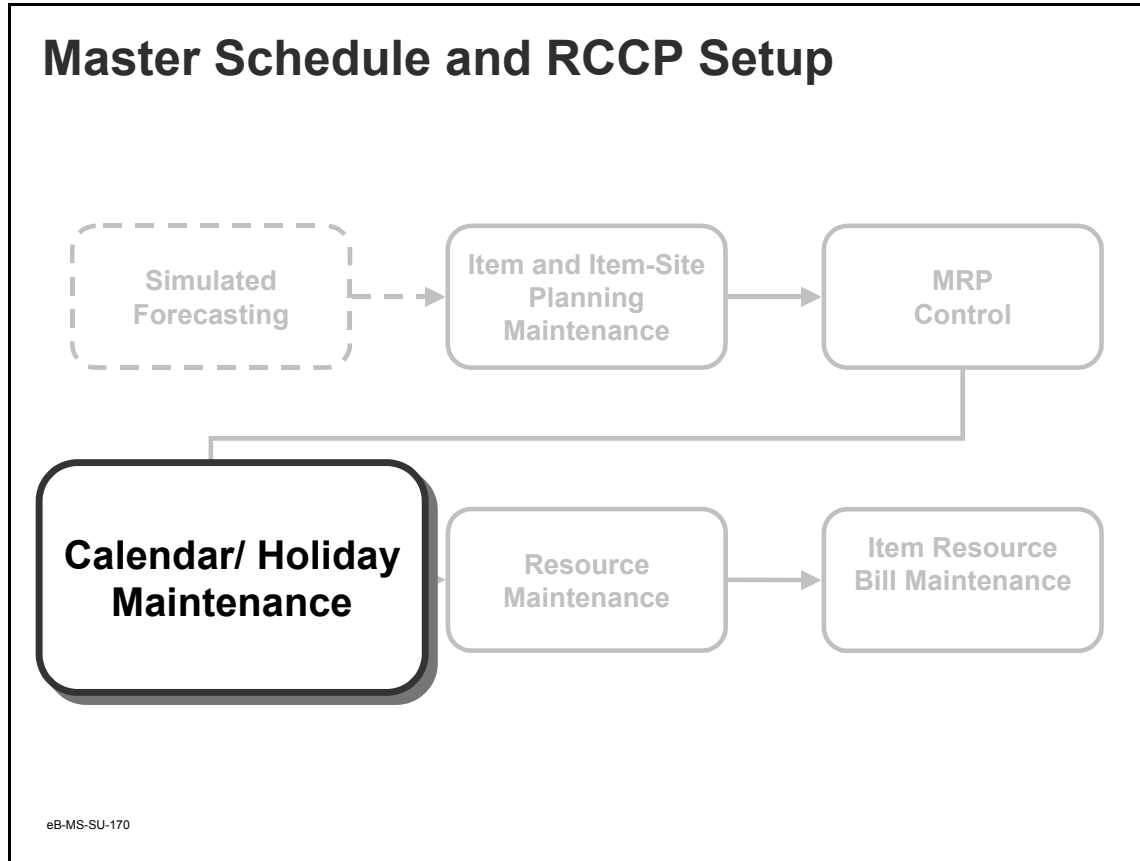
- Number of calendar days from the system date inside of which MRP will not create or change existing planned orders
 - Order action messages, however, will be generated if necessary
- The time fence is where manual control is exerted in computer-assisted master scheduling

MRP Horizon

The MRP horizon should be at least as long as the master scheduled item with the longest cumulative lead time for the item being scheduled or else key materials may not be planned to be available when required.

- MRP only processes material requirements within this planning horizon

Warning If the horizon is changed, items are not automatically flagged for net change replanning. Run Regenerate Materials Plan.



Holiday/Calendar Maintenance

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

Reference:
Start:
End:
Daily Hours:

eB-MS-SU-180

Calendar Maintenance

Calendar maintenance is only relevant for master scheduling when using the fully automatic or computer-assisted method.

- Calendars define:
 - The standard work week for a site and the work centers in it
 - Exceptions to the normal calendar, such as scheduled overtime or shutdown periods
- In a calendar, work days = Yes and nonwork days = No

Note If the Site, Work Center, and Machine are blank, the calendar acts as the default for the entire company (must be blank for RCCP.)

Manufacturing order due dates are scheduled only on work days. Each work day has a production capacity in hours, excluding breaks and non-productive time. Manufacturing operations can only be scheduled up to the production capacity of the day.

You can specify exceptions for overtime or machine downtime. This information is used only when operation schedules are prepared, not when calculating manufacturing order due dates. When a discrepancy occurs, you may have to adjust the due date.

To implement shop calendars correctly:

- Create a calendar with Site, Work Center, and Machine left blank
 - This is the system calendar
- Create a calendar for each site with the Work Center and Machine left blank
 - This is the calendar used by CRP to calculate capacity, including holidays
- Create Work Center calendars with site and work center filled in

MFG/PRO looks first for a calendar for the specific site, work center, machine combination.

- If none is found, it looks for a match on Site and Work Center with Machine = Blank
- If none is found, it looks for a match on Site with both Work Center and Machine = Blank
- If none is found, it looks for a default calendar with Site, Work Center, Machine = Blank

To schedule exceptions, enter the Reference and specify the number of hours per day (positive for overtime, negative for downtime or holidays).

Example If you normally work 8 hours a day, enter -8 hours for a shutdown date.

Use Start and End dates to schedule multiple days of overtime or downtime.

Warning When scheduling overtime, you could schedule a non-work day. When scheduling downtime, each of the days from Start through End must have at least this number of hours normally scheduled, or you could end up with a negative production capacity on those days.

Holiday Maintenance



The screenshot shows a window titled "Holiday Maintenance" with a table containing holiday information. The table has three columns: "Site", "Date", and "Holiday". The first row shows "12000" for Site, "01/01/2003" for Date, "Wednesday" for the day of the week, and "New Years Day" for the Holiday. The second row shows "12000" for Site, "12/25/2003" for Date, "Thursday" for the day of the week, and "Christmas Day" for the Holiday. Below the table, there are input fields for Site and Date, and a button labeled "Add Link".

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

Holiday Maintenance

Holidays are days that no one works; the plant is shut down and no production is scheduled. Holidays can be different at each site.

Manufacturing orders are never due and operations are never scheduled on a holiday (you can override this, if desired.)

If a holiday doesn't apply to all work centers, it isn't a holiday. It is an exception to the normal shop calendar. Exceptions are entered using Calendar Maintenance, recording the day off only for the work centers to which it applies.

Rough-Cut Capacity Planning

Examples of Resources

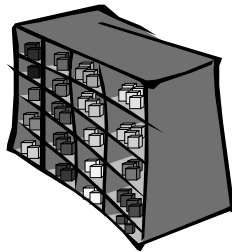


Electricity

Labor



Storage



Water

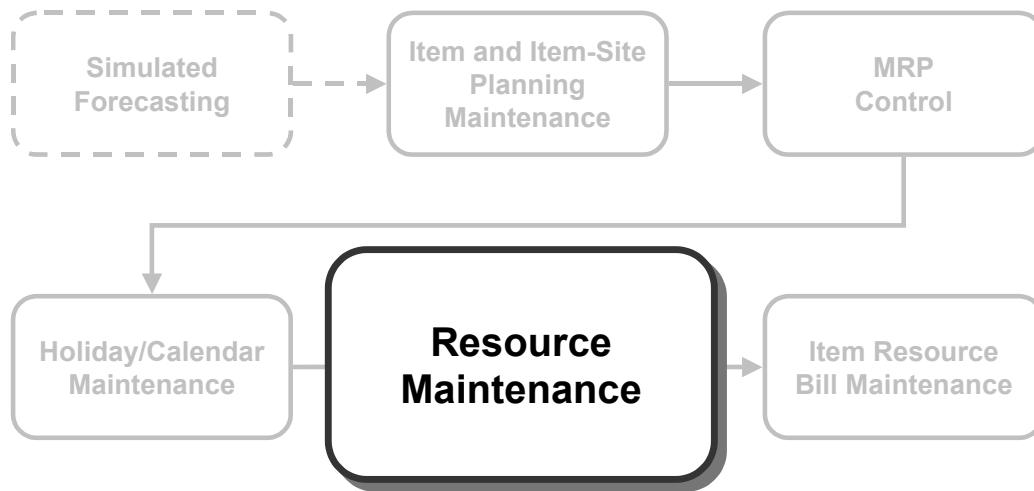
eB-MS-SU-200

Rough-Cut Capacity Planning

Rough-cut capacity planning:

- Shows consumption of critical resources
- Enables master schedulers to:
 - Test end-item production plans
 - Calculate capacity to meet the master schedule
 - Compare and modify required and planned capacity
 - Analyze load on key resources by time period
 - Isolate and resolve potential problems

Master Schedule and RCCP Setup



eB-MS-SU-210

Resource Maintenance

The screenshot shows a window titled "Resource Maintenance" with a header area containing the following information:

- Resource: Labor
- Description: Labor Hours
- Unit of Measure: HR
- Site: 12000

Below the header is a table with the following columns: Reference, Start, End Date, and Cap/Day. The table contains three rows of data:

Reference	Start	End Date	Cap/Day
Downtime	04/01/2003	04/15/2003	-32.5
Normal	01/01/2003		65.0
Seasonal	05/01/2003	08/01/2003	20.0

Each row has a set of navigation arrows (left and right) to its right.

References allow exact accounting of specific resources over specific time periods

eB-MS-SU-220

Resource Maintenance

Resources must be defined before you can evaluate resource load.

Product line planning, master scheduling, and operations planning activities are feasible only if key resources are available. Rough-cut resource planning is usually done prior to committing production resources to a plan.

First, identify the resources in your company that are bottlenecks or can't be easily increased in the short term. These are your key resources. Examples of key resources include specialized labor, special machinery, and cash.

- Define key resources in Resource Maintenance, then set up resource bills for:
 - Individual product lines in PL Resource Bill Maintenance

- Items in Item Resource Bill Maintenance.

Load Profiles

Resource bills (also called load profiles) help you compare the resource capacity needed for production against the available capacity. If you need more of any resource than you have available, you must change the plan or increase the resource capacity.

Resource capacity changes over time. For example, another machine or shift is added, or downtime and holidays are scheduled. These changes are recorded with a Reference code, Start Date and End Date.

Cap/Day can be positive or negative. If the normal capacity for a resource is 100 hours per day, and you are planning a shutdown on May 10 and 11, you would enter it as:

- Reference [Shutdown]
- Start Date [May 10]
- End Date [May 11] and
- Cap/Day [-100]

A resource's capacity on a specific date is the cumulative capacity from the references which are in effect on that date.

Description

- A short description of this resource
- Description prints on most reports and inquiries, as space permits

When you access Help from the Resource field, a pop-up window displays the resource codes and descriptions. You can search through this window in sequence by either field or description. This may influence how you set up your descriptions. For example, you may choose to make the first few characters or words significant for searching purposes.

Reference

This optional code identifies a level of resource capacity, such as:

- Normal
- Vacation
- Shutdown

If you use MFG/PRO's Enterprise Ops Plan, you can access the capacity information for this time period on item resource bills that reference this code. Otherwise, the reference merely describes the resource capacity level for the specified time period.

The capacity of each resource is stated in terms of an average level per day over a certain time period. The capacity may change, perhaps for vacation plant shutdowns or adding a second shift. These capacity changes are identified by reference. The total capacity on any given day is the sum of the capacity components effective on that day.

Example A machine resource has the following capacity levels:

- NORMAL Jan 1 to Dec 31 7 hrs/day
- SHUTDOWN Aug 1 to Aug 31 -7 hrs/day
- 2nd SHIFT Oct 1 to Dec 31 7 hrs/day

The total capacity on August 15th is zero, while the total capacity on October 15th is 14 hours per day.

Key Resource

A single resource can consist of multiple positive or negative dated components.

RCCP tests resources that may limit production of an item's schedule:

- Skilled labor hours
- Production line quantities per hour
- Inspection or testing hours
- Scheduled losses of resource capacity
 - Overlapping vacations
 - Equipment replacement

Components of a Resource

- Each key resource is defined separately in MFG/PRO
 - Available in different quantities at different times of the year
- Normal resource quantities are entered as primary resource references or components
- Additional references include the amount by which they add to or subtract from capacity

Example In a firm where five specialized fabricators (such as aluminum welders) are employed, the resource is defined in welder hours. The first component could be defined as the hours that the five employees provide in capacity per day (5 welders x 7 hours = 35 hours/day).

Adding Time-Phased Changes

Additional references can be added for employee's vacations that reduce capacity

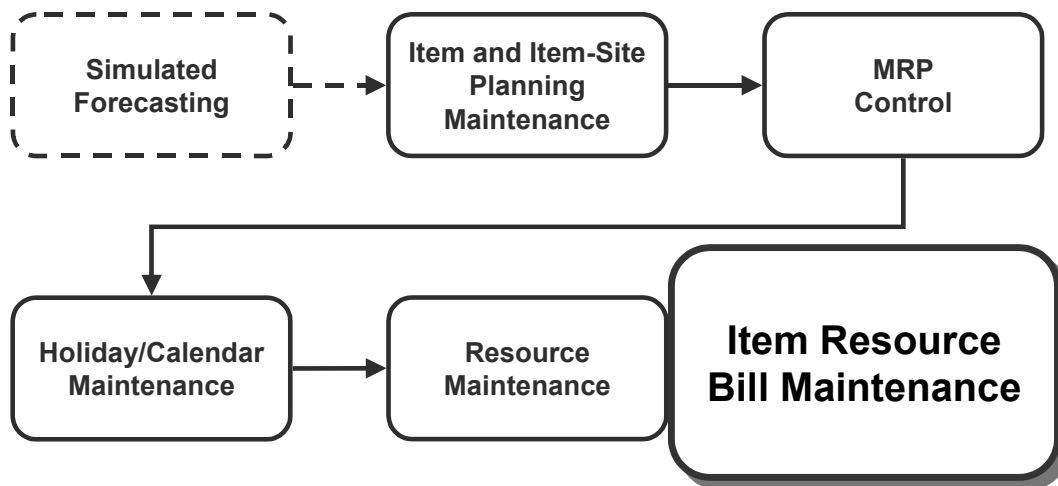
- BobV -7.0 hours, July 1 to July 10

Periods of scheduled overtime will increase capacity

- OT 20 hours, September 15 to October 15

When the resource is tested against scheduled production, MFG/PRO eB calculates the available resource quantity using these dates and the shop floor calendar.

Master Schedule and RCCP Setup



eB-MS-SU-230

Item Resource Bill Maintenance

Item Resource Bill Maintenance

Item Number: 44-110 CONTROL UNIT, AUTOMOT.

Site: 12000

Resource: Labor Labor Hours

Start Date: End Date:

Resource Qty Per: 0.4

Lead Time (Days): 1

Offset (Days): 0

Add Link

Item Resource Bill Maintenance

Item resource bills are used only to evaluate the manufacturing schedule. Item Resource Bill Maintenance records information on resource requirements for individual items.

Manufacturing schedules are feasible only if key resources are available. Rough-cut capacity planning verifies resource availability prior to committing production resources. An item resource bill (or load profile) specifies the amount of a resource required to make one unit of the item. The resource amount is expressed in the resource unit of measure (tons, hours, etc.).

Example To produce a case of ice cream, a blending machine processes 36 kilos of vanilla cream. In the resource record for the blending machine, capacity is expressed in metric tonnes. Therefore, the resource quantity per for the ice cream item resource bill is 0.036 tonnes.

The resource bill also determines when and for how long the resource is required.

Lead Time (Days)

- Identifies the number of production days the resource is required

Offset (Days)

- Identifies how many days in advance of production the resource is required

For the ice cream, the blending machine is used for one work day, but the order for the ice cream must be released two days in advance of the requirement.

Note Lead time must always be at least 1 (if zero, no load will be calculated).

Review the Item Resource Load Summary Report and Item Resource Load Detail Report before committing resources to the production plan.

If you need more of any resource than you have available, you must either change the plan or increase the capacity of the resource.

Create the End-Item Load

Work Order: 06190042 ID: 43
Item Number: 44-110 CONTROL UNIT, AUTOMOT.
Type:
Site: 12000

Quantity Ordered: 700.0
Quantity Completed: 0.0
Qty Rejected: 0.0
Work Order Status: P
Sales/Job:
Supplier:
Yield Percent: 100.00%
Remarks:
Comments: ☐

Order Date: 06/19/2003
Release Date: 06/30/2003
Due Date: 06/30/2003
Site: 12000
Routing Code:
BOM/Formula Code:

700 x 0.4 = 280 labor hours required for production

Item Resource Bill Maintenance

Item Number: 44-110 CONTROL UNIT, AUTOMOT.
Site: 12000
Resource: Labor Labor Hours
Start Date:
End Date:
Resource Qty Per: 0.4
Lead Time (Days): 1
Offset (Days): 0

MFG/PRO multiplies the end item production quantity by the Quantity Per conversion factor to obtain the quantity of resources required.

Add Link

eB-MS-SU-250

Creating the End-Item Load

Menu Master Schedule Order Maintenance

Menu Item Resource Bill Maintenance

Production Conversion Factor

To see exactly how much of a certain resource is required by a scheduled production quantity, the production must be measured in resource units—typically hours or items per day. To do this in MFG/PRO, determine a conversion factor and enter it in the Resource Qty Per field in Item Resource Bill Maintenance.

Example To convert production schedules into resource units for RCCP, determine how many hours (or other units) it takes to create a single scheduled end item. If it takes 1.3 hours to complete one end item, the conversion is 1.3. To make 100 end items for the scheduled item, it would take $100 \times 1.3 = 130$ hours.

Lead Times

In order for MFG/PRO to calculate capacity, at least 1 must be entered in the Lead Time field in Item Resource Bill Maintenance.

- Lead time is the number of days over which a resource must be available
- A testing process might be required three days after work order release and need two days
 - Offset = -3, Lead Time = 2
- Schedule the first date the resource is required
 - Use work order release dates and number of days the resource is needed
- The Offset is the number of days from work order release that a resource must be available
 - Positive for days before work order release
 - Negative for days following
 - Zero for the same day

Note This method of calculating the offset is the opposite of that used for product structures.

Create the End-Item Load

The screenshot displays two overlapping windows from the MFG/PRO software. The top window, 'Item-Site Planning Maintenance', shows details for Item Number 44-110, Description 'CONTROL UNIT, AUTOMOT.', Unit of Measure 'EA', and Site 12000. It includes a section for 'Item Planning Data' with various scheduling and planning parameters. The bottom window, 'Item Resource Bill Maintenance', shows the same item and site, with the Resource set to 'Labor'. It includes fields for 'Resource Qty Per' (0.4), 'Lead Time (Days)' (1), and 'Offset (Days)' (0). Arrows indicate data flow: one from 'Run Time: 0.400' in the top window to 'Resource Qty Per: 0.4' in the bottom window, and another from 'Setup Time: 0.000' in the top window to 'Lead Time (Days): 1' in the bottom window.

Item-Site Planning Maintenance

Item Number: 44-110 Description: CONTROL UNIT, AUTOMOT.
Unit of Measure: EA Site: 12000

Item Planning Data

Mstr Sched: ☒	Buyer/Planner: qad	Phantom: ☐
Plan Orders: ☒	Supplier: 5003000	Minimum Order: 0
Time Fence: 0	PO Site: 12000	Maximum Order: 0
MRP Required: ☒	Purchase/Manufacture: M	Order Multiple: 0
Order Policy: POQ	Configuration Type: ATO	Op Based Yield: ☐
		Yield Percent: 100.00%
		Run Time: 0.400
		Setup Time: 0.000
		EMT Type: NON-EMT
		Auto EMT Processing: ☐
		Work Code:
		Routing Code:
		Formula:

Item Resource Bill Maintenance

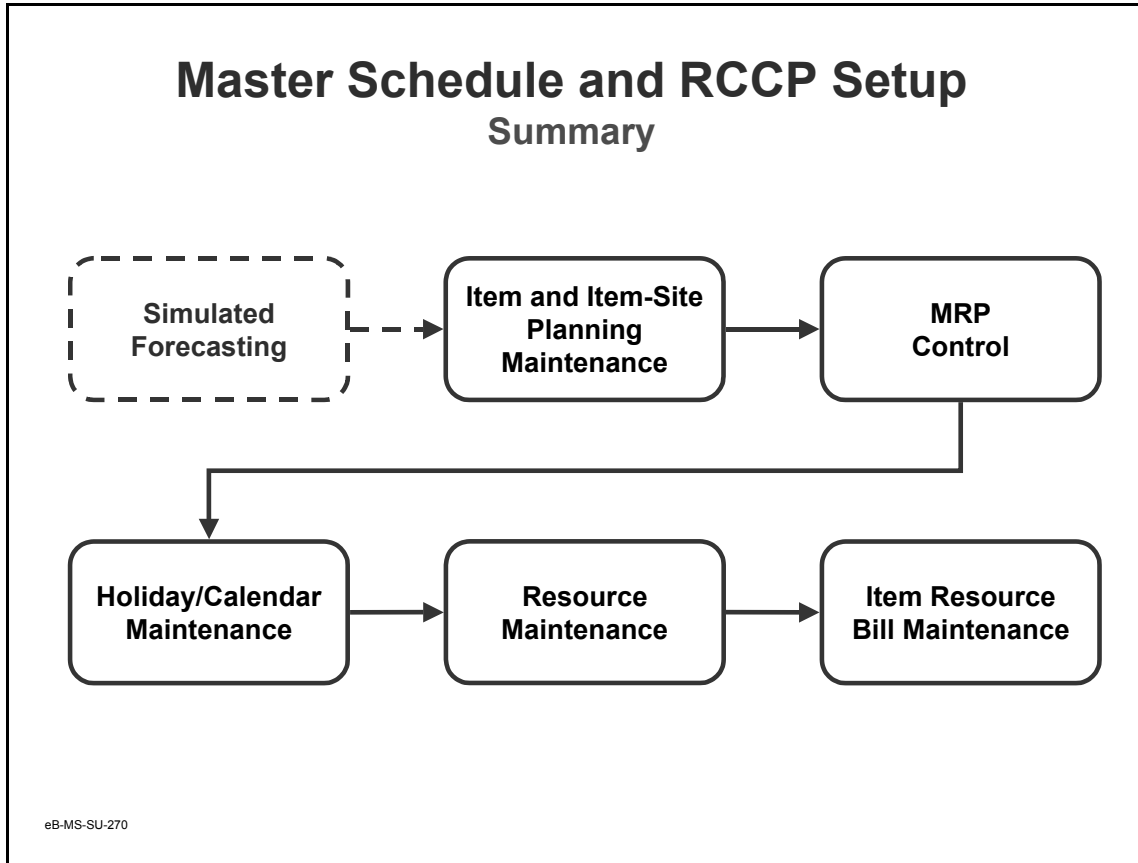
Item Number: 44-110 Description: CONTROL UNIT, AUTOMOT.
Site: 12000
Resource: Labor Labor Hours
Start Date: End Date:
Resource Qty Per: 0.4
Lead Time (Days): 1
Offset (Days): 0

Add Link

eB-MS-SU-260

Menu Item Planning Maintenance

Menu Item Resource Bill Maintenance



Summary

Setup Exercises



eB-MS-SU-280

Setup Exercises

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

Enter and Review Item Data

Instructions: The objective of this activity is to review critical fields of some items used in this course and ensure that they are set correctly. Incorrect item settings could cause problems with subsequent activities. Please check the following settings carefully using Item Master Maintenance:

Items 44-100 and 44-110

Product Line: 2000
 Lot/Serial Control: <blank>
 Master Schedule: Yes
 Plan Order: Yes
 Buyer/Planner: [your initials]

Items 44-1000, 44-2000, 44-3000, 44-4000, 44-5000, 44-7000, and 44-7001

Product Line: 2000
 Lot/Serial Control: <blank>
 Master Schedule: No
 Plan Order: Yes
 Buyer/Planner: [your initials]

Enter and Review a Forecast

Instructions: This activity covers how to enter and review a forecast, and how to set up and observe forecast consumption. Before we do this, however, we will review the items that will be used for the forecasting and master scheduling activities.

- 1 Using Product Structure Maintenance, review the parent/component relationship for parent item 44-100, component item 44-1000, reference R1, and start effective date 06/01/92.
 Be sure that the quantity per is 2, and that the End Effective date is blank. All other fields can remain as they are.

- 2** Review both 44-100 and 44-1000 for site 12000. Use Item Master Maintenance to make sure the following settings are correct:

Item Number:	44-100	44-1000
UM:	EA	EA
Description:	Control Unit, Home Use	Sensor Unit
Product Line:	2000	2000
Item Type:	COMP	COMP
Status:	AC	AC
Group:	Electron	Electron
Lot/Serial Control:	<blank>	<blank>
Site:	12000	12000
Master Schedule:	yes	no
Plan Orders:	yes	yes
Order Policy:	LFL	LFL
Order Qty:	10	10
Order Period:	0	0
Buyer/Planner:	your initials	your initials
Pur/Mfg:	M	M
Mfg LT:	3	1
Yield%:	100.00	100.00

- 3** In the Sales Order Control program, set Ln Format S/M to Single and set Consume Fwd to 1, Consume Back to 2.

Note Do Step 4 only if you have not previously completed activities for Forecast Simulation. Otherwise, proceed to Step 5.

- 4** Use Forecast Maintenance to enter the following weekly forecast for item 44-100 at site 12000, beginning with the Monday of the current week and covering the following nine weeks: (If there are any additional weeks forecast, change those weeks to zero.)

Forecast Shipments of 44-100

<u>Weeks</u>	<u>Quantity</u>
1	100.0
2	120.0
3	130.0
4	140.0
5	150.0
6	140.0
7	130.0
8	120.0
9	110.0
10	<u>100.0</u>
Total	1,240.0

- 5** Run the forecast report on both summary and detail for 44-100 only at site 12000.
- 6** Using Master Schedule Summary Inquiry, run the master schedule summary inquiry for 44-100 at site 12000. After first six periods, press the down arrow to display next six periods.
- 7** Use Customer Maintenance to update the credit limit for customer 1001000 to \$1,000,000.
- 8** Using Sales Order Maintenance, enter a new Sales Order for customer 1001000.
 - a** Make certain that the due date is two weeks from next Monday, the site is set to 12000, and Confirmed = Yes. Turn off freight charges.
 - b** On line 1, enter item 44-100 and a quantity of 250. Save the order.
- 9** Run the Forecast Inquiry for 44-100 at site 12000 and review how the forecast has been consumed in the Net Forecast column.
- 10** Run the Master Schedule Summary and Detail Inquiries for 44-100, site 12000, and review the forecast.

Create a Labor Resource

Instructions: In this activity, create a labor resource and a conversion factor and then compare the labor resource capacities to the load.

- 1 Using Calendar Maintenance, enter a shop calendar for site 12000 (leave work center and machine blank). Make sure that Monday through Friday are the established work days and that each one shows eight hours.
- 2 Use Resource Maintenance to add Labor in the Resource field for site 12000. Use a description of Labor hours. The unit of measure (UM) is HR for hours.
- 3 Add the following three references and name each one uniquely:
 - a Use dates for this year (xx = current year).

<u>Reference</u>	<u>Field</u>	<u>Data</u>
Normal	Start:	01/01/xx
	Cap/Day:	65.0 (10 assemblers x 6.5 hours/day)
Seasonal	Start:	05/01/xx
	End:	08/01/xx
	Cap/Day:	20.0 (5 assemblers x 4.0 hours/day)
Downtime	Start:	04/01/xx
	End:	04/15/xx
	Cap/Day:	-32.5 (5 assemblers x -6.5 hours/day)

Add a Family Item

Instructions: In this activity, we will add a family item in order to forecast and schedule multiple items within the same family.

- 1 Use Item Master Maintenance to add item 44-0000. Make this item:

Description: Control Unit Family

Product Line: 2000

Item Type: Family

Status: AC

Group: Electron

Site: 12000

Master Sched: yes

Plan Orders: yes

Order Policy: LFL

Buyer/Planner: your initials

Pur/Mfg: F

- 2 Using Product Structure Maintenance:
 - a Add parent item 44-0000
 - b Make another component, 44-100 with a Structure Type of P and a Forecast% of 60. Qty 1.
 - c Make one of its components item 44-110 with a Structure Type of P and a Forecast% of 40. Qty 1.
- 3 Use Forecast Maintenance to enter a forecast for 44-0000, at site 12000; 1000 for each of six weeks, starting with next week.
- 4 View items 44-0000 and 44-110 at site 12000 in Master Schedule Summary Inquiry and note that there is no change.
- 5 Run Selective MRP for items in the range from 44-0000 to 44-110 at site 12000.
- 6 Review the Master Schedule Summary for 44-0000, 44-100, and 44-110.
- 7 Using Sales Order Maintenance, create a sales order in which you sell item 44-110, at site 12000, qty 500, due one week from Monday to customer number 01000000.
- 8 Run Selective MRP for items in the range from 44-0000 to 44-110 at site 12000.

112 MFG/PRO TRAINING GUIDE — MASTER SCHEDULING AND RCCP

- 9** Review the Master Schedule Summary for 44-0000 and 44-110.

Create an Item Resource Bill

Instructions: In this activity, you create an item resource bill that will be used to determine if the master schedule is achievable.

- 1 Items 44-100 and 44-110 require labor resources. Use Item Resource Bill Maintenance to create an Item Resource Bill with the following data:

Item Number:	44-100	44-110
Site:	12000	12000
Resource:	Labor	Labor
Start Date:	<blank>	<blank>
End Date:	<blank>	<blank>
Resource Qty. Per:	0.35	0.40
Lead Time:	1 (required)	1 (required)

- 2 Review the Item Resource Load Summary Inquiry and Item Resource Load Detail Inquiry.
 - a Use the Up Arrow and Down Arrow keys to move forward between the time periods.
 - b Has the schedule exceeded capacity in any period?
 - c Based on this information, do you think that the plan can be made?

Course Overview

- ✓ Introduction to Master Scheduling and RCCP
- ✓ Business Considerations
- ✓ Set up Master Scheduling and RCCP
- ♦ Use Master Scheduling and RCCP

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Course Overview

CHAPTER 4

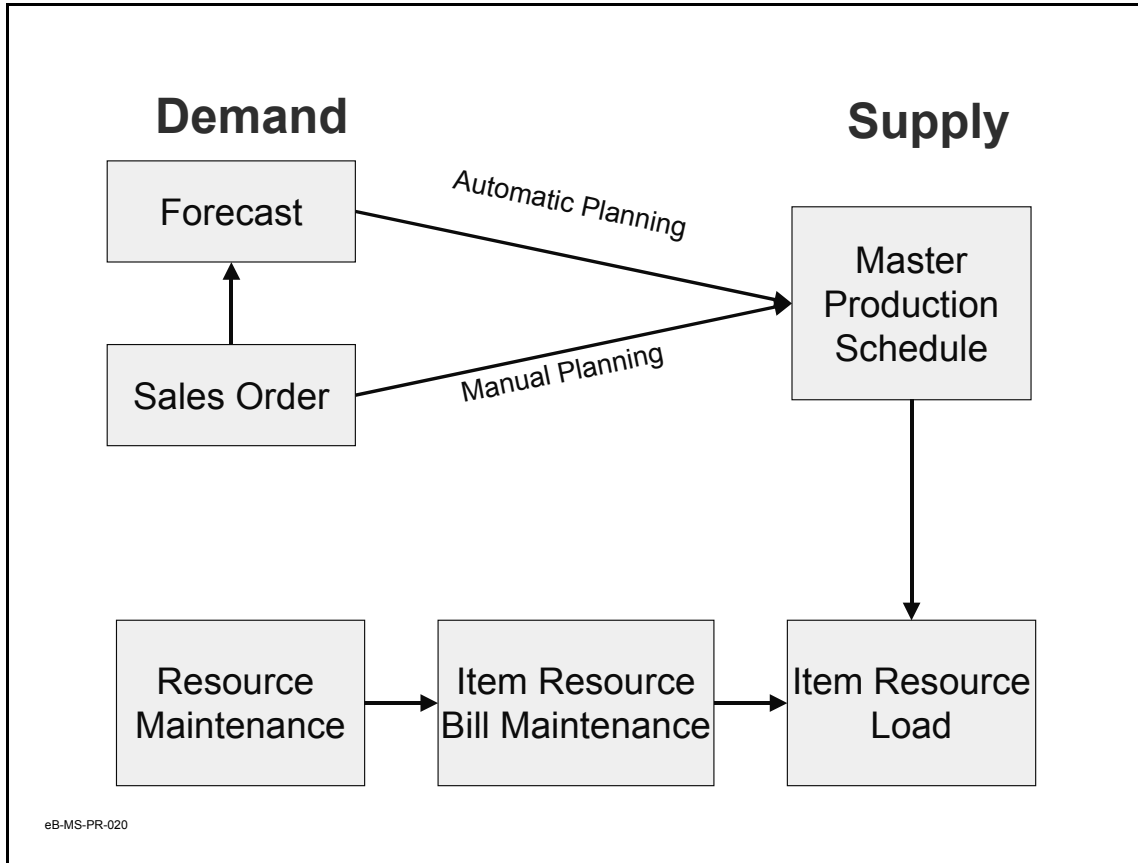
Using Master Scheduling and RCCP

Use Master Scheduling and RCCP

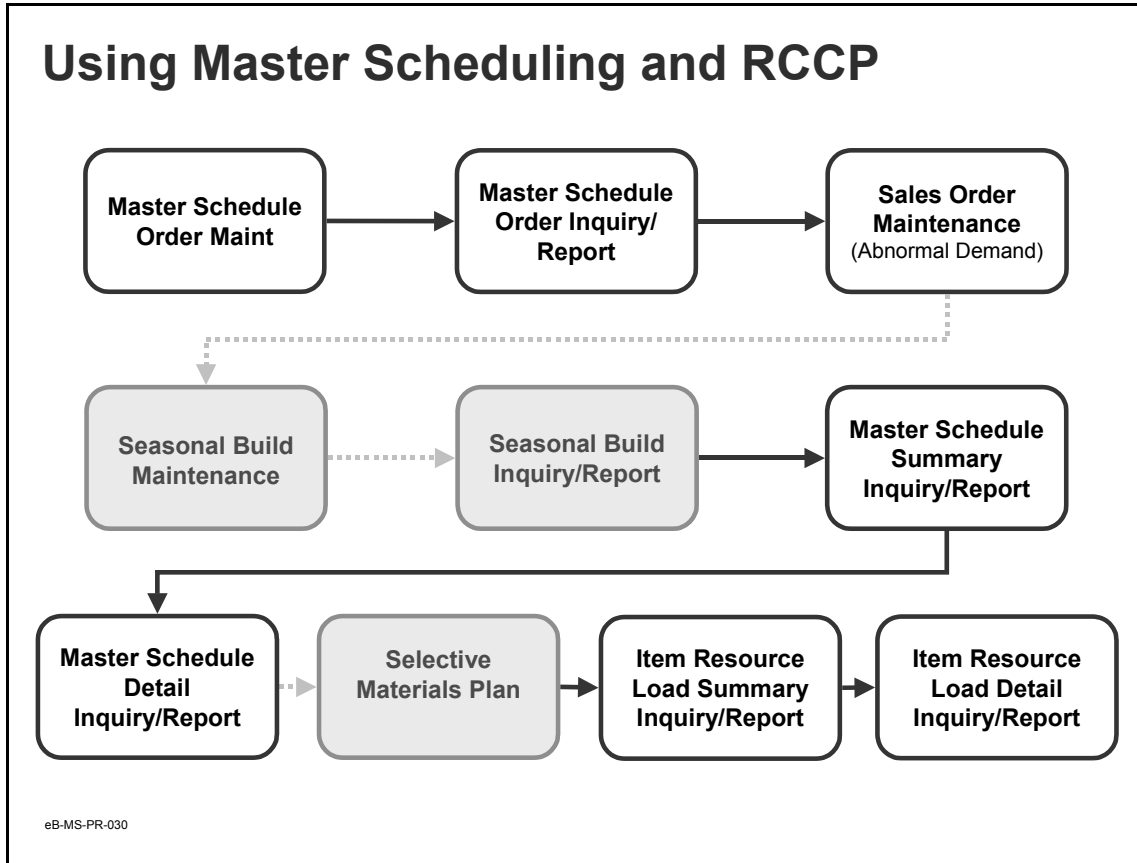
In this section you learn how to:

- ✓ Identify some key business considerations before setting up Master Scheduling and RCCP in MFG/PRO
- ✓ Set up Master Scheduling and RCCP in MFG/PRO
- ✓ **Use Master Scheduling and RCCP in MFG/PRO**

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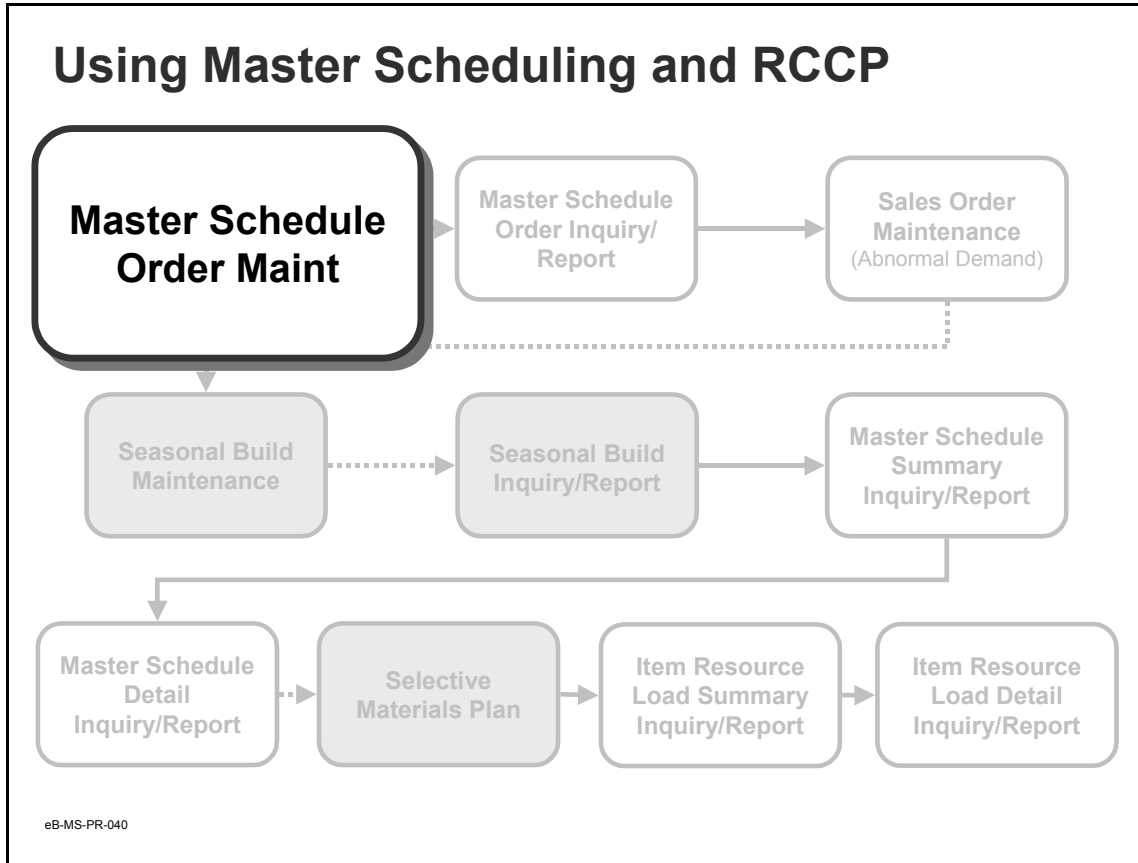


Processing Demand and Supply in MFG/PRO



☐ Boxes with solid lines are required to process Master Scheduling and RCCP and are covered in this course.

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



Master Schedule Order Maintenance

Work Order: 06190042		ID: 43	
Item Number: 44-110		CONTROL UNIT, AUTOMOT:	
Type:			
Site: 12000			

Quantity Ordered: 700.0	Order Date: 06/19/2003
Quantity Completed: 0.0	Release Date: 06/30/2003
Qty Rejected: 0.0	Due Date: 06/30/2003
Work Order Status: P	Site: 12000
Sales/Job:	Routing Code:
Supplier:	BOM/Formula Code:
Yield Percent: 100.00%	
Remarks:	
Comments:	

Post variances at SFC: ☒

Add Link

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Master Schedule Order Maintenance

Note This screen is the same as Work Order Maintenance

- Enter master schedule orders as firm planned orders
- Master schedule orders are managed and released like normal work orders

To have MRP review master scheduled items and produce action messages, set the following values in Item Planning Maintenance:

Master Schedule

Yes

Plan Orders

No

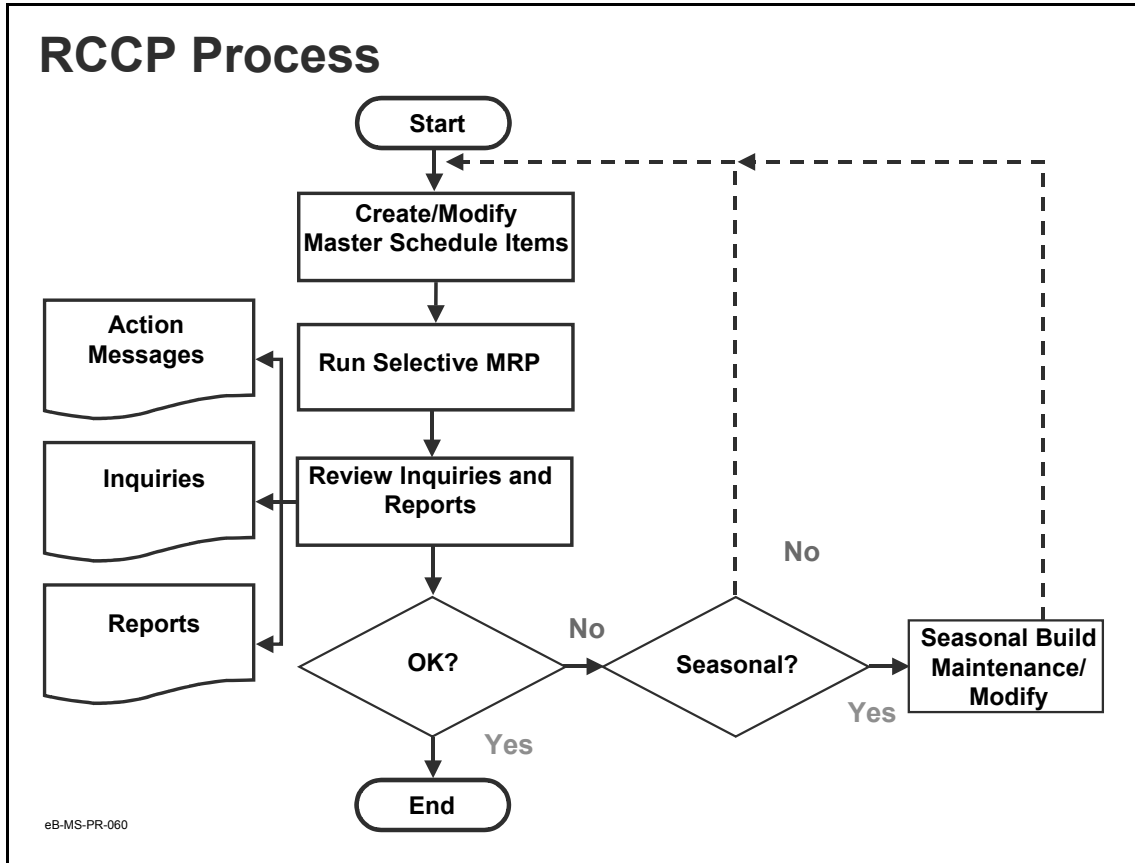
Order Policy

Any option other than blank

The firmed supply order creates the master schedule and becomes the primary input to MRP.

The master schedule is controlled by establishing:

- Firmed planned work orders
 - Master Schedule Order Maintenance
- Repetitive schedules
 - Schedule Maintenance
 - Can be used to master schedule items, even if work orders track actual production (this means you have to take the exploded type S work orders from the repetitive schedule and change them to R)
- Purchase requisitions
 - Purchase Requisition Maintenance



RCCP Process

Master Schedule Summary and Detail Inquiries/Reports

The Master Schedule Summary Inquiry and Report, and the Master Schedule Detail Inquiry and Report and display the following information:

Production Forecast

System-calculated forecast used in multilevel master scheduling

Forecast

Forecast quantity for an item, either loaded into forecast summary files using Simulation to Summarized Forecast or entered manually using Forecast Maintenance or Forecast Worksheet Maintenance.

Sales Orders

Demand derived from confirmed sales orders and required ship schedules

Gross Requirements

The sum of an item's requirements from forecasts, higher-level products, confirmed sales orders, required ship schedules, service items, and intersite orders generated by DRP. Gross requirements do not take into account inventory on hand or scheduled receipts.

Master Scheduled Receipts

Total scheduled receipts for an item from work orders, repetitive schedules, purchase orders, and distribution orders.

Projected QOH

Projected item quantity on hand, calculated by the system. This is a projection by period of an item's on-hand balance plus scheduled receipts minus gross requirements.

Available-to-Promise

The uncommitted portion of inventory or planned production, calculated by deducting real demand from real supply.

Seasonal Build

For products with seasonal demand cycles, you may need to build up inventory in advance of periods of peak demand.

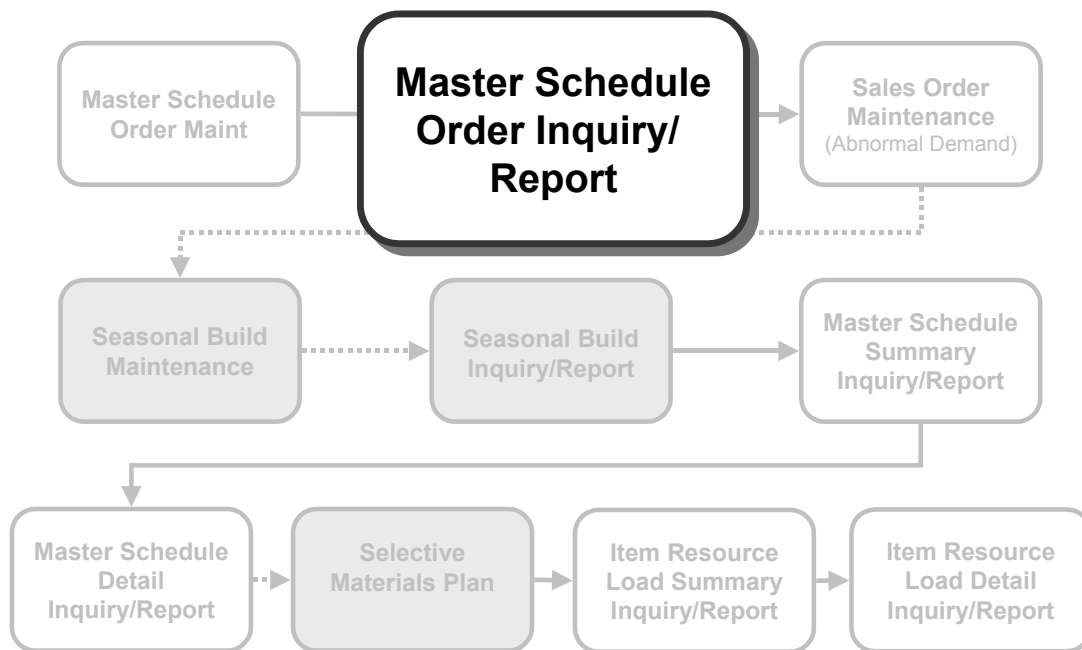
You can do this using work orders or repetitive schedules, or you can use seasonal build requirements to build up inventory to a predetermined level prior to its expected demand.

Seasonal build requirements let master schedulers specify a target inventory level for seasonal demand items that is not included when calculating ATP quantities, but can still be allocated and shipped on sales orders and customer schedules.

Seasonal build quantities appear separately on master schedule reports that display ATP quantities.

The Master Schedule Detail Inquiry and Report functions display the same information as the Master Schedule Summary Inquiry and Report, sequenced by due date. They also include source-to-demand pegging details, allowing you to identify the actual work order or sales order generating a particular item requirement.

Using Master Scheduling and RCCP



eB-MS-PR-070

Master Schedule Order Inquiry

Item Number	Release Date	Work Order	ID	Quantity Open	Due Date	Sales/Job	Status
44-110	06/23/03	06190041	42	400	06/23/03		P
44-110	06/30/03	06190042	43	700	06/30/03		P
44-110	07/07/03	06190043	44	400	07/07/03		P
44-110	07/14/03	06190044	45	400	07/14/03		P
44-110	07/21/03	06190045	46	400	07/21/03		P
44-110	07/28/03	06190046	47	400	07/28/03		P

Master Schedule Order Inquiry

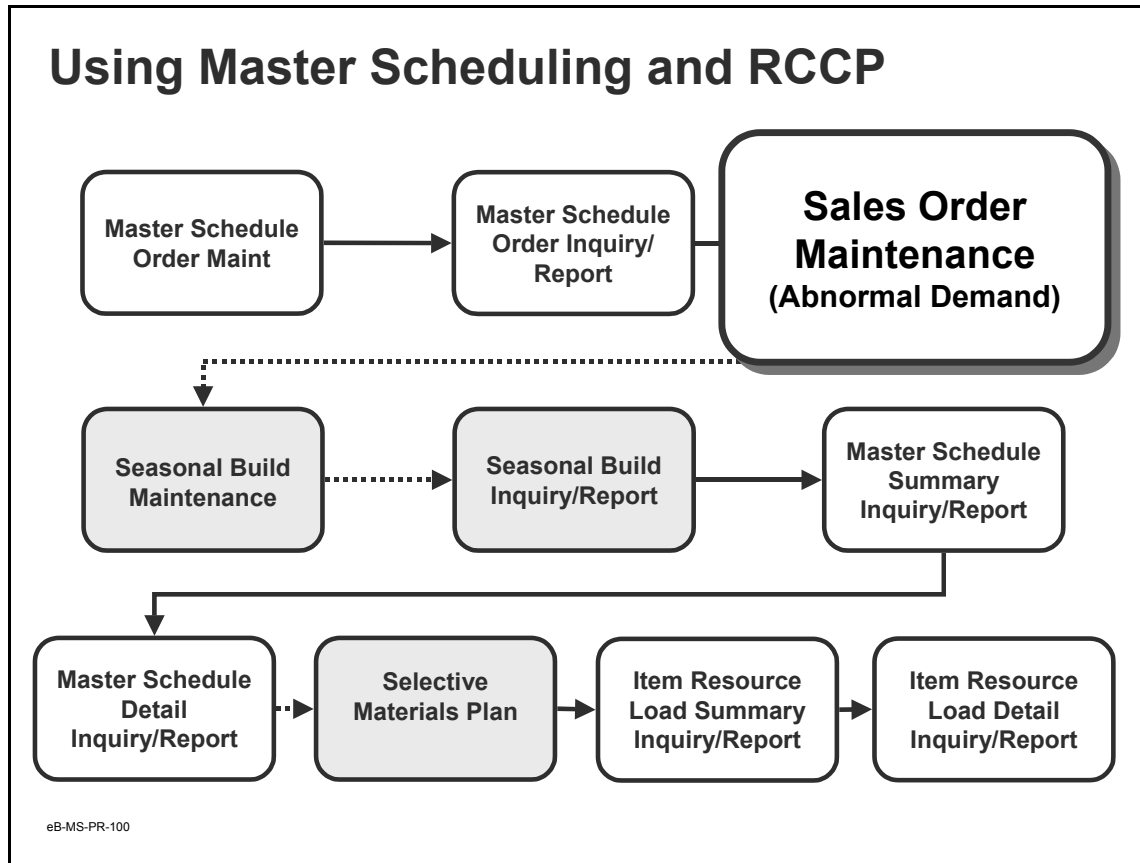
Status

- F = Firm
- P = Planned

Master Schedule Order Report

msmrp02.p 2+		Master Schedule Order Report							Date: 06/23/03	
Page: 1		MFG/PRO Training DB							Time: 15:22:25	
Work Order	ID	Item Number	Qty Ordered	Open Qty	UM	Order Date	Rel Date	Due Date	SO/Job	ST
06190041	42	44-110	400.0	400.0	EA	06/19/03	06/23/03	06/23/03		P
		CONTROL UNIT, AUTOMOTIVE								
06190042	43	44-110	700.0	700.0	EA	06/19/03	06/30/03	06/30/03		P
		CONTROL UNIT, AUTOMOTIVE								
06190043	44	44-110	400.0	400.0	EA	06/19/03	07/07/03	07/07/03		P
		CONTROL UNIT, AUTOMOTIVE								
06190044	45	44-110	400.0	400.0	EA	06/19/03	07/14/03	07/14/03		P
		CONTROL UNIT, AUTOMOTIVE								
06190045	46	44-110	400.0	400.0	EA	06/19/03	07/21/03	07/21/03		P
		CONTROL UNIT, AUTOMOTIVE								
06190046	47	44-110	400.0	400.0	EA	06/19/03	07/28/03	07/28/03		P
		CONTROL UNIT, AUTOMOTIVE								

Master Schedule Order Report



Abnormal Demand

Abnormal demand is usually a large, unexpected sale.

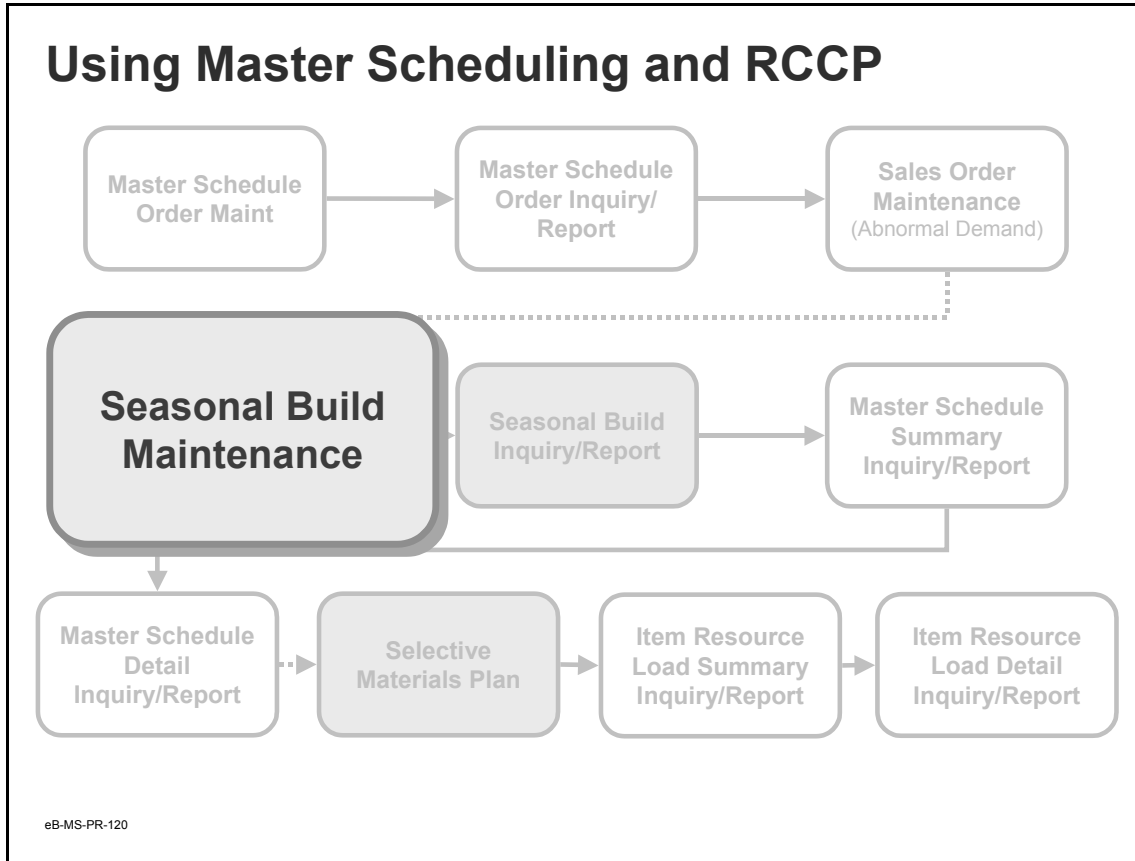
Sales Order Maintenance – Abnormal Demand

Sales Order Maintenance						
Order: SO20016		Sold-To: 1001000		Ln Format S/M:Single		
Sales Order Line						
Ln	Item Number	Qty Ordered	UM	List Price	Discount	Net Price
1	44-100	1,000.0	EA	1,000.00	0.0	1,000.00
Desc: CONTROL UNIT, HOME Sales Account: 3000 0200 Loc: 12000 Site: 12000 Disc Acct: 3900 0200 USD Cost: 150.00 Confirmed: ☒ Credit Terms Int: 0.00 Lot/Serial: Required: Ship Type: Qty Allocated: 0.0 Promised: UM Conversion: 1.0000 Qty Picked: 0.0 Due Date: 06/25/2003 Consume Fcst: Qty Shipped: 0.0 Perform Date: Detail Alloc: Qty to Invoice: 0.0 Pricing Date: 06/24/2003 Taxable: Salesperson 1: 00000005 Multiple: ☐ Freight List: A02-NTAX Commission 1: 10.00% Category: Fixed Price: ☒ Comments:						

[Add Link](#)

Some Causes of Abnormal Demand

- Unplanned orders received due to:
 - Hurricanes
 - Earthquakes
 - Floods
 - New customers
 - New markets
- These types of orders generally do not apply to forecasts



Seasonal Build

This program allows incremental buildup and release of inventory. At times, the master scheduler may need incremental inventory build up to a predetermined level. This situation most often occurs for seasonal demand items.

- Need to build up an item's inventory prior to its expected demand
 - Input into the master schedule is required

Although master scheduled orders could be entered to adjust for seasonality, identifying a demand as seasonal build prevents MRP from issuing action messages to cancel or delay orders for those items whose demand is not yet apparent.

Seasonal Build Maintenance – Optional

Seasonal Build Maintenance

Site: 12000 Electronics Division
 Item Number: 44-1000 SENSOR UNIT
 Date: 07/07/2003
 Reference: INTRO
 Seasonal Inventory: 30.0 UM: EA

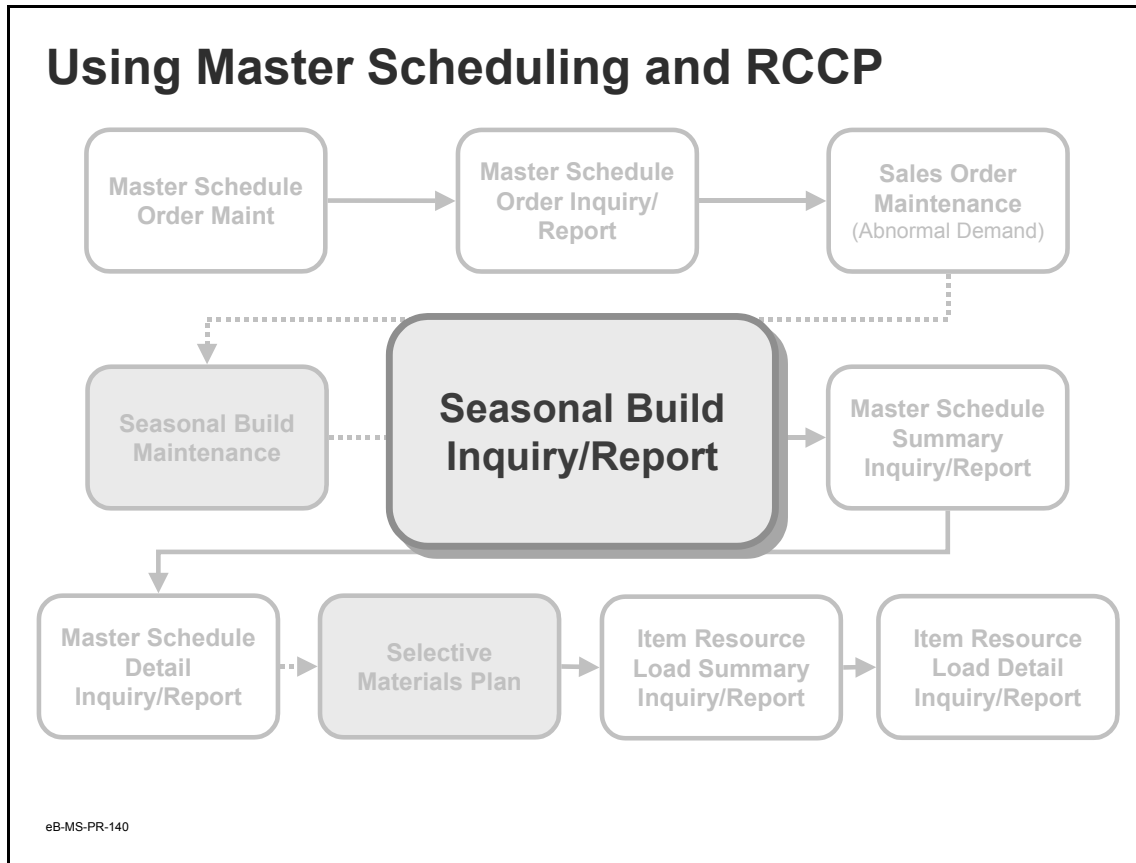
← → Add Link

Seasonal Build Maintenance

In MFG/PRO, seasonal build inventory is entered into the system using Seasonal Build Maintenance. Assume an additional 600 units are needed on December 1st, with an anticipated build rate of 200 units per month:

<u>Date</u>	<u>Seasonal Inventory</u>
SEP 30	200
OCT 31	400
NOV 30	600
DEC 01	0

The Dec 1st setting indicates to MFG/PRO the seasonal build requirement is completed. Setting the inventory to zero (0) enables the items to be shipped.



Seasonal Build Inquiry/Report

Seasonal Build Inquiry – Optional

Item Number	Site	Date	Reference	Seasonal Inventory	Unit	Description
44-1000	12000	07/07/03	INTRO	30	EA	SENSOR UNIT
44-1000	12000	07/14/03	INTRO	60	EA	SENSOR UNIT
44-1000	12000	07/21/03	INTRO	0	EA	SENSOR UNIT

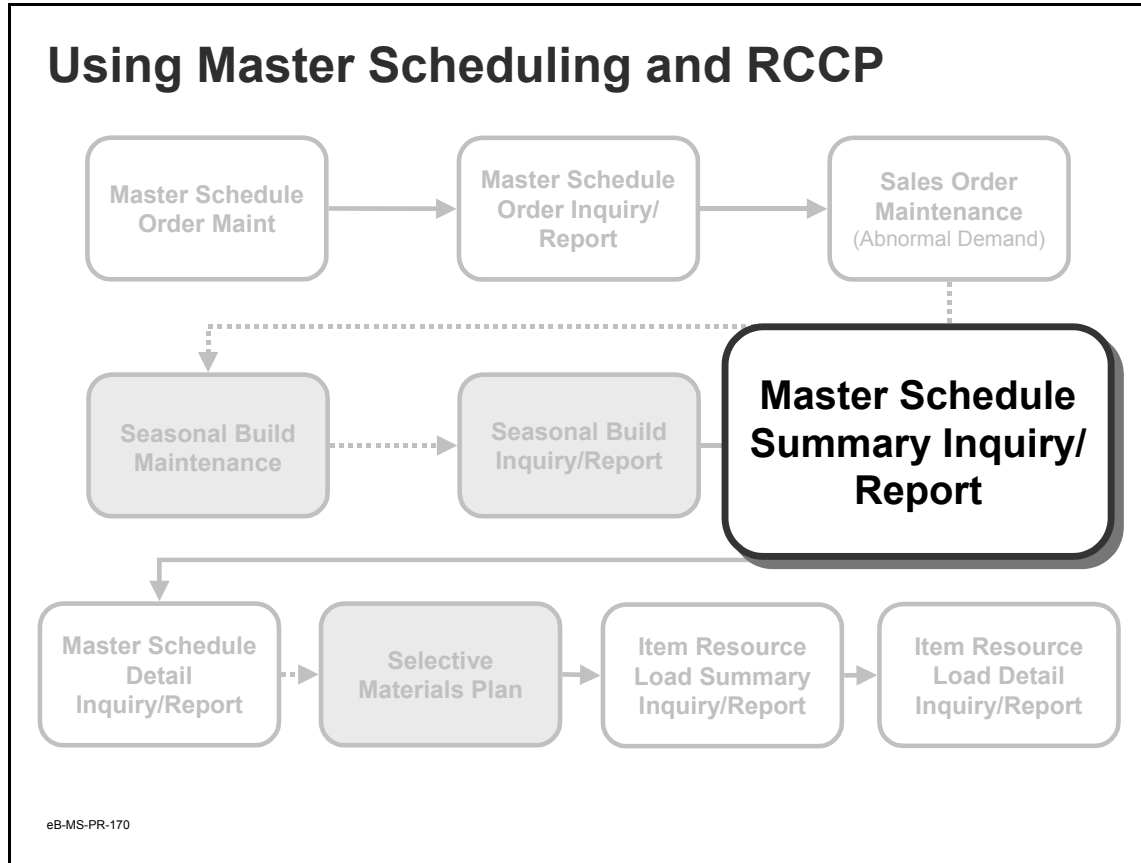
Seasonal Build Inquiry

The Seasonal Build Inquiry shown above illustrates a completed seasonal build.

Seasonal Build Report – Optional

Item Number	Description	Site	Reference	Date	Seasonal Inv	UM
44-1000	SENSOR UNIT	12000	INTRO	07/07/03	30.0	EA
		12000	INTRO	07/14/03	60.0	EA
		12000	INTRO	07/21/03	0.0	EA

Seasonal Build Report



Master Schedule Summary Inquiry/Report

Master Schedule Summary Inquiry

Master Schedule Summary Inquiry

Item Number: 44-1000 SENSOR UNIT MRP Req: Yes
Site: 12000 Mfg LT: 1 Plan Orders: Yes Pur/Mfg: M
QOH: 0.0 EA Pur LT: 0 Order Qty: 10 Min Ord: 0
Order Policy: LFL Safety Stock: 0 Yield%: 100.00% Max Order: 0
Order Period: 0 Safety Time: 0 Time Fence: 0 Ord Mult: 0

Past	06/23/03	06/30/03	07/07/03	07/14/03	07/21/03	07/28/03
06/22/03	06/29/03	07/06/03	07/13/03	07/20/03	07/27/03	08/03/03
Prod Fcst	0	0	0	0	0	0
Forecast	0	0	0	0	30	30
Sales Orders	0	0	0	0	0	0
Gross Reqs	1880	1000	2400	1720	1804	1812
Mstr Sched	1880	1000	2400	1720	1804	1812
Projected QOH	0	0	0	0	-30	-60
Avail Promise	0	0	0	0	0	0
Cumulative ATP	0	0	0	0	0	0
Seasonal Build	0	0	0	30	60	0

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Master Schedule Summary Inquiry

The master schedule summary is the single most crucial screen for planners to understand. It highlights:

Production forecast

- System calculated forecast used in multilevel master scheduling

Forecast

- Manually loaded or via Simulation to Summarized Forecast
 - Independent demand entered in Forecast Maintenance

Sales orders

- Demand derived from sales orders, required ship schedules
 - Independent demand entered in Sales Order Maintenance

Gross requirements

The sum of an item's requirements from:

- Forecasts
- Higher level products
- Confirmed sales orders
- Required ship schedules
- Service items
- Intersite orders generated by DRP

Gross requirements do not take into account inventory on hand or scheduled receipts.

- Manufacturing requirements from a parent work order
 - Can be both master scheduled and a component on a multilevel bill
 - May be intersite demand in DRP environment

Master Scheduled Receipts

Total scheduled receipts for an item from:

- Work orders
- Repetitive schedules
- Master schedule orders
- Purchase orders
- Distribution orders

Projected quantity on hand (QOH)

- System calculated
- A period-by-period projection of an item's on-hand balance plus scheduled receipts minus gross requirements

Available-to-Promise

The uncommitted portion of inventory or planned production calculated by deducting real demand from real supply.

Seasonal Build

Quantity in inventory for that period NOT INCLUDED in available-to-promise quantity.

Available-to-Promise Calculation (MFG/PRO methodology)

- Beginning QOH
 - + Master schedule receipts
 - - Gross requirements
 - - Sales (until next master schedule)
 - - Increased seasonal build
 - + Decreased seasonal build

Master Schedule Summary Inquiry

Master Schedule Summary Inquiry							
Item Number: 44-110 CONTROL UNIT, AUTOMOTIVE MRP Req: No Site: 12000 Mfg LT: 0 Plan Orders: Yes Pur/Mfg: M QOH: 0.0 EA Pur LT: 0 Order Qty: 0 Min Ord: 0 Order Policy: POQ Safety Stock: 0 Yield%: 100.00% Max Order: 0 Order Period: 7 Safety Time: 0 Time Fence: 0 Ord Mult: 0							
	Past	06/23/03	06/30/03	07/07/03	07/14/03	07/21/03	07/28/03
		06/22/03	06/29/03	07/06/03	07/13/03	07/20/03	07/27/03
Prod Fcst	0	400	200	400	400	400	400
Forecast	0	0	0	0	0	0	0
Sales Orders	0	0	500	0	0	0	0
Gross Reqs	0	0	0	0	0	0	0
Mstr Sched	0	400	700	400	400	400	400
Projected QOH	0	0	0	0	0	0	0
Avail Promise	0	400	200	400	400	400	400
Cumulative ATP	0	400	600	1000	1400	1800	2200

Available to Promise Calculation							
Beg Qty OH	0	0	0	0	0	0	0
+Master Schedule	400	700	400	400	400	400	400
- Gross Requirements	0	0	0	0	0	0	0
- Sales	0	500	0	0	0	0	0
Available to Promise	400	200	400	400	400	400	400

eB-MS-PR-190

Order Promising

The completed master schedule provides a basis for order promising. Order promising simply verifies whether a sales order can be filled within a specific time frame given other demands and the currently scheduled supply orders.

Available-to-Promise (ATP)

- Shows true day-to-day supply available to fulfill incoming sales orders
- Order promising verifies whether a sales order can be filled within a specific time frame
 - Check Avail Promise row of the Master Schedule Summary Inquiry
- Tracks real supply against real demand

- Does not factor in Forecast or Prod Forecast quantities
- Does factor in Seasonal Build
 - Increase in Seasonal Build decreases ATP
 - Decrease in Seasonal Build increases ATP

The calculation occurs on any date when a Master Sched receipt is due or a Seasonal Build quantity is made available and a net increase in supply is caused.

- Includes all sales orders and gross requirements up to the next increase in available supply

Calculation

Master Sched – Sales Orders – Gross Requirements – Seasonal Build net increases + Seasonal Build net decreases = Available-to-Promise

Warning Sales orders can use ATP from the past, which can be confusing when interpreting the calculation.

This is true except in the first instance of available-to-promise on a summary screen.

To start the ATP out, the beginning quantity on hand is added.

In the Past columns of the daily Master Schedule Summary (as well as in the weekly and monthly displays), ATP is Time Period sensitive (Net Amount):

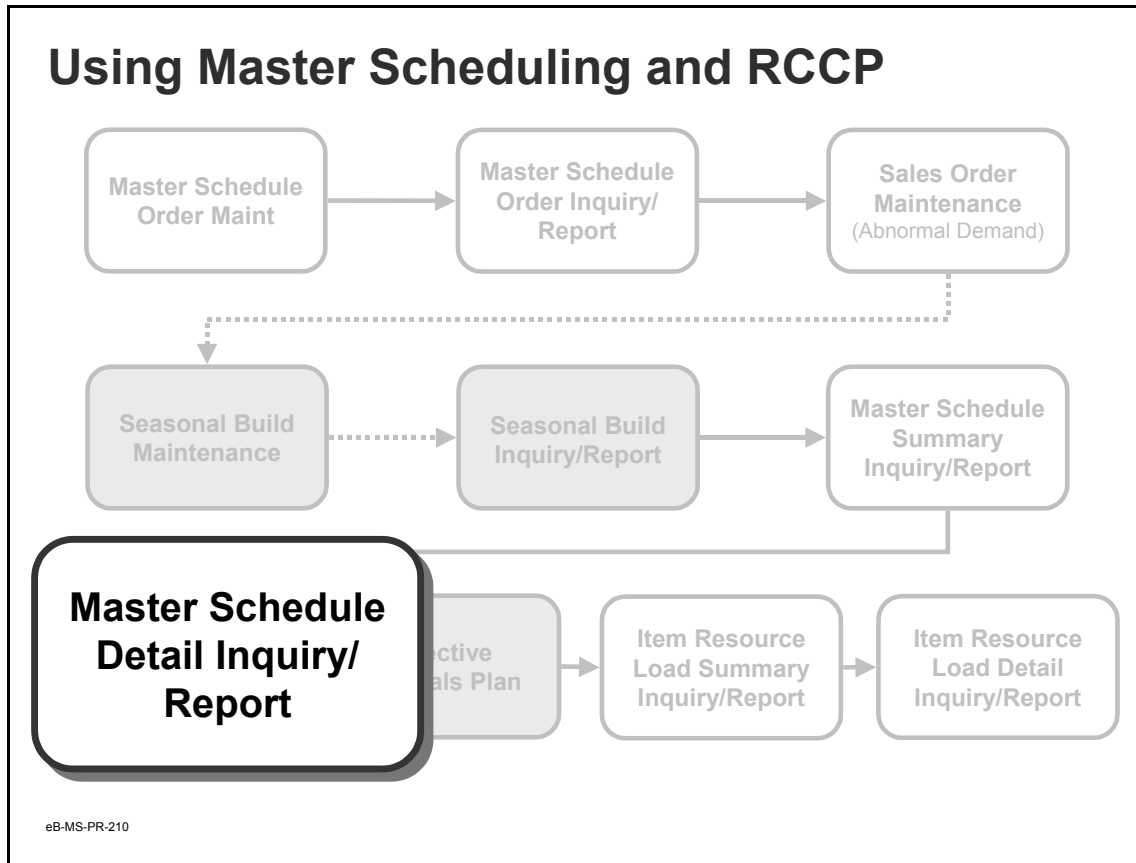
- All uncommitted supply that can be promised to new sales orders is shown
- The ATP is decremented during sales order entry and is revised immediately

Master Schedule Summary Report

Item Number: 44-110		CONTROL UNIT, AUTOMOTIVE				Buyer/Planner: qad				Site: 12000			
Prod Line: 2000		BOM/Formula:				Supplier: 5003000							
Qty On Hand: 0.0		UM: EA		Time Fence: 0		Mfg LT: 0		MRF Required: no					
Order Policy: POQ		Min Ord: 0		Safety Time: 0		Pur/Mfg: M		Pur LT: 0		Master Sched: yes			
Order Period: 7		Max Ord: 0		Safety Stk: 0		Inspect: no		Ins LT: 0		Plan Orders: yes			
Order Qty: 0		Ord Mult: 0		Yield%: 100.00%				Cum LT: 0		Issue Policy: yes			
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											
Prod Fcst	0	400	200	400	400	400	400	0	0	0	0	0	0
Forecast	0	0	0	0	0	0	0	0	0	0	0	0	0
Sales Orders	0	0	500	0	0	0	0	0	0	0	0	0	0
Gross Reqs	0	0	0	0	0	0	0	0	0	0	0	0	0
Mstr Sched	0	400	700	400	400	400	400	0	0	0	0	0	0
Projected QOH	0	0	0	0	0	0	0	0	0	0	0	0	0
Avail Promise	0	400	200	400	400	400	400	0	0	0	0	0	0
Cum ATP	0	400	600	1000	1400	1800	2200	2200	2200	2200	2200	2200	2200

Master Schedule Summary Report

- Provides a printed copy of the Master Schedule Summary Inquiry
- Gives costing data of the quantitative data displayed



Master Schedule Detail Inquiry/Report

Master Schedule Detail Inquiry

Item Number: 44-110		Site: 12000	Start Date:		
CONTROL UNIT, AUTOMOTIVE		Output: page			
Item Number: 44-110		Qty on Hand: 0.0	Site: 12000		
CONTROL UNIT, AUTOMOTIVE		UM: EA	Pur/Mfg: M		
Buyer/Planner: qad	Order Policy: 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 Percent: 100.00%	Cum LT: 0		
Due Date	Gross Reqs	Mstr Sched	Proj QOH	Plan Ords	Details

			0		Beginning Available
06/23/03	400		-400		Prod F/C 44-0000
06/23/03			0	400	W/O: 06190041 ID: 42
					Release Date 06/23/03
06/30/03	200		-200		Prod F/C 44-0000
06/30/03	500		-700		SO: SO20015 Line: 1
06/30/03			0	700	W/O: 06190042 ID: 43
					Release Date 06/30/03
07/07/03	400		-400		Prod F/C 44-0000
07/07/03			0	400	W/O: 06190043 ID: 44
					Release Date 07/07/03

eB-MS-PR-220

Master Schedule Detail Inquiry

Within the 7-day order period, MRP plans one order to satisfy demand.

- A demand = 400
 - MRP plans W/O 06190041 for 400
- B demand = 200 + 500
 - MRP plans W/O 06190042 for 700
- C demand = 400
 - MRP plans W/O 06190043 for 400

The Master Schedule Detail Inquiry displays:

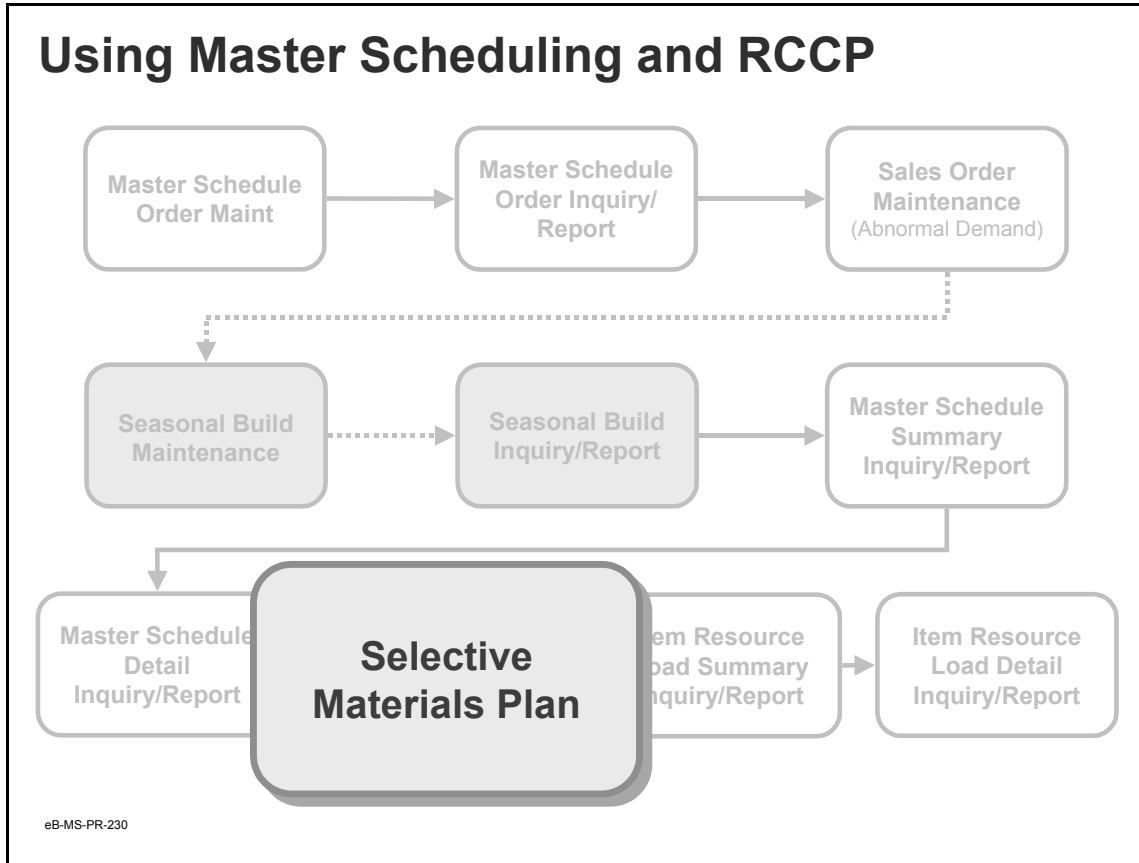
- A date-sequenced description of each demand and supply record
- Item/site planning data followed by a time-phased replenishment display in due date sequence

The screen shows the same information as the Master Schedule Summary Inquiry, including the pegging of demands to their source. For example, the actual work order or sales order that generated the requirement is identified.

Note One-level pegging is available in MFG/PRO

Master Schedule Detail Report

- Provides a printed copy of the information displayed in Master Schedule Detail Inquiry.



Selective Materials Plan

Selective Materials Plan – Optional

Selective Materials Plan

Item Number: To:

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-MS-PR-240

Selective Materials Plan

Selective Materials Plan lets you plan master scheduled items separately from MRP items. If you use the computer-assisted approach to master scheduling, you may want to run Selective Materials Plan as follows:

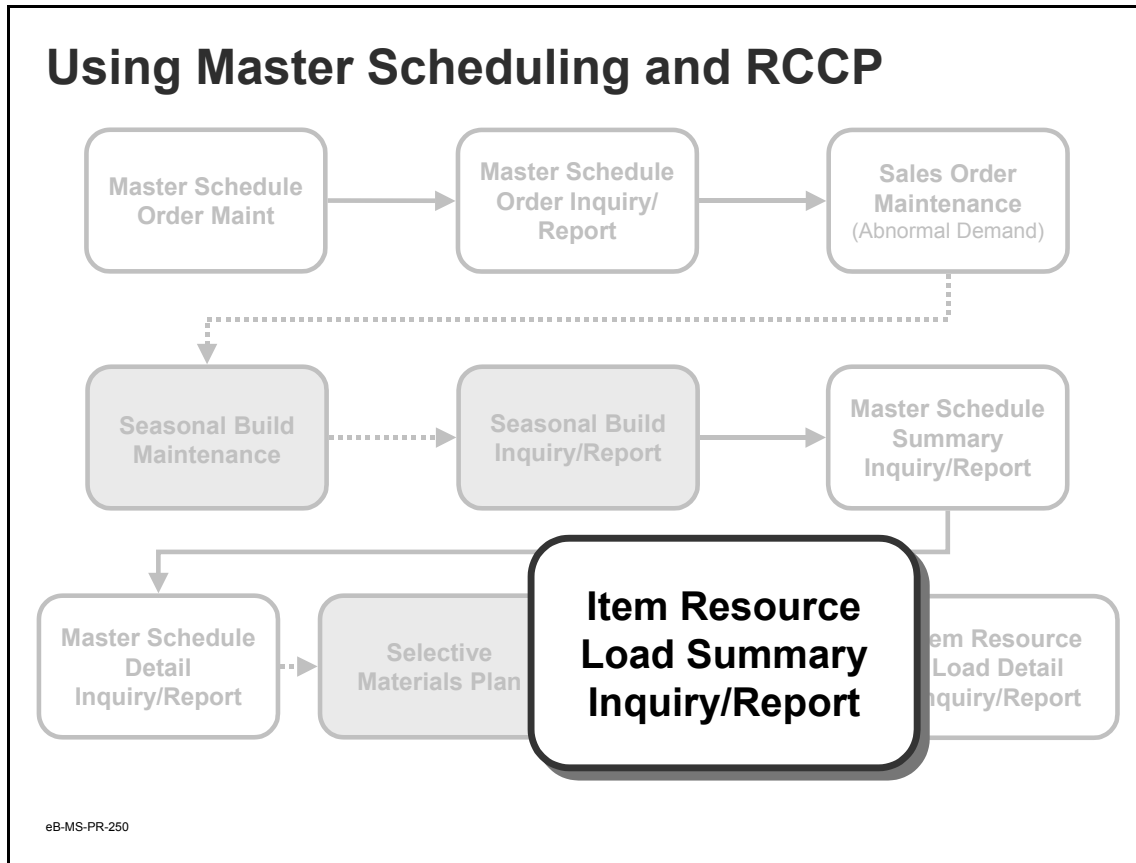
- Run Selective Materials Plan for master scheduled items only
- Adjust the master schedule and rerun Selective Materials Plan as needed
- Run Selective Materials Plan for MRP-scheduled items only
- MRP provides time-phased balancing of:
 - Supply and demand for purchased and manufactured items
- MRP uses the master schedule and all other sources of demand and supply to:

- Calculate gross requirements and projected on-hand inventory
- Schedule and plan orders
- Produce action messages for managing the materials plan
- Selective MRP runs as Net Change (MRP Required = Yes) or as Regenerative (MRP Required = No)
 - Plans only the items selected, passing down gross requirements to the next unselected level, but not replanning orders
 - Net Change Materials Plan and Regenerate Materials Plan items are based on low-level code, generating requirements at the top level first, then down through the structure one level at a time
- Selection can be based on:
 - Item Number
 - Site
 - Buyer/Planner
 - Prod Line
 - Group
 - Item Type
 - Supplier
 - Pur/Mfg
- One or both of the Master Scheduled Items or Non Master Scheduled Items flags must = Yes
 - The same is true of the MRP Items and DRP Items flags

Replanning Master Scheduled Items

When master scheduled items are selected, orders are planned for parent items and gross requirements are passed down to the next-level components and will not be replanned.

- No orders are planned for the components



Comparing Load and Capacity

Item Resource Load Summary Inquiry

Comparing Load and Capacity

Rough cut of next month's loads against a specified resource



eB-MS-PR-260

Item Resource Load Summary Inquiry

Calculating Load

Item Resource Load Inquiries and Reports can be run after the:

- Resource has been entered
- Conversion factor and lead times have been set up

MFG/PRO calculates the load automatically using the scheduled end-item quantities and the Resource Qty Per entered in Item Resource Bill Maintenance.

The Item Resource Load Summary displays the:

- Resource capacity

- Required resource capacity (production load) to meet scheduled production
 - In daily, weekly, or monthly buckets
- The load is subtracted from capacity
 - Over-capacity appears as a negative number in the Over/Under row
 - Under-capacity appears as a positive number

Load % of Capacity

The cumulative column displays the Over/Under quantity added to any over- or under-capacity from past planning periods.

Item Resource Load Summary Report

Resource: Labor	Labor Hours			UM: HR		Site: 12000								
	Past 06/23/03	06/24/03	07/01/03	07/08/03	07/15/03	07/22/03	07/29/03	08/05/03	08/12/03	08/19/03	08/26/03	09/02/03		
	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		
Workdays	0	5	5	5	5	5	5	5	5	5	5	5	5	
Capacity	0	475	475	475	475	475	455	375	375	375	375	375	375	
Total Load	0	1,224	458	391	406	407	40	40	40	40	49	49	49	
OVER/UNDER	0	-749	18	84	69	68	415	335	335	335	326	326	326	
Cumulative	0	-749	-731	-647	-578	-510	-95	240	575	910	1,236	1,562		

Item Resource Load Summary Report

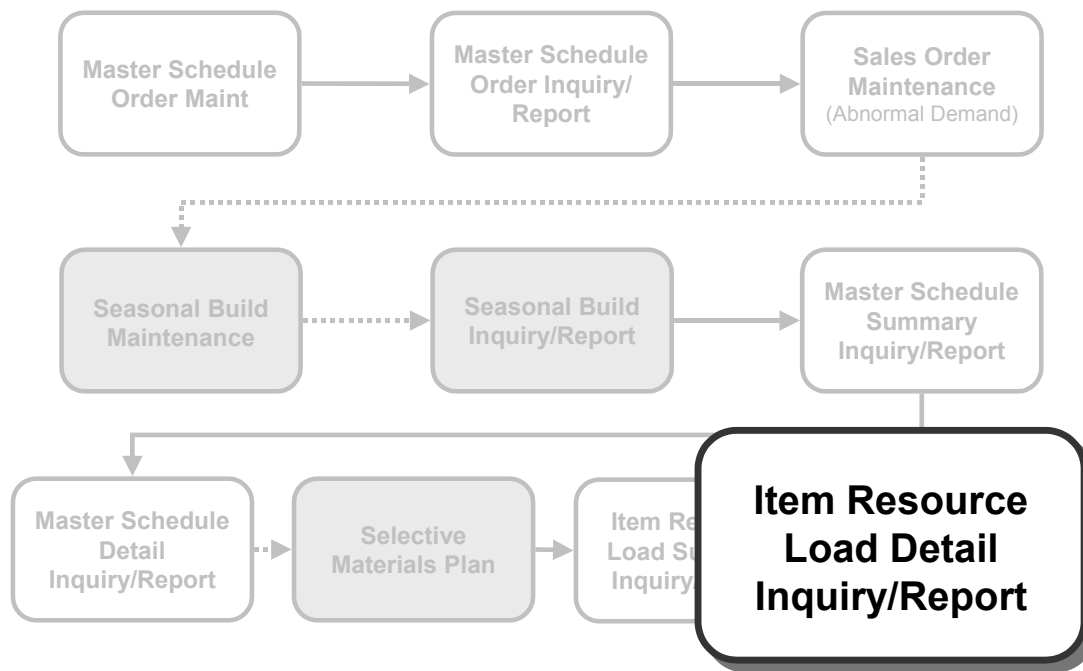
For each resource, you can define resource bills (load profiles) that specify the amount of the resource required to manufacture a product line or item.

- Resource planning:
 - Evaluates the feasibility of production plans and master schedules
 - Identifies where adjustments are required

If the production plan needs more machine capacity, decrease production or increase machines.

Catching the imbalance at this level allows adjustment of the plan before work is scheduled or customer promises are made.

Using Master Scheduling and RCCP



eB-MS-PR-280

Item Resource Load Detail Inquiry

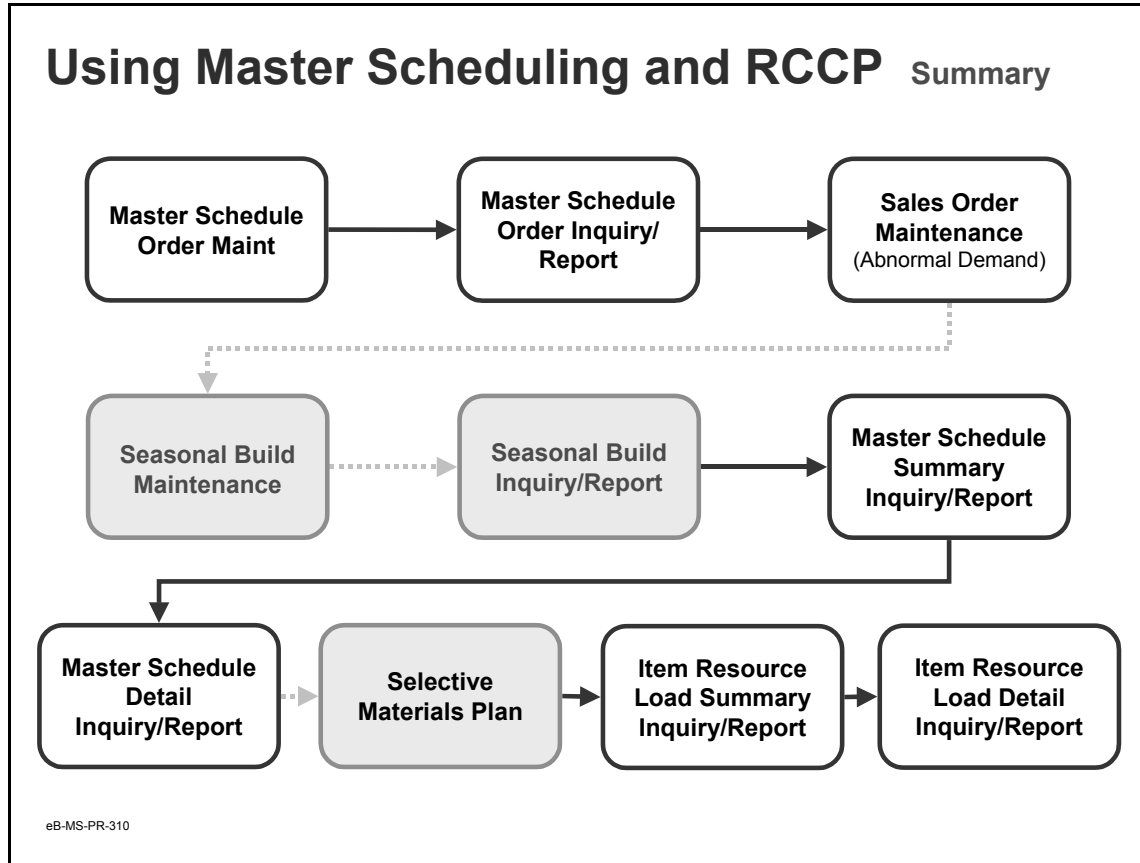
	Past	06/24/03	07/01/03	07/08/03	07/15/03	07/22/03	07/29/03
	06/23/03	06/30/03	07/07/03	07/14/03	07/21/03	07/28/03	08/04/03
Workdays	0	5	5	5	5	5	5
Capacity	0	475	475	475	475	475	455
W/O: 06190001		Item: 44-100					
	0	210	0	0	0	0	0
W/O: 06190002		Item: 44-100					
	0	119	0	0	0	0	0
W/O: 06190003		Item: 44-100					
	0	350	0	0	0	0	0
W/O: 06190004		Item: 44-100					
	0	105	0	0	0	0	0
W/O: 06190005		Item: 44-100					
	0	0	88	0	0	0	0
W/O: 06190006		Item: 44-100					
	0	0	210	0	0	0	0
W/O: 06190007		Item: 44-100					
	0	0	0	21	0	0	0
W/O: 06190008		Item: 44-100					
	0	0	0	210	0	0	0
W/O: 06190009		Item: 44-100					
	0	0	0	0	36	0	0
W/O: 06190010		Item: 44-100					
	0	0	0	0	210	0	0
W/O: 06190011		Item: 44-100					
	0	0	0	0	0	37	0
W/O: 06190012		Item: 44-100					
	0	0	0	0	0	210	0
W/O: 06190013		Item: 44-100					
	0	0	0	0	0	0	40
W/O: 06190041		Item: 44-110					
	0	440	0	0	0	0	0
W/O: 06190042		Item: 44-110					
	0	0	160	0	0	0	0
W/O: 06190043		Item: 44-110					
	0	0	0	160	0	0	0
W/O: 06190044		Item: 44-110					
	0	0	0	0	160	0	0
W/O: 06190045		Item: 44-110					
	0	0	0	0	0	160	0
Total Load	0	1,224	458	391	406	407	40
OVER/UNDER	0	-749	18	84	69	68	415
Cumulative	0	-749	-731	-647	-578	-510	-95

eB-MS-PR-290

Item Resource Load Detail Report

Resource: Labor	Labor Hours	UM: HR					Site: 12000											
Past		06/24/03	07/01/03	07/08/03	07/15/03	07/22/03	07/29/03	08/05/03	08/12/03	08/19/03	08/26/03	09/02/03						
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						
Workdays	0	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5		
Capacity	0	475	475	475	475	475	455	375	375	375	375	375	375	375	375	375		
Item Number: 44-100 CONTROL UNIT, HOME USE																		
W/O: 06190001	0	210	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190002	0	119	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190003	0	350	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190004	0	105	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190005	0	0	88	0	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190006	0	0	210	0	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190007	0	0	21	0	0	0	0	21	0	0	0	0	0	0	0	0		
W/O: 06190008	0	0	0	210	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190009	0	0	0	0	36	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190010	0	0	0	0	210	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190011	0	0	0	0	0	37	0	0	0	0	0	0	0	0	0	0		
W/O: 06190012	0	0	0	0	0	210	0	0	0	0	0	0	0	0	0	0		
W/O: 06190013	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0	0		
W/O: 06190014	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0	0		
W/O: 06190015	0	0	0	0	0	0	0	0	40	0	0	0	0	0	0	0		
W/O: 06190016	0	0	0	0	0	0	0	0	0	0	40	0	0	0	0	0		
W/O: 06190017	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0	0		
W/O: 06190018	0	0	0	0	0	0	0	0	0	0	0	0	49	0	0	0		
Item Number: 44-110 CONTROL UNIT, AUTOMOTIVE																		
W/O: 06190041	0	440	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190042	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190043	0	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190044	0	0	0	0	160	0	0	0	0	0	0	0	0	0	0	0		
W/O: 06190045	0	0	0	0	0	160	0	0	0	0	0	0	0	0	0	0		
Total Load	0	1,224	458	391	406	407	40	40	40	40	49	49	49	49	49	49		
OVER/UNDER	0	-749	18	84	69	68	415	335	335	335	326	326	326	326	326	326		
Cumulative	0	-749	-731	-647	-578	-510	-95	240	575	910	1,236	1,562	1,562	1,562	1,562	1,562		

eB-MS-PR-300



Summary

Processing Exercises



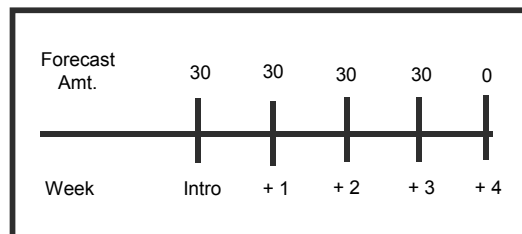
eB-MS-PR-320

Processing Exercises

Review a Seasonal Build Forecast

Instructions: This activity covers entering and reviewing a forecast and a seasonal build plan.

- Item 44-1000 at site 12000 is being introduced 4 weeks from next Monday. Create a forecast for 30 items for 4 weeks from next Monday (Intro Date). Forecast another 30 items per week for the following 3 weeks.



- As a hedge against sales being greater than anticipated, you would like to have an additional 60 units in stock available on the date of the introduction. These will be produced in the two weeks prior to the introduction.

Use Seasonal Build Maintenance to enter a seasonal build schedule using Monday dates.

	1st Entry	2ndEntry	3rdEntry
Site:	12000	12000	12000
Item Number:	44-1000	44-1000	44-1000
Date:	2 wks prior	1 wk prior	Intro date
Reference:	INTRO	INTRO	INTRO
Seasonal Inventory:	30.0	60.0	0.0

- Run a Seasonal Build Inquiry for item 44-1000 to ensure that the data has been entered correctly.
- Review the Master Schedule Summary and Detail Inquiries to review the impact of the seasonal build.

Rough-Cut Capacity Planning

Instructions: In this activity, you will level a load using the rough-cut capacity planning (RCCP) process. The activity includes creating master scheduled orders, running selective MRP, reviewing inquiries and reports, and increasing capacity to balance the load. Use item 44-1000, site 12000 throughout the activity.

- 1 Create a master schedule order for item 44-1000 at site 12000.

Work Order: <blank>
 ID: <blank>
 Item Number: 44-1000
 Type: <blank>
 Site: 12000
 Qty Ordered: 100
 Order Date: Today's Date
 Release Date: Two weeks from today
 Due Date: Three weeks from today

Use Master Schedule Order Maintenance

- 2 Run Selective Materials Plan. Items 44-0000 to 44-110, site 12000 to 12000.
- 3 Using Item Resource Load Summary Inquiry, review the resource load for site 12000, resource Labor.
- 4 Using Resource Maintenance, increase labor capacity for site 12000.

Resource: Labor
 Site: 12000
 Reference: Normal
 Cap/Day: 75

- 5 Review the resource load for site 12000, resource Labor.
 Use Item Resource Load Summary Inquiry and Item Resource Load Detail Inquiry.

Course Overview

- ✓ Introduction to Master Scheduling and RCCP
- ✓ Business Considerations
- ✓ Set up Master Scheduling and RCCP
- ✓ Use Master Scheduling and RCCP

eB-MS-PR-330

Course Overview

APPENDIX A

Workshops and Study Questions

Master Schedule Setup

- 1 Explain what fields must be set to have forecast consumption occur.
- 2 In MFG/PRO, to allow shipment of seasonal build requirements, what entry must be entered on the Seasonal Build Maintenance screen?
- 3 What fields in Item-Site Planning Maintenance are used to designate a master schedule item?
- 4 A forecast is considered to be a dependent demand requirement.

☐ True ☐ False
- 5 Abnormal demand is the preferred method of building to inventory.

☐ True ☐ False

- 6** A Plan Orders flag setting of No constitutes the fully manual approach to master scheduling.
- True False
- 7** A time fence is the longest period of time it takes to either purchase or manufacture an item, assuming nothing is on hand.
- True False
- 8** Available-to-promise (ATP) is a manually entered value in MFG/PRO.
- True False
- 9** Dependent demand items can be shipped on a sales order.
- True False
- 10** In any time period, the ATP quantity can never be less than the projected on-hand quantity.
- True False

RCCP

- 1** List four of the key resources for scheduled end items in your company's plants.
- a**
- b**
- c**
- d**

2 If the Item Resource Summary shows 150% load in each of the next four weeks, what do you need to do?

3 The item resource plan does not take into account component production demands.

True False

4 A resource plan that appears slightly over or under capacity is typically ignored.

True False

5 Item resource loads are calculated from _____.

6 Overtime is scheduled by entering a Reference and a positive number of hours in Item Resource Bill Maintenance.

True False

7 Rough-cut capacity planning only looks at firm planned work orders and repetitive schedules.

True False

8 A negative lead time offset in the Item Resource Bill Maintenance indicates that the resource is needed before/after production begins.

Before After

Answers to Master Schedule Setup Study Questions

- 1 Set Consume Forecast = Yes on the sales order and enter a positive value in Consume Fwd and/or Consume Back in Sales Order Control.
- 2 A quantity smaller than the previous seasonal build entry must be entered. To release the entire seasonal build quantity, enter a zero.
- 3 In fact, an item is a master schedule item if the planner says it is. The planner determines whether it should be selected during a selective MRP based on Master Schedule = Yes or No. The planner also decides whether the system should create planned orders.

Set the following fields: Master Sched = Yes, Plan Orders = No. The key is the Plan Orders setting, which tells MRP whether to plan the item or not. You can set Plan Orders = Yes, and then use a Time Fence value to control the creation of orders within the near term horizon.
- 4 False. Forecasts and sales orders are independent demand requirements.
- 5 False. Seasonal build is the accepted method of building to inventory.
- 6 True.
- 7 False. A time fence is a period of calendar days from the system date for which MRP will not create planned orders.
- 8 False. ATP is calculated by the system and appears on the Master Schedule Summary Inquiry screen.
- 9 True.
- 10 False. If ATP is negative, it is over-promised for the remaining planning horizon.

Answers to RCCP Study Questions

- 2 Reduce production by 50% or increase capacity by 50%.
- 3 True. The Capacity Requirements Plan performs this task.
- 4 True. Slight deviations can usually be worked out on the shop floor.
- 5
 - a The production forecast from the Product Line Plan.
 - b The master schedule for the items.
- 6 False. Use Resource Maintenance.
- 7 False. It includes released, firm planned, exploded, and allocated orders.
- 8 After.

APPENDIX B

Reports, Inquiries, Browsers

Master Scheduling and RCCP Reports, Inquiries, Browsers

Report, Inquiry, Browse	Function/Purpose
Forecast Inquiry	Displays forecasts for any item or product subject to independent demand. Forecasts may also be displayed for spares requirement, planning items and configured products.
Forecast Report	Provides a means of printing the information displayed in Forecast Inquiry.
Seasonal Build Inquiry	Displays seasonal build forecasts which are usually derived from a product line plan, then used to develop the operations plan and the master production schedule. They are then periodically adjusted based on actual results or changes in the business plan.
Seasonal Build Report	Provides a means of printing the information displayed in Seasonal Build Inquiry.
Master Schedule Order Inquiry	Displays information about master schedule orders which determine how items will be made (routing), and what components will be used (BOM).
Master Schedule Order Report	Provides a means of printing the information displayed in Master Schedule Order Inquiry.
Master Schedule Summary Inquiry	Displays vital information derived from the production forecast, sales orders, gross requirements, master scheduled receipts, projected quantities on hand. Projection by period of the on-hand balance plus incoming orders minus the requirements
Master Schedule Summary Report	Provides a means of printing the information displayed in Master Schedule Summary Inquiry.
Master Schedule Detail Inquiry	The Master Schedule Detail Inquiry and Report functions 22.21 and 22.22 display the same information as the Master Schedule Summary Inquiry and Report, sequenced by due date. They also include source-to-demand pegging details, allowing you to identify the actual work order or sales order generating a particular item requirement.
Master Schedule Detail Report	Provides a means of printing the information displayed in Master Schedule Detail Inquiry.
Item Resource Bill Inquiry	Displays information on resource requirements for individual items.
Item Resource Bill Report	Provides a means of printing the information displayed in Item Resource Bill Inquiry
Item Resource Load Summary Inquiry	Displays the required resource capacity (production load) to meet scheduled production in daily, weekly, or monthly buckets. The load is subtracted from capacity: over-capacity appears as a negative number in the Over/Under row, under-capacity appears as a positive number.

Master Scheduling and RCCP Reports, Inquiries, Browsers

Report, Inquiry, Browse	Function/Purpose
Item Resource Load Summary Report	Provides a means of printing the information displayed in Item Resource Load Summary Inquiry.
Item Resource Load Detail Inquiry	Displays detailed information about the required resource capacity.
Item Resource Load Detail Report	Provides a means of printing the information displayed in Item Resource Load Detail Inquiry.

Index

A

Abnormal Demand 127
Available-to-Allocate 27
Available-to-Promise 139

C

Calendar Maintenance 90
Capacity Requirements Planning (CRP) 20
Certification Preparation 9
Constraints 54
Course Objectives 31
Course Overview 12

D

Demand
 Abnormal 127
 and Supply 61
 Dependent 25
 Independent 25
 Processing in MFG/PRO 117
 Seasonal 130
Distribution Requirements Planning 20

E

End-Item Planning 15
Enterprise Resource Planning 16
Exercises
 Processing 156
 Setup 106

F

Family-Level Items 84
Features and Options 52
Forecasting 18

H

Holiday Maintenance 92

I

Independent Demand 25
Item
 Planning Maintenance 66
 Resource Bill Maintenance 100
 Site Planning Maintenance 74

M

Master Schedule
 and RCCP Uses 30
 Benefits 24
 Computer Assisted 76
 Fully Automatic 78
 Fully Manual 79
 Items 40, 65
 Multilevel 42, 80, 84
 Order Maintenance 120
 Planning 18, 21
 Summary and Detail Inquiries/Reports 122
 Top-Level Items 83
Master Scheduler
 Qualifications and Responsibilities 19
Material Requirements Planning (MRP) 15
 Control File 86
 Horizon 48

O

Order Promising 139

P

Planning
 Areas of Concern 21
 Bills 82
 Issues 25
 Levels Supported by MFG/PRO 14
 Overview 13
 Parameters 38
 Phases 17

172 MFG/PRO TRAINING GUIDE — MRP AND CRP

Prerequisites 8
Pre-Setup Business Issues 37
Processing Exercises 156
Product Line Planning 14
Production Conversion Factor 102
Production Forecast 43

R

Related Courses 9
Resource Maintenance
 Adding Time-Phased Changes 98
 Components of a Resource 97
 Key Resources 97
 Load Profiles 96
Rough-Cut Capacity Plan (RCCP) 29
 Comparing Load and Capacity 148
 Creating the End Item Load 102

Lead Times 103
Production Conversion Factor 102
Resource Profile 45

S

Sales Order Maintenance 128
Seasonal Build
 Maintenance 130
 Requirements 46
Selective Materials Plan 145
Setup Exercises 106
Strategic Planning 13

T

Terminology 26
Time Fence 50

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