



Production Planning

Lesson 6 : Material
Requirements Planning

Lesson Objectives



■ Objectives -On successful completion of this training module, you should have:

- Understood the basics of Demand Management
- Become familiar with Consumption Base planning
- Become familiar with Master Production Schedule
- Become familiar with Lot Sizing Procedure
- Become familiar with PP-MRP Planning Run

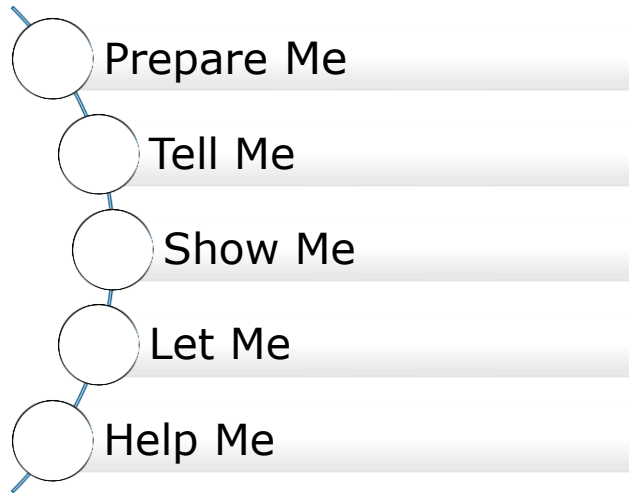
Training Agenda



- PP MRP Procedure
- PP Consumption Base planning
- PP Master Production Schedule(MPS)
- PP Firming Type
- PP Material Requirement Planning(MRP)
- PP Net Requirement Calculation
- PP Lot Sizing Procedure
- PP Scheduling
- PP BOM Explosion
- PP-MRP Planning Run

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Material Requirements Planning

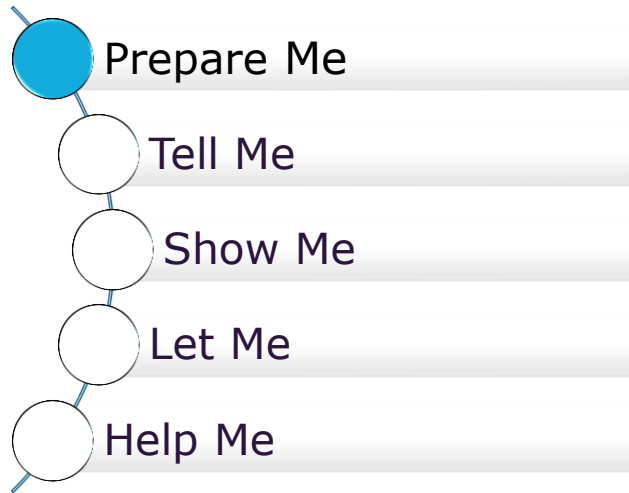


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Material Requirements Planning



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Prepare Me



The main function of material requirements planning is to guarantee material availability, that is, it is used to procure or produce the requirement quantities on time both for customer dependent and independent requirements

MRP tries to strike the best balance possible between

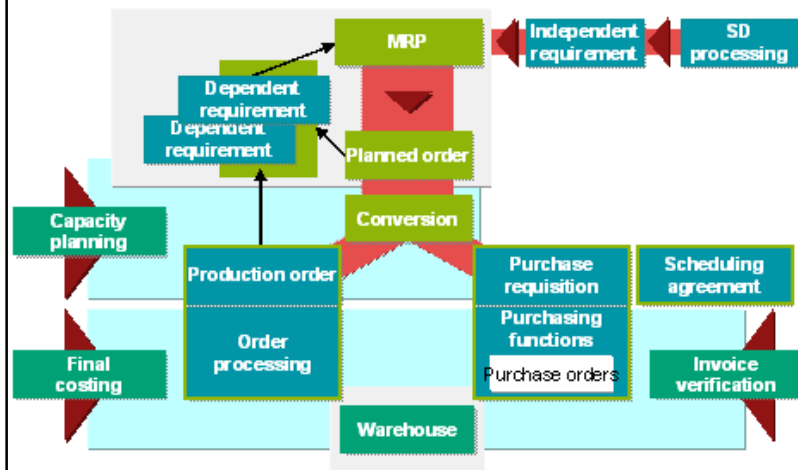
Optimizing the service level and

Minimizing costs and capital lockup.

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MRP in the Logistics Chain



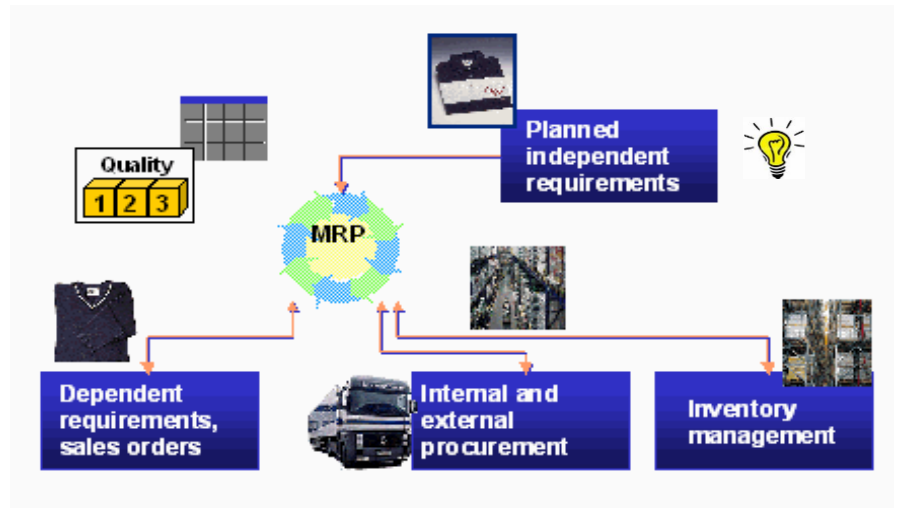
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Material Requirement Planning



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Purpose



The aim of material requirements planning is to tailor available capacities and receipts on time to suit requirements quantities

MRP tries to strike the best balance possible between

- Optimizing the service level and
- Minimizing costs and capital lockup

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Use



It is used to procure or produce the requirement quantities on time both for internal purposes and for sales and distribution. This process involves the monitoring of **stocks** and, in particular, the automatic creation of **procurement proposals** for **purchasing and production**.

SAP MRP creates planned orders based on a material's net requirement quantity and its needed availability.

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Challenges



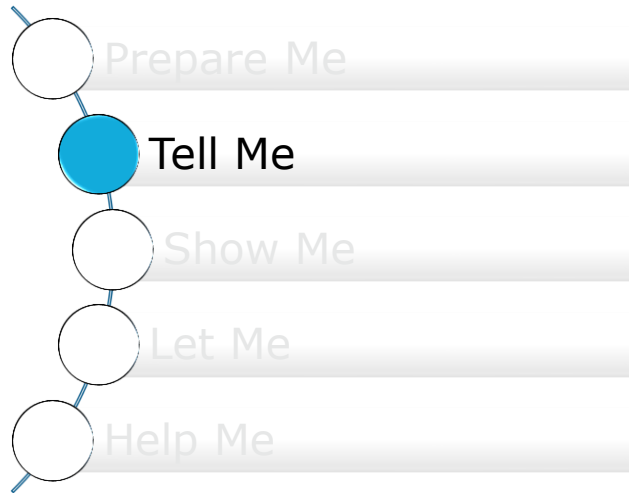
- Accuracy of Master Data
- Material master
- Bills of material
- Work center – For in-house production
- Routing - For in-house production
- And also the following components
 - Demand Management
 - Sales and Distribution

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PP1003 - Material Requirements Planning



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Process Flow

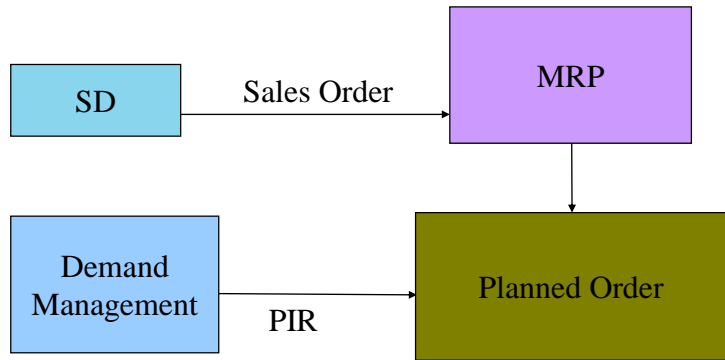
Process Description

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Process Flow

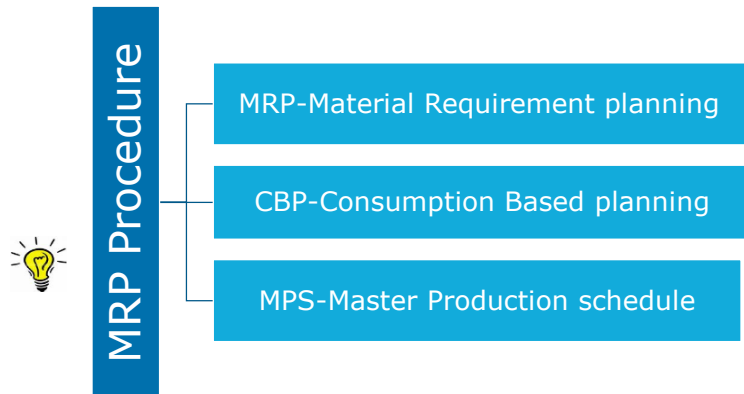


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Process Description



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Demand and Stock elements for MRP



Various Requirement Elements

- Demand plan (Forecast) from Demand Planning system
- Sales Order requirements
- Dependent Requirements
- Requirements from other Plants (stock transfer requirements)
- Safety Stock requirements

Various Stock Elements

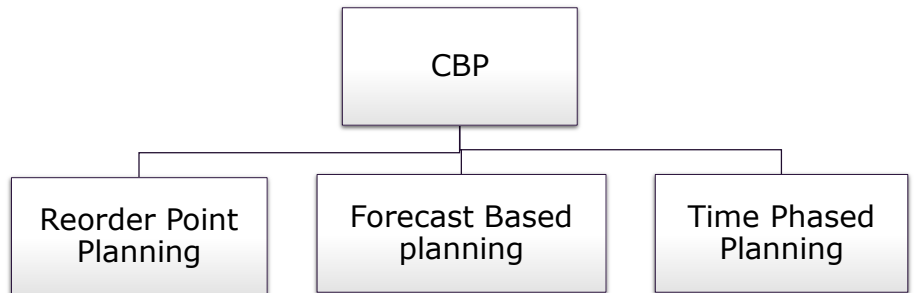
- Available stock in warehouse (various stock types)
- Planned Orders
- Production Orders
- Purchase Requisitions
- Purchase Orders
- Stock Transfer Requisitions
- Stock Order Orders

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Consumption Base Planning



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Net Requirements Calculation: Reorder Point Planning

Available warehouse stock is calculated as follows:

$$\begin{array}{l} \text{Plant stock} \\ + \text{ Open order quantity (purchase orders, firmed planned orders,} \\ \text{firmed purchase requisitions)} \\ \hline = \text{ Available stock} \end{array}$$

If available warehouse stock falls below Reorder Point then in MRP Run Systems generate procurement proposal

Add the notes here.



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Net Requirements Calculation: Reorder Point Planning

Available stock is calculated as follows:

Plant stock	
- Safety stock	
+ Receipts (purchase orders, firmed purchase orders)	
- Requirements quantity (forecast requirements)	
= Available stock	

If the available stock becomes negative then in MRP run system generates new procurement proposal.

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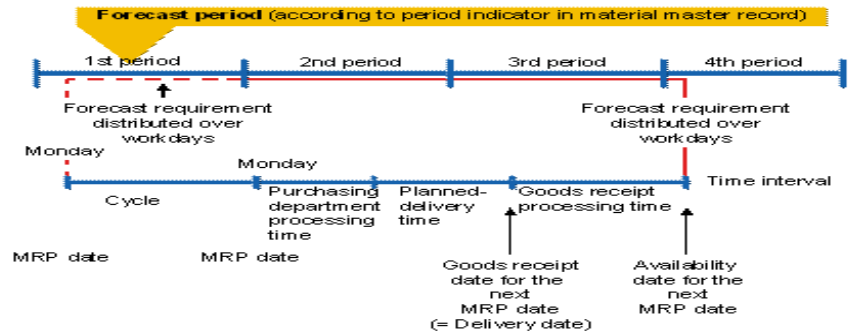
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Net Requirements Calculation: Time Phased Planning

If a vendor always delivers a material on a particular day of the week, it makes sense to plan. This material according to the same cycle, in which it is delivered.



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MPS: Master Production Scheduling



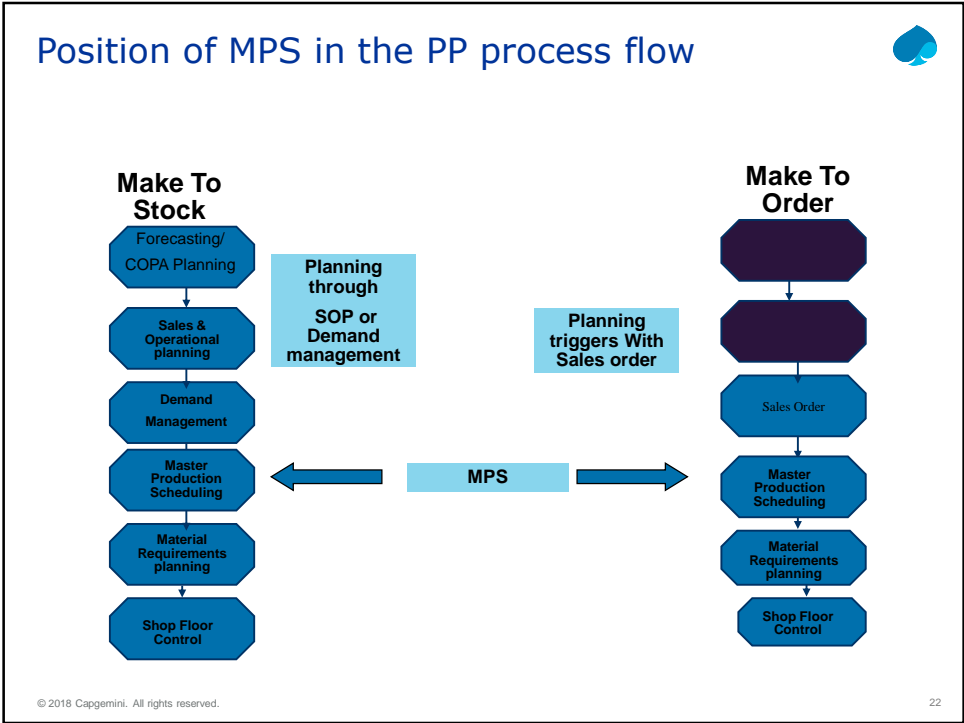
- MPS enables you to plan materials that greatly influence a company's profits and critical.
- The master production scheduling run only plans the master schedule items. Master production scheduling is executed with the same logic as MRP.
- MPS run will plan and pass on the dependent requirement but it will not create any procurement proposal for the material which are planned with MRP run. i.e. in the material master MRP type PD.
- The firming type defines how the order proposals are firmed and how the dates are set within the firming period.
- Goods having high inventory cost and less in demand can be planned through MPS planning.

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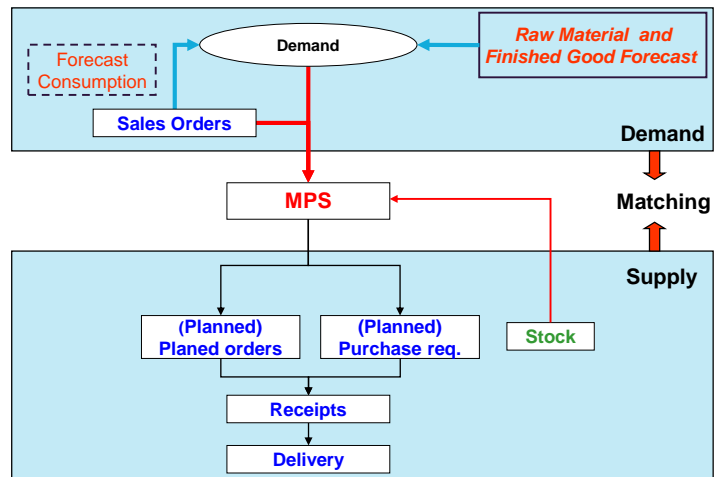
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Process Flow: MPS



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MPS Planning



- **Planning Time Fence** : You can protect the master plan from any automatic changes to master schedule items in the near future by using a planning time fence.
- You can define the planning time fence either material-specific or per MRP group
- **Firming Type** : The firming type determines how procurement proposals are to be firmed and scheduled within the planning time fence during the planning run

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Firming Type



- The following firming types are available

Firming Types	Existing order proposals are	New order proposals are
M0	Not automatically firmed	Created with appropriate dates
M1	Automatically firmed	Created, moved to end of firming period
M2	Automatically firmed	Not created, shortages remain uncovered
M3	Not automatically firmed	Created, moved to end of firming period
M4	Not automatically firmed	Not created, shortages remain uncovered

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MRP :Material Requirement Planning



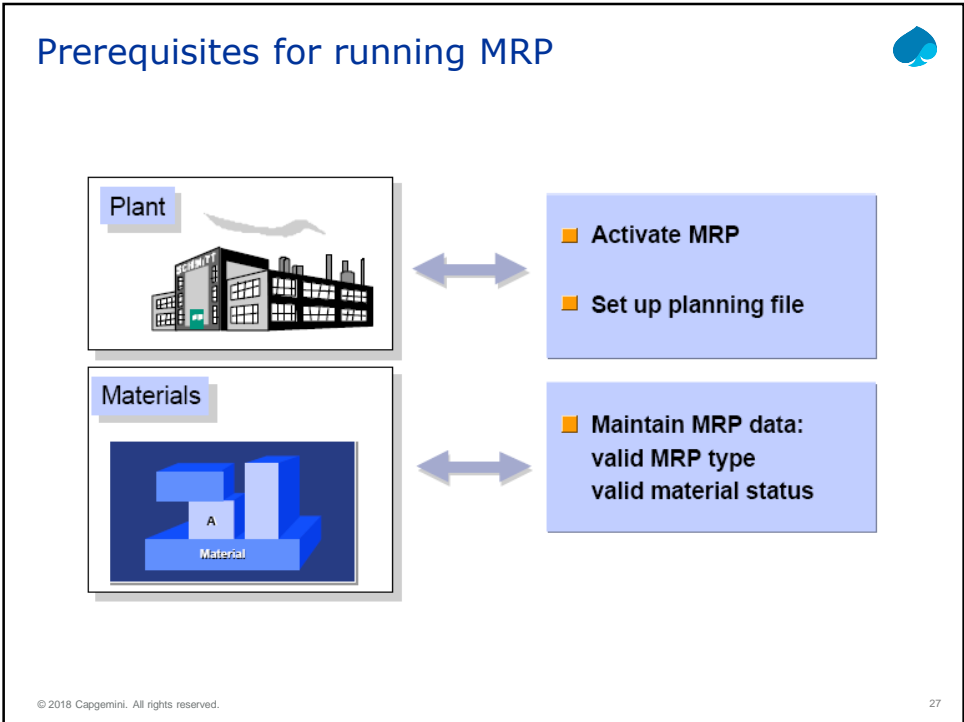
Deterministic MRP is carried out using current and future sales figures. The planned and the exact requirement quantities trigger the net requirements calculation. The requirement elements of this calculation include sales orders, planned independent requirements, material reservations, dependent requirements received from BOM explosion, and so on. The net requirements calculation can give the exact requirements for each day.

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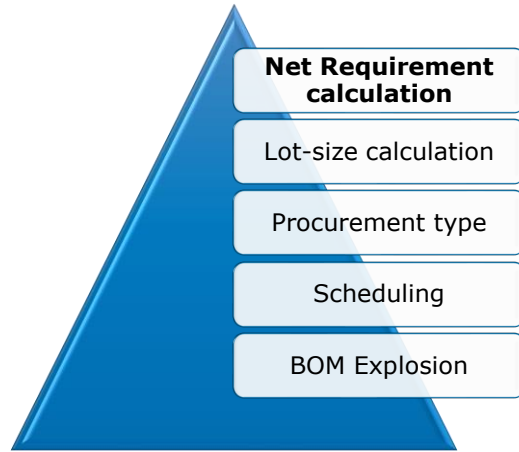
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MRP Flow



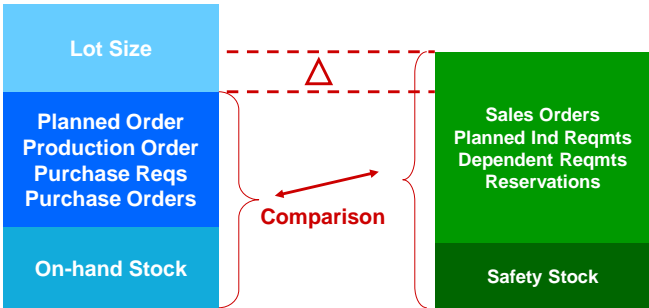
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Net Requirements Calculation



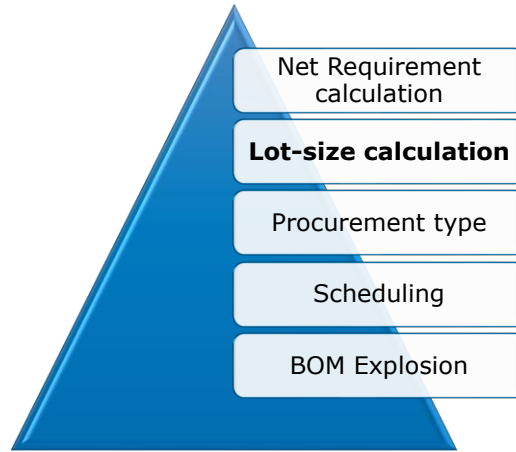
- MRP determines how much supply is needed to satisfy demand in the net requirements calculation.
- The difference between the demand and the supply of an item is the shortage. This shortage quantity must now be covered by one or more planned orders.
- The system calculates the quantity of the planned order according to the lot sizing procedure specified in the material master.

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MRP Flow Contd.



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Lot Sizing Procedure



- During MRP, the system creates procurement proposals based on your lot-sizes if there is a stock shortage.
- By determining lot-sizes you can plan optimal quantities per procurement proposal and thus specifically cover your requirements.
- The planning of lot-sizes influences the planning of the available capacity, and the planning of the production or procurement costs.

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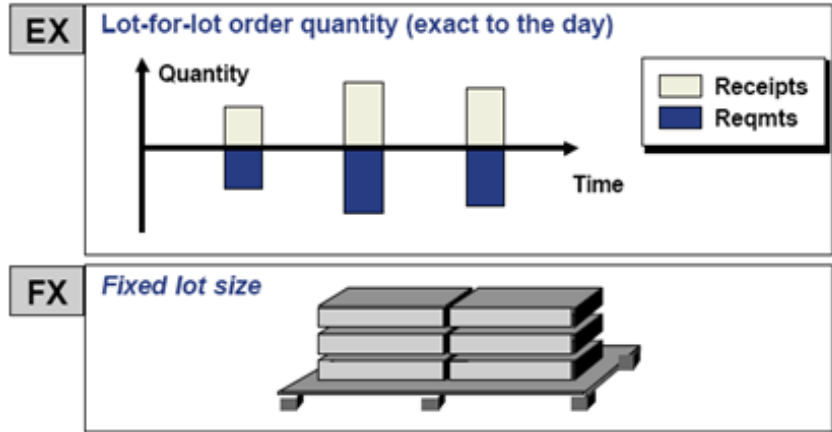
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Static Lot Size Procedures



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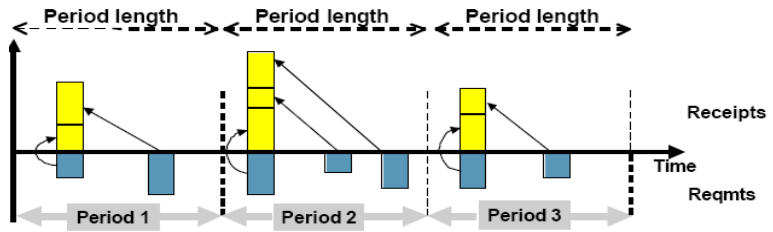
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Period Lot Sizing Procedures



TB *Daily lot size* **WB** *Weekly lot size*
MB *Monthly lot size*

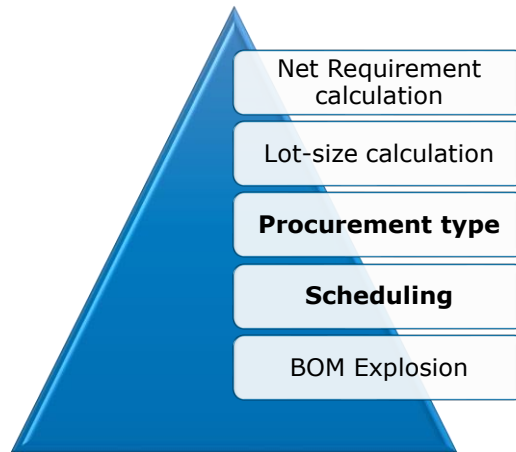


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MRP Flow Contd.



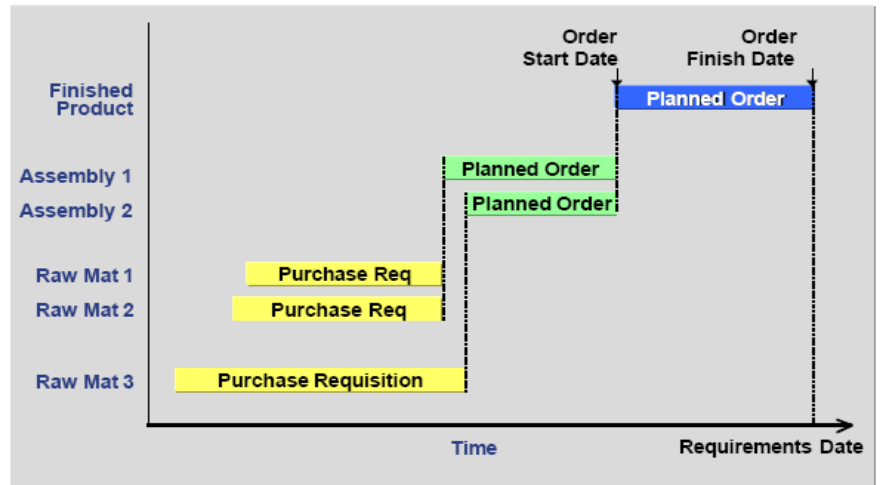
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MRP : Order Scheduling



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MRP : Order Scheduling Contd.



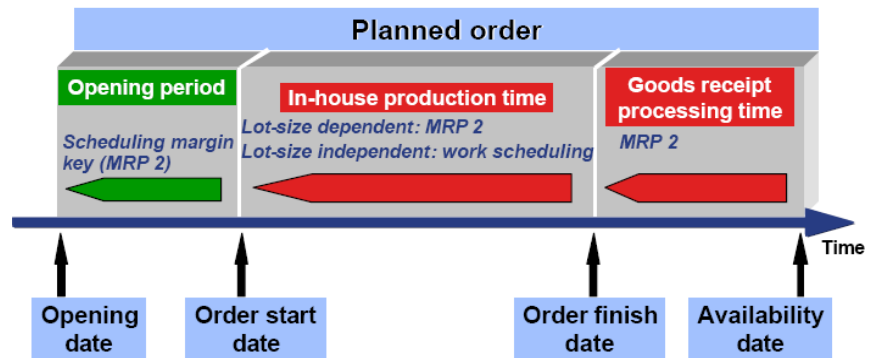
- After MRP calculates the planned order lot size, it must calculate the planned order finish date and the planned order start date. These dates are known as the basic dates of the planned order.
- The order finish date of the finished product's planned order is based on the requirement date of the customer order or the planned independent requirement. To calculate the order start date, MRP backward schedules using lead-time information from either the material master or the routing.
- The order finish date of planned orders of the assemblies is based on the order start date of the finished product's planned order. MRP backward schedules to determine the order start date of each.
- This process continues for the purchase requisitions. This is done using the planned delivery time from the material master to determine the order start date.

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Backward Scheduling for In house Production



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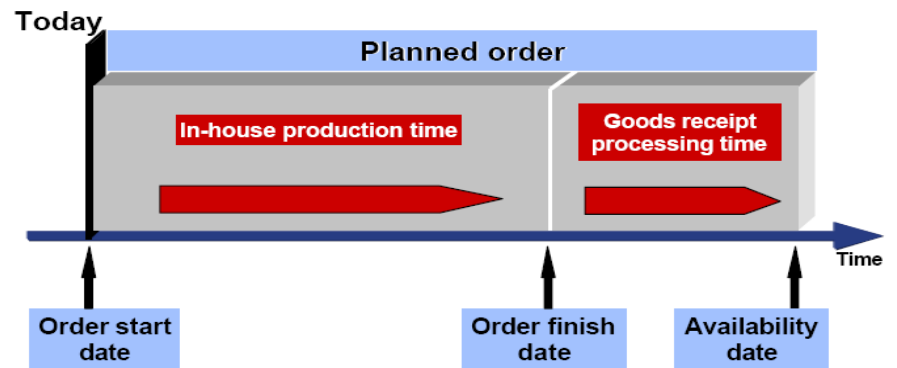
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Forward Scheduling for In house Production



Automatic, if order start date is in the past during backward scheduling

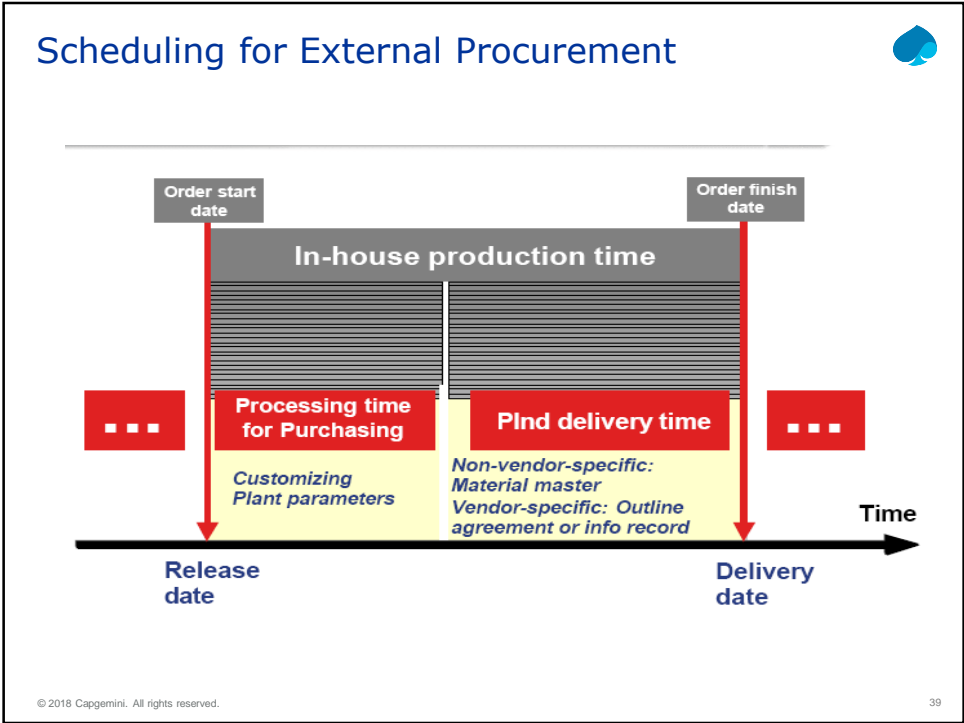


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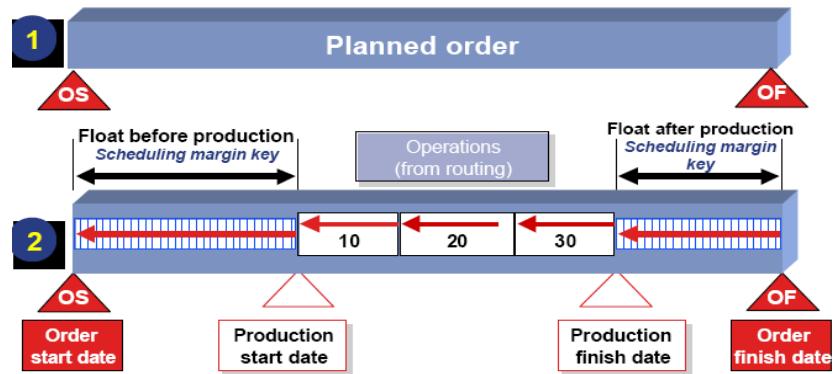


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Lead Time Scheduling



Scheduling ind. = 2, capacity requirements are calculated

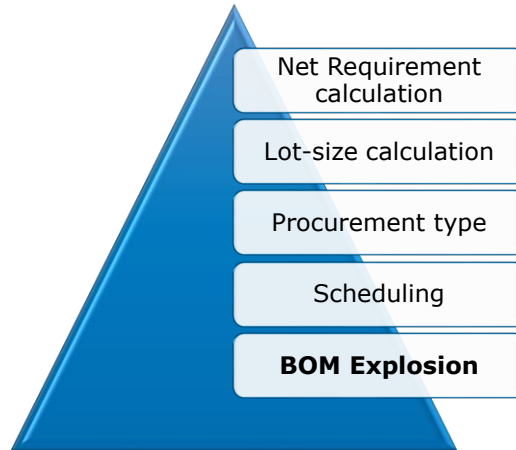


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MRP Flow Contd.



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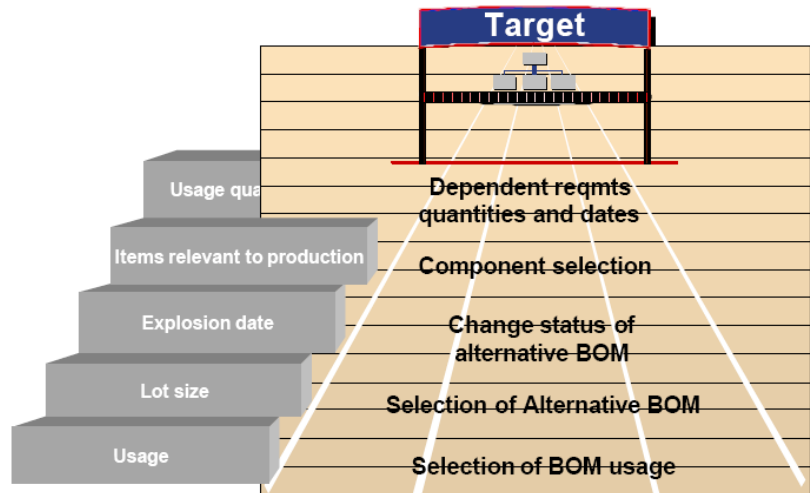
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BOM Selection



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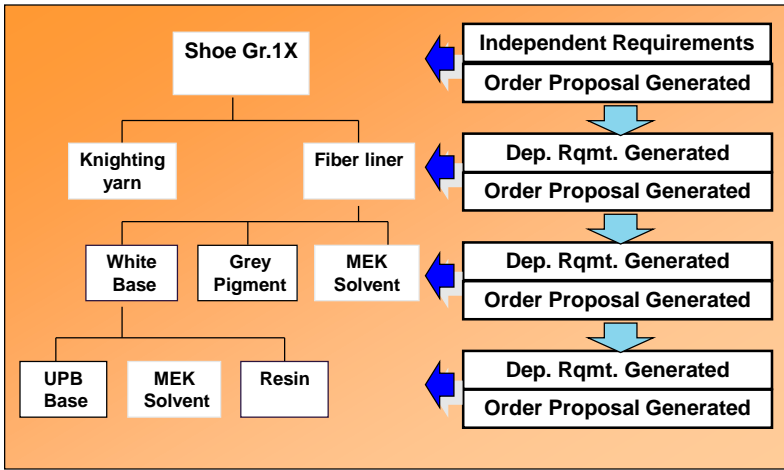
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BOM Explosion and Dependent Requirement Calculation



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MRP Planning Run



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Carrying out the Planning Run - Total Planning

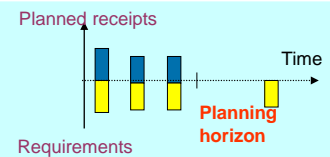
Planning Types

- Regenerative planning
- Net change planning
- Net change planning within the planning horizon



Plant

Planning horizon



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MRP Planning Run: Control Parameters



- Planning run can be carried out at different levels:
 - Single-item Single-level planning for an individual material
 - Single-item Multi-level planning for an individual material
 - Total planning for all materials in a plant
- Planning Run Types
The planning run type determines which materials are to be planned:
 - **Regenerative planning (NEUPL)** - The system plans all the materials that are contained in the planning file
 - **Net change planning (NETCH)** - The system only plans materials that have undergone a change relevant to MRP since the last planning run
 - **Net change planning in the planning horizon (NETPL)** - The system plans for any material that has undergone some changes since last MRP run, and those changes are in the planning horizon

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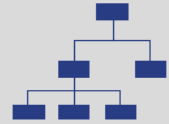
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Executing Planning Run for Single Items



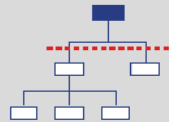
■ Single-Item, Multi-Level Planning

- ▶ Planning a BOM structure
- ▶ Possibility of changing the master plan for each material in the BOM manually.



■ Single-Item, Single-Level Planning

- ▶ Planning one BOM level only
- ▶ Dependent requirements are transmitted for the next BOM level
- ▶ Manual changes can be made at any time

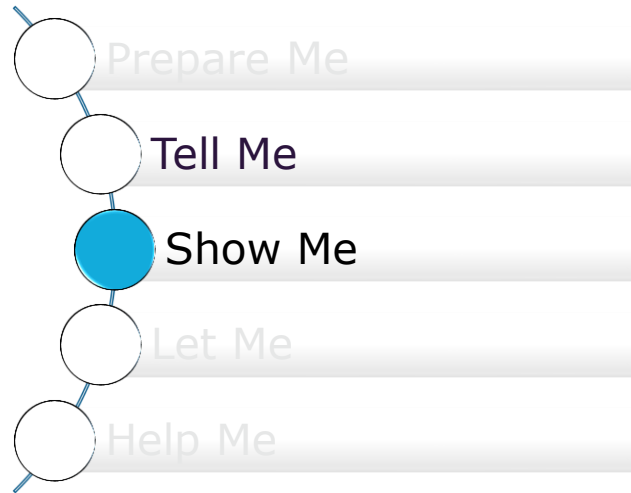


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Environment

The Environment in which MRP runs is SAP R3 under
Production Planning Module

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Prerequisites

- **Material Requirements Planning Procedure**
 - You have set an *MRP type* for MRP in the material master (*MRP 1* view).
 - You define MRP types in Customizing for MRP in the IMG activity *Check MRP types*

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Master Data



- The settings for master data such as routings, bills of material, work center, production resources/tools, trigger points are important when MRP is carried out.
- Except these, settings need to be done in different planning strategies.

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Configuration



Configuration require various master data configuration & to maintain plant parameters for MRP for a particular plant.

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Plant Parameter for MRP

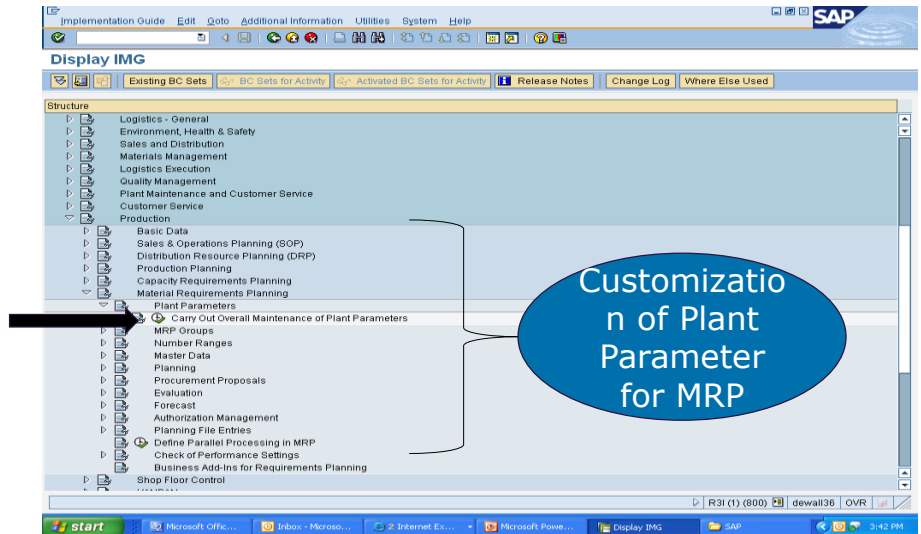


- This configuration setting enables to configure the plant parameter for Materials Requirement Planning (MRP).
- MRP will ensure
 - Availability of right material at right time.
 - Calculate the capacity requirements.
- Following MRP related parameters must be configured to perform MRP.
 - Frequency of planning,
 - How to explode the BOM,
 - Order type to be used when converting planned order
 - Planning horizon
 - Scheduling
- Apart from above there are more parameters to be configured, which we shall discuss.

Plant Parameter for MRP



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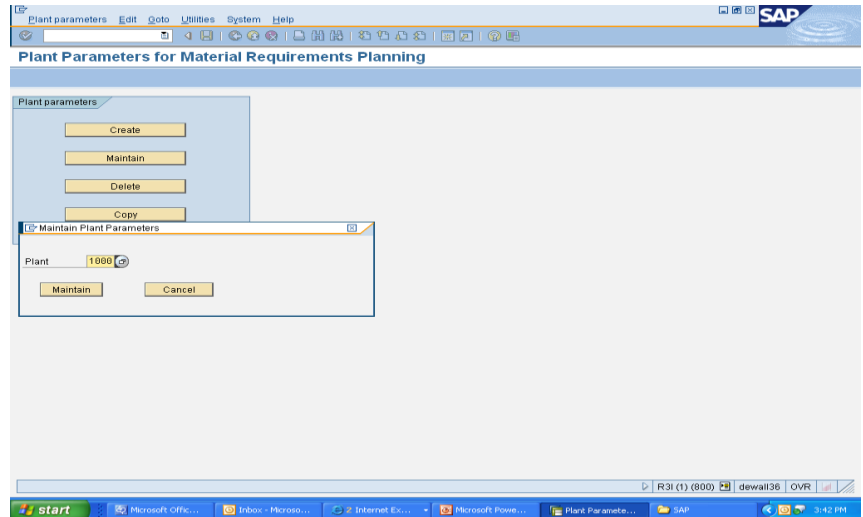


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Plant Parameter for MRP



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Plant Parameter for MRP



Plant parameters Edit Goto System Help

Maintain Plant Parameters

Plant: 1000 Werk Hamburg Reference plant: Initial

Environment		Planning run	
Number ranges	Maintained	BOMrouting selection	Maintained
Check rule: backorders	Maintained	BOM explosion	Maintained
		Param: detailed sched.	Maintained
Master data		External procurement	Maintained
MRP controllers	Maintained	Rescheduling	Maintained
Special procurement	Maintained	Planning horizon	Maintained
Floats	Maintained	Available stock	Maintained
Planned orders		Direct procurement	Maintained
Conversion	Maintained	Error handling	Maintained
Dep. reqmt. availability	Maintained	Item numbers	Maintained
		Order start in past	Initial
Reporting	Maintained		
Performance	Initial		

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start Microsoft Office... Inbox - Microso... Internet Ex... Microsoft Powe... Maintain Plant... SAP

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PP1003 - Material Requirements Planning



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Planned indep. reqmts. Edit Goto Settings System Help

Create Planned Independent Requirements: Initial Screen

User Parameters

Planned independent requirements for

☒ Material

☐ Product group

☐ Req. plan number

MRP area

Plant

Define version

Version Requirements plan

Planning horizon

From To Planning period Month

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Sales document


Edit


Go to

Environment

System

Help





Create Sales Order: Initial Screen

Create with Reference

Sales

Item overview

Ordering party

Order Type

OR

Standard Order

Organizational data

Sales Organization

1000

Germany Frankfurt

Distribution Channel

10

Final customer sales

Division

00

Cross-division

Sales Office

Sales Group

T-Code:VA01

R31 (1) (800)

dewalt30

OVR

start

Microsoft

Internet - Me...

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In Demand Management We can split the requirement quantities into further subperiods.

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SAP Sales document overview screen for 'Create Standard Order: Overview'.

Standard Order: Net value: 65,000.00 EUR

Sold-to party: T-L67A02 Amadeus Software Solutions / Faberstr. 419 / 81378 München

Ship-to party: T-L67A02 Amadeus Software Solutions / Faberstr. 419 / 81378 München

PO Number: PO date:

Item overview:

Item	Material	Order quantity	ISU	Description	S	Customer Material Numb	ItCa	DOI	HgVlt	D	First date	Print	Batch
10	T-F100	95	PC	Pumpe PRECISION 1 ..			TAN			D	10.04.2007	1000	
										D	10.04.2007		
										D	10.04.2007		
										D	10.04.2007		

Order Qty (highlighted in the table)

Req. deliv. date: D 10.04.2007

Deliver Plant:

Complete div.: ☐

Delivery block: ☐

Billing block: ☐

Payment card:

Payment terms: ZB02 8 days 5%, 14/2%, ... Incoterms: EXW Dresden

Order reason:

Sales area: 1000 / 10 / 00 Germany Frankfurt, Final customer sales, Cross-division

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Stock/Requirements List: Initial Screen

Individual access Collective access

Material T-F100 Pump PRECISION 100
MRP area
Plant 1000 Werk Hamburg

☐ With filter

T-Code:MD04

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Stock/Requirements List as of 08:00 Hrs

Material: **IL-F100** Pump PRECISION 100
 MRP area: 1000 Hamburg
 Plant: 1000 MRP type: PC Material type: FERT Unit: PC

A	Date	MRP	MRP element data	Reschedul...	E	Rec./reqd qty	Available qty	Sto...
29.03.2007	Stock						0	
01.03.2007	IndReq	VSF				50-	50-	
14.03.2007	PrdOrd		000060003165/PP08/Re 01.03.2007	18		10	40-0002	
02.04.2007	IndReq	VSF				75-	115-	
03.04.2007	Order		0000011436/000010/0...			25-	140-	
02.05.2007	IndReq	VSF				150-	290-	

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Stock\Requirement List is a dynamic list which shows the current Stock\Requirement situation. It always updates itself as soon as any changes occur relevant to requirement & planning.

Let Me



Planning Edit Goto Settings Extras System Help

Single-Item, Multi-Level

Material: T-F100
MRP area:
Plant: 1000

Scope of planning
☐ Product group

MRP control parameters

Processing key	NETCH	Net change for total horizon
Create purchase req.	2	Purchase requisitions in opening period
Delivery schedules	3	Schedule lines
Create MRP list	1	MRP list
Planning mode	1	Adapt planning data (normal mode)
Scheduling	1	Basic dates will be determined for plann

Process control parameters

- ☐ Also plan unchanged components
- ☐ Display results before they are saved
- ☐ Display material list
- ☐ Simulation mode

T-Code-MD02

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Stock\Requirement List is a dynamic list which shows the current Stock\Requirement situation. It always updates itself as soon as any changes occur relevant to requirement & planning.



Single-Item, Multi-Level

Statistics	
Materials planned	6
Materials with new exceptions	2
Materials with terminated MRP list	

Parameters	
MRP Area	1000
Plnt	1000
Processing Key	NETCH
Create Purchase Requisition	2
Sched. Agreement Schedule Line	3
Create MRP List	1
Planning Mode	1
Scheduling	1

Database statistics	
Planned orders created	5
Dependent requirements created	21

Run-time statistics	
Start of planning run	08:03:14
End of planning run	08:03:20
Planning run time	00:00:06
CPU time: Import	00:00:01
CPU time: net calc. and lot-size calc	00:00:01
.. BAdI: Change char. value assgmt	00:00:01
CPU time: BDR explosion	00:00:01
.. BAdI: Alternative Explosion	00:00:01
CPU time: update	00:00:02

R3I (1) (800) | dewall36 | OVR

Stock\Requirement List is a dynamic list which shows the current Stock\Requirement situation. It always updates itself as soon as any changes occur relevant to requirement & planning.

Let Me



Stock/Requirements List as of 08:04 Hrs

Show Overview Tree

Material: T-F100 Pump PRECISION 100
 MRP area: 1000 Hamburg
 Plant: 1000 MRP type: PD Material type: FERT Unit: PC

	Date	MRP	MRP element data	Reschedul	E	Rec / reqd qty	Available qty	Sto...
	28. 03. 2007	Stock					0	
	01. 03. 2007	IndReq	V5F			50-	50-	
	14. 03. 2007	PrdOrd	000000003165/PP08/Re	01. 03. 2007	10		48-0002	
	02. 04. 2007	IndReq	V5F			75-	115-	
	03. 04. 2007	Order	0000011436/000018/0...			25-	148-	
	11. 04. 2007	PiOrd	0000036055/Stck	01. 03. 2007	30		115-0002	
	13. 04. 2007	PiOrd	0000036053/Stck	01. 03. 2007	30		75-0002	
	23. 04. 2007	PiOrd	0000036054/Stck	02. 04. 2007	30		0-0002	
	02. 05. 2007	IndReq	V5F			150-	150-	
	09. 05. 2007	PiOrd	0000036056/Stck	02. 05. 2007	30		0-0002	

T-Code-MD04

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R31 (1) (800) | dewalt36 | OVR

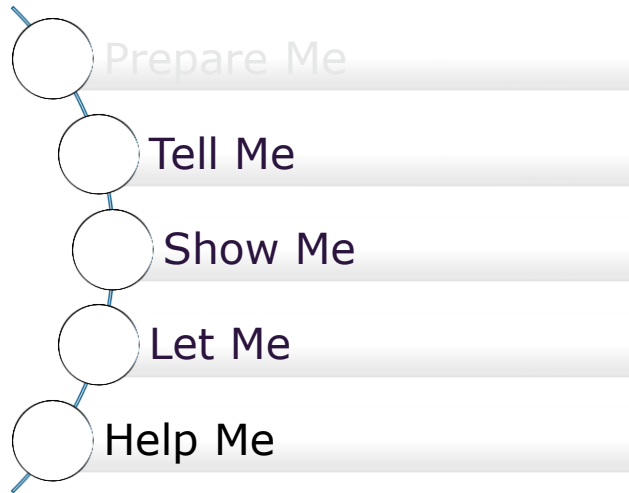
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Stock\Requirement List is a dynamic list which shows the current Stock\Requirement situation. It always updates itself as soon as any changes occur relevant to requirement & planning.

Add instructor notes here.

Material Requirements Planning



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here.

Help Me



For further information please refer

http://help.sap.com/saphelp_46c/helpdata/en/f4/7d3f9344af11d182b40000e829fbfe/frameset.htm

Add instructor notes here.

Summary



The main function of material requirements planning is to guarantee material availability, that is, it is used to procure or produce the requirement quantities on time both for customer dependent and independent requirements

It is used to procure or produce the requirement quantities on time both for internal purposes and for sales and distribution.

MPS enables you to plan materials that greatly influence a company's profits and critical.

The master production scheduling run only plans the master schedule items. Master production scheduling is executed with the same logic as MRP.

Deterministic MRP is carried out using current and future sales figures. The planned and the exact requirement quantities trigger the net requirements calculation.

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Add the notes here.

Add instructor notes here.

Review Questions



1. The main function of material requirements planning is to guarantee material availability

Check whether the statement is true or false

- a. True
- b. False

2. Reorder Point Planning is related to Net Requirements Calculation

Check whether the statement is true or false

- a. True
- b. False

Add the notes here.