Sage X3

Manufacturing:
Beyond the Basics
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Lesson 1
Welcome and Introduction

Welcome to the Sage X3 Manufacturing - Beyond the Basics training course. This course is divided into discussion of concepts and practices, and is intended to provide you with an advanced perspective of the functions and features of the manufacturing process in Sage X3.

Note: The lessons in this course do not follow a particular business flow as you move from lesson to lesson.

This course will help you meet the following objectives:

- Learn about the general parameters used in manufacturing.
- Learn about advanced MRP concepts.
- Learn how to manage dynamic locations and replenishment.
- Learn how to modify work order components.
- Learn how to work with phantoms.
- Learn how to manage multi-product work orders.
- Learn how to set up assignment rules and use the assignment plan.
- Learn about multi-level planning.
- Learn about capacity planning and managing loads.
- Learn how to manage sub-contracts.
- Learn how to track time, material, manufacturing, reintegration and technical sheet plans.
- Learn how to perform mass closures and completions.
- Learn about Product versioning and Change control management (CCM)
- About the setup requirements for versions and CCM
- How to identify Product version fields added to Sage X3 functions
- Learn the steps to implement and complete the CCM process
- How to perform impact analysis, change request plans, implement change actions
- How to complete and close change requests
Welcome and Introduction (continued)

**How to Use This Curriculum**

The following table describes the conventions used in this curriculum.

<table>
<thead>
<tr>
<th>Convention</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step numbers versus</td>
<td>Step numbers are not part of a Practice and are intended to provide you with the steps typically used to complete a task. Practice numbers appear in bold and are completed in class.</td>
</tr>
<tr>
<td>Practice numbers</td>
<td></td>
</tr>
<tr>
<td><em>Italic font in a Practice</em></td>
<td>Items that are part of a Practice and appear in an italic font indicate you need to select a task or perform a specific action to complete the step (for example, click <em>OK</em>).</td>
</tr>
<tr>
<td><em>Courier font in a Practice</em></td>
<td>Items that are part of a Practice and appear in courier font indicate information you should enter (for example, at the Customer No. field, enter 01-ABS).</td>
</tr>
</tbody>
</table>

**Logging on to the program**

Use the following steps to log on to the program.

1. Click the *Sage X3* icon on the desktop of your training image.
2. Type *admin* as the user name and *admin* as the password.
3. Click *Sign in*. 
Lesson 2

Manufacturing - General Parameters

In the following topics, you will learn about the parameter settings and values that control the manufacturing process in Sage X3.

The topics in this lesson include:

➢ Understanding the Manufacturing General Parameters
➢ Lesson Practices
Understanding the Manufacturing General Parameters

Use Parameter values (ADPVAL) accessed from Setup > General parameters to update the manufacturing parameters in the software. Recall from the Common Tools course that parameters are values that influence the operation of the software.

- The values that affect manufacturing are located under the GPA Manufacturing folder in the Parameter values Left list as shown below. In this lesson, we will investigate the general parameters specific to the manufacturing process.
Understanding the Manufacturing General Parameters (continued)

- In the Parameter values window, click the Actions icon for any Manufacturing parameter group and then select Detail to view the individual parameter values in that group.
Understanding the Manufacturing General Parameters (continued)

- To change the value for a parameter, click the Selection icon at the Value field and select Selection.
Understanding the Manufacturing General Parameters (continued)

**Accounting interface (ACC group)**

The Accounting Interface (ACC group) contains the following parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set ea.</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ACCSTENT</td>
<td>Revised cost auto journal</td>
<td>COST</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>2 ACCWIPENT</td>
<td>WIP automatic journal</td>
<td>WIP</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>3 MWHBOMEXI</td>
<td>WIP balance aggregation</td>
<td>No</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>4 OHEIFA</td>
<td>WIP accounting interface</td>
<td>No</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Revised cost auto journal (ACCSTENT):**
- This parameter specifies the automatic journal code (posting structure) used for the posting of the stock value variation following the recalculation of a revised standard price.
- If this automatic journal code is not entered, the value variation cannot be posted.
- Its values are defined by Automatic Journals.
- The global variable GACCCSTENT is associated with this parameter.
- This parameter is also associated with Calculated Cost Update, Standard Cost Calculation and the revised Standard Cost Calculation.

**Open items automatic journal (ACCWIPENT):**
- This parameter specifies the automatic journal code (posting structure) used to post the production work in process (WIP).
- The global variable GACCWIPENT is associated with this parameter.
- This parameter is associated with WIP Accounting Interface Work Order Tracking and Posting of the WIP.

**WIP balance aggregation (MWHBOMEXI):**
- This parameter is used in Tracking without WO balance, which is used to complete the work in process (WIP) generated by tracking operation without work orders.
- This parameter specifies whether the system must aggregate the WIP generated by this function or not. Two values are possible:
  - No: To close the WIP, the system will always create a new record in the WIPCOST table.
  - Yes: To close the WIP, the system will check the WIPCOST table to see if a record exists with start and end dates higher than the date range entered. If so, the amount of the balance is posted to this record.
Understanding the Manufacturing General Parameters (continued)

- WO WIP accounting interface (OPEIFA):
  - This parameter is used to activate the posting of the production work in process (WIP). Two values are possible:
    - **No**: No account posting.
    - **Yes**: Account posting of the production WIP (with the automatic journal entered in the ACCIPENT general parameter).

## Costs (COS group)

The Costs (COS) group contains the following parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set of values</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARRQTYCPN</td>
<td>Apply link qty rounding</td>
<td>No</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>CLCEUDRAT</td>
<td>Dimension rate selection bud C</td>
<td>Budget</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>CLCCUTRAT</td>
<td>Dimension rate selection act C</td>
<td>Revised standard</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>CLCSIMRAT</td>
<td>Dimension rate selection sim C</td>
<td>Simulation</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>CLCSISTRAT</td>
<td>Dimension rate selection std C</td>
<td>Standard</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>CLCICOCAT</td>
<td>Auto provisional costs</td>
<td>In WO creation and modification</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>CSTRCPORD</td>
<td>Provisional cost declaration</td>
<td>Release</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>EFFCOUSE</td>
<td>Efficiency/cost considered</td>
<td>Yes</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>MFCRATPOR</td>
<td>Actual PC dim rate selection</td>
<td>Standard</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>MFCRATTXT</td>
<td>Expected PC dim rate selection</td>
<td>Standard</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>OPRRATE</td>
<td>Labor rate selection</td>
<td>Operator else Work center</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>OVECOLBUD</td>
<td>Budget calc overhead column</td>
<td>Fixed C</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>OVECOLCUT</td>
<td>Updated calc overhead column</td>
<td>Fixed B</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>OVECOLMFC</td>
<td>PC calc overhead column</td>
<td>Fixed A</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>OVECOLSIM</td>
<td>Simulated calc overhead column</td>
<td>Fixed D</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>OVECOLSTD</td>
<td>Standards calc overhead column</td>
<td>Fixed A</td>
<td>Folder</td>
<td></td>
</tr>
<tr>
<td>SCAMAU</td>
<td>Material loss increase / costs</td>
<td>Yes</td>
<td>Folder</td>
<td></td>
</tr>
</tbody>
</table>

- Apply link qty rounding (ARRQTYCPN):
  - The ARRQTYCPN parameter is used in the Cost calculations function (Costing > Cost calculations).
  - This parameter determines if during the quantity of component required, rounding occurs.
Understanding the Manufacturing General Parameters (continued)

- The two possible values are:
  
  o **No**: No rounding.
  
  o **Based on BOM**: Rounding is performed depending on the rule defined for the BOM link.

- Example: A finished good with a BOM is composed of two components: CPN1 and CPN2.

  CPN1: Quantity = 77. The Round the quantity setting is “Less than” and the unit of this product is managed with one decimal.

  CPN2: Quantity = 120. The Round the quantity setting is “Round to the nearest” and the unit of this product is managed with no decimals.

  Depending on the value of this parameter, the component quantities taken into account for the calculation of one finished good are:

<table>
<thead>
<tr>
<th>Parameter Value</th>
<th>CPN1</th>
<th>CPN2</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>0.77</td>
<td>1.2</td>
</tr>
<tr>
<td>Based on BOM</td>
<td>0.7</td>
<td>1</td>
</tr>
</tbody>
</table>

- **Dimension rate selection budget calculation (CLCBUDRAT):**

  - The CLCBUDRAT parameter is used to choose the default rate (standard, revised, budget, or simulated) to be used during the budget cost calculation for a product for valuing the routing operations. This choice can be modified during the launch of the calculation.

- **Dimension rate selection actual calculation (CLCCUTRAT):**

  - The CLCCUTRAT parameter is used to choose the default rate (standard, revised, budget, or simulated) to be used during the revised standard cost calculation for a product in order to value the routing operations. This choice can be modified during the launch of the calculation.

  - This parameter is associated with: Revised Cost Calculation and revised Standard Cost Calculation.

- **Dimension rate selection simulated calculation (CLCSIMRAT):**

  - The CLCSIMRAT parameter is used to choose the default rate (standard, revised, budget, or simulated) to be used during the simulated cost calculation for a product in order to value the routing operations. This choice can be modified during the launch of the calculation.

  - This parameter is associated with Simulated Cost Calculation and Simulated Cost Price Calculation.
Understanding the Manufacturing General Parameters (continued)

- Auto provisional costs (CLWOCAUT):
  - The CLWOCAUT parameter is used to determine when the calculation of the theoretical provisional costs and provisional release costs must be launched.
  - This parameter is associated with Calculate Expected Cost, Calculate Subcontract Expected Cost, and Upgrade Work Order.

- Provisional cost declaration (CSTRCPORD):
  - The CSTRCPORD parameter is used to define at what cost the production reporting will be valued.
  - The possible values are:
    - **Theoretical provisional cost**: This is the cost calculated based on the technical data.
    - **Provisional release cost**: This is the cost calculated based on the work order data.
  - This parameter is associated with Calculate Expected Cost and WIP Cost Inquiry.

- Efficiency / cost selection (EFFCSTUSE):
  - The EFFCSTUSE parameter is used in the cost calculation.
  - The possible values are:
    - **No**: Efficiency is not taken into account. The planned times are counted as they are.
    - **Yes**: The efficiency is taken into account for the provisional cost calculations. In this case, the WSTEFFINH parameter (Inherit work center efficiency) is also taken into account. If WSTEFFINF is also set to Yes, the efficiency entered at the work center is proposed in the routing operation. The operation time taken into account is:
      - routing operation time * 1 / routing operation efficiency
  - This parameter is associated with provisional cost calculation.

- Actual PC dim rate selection (MFCRATCPL):
  - The MFCRATCPL parameter is used to choose the rate (standard or revised standard) used for the production cost regarding the calculation of the actual cost to value the routing operations (identical with the WIP valuation).
  - This parameter is associated with Calculate Expected Cost, WIP Finalization, Production Cost Price Calculation, and WIP Valuation.
Understanding the Manufacturing General Parameters (continued)

- Expected PC dim rate selection (MFCRATEXT):
  - The MFCRATEXT parameter is used to choose the rate (standard or revised standard) used regarding the production cost for the calculation of the planned cost to value the routing operations (identical with the WIP valuation).
  - This parameter is associated with Calculate Expected Cost, WIP Finalization, Production Cost Price Calculation, and WIP Valuation.

- Labor rate selection (OPRRATE):
  - The OPRRATE parameter is used to choose the rate to value the labor tracking (Work Center Rate, Operator Rate, or Operator else Work Center).
  - This parameter is associated with Work Order Tracking and Production Cost Price Calculation.

- Budget calc overhead column (OVECOLBUD):
  - The OVECOLBUD parameter is used to choose one of the columns for the budget cost calculation. This choice can be changed at the time of the calculation launch.
  - This parameter is associated with budgeted cost calculation.

- Updated calc overhead column (OVECOLCUT):
  - The OVECOLCUT general parameter is used to choose one of these columns by default for the revised standard cost calculation. This choice remains modifiable at the time of the calculation launch.
  - This parameter is associated with revised cost calculation.

- PC calc overhead column (OVECOLMFC):
  - The OVECOLMFC parameter is used in Production Cost Price Calculation and in WIP Valuation for a product.
  - This parameter is associated with: Calculate Expected Cost, WIP Finalization, Production Cost Price Calculation, and WIP Valuation.

- Simulated calc overhead column (OVECOLSIM):
  - The OVECOLSIM parameter is used in Simulated Cost Price Calculation for a product. This choice remains modifiable at the time of the calculation launch.
  - This parameter is associated with Simulated Cost Calculation and Simulated Cost Price Calculation.
Understanding the Manufacturing General Parameters (continued)

- Standard calc overhead column (OVECOLSTD):
  - The OVECOLSTD parameter is used in Standard Cost Price Calculation for a product. This choice remains modifiable at the time of the calculation launch.
  - This parameter is associated with Standard Cost Calculation and Standard Cost Price Calculation.

- Material loss increase/costs (SCAMAJ):
  - The SCAMAJ parameter is used in Provisional Cost Price Calculation (standard, revised, budget, and simulated). This choice remains modifiable at the time of the calculation launch.
  - This parameter is associated with Simulated Cost Calculation and Simulated Cost Price Calculation.

### Production tracking controls (CTL group)

The Production Tracking Controls (CTL group) contains the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set of values</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTLALL</td>
<td>Checking allowed</td>
<td>No</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>CTLCLE</td>
<td>Blocked in closing</td>
<td></td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>CTLPCTEC</td>
<td>Technical sheet control</td>
<td>No</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>CTLOPRE</td>
<td>Expected operation tracking co</td>
<td>No</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>DOSFAB</td>
<td>Printing WO documents</td>
<td>Optional</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>MK11MGT</td>
<td>Allocation to the WO mandatory</td>
<td>No</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>WQMNVTWAI</td>
<td>Pending stock mt control</td>
<td>Not blocking</td>
<td></td>
<td>Folder</td>
</tr>
</tbody>
</table>

- Checking allowed (CTLALL): After the system begins to run, the value is put into the global variable GCTALL.
  - The possible values are:
    - No
    - Yes with blocking
    - Yes without blocking
Understanding the Manufacturing General Parameters (continued)

- Block the closing (CTCLE):
  - The CTCLE parameter is used to set the rules that can prohibit the closure of a work order based on the operations or materials that are still open in the work order.
  - The possible values are:
    - **Blocking pending materials**: the closure of the WO is not possible if at least one material has not yet been consumed.
    - **Blocking pending operations**: the closure of the WO is not possible if at least one operation still remains to be carried out.
    - **Blocking pending operations or materials**: the closure of the WO is not possible if at least one material has not yet been consumed or if at least one operation still remains to be carried out.
    - **No**: the fact that a material or an operation is still pending does not prevent the closure. The system simply warns the user.
  - This parameter is associated with Work Order Close, Mass Closure/Completions, and Work Order Closure/Completion.

- Technical sheet control (CTLFICTEC):
  - The CTLFICTEC parameter is used to define if the technical sheet attached to the operation being tracked should be controlled to check that it has been correctly entered.
  - Possible values are: No, Yes without blocking, Yes with blocking, Yes without blocking first tracking, or Yes with blocking first tracking.
  - This parameter is associated with Time Tracking and Work Order Tracking.
Understanding the Manufacturing General Parameters (continued)

- **Expected operation tracking co (CTLOPEPRE):**
  - The CTLOPEPRE parameter is used to define, during an operation tracking, if the operation that precedes it in the routing has itself been correctly tracked.
  - Possible values are: No, Yes without blocking, and Yes with blocking.

- **Printing WO documents (DOSFAB):**
  - The DOSFAB parameter is used to define if it is mandatory or not to print the production folder for a work order in order to be able to start producing this order.
  - The possible values are:
    - **Optional:** Even if the production folder has not been printed, it is possible to enter the Work Order Tracking function.
    - **Mandatory:** If the production folder has not been printed, the entry into the tracking function for this work order is prohibited. The system issues the message "The WO has not been printed, tracking not possible". The work order is not proposed in the list of work orders to be tracked.

- **Allocation to the WO mandatory (MKTALLMGT):**
  - The possible values for the MKTALLMGT parameter are:
    - **Yes:** Indicates that it is possible to start working on the work order unless it is allocated, at least globally, and if no critical material is in shortage.
    - **No:** Indicates that it is no longer mandatory to allocate, at least globally, a work order before starting tracking. In this case, the Release if Material Shortage check box is disabled.
  - If the work order to be tracked is allocated in detail, these allocations are available for consumption.
  - If the work order to be tracked is not globally allocated or detail allocated, the automatic tracking consumes the stock according to the de-stocking method for each material, without changing the allocation status of the work order or material.
  - The manual tracking proposes all the available stock lines. You can then select the stock you want to be consumed. If the material is managed with serial numbers, the selected serial numbers affect the stock lines to be consumed. After tracking validation, the allocation status of the work order and materials remain unchanged.
  - This parameter is associated with Manufacturing plan, Material tracking plan, Time tracking, Production tracking, Operation workbench, Material issue workbench, and Production workbench.
Understanding the Manufacturing General Parameters (continued)

**Scheduling/load (LOA group)**

The Scheduling/Load (LOA) group contains the following parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set of values</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DEFDIH</td>
<td>STD</td>
<td>q</td>
<td>Folder</td>
</tr>
<tr>
<td>2</td>
<td>GPERCOMP</td>
<td>% LT reduction default</td>
<td>0</td>
<td>q</td>
</tr>
<tr>
<td>3</td>
<td>GTPSCOMP</td>
<td>Slack time compression</td>
<td>None</td>
<td>q</td>
</tr>
<tr>
<td>4</td>
<td>OPTSCDRAZ</td>
<td>Reschedule optimized orders</td>
<td>No</td>
<td>q</td>
</tr>
<tr>
<td>5</td>
<td>POMSCDRAZ</td>
<td>Reschedule optimized orders</td>
<td>No</td>
<td>q</td>
</tr>
<tr>
<td>6</td>
<td>SCHEDHOR</td>
<td>Scheduling horizon</td>
<td>7</td>
<td>q</td>
</tr>
</tbody>
</table>

- Default schedule (DEFDIH): The default schedule is one of the defined schemas you define in Setup > Manufacturing > Time-table schema.
- % LT reduction default (GPERCOMP):
  - The GPERCOMP parameter is used to set the default compression rate. This rate is applied to the load calculation linked to the MRP processing and during the releases with scheduling carried out from Enterprise workbench, Product workbench, and Company site grouping.
  - During the load calculation, the system can compress certain times outside of the planned load in the routings (such as, preparation time, waiting time, and post operation time).
  - This parameter is proposed by default in Work Order Management where it is accessible and modifiable.
  - Possible values are any values between 0 and 100.
- Slack time compression (GTPSCOMP):
  - The GTPSCOMP parameter is used to set which times it is possible to compress that are not included in the load for a routing.
  - The compression percentage applied is either the rate specified at the level of the GPERCOMP parameter, or the rate specified at the time of the release in Work Order Management.
- Scheduling horizon (SCHEDHOR):
  - The SCHEDHOR parameter is used in the Automatic scheduling, which proposes the scheduling or rescheduling of the work orders.
Understanding the Manufacturing General Parameters (continued)

- The scheduling is time-range constrained. You must specify up to which end date to schedule the work orders. This "up to end date" is initialized to the SCHEDHOR parameter as follows:
  
  Up to end date = today's date + SCHEDHOR

- This parameter is associated with Automatic scheduling.

### Miscellaneous (MIS group)

The Miscellaneous (MIS) group contains the following parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set of values</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ALLHOR</td>
<td>Allocation horizon</td>
<td>15</td>
<td>q =</td>
<td>Folder</td>
</tr>
<tr>
<td>2 GREGENPLN</td>
<td>Planning regeneration</td>
<td>No</td>
<td>q =</td>
<td>Folder</td>
</tr>
<tr>
<td>3 LOTMGT</td>
<td>Lot management mode</td>
<td>No (stock rules applied)</td>
<td>q =</td>
<td>Folder</td>
</tr>
<tr>
<td>4 QEEFPAPP</td>
<td>Efficiency application</td>
<td>Set Time + Operational</td>
<td>q =</td>
<td>Folder</td>
</tr>
<tr>
<td>5 RLMMAXFIL</td>
<td>Max no of elements to process</td>
<td>0</td>
<td>q =</td>
<td>Folder</td>
</tr>
<tr>
<td>6 SSTRICMOD</td>
<td>Sub contract close method</td>
<td>Purchasing</td>
<td>q =</td>
<td>Folder</td>
</tr>
<tr>
<td>7 WSTEFFNH</td>
<td>Work center efficiency history</td>
<td>Yes</td>
<td>q =</td>
<td>Folder</td>
</tr>
</tbody>
</table>

- **Allocation horizon (ALLHOR):**
  - The ALLHOR parameter is used in Automatic allocation.
  - This function proposes the mass allocation of the materials linked to the production for a given site, a given period and a selection of a work orders.
  - The allocation is carried out for a date range: the user must specify up to what requirement date they wish to allocate the material. The "requirement date up to" is initialized thanks to the ALLHOR parameter in the following way:
    
    Requirement date up to = current date + ALLHOR

- **Planning regeneration (GREGENPLN):**
  - The GREGENPLN parameter is used to manage the regeneration of the planned quantities when decreasing the quantity of a firm work order (WOF) coming from a planned work order (WOP) or when deleting this firm work order.
  - The regeneration consists of increasing the quantity of the corresponding WOP(s), if they still exist, or re-creating the corresponding WOP(s) if they no longer exist.
  - The possible values are:
    - Manual regeneration: A message prompts you to regenerate the planned quantities.
    - Automatic regeneration: The planned quantities are always regenerated.
    - No: The planned quantities are never regenerated.
Understanding the Manufacturing General Parameters (continued)

- This parameter is associated with Pegging History, Work Order Management, Enterprise Workbench, and Product Workbench.

  Lot management mode (LOTMGT):
  - The LOTMGT parameter is used to define the lot method for the manufactured products.
  - The possible values are:
    - **No**: The stock management rules are applied to calculate the lot numbers at the time of the different stock receipts.
    - **In planning**: The lot number is calculated at the time of the work order planning.
    - **In release**: The lot number is calculated when the work order is firm.
    - **At first tracking**: The lot number is calculated at the time of the first production reporting.
  - This parameter is associated with Work Order and Production Tracking.

  Efficiency application (OPEEFFAPP):
  - The OPEEFFAPP parameter is used to indicate the efficiency time type that should be applied.
  - The possible values are:
    - **Setup + operation time**
    - **Operation time**
  - This parameter is associated with MRP Calculation, Scheduling, Work orders, and Cost calculation.

  Sub contract close method (STRCLEMOD):
  - The STRCLEMOD parameter controls the behavior of the closure of the subcontracting operations at the time of the completion of a subcontracting order.
  - The possible values are:
    - **Production**: During the completion/closure of a subcontracting order, the system closes the subcontracting operation to the level of the quantity received and regenerates the requirement for the non-received quantity on the fraction 0 of the subcontracting operation concerned. The "Production" keeps the control of the subcontracting operation completion.
    - **Purchase**: During the completion of the subcontracting purchase order, the system closes the subcontracting operation without regenerating any requirement.
Understanding the Manufacturing General Parameters (continued)

- This parameter is used in the order completion from Order Management, Automatic Completion or Complete on order receipt.

■ Work center efficiency history (WSTEFFINH):
  - The WSTEFFINH parameter is used to specify whether the efficiency defined at work center level should be used on the routing operation.
  - The possible values are:
    - Yes: The efficiency entered in the work center is proposed by default when creating the routing operation with this work center. The calculated runtime is: runtime entered \( \times \frac{1}{\text{operation efficiency}} \).
    - No: The efficiency entered in the work center is combined with that entered in the routing operation. The calculated runtime is: runtime entered \( \times \frac{1}{\text{work center efficiency}} \times \frac{1}{\text{operation efficiency}} \).

Optimization (OPT group)

The Optimization (OPT) group contains the following parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set of values</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTAMMAR</td>
<td>Forward optimization margin</td>
<td>5</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>OPTAVMAR</td>
<td>Forward optimization margin</td>
<td>10</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>OPTFRHOR</td>
<td>Firm optimization horizon</td>
<td>0</td>
<td></td>
<td>Folder</td>
</tr>
</tbody>
</table>

Forward optimization margin (OPTAMMAR):

- The activation of the Optimization function requires the choice of a planning horizon, which by default is proposed as a month, and which can be entered.
- The horizon is then corrected by the OPTAMMAR parameter, expressed in weeks, and which represents the lead-time to be considered before the first work order of the selection in the planning horizon.
- This margin is used to define the start date of the optimization calendar with respect to the chosen horizon.

■ Backward optimization margin (OPTAVMAR):

- The activation of the Optimization function requires the choice of a planning horizon, which by default is proposed to a month, and which can be manually entered.
- This horizon is then corrected by the OPTAVMAR parameter, expressed in weeks, and which represents the lead-time to be considered after the first work order of the selection in the planning horizon.
Understanding the Manufacturing General Parameters (continued)

- This margin is used to define the end date of the optimization calendar with respect to the chosen horizon.

  ■ Firm optimization horizon (OPTFRHOR):
    - This horizon is expressed in weeks.
    - During the optimization of the load plan, you can set a period from the calculation date, during which, the load optimization process must not put the planning into question. This period is called Fixed horizon and is entered in the entry window of the Optimization function parameters, loaded by default from the OPTFRHOR parameter.

### Routings (ROU group)

The Routings (ROU) group contains the following parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set of values</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEFWORTYP</td>
<td>Default WO mgmt meth</td>
<td>Change materials and operations</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>ROUSTE</td>
<td>Operation sequence increment</td>
<td>5</td>
<td></td>
<td>Folder</td>
</tr>
</tbody>
</table>

- Default work order mgmt meth (DEFWORTYP):
  - The DEFWORTYP parameter is used to propose a default management method during the definition of a routing. This is found in the Header tab of the routing management. This value can be modified later. The purpose here is to specify the types of modifications that are possible to carry out in a work order arising from this routing.
  - The possible values are:
    - **Materials Change:** In a work order, it is possible to exclude a material found in the BOM or to add a material that is not planned in the BOM. However it is not possible to intervene in the same way at the level of the operations.
    - **Operation Change:** In a work order, it is possible to exclude an operation arising from the routing or to add an operation not planned in the routing. However it is not possible to intervene in the same way at the level of the materials.
    - **Change Materials and Operation**
    - **No Change**
  - In the case of work orders launched without routings, it is possible to release materials-only work orders. The release function is directly based on the DEFWORTYP parameter to identify the modification level in the work order.
  - This parameter is associated with Work orders and Routings.
Understanding the Manufacturing General Parameters (continued)

- Operation sequence increment (ROUSTE):
  - The ROUSTE parameter is used to define the step increments that will be proposed for the definition of the routing operations.
  - The operation numbers proposed in this way can be modified during the definition of the routings.
  - Possible values: 0; 1; 5; 10; 20; 100

**Transactions (TRA group)**

The Transactions (TRA) group contains the following parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set of values</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEMTSNUM</td>
<td>Complete/close tracking TRS</td>
<td>STD</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>MKITRSNUM</td>
<td>Import prod rptng TRS</td>
<td>STD</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>MKMTRSNUM</td>
<td>Import material tracking TRS</td>
<td>STD</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>MKOTRSNUM</td>
<td>Import time tracking TRS</td>
<td>STD</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>MKRTRSNUM</td>
<td>Import reintegration trnx</td>
<td>STD</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>MKIMTRSNUM</td>
<td>Sub-contract /tracking trans</td>
<td>STD</td>
<td></td>
<td>Folder</td>
</tr>
</tbody>
</table>

- Complete/close tracking TRS (CLEMTSNUM):
  - The CLEMTSNUM parameter is used to define the work order tracking transaction used by the system during the running of Work Order Closure/Completion.
  - This tracking transaction provides the choice of the tracking unit that will be used to carry out any operation tracking during completion or closure.
  - Possible values: One of the valid work order tracking transactions parameterized in the system.

- Import prod rptng TRS (MKITRSNUM):
  - The production reporting import function with or without work order makes use of the mechanisms used in the Production workbenches.
  - It is therefore necessary to specify with which production workbench transaction the import must work. This in turn, sets the tracking type to be carried out from the imported data, either by importing this transaction with the data or by entering the MKITRSNUM general parameter.
  - **Note:** It is not possible to import the production reporting for products managed with serial numbers.
Understanding the Manufacturing General Parameters (continued)

- Import material tracking TRS (MKMTRSNUM):
  - The material tracking import function (with or without work order) makes use of the mechanisms used in the material issue workbenches.
  - It is therefore necessary to specify with which material issue workbench transaction the import must work. This in turn, determines the tracking type to be carried out from the imported data, either by importing this transaction with the data, or in its absence, by entering the MKMTRSNUM general parameter.
  - **Note:** It is not possible to import the material tracking for components managed with serial numbers.

- Import time tracking TRS (MKOTRSNUM):
  - The import function for the operations tracking (with or without work order) makes use of the functionality in the operation workbenches.
  - It is therefore necessary to specify according to which operation workbench transaction the import must work. This in turn, determines the tracking type to be carried out from the imported data, as well as the possible links (production reporting, material consumption) either by importing this transaction with the data, or in its absence, by entering the MKOTRSNUM general parameter.

- Sub-contract / tracking transa (MTKMTSNUM):
  - The MTKMTSNUM parameter is used to define the production tracking transaction used by the system at the time of a sub-contracting purchase receipt.
  - Based on the parameter settings of this transaction, it is possible to automatically carry out the following a sub-contract receipt, the reporting of the sub-contract operation, the consumption of the materials linked to this operation, and the receipt to stock of the finished product, if the operation has been declared as productive.
  - **Possible values:** One of the valid work order tracking transactions parameterized in the system.
Understanding the Manufacturing General Parameters (continued)

Weighing stations

The Weighing stations (WEI) group contains the following parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set of values</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ALLAUT</td>
<td>Automatic allocations</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CUTFAB</td>
<td>BC division upon recheck</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CUVCTL</td>
<td>Tank recontrol info weighing</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>ENGAGE</td>
<td>Committed to info</td>
<td>By phase</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>ITMCIL</td>
<td>Re-check product (weighing)</td>
<td>Lot</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>LENLOT</td>
<td>No. characters for comparison</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>USMAT</td>
<td>Material list loading</td>
<td>When entering</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>PRIALL</td>
<td>Allocation priority</td>
<td>Weighing priority</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>PRTWEI</td>
<td>Partial weighing</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>RECONCIL</td>
<td>Reconciliation</td>
<td>By work order</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>RECONOBL</td>
<td>Mandatory reconciliation</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>REDNEG</td>
<td>Negative adjustment</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>SEWGG</td>
<td>Selection of weighings</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>UPDSO</td>
<td>Update stock line</td>
<td>Yes with control</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>WIRPTALL</td>
<td>Allocation report code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>WIRPTLTI</td>
<td>Weighing label report code</td>
<td>MATWEIGH</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>WIRPTOPF</td>
<td>End of WO report code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>WIRPTOFE</td>
<td>End of operation report code</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>WIRRSNUM</td>
<td>Weighed material tracking tran</td>
<td>STD</td>
<td></td>
</tr>
</tbody>
</table>
Understanding the Manufacturing General Parameters (continued)

**Work orders (WOM group)**

The Work orders (WOM) group contains the following parameters.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Value</th>
<th>Set of values</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPUSBCTR</td>
<td>Usable component control</td>
<td>Yes</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>CUMMAT</td>
<td>Material accumulation mode</td>
<td>No accumulation</td>
<td></td>
<td>Folder</td>
</tr>
<tr>
<td>RELUPD</td>
<td>Upgrade upon execution</td>
<td>Routing and BOM</td>
<td></td>
<td>Folder</td>
</tr>
</tbody>
</table>

- **Usable component control (CMPUSBCTR):**
  - During the creation of a work order, this parameter is used to check the presence of a component with a non-usable status.
  - Two values are possible:
    - **No**: If a component in the BOM is not usable, the work order will be created without this component.
    - **Yes**: If a component in the BOM is not usable, it will be impossible to create the work order.

- **Material accumulation mode (CUMMAT):**
  - If a single component is called several times in a work order material list (for instance, in the case of a multiple release), the CUMMAT parameter is used to choose whether to cumulate these material lines on a single line from the following choices:
    - **No Accumulation**: Do not cumulate the material lines.
    - **Accumulation upon Release**: The work order will only contain a single material line for this component.
    - **Accumulation upon Tracking**: Upon release, the work order keeps several material lines for the single component. At the time of carrying out material issues for the work order, the system aggregates all the requirements for a single component.
  - This parameter is associated with Upgrade, Production tracking, Work orders, and Work order tracking.

- **Upgrade upon execution (RELUPD):**
  - The RELUPD parameter is used to determine if the work order should be updated automatically when being converted from planned to firm.
  - If modifications were made on a firm or planned work order without changing the status, the database is not re-read regardless of the value of the RELUPD parameter.
  - Possible values are NO, Route, BOM, and Route + BOM.
Understanding the Manufacturing General Parameters (continued)

- **Warning:** If modifications are carried out on the materials or the operations of a planned order (for example, the addition of a material or an unplanned operation), these modifications will be lost during a re-read of the database.

- This parameter is associated with: Work Orders, Enterprise workbench, Product workbench, Grouping, and Work order management.
Lesson Practices

Complete the following lesson practice.

**View and modify manufacturing parameters**

In this Practice, view and modify various parameters for the Manufacturing module.

1. Under Setup > General parameters, select *Parameter values*.
2. In the Parameter values Left list, expand *GPA Manufacturing > Folder*.
3. Select the *SEED* folder.
4. Select the *USA* legislation.
5. Click the Actions icon for the *MIS* group and then select *Detail*.
6. Change the value of the *ALLHOR* parameter to 14. This is the allocation horizon in days. In this case, we want to show a two-week period of time, so enter 14 to replace 15 days.
7. Click *OK*.
8. Continue to explore the parameter values for the various manufacturing groups. What are the possible values for the *DEFWORTYP* parameter in the Routings (ROU) group? Write them below.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

9. How many parameters are in the Work Orders (WOM) group? Write them below.

__________________________________________________________________

__________________________________________________________________

__________________________________________________________________

10. Which group contains the parameter for setting the scheduling horizon value? Write your answer below.

__________________________________________________________________

11. Click *Cancel*.
12. Click *Continue* when prompted to cancel the modification.
Lesson 3

Advanced MRP Concepts

In the following topics, you will learn about Material Requirements Planning (MRP) concepts beyond what you learned in the Manufacturing Fundamentals course. Classified as a proactive approach, MRP uses bill of materials to calculate requirements. MRP provides relevant results in maintaining the due dates and provides information for reducing inventories.

The topics in this lesson include:
- Understanding the MRP/MPS Process
- Defining MRP Parameters
- Working with MRP Data
- Reorder Policy
- BOM Explosion
- Low Level Code
- Suggestion Characteristics
- Understanding Time Buckets
- Determining When to Order
- Additional MRP Features
- Lesson Practices
Understanding the MRP/MPS Process

The purpose of MRP is to propose suggested orders for manufacture and purchase (provider, inter-site provider, or sub-contract provider) in order to ensure that the considered demands (sales orders, forecasts, etc.) are satisfied. The orders are dated to allow for the timely flow of materials from suppliers, through the production process and to the finished stock or customer.

MRP examines each selected product, either in time buckets, or by demand order, and considers the following questions:

- Do I need to order?
- How much do I need to order?
- When do I need to start/finish each order?
- Do existing orders require re-planning?

Every piece of information and setting is examined and influences the answers to these questions.

- MRP (Material Requirements Planning) principals are usually short term and determine what is needed to meet existing schedules.
- MPS (Master Production Schedule) is the process of applying MRP principles to a business plan, in order to ensure the practicality of the plan while also considering all business constraints.
- We will start by looking at the settings and controls that influence the MRP/MPS process. These settings and controls are located throughout the software and are accessible to the correct users (buyers, planners, inventory control managers, etc.)
Understanding the MRP/MPS Process (continued)

- Some of the controls include:
  - The requirements planning parameters
  - The product – site planning settings
  - The reorder policies
  - The general parameters
Defining MRP Parameters

MRP is a shared tool between the planner and the buyer; therefore, they should agree on the settings in Requirements parameters (GESPCB) (Setup > Stock).
Defining MRP Parameters (continued)

- As you learned in the Manufacturing - Fundamentals course, The Requirements parameters function is made up of four tabs for both MRP and MPS parameters. As MRP and MPS are similar in their processing, they share similar settings. Note that they are not set on the same lead time and not set with the same requirements and supplies.

  - Two of the tabs are dedicated to MRP: MRP calculation, and MRP calculation 1, and two of the tabs are dedicated to the MPS. The Management variables are identical to the MRP tabs.

- You should regularly run the Low-level codes resynchronization function to maintain the accuracy of the BOM tree structure. It identifies changes to the lowest levels of the BOM structure allowing for the most accurate MRP and MPS processing. MRP and MPS needs to determine where the lowest levels of the tree are in order to know where to start identifying material requirements. For more information, see Low Level Code in this document.

### MRP Calculation tab

Use the MRP Calculation tab to define all the processing parameters.

#### Processing section

The following provides information about the settings in the Processing section in Requirements parameters.

![Processing Screenshot]

- **BOM type** - Manufacturing
- **BOM code** - 40
- **Weekly structure** - SC1
- **Replanning analysis** - 7 weeks
- **Production LT** - Routing/product lead times
- **Maximum stock analysis** - ✔
- **Journal print-out** - ☑
- **MPS and MRP products** - ☑
- **Exclusive selection** - ☑

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Defining MRP Parameters (continued)

- **Weekly structure**: This is the time period the facility is operational. The weekly structure applies to the population of produced goods. The purchased goods are subjected to calendar lead times. Common settings are SC1 for 5x8 hour days or SC2 for 5x16 hour days with 2 shifts.

<table>
<thead>
<tr>
<th>Weekly structure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC0</td>
<td>Empty</td>
</tr>
<tr>
<td>SC1</td>
<td>5 x 8 hours</td>
</tr>
<tr>
<td>SC2</td>
<td>5 x 16 hours</td>
</tr>
<tr>
<td>SC3</td>
<td>5 x 24 hours</td>
</tr>
<tr>
<td>SC4</td>
<td>7 x 8 hours</td>
</tr>
<tr>
<td>SC5</td>
<td>7 x 16 hours</td>
</tr>
<tr>
<td>SC6</td>
<td>7 x 24 hours</td>
</tr>
<tr>
<td>SC9</td>
<td>4 x 8,25 + 7,7 hours</td>
</tr>
</tbody>
</table>

- **BOM code**: This is the BOM code that will be used for developing the dependent demands for a suggested work order (MW*).
  - The same value is applied to all products.
  - The selected value must allow MRP (or MPS) processing.
  - A TPOP (Time Phased Ordered Point) dedicated to purchase-sold products, can be run with a BOM code, even if the product does not need a BOM code.
  - **Note**: The MRP calculation is based on a unique BOM code.
Defining MRP Parameters (continued)

- Replanning analysis:
  - An order that the end date exceeds the last day of the horizon (expressed in weeks) is not re-planned.
  - A back-to-back order is not re-planned.
  - From a production point of view, the replanning analysis manages neither the By Order management coming from the product file (a WOF linked to a SOF can be re-planned), nor material availability (unless its component is re-planned managed), nor a possible overload that may occur during a work order re-planning.

- **Load calculation:** Load calculation uses routings and schedule loads. At each work center, a load profile is established based on MRP suggestions (blue color for suggested load, green for planned, and orange for firm).
  - Material need dates, in the MRP process with load calculation, match the operation start date. The process uses the routing during load calculation. In the case where the component is linked to an operation in the BOM, the process can update material (sub-part) need date. After the load calculation horizon, the MRP bases its calculation on the product-site procurement or manufacturing lead time.
  - The buckets delimit the MRP processing horizon (priority planning). Use caution when a load calculation (CRP capacity planning) is run for a certain horizon (scheduling parameter in Setup > Manufacturing > Scheduling). You must fit priority planning buckets with capacity planning buckets. Remember that the CRP is coupled to the MRP release.
  - The following illustrates a load calculation. If a number of weeks is set on the Load calculation field on the MRP calculation tab, it triggers OWS. If it is set on the MPS calculation tab, it triggers ORS.
Defining MRP Parameters (continued)

- **Note:** It is possible for the daily load inquiry to show a load on Saturday or Sunday with neither day set as a work day in the Weekly structure (Setup > Manufacturing > Weekly structures). The reason is that there is a mismatch between the setup in the weekly structure and the way the scheduling is set up and the scheduler places loads on a weekend when no load was expected during that time.

- **Maximum stock analysis:** Maximum stock analysis triggers VRS ORDERS records – only visible in the MRP (MPS) result. The MRP quantity for the VRS indicates the level of the projected stock at the end of a bucket if this level is higher than the maximum + technical lot.
  - Maximum stock and technical lot are defined in Product category or Product – sites (Planning tab).
  - These can be reported from the table, CBNDET, selecting WIPTYP = 11, MRPMES = 13.

- **Product selections:** Only products managed in stock on this site could be analyzed by the MRP processing. It depends on the Product – sites reordering mode being MRP or MPS.
  - Select the MPS and MRP products check box to process all MPS and MRP management products. Warning: Previous suggestions and replanning messages will be erased and replaced for all processed products.
  - Normally, all products will be process, taking into account all MWS (either generated from the MRP process, or remaining from the MPS process.
  - Suggestions are only passed to ORDERS according to the selections.
  - The following illustrates the processing that occurs with the MPS and MRP products check box cleared and the Exclusive selection check box cleared:
Defining MRP Parameters (continued)

If the MPS and MRP products check box is selected, MPS products will display an MRP origin because the calculation processes them in the same way as the MRP reorders. If the MRP has been released beforehand, the gross requirements on the MRP population will be doubled. Additionally, if you select the Exclusive selection check box, the system will only place one suggested resource facing the one whose origin is now MRP (and not two that would be incorrect). Therefore, it is highly recommended that whatever happens, the Exclusive selection check box remains selected.

The following illustrates the processing that occurs with the MPS and MRP products check box selected and the Exclusive selection check box cleared:
Defining MRP Parameters (continued)

- Two changes occur if the Exclusive check box is selected:
  - Only the selected products are processed.
  - Where a WOS remains from another process on a product included in this process, its MWS will not be considered as dependent demands.
- Exclusive selection respects the product’s MPS origins. The MRP traditionally exploits MPS –type MWS requirements. This means that MRP suggestions are determined through the requirements (MWS) emitted by independent products with an MPS origin.
  - The following illustrates the processing that occurs with the MPS and MRP products check box selected and the Exclusive selection check box selected:

- When a RCCP has run before MRP, manufacturing lead times for MPS products are unfortunately based on product load profile. The MPS and MRP products check box should be selected in order to have realistic lead times (based on routing).
  - You should regularly run the Low-level resynchronization function.

**Buckets section**

Refer to Understanding Time Buckets in this lesson.
Defining MRP Parameters (continued)

Starting stock section

The following provides information about the settings in the Starting stock section in Requirements parameters.

- **Physical stock:** Starting stock is the site physical stock (according to the following selections), less the allocations. Allocated requirements (MWF, SOF) are not considered as demands. Dock stock and subcontract stock are considered available for MRP, unless the subcontract stock is allocated.

  **Note:** If you want to exclude subcontract stock from starting stock, you can use the entry point STRSTO in MRP processing. You can create the STODISSCO general parameter linked to the global variable GSTODISSCO. If the value is set to 1, the subcontract stock will no longer be included in starting stock.

  - **On hand:** Select On hand to specify if the physical stock must be included in the calculation starting stock. If selected, allocations will be deducted from the starting stock.

  - **QC:** Each quality control (QC) request is analyzed and a VRF (miscellaneous resource) is created in the CBNDET table for the quantity/end date. This setting specifies whether:
    - The stock under control must not be included in the starting stock.
    - The stock under control must be thoroughly included in the starting stock.
    - The stock under control must be included to the available stock at the control end date.

  - **Rejected:** Specifies if the starting stock must include the rejected stock.

  - **Transfers:** Specifies if the current transfers must be included in the starting stock of the calculation.
Defining MRP Parameters (continued)

- **Stock phantoms:** Select this check box if the calculation must take the phantom product stock into account.

**Requirements section**

The following provides information about the settings in the Requirements section in Requirements parameters.

![Requirements section](image)

- Select from:
  - Sales orders (SO*) and Transfer demands (TPx) can be included or excluded.
  - Work order material requirements (MWP and MWF) are always included.
  - Suspended transactions can be included or excluded.
  - Sales forecasts (SOS) can be offset.
Defining MRP Parameters (continued)

**Resources section**

The following provides information about the settings in the Resource section in Requirements parameters.

- **Resources**

  - Planned WOs
  - WOs released
  - PCs planned
  - PCs firm
  - Planned transfer dem
  - Firm transfer dem
  - Sub-contract planned
  - Sub-contract firm

- Select from:
  - Work orders (WO*): Then the work order material requirements suggested (MWS) are included in the requirements.
  - Purchase orders (PO*)
  - Transfers (TR*)
Defining MRP Parameters (continued)

**MRP Calculation 1 tab**

As you learned in the Manufacturing Fundamentals course, the MRP calculation 1 tab is dedicated to re-planning rules, display of messages aimed at optimizing resources already positioned, and various adjustments concerning data set in the product site and the reordering policy. For more information, refer to your Manufacturing Fundamentals curriculum.

<table>
<thead>
<tr>
<th>MRP calculation</th>
<th>MRP calculation 1</th>
<th>MPS calculation</th>
<th>MPS calculation 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☐ Ignore safety stock</td>
<td>☐ Ignore coverage</td>
<td>☑ Resources in cov.</td>
<td></td>
</tr>
<tr>
<td>☐ Ignore link % scrap</td>
<td>☐ Sug. in firm hor.</td>
<td>Rebuild safety stock</td>
<td>Always</td>
</tr>
<tr>
<td><strong>Suggested orders</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>☑ Work order suggestions</td>
<td>☑ POs suggested</td>
<td></td>
<td></td>
</tr>
<tr>
<td>☑ Inter-site suggestion</td>
<td>☑ Subcontract suggestions</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Statistics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Last calculation date</td>
<td>Time in minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>09/30/15</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Replanning rules**

<table>
<thead>
<tr>
<th>Type</th>
<th>Method</th>
<th>Backward lead time</th>
<th>Forward lead time</th>
<th>Replan quantities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WOF</td>
<td>Simulation</td>
<td>2</td>
<td>4 Decrease/increase</td>
</tr>
<tr>
<td>2</td>
<td>WOF</td>
<td>Simulation</td>
<td>4</td>
<td>4 Decrease/increase</td>
</tr>
<tr>
<td>3</td>
<td>POF</td>
<td>Simulation</td>
<td>2</td>
<td>4 Decrease/increase</td>
</tr>
<tr>
<td>4</td>
<td>POP</td>
<td>No processing</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>TRF</td>
<td>No processing</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>TRP</td>
<td>No processing</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>EOF</td>
<td>No processing</td>
<td></td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>EOP</td>
<td>No processing</td>
<td></td>
<td>None</td>
</tr>
</tbody>
</table>
Working with MRP Data

Settings within many functions in the software affect MRP processing. This topic explains some of these settings in Products and Products – sites. The Material Requirements Planning program may be processed on a site of the following types:

- Manufacturing
- Stock (a BOM code is mandatory despite the lack of BOM for bought-sold products).
- Product – site managed stock

Products

- Use Products accessed from Common data > Products to make settings affecting the MRP process.
  - **Management mode:** Affects By Order or Available Stock.
  - **QC management:** Influences the stock status. This has an impact on the reservations and the stock available take into account in the MRP process.
  - **Expiration management:** Reserved to the product with lot management. This influences the stock status and has an impact on the reservations and MRP. This can trigger VDS orders to plan the issue of the lot from the stock available (only in the inquiry MRP results or MPS results).

Products - sites

- Use Products - sites accessed from Common data > Products to make settings affecting the MRP process.
  - **Firm horizon:** The horizon (in weeks or months) is used to set a frozen zone for planning reasons during which MRP cannot place any suggestion.
  - **Demand horizon:** Inside the demand horizon, the forecasts are ignored and beyond the maximum (SOP + SOF, SOS) is considered.
  - **Trend profile:** The trend profile is used to adapt to a produced good or purchased good in MRP (see the STO > REA > MRPDYNSAF general parameter) or to build calculated forecasts.
  - **Production, QC, purchasing lead time:** Variables taken into account in the MRP process and order management.
  - **Digressivity factor:** The digressivity factor is used to adapt the order lead time in proportion to EOQ. It is used in the MRP process and the work order (technical lot). Corrected lead time = DR*(1+ (quantity/lot – 1)*coefficient/100).
Working with MRP Data (continued)

- **Multi-level lead time:** This is the cumulative lead time. The Multi-level planning function can calculate this lead time (Manufacturing > Planning > Multi-level planning).

- **Assignment rule:** Does the component need to be linked with its parent? Does the finished good need to be linked with the sales order?

- **Reordering policies:** The products are able to be reordered according to the reorder point, re-completion, or MRP/MPS methods. If the choice is MRP or MPS, a re-ordering policy is entered.

- **Coverage:** Each bucket triggers a suggested order with a quantity equal to the sum of the “x” next week’s needs (SOP/F, MWP/F…), even if the system is demand/supply balanced. It is called Time Period Safety Stock.

- **Suggestion type:** The nature of the planned order created by MRP/MPS depends on this choice. If the suggestion is inter-site, the reordering site must be entered.

- **Safety stock:** The safety stock defined is taken into account in MRP according to two conditions:
  - The reorder policy defines that it must be taken into account
  - The parameter of the MRP

- **Reorder point:** The reorder point can be entered if the ROP method has been chosen.

- **Maximum stock:** The maximum stock can be entered if periodical replenishment was chose.

- **EOQ:** The economic lot can be an external, internal, or economical constraint.
  - External: Supplier capacity
  - Internal: Profitability of a mold or of a tank refill, for example
  - Economical: The economic lot can be used in a reorder policy specific to each product. The Wilson formula as shown below is a formula that is also used to refine the calculation of a manufacturing or purchase lead time. If my reorder requirement is 300 quantities – will it take me 5 to 10 days knowing that my lead time is 5 days for a lot of 150?

\[
EOQ = \sqrt{\frac{2 \times D \times CL}{c \times t}}
\]

D = Requests over a certain period (year) (annual demand)
CL = purchasing cost for a single order
c = cost to hold one unit of inventory for a year
t = rate of carrying cost

You can adjust the size of the EOQ considering several points: warehouse size, handling considerations, spoilage, whether there is enough staff (such as craftsmen for setup), and whether to round for tool wear and tear.
Working with MRP Data (continued)

- **Technical lot:** The technical lot is subject to a technical constraint. It is used in the MRP as much for purchased products as manufactured products, but also and especially in manufacturing releases.

  The technical lot is a subdivision of the economic lost and offers the possibility of splitting up the reorder suggestions into multiple lots. For example: A manufacturing order of 1,000 is given by MRP, while the economic lot is 500 and the technical lot is 100. The system can display 10 suggestions of 100.

- **Protection in process (replan):** the orders in process can be excluded from replanning.

## General parameters

- **GPNLFLT:** Sage X3 tests the field (Planner / Buyer) for the creation of WOP, WOF, or POP.
  - **Yes:** If no planner, the workbenches display all orders.
  - **Yes exclusive:** If no planner, nobody can reorder.

- **BUYFLT:** Tests the field buyer for the creation of POFs.
  - If BUYFLT is Yes and no buyer is entered in the product site, everybody can reorder.
  - If BUYFLT is Yes and a buyer is entered in the product site, only this buyer can reorder.
Reorder Policy

Products can be reordered according to the reorder point, periodic, or MRP/MPS methods. If the choice is MRP or MPS, a re-ordering policy is entered. Reorder policies are used exclusively with MRP/MPS methods. They are not considered if the reorder method is ROP or periodic. The reorder policy is a set of rules that modify how MRP/MPS behaves with respect to the product it is associated with. A reorder policy is associated with the product on the product – site record (Planning tab) the reorder policy can be different for each product at each site.

- Use Reorder policy (GESTRP) accessed from Common data > Product tables to define the reordering policies used in the MRP and MPS processes. This allows for distinctive management of quantities to be manufactured or purchased per product.

- The reordering policies are used for a given product to specify certain details during the requirements calculations (MRP and MPS) to identify the suggestion type, the reorder quantity, the splitting, safety stock, use of the loss percentage, and the re-planning analysis.
Reorder Policy (continued)

- The reorder quantity field has the following options:
  - **Net quantity**: The suggestion is the same quantity as the demand. It is normally important to use this for products whose management mode is By Order.
  - **Minimum quantity without rounding**: Any quantity equal or greater than the EOQ.
  - **Minimum quantity with rounding**: Equal to the EOQ by a multiple of technical lot.

- The Splitting field has the following options:
  - **No splitting**: One suggestion per period or demand.
  - **Parallel splitting**: One suggestion per technical lot, all on the same dates.
  - **Successive splitting**: One suggestion per technical lot, distributed across the lead time.

- Example: EOQ = 500, Technical lot = 100

- The following table shows suggestion based on needed quantities, whether or not splitting is used and whether new quantity, minimum quantity without routing or with routing is used.

<table>
<thead>
<tr>
<th>Reorder Qty</th>
<th>Splitting</th>
<th>Need = 450</th>
<th>Need = 650</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Net quantity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No splitting</td>
<td>1 suggestion = 450</td>
<td>1 suggestion = 650</td>
<td></td>
</tr>
<tr>
<td>Splitting</td>
<td>4 suggestions of 100 + 1 suggestion = 50</td>
<td>6 suggestions of 100 + 1 suggestion = 50</td>
<td></td>
</tr>
<tr>
<td><strong>Minimum quantity without rounding</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No splitting</td>
<td>1 suggestion = 500</td>
<td>1 suggestion = 650</td>
<td></td>
</tr>
<tr>
<td>Splitting</td>
<td>5 suggestions of 100</td>
<td>6 suggestions of 100 + 1 suggestion = 50</td>
<td></td>
</tr>
<tr>
<td><strong>Minimum quantity with rounding</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No splitting</td>
<td>1 suggestion = 500</td>
<td>1 suggestion = 700</td>
<td></td>
</tr>
<tr>
<td>Splitting</td>
<td>5 suggestions of 100</td>
<td>7 suggestions of 100</td>
<td></td>
</tr>
</tbody>
</table>
BOM Explosion

The principle of BOM explosion is to analyze the upper level of the BOM to determine the component needs. Component purchase orders are anticipated because of their dependent demand on the parent product in a work order. The work order start date (suggested, planned, or firm) is used as the due date (expected receipt date) for the procurement.

The following illustrations indicate the suggestions that occur with and without pegging.

Note: Pegging indicates the relationship between supply and demand. It determines the quantities needed for the components by the parents and also the schedule for which they are needed.

- **Suggestion with MRP Pegging**: BOM explosion analyzes the upper level of the BOM in order to determine the component needs. Component purchase orders are anticipated because of its dependent demand on the parent product in a work order.
  - It is important to define the most-used BOM for every product under the same BOM code.
BOM Explosion (continued)

- **Suggestion without MRP Pegging**: This could be useful if the planner wants to base the semi-finished and component analysis after the creation of a planned or firm work order on the finished good.
  - With this kind of organization, the scheduling is done per low level code, and the MRP is run many times. In this example, the scheduling of all the finished goods is done in the first stage. Then, a new MRP is run on the dependent demand on component (MWP/F - and the semi-finished goods are scheduled). A last new MRP is run on dependent demand on component (MWP/F – and finally the raw materials are purchased).

- **MRP Pegging Only**: This is used for phantom product.

The following table shows the types of suggestions:

<table>
<thead>
<tr>
<th>Type of suggestion</th>
<th>MRP Work File CBNDET</th>
<th>Planning Orders</th>
</tr>
</thead>
<tbody>
<tr>
<td>No suggestions</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Parent and components (suggestions with MRP pegging)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Parent Only</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Components Only (MRP pegging records only)</td>
<td>Yes</td>
<td>Yes, zero quantity</td>
</tr>
</tbody>
</table>

- The normal setting is parents and components.
  - **Parent only**: The finished good is make to order (MTO) managed and its MRP suggestions respond to firm sales orders. Its components are make to stock (MTS) managed with MRP suggestions responding to forecasts. Therefore, the MRP pegging triggered by the upper level must not be taken into account for suggestion generation. SOS and MWS cannot be accumulated in that case.

Or, the planner or buyer may want to wait before the WOS is validated into a WOP or WOF before planning (if there is a semi-finished good involved) or before buying (for raw materials). As a WOS is transformed into a POF or can be validated on a different BOM code, the requirement on the component can be changed completely, so there is a risk to planning and buying before the WOS validation.

- **Components only**: is useful in an engineer to order (ETO) environment where work orders are released manually. It is also used for a phantom with this expected behavior: no WOS on the phantom product but a requirement on its component.

  The work order should not be created until the BOM is complete. While the designers are adding components to the BOM, this ensures that MRP will procure the components without any possibility of accidentally releasing a work order which is not linked to the sales order.
Low Level Code

Before carrying out an analysis of a product, make sure to generate all the dependent demands that affect it; therefore, creation or modification of bills of material maintains an absolute low level code for each product. This represents the lowest level at which it appears in any BOM. Within a BOM, all components must be at a lower level than the parent. The low level code is an important part of the key to reading the products to process.

- Low level code is held in the ITMBOM table.
- The low level code defines the order of the product analysis.
- **Note:** The cost calculation uses the same low level code to define the order of the product analysis, but in reverse order (the highest low level code first to the lowest low level code at the end).

![Diagram of Low Level Code and BOMs](image)

- Low level code of A, E, F = 0. Low level code of B=2.
Low Level Code (continued)

- Use Resynchronization (SYNCLLC) under Low level codes in Common data > BOMs to recalculate low level code that is no longer synchronized (in the case where many changes occur in the BOM).

![Lowest level code resynch](image)
Suggestion Characteristics

All the characteristics of a suggestion can be manually modified before validation:

- **End / start date**
- **Quantity and Order type**
- **Supplier (for purchase order)**
- **BOM code and routing (for work order)**

<table>
<thead>
<tr>
<th>Flow</th>
<th>Suggested (S)*</th>
<th>Planned (P)</th>
<th>Firm (F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Order</td>
<td><strong>R</strong> SOS Forecast</td>
<td><strong>R</strong> SOP</td>
<td><strong>R</strong> SOF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shipment request planned Quotes Sales order firm</td>
<td></td>
</tr>
<tr>
<td>Purchasing</td>
<td><strong>S</strong> POS Purchase order suggested</td>
<td><strong>S</strong> POP Purchase request planned Purchase requests</td>
<td><strong>S</strong> POF Purchase request firm Purchase order firm</td>
</tr>
<tr>
<td>Manufacturing</td>
<td><strong>S</strong> WOS Work order suggested</td>
<td><strong>S</strong> WOP Work order planned</td>
<td><strong>S</strong> WOF Work order firm</td>
</tr>
<tr>
<td>Material for working</td>
<td><strong>R</strong> MWS Depends on WOS</td>
<td><strong>R</strong> MWP Depends on WOP</td>
<td><strong>R</strong> MWF Depends on WOF</td>
</tr>
<tr>
<td>Subcontracting</td>
<td><strong>S</strong> EOS External order suggested</td>
<td><strong>S</strong> EOP External order planned</td>
<td><strong>S</strong> EOF External order firm</td>
</tr>
<tr>
<td>Material for subcontracting</td>
<td><strong>R</strong> MSS Depends on EOS</td>
<td><strong>R</strong> MSP Depends on EOP</td>
<td><strong>R</strong> MSF Depends on EOF</td>
</tr>
<tr>
<td>Inter-company or inter-site provide</td>
<td><strong>R</strong> TPS Depends on TRS</td>
<td><strong>R</strong> TPP Depends on TRP</td>
<td><strong>R</strong> TPF Depends on TRF</td>
</tr>
<tr>
<td>Inter-company or inter-site required</td>
<td><strong>S</strong> TRS Transfer required suggested</td>
<td><strong>S</strong> TRP Transfer required planned</td>
<td><strong>S</strong> TRF Transfer required firm</td>
</tr>
</tbody>
</table>
Suggestion Characteristics (continued)

- The many document types can be grouped into two types:
  - Requirements (represented with an R in the table on the previous page).
  - Supply (represented with an S). Note: A work order represents an S but to make the work order, it may generate downstream documents MWS, MWP, or MWF, which are R types (requirements for the work order).

- The product category allows the type of flow for each product:
  - Manufactured
  - Subcontracted
  - Purchased
  - Sold
  - The same product can be linked to many flows (such as manufactured + purchased + sold).

- Then, in Product-sites (Planning tab), it is possible to set the order type suggested by the MRP.

- Note: A suggestion can also be manually validated into another order type (such as WOS to POF only if the product is set as manufactured + purchased).
Suggestion Characteristics (continued)

**MRP is backward only**

- The MRP calculation is performed based on the procurement lead time (purchase or manufactured lead time) to determine when the order will be released. This can be a purchase order, work order, inter-site order, or an external order.

- MRP uses only the lead time. The MRP suggestions are made in infinite capacity logic. The following is an example of when to start/finish each order.

  **Note:** MRP is backward.

![Diagram](image)

- The company that works in MTO needs to define the first available date (forward logic), then it is possible to use the multi-level plan to meet this requirement.
  - Once the first available date is set as the shipment date, the MRP is able to generate the correct suggestions.

**Digressivity Factor**

- The digressivity factor is applied to the manufacturing lead time (or to the purchasing lead time).
  - The digressivity factor is used to adapt the order lead time in proportion to the EOQ. It is used in the MRP process and the work order (technical lot).

- Example: Lead time = 5 days for a lot of 150

  - Suggestion = 300
  - LT coeff = 100%  LT = 10 days = 5*(1 + 1*100%)
  - Suggestion = 300
  - LT coeff = 60%  LT = 8 days = 5*(1 + 1*60%)
  - Suggestion = 300
  - LT coeff = 0%   LT = 5 days = 5*(1+1*0%)

- Formula: Corrected lead time = LT*(1 + (quantity/lot - 1)*coefficient/100)
Suggestion Characteristics (continued)

Multi-level BOM example

- The following is a multi-level BOM example that illustrates when to start and finish each order.

- FG1 lead time is 10 days
- SF1 lead time is 5 days
- B1 lead time is 10 days
- B2 lead time is 13 days
- B3 lead time is 25 days

Note: For inter-sites, a TRS has an offset equal to the lead time (purchase lead time) set on the product site corresponding to the time transit between the two sites.

- A TPS (Transfer Provide) is generated automatically on the provider site. This order represents a need to produce or purchase; therefore, it can trigger a supply order (such as POS or WOS).
- Inter-site runs with two sites declared as Customer and Provider.
- If the lead time is shortened between the two sites, you can set “in transit” stock available for the MRP.
- Inter-site contracts can be set up.
Understanding Time Buckets

A bucket is the finest level of the supply/requirement balance done by MRP processing. If a bucket is defined as a day, then all the supplies available that day will be compared to the sum of all the requirements for that day.

If Supply < Requirement → Suggestion of the variance

- Therefore, if the bucket is defined as a day, there is a maximum of one suggestion per day. Or, if the bucket is defined as a week, there is a maximum of one suggestion per week. Likewise, if the bucket is defined as a month, there is a maximum of one suggestion per month. The purpose of the buckets is to group suggestion per day, week, or month.

- Time buckets can use a range of days, weeks, and months, defined in Requirements parameters.
  - Using smaller buckets increases the processing time; it can also lead to numerous suggestion orders.
  - The normal setting is days for the short term to be as precise as possible, week for medium term to check the global balance for the entire week and to minimize the replanning, and months for the long term only to check the global balance for the entire month.

**Automatic adjustment**

- If the current date is mid-month, and your selection is 4 weeks followed by 5 months, the first month is a part-month.
  - Automatic adjustment means that you would get 6 weeks, up to the start of a full month.
Understanding Time Buckets (continued)

**Analysis lead time**

- The buckets in days + the buckets in weeks + the buckets in months = Analysis lead time.

- Example: Work days = Monday through Friday
  - Lead time in days = 5 days: On this lead time, a daily balance between supplies and requirements is done based on the projected stock calculated by MRP. A daily suggestion is done if necessary.
  - Lead time in weeks = 1 week: On this lead time, a balance between supplies and requirements is done based on a projected stock calculated by MRP. A suggestion is done if necessary.
  - Lead time in months = 1 month: On this lead time, a unique balance between supplies and requirements is done based on a projected stock calculated by MRP. A suggestion is done if necessary.
Understanding Time Buckets (continued)

**By order vs Available stock**

- The Management mode field in Products (Common data > Products), allows you to select whether to manage by Available Stock or By Order.

  ![Management mode](image)

  - In By Order management, the bucket definition has no impact except to define the global lead time of the MRP analysis.
  - For order management strategy, the customer, its order number, and the project designation are kept on the orders.

  ![Focus on stock management](image)

- The link between a work order suggestion and the sales order are automatically inherited on the WOP or WOF firm created from the suggestion. If the components are managed as well with By Order, then the suggestion of the following level of the BOM will be linked to the sales order. This is just an informative link with no automatic action, such as automatic allocation in the direct order function or with the assignments.

- The main advantage of By Order management in comparison to direct order, is the MRP is set with By Order checks if there is no stock available before the generation of the supply order. This is very useful for companies that mix MTO (Make To Order) management for a big quantity sold and MTS (Make To Stock) management for a small quantity sold.

- If you group two work orders linked to two different sales orders, then the work order created loses the link with all the sales order.
Understanding Time Buckets (continued)

**Coverage**

- If Coverage is defined and used, then the requirement period in each period is raised by the requirements in the defined future periods (coverage). Safety stock is ignored.
- Coverage is defined in Product categories or Product – sites (Planning tab) in weeks.

Coverage can be dynamic, according to the Seasonality setting in Products – sites. (General parameter STO > REA > MRPDYNCOV or MPSDYNCOV = Yes.)

- Coverage is adjusted by the ratio of the current period to the total of the Trend profile. If the current period is 10% of the total Trend profile, coverage will be 10% of the Product – sites coverage.
Understanding Time Buckets (continued)

- Coverage can be globally ignored with a check box in Requirements parameters (Setup > Stock). Resources in the Coverage period can be taken into account with this check box. (Resources are normally only considered up to the current period.)

- The following illustrates resources in coverage with the Ignore coverage check box selected.

<table>
<thead>
<tr>
<th>Period</th>
<th>Initial inventory</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Forecast</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sales orders</td>
<td></td>
<td>12</td>
<td>9</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sum of Needs</td>
<td>48</td>
<td>54</td>
<td>13</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Scheduled receipt</td>
<td></td>
<td>4</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expected stock**</td>
<td>2</td>
<td>22</td>
<td>25</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Net requirements</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>R</td>
<td>End suggestion date</td>
<td>30</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Start suggestion data</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

** calculated during MRP process
Understanding Time Buckets (continued)

The following illustrates resources in coverage with the Ignore coverage check box cleared.

```
<table>
<thead>
<tr>
<th>Period</th>
<th>Initial inventory</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecast</td>
<td></td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sale orders</td>
<td></td>
<td>12</td>
<td>3</td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Sum of Needs</td>
<td></td>
<td>18</td>
<td>21</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Scheduled receipt</td>
<td></td>
<td>5</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projected stock</td>
<td></td>
<td>2</td>
<td>46</td>
<td>29</td>
<td>29</td>
<td>14</td>
</tr>
<tr>
<td>Net requirements</td>
<td></td>
<td>44</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>End suggestion date</td>
<td></td>
<td>44</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Start suggestion date</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
```

**^ Calculated during MRP process**
Understanding Time Buckets (continued)

- **Note:** It may be better to run MRP/MPS with weekly buckets if Coverage is used.

  Example:
  Product A, coverage is 5 weeks, no safety stock, starts at stock 0
  Production lead time is 1 week
  Requirements are expressed by week
  Grid of the requirements are expressed over 10 weeks

<table>
<thead>
<tr>
<th></th>
<th>W0</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
<th>W9</th>
<th>W10</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOF</td>
<td>50</td>
<td>250</td>
<td>100</td>
<td>50</td>
<td>105</td>
<td>105</td>
<td>150</td>
<td>250</td>
<td>125</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>WOF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>WOS</td>
<td>350</td>
<td>105</td>
<td>105</td>
<td>150</td>
<td>150</td>
<td>125</td>
<td>125</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>350</td>
<td>405</td>
<td>260</td>
<td>410</td>
<td>510</td>
<td>530</td>
<td>550</td>
<td>400</td>
<td>250</td>
<td>125</td>
<td>0</td>
</tr>
</tbody>
</table>

- You can make an inquiry of the projected stock calculated by MRP/MPS as follows:
  Manufacturing > Inquiries > Reorder results > MRP results
  Manufacturing > Inquiries > Reorder results > MPS results
  Or…
  Stock > Inquiries > MRP/MPS replenishment > MRP results
  Stock > Inquiries > MRP/MPS replenishment > MPS results
Determining When to Order

This topic covers concepts for determining when to order.

- MRP processing:
  - Is done one site at a time.
  - Only one-way direction inter-site and inter-company flow can be handled with MRP processing.
  - Is regenerative.
- The first step of the MRP processing is the deletion of all the previous suggestions made by MRP.
- Defines per bucket, a net requirement applying the following:
  - Available stock could include stock in status A* and/or Q* or R* and/or the in-transit stock.
  - The supply order could include EO and/or WO and/or PO and/or TP.
  - Requirement order could include MS and/or MW and/or SO and/or TR.
Determining When to Order (continued)

- If there is a net requirement, then a suggestion will be generated.
- Only orders in progress will impact the MRP processing; therefore, a work order closed or a sales order line closed will not affect the results.
- The following illustrates MRP with data.

* Can be other kind of needs, such as dependent needs due to a parent product work order.

- Example with a manufacturing lead time of one week:
  - The period or bucket could be a day, week, or month.
  - N = The cumulated need on the period. In progress order such as:
    - SO*: Sales order (delivery date)
    - TP*: Transfer provide (inter-company or inter-site order)
    - MW*: Material for working (manufacturing requirement)
    - MS*: Material for subcontracting (external order requirement)
    - Safety stock
  - S = The cumulated Supply on the period. Incoming stock, such as:
    - PO*: Scheduled receipt (receipt date of the purchase order)
    - TR*: Scheduled receipt of an inter-company or inter-site order
    - WO*: Scheduled work order entry (end date of a work order)
    - EO*: Scheduled external order (end date of the external order)
    - Available stock: Depends on the MRP settings
Determining When to Order (continued)

**Stock target**

Normally, you would need the suggested order to be received (due date) when the projected stock reaches zero. The suggested order due date can be ahead of the requirement date if you have quality control (QC) lead times.

- Safety stock can be defined at minimum projected stock level, so the requirement date will be the time when the projected stock falls below that level.

**Safety stock**

Normally, you would target to have a suggested order delivered (completed) at the time the stock is projected to reach zero.

- If a safety stock is considered, you can target to have a suggested order delivered (completed) at the time the stock is projected to reach the safety stock.
  - Safety stock is defined in Product category or Product –sites (Planning tab).
  - Safety stock can be systematically calculated.
  - Safety stock is taken into account according to the Reorder policy.
  - Safety stock can be globally ignored using a check box in Requirements parameters.
  - Safety stock can be dynamic according to the Trend profile setting in Product –sites (General parameter STO> REA > MRPDYNSAF or MPSDYNSAY is set to Yes).
    Safety stock is adjusted by the ratio of the current period to the total of the Trend profile. If the current period is 10% of the total in Trend profile, safety stock will be 10% of Product –sites safety stock.

- Coverage can give a flexible safety stock; the requirement date will be at a time when the projected stock fails to cover the demands of a certain future period.
Additional MRP Features

This topic contains additional factors that affect MRP, such as end date calculations, firm and demand horizons, and forecasts.

Objective exceeding

In MRP, date calculation is done by bringing the order as close as possible to the requirement. Then, the system places the start date based on a lead time (backward scheduling).

- If the situation occurs for the past, the reverse logic applies: An order end date is calculated (and not a start date).
  - Calculation is based on the product – site lead time (or routing depending on MRP parameters in case of automatic forward scheduling).
  - The LATSUGDAT general parameter in the STO chapter is used if it is impossible to make the objective date and the end date coincide.
  - If the due date is exceeded (start date of a sales order for example) due to a production lead time which is longer than the customer constraint, the system may limit the suggestion end date to the objective date. But it also enables the order to be placed on an end date calculated with production lead time (from the start date) and therefore after the due date.

![Work order re-scheduling diagram](image)
Additional MRP Features (continued)

**Firm horizon**

The purpose of the firm horizon is to provide a frozen zone for the production plan.

- Within this period, any suggestions created will be automatically delayed to outside the period. Therefore, the suggestion is made after the due date.
  - Firm horizon is defined in Product categories or Product – sites (Planning tab).
  - It can be ignored in processing using the Sug. in firm hor. check box in Requirements parameters.
  - Parameter STO > REA > LATSUGDAT controls whether the start or end is delayed to the firm horizon.
    - First avail date: Both the start and end date of the delayed suggestion will be on the firm horizon.
    - First avail date + LT: The start date of the delayed suggestion will be on the firm horizon. The end date will be later by the lead time.
Additional MRP Features (continued)

**Demand horizon**

Inside the demand horizon, the forecasts are ignored and beyond the max (SOP + SOF, SOS) is considered.

- In this example, MRP is run on Friday. The end of MRP is in 4 weeks (for example) and all buckets are in days. The 2 weeks demand horizon should end on Friday, 14 days after. However, the process extends until the next Sunday. And after, the comparison between forecasts and firm/planned demands occurs every full week from Monday to Sunday.

- **Note:** This is the sales forecast and not consumption forecast. The MRP does not perform the Max (MWP + MWOF, SOS).
Additional MRP Features (continued)

<table>
<thead>
<tr>
<th>Forecasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Forecasts can be run in:</td>
</tr>
<tr>
<td>- Manufacturing &gt; Planning &gt; Demand forecasts</td>
</tr>
<tr>
<td>- Stock &gt; Reordering &gt; Demand forecasts</td>
</tr>
<tr>
<td>● Forecasts can be created by a number of methods:</td>
</tr>
<tr>
<td>- <strong>Manual entry:</strong> For a given product/site, enter the year and month, and a quantity for each week. Note: As you are in each week’s field, the dates display in the status bar of the window.</td>
</tr>
<tr>
<td>- <strong>Copy:</strong> The forecasts of another product/site can be copied using a range of dates. For the destination product/site, enter the range of dates, then select the origin product/site in the Duplicate forecasts left-list.</td>
</tr>
<tr>
<td>- <strong>Trend profile:</strong> Trend profiles can be created (Common data &gt; Product tables) to express the un-even distribution of a given quantity over a period.</td>
</tr>
<tr>
<td>- <strong>Import template:</strong> Access from Usage &gt; Imports/exports to import the on hand order of the type consumption prediction. This is based on a standard template, SOS. There are two modes: Complete and Incremental.</td>
</tr>
<tr>
<td>o Complete: The existing prevision totals are purged before importing the new prediction.</td>
</tr>
<tr>
<td>o Incremental: The existing predictions are retained, except if the previous and new predictions have taken place on the same dates. In this case, the previous predictions are deleted.</td>
</tr>
</tbody>
</table>
Additional MRP Features (continued)

**Result analysis**

- MRP/MPS results functions update each MRP calculation (de-synchronization with the ORDERS file from the time an order is taken into account).
  - Manufacturing > Inquiries > Reorder result > MRP results
  - Manufacturing > Inquiries > Reorder result > MPS results
  - Stock > Inquiries > MRP/MPS replenishment > MRP results
  - Stock > Inquiries > MRP/MPS replenishment > MPS results
- MRP calculation is done when MRP processing is run.
- This is not an ongoing process. If modification of the requirement or supplies is made after the MRP calculation, the suggestion might not be in step with the new situation.

- Information displayed includes work in process by period (bucket).
Additional MRP Features (continued)

- Header view of all parameters linked to product-site reorder mode:
  - Suggestion type
  - Reorder mode

- Inquiry of the various product-site stock:
  - Physical stock
  - Allocated stock
  - Starting stock

- Access to the following (through buttons):
  - Site stock: a stock inquiry
  - WIP: Orders in process function, updated at every event that impacts the WIP
  - Reorder policy
  - Status
  - Product
  - Product site
Additional MRP Features (continued)

Purge suggestions

- Use Purge suggestions (FUNPURSUG) accessed from Manufacturing > Batch processes to purge the suggestion generated by MRP, MPS, or the previous MPR replenishment depending on filters and selections.

You can select:
- Type: Purchase order, work order, and/or transfer suggestions.
- Origin: Stock (ROP, Periodic), MRP, MPS
- Range of products and/or end dates

At the start of each process, the following purges are carried out:
- For each existing CBNHEA record (either type)
- Purge suggestions for this process type
- Delete CBNDET records
- Delete CBNHEA records
- If the process is not MRP and MPS, purge remaining suggestions of this origin

In some situations, particularly where MRP and MPS are used together, or where Product – sites have had their reordering mode change, you may want to purge suggestions manually before running a process.
Lesson Practices

Complete the following lesson Practices in the order shown.

Set up the site and requirement parameters

In this Practice, create a copy of an existing site and then set up the requirement parameters.

Make a copy of an existing site.

1. Under Setup > Organizational structure, select Sites.
2. In the Sites Left list, select site NA012 (Bike & Toy Products) under NA10 NA Discreet.
3. At the Site field, replace NA012 with TR012 and enter Phoenix Bikes for the description. Enter Phx Bikes for the short title.
4. Click the Warehouse tab and make sure the Warehouse management check box is cleared.
5. Click Create and click Continue to confirm the duplication.
Lesson Practices (continued)

Set up the requirement parameters.

1. Under Setup > Stock, select Requirements parameters.
2. In the Requirements parameters Left list, select NA012 (Bike & Toy Products).
3. At the Storage site field, enter TR012 and press the TAB key.
4. On the MRP Calculation tab, make the following settings:

   ![MRP Calculation Tab](image)

   - Click Create and then Continue when prompted to confirm the duplication.
Lesson Practices (continued)

Check the management and reorder modes

In this Practice, make a copy of an existing product and product site. You will also select By Order for the management mode of the product. (Recall that this indicator is used in the reorder calculation [MRP and MPS].) Also verify the reorder method of the product is By MRP.

Make sure the product sequence for the FINIS category is cleared.
1. Under Common data > Products, select Product categories.
2. In the Products Left list, select the FINIS (Finished Product) product category.
3. Clear the entry at the Product sequence field.
4. Press the TAB key.
5. Click Save.

Make a copy of an existing product and set up the product site.
1. Under Common data > Products, select Products.
2. In the Products Left list, select FIN001 (Children’s std road bike).
3. Enter a new product ID BIKEBLUE in place of FIN001 product.
4. Enter Blue – Child std road bike as the description.
5. Use the FINIS product category.
6. Clear the entry at the UPC code field.
7. On the Management tab, select By Order as the management mode.
8. On the Customers tab, select NA004 as the customer.
9. Enter NA004FIN001 as the customer product.
10. Delete the FR001 customer on row 1, if it exists.
11. Click Create and then Continue to confirm the duplication.
12. Click Product-site in the Right panel.
13. At the Storage site field, enter TR012 (Phoenix bikes).
14. On the Planning tab, make sure By MRP is selected for the reorder mode.
15. At the Reorder policy field, enter BNT, if it is not already selected.
16. At the Suggestion type field, make sure Manufacturing is selected.
17. Enter 5 as the production lead time.
18. Click Create.
Lesson Practices (continued)

Create a production BOM.
1. Under Common data > BOMs, select *Production BOMs*.
2. Select *FIN001* in the Left list.
3. Enter a parent product called *BIKEBLUE* based on the FIN001 product.
4. Write down the component product numbers:

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

5. Make sure the *Available to Use* option is selected.
6. Click *Create* and then *Continue* to confirm the duplication.
7. Return to the Navigation page.
8. Under Common data > Products, select *Products*.
9. For each of the component products that you wrote down in step 4, access *Product-site creation* under Functions in the Right panel. Select the TR012 site and click *Creation*. This will place all the component products into the TR012 warehouse.

Identify the work centers to use.
1. Select *Routing management* under Routings in Manufacturing > Technical data.
2. In the Left list, select the routing for the *FIN001* product for site *NA012*.
3. Click the *Routings* tab and identify the work centers used in the NA012 warehouse. (Scroll past the work center group column.) Write down the work centers.
Lesson Practices (continued)

Create the work centers for site TR012.

1. Select Work centers under Work centers in Manufacturing > Technical data.
2. Access the work centers that you identified in the previous steps and copy them for site TR012.
3. Use the Actions icon to tunnel on the Costing dimension field and create the costing dimension for site TR012.
4. Click Create and then Continue to confirm the duplication. Close the Costing dimension page.
5. In Work centers, click Create and then Continue to confirm the duplication.
6. Repeat these steps until all the work centers you previously identified are copied for site TR012.

Create a routing.

1. Select Routing management under Routings accessed from Manufacturing > Technical data.
2. Click New and select BIKEBLUE for the routing, a routing code of 40 (Production), and TR012 for the site.
3. For the header title, type Bike, R330, 54cm, Blue.
4. Make sure the routing is available to use.
5. Also make sure you can change materials and operations for the routing.
6. Click the Routings tab and enter the following operations using the work centers previously created.
   - Operation 5 Wheel assembly
   - Operation 10 Install components
   - Operation 15 Final assembly
   - Operation 20 Adjustments
7. Click Create.
Lesson Practices (continued)

Modify reorder parameters

In this Practice, change the reorder parameters for the BIKEBLK product.

1. Under Common data > Products, select Products.
2. Select the BIKEBLUE product you previously created.
3. Click Product-site in the Right panel to open the Product – sites window.
4. In the Product – sites Left list, select the BIKEBLUE product.
5. On the Planning tab, change the value at the Production lead time field to 10.
6. Use the Jump to icon to tunnel on the Reorder policy field to open the Reorder policy window.
7. Make sure the Safety stock, Replanning analysis, and Apply % loss check boxes are cleared.
8. Click Save if needed and then close the Reorder policy window.
9. Click Save in the Products - sites window.

Create a sales order and run MRP

In this Practice, create a sales order and run the MRP process.

1. Under Sales > Orders, select Orders.
2. In the Transaction selection window, click ALL (Full entry).
3. Click New.
4. Enter TR012 for the sales site.
5. Select NA004 as the sold-to customer.
6. Click the Delivery tab.
7. Select TR012 as the shipment site
8. For the required delivery date, select a date two months greater than the date that is currently displayed.
9. Click the Lines tab.
10. Select the BIKEBLUE product you previously created.
11. Enter 10 for the quantity ordered.
12. Tab through the line accepting all defaults.
13. Click Create.
Lesson Practices (continued)

15. Select the TR012 storage site and then click OK.

16. Take a few minutes to review the Material Requirements Planning log that is displayed.

17. Correct any errors listed on the log and then run MRP processing again.

18. Close the log and return to the Navigation page.


20. In the Transaction selection window, select ALL Full entry.

21. Select the TR012 site and BIKEBLUE product.

22. Click Search. Take a few minutes to review the results.

23. Close the page.

Understand the impact of routing lead times

In this Practice, change the production lead time to routing lead time.

1. Under Setup > Stock, select Requirements parameters.

2. Select the TR012 storage site.

3. On the MRP Calculation tab, change the production lead time to Always routing lead times.

4. Press the TAB key and then click Save.

5. Return to the Navigation page.

6. Run MRP processing again (Manufacturing > Planning).

7. Select storage site TR012 and click OK.

8. Review and then close the log.

9. Run MRP results (under Reorder results in Manufacturing > Inquiries).

10. Select site TR012 with product BIKEBLUE.

11. Click Search.

12. What is the WOS start date? _________________________________
Lesson Practices (continued)

Experiment with the scrap impact

In this Practice, experiment with the scrap impact in the MRP process. **Note:** You may need to move the date out in order to see the work order in the planning workbench.

1. Select *Products-sites* accessed from Common data > Products.
2. Select the *BIKEBLUE* product for site TR012.
3. Click the *Planning* tab.
4. At the Shrinkage percent field, enter 10.
5. Click the Jump to icon to tunnel on the Reorder policy field.
6. In the window that is displayed, select the *Safety stock* and *Apply % loss* check boxes.
7. Click *Save* and close the Reorder policy function.
8. Click *Save* and close the Product-site function.
10. In the Requirements parameters Left list, select *TR012 Phoenix Bikes*.
11. Change the load calculation to 0.
12. Change the setting at the Production lead time field to *Product lead times*.
13. Click *Save* and return to the Navigation page.
15. Click *OK*.
16. Review and then close the log.
17. Run *Planning workbench* (Manufacturing > Planning).

**Note:** To see results in the Planning workbench, you may need to extend the date by several months or find or release the work order and check for operational loads.

18. In the Transaction selection window, select *All Full entry*.
19. Select the TR012 site and *BIKEBLUE* product.
20. Click *Search*.
21. For the work order suggestion (WOS), what are the remaining quantity and projected quantity?

_________________________________________________________________
Lesson Practices (continued)

Experiment with the safety stock

In this Practice, experiment with the safety stock in the MRP process.

1. First, create a sales order (Sales > Orders > Orders) based on your previous sales order, for the BIKEBLUE product.
2. The expected delivery date is the current week for a quantity of 10 for customer NA004.
3. Click Create and then Continue to confirm the duplication.
4. Next, access Products-sites (Common data > Products) and make the following entries.
   • Select the BIKEBLUE product for site TR012.
   • Click the Planning tab.
   • Change the shrinkage percent to 0.
   • Change the safety stock to 50.
5. Click the Jump to icon to tunnel on the Reorder policy field and select the Safety stock check box, if it is not already selected. Click Save and close the Reorder policy window.
6. Click Save and close the Product – sites window.
7. Run MRP processing (Manufacturing > Planning) using site TR012.
8. Click OK.
9. Review and then close the log.
10. Run MRP results (Manufacturing > Inquiries > Reorder results).
11. Select the TR012 site and BIKEBLUE product.
12. Click Search.
13. For the first work order suggestion (WOS), what is its period?

15. Access Requirements parameters (Setup > Stock).
16. In the Requirements parameters Left list, select TR012 Phoenix Bikes.
17. Click the MRP Calculation 1 tab.
18. At the Rebuild safety stock field, select At first requirement.
19. Click Save and return to the Navigation page.
20. Run MPR processing (Manufacturing > Planning) using site TR012.
Lesson Practices (continued)

21. Click OK.
22. Review and then close the log.
23. Run MRP results (Manufacturing > Inquiries > Reorder results).
24. Select the TR012 site and BIKEBLUE product.
25. Click Search.
26. For the work order suggestion (WOS), what is its period?

___________________________________________________________

___________________________________________________________
Lesson 4

Dynamic Locations and Replenishment

In the following topics, you will learn about dynamic locations and replenishment in the manufacturing process.

The topics in this lesson include:

- Managing Dynamic Locations and Replenishment
Managing Dynamic Locations and Replenishment

Setting up location management requires completing the following steps.

- Create the location types.
- Create the locations.
- Create the products.
- Create the product-sites.
- Assigning locations (optional). Assigning locations makes it possible to link one or several products to a location.
- Calculate replenish-able locations (optional). This is used to perform internal replenishment on locations.

The following further describes locations:

- A location is a storage area belonging to a site.
- The level of detail of this area depends on the various management needs. It may be a vast physical area of a location or an asset. In most cases it is a very definitely marked area.
- The location is used to manage the finer details of a site, for example, to be able to find out at any time where a product is stored and where it can be stored.
- A location can be used in all functions linked to stock movements.
Managing Dynamic Locations and Replenishment (continued)

Creating a location type

The location types are necessary for managing stock locations.

- **Location type**
- **Code**
- **Description**
- **Characteristics**

... 

Location type (GESTLO)
Common data > Product tables > Location types

List of location types (TABLOCYP)

- Location types are used to do the following:
  - Code the locations of the storage sites.
  - Group the locations with similar characteristics according to certain criteria (authorized quality, statuses, dimensions, storage constraints, etc…)
  - Assign locations to the products during receipt to stock movements.
Managing Dynamic Locations and Replenishment (continued)

Creating a location

A location can only be created from the record of the location type by clicking the Create locn. button in Right panel of the Location types (GESTLO) function (Common data > Product tables).

- Location characteristics come from the location type and cannot be modified. You can, however, do the following:
  - Modify authorized statuses.
  - Block the location.
  - Assign products.
- After clicking Create locn. in the Location types, the following window appears.

Use this window to enter the range limits on the location codes (with respect to the location format).
  - Click Save to generate all the locations found between these two ranges.
Managing Dynamic Locations and Replenishment (continued)

Creating products with location management

Only products managed in stock use location management. Much of the information regarding creating products is covered in other courses.

- Common data > Products > Product category is used to indicate location management and the titles of the dedicated locations.
- Common data > Products > Products must be managed in stock.
- Common data > Products > Product-site allows you to modify information from the product category, such as location management, the types of locations, and default locations by location title.

Assigning locations

- Assigning locations is useful in the following two situations.
  - Assigning a product for dedicated sites. This is done using Common data > Product tables > Location types.
  - Assigning products for the replenish-able locations.
- Assigning locations from the location type can be handled in two different ways:
  - By indicating the locations and products that may be used for entering a reorder point and maximum stock point.
  - By entering each location-product pair with the possibility of entering a reorder point and a maximum stock point.
- Assigning locations from a location is carried out from the location record using Common data > Product tables > Locations.
  - This is only possible for dedicated or replenish-able locations.
  - The product(s) being assigned must be indicated.
Managing Dynamic Locations and Replenishment (continued)

**Internal transactions**

- You can calculate replenishable locations for which products have been assigned with a reorder point, a maximum quantity, and a minimum lot.
  - The Calculate replenishable locations function in the Stock > Internal transactions block searches the locations entered internally, compares the actual stock and the reorder point, and generates the replenishment proposals in the form of location changes.
- Use Reorder plan in the Stock > Internal transactions block to replenish locations for which products have been assigned.
  - Replenishment plan is used to obtain inter-location replenishment proposals when the quantity of a product contained in a location has fallen below the reorder point.
  - If there are enough quantities in other locations, change proposals are made. These proposals are shown in the form of location changes, which can be seen on the replenishment plan.
- Use Storage plan in the Stock > Internal transactions block to perform the following.
  - Add the missing information for the products received on dock (receipt, miscellaneous receipt, return, etc.). The receipt on dock is used to rapidly stock, on an awaiting storage type, and mark its receipt without taking the time to accurately enter the stock information required for managing the products effectively.
  - Make storing proposals from selected or displayed stock that is awaiting storage. The system calculates any missing stock information on the lines as well as the location where the stock should be stored according to the management rule used for the original receipt movement (miscellaneous receipt, receipt, or delivery return, etc.).
  - Validate the location changes made and save them on the system and update the original receipt with the final stock information entered when storing.
Managing Dynamic Locations and Replenishment (continued)

**Bin replenishment and put-away**

Some storage locations are considered “working locations” and/or “picking locations.” Stock is regularly pulled from these bins to meet shipping and production requirements. The efficient functioning of the business requires that these bins be re-stocked before they are completely empty. The software provides settings and functions that support this business process.

- Setup: Locations (bins) that require regular replenishment must be identified.
  - The Replenish check box must be selected in Location types.

- Each replenishment location must have a product assigned.
  - Each replenishment location must have a reorder point, a maximum capacity, and an EOQ in the Locations function for a product.

- When the functions run, each location is examined for replenishment. A suggestion to refill the bin (based on EOQ) is created if the location contains less than the reorder point.
  - You can view a list of locations to be replenished. Additionally, after the stock has been moved, inventory transactions representing the stock movement can be created.
Managing Dynamic Locations and Replenishment (continued)

- The following process must be performed on a regular basis based on the rate of consumption from the bins. This can be hourly, daily, weekly, or monthly as needed.
  - **Process step 1:** Access Calculation of replenished locations from the Stock > Internal transactions block.
  - **Process step 2:** Access Reorder plan under Stock > Internal transactions. This function assists in picking the locations and products to be replenished. You can accept or reject suggestions and select the exact stock to be replenished by lot, location, and other factors.
    a) Select suggestions to replenish.
    b) Select source of stock.
    c) Create list of storage.
    d) Repeat the steps above to create as many lists as needed.
    e) Move stock on each list to the appropriate bins.
    f) Use the validate function to create the supporting transactions.
    g) Update your calendar to repeat the cycle.

- **Process step 3:** The last process is not directly related to bin location replenishment. It is used to provide a convenient way to receive stock to a docking station and then move it to a permanent storage location at a later time. This avoids the need to immediately determine a put-away location providing the ability to receive and put away later.
  a) Set up a bin as a docking station.
  b) Receive into the location.
  c) Run the storage plan and click Search to see is required for put-away.
  d) Create a put-away list (list of storage) by clicking Storage list.
  e) Print the list if needed.
  f) Move the items to permanent storage.
  g) When the moves are complete, create translations by validating the list of storage.
Lesson 5
Work Order Components

In the following topics, you will learn how to view and modify component information of a work order, including adding materials and operations, and how to change an alternate BOM.

The topics in this lesson include:
- Modifying Work Order Components
- Lesson Practices
Modifying Work Order Components

As discussed in the Manufacturing – Fundamentals course, the Components tab in Work order (GESMFG), accessed in Manufacturing > Planning, is used to list the components required for producing the released product (parent). It also provides information about components initialized due to the bill of materials (BOM) link. You can generate a list of materials during work order creation, which is translated in the work in process (WIP) as gross requirements, firm reservation material (MWF), and planned reservation material (MWP) type orders. In this topic, you will also learn about the many ways to view or modify component lines in a work order.

### Modifying lines

You can modify component lines of a work order as illustrated below.
Modifying Work Order Components (continued)

- The Actions icon allows you to view information such as management data, and projected stock. You can also use Actions icon to view product – site information, projected stock, perform manual and global allocations, and view tracking status.

- Depending on the setup of the component line, the Actions icon options may vary. Additionally, if you click Allocation in the Right panel, the options accessed from the Actions icon may vary. For example, for allocated lines, you cannot exclude components.

- If you click the Actions icon on a blank line on the Components grid, you can add or exclude unexpected material, and add a phantom sub-group (except multi-product work orders).
Modifying Work Order Components (continued)

Sorting

Use the Sort by Operation / Material option from the Actions icon to sort the components in the grid by operation or by product. This option “toggles” between these two sort methods.
Modifying Work Order Components (continued)

**Material detail**

Use the Material Detail option accessed from the Actions icon to view data that has an effect on material availability.

- Components can be linked to routing operations, according to the manufacturing process requirements.
Modifying Work Order Components (continued)

- The following is an example of how the operation lead time and material dates work together.
  - The operation lead time is used at the release of the product and in MRP calculation. It is used to offset the component requirement regarding the production start date of the parent. Lead time is expressed in workdays.

![Diagram showing order start date and produced item](image-url)
Modifying Work Order Components (continued)

Excluding and reactivating lines

Use the Exclude line and Reactivate options on the Actions icon to exclude or reactivate a component line.

- When you exclude a component line, the line status changes to Cancelled. Reactivating the component line changes the line status back to Pending.
- Note: The Exclude line option is available only if the component is not allocated and the user profile grants permission to modify the component line.
Modifying Work Order Components (continued)

**Manual allocations**

Use the Manual Allocations option on the Actions icon for a component row to manually allocate the materials during work order creation.

---

**Manual allocations**

---

<table>
<thead>
<tr>
<th>Location</th>
<th>Status</th>
<th>Available STM</th>
<th>Allocated qty/STM</th>
<th>Site allocated LC</th>
<th>PDU</th>
<th>PWG-STM conversion</th>
<th>Quantity in stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST012</td>
<td>A</td>
<td>1900</td>
<td>1900</td>
<td>1900</td>
<td>DA</td>
<td>1.000000</td>
<td>1900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Storage site**

<table>
<thead>
<tr>
<th>Location</th>
<th>Status</th>
<th>Available STM</th>
<th>Allocated qty/STM</th>
<th>Site allocated LC</th>
<th>PDU</th>
<th>PWG-STM conversion</th>
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<td>1900</td>
<td>DA</td>
<td>1.000000</td>
<td>1900</td>
</tr>
</tbody>
</table>
Modifying Work Order Components (continued)

- Clicking Selection criteria in the Right panel allows you to refine your selection criteria. For example, if you enter a Pack unit as a filter, clicking Save displays only the stock lines with the pack unit in the Left list.

![Selection criteria in the Right panel](image)

- You can also de-allocate a component manually using the Automatic deallocation button.
- The Filter parameterized locations check box is selected by default. If a location allocation rule is set in the product category, the proposed stock lines will use the rule.
Modifying Work Order Components (continued)

Global allocations

Use the Global allocation option on the Actions icon for a component row to globally allocate the materials during work order creation.

Global vs detailed allocation:
- Global allocation is stock that is reserved but not identified.
- Detailed allocation is stock that is reserved and identified (lot, sub-lot, status, location, serial number, PAC, etc).
Modifying Work Order Components (continued)

**Viewing allocations**

Use the View allocation option on the Actions icon for a component row to view the allocation information for a component line.

- An allocated component is a component for which a reservation has been performed, but which has not left the shop.
- Only firm orders can be allocated.
Modifying Work Order Components (continued)

- You can also use the Allocation option in the Right panel in Work orders to view a summary of the component allocation information.

The allocation statuses include:
- Non-allocated
- Partial
- Complete
- Partial/shortage
- Complete/shortage
Modifying Work Order Components (continued)

**Viewing projected stock**

Use the Projected stock option on the Actions icon to view the projected stock levels of a product by site for all sites. The information you can view takes into account all the requirements and resources for the product. The planned and projected stock quantities display in the grid, as well as the order document number and original document.

- All the orders in process display in the grid, sorted by requirement date (or end date).
- Requirements are shown in red and resources are shown in black. Quantities do not use + or – signs.
Modifying Work Order Components (continued)

Viewing text components

Use the Text option accessed from the Actions icon to view or print comments created for the component.
Modifying Work Order Components (continued)

Viewing tracking status

Use the Tracking Status option on Actions icon to view the planned, consumed, remaining, allocated, and shortage quantities.
Modifying Work Order Components (continued)

**Viewing stock management data**

Use the Management data option using the Actions icon to view product and site data, reordering information, unit of measure, and default locations for stock.
Modifying Work Order Components (continued)

- In the Stock management data window, you can use the buttons in the Right panel to view the stock information by status (A, Q, or R) or by unit. You can view the units of measure available for the product as well.

**Viewing product – site information**

Use the Product - site option using the Actions icon to view product site for the component.
Lesson Practices

Complete the following lesson Practices in the order shown.

**Check quantity availability**

In this Practice, create a new work order and check the available quantity for a component.

1. Under Manufacturing > Planning, select Work order.
2. At the Transaction selection window, select STD Standard.
3. Click New.
4. At the Planning site and Production site fields select NA012.
5. Tab to the grid.
6. At the Product field, select FIN903 (Yellow Wagon Body) and press the TAB key.
7. At the Released field, type 100.
8. At the BOM Code field, enter 40 (it may default to 40).
9. Continue tabbing to the end of the line, accepting the defaults.
10. Use the Backward scheduling mode.
11. Enter today’s date for the end dates. (The system asks for the end date first.)
12. If prompted that the date comes before the current date, click OK.
13. Click Create.
14. Click Yes if a downstream reschedule message displays.
15. Write down the work order number. ________________________________
16. Click the Components tab.
17. On the SFI913 component line, tab to the Available qty column.
18. Is there enough quantity of the component? ________________________________
19. Click the Actions icon on the SFI913 component and select Material Detail.
20. Take a few minutes to review the information on the Component detail window.
   - What is the link type for the component? ________________________________
   - What is the quantity BOM unit of measure? ________________________________
   - What is the component type? ________________________________
21. Why is it possible to make changes in the work order? __________________________
Lesson Practices (continued)

Allocate manually

In this Practice, set the material tracking method, create a new work order, and view the impact of the scheduling on the component required date. You will then perform a manual allocation.

Set the material tracking method.

1. Under Common data > Products, select Product - sites.
2. In the Product-sites Left list, select the FIN903 (Yellow Wagon Body) product for product site NA012.
3. On the Management tab, select Backflush for the stock material mode.
4. Press the TAB key and click Save.
5. Return to the Navigation page.
6. Create a work order (Manufacturing > Planning > Work order).
7. At the Transaction selection window, select ALL.
8. Click New.
9. Select NA012 for the planning and production sites.
10. Tab to the Product field in the grid and select FIN903 (Yellow Wagon Body).
11. At the Released field, type 1200.
12. At the BOM Code field, leave the entry at 40.
13. Tab to the end of the line, accepting all defaults.
14. Use today’s date as the end date.
15. Click Create.
16. Review and close the log.
17. Click the Components tab and view the components.
   - How many components comprise the product? ___________________________
   - What is the status of each component? ______________________________
   - What are the allocated quantities? ______________________________
18. Write down the work order number. ______________________________
19. Using the same work order, click the Actions icon on a component line, and select Manual Allocations.
20. In the window that is displayed, click Selection criteria in the Right-panel.
21. At the Status field in the Filters section, select the ‘A’ statuses check box and click Save.
Lesson Practices (continued)

22. Make sure the lot in the Left list is selected.

23. What do you observe about the stock lines that display on the Left list? Location? Status? How many available?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

24. Click Save.

View projected stock information

In this Practice, view the projected stock information for a component.

2. In the Transaction selection window, select STD Standard.
3. Select a work order that you previously created.
4. Click the Components tab.
5. Click the Actions icon on the first line in the grid and select Projected stock.
6. Take a few minutes to view the information about the projected stock for the component.

Create a text component

In this Practice, enter a text line for a component of a BOM.

1. Under Common data > BOMs, select Production BOMs.
2. Select the FIN903 product in the BOM left list.
3. Click the Actions icon on a blank line at the bottom of the Component product grid and select Record entry. The Mfg record BOM window is displayed.
4. At the Component type field, select Text.
5. At the Link description field, enter Text component.
6. Type Component text for the link description.
7. Click OK.
8. Click Save in Production BOMs.
9. Click the Printer > Record in the Right panel to print the Bill of material listing.
10. In the Enter report parameters window, click the Print button in the Right panel.
Lesson Practices (continued)

11. Why doesn’t the text link display on the Bill of material listing?
___________________________________________________________________
___________________________________________________________________

12. Close the Bill of material listing window.
15. In the Transaction selection window, select STD Standard.
16. Click New.
17. At the Planning site and Production site fields, enter NA012.
18. At the Product field, select FIN903.
19. Enter 300 at the Released field.
20. At the BOM Code field, leave as 40.
21. Continue tabbing to the end of the line, accepting all defaults.
22. Enter today’s date as the end dates.
23. Click Create.
24. Click Yes if prompted with a downstream reschedule message.
25. Write down the new work order number. ________________________________
26. Click the Components tab and view the text line that was added.

View tracking status information

In this Practice, view the tracking status information for a component.
1. In the work order you previously created, click the Components tab.
2. Click the Actions icon on a component line and then select Tracking Status.
   - What is the planned quantity for the component? _________________________
   - What is the remaining quantity for the component? _____________________
   - Is there a shortage amount? __________________________________________
Lesson Practices (continued)

View stock management information

In this Practice, view stock management data for a component.
1. In the work order you previously created, click the Components tab.
2. Click the Actions icon on a component line and then select Management data.
   • Is the product being stock-managed?
   _______________________________________
   • What is the reordering mode? ______________________________________
   • Is there safety stock? _____________________________________________

View product – site information

In this Practice, view product – site information for a component.
1. In the work order you previously created, click the Components tab.
2. Click the Actions icon on a component line and then select Product - Site.
   • Is the product under quality control? _________________________________
   • Is the product under location management? __________________________
   • What is the material tracking method? ________________________________
In the following topics, you will learn how to work with phantoms in bill of materials.

The topics in this lesson include:

- Working with Phantoms
- Lesson Practices
Working with Phantoms

Phantoms are groups of components used in other bills of material. An example is a sub-assembly that is built, but whose process now takes place at the assembly level. Another example is a common group of components used in many assemblies.

- Typically, you would expect processes such as MRP or Work Order Release to pass through the phantom and express the component requirements directly on the work order. However, there are many circumstances where you can find stock of a phantom. If so, it can be consumed. In this case, the management becomes more complex.

- In Work Order Release, if stock of a phantom exists, it will be proposed and included in Work Order Materials. If stock exists to meet part of the requirement, you can use the phantom stock or not use it, and add sufficient components to meet the shortage.

- For information about taking the phantom product stock into account see the Defining MRP Parameters lesson.
Lesson Practices

Complete the following lesson Practices in the order shown.

Create and work with a phantom

In this Practice, create a new phantom production BOM so that we can re-use a container and lid for multiple products, if needed.

1. First, view the FIN301 (8oz Jalapeno Bean Dip, 24 PK) product (Common data > BOMs > Production BOMs).

2. Notice that sequence number 10 is for the container for component RAW321 and sequence number 20 is for the lid for component RAW324.

3. Return to the Navigation page.

4. Under Common data > BOMs, select Multi-level BOMs and then enter NA021 for the site.

5. At the Parent product field, select product FIN301.

6. View the jar and lid components in the structure, which should look similar to the following.

7. Return to the Navigation page.

8. Next, look at the PHANT product category by selecting Product categories accessed from Common data > Products.
Lesson Practices (continued)

9. Select PHANT from the Product category Left list and confirm that the Phantom check box is selected in the Types of category section.

```
   TYPES OF CATEGORY
     Service    Phantom
     Tools      Generic
     Maintenance
```

10. Return to the Navigation page.
11. Under Common data > Products, select Products.
12. Click New.
13. At the Category field, select PHANT.
14. At the product description field, type Package assembly as the description.
15. Select STD for the accounting code and NOR for the Tax Level 1.
16. Click Create and write down the product ID that is automatically generated.
17. Return to the Navigation page.
18. Create a new production BOM by selecting Production BOMs under Common data > BOMs.
19. Click New.
20. At the Parent product field, enter the phantom product ID previously created.
21. At the BOM code field, enter 40.
22. Select the Available to Use option.
23. On the Components tab, click the Sequence field and tab to the Component field. Select the RAW321 component.
24. Tab to the Link quantity STK field and enter 48. Tab through the remaining fields on the line.
25. For the next line, select the RAW324 component with 48 at the Link quantity STK field.
26. Click Create and then close the page.
27. Next, go back to the product FIN301 (Common data > BOMs > Production BOMs) and delete the component lines for the container (RAW321 and lid (RAW324)).
28. After the last line, add a line for the phantom component. Use a quantity of 1.
29. Click Save and then close the page.Lesson Practices (continued)
Lesson Practices (continued)

30. Access the Multi-level BOMs function (Common data > BOMs) again using site NA021 to view the parent product FIN301.

31. Take a few minutes to view the Package assembly components. Do you see the phantom that you created?

32. Expand the phantom level to view the jar and lid components.
Lesson 7

Multi-Product Work Orders

In the following topics, you will learn how to work with multi-product work orders.

The topics in this lesson include:

- Working with Multi-Product Work Orders
- Lesson Practices
Working with Multi-Product Work Orders

You would create multi-product work orders if you are building several different styles of products. For example, if you make televisions, the televisions may have different casings. In this case, the product is the same and the same routing and steps are used to make the products. The product may have slight variations. Each product may have a different number, but use the same routing.

When working with multi-product work orders:

- You can only use one routing. Each product must have the same routing.
- Times are based on total quantity, such as the sum of all released quantities.
- Depends on the setting at the Multi-Product Authorize check box in the Work order transaction entry window (Setup > Manufacturing > Entry transactions> Work orders).

- If there is no accumulation, or if there is accumulation at tracking, each material line of the order is linked to its released product line.
  - For more information, see the description for the Material Accumulation Mode (CUMMAT) general parameter in the Manufacturing General Parameters lesson.
- If there is accumulation at release, lines that have been accumulated have a link type of “Complete order.”
  - If a change is made to a released product quantity, a warning displays stating that the material quantities must be adjusted manually.
Lesson Practices

Complete the following lesson Practices in the order shown.

Create a product for multi-product work orders

In this Practice, create a product that you can use when working with multi-product work orders.

1. Under Common data > Products, select Products.
2. Create a new product from an existing product FIN001. Create FIN001R from this product.
3. On the Identification tab, clear the UPC code.
4. On the Customers tab, select customer NA004.
5. Enter NA004FIN001R as the customer product.
6. Click Create and then click Continue to confirm the duplication.
7. Under the Functions menu in the Right panel, select Product-site creation.
8. Select NA012 and then click Creation.

Add a routing

In this Practice, add a routing.

1. Under Common data > BOMs, select Production BOMs.
2. Create product BOM FIN001R from FIN001.
3. Click Create and then click Continue to confirm the duplication.
4. Close the page.
5. Go back to Products – sites (Common data > Products).
6. Select product FIN001R in the Products Left list.
7. Click the Manufacturing tab.
Lesson Practices (continued)

8. Add the routing FIN001 for all the routing fields.

![Routing Table]

9. Click Save.
10. Close the page.

Verify the Accumulate Upon Release parameter

In this Practice, make sure the general parameter for accumulating the components upon release is set in the GPA Manufacturing folder.

1. Under Setup > General Parameters, select Parameter values.
2. In the Left list, expand the GPA Manufacturing folder.
3. Expand Folder.
4. Select the SEED folder.
5. Click the Actions icon at the WOM group and select Detail.
6. Set the CUMMAT parameter to Accumulation upon release, if it is not already set.

![Parameter Table]

7. Click OK.
8. Click Save.
Working with Multi-Product Work Orders (continued)

Enter the work order

In this Practice, enter a work order.

1. Under Manufacturing > Planning, select Work order.
2. At the Transaction selection window, select All (Full entry).
3. Click New.
4. At the Planning site and Production site fields, enter NA012.
5. At the Product field, enter FIN001.
6. Tab to the Released field and enter 1000.
7. Tab through to the next line.
8. At the next line, at the Product field, enter FIN001R.
9. At the Released field, enter 1000.
10. Press the TAB key to enter all the remaining defaults for the line.
11. Enter today’s date for the start and end dates.
12. Click Create.
13. Click Yes at the rescheduling message.

14. Exit the Phantoms window if it appears.
15. Write down the work order number. __________________________
16. Why are the routings the same for both products? __________________________
17. Click the Components tab.
18. Are the component lines accumulated for the two products? ________________
Lesson 8
By-Products and Scrap

In the following topics, you will learn how to manage by-products and scrap.

The topics in this lesson include:
- Managing By-Products
- Managing Scrap Allowance
- Lesson Practices
Managing By-Products

**Definition**

By-products are secondary products that are produced when making another product.

- **Examples:**
  - The sub-assembly is packed in a protective case. When it is used in a full assembly, the protective case is sent back to stock.
  - During plastic molding, the runners are collected and become re-usable materials (re-grind).
  - A component is made from an angular piece of sheet metal. The center piece that is cut out can be returned to stock as a blank for smaller components.

**BOM component line**

- By-products are defined in Bill of Materials as a component with a component type of By-product.
  
  - **Note:** It is possible to set up a tool as a by-product. First, set up the tool (tap, die, mold, adjustment wrench, etc.) in the Products function as a tool type.

- If the Valuation field is set to Yes in the BOM component line (Common data > BOMs > Production BOMs), the value of the by-product is taken into account when calculating the standard cost of the product.
  
  - The calculated standard cost is reduced by the value of the by-product.
Managing By-Products (continued)

<table>
<thead>
<tr>
<th>Processing</th>
</tr>
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</table>
| - In MRP, a suggested by-product working (BWS) record is created for the by-product, indicating an increase in stock.  
  - By default, it is on the start date of the order.  
  - If attached to an operation, the end date of the BWS is the end date of the operation. It is usually necessary to attach a by-product to an operation.  
- In work orders, a firm by-product working (BWF) record is created for the by-product.  
  - It appears on the Header tab of the work order object, under Release Products.  
  - The line can be deleted or modified from the object.  
  - It cannot be modified from workbenches.  
  - It is held in the MFGITM table with ITMTYP=2.  
- Tracking:  
  - In production tracking, it is tracked with the manufactured product.  
  - In Material Tracking Plan, it is not available to process.  
  - In Manufacturing Plan, it is available to process. |
Managing Scrap Allowance

Scrap formula
- The following shows the scrap formula used in the software:
  - \( Q_r = Q_n (1 + \text{scrap}) \)
  - \( Q_n = \text{Quantity need} \)
  - \( Q_r = \text{Quantity to release} \)
  - For example, if \( Q_n \) is 100 and the scrap factor is 50%, then \( Q_r \) is 150.
    Released quantity = 100 * (1 + .5) = 150

Processing
- Scrap on a component line of BOM:
  - Usually increases the amount of the component required in MRP. This is controlled by the Ignore link % scrap in Setup > Stock > Requirements parameters.
  - Also included in Cost Calculations according to the GPA / COS/ SCAMAJ parameter.
  - Also in the calculation of component requirements during creation of a work order. This is controlled by the Shrinkage on release field in Product – sites of the parent product.

Managing Scrap Allowance (continued)

**Product - site**

- You can set the shrinkage percentage on the Product – Site Planning tab (Common data > Products).

  ![Shrinkage Percent 0.000](shrinkage_percent.png)

  - This is linked to Replenish policy (Common data > Product tables) at the Apply % loss field.

  ![Apply % loss](apply_loss.png)

  - If the Apply % loss check box is selected, quantities will be increased to allow for loss.

  - This is equivalent to expecting to lose product during post-production quality control.

  - If the shrinkage percentage is set to 10%, a requirement for 100 leads to a suggestion for 110.

**Work center**

- The shrinkage percentage in Routing defaults from Work Center.

  ![Shrinkage in % 0.000](shrinkage_in_percent.png)

  - This gives an increase in the planned quantity (and time) for that operation. It will not roll back to previous operations or the materials.

**Shrinkage in routing**

- The formula is applied to operation quantities. Sage X3 considers each scrap operation separately. Be very careful when setting up scrap values.

- **Note:** During the process of time tracking, for the second operation, Sage X3 does not propose an operation quantity of 95. It ignores if 5 has been scrapped and proposes 100.
Lesson Practices

Complete the following lesson Practices in the order shown.

View by-products

In this Practice, view by-products. For the product FIN001, you will add a by-product to the production BOM. First, however, you will need to create a category called SCRAP (Steel scrap).

1. Under Common data > Products, select Product categories.
2. Select the RAWMA product category and replace the Category field with SCRAP with a description of Steel scrap.
3. In the Types of flow section, select the Bought, Sold, and Deliverable check boxes.
4. On the Management tab, make sure the Managed option is selected.
5. On the Units of measure tab, make sure a weight unit of LB (Pound) is displayed.
6. Click Create.
7. Click Continue to confirm the duplication.
8. Close the page.
10. Click New.
11. At the Category field, select the SCRAP category you previously created.
12. At the Product field, type STEELSCRAP and a description of Steel scrap.
13. On the Financials tab, at the Tax level field, select NOR (Normal), if it is not already selected.
14. Click Create
15. Click Product-site in the Right panel and associate site NA012 with the product. (Select site NA012, click Create and then End.)
16. Click Save and End.
17. Under Common data > BOMs, select Production BOMs.
18. In the BOM Left list, select FIN001.
19. On the Components tab, go to the line after the last line in the grid and add a by-product. At the Component type field, select By-product.
20. Add STEELSCRAP as the by-product.
Lesson Practices (continued)

21. Enter 1 at the Quantity BOM UO field and tab through the remaining field in the line.

22. Click Save and close the page.

23. Next, create a new work order that contains the by-product added to FIN001. Under Manufacturing > Planning, select Work orders.

24. At the Transaction Selection window, select ALL (Full entry).

25. Click New.

26. At the Planning Site and Product Site fields, select NA012.

27. Tab to the Product field in the grid and select FIN001.

28. At the Released field, type 200.

29. Tab to the end of the line.

30. Enter today’s date as the end date and press the TAB key.

31. Click OK if you receive a message that the date is before the current date.

32. Click Create.

33. If prompted with a scheduling message, click Yes.
Lesson 9
Multi-Level Planning

In the following topics, you will learn how to work with planned or firm work orders and purchase orders associated with BOM sub-levels.

The topics in this lesson include:

- Understanding Multi-Level Planning
- Lesson Practices
Understanding Multi-Level Planning

Use Multi-level planning (MULTIWOX) accessed from Manufacturing > Planning to launch the planned or firm work orders and the planned or firm purchase orders corresponding to all or a selection of the BOM sub-levels. You can transfer identical generated information to a group of orders, such as a project code, a BP code etc.

Many times there will be a multiple-level product defined, and the creation of one product’s work order will necessitate the creation of other product work orders (and purchase orders for raw materials). MPS/MRP suggests the appropriate work orders and purchase orders needed, individually. This function allows you to create these multiple level structures in one functional area.

Before using this function, the following should already be set up.

- Product and product-site for finished goods and raw materials
- Bill of materials defined
- Routings defined
- Multiple-level structure established

Multi-level planning

<table>
<thead>
<tr>
<th>Site</th>
<th>Type</th>
<th>User</th>
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</thead>
<tbody>
<tr>
<td>HA023</td>
<td>Chemical Products</td>
<td>ADMIN</td>
</tr>
</tbody>
</table>

**Planning**

- Status
- Planned quantity
- Start date
- End date
- Order description

**Process**

- BOM code
- Routing
- Routing code
- Lead time
- BP

**Semi-finished**

- Category
- Management mode

**WO documents**

- Report
  - Printer
  - Major version
  - Minor version
Understanding Multi-Level Planning (continued)

- The Work Order Description, Project, BP, and Source Document fields are regarded as optional.
  - If any of this information exists, it is transferred to all the work orders and purchase orders that are generated, with the exception of the project code that is not picked up in the purchase orders linked to the contract.
- Only the exploded BOM products are filtered matching the method selected at the Entry mode field.
- You must specify the release transaction at the WO Transaction field.
  - You can also choose whether the calculations for the work order start/end dates and purchase order receipt dates are calculated as a function of the lead-times entered at the level of each product or by considering the times carried by the routings.
- Use the Planning section to choose which status to generate and the quantity to release.
- If the Ctrl stock avail. Allocation check box is selected, the system controls the available stock and proposes only orders for products without available stock.

Orders to process

After all the criteria are entered, click OK to display the proposed orders. Note that these are only suggestions and nothing has been created. If needed, you can manually modify or complete the proposed orders.

- The grid displays the bill of materials hierarchy.
- You can select lines as needed. (You can also use the Include / Exclude buttons to include or exclude all lines.)
- Click Reinitialize to return to the initial state of the suggestions made by the system after applying modifications.
Understanding Multi-Level Planning (continued)

- Click Generate to generate the suggestions and modifications made. Only the selected lines are taken into account.
- Products that display in red indicate a warning or problem, such as an invalid routing or quantity.
- After you have selected the lines, click Generate. A log file is displayed at the end of the process, which provides the order and work order codes generated for the products.
- The suggestions shown with a red check mark can be created in the report (these have no missing information).
- If the product code displays in red text, the suggestion cannot be confirmed.
  - If it is a work order, ensure the dates are actually attainable. However, you can allow the system to generate a work order with a start date in the past.
  - If it is a purchase order, you must complete either the contract or the supplier to validate the suggestion.
- For each suggestion, the following is displayed:
  - The order type (which also indicates the status)
  - The product
  - The quantity (this information can be modified)
  - The start and end dates for the work order or the requirement date for a purchase-type replenishment. This information is modifiable.
  - The routing alternative needed for the generation of the work order for the different sub-levels.
  - For a purchase-type replenishment, a preferred supplier displays if it is known. You can also specify a contract using the Actions icon.
  - A balance sheet displays the following information that has been calculated by the system:
    - First provision date: This date can be modified. Any modification leads to a recalculation for all the components.
    - The availability date requested during the release.
    - The availability quantity: This is the available quantity in stock on the date of the planning.
    - Available at date: This is the quantity available for the start date proposed. The theoretical availability calculated by the system using the purchase lead times for all the components of the finished product.
- You can also use the Actions icon on each order line to access the stock management data or access the planning workbench (Multi-level planning).
Lesson Practices

Complete the following lesson Practices in the order shown.

Generate orders for multiple levels

In this Practice, generate orders for multiple levels.
1. Under Manufacturing > Planning, select Multi-level planning.
2. Select NA012 as the production site.
3. Select FIN901 as the multi-level product to process.
4. Select Firm as the status.
5. Enter 50 as the planned quantity.
6. Enter today’s date at the Start date field.
7. Select All as the management mode, if it is not already selected.
8. At the BOM code, enter 40.
9. At the Routing field, select FIN901.
10. Click OK.
11. Click OK at the message indicating the release transaction includes automatic scheduling.
12. Take a few minutes to explore the window that is displayed.
13. Do any of the products display in red? If so, why? __________________________
______________________________
Lesson 10
Capacity Planning

In the following topics, you will learn about capacity planning and how load affects capacity. You will also learn about tools to recalculate the load as well as view the load for a site and verify the available capacity.

The topics in this lesson include:

- Understanding Capacity Planning
- Load Recalculation
- Load Inquiry
- Printing Production Documents
- Lesson Practices
Understanding Capacity Planning

In capacity planning, you can look at the entire site and judge the capacity to determine if the manufacturing system has enough people and machines for a given period of time. Work order allocation and scheduling occurs automatically either when the work order is created or through an automatic batch process.

- Production orders are scheduled according to infinite capacity, meaning that when the load against a work center is scheduled, it takes into account the available capacity for each work center for the work order to schedule the load. It does not consider other work orders that are already scheduled.
- The load for each work center can be viewed and smoothed out according to the available capacity by manipulating work order dates.

Loads are managed in two ways:

- The Workload table has a bucket for each work center per load period. This table holds capacity and load for scheduled orders only.
  - This allows for load/capacity comparisons.
- The Operations table holds every operation, including:
  - Firm and planned, scheduled and un-scheduled
  - Suggested within the load calculation horizon
  - This allows total load inquiries, whatever the status or situation of the order, but not as a comparison to capacity.
Understanding Capacity Planning (continued)

- With finite loading, there is an assumption that there is a definite limit to capacity at any work center. Infinite loading, on the other hand, assumes the capacity is infinite at any work center.

**Understanding the capacity planning structure**

As learned in the Manufacturing – Fundamentals class, capacity is the capability of a work center to produce output during a given period of time.

- Capacity planning helps you determine if resources will be available to support the master production schedule.
  - It is important to check for constraints in order to determine if the system will fail or succeed. If needed, the plan can then be altered.

In the following diagram, the operation times are entered in a routing operation in hours. The maximum time (waiting, post-operation) is taken into account in the scheduling.
Load Recalculation

- The load recalculation process rebuilds the load buckets according to the period breakdown.
  - Load Recalculation should be run regularly, particularly if the load buckets are progressively sized.
  - The reference date is considered as the new start date for any orders that are unfulfilled.
  - You can select whether orders that are in arrears should be automatically rescheduled and whether operations with force dates are modified.
- The reference date is considered the new start date for any orders that are in arrears.
- The following diagram is an example of load and finite scheduling.
  - Work Center 1
  - Number of resources = 5
  - Hours per day = 7

![Diagram of Load Recalculation Example](image-url)
Load Recalculation (continued)

Use Recalculate loads (FUNMIWL) accessed from Manufacturing > Batch processes to recalculate the load. This process is important to load management. It also allows you to reschedule all past orders relative to the reference date used for the recalculation.

- Enter the reference date, from which the load buckets are built.
- The work center represents an entity for which the load needs to be planned and/or the production times need to be tracked.
  - Each work center is associated with an assignment site.
  - The work center corresponds to the production resource on which a routing operation will be carried out.
- In the Parameter definition section, select to enable the rescheduling of unfulfilled work orders and/or optimized work orders.
Load Recalculations (continued)

- After clicking OK, a window similar to the following is displayed allowing you to view the load recalculation information.

![Log Reading F14488](image)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
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<td></td>
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<tr>
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<td><strong>NM01 Food Products</strong></td>
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</tr>
<tr>
<td><strong>Reference date</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Start - end range</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Work center</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Parameters</strong></td>
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<td><strong>Reschedule optimized as</strong></td>
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</tr>
<tr>
<td><strong>Work Order suggested SUXNA20210160119</strong></td>
<td><strong>updated load</strong></td>
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<td><strong>updated load</strong></td>
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</tr>
</tbody>
</table>
Load Inquiry

Use Loads (CONSMWK) under Loads accessed from Manufacturing > Inquiries to display the available load for a given site and to verify there is available capacity. You can also filter the results based on work center, work center group, and date criteria. The load represents the load generated during the creation of a work order (firm or planned) or generated during the launch of MRP with load calculation. This load may be scheduled or not. The un-scheduled order load is displayed by operation start and end dates that correspond to the start and end dates of the work order.

Before using this function, you should have defined work centers, routings, and scheduling parameters. For more information about the scheduling and load parameters, see Scheduling/Load (LOA Group) in the Understanding Manufacturing Parameters lesson.

Use the Actions icon on the grid to view the load and capacity information in graphical format. The graph creates a view of the current load against the available capacity for the work center.

- The graph identifies periods that are overloaded and need smoothing, as well as periods that have available capacity.
Load Inquiry (continued)

- You can filter the load based on work centers or work center groups.
- The load for each work center can be viewed and smoothed out according to the available capacity by manipulating the work order dates.
- The date range is used to view the load and list out all the jobs that are scheduled to start in the week being planned.
- Click Criteria to enter additional sort criteria.
- After the selections are entered, click Search to load the jobs that are scheduled to start in the week being planned.
  - If additional resources are available, capacity adjustments can be made on the work centers and the load can be recalculated.
  - Reschedule work orders as necessary to adjust the work center load.

Smoothing bottlenecks

In the load results window, you can determine which jobs need to be moved. This can be done by analyzing the periods that are overloaded, viewing the jobs that are scheduled for that period and making a determination of which jobs to move.
Printing Production Documents

Use the Production documents function accessed from Reports > Prints/group > Manufacturing to provide team leaders at each workstation with various manufacturing documents, such as job tickets, material issue notes, routing sheets, technical sheets and answers, and production slips. This provides the team leaders with information about what to perform for the day.

You should review the job packet and Dispatch report with the shop manager. Then, you can adjust the loads and capacity to meet the unexpected changes to the schedule. The job packet moves with the job during the production process. The Material issue notes (Pick List) is sent to the warehouse to pull the needed materials.

- Print the load for each work center that is scheduled to start during this date range.
Lesson Practices

Complete the following lesson Practices in the order shown.

Recalculate the loads

In this Practice, recalculate the loads.
1. Under Manufacturing > Batch processes, select Recalculate loads.
2. At the Production site field, enter NA012.
3. At the Reference Date field, use today’s date.
4. Select the Rescheduling and Reschedule optimized orders check boxes.
5. Click OK.
6. Take a few minutes to view the information in the log that is displayed.
7. How many firm work orders were rescheduled? _____________________________
8. How many suggested work orders were rescheduled? ________________________
9. Close the log window and then return to the Navigation page.

View load and capacity information

In this Practice, view load and capacity information.
2. At the Site field, select NA012.
3. At the Grouping field, select By Site, if it is not already selected.
4. Accept all other defaults and click Search. A list of all the jobs can be viewed and analyzed, including the start dates, end dates, and remaining quantity for each work center.
5. Click the Action icon and select Show graph.
6. Take a few minutes to view the load and capacity information that is displayed.
7. Click a point on the grid and access the operation load information.
Lesson Practices (continued)

Print material issue notes

In this Practice, print material issue notes.

1. Under Reports > Prints/group > Manufacturing, select *Production documents*.
2. In the Selection window that displays, select *BSM (Material issue notes)*.
3. At the Plant range fields, enter *NA012*.
4. At the Date range fields, enter 12/15/13 and 12/15/14.
5. At the Output type field, select *PREVISU*, if it is not already selected.
6. Click *Print*.
7. Take a few minutes to view the information that is displayed on the report.
8. Close the report window.
Lesson 11
Sub-Contracting

In the following topics, you will learn about setting up sub-contract BOMs and working with sub-contracts with and without work orders.

The topics in this lesson include:

- Setting Up Sub-Contracting BOMs
- Types of Sub-Contracts
- Sub-Contracting With a Work Order
- Sub-Contracting Without a Work Order
- Viewing Cost Prices for Sub-Contract Orders
- Lesson Practices
Setting Up Sub-Contracting BOMs

A bill of material (BOM) can be used to describe the list of component references for a given product regarding service. You can have several sub-contract BOMs for a single product. The sub-contract BOMs are used in the entry of the purchase order document.
Setting up Sub-Contracting BOMs (continued)

Setting up a BOM for sub-contracting

- Set up the sub-contract BOM as a service provision for the product category. This is done under Product categories (GESITG) accessed Common data > Products.

Create the products. This is done in Common data > Product > Products (GESITM).

Create the product-site for the product and site you are using. This is done in Common data > Products > Product – sites (GESITF).
Setting up Sub-Contracting BOMs (continued)

- Create the location type. This is done in Common data > Product tables > Location types (GESTLO).

![Location types](image)

- Create the location. This is done in Common data > Product Tables > Locations (GESLOC).

- When setting up sub-contracting for BOM production, make sure you have a BOM code set up. This is done in Common data > BOMs > BOM codes.

![BOM code](image)

- The alternative BOM type is used to distinguish the BOMs for sub-contracting usage from those used for the production management and sales.

- The BOM alternatives are used to define several BOMs for a single product with the BOM reference being made up of the product reference and the alternative number.
Setting up Sub-Contracting BOMs (continued)

- You can define one or more alternative BOM codes of type sub-contract. For each one, you can enter a description and short title.
- You can also restrict the usage of the BOM by operator through the use of access codes.
- The sub-contract BOM alternatives can be set up for specific sites.

Creating a sub-contracting BOM

Use Sub-contracting BOM (GESBODS) accessed from Common data > BOMs to create a sub-contracting BOM.

Several BOMs can be defined for the same product reference. Alternate BOMs are distinguished with a code.

The grid displays the components. A component cannot appear twice with the same sequence in a BOM.
Setting up Sub-Contracting BOMs (continued)

- The various alternate BOM codes can be used to manage different product structures according to their use, such as MRP calculation, sales order entry, or manufacturing/production.

- The reference date is used to select the products according to their validity start and end dates. **Note:** The reference date cannot be equal to zero or earlier than the current date.

- At the Management unit field, it is possible to enter a BOM for 1 product unit, 100 product units, 1000 product units, in percentage, or for a specific product lot size. If using a percentage, the total must equal 100%.
  - The Management unit field is used to define the quantity of the BOM links on a basis other than the product unit.
Types of Sub-Contracts

Functions related to outsourcing are used only when the stock is provided to the supplier of the service without transfer of ownership.

There are two standard flows:

- Sub-contracting with a work order
  - Setup is on the routing step for subcontracting
  - Uses the normal production BOM
- Sub-contracting without a work order (independent process)
  - Requires setup of a subcontracting BOM

Impact on categories

- The Product category function allows you to create the product used in the subcontracting process with or without a work order.
  - Service provision: Indicates that product with this category type is used in a subcontract BOM or a subcontract routing operation.
  - Subcontract and Manufactured: For manufactured products.
  - Bought: For components provided by the sub-contractor and indicates the product is of type Purchased.
  - Deliverable: For components to be shipped from sub-contractors (and not necessarily sold).
Sub-Contracting with a Work Order

Sub-contracting with work order follows the general work order process – the steps are similar to the normal manufacturing work order flow with the exception that the purchase order is created during the manufacturing process.

- You can assign sub-contracting operations.
- A cost can be generated.
- Sub-contracting is managed as a combination of manufacturing and purchasing flows. A link is established between the Purchase Order module and Work Order module allowing:
  - Traceability between manufacturing requirements and purchase order.
  - Link to the supplier for shipment of components.

The stages include the following:

1. Create a work order as you normally would (compulsory): The work order has at least one routing requiring sub-contracting. This step is similar to standard manufacturing flow except it relates to outsourcing.

2. Create the purchase order from the work order (compulsory): This can be done from Work Order, Enterprise Planning, or Groupings. Rates and deadlines come from the service product.

3. Allocation of components to outsource (optional): This is a normal allocation of the work order. Booking can be automatic depending on the sub-contractor stock levels.

4. Shipment of material to the sub-contractor (optional): This can be done through Shipping. It is important to check the Sub-contract shipment check box after the new entry is started. Sub-contractor transfer is used to transfer parts from internal location to sub-contractor location.
Sub-Contracting with a Work Order (continued)

- 5. Receipt of the purchase order from the sub-contractor (compulsory):
  
  This receipt can trigger manufacturing follow-up:
  
  Sub-contracting operations considered complete.
  
  If productive operation, entry in stock of finished products according to quantity received.
  
  Tracking materials associated with the sub-contract operation from the location associated with the sub-contractor.
  
- 6. Additional manufacturing tracking (compulsory): It is likely the work order created in step 1 has many operations/steps; therefore, it is necessary to track the non-subcontracting steps as is done for a normal work order.

- After setting up the routing, you create a work order as you normally would. Once released, the work order follows the routing steps in the proper order until the sub-contracting step is reached.

**Return management - outsourcing**

- You can make returns for sub-contractors; however, only finished products are shipped to the sub-contractor.

- There is no possibility of reactivating the production order and the order of the original purchase.

- You must re-create a production order where the sub-contractor must return the goods.
Sub-Contracting Without a Work Order

The function of sub-contracting without a work order was created to meet several requirements:

- A growing need in the industry to outsource all or a part of its production from a simple assembly to a complex product (automotive, aviation, etc.).
- Manage outsourcing simply without using and configuring the Manufacturing module.
- Other characteristics of sub-contracts without work orders include:
  - Each sub-contract is connected to a unique service-provider.
  - A line of a purchase order is attached to a single service provider; however, it is possible to have multiple suppliers for the same service.
  - The objective is to manage firm and planned sub-contracting orders (equivalent to work order).
  - Sub-contracting orders can be created manually or automatically as the result of a requirement, such as MPS, MRP, etc.
  - Orders can be inter-site or inter-company.
  - Orders can allow cost calculation.
  - A new type of order (EO – External Order) appears in WIP management.
Sub-Contracting Without a Work Order (continued)

- The stages for creating a sub-contracts without work order include the following:
  - 1. Create sub-contracting order: This step is specific to the flow of outsourcing but is comparable to creating a type of “material only” order. Use Subcontract orders (GESSCO) accessed from Purchasing > Subcontract to plan and order the services and materials for sub-contracted products.

- 2. Create purchase order (compulsory): The purchase order is created in this step, which can be done from Sub contract order, purchasing plan, or consolidation plan. You can also click the Order button on the Sub contract orders window. This step groups services and components provided by sub-contractor.

- 3. Allocation of components to outsource (optional): This is performed in the sub-contract or using the automatic allocations (use Purchasing > Subcontract > Automatic Allocations). Booking can be automatic depending on sub-contractor stock levels. You can also perform automatic de-allocations (Purchasing > Subcontract > Automatic De-Allocations).
Sub-Contracting Without a Work Order (continued)

- **4. Shipment of material to sub-contractor (optional):** This can be performed through Shipping. Sub-contractor transfer is used to transfer parts from internal location to sub-contractor location.

A shipment of the sub-contracting type is never attached to an order. It is always a direct shipment. It is therefore necessary during a shipment of this type to specify that it is a shipment designed to a sub-contractor. The confirmation of the shipment corresponds to a location change. The stock concerned by a loan delivery, passes from a shipping site location to a sub-contractor location defined in the delivery address of the sub-contractor. There is never a decrease in the physical stock in the case of the confirmation of a sub-contractor shipment; however, the available stock will be decreased.

To be able to carry out a sub-contracting shipment, you must have the LST activity code assigned and also assign a customer role to the supplier, as well as assign a shipment address to them that is linked to the sub-contracting location. A sub-contractor shipment is used to reorder a sub-contractor for which material shortages have been established in the operation carried out. A sub-contracting shipment will, however, not be invoiced or give rise to a pro forma. (The buttons on the window are not available in this case.)

- **5. Receipt of sub-contracting purchase order (compulsory):** In this step, the purchase order is received and the sub-contracted material goes to stock.
Viewing Cost Prices for Subcontract Orders

Use Subcontract WIP inquiry (GESPWI) accessed from Costing > Subcontract costs to view cost prices for sub-contract orders.
Lesson Practices

Complete the following lesson Practices in the order shown.

Create a sub-contracting order (without work order)

In this Practice, create a sub-contracting order without a work order.

1. Ensure that product category SUBCO can be purchased (Common data > Products > Product categories).

2. Ensure that the service product category, SERVI, is set up.

3. Select or set up a subcontractor business partner (use any external supplier).

4. Set up a subcontract location type and create a location at a subcontractor supplier business partner (Common data > Product tables > Location types).

5. Set up a product to be made by a subcontractor. (Common data > Products > Products).

6. Set up a subcontracting BOM for the product above (Common data > BOMs > Sub-contracting BOMs).
   - For each product, indicate if it is to be supplied for our company or the subcontractor.
   - Each product must be purchasable, sellable, and deliverable.
   - Make sure each product can have zero value as set on the stock valuation type.

7. Do a subcontract stock transfer to supply the contractor with any material to be supplied by our company. (The receipt is not possible unless this is done.) (Stock > Receipt/issue transactions > Sub-contract transfers.)

8. Set up a new product to represent the service the subcontractor will perform. (Common data > Products > Products. Use the SERVI contracted service category.)

9. Set up a service price for the above product. (The service price can be entered as a purchase price entry or added to the order itself in Purchasing > Subcontract > Sub contract orders.)

10. Create a subcontract order (Purchasing > Subcontract > Sub contract orders).
    - Enter the subcontract service product.
    - Enter the product to be built by the subcontractor, complete with quantity.

11. Allocate the subcontract created (click Allocate or select Purchasing > Subcontract > Automatic allocations).

12. Create the subcontracting purchase order by clicking Order in the window for the subcontract previously created.
Lesson Practices (continued)

13. Create a receipt for the subcontractor order you created using norm purchase order receiving.

14. Calculate the subcontracting cost (Costing > Sub-contracting cost > Calculate sb-cont cost).
Lesson 12
Tracking Plans

In the following topics, you will learn about the tracking plans available in the software.

The topics in this lesson include:
- Understanding Tracking Plans
- Time Tracking
- Material Tracking Plans
- Manufacturing Plan
- Reintegration Plan
- Technical Sheet Plan
- Managing the Tracking Plans
- Lesson Practices
Understanding Tracking Plans

- As learned in the Manufacturing – Fundamentals course, tracking can be generated from many different sources:
  - BOM tracking for completed quantity or material tracking.
  - Routing tracking for time tracking.
  - Work center tracking for time tracking.

- Tracking without a work order can only be created through the tracking plan functions. Modifications are only possible through Production tracking.
- Tracking can be combined or done automatically as illustrated below.
  - From the Time Tracking Plan, you can combine a time tracking with a production tracking and/or material tracking. You can also generate a production or material tracking from your time tracking.
  - From the Manufacturing Plan, you can combine a material tracking. You can also generate a material plan from your manufacturing plan.
  - From the closure, you can generate time tracking and/or a production and/or material tracking (only if the work order is already in progress).
Understanding Tracking Plans (continued)

Use Managing the tracking plans (FUNBENPLT) accessed from Manufacturing > Production tracking to track time, material, manufacturing, reintegration, and technical sheet plan information. These functions can also be accessed directly from Production tracking as shown below.
Time Tracking

When work orders have been created, at some point, the reporting of labor hours needs to occur. Time tracking allows you to track labor times for one or more work orders simultaneously.

Unlike Production tracking, different types of time can be entered using Time Tracking, such as:

- Time spent on an operation for a released work order.
- Time spent on a routing operation without a work order.
- Miscellaneous time (unproductive time).

The following diagram shows the main features of a time tracking plan.

- The time type is linked to the origin of the tracking:
  - Work Order → Origin = Work Order Number
  - Product → Origin = Routing + Alternate
  - Miscellaneous → Origin = blank

- Depending on the setup of the time transaction, material can also be back flushed when reporting time against an operation on a work order. Finished goods reporting can also be transacted.

- Time tracking allows you to enter the production times or other times at one time.
Time Tracking (continued)

Setting up transaction entries for time tracking

First, you may want to set up the transaction entry window to tailor the way you enter time tracking information. This can be done in the Time tracking entry transaction window.

Use the Time tracking plan (GESMOL) entry transaction window (Setup > Manufacturing > Entry transactions) to define your transactions to track by work order or by routing.

- Time tracking relies on transaction entry windows to determine the type of time that is to be entered (with or without work order and miscellaneous) and if the time entry should be associated with a consumption of material, a production reporting, or should be manual and/or automatic.
- In the Tracking type section, select whether to allow tracking by work order, routing, and/or work center.
- In the Material consumption section, you can define the tracking to perform for material issues linked to the time entry:
  - No: No material consumption.
Time Tracking (continued)

- **Yes manual**: Save the consumption of associated materials.
- **Yes automatic**: The consumption of associated materials is automatically carried out on validation.
- **Yes automatic and manual**: Manually track the associated materials. If the associated materials were not manually tracked, they are upon validation.

- Use the Stock issuing method section to define the material consumption mode for this transaction entry. You can select the mode according to the immediate planned quantity, the ranged produced quantity, or the progressive produced quantity.
- The check boxes in the Filter section are used to specify an automatic tracking options on materials completed, not completed, or on both criteria.
- The Production reporting section determines whether the transaction allows the production statement on the associated products.
  - **No**: No production statement.
  - **Yes manual**: It is possible to save the production statement of the associated end product.
  - **Yes automatic**: The production statement of the associated end products.
  - **Yes automatic and manual**: Manually declare the production of associated products. The production statements that were not created manually are automatically created upon validation.

- The Manual only check box determines whether or not a material with immediate stock issue mode can be tracked by backflush consumption.

### Input tab

Use the Input tab to determine the following:

- Specify whether the personnel ID number can be assigned.
- Define specific stock receipt rules and stock issue rules for some transactions. For example, expert users could authorize a receipt to stock of goods with a status of A using a dedicated transaction; whereas, for all other users, the goods would have a status of Q.
  - **Note**: This is only possible for product categories authorizing this type of receipt rules and having the appropriate move code.
- Determine whether to print the document or not for this transaction. You can also specify whether to be able to enter the number of print jobs for the document.
- The movement code is used to define specific stock receipt rules and stock issue rules for some transactions.
- Activate or deactivate the modification of the operation unit.
Time Tracking (continued)

**Filters/sort tab**

Use the Filters/Sort tab to determine the following:

- Determine the default value at the Filter field (Not closed, Close, or All). This affects the filter of the operations appearing on the plan.
- Determine if the Filter field can be entered, displayed, or hidden.
- Determine the sorting criteria for posting.
- Activate or deactivate the modification of the operation unit.

**Display tab**

Use the Filters/Sort tab to determine the following:

- Determine the default value at the Filter field (Not closed, Close, or All).
- Determine if the Filter field can be entered, displayed, or hidden.
- Determine the sorting criteria for the grid.
Time Tracking (continued)

Entering time tracking information

Use Time tracking plan (FUNBENCHO) accessed from Manufacturing > Production tracking to view the production times and the actual quantities for operations.

- A site must be entered for a standard operation. The site associated with the user is displayed by default, but can be changed.
- At the Personnel field, enter the labor operator.
- The End date field determines the horizon to use.
- At the Filter field, select how to filter the records being tracked (Closed, Not closed, or All).
- If the global time is entered, it is broken down over the different operations of the selection according to the planned times.
Time Tracking (continued)

- Use the Selections section to enter the start and end work order product numbers, operations, released product numbers, routings, alternate routing, and work centers. This information is used to refine the results that display in the grid.
- Click Criteria to further filter the operations.

Grid entry

The grid is loaded with routing or work order operations according to the selection criteria. Many of the fields in the grid provide an opportunity to enter more precise information.

- The posting date for the transaction is defaulted to the current date. You can reenter this date to a prior date on the condition that the date is in an open period. You cannot enter a date that is later than the current date.
- The Time type field can take the following values:
  - **WO**: The declared time regarding the work order operation. The work order to be tracked can come from the selection criteria or added manually in the grid.
  - **Product**: This is for information purposes and is not associated with a work order.
  - **Miscellaneous**: The declared time regarding non-productive time, such as cleaning, maintenance, etc. on a work center.
- The Order no. field is the work order number allowing for a unique identifier. This number is generated automatically at each creation.
- If WO is the time type, you can modify the Actual Work Center and the Actual Labor W/C fields.
- The Personnel ID field is used for collecting information about the personnel or team.
- The Tot achieved qty field is the total quantity completed for the operation. It includes the rejected quantity or the quantity under control coming from the operation. To minimize the entry and if the transaction set up allows it, the completed quantity for each operation is loaded by default with the remaining quantity for the work order. The operation closure is proposed by default.
- The Operation UOM field is the unit of measure in which the production is occurring.
- The Message field allows you to assign a message to an operation tracking. This also allows you to create new messages during tracking.
Time Tracking (continued)

- Click Validation and review the log that is displayed.

---

Log Reading F11867 DEFAULT ⬤

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/12/14 15:51:43 (ADMIN) Time tracking</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Track WO Material : WO02000010 5 IN7501 Qty consumed 140000 LB</td>
</tr>
<tr>
<td>5</td>
<td>Track WO Material : WO02000010 5 RAW507 Qty consumed 4000 EA</td>
</tr>
<tr>
<td>6</td>
<td>Track WO Material : WO02000010 5 RAW507 Qty consumed 1800 EA Caution: quantity limited to the available stock!</td>
</tr>
<tr>
<td>7</td>
<td>Track WO Material : WO02000010 5 RAW507 Qty consumed 1800 EA Caution: quantity limited to the available stock!</td>
</tr>
<tr>
<td>8</td>
<td>Production reporting on WO : WO02000010 FMM502</td>
</tr>
<tr>
<td>9</td>
<td>Completed qty: 4000 PL</td>
</tr>
<tr>
<td>10</td>
<td>Track WO operation : WO02000010 5 MACT55</td>
</tr>
<tr>
<td>11</td>
<td>Completed qty: 4000 PL Rejected completed qty: 0 PL</td>
</tr>
<tr>
<td>12</td>
<td>Set time completed: 0 Hours Run Time completed: 192.6 Hours</td>
</tr>
<tr>
<td>13</td>
<td>Creation of WO tracking W002000100</td>
</tr>
<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Normal end of log file 09/12/14 15:59:01</td>
</tr>
</tbody>
</table>
Material Tracking Plans

Use Material tracking plan (FUNBENCHM) accessed from Manufacturing > Production tracking to record the consumption of a group of materials either on a work order or on a BOM (without work order).

- Tracking is carried out on the selected production site. The site associated with the operator displays by default, but can be changed.
- Enter dates for the required date range which the work order materials to be issued from stock are selected.
- In the Selections section, enter ranges at the fields to refine the filter on the work orders.
- All the columns displayed in the grid depend on the type of tracking.
- The current date displays at the Date field by default, but can be changed.
  - You can enter an earlier date than the current date, but not a later date.
  - The stock issues are carried out on this date.
  - The system validates that the entry falls in a period for which stock updates are authorized.
Material Tracking Plans (continued)

- You can enter the tracking type, which can be of type work order or BOM.
  - **Work order**: Consumption deals with a material related to the product work order.
  - **BOM**: Consumption deals with a material related to a BOM.
- At the Order no. field, a unique work order number is automatically generated.
- The BOM field contains the bill of materials code for the product.
Production Plan

A Manufacturing plan provides a way to prepare for resources, people, and facilities for the operations and manufacturing processes.

**Setting up transaction entries for the production plan**

First, you may want to set up the transaction entry window to tailor the way you enter manufacturing plan information. This can be done in the Production Plan entry transaction window.

Use the Production plan (GESMIL) entry transaction window (Setup > Manufacturing, Entry transactions) to enable/disable work order tracking, select the default quantity to use during tracking, determine if materials can be back flushed, and determine how material issues will be managed.

- The Parameter definition section determines if work order tracking is enabled.

Production Plan (continued)

- The options in the Filter section are used to specify automatic tracking on materials completed, not completed, or on both criteria.
- Select the default quantity to use during tracking.
- The Material consumption section allows you to:
  - Determine how material issues will be managed.
  - Define the material consumption mode.
- The Manual issue only check box determines if the materials can be back flushed or if manual issue is required.

Filters/sort tab

Use the Filters/Sort tab to make the following settings:

- Determine if the filter can be modified during tracking.
- Define the sort criteria for selected lines (by date, by work order, or by product).
- Enter the transaction groups and movement codes associated with the issue and receipt transactions.
Production Plan (continued)

Entering production plan information

Use Production plan (FUNBENCHI) accessed from Manufacturing > Production tracking to record the production of a set of products jointly with a material consumption. This can be done either on the basis of a work order or a BOM without a work order. The usefulness of this process is for manufacturing environments that produce the same item on the same line each day without interruption.

Production plan STD : Production reporting

- Enter the site on which to carry out the tracking.
- The end date range allows you to select the released articles of work orders to be received to stock.
- In the Selection section, if the request applies to BOMs and not work orders, these fields are used to filter on the BOMs in question.
- The columns displayed in the grid are the released products and sub-products linked to the work orders of the selection and/or the products manufactured on the selected BOMs.
- The current date displays by default, but can be changed. You can enter an earlier date than the current date, but not a later date.
  - Receipts to stock and potential joint stock issues are posted on this date. The system validates that the entry falls in a period for which stock updates are authorized.
Production Plan (continued)

- The grid also displays the tracking type, work order code, BOM, actual quantity, and whether the work order is closed.
  - If not all the information required to complete the stock entry displays automatically, the product is displayed in red, indicating that the remaining information needs to be entered manually.
- The Production Plan is set up to backflush materials when production is reported into stock.
- By reporting a quantity into stock, the Production plan consumes all materials required to produce end items according to the bill structure.
- Labor is not a factor and will not be tracked when performing this type of reporting.
- The Production plan also allows a range of end products to be transacted simultaneously.
Reintegration Plan

A Reintegration Plan allows the return of stock of materials associated with or without a work order. This is done without affecting the product produced (received into stock).

**Setting up transaction entries for the reintegration plan**

First, you may want to set up the transaction entry window to tailor the way you enter reintegration plan information. This can be done in the Reintegration plan entry transaction window.

Use the Reintegration plan (GESMRE) entry transaction window (Setup > Manufacturing > Entry Transactions) to set up the Reintegration plan transaction entry screens.

<table>
<thead>
<tr>
<th>Parameter Definition</th>
<th>Filters/Sort</th>
<th>Display</th>
<th>Stock</th>
<th>Analytical</th>
</tr>
</thead>
<tbody>
<tr>
<td>WO reintegration</td>
<td>BOM reintegration</td>
<td>Single warehouse</td>
<td>Warehouse</td>
<td>Hidden</td>
</tr>
</tbody>
</table>

- At least one reintegration plan transaction entry is installed with the software and can be modified or deleted.
- You can specify whether to track on the work order and/or BOM.
Reintegration Plan (continued)

**Entering reintegration plan information**

Use Reintegration plan (FUNBENCHR) accessed from Manufacturing > Production tracking to record the reintegration of a group of materials either on a work order or on a bill of materials (without work order). For example, you can take off some materials from the work order and place them back into stock.

**Transaction selection**

<table>
<thead>
<tr>
<th>ALL Mat Reorder Full entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>STD Full reorder: wkrb</td>
</tr>
</tbody>
</table>

**Reintegration plan ALL : Mat Reorder Full entry**

- Enter the site where the reintegration will take place.
- At the Filter field, select to show All, Not Closed, or Closed records.
- In the Selections section:
  - The Work Order range fields are used to set a filter on the work orders to be processed by the reintegration plan. This filter is only accessible if the tracking type WOW is planned by the transaction.
Reintegration Plan (continued)

- The Operation range fields are used to set a filter on the materials to be processed by the reintegration plan. This filter is only accessible if the tracking type WOW is planned by the transaction.

- The Release Product and Alternate range fields are used to define a filter on the BOMs to be processed.

- The Material range fields are used to filter the materials to be processed among the selected work orders and BOMs.

- The columns available on the grid depend on the type of tracking that needs to be carried out.

- If the location is not entered and the product is managed by location, the stock window displays.

- Using the Actions icon on the grid allows you to view the material quantities (Tracking Report), material detail, the work order, and stock movement information associated with the material. You can also enter receipts (Enter Detailed Quantities).

- Click Search to load the grid with materials to be tracked according to the selection criteria.

- Click Validate to confirm all entries.
Technical Sheet Plan

Use Technical sheet plan (FUNBENCHT) accessed from Manufacturing > Production tracking to create and modify the answers to the technical sheets within the framework of operation trackings created previously. Operation trackings display based on the selection criteria.

- Enter the site where the tracking takes place.
- You can enter ranges for production tracking, operation, and work center to refine the filter.
- Click Search to display the results of the selection criteria.
- The tracking number is automatically generated and provides a unique identifier.
- Use the Actions icon on a line in the grid to manage the tracking and technical sheet for the transaction.
- Operation trackings within the Tracking date range display in the grid.
- The Routing field indicates the reference identifying the product, which is generated by a sequence number counter.
- Several routings can be defined for a single product reference. The codes at the Alternate field:
  - Manage different operation processes according to their use, such as detailed calculation of costs or global costs, use of different machines, etc.
  - Manage different routings by site.
- The routing is described by means of operation numbers. Each operation corresponds to a task carried out on a given resource with given times.
Technical Sheet Plan (continued)

- The standard operation is a "template" operation used to create or modify the routing operations.
  - The definition of the fields of a standard operation is very similar to that of a routing operation.
- The Type field indicates whether the type is machine, labor, or sub-contracting.
Managing the Tracking Plans

Use Managing the tracking plans (FUNBENPLT) accessed from Manufacturing > Production tracking to launch the Managing the tracking plans function after selection of the work orders with the status of Firm, Not suspended, Pending, In process, or Completed. This is a general process that can perform many actions.

The actions you can perform are:

- Time tracking plan
- Material tracking plan
- Manufacturing plan
- Re-integration plan
- Technical sheet plan

You can click Criteria in the Right panel to further refine the search criteria.
Managing the Tracking Plans (continued)

- After entering criteria, click Search to display the results in the grid.
- In the grid, select the Pick check box adjacent to the work order(s), and then click one of the buttons in Right panel to perform the following functions.
- Use the other related buttons in the Right panel to perform the following:
  - Click Time to create a Time tracking plan.
  - Click Manufacturing to create a manufacturing plan.
  - Click Consumption to create a material tracking plan.
  - Click Reintegration to create a reintegration plan.
  - Click Technical sheets to create a technical sheet plan.

<table>
<thead>
<tr>
<th>Search</th>
</tr>
</thead>
<tbody>
<tr>
<td>Criteria</td>
</tr>
<tr>
<td>Time</td>
</tr>
<tr>
<td>Manufacturing</td>
</tr>
<tr>
<td>Consumption</td>
</tr>
<tr>
<td>Reinstatement</td>
</tr>
<tr>
<td>Technical sheets</td>
</tr>
<tr>
<td>Include all</td>
</tr>
<tr>
<td>Exclude all</td>
</tr>
</tbody>
</table>
Lesson Practices

Complete the following lesson Practices in the order shown.

Enter material tracking information

In this Practice, enter material tracking information. Copy the work order previously created to make a new work order. Use the new work order for this Practice.

1. Before you start, create a new work order by copying a work order you previously created (Manufacturing > Planning > Work orders).
2. View the components of the work order and add a miscellaneous receipt to ensure sufficient stock is available for the work order.
4. At the Transaction Selection window, select STD Material Consumption.
5. Select the work order you previously created.
6. Select the site.
7. Click Search
8. Click Validation.
9. Make note of the materials that are tracked and the tracking number.
10. Close the page.
11. Access Work order status (Manufacturing > Production tracking).
12. Enter the site.
13. Select the work order you previously created.
14. Click Tracking detail.
15. Take a few minutes to view the information, and then return to the Navigation page.

Enter production plan information

In this Practice, enter manufacturing plan information.

1. Under Manufacturing > Production tracking, select Production plan.
2. At the Transaction selection window, select STD Production reporting.
3. At the Site field, select NA012.
4. Click Search.
5. Delete any lines that are not ready for validation.
6. Click Validation.
Lesson Practices (continued)

7. Click Yes when prompted with the entry validation message.

8. The Production tracking log is displayed. Take a few minutes to review the information in the log.

9. What are the completed quantities for your work orders?

| ______________________________________ |
| ______________________________________ |
| ______________________________________ |

10. Return to the Navigation page.

Return materials to stock

In this Practice, create a copy of a work order, create the materials, and then return some materials back to stock.

Copy an existing work order.


2. At the Transaction selection window, select ALL (Full launch Full entry).

3. In the Left list, copy the last work order you created.

4. Clear the work order number and press the TAB key. (This allows you to create a new work order based on the existing work order.)

5. Change the order status to Firm.

6. Change the amount at the Release field to 100.

7. Change the start and end date to 12/15/14.

8. Click Create, and then click Continue to confirm the duplication.

9. Click Yes if prompted with a rescheduling message.

10. Write down your new work order number. ______________________________________

11. Close the page.

Note: You may need to add stock to the work order in order to track the materials and allocate.

Access Time Tracking.

1. Under Manufacturing > Production tracking, select Time tracking.

2. At the Transaction Selection window, select STD.

3. Enter the production site and work order from the previous steps.

4. You must also change the dates to make sure the work order is in the date range.
Lesson Practices (continued)

5. Click Search.

6. After the total quantity is achieved or the time is entered on the line, you can click Validation.

7. Click Yes when prompted with the entry validation message.

8. In the log window, notice that a component does not have enough stock available.

9. Exit all windows.

Access Reintegration Plan.

1. Under Manufacturing > Production tracking, select Reintegration plan.

2. At the Transaction selection window, select ALL (Mat Reorder Full entry).

3. At the Site field, enter NA012.

4. At the Work Order field enter the work order you previously created.

5. Click Search.

6. At the Qty to be reintegrated field, enter 10 for the amounts of materials you want to return for the first two lines. Notice that the Pick field for the materials displays check boxes.

7. Click Validation.

8. Click Yes when prompted with the entry validation message.
Lesson Practices (continued)

9. In the log window that displays, verify the items are returned.

10. Write down the work order tracking number. _______________________________


Access Work Order Status.

1. Access Work order status (Manufacturing > Production tracking).

2. Select the NA012 production site and work order you created.

3. Click Tracking detail in the Right panel.

4. Click the Components tab. Notice the materials that you returned display “Return” in the Type column (Hint: The return materials may be displayed at the bottom of the grid.)

Access Stock Transactions.


2. Enter the production site NA012 and the product previously used.

3. Click Search.

4. Return to the Navigation page.

5. Access Reintegration plan (Manufacturing > Production tracking).

6. Enter your production site and work order.

7. Click Search.

8. What are the consumed amounts for the materials you returned? _______________________________
   ____________________________________________________________________________
Lesson 13

Mass Updates, Closures, and Completions

In the following topics, you will learn how to perform mass updates, closures, and completions on work orders.

The topics in this lesson include:
- Mass Work Order Updates
- Working with Mass Closures and Completions
Mass Work Order Updates

Use Levelling WO (FUNMAUTP) (accessed from the Manufacturing > Batch processes > Work order > Upgrade), to update a planned and/or firm work order when the bill of material (BOM) or routing has been modified. There is also a new parameter, RELUPD, that is used to determine if the work order should be updated automatically when being converted from planned to firm.

- This function is used to carry out a mass update of the pending work orders from the routings and BOMs.
- All the changes carried out on the technical data from the creation of the work orders can be carried forward.
- At the Formula field, you can enter, select, or build a Sage X3 expression.
- In the Filters section, select to process for planned and/or firm orders.
- Use the fields in the Starting – ending range section to filter the work orders based on individual criteria or ranges of criteria.
Mass Work Order Updates (continued)

- There are three level updates available:
  - **Routing**: Take into account the modifications carried out on the routing.
  - **BOM**: Take into account the modifications carried out on the BOM.
  - **Routing and BOM**: Take into account the modifications carried out on the routing and on the BOM.

- You can choose to ignore or keep unplanned elements:
  - **Ignore**: If a work order contains unplanned elements (materials, operations), you can ignore these orders.
  - **Keep unforeseen elements**: The routing/BOM in these orders will be updated keeping all the unplanned elements.
  - **Discard unforeseen elements**: The routing/BOM in these orders will be updated and the unplanned elements will be deleted.
Mass Closures and Completions

Use Mass closure/completions (FUNTDUCLO) under Manufacturing > Production tracking to perform mass completions and closures of selected works orders. Only in-process firm works orders (those having been the object of a production booking) can be completed/closed. The first window is used to select the work orders to be processed.

- Enter the production site to use for the work orders.
- In the Starting – Ending range section, enter ranges for work order number, product, start date, project and order to refine the filter on the work orders.
- Use the Completed WO only check box to indicate that only completed work orders are eligible for mass closure.
Mass Closures and Completions (continued)

- You can block closures or completions by selecting the appropriate check box in the Block section.
  - **If at least one sub-con ordered/in progress:** The work order in question has a sub-contractor operation and it is on order or in the process of being received. Even if this check box is cleared, the operation cannot be completed and the closure of the work order cannot be carried out. In this case, a message displays in the log file. This check box only has an effect on the completion.
  - **If at least one oper. is not complete:** The current work order has at least one operation where the production tracking status is Pending.
    If an attempt to close the work order occurs, the result depends on the general parameter CTLCLE value. In this case, a message displays in the log file.
  - **If at least one rel. prod not produced:** The current work order has at least one product launched where the production tracking status is Pending.
  - **If at least one material not consumed:** The current work order has at least one material where the production tracking status is Pending.
    If an attempt to close the work order occurs, the result depends on the general parameter CTLCLE. In this case, a message displays in the log file.
  - **If the completed qty < planned qty:** At the time of the closure, if the quantity produced is less than the planned quantity, you can choose to block the closure.

- Use the options in the Automatic Functioning section to control the automatic tracking of materials and operations.
  - **Track automatic materials:** At the time of completion or the closure of a work order, if the production of the launched product has started, you can automatically backflush the consumption of the materials. You must select the check box to carry out the material tracking.
  - **Automatic tracking of operations:** At the time of completion or the closure of a work order, if the production of the launched product has started, you can automatically complete the operations according to the quantity produced of the launched product. You must select the check box to carry out the tracking of operations.
  - **Production Cost Price:** Select this check box to automatically run the work order cost calculation. This allows the system to automatically calculate production costs following a work order closure. Work order finalization is run for each work order and each work order is closed. You can view the results by accessing Costing > Production Cost > WIP Cost Inquiry.

- Click OK to display all the work orders resulting from the selection criteria.
Mass Closures and Completions (continued)

- After clicking OK, the following window appears.

![Mass closing/completions](image)

- Use the grid to select or deselect the lines for work orders being completed or closed.
- You can use the Actions icon on a line to view the work order detail and tracking information.

- Use the options in the Right panel to perform the following:
  - Click Include All or Exclude All to select all or none of the work orders in the grid.
  - Click Close to perform the Closure function on the selected work orders.
  - Click Complete to perform the Completion function on the selected work orders.
Lesson Practices

Complete the following lesson practice

Close and complete mass work orders

In this Practice, close several work orders at one time.

2. At the Production site field, select site NA023.
3. Click OK.
4. Select all the lines and then click Complete.
5. View the log file and then return to the Navigation page.
6. Access Mass closure/completions again and this time close the work orders for the same work orders that you completed above.
Lesson 14

Product Version Management and Change Control Management

In the following topics, you will learn about Product Version Management and Change Control Management (CCM).

The topics in this lesson include:

- What Product versioning is and how it is used
- Learn about the Product versioning setup requirements
- Identify Product Version fields added to Sage X3 functions
- Explain the Change Control Management setup requirements
- Understand the steps to implement and complete the Change Control Management Process
- Lesson Practices
Understanding Product Version and Change Control Management

Product Version management works with the new Change control management module (CCM) to provide you with the tools to identify and track different versions of the same product. The Change control management tools support management of the change process with approvals at various levels leading to a new product version.

The CCM module and the Product Version Management enhancements:

- Create and maintain version management on products and BOMs
- Revise the version for products and BOMs
- Manage different statuses on version number
- Manage restriction on use depending on the status
- Allow you to define which version of a product is to be sold, bought, or produced
- Enable stock management, cost calculation, and stock valuation for each version
- Support reports and statistics for product versions

Product version management and Change control management are two software tools that mutually support one another. It is possible to use version management with or without using the Change control management module.

In this section, product version management and change control management will be described and the processes outlined followed by the setup requirements for version management and the Sage X3 functions that have been enhanced to accommodate product versioning.

A discussion of the Change control management module and its features will follow the review of product versioning.
Understanding Product Versions and CCM (continued)

The main objective of product versioning is to manage changes on a product and control the use a product version number in different transactions and in the Sage X3 functions listed:

- Sales
- Purchases
- Manufacturing
- Subcontracting
- Stock issues

- You can manage the versioning and ensure the traceability of changes for a product through three primary functions in Sage X3, product version management, the manufacturing BOM and the subcontracting BOM. Each of these 3 areas may have different valid dates and different status’ for the same product.

- Version management on the product linked to a version table in which you can follow the different versions.

- Manufacturing and Subcontracting BOMs have new functions in the right panel under the versions dropdown.

  - Revision is used to change the current version and create a future new version with status “In development”.
  - Validation can validate the version “In development” to become “Available to use”.
  - When all changes are complete use management to see the list of different BOM versions.
Understanding Product Versions and CCM (continued)

Change control management is a separate module that supports design and engineering changes to products. This module allows you to manage requests for change through the final changes to a product version. The fundamental steps are listed below and are reviewed later in this lesson in the CCM topic.

The basic CCM steps are:

1. Create a change request
2. Conduct a change impact analysis
3. Approve or reject the request
4. Plan the changes to be made
5. Execute the change request
Setting Up Product Version Management

In this topic, you will learn about what is needed to set up Product version management.

**Stock Management Rule Setup for Version Management**

Before creating and processing versions, setup is required. The stock management issue rules have been enhanced with four new columns on the Issue flow tab. The first three new columns define the possibilities of issuing the stock based on its version type.

Each type has its own column for determining the issue rules. The types are Prototype version, Active version, and Stopped version. A to “Activate” status may also be assigned to a product version. There are four choices available for each type:

- No: issues on this version status are not possible
- Yes, except on hold: issues are possible except if the version is suspended
- No, except exemption: issues are not possible; only if you have an exemption date (stopped version)
- Yes: Issues are possible

The last column determines if an exclusive version number should be used for the stock issue (for example: only the version defined on the sales order line).

- There are two possibilities: Yes or No
  - Yes means an exclusive version number is needed for issue

**Enabling the activity CCM code**

To use CCM and product version management, the activity code ECC must be enabled.

- The ECC tools can be used with and without Manufacturing. CCM is assigned to the Common Data module. ECC Version Management is available with and without the CCM Module.
- Activity code ECCMX will be activated automatically with ECC, to manage versioning in the MRP Process.
- Setup counters for each sequence of product versions to be managed.
- First indicate if stock will be managed at a single or major level. You may also decide to manage secondary or minor versions. Choose the correct stock version management level on the category or product during setup.
- Create version sequence counters for the major and minor versions. Sequence counters for each version level can be setup in the Setup Module under Stock.
Setting Up Product Version Management (continued)

Version Management Counter Setup Information

Use Version counter setup under Setup > Stock to establish the required sequence for identifying product versions.

- Click “Constant management” to add a constant before the version sequence number. The Constant value is the sequence of characters used to set the constant (Alphanumeric) portion of the version counter.
- The Sequence number type allows the user to select from a variety of possible version number patterns.
  - 0 to 9: Numbers in ascending order.
    Example: 0 to 9 with length = 2. You get: 01, 02, 03, …, 99
  - a to z: Alphabetical order (lowercase letters)
  - A to Z: Alphabetical order (capital letters)
  - 0 to 9 then a to z:
    - A sequence where the numbers are first in ascending order, and then letters in alphabetical order (i.e. 0 has the lowest value, and z is the highest)
Setting Up Product Version Management (continued)

- 0 to 9 then A to Z: the same as before with capital letters
  Example: 0 to 9 then A to Z with length = 2.
  You get: 01, 02, …, 09, 0A, 0B, …, 0Z, 10, …, A0, …, AZ, …, YZ, ZZ
  - Sequence start: to choose whether you want to start with 0 or 1.
  - Sequence End: Only if you define a counter with 0 to 9 and a/A to z/Z
    - You can choose the last letter used in the alpha position
  Example: 0 to 9 then A to Z
  Length: 2
  Sequence End: C
  You get: 01, 02, …, 09, 0A, 0B, 0C, 10, …, 1C, …, A1, …, CB, CC.

Simulation supports the function on the right panel to simulate the sequence and see the result in the Simulation field.

Versions

Stock versions can be applied or associated with three products in three types. A product can have a stock version, a bill of materials can be set to produce a version and a subcontracting bill of materials can produce a version.

- Kits, sometimes called commercial BOMs do not use version management because the content of the kit can be changed at the sales order level.
- The Major Version of the product is displayed on the Management tab in the Block Version management. To see the display of all versions and statuses click on the arrow to open the grid for the Major Version. The grid manages the version list for the product and status of each version.

Product Category Setup

A new Version management section has been added to the Management tab of the Product category setup.

- A Version management check box, when selected, indicates the product is to be managed according to its version. This check box must be selected.
- Product versions shows which versions, major, minor or both major and minor versions. The counters can be used to define the version sequence.

Note: the settings on the product can be different from the settings on the category.
Setting Up Product Version Management (continued)

### Stock Version Table

The Stock versions table stores a list of versions used to track a product. The list can be opened directly using the path: Common Data > Products > Versions

- There are eight columns in the display:
  - Major Version
  - Description
  - Short description.
  - Status
    - Prototype: Version in study
    - Active: Validated version
    - Stopped: We stopped using this version
    - To activate: Not validated version, must be activated before use
  - Exemption (Yes /No): To continue to use a “stopped” version
  - Exemption date: Exemption until this date.
  - On hold (yes/ no): To suspend the use of the version
  - Minor versions (Arrow or right click): Jump to minor version grid

- An Arrow in the Major version grid gives access to the grid to manage the list of minor versions for the product. The arrow appears in the last column to the right called Minor Versions.
Setting Up Product Version Management (continued)

- There are 5 columns in the minor version display.
  - Major version, minor version
  - Exemption (Yes/no)
  - Exemption date: Exemption until this date.
  - Flow:
    - Stock: If it’s a stock version (bought, sold, stored)
    - Manufacturing BOM: If it’s a manufacturing BOM version
    - Sub-contracting BOM: If it’s a sub-contracting BOM version

Stock version allows you to define available versions for Sale, Purchase, and Stock flow. It could be different to the Manufacturing or Subcontracting version because you can decide to stop a version in manufacturing, but decide to continue to sell the version of the product until the stock runs out.

Costing of Versions

The different cost methods are managed by version. New fields (Major and Minor version) are added on the screen and in the left list to help you to find a cost for a specific version.

- This can be done for all four methods of standard cost:
  - Standard Cost
  - Revised Standard Cost
  - Budget Standard Cost
  - Simulated Standard Cost
Setting Up Product Version Management (continued)

**Transactional Functions that support version management**

- Stock transactions
  - Miscellaneous receipts / Tab Stock: Major & minor version fields added
    Major or minor version will be displayed or hidden
  - Miscellaneous issues / Tab Parameters: Major & minor version fields added
    Major & minor version will be entered/displayed or hidden
  - Receipts / Tab Stock: Major & minor version fields added
    Major or minor version will be displayed or hidden
  - Deliveries / Tab line 1: Major & minor version fields added
    Major & minor version will be entered/displayed or hidden
  - Stock changes / Tab Stock: Major version field added
    Major version will be displayed or hidden
  - Storage Plan: Major & minor version fields added
    Major or minor version will be displayed or hidden
  - Miscellaneous receipts / Tab Stock: Major & minor version fields added
    Major or minor version will be displayed or hidden
  - Miscellaneous issues / Tab Parameters: Major & minor version fields added
    Major & minor version will be entered/displayed or hidden
  - Receipts / Tab Stock: Major & minor version fields added
    Major or minor version will be displayed or hidden
  - Deliveries / Tab line 1: Major & minor version fields added
    Major & minor version will be entered/displayed or hidden
  - Stock changes / Tab Stock: Major version field added
    Major version will be displayed or hidden
  - Storage Plan: Major & minor version fields added
    Major or minor version will be displayed or hidden
  - Assembly/Disassembly / Tab Stock: Major & minor version fields added
    Major or minor version will be displayed or hidden
Setting Up Product Version Management (continued)

- Manufacturing transactions
  - Work Orders / Tab Input: Major & minor version fields added
    Major or minor version will be entered/displayed/hidden
  - Production Tracking: Major & minor version fields added on
    Tab Issue parameters: version fields will be entered/displayed/hidden
    Tab Receipt parameters: version will be displayed or hidden
- Material tracking plan / Tab display: Major & minor version fields added into the list of fields displayed
- Production plan: Major & minor version fields added on
  - Tab display: version fields added into list of fields displayed
  - Tab Stock : Major & minor version will be displayed or hidden
- Reintegration plan: Major & minor version fields added on
  - Tab display: version fields added into list of fields displayed
  - Tab Stock : Major & minor version will be displayed or hidden

Creating a Version Managed Product

The Product has a new block for version management similar to the product category. It functions in the same way as the product category. Setups on the product category serve as a default for products of that category.

- Settings can be defaulted from the product category, or they can be specified for the product.
- In order to version-manage a product, you must select “Mandatory Lot” within Stock Management setup.
  1) Create a product
  2) Turn on mandatory lot
  3) Turn on version management
  4) Select major or minor or both
  5) Add version sequences
  6) Create a product-site record
  7) Open the version function and add the product and the version number
  8) Set the status of the first product to active
  9) Add additional versions as needed
  10) Add minor versions as needed
Setting Up Product Version Management (continued)

Creating a Version Managed Product Bill of Materials

Production BOMs are version-managed on the header:

- There are four new fields: Major version, Minor version, Version Start Date, Version End Date.
- Each component line has three new fields: Grp; Major version, Minor version, Grp: Numeric field to indicate a group of modifications for the same component’s line.
- Functions in the right panel include four functions.
  - BOM code: To define one BOM code when the status is “In development” and another when the status is “Available to use”. Note: for version management products, there must be separate BOM’s to be both in development and available. To do this setup 2 separate BOM codes one for each condition and use the right panel BOM Code function to manage them.
  - Revision: To revise a BOM and increase the version number of the BOM
  - Validation: To validate the new version of the BOM When you validate the version with status “In development” with the function validation, this is confirmed with a message box. If you click Yes, Sage X3 automatically generates the new BOM version with status “Available to use”.
  - Management: To see the list of versions for the BOM
- Sub-contracting BOMs
  - Contents are exactly the same as those for the Production BOMs
- Commercial BOMs
  - No changes on Commercial BOMs, Commercial BOMs are not version managed as changes can be made directly in the Sales order.
Setting Up Product Version Management (continued)

Performing a Cost Roll up for Version Managed Products

Standard costs:
- The different cost methods are managed by Version.
- New fields (Major and Minor version) are added on the screen and in the left list to allow users to find a cost for a specific version.
- The four methods of standard costing have been enhanced to support versions:
  - Standard Cost
  - Revised Standard Cost
  - Budget Standard Cost
  - Simulated Standard Cost
- All existing WO cost calculations have been improved to manage versioning whilst maintaining the existing behavior.
  - Only one change has been made in the calculation algorithm to take into account the version number of the released product and the goods cost on every component according to the version of components.
  - Screens to show different cost inquiry have new fields (Major and Minor version).
  - WO cost detail report has new fields for Major and minor version.

Managing Work Orders for Version Managed Products

Work order management will manage manufactured products with a version number, and manufactured products that use some component with a version number.
- New fields are added Major and Minor version on the released product line. By-product are managed also. These fields are also present (Major and Minor version) on the component line.
- Validity date of the version is compared with the WO Start date. If the version is no longer available at the start date, it will be not possible to create the WO, and the release product line will be in red. The user must select a version number consistent with the start date.
- If a product has an exemption date on the version, the version is accepted according to the start date of WO and the End date of Exemption. Load the component’s lines regarding the End date of Exemption also. On the component line, if the version number of the component is not available, then the line will be in red, however the WO creation is not blocked. Tracking will be blocked if the component is unavailable when tracking.
Setting Up Product Version Management (continued)

- If the version number on the release product is changed and this version is available and consistent with the start date, then the BOM is reloaded and the components updated as needed.

- Rules to update the work order cannot be applied if:
  - Components are allocated (deallocation is mandatory)
  - The work order is already in progress

Note: the same concepts and rules apply to subcontracted orders.

Tracking Work Orders for Version Managed Products

Production tracking, Production plan material tracking plan, and the Reintegration plan have been improved to support products with version numbers.

- Fields for Major and Minor version have been added into the grid to manage tracking with versioning.
  - Version number can’t be changed for the manufacturing product. We just display this information as defined on the work order.
  - Version number on material lines can be changed according to the rules on the stock issue transaction:

- Movement type, Work Order issue, or subcontract issue.

Work Order Cost Calculation for Version Managed Products

All existing WO cost calculations have been improved to manage versioning while maintaining the existing behavior.

- The calculation algorithm has been improved to take into account the version number of the released product and the goods cost on every component according to the version of components.

- Screens to show different cost inquiry have new fields (Major and Minor version).

- WO cost detail report has new fields for Major and minor version.

MRP for Version Managed Products

Under version management, the settings for the MRP Process remain the same.

- Only the structure and the algorithm has been updated.

- New fields showing Major and minor version have been added to the different functions to manage the MRP results and suggestions.
Setting Up Product Version Management (continued)

<table>
<thead>
<tr>
<th>Sales Functions for Version Managed Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quotes</td>
</tr>
<tr>
<td>- Depending on the entry transaction settings, the major and minor version can be preloaded, entered, displayed or hidden on quote lines.</td>
</tr>
<tr>
<td>- These fields are not mandatory when we create the quote.</td>
</tr>
<tr>
<td>- A message appears if the status of the version number is not authorized.</td>
</tr>
<tr>
<td>Sales orders</td>
</tr>
<tr>
<td>- Depending on the entry transaction settings, the major and minor version can be preloaded, entered, displayed or hidden on Sales lines (same screen as Quotes)</td>
</tr>
<tr>
<td>- These fields are not mandatory when we create the Sales order.</td>
</tr>
<tr>
<td>- A version number can be selected when we allocate stock.</td>
</tr>
<tr>
<td>Allocation</td>
</tr>
<tr>
<td>- Depending on the rules in the product categories and the version number entered on the lines, the allocation of the stock may function differently.</td>
</tr>
<tr>
<td>- If the version number is not entered on the lines, X3 search the version number available.</td>
</tr>
<tr>
<td>- If the version number is entered on the lines and “Exclusive version entered” equal “Yes” only the same version number can be allocated or selected.</td>
</tr>
<tr>
<td>- If the version number is entered on the lines and “Exclusive version entered” equal “No” X3 allocates in priority the same version number and another version number can be allocated or selected if the rules allow.</td>
</tr>
<tr>
<td>Shipment preparation</td>
</tr>
<tr>
<td>- As with quotes and sales orders, shipment preparation includes the versioning and we can see the version number selected in stock issue associated with the picking ticket.</td>
</tr>
<tr>
<td>Deliveries</td>
</tr>
<tr>
<td>- Depending on the entry transaction settings, the major and minor version can be entered, displayed or hidden.</td>
</tr>
<tr>
<td>- Following the picking ticket we are creating a delivery.</td>
</tr>
<tr>
<td>- We can find the previously selected version.</td>
</tr>
<tr>
<td>Invoice</td>
</tr>
<tr>
<td>- Depending on the entry transaction settings, the major and minor version can be entered, displayed or hidden.</td>
</tr>
<tr>
<td>- For customer return, loan return, subcontract material return and credit memo, only the stock detail setting on the transaction will be available for selection if version number is displayed or hidden.</td>
</tr>
</tbody>
</table>
Setting Up Product Version Management (continued)

<table>
<thead>
<tr>
<th>Purchase Flows for Version Managed Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Purchase Request / Purchase order</td>
</tr>
<tr>
<td>- Depending on the entry transaction settings, the major and minor version can be preloaded, entered, displayed or hidden.</td>
</tr>
<tr>
<td>- These fields are not mandatory when we create the purchase order.</td>
</tr>
<tr>
<td>• Receipt</td>
</tr>
<tr>
<td>- Only the stock detail setting on the transaction will be available for selection if version number is displayed or hidden.</td>
</tr>
<tr>
<td>• Purchase order from Subcontracting order</td>
</tr>
<tr>
<td>- Version number specified on subcontracted product is automatically assigned on the purchase line generated.</td>
</tr>
</tbody>
</table>
Setting Up and Using Change Control Management

In this topic, you will learn about what is needed to set up Change control management. Change control management is a separate module that supports design and engineering changes to products. The CCM module allows you to manage requests for change through the final changes to a product version. The steps are below follow the process from the change request to executing the final product changes. See the chart below for additional process detail.

1. Create a change request
2. Conduct a change impact analysis
3. Approve or reject the request
4. Plan the changes to be made
5. Execute the change request
Setting Up and Using Change Control Management (continued)

**Change Control Management Setup**

Activity codes, local menus and parameters must be configured to setup and use the Change Control Management Setup. In addition the Change Manager, Approver, Planner and Actioner must be identified.

The activity code ECC must be on to use change control with version management.

- Set up the CCM parameters
  - Before using CCM for the first time, make sure all the parameters and presetstings data are set up correctly.
  - CCM has 2 levels of parameters:
    - Folder level: Setup -> GENERAL PARAMETERS -> Parameter values
      User level: Setup -> Users (Parameter tab -> Group: CCM)
    - You will find the pre-settings data in Development -> DATA AND PARAMETERS -> Tables -> Local Menus - Messages:
      Module: Common Data
      Activity code: CCM
  - Folder level parameter values
    - Select the Default change manager and planner. You can select the types of email notification to be send by changing the corresponding value to Yes.
Setting Up and Using Change Control Management (continued)

- User parameters
  - Before updating the User parameters (CCMROLE and CCMDEPT), the following data must be available (Note: It is not mandatory to set up these 2 parameters):
    - Local Menu 2036 User Role – for example: Project Manager
    - Local Menu 2037 User Department – for example: R&D
    - In Setup > Users > Users enter the code for the user to be assigned a change request role or roles (the “Active” and “X3 connection” fields for this user must be selected)
    - Click the Parameters tab and find the Common Data, CCM line:

      ![Common Data Table]

      - Click Detail to open the following screen:
        - Select Yes for the roles this user will have in CCM. For example: If the user is a CM then set CCMCHMAN to Yes.
        - The user may have more than one role. You can also select the Department (CCMDEPT) and CCM Role (CCMROLE), but these are optional.

  **Note:** The CCMROLE is not the same as the CR role. The CCMROLE reflects the job role of the user such as Project Manager, Tester, etc.
Setting Up and Using Change Control Management (continued)

- Changeable data – Local menu 2032 Actions
  - The following data is delivered with the system, but can be changed to suit your business needs

- Changeable data – Local menus
  - The following data can also be changed to suit your business needs. It is setup in a working configuration during installation and should only be changed after analysis. Be careful if you need to change these messages.
    - Local menu 2030 – Severity level
    - Local menu 2031 – Product version level
    - Local menu 2034 – Reason codes
    - Local menu 2035 – Rejection codes
    - Local menu 2043 – Attachment categories
    - Local menu 2038 – Messages – These messages are displayed as errors and warnings

- Static data
  - The following data are necessary for CCM but cannot be changed
    - Local menu 2039 – Entity
    - Local menu 2040 – Line status
    - Local menu 2041 – Approval status
    - Local menu 2042 – Closed state
    - Local menu 2044 – Order action status
    - Local menu 2045 – Plan status
    - Local menu 2050 – Sales order stage
Setting Up and Using Change Control Management (continued)

- Data for email notification – Local menus
  - The following data can also be changed to suit your business needs
    - Local menu 2054 – New change manager email text
    - Local menu 2055 – New planner email text
    - Local menu 2056 – Old change manager email text
    - Local menu 2060 – New approver email text
    - Local menu 2061 – Approver rejection email text
    - Local menu 2062 – All approver email text
    - Local menu 2063 – Plan complete email text
    - Local menu 2064 – Old approver email text
    - Local menu 2065 – Creator email text
    - Local menu 2066 – Actioner email text
    - Local menu 2067 – Old planner email text

- Actions (Menu Item) setup - The Actions that will be used during Planning must be set up before CCM can be used:
  - Items local menu 2032 (Actions) and local menu 2039 (Entity) are used together to create an Action.
  - Enter the Action ID – It is alphanumeric and you can enter anything
  - The description is selected from the list containing items from local menu 2032 – Action
  - The entity is selected from local menu 2039 – Entity that holds the different Impact Analysis entities (documents) for example Sales Order, Purchase Order, etc.
  - See the screens to change actions below.
Setting Up and Using Change Control Management (continued)

- Batch server (Usage > Batcher server (CCMIMPBATT))
  - CCM uses a Batch server process to create the Impact Analysis data for ALL Transaction Types when the change request status is changed to In Review (in the background)
  - The following message will be displayed in the change request while the data is being created: “Impact Analysis data is currently being created. Please try again later”
  - As soon as the Impact Analysis data is available, the Impact Analysis link on the change request becomes available
  - When the Impact Analysis data is created initially, it can take a while for products with large numbers of transactions
  - The User is not required to wait for the creation to complete

- Batch server (Usage > Batcher server (CCMIMPBATT))
  - You can check the status of the Batch server operation in Query management.
  - Each time you edit or save the change request, the batch server process is triggered.

The Change Control Management Process

The Change Request (CR) is status-driven. Change requests may be in the statuses shown below as they progress through the CCM process.

- The statuses are in order of New, In progress, Plan, Implement, Completed, Closed
- There is also a status – Rejected
- The statuses can be reversed as needed. This means that while the change request is not yet at Completed or Closed status, the status can be moved back to a previous status within the following rules:
  - At Implement status – if no actions have been implemented yet – the status can be moved back to Plan
  - At Plan status – the status can be moved back to In Review – all the Plans and actions will be deleted
Setting Up and Using Change Control Management (continued)

- If a change request is at Rejected status, the status cannot be changed. If a decision is made that the issue must be investigated, a new change request must be created

- **CCM User roles are:** Change Manager, Approver, Planner, Actioner
  - The roles − Change Manager:
  - Every Change Request (CR) has a Change Manager assigned to it
  - The Change Manager has full control of the CR
  - When the CR is created the Change Manager field defaults to the Default Change Manager. This is setup in the Parameter values for CCM. The Change Manager can be changed
  - The Change Manager (assigned to the CR) or an ADMIN user can re-assign the CR to another Change Manager
  - When the CR is at Completed status, the Change Manager will move the status to
  - after receiving confirmation from the Change Requestor (creator)

- **CCM User roles**
  - Approvers:
    - The Change Manager assigns Approvers to the change request to review the change request and do the Impact Analysis.
    - The Approvers decide whether to approve the change request or to reject it.
    - The Change Manager has the final say and can approve the change request even if all the Approvers have rejected it
  - Planner:
    - When the Change Request (CR) is created the Planner field is populated with the Default Planner. This is setup in the Parameter values for CCM
    - The Change Manager (assigned to the CR) or ADMIN user can select another Planner
    - The Planner assigns actions (selected from the Actions table) to the detail lines in the Plans
    - The Planner also assign Actioners to Implement the various actions and add a date by when the action must be completed
  - Actioner:
    - The Actioner implements the actions assigned to him, and records when the action is In progress and later when the action is completed
Setting Up and Using Change Control Management (continued)

- Originator:
  - This is not a role in CCM but Originators are recorded in the CR. The Originator is the person that reported the issue. There can be more than one originator. It can be a Supplier, Customer, Internal or Other.

- Change request email notification
  - Email notification messages are defined in local menus
  - Email notification for the various roles can be switched on or off

<table>
<thead>
<tr>
<th>Role</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Manager</td>
<td>When the Change Manager is assigned. Email is sent to the Change Manager</td>
</tr>
<tr>
<td></td>
<td>When the Change Manager is changed. Email is sent to both the Old and New Change Manager</td>
</tr>
<tr>
<td></td>
<td>When an Approver changes the Approval status to “Rejected”. Email is sent to the Change Manager.</td>
</tr>
<tr>
<td></td>
<td>When all Approvers have set all the Approval statuses to “Approved” or “Rejected”. Email is sent to the Change Manager.</td>
</tr>
<tr>
<td></td>
<td>When the Plan status is changed to “Complete” or “Not applicable”. Email is sent to the Change Manager.</td>
</tr>
</tbody>
</table>

- Change request email notification

<table>
<thead>
<tr>
<th>Role</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approver</td>
<td>When the Change Request is “In Review” and a new Approver is added or an existing Approver is changed. Email is sent to either the New Approver only or both the Old and New Approver respectively.</td>
</tr>
<tr>
<td>Planner</td>
<td>When Change Request status is changed from “In Review” to “Plan”. Email is sent to the New Planner.</td>
</tr>
<tr>
<td>Actioner</td>
<td>When a detail Plan (or High Level Plan) is set to “Planning complete”. Email is sent to each Actioner (1 email per Actioner).</td>
</tr>
<tr>
<td>CR creator (Change Requestor)</td>
<td>When the Change Request is changed to “Completed” or “Rejected”. Email is sent to the Change Requestor</td>
</tr>
</tbody>
</table>
Setting Up and Using Change Control Management (continued)

- Impact analysis – data is provided for the following:
  - Sales orders
  - Sales quotes
  - Purchase orders
  - Purchase requests
  - Work orders
  - Sub-contract orders
  - Demand forecasts
  - Stock
  - BOMs
  - Routing
- Plans are automatically generated from each impact analysis when the change request status moves to Plan

### Creating Change Requests

Any Sage X3 user can create a change request.

To create a Change Request:

1. From Change Control, select the Change request menu item. The following Query facet is displayed.
2. Click Create.
Setting Up and Using Change Control Management (continued)

3. Click Save or the Originators tab to add the originator details

4. Click the Plus icon (+) to identify the person making the request as shown.
Setting Up and Using Change Control Management (continued)

5. The request ID is automatically generated when the change request is created and saved.

6. The Change Manager reviews the change request.

7. The Change Manager receives an email that the change request is ready for review. The Change manager selects the change request from the list of change requests.

8. After a quick review the Change Manager decides to reject or accept the change request.

9. After saving the change request, the Change Manager closes the change request (after receiving confirmation from the Change Requestor).
Setting Up and Using Change Control Management (continued)

- A new change request is created to show this process, as the original change request has been Rejected and Closed.

- After setting the change request status to “In Review”, the change request is saved. It triggers the creation of the Impact Analysis data using a batch server. You will see the following message displayed.

10. In the meantime, the Change Manager can add the Approvers to review the change request. The Approvers will either accept the change request or reject it.
Setting Up and Using Change Control Management (continued)

11. Add the Approvers with the entities (Impact Analysis) they need to review.
   a. Click Add the Approvers with the entities (Impact Analysis) they need to review
   b. Click on the blue “+” sign to open a new line
   c. After adding the Approvers, click on the “Save” link. You can always add more Approvers later if required
Setting Up and Using Change Control Management (continued)

**Change Control Management Impact Analysis**

- Each Approver added to the Change Request (CR) receives an email.

1. The Approvers can use the Impact Analysis menu item and select the CR from the inquiry. See the screen below.

2. The Approver (STLIG) starts to review the Sales order Impact Analysis (IA). As the Approver has been assigned ALL the IAs to review, that will be done one by one, and then a decision is recorded.
Setting Up and Using Change Control Management (continued)

Note: You can drill down into the details of fields which are underlined for example: Order number.

Change Control Approvals/Denials

When the Approver completes the review of the change request and makes a decision, the Approver records the decision to either reject or approve the change request.
Setting Up and Using Change Control Management (continued)

1. The Approver updates the Approval and Reason fields and clicks Save.  
   **Note:** Only the assigned Approver can update his details for example: Only NIKIN can update the approval details for NIKIN and no one else

2. When all the Approvers have recorded their decision to reject or approve, the Change Manager receives an email. A quick message is displayed to inform the user that an email has been sent.

3. The Change Manager has the final decision - and even if one of the Approvers or all Approvers have rejected or accepted the change request, the Change Manager can override this decision. In this case, the change request was rejected by NIKIN, but the Change Manager decided to move the change request to the Plan status.
Setting Up and Using Change Control Management (continued)

4. The Change Manager also decides to re-assign the Planner from BAKHA to NIK01. After the change request status has been moved to “Plan” and saved, the Plans are automatically generated from the Impact Analysis Data.

![Image of Change Control Management interface]

**Product Change Plans**

As mentioned previously, when the change request status is set to Plan, the plans are created from the Impact Analysis data.

1. The Planner (BAKHA) decides which actions to add to the detail lines of the plans.
   - It is not mandatory to have actions for each detail line.
2. The Planner selects the change request to plan from the Change Request or the Plan menu items.

![Image of Plan view interface]
Setting Up and Using Change Control Management (continued)

- The Plan section of the change request starts with the Summary page where the summary data for all the Impact Analysis entities are displayed.
  - There is also a section for a High-level plan – this is not mandatory – but it is possible to add actions here for Customers, Suppliers or any other global action.
  - There are links on the right panel for the plans for each Impact Analysis Entity.
  - It is not mandatory to have actions for the plans, but if you don’t you still have to mark each plan as “Planning complete”. This will mark the plan as “Not applicable” and the change request can then be moved to Completed status.
  - See the Plan summary page below:
Setting Up and Using Change Control Management (continued)

- High level plan
  - If the Planner (BAKHA) clicked on the Edit link on the previous page, the Planner can now update the actions for the High-level plan.
  - If there are no actions for the High-level plan, the “Planning complete” field must still be selected.

- High level plan - no action
  - The Planner (BAKHA) ticked the “Planning complete” field, as there are no High-level actions for this Change Request (CR). The High-level plan status is now set to “Not applicable”. This means that the CR will not expect this to be implemented.
Setting Up and Using Change Control Management (continued)

- High level plan - no action
  - The Planner (BAKHA) may decide to add actions to the high-level plan. To enable this, click on the Edit link on the Summary page and clear the “Planning complete” field.

- High level plan - no action
  - When all the High-level plan actions have been added, select the Planning complete field and click Save.
Setting Up and Using Change Control Management (continued)

- The High-level Plan status is now “Implement”. This means that the actioner can start implementing the actions while the rest of the Plans are still being planned.
  - The Planner can add actions and actioners to the Plan, except for those that are marked as “Not applicable”.
  - The Planner now clicks the Sales order link to start planning this.

- Detail plans – actions. There are two ways to update the detail lines:
  - Click Edit and perform a mass update, where all the lines can be populated with the same actions, actioner, and dates. The lines can then be amended that need other actions.
  - You can update the detail lines one by one by clicking the Quick Edit icon on each detail line.
Setting Up and Using Change Control Management (continued)

- Detail plans – actions
  - Using the Edit link.
  - The Planner (BAKHA) selects the three values and click Save. All the Sales order details lines are updated with the same three values.

- Detail plans – actions
  - Using the Quick Edit link.
  - The Planner can now click the Quick Edit icon for the lines to be changed.
Setting Up and Using Change Control Management (continued)

- Detail plans – actions
  - Using the Edit link.
  - Note the action ID and click Save.

- Detail plans – actions
  - Using the Edit link.
  - The Planner is satisfied that the Plan is ready for implementation and click
Setting Up and Using Change Control Management (continued)

- Detail plans – actions
  - Using the Edit link.
  - The Plan completed field can then be selected.

- The Sales order plan is ready for implementation. The Planner can continue working on the plans. Click Return to plan.
- Note: As soon as one plan, for example, Sales order or High level plan is at status = Implement, the overall plan status moves to Implement.
Setting Up and Using Change Control Management (continued)

- The user continues planning until all the detail plans are at status Implement or Not applicable.
  - It is not mandatory to add actions to all the detail plans. The Planner can just select “Planning complete” for those entities that don’t need implementation. The status for these will change to “Not applicable”. Here we see that all the other entities were not planned, but set to “Not applicable” the only detail plan is for Sales order.
Setting Up and Using Change Control Management (continued)

### Executing Changes

It is not mandatory to add actions to all the detail plans. The Planner can just select “Planning complete” for those entities that don’t need implementation. The status for these will change to “Not applicable”. Here we see that all the other entities were not planned, but set to “Not applicable” The only detail plan is for Sales order.

1. The Actioners implement the actions assigned to them. Using the Plan menu item, the Actioner selects the change request to be implemented from the list.

2. The Actioners implement the actions assigned to them.
   - Using the Plan menu item, the Actioner (JAWOL) selects the change request to be implemented from the list. The Actioner has actions from the High level plan to implement.
   - Note: Actioners have access to only their assigned actions. They cannot update any other action.
Setting Up and Using Change Control Management (continued)

3. The actioner clicks Edit to begin.

4. The Actioners implement the actions assigned to them.
   - The Actioner sets the Status field for each line to In progress.
   - The start date is automatically updated.
   - Click Save when ready.
Setting Up and Using Change Control Management (continued)

- The Actioners implement the High-level plan.
  - When the actions are completed, the Actioner sets the status for each line to Completed. The end date is automatically updated.
  - When all the High-level plan actions are at status Completed, the High level plan status is moved to Complete.

- The Actioners implement the Detail plans.
  - Click the Plan menu item. The Actioner selects the change request to be implemented from the list and implements the actions on the Sales order plan they are assigned.
  - Note: All the actions are currently implemented manually outside CCM.
Setting Up and Using Change Control Management (continued)

- Use the Edit link (for mass update) or the Quick Edit icon on the detail lines to update the actions line by line.

- Use the Quick Edit icon (see the page above) on the details lines to update the actions line by line. When the status is set to “In progress”, the start date is updated automatically after clicking Save. When the status is Completed, the end date is automatically updated after clicking Save.
Setting Up and Using Change Control Management (continued)

- The Plans are all at Complete or Not applicable status. The Change Manager can move the change request status to Completed.
  - When all the actions on the Sales order plan are set to the Completed status, the Sales order plan is move to Complete. When all the Plans are set to Complete or Not applicable, the overall Plans status is moved to Complete.
  - The Change Manager (ROKRI) receives an email and can move the status to Completed.

5. The Change Manager (ROKRI) receives an email notification that the change request is ready to be set to Completed. The CR can be selected from change request list.
Setting Up and Using Change Control Management (continued)

6. To edit the CR, the Change Manager clicks the Edit link.

7. The Change Manager moves the status to Completed and clicks Save.
Setting Up and Using Change Control Management (continued)

8. An email notification is sent to the Change Requestor (creator) informing that the change request has been completed. The Change Manager waits for confirmation from the Change Requestor before setting the status to Closed. When the Change Manager receives confirmation from the Change Requestor that the change request can be Closed. The Change Manager moves the status to Closed and clicks Save.
Summary

You have learned:

- About the general parameters for manufacturing.
- How to manage dynamic locations and replenishment.
- About advanced MRP concepts.
- How to modify work order components.
- How to work with phantoms.
- How to manage multi-product work orders.
- How to set up assignment rules and use the assignment plan.
- About multi-level planning.
- About capacity planning and managing loads.
- How to manage sub-contracts.
- How to track time, material, manufacturing, reintegration and technical sheet plans.
- How to perform mass closures and completions.
- What Product Versioning is and how it is used.
- What Change Control Management is and how it is used.
- About the setup requirements for versions and Change Control Management.
- How to identify Product Version fields added to Sage X3 functions.
- The steps to implement and complete the Change Control Management Process.
- How to perform impact analysis, change request plans, implement change actions.
- How to complete and close change requests.
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