Sage University

Sage ERP X3

Manufacturing Fundamentals

Sage North America certified course curriculum
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Welcome to the Sage ERP X3 Fundamentals of Manufacturing training class. This course is divided into discussion of concepts and practices, and is intended to provide you with a basic understanding of the functions and features of the manufacturing process in Sage ERP X3.

This course will help you meet the following objectives:

- Learn about manufacturing concepts and processes.
- Learn about the manufacturing planning tools.
- How to set up manufacturing requirements.
- How to process material requirements planning and view the results.
- How to create work orders and perform allocations and scheduling.
- How to track the production process.
- How to view the work order status.
- How to close the work order.
- How to view actual costs compared to planned costs.
- How to determine the production cost for a completed work order.
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 Practice numbers</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><em>Italic</em> font in a Practice</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</em> font in a Practice</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 onto the program

In this Practice, log onto the program.

1. Open Internet Explorer and enter the URL provided by the instructor.
2. Click *Click here to start your experience*.
3. When prompted, enter *admin* as the user name and password.
4. Click *OK*.
5. Once the Landing page displays, click the *Navigation* icon in the Upper bar to view the Navigation page. This will be used for all activities.
In this lesson, you will learn about the manufacturing flow and principles of manufacturing in Sage ERP X3.

The topics in this lesson include:

- Understanding the Manufacturing Flow
Understanding the Manufacturing Flow

Sage ERP X3 provides a powerful computer integrated manufacturing (CIM) system resulting in a highly effective production process. It helps you reduce inventory investment and production costs resulting in higher customer satisfaction. The following depicts a high-level view of the CIM system available in the program.
Understanding the Manufacturing Flow (continued)

The following depicts a high-level view of how the various entities and functions in the manufacturing process work together within the program.

- A manufacture/purchase product can be executed using a work order or a purchase order.
Understanding the Manufacturing Flow (continued)

### Manufacturing principles in Sage ERP X3

- Parameters set up in Sage ERP X3 feed the most accurate information coming from the category, product, product site, bill of materials, and routing.
- Calculation algorithms (MRP Process), control tools (Planning Workbench), and checking tools (MRP Results) provide work orders.
  - These work orders have dates and quantities that match the components and production resource availability constraints.
  - These same work orders provide purchase orders to supply components and operation orders (OW*) to control load. If running under capacity constraint, you can launch finite capacity analysis (on OWS) before running material requirements.
- A production order is created as close as possible to the need. This avoids inventory build-up between the end of the production and its delivery downward.
- Two balances are considered in the manufacturing process:
  - **Demand/supply**: Fits resources to the needs (in terms of quantity/date). For example, a purchase order (resource or supply) is triggered by the need to produce a work order which uses it. If demand is greater than supply, a shortage occurs. If supply is greater than demand, excess inventory is created. Production orders are created as a way of authorizing the manufacture of products.
Understanding the Manufacturing Flow (continued)

- **Load/capacity**: Fits capacities (hours needed to perform assembly) to the planned load. Forecasting is used to level under- or over-loaded periods. Load/capacity balance answers the questions: How? How long? and When?
Understanding the Manufacturing Flow (continued)

- The following depicts the priority planning and capacity planning logic used in the program.

![Diagram showing priority planning and capacity planning logic]

- Real-life occurrences, such as machine breakdowns and illness result in the need to react to supplier delays, queue in front of machines, etc. and the need for short-term control measures, such as work order reschedule, operations reschedule, operation sequencing, etc.

- The process flows from planning to execution (tracking).
Understanding the Manufacturing Flow (continued)

Manufacturing methods

- There are many different methods that manufacturing companies can use to produce goods:
  - **Engineer to order (ETO):** Requires a unique design by the customer. With this method, there is a unique set of part numbers, bills of material, and routings for every customer.
  - **Make to order (MTO):** Goods are produced as orders from the customer are received.
  - **Assemble to order (ATO):** Products are custom built from basic components or subassemblies.
  - **Finished to order (FTO):** The company uses a postponement strategy during order fulfillment. Finish-to-order occurs after the customer order is received. In this case, there may be an inventory of semi-finished goods in addition to a backlog of customer orders promised for future shipment.
  - **Make to stock (MTS):** Typically used for high-volume products. Items are usually produced in batches and stock is inventoried before receiving orders from the customer.

- The following diagram shows the demand lead times and cumulative lead time constraints for the various manufacturing methods.

![Diagram showing demand lead times and cumulative lead time constraints for ETO, MTO, ATO, FTO, and MTS.](image-url)
Lesson 3
Setting Up Manufacturing Requirements

In this lesson, you will learn how to set up the requirements needed for various aspects of the manufacturing process, such as product categories and sites, material costs, bill of materials, work centers, costing dimensions, overhead, standard operations, routings, standard cost calculation, requirement parameters, and demand forecasts.

The topics in this lesson include:

- Understanding Product Categories
- Setting Up Products and Categories for Manufacturing
- Setting Up Product Sites for Manufacturing
- Material Costs – Standard Cost Entry/Inquiry
- Bill of Materials
- Work Centers and Groups
- Costing Dimensions
- Overhead
- Standard Operations
- Routings
- Standard Cost Calculation
- Requirements Parameters
- Demand Forecasts
- Lesson Practices
Understanding Product Categories

The product category contains the information and settings used to control the behavior and management of the product.

- A category is defined at either the folder or site level.
- The product categories are used to classify and filter the products according to their use.
- Certain parameters/codes such as the stock level transactions are attached to the category.
  - This information is used as default values for the product and the product site.
- The rules of management and rules of allocation are defined only on the product category.
  - One benefit is fast generation of the base product and product site.
  - Another benefit is consistency of information common to a group of products.
- The following shows some examples of product category acronyms.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF</td>
<td>Semi-finished good</td>
</tr>
<tr>
<td>FG</td>
<td>Finished good</td>
</tr>
<tr>
<td>RAW</td>
<td>Raw material</td>
</tr>
<tr>
<td>B</td>
<td>Bought</td>
</tr>
<tr>
<td>M</td>
<td>Manufactured</td>
</tr>
<tr>
<td>S</td>
<td>Sold</td>
</tr>
<tr>
<td>SER</td>
<td>Serial managed</td>
</tr>
<tr>
<td>SN</td>
<td>Stock managed, not by lot</td>
</tr>
<tr>
<td>SL</td>
<td>Stock managed by lot</td>
</tr>
<tr>
<td>PL</td>
<td>Picking by lot</td>
</tr>
</tbody>
</table>

- Product codes can be user defined or comprised of the following:
  - Product category + sequence number
Setting Up Product Categories for Manufacturing

Use Product categories (GESITG) in the Common data > Products block to group products based on their management method (purchased, manufactured, subcontracted, generic, etc.). You can also form an association between management rules common to products attached to this category. These management rules are mainly used as default values when a product is created for the category. This information is used as default values for the product and product site and can be modified at the product and product site levels.

The benefits of using the Product categories function include:

- Fast generation of the product and product-site base
- Grouping the information common to a set of products

- The storage site must be defined with a warehouse associated with it.
- A category can be defined for an entire folder, and also at the site level. The folder category is created first, and then the category is specified for all designated sites.
Setting Up Product Categories for Manufacturing (continued)

Understanding management rules

You can use tabs in the Product categories function to define stock management rules. The following diagram shows the areas affected by the management rules.

- **Status**: If the document and/or product definition do not force the Q status, a default status can be specified per entry transaction.
- **Location**: A default location can be specified during an entry. The location description makes it easier to find the location type and/or the location in the product site.
- **Quality Control entry**: The entry can trigger an analysis request.
- **Lot entry**: If the product is lot managed, can control if the lot exists in the database.
- **Lot by default**: A sales order or a work order number can be used as the lot number.
Setting Up Product Categories for Manufacturing (continued)

**Description tab**

Use the Description tab to make the following settings concerning the manufacturing process.

- **Characteristics**
  - Determine the sequence numbers used to number the objects managed by this function, such as:
    - **LOT**: Global lot numbers
    - **SER**: Global serial numbers
    - **ITM**: Products
  - Use the Creation method field to indicate if the product will be immediately available for all processes or if it will be created with the status of “In process.”
Setting Up Product Categories for Manufacturing (continued)

**Types of category**

The type selected in the Types of category section defines how products assigned to this category can be used, such as Service provision, Phantom, Tools, and Generic.

- Indicate the type of category if subcontracting a bill of material, how to manage the grouping of components or stock if using phantoms, indicate if the product is used in routing, or indicate if the product is of the generic type.
  - Tools can be associated with the operations of the routing.
  - The Phantom mode allows you to exhaust inventory of a product and facilitate the flattening of bill of materials.
  - The Generic mode is not managed in stock.

- You are not required to select a type for a category. If a type is not selected, the products assigned to the category are not restricted based on the type selected.

**Types of flow**

The option(s) selected in the Types of flow section determine if products associated with the category are bought, manufactured, subcontracted, sold, and/or deliverable.

- You can select more than one option. For example, you can select that the product associated with the category is both bought and manufactured.

- You must select Sold to indicate that products in this category can be sold.

- The Deliverable option can be selected, even if the Sold option is not selected. For example, you may have products that are loaned out on a job but not actually sold to a customer.

- The options available in this section are based on selections in the Types of category section. For example, if you select Phantom as the type, only the Manufactured option is available for selection.
Setting Up Product Categories for Manufacturing (continued)

Management tab

Use the Management tab to define stock, lot and serial number management, quality, storage, expiration, and packaging information.

Stock management

At the option(s) in the Stock management section, you can determine whether products associated with the selected category is managed, not managed, or potency managed.
Setting Up Product Categories for Manufacturing (continued)

**Stock parameters**

The option(s) selected in the Inventory parameters section allow you to enter management and count mode information, as well as material tracking and traceability parameters.

- The Stock < 0 authorized field allows you to ship products not in stock. Doing this creates a suspended transaction. When the stock arrives, the received quantity is immediately reduced by the quantity of the suspended transaction. This brings the on-hand quantity back into balance.

- The options selected at the Management mode and Material tracking fields are used in MRP and MPS. The options available are Available Stock and By Order.
  - This is based on the requirement to track the demand of the original source.
  - The following diagram depicts the action that occurs toward a work order suggestion (WOS), depending on whether you select the Available Stock option or the By Order option at the Management Mode field.

- The option selected at the Count mode field determines when stock is counted as part of the physical count process.
  - The options available include Cycle method and Annual count.

- The option selected at the Traceability field determines if stock transactions are traced in detail or summary.
  - If Summary traceability is selected, stock transactions of the same product, lot, status, document and transaction, are summarized.

- At the Material tracking field, the mode of the material tracking relates to the components of a work order.
  - This parameter is used as a filter when selecting materials for tracking.
  - This field allows the system to select materials during tracking or to manually select products to be explicitly issued during the tracking process.

**Expires**

- The Expiry management field applies only to batch/lot managed products.
Setting Up Product Categories for Manufacturing (continued)

<table>
<thead>
<tr>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>The option(s) selected in the Quality section allow you to define the behavior during production receipt, select a technical sheet, and add access restrictions. For more information about the quality control process, refer to your Distribution – Inventory course materials.</td>
</tr>
<tr>
<td>- The QC management field defines the behavior during production receipt.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>- The technical sheet selected at the Technical Sheet field details the quality control tests to be applied to the product. Technical sheets are defined through Technical Sheets under Technical sheet in the Common data &gt; Product tables block.</td>
</tr>
<tr>
<td>- To add additional access restrictions for products from this category placed in quality control, you can optionally define a quality control access code.</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lot management</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Lot management section, select whether products are managed by lot.</td>
</tr>
<tr>
<td>- Select Optional Lot if it is possible to have the same product received with or without a lot number.</td>
</tr>
<tr>
<td>- Select Lot and sub-lot to make provisions for management with sub lots, which are sub-divisions of a lot.</td>
</tr>
<tr>
<td>- If lot numbers are entered, you can enter a lot sequence number at the Lot Sequence No. field. This will automatically number the lots up to a maximum of 15 characters.</td>
</tr>
<tr>
<td>- If you are managing lots, you can also determine if the expiration date is managed in the Expires section.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Serial no. management</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Serial No management section, select whether products are managed by serial number.</td>
</tr>
<tr>
<td>- Select Issued to only define a serial number when an item is being issued. This may be necessary for customer tracking, verifying warranties, processing recalls, etc.</td>
</tr>
<tr>
<td>- Select Received and Issued to require a serial number upon receipt and issue. This also includes internal movements and transactions such as physical counts.</td>
</tr>
<tr>
<td>- If serial numbers are entered, you can enter a serial counter at the Serial counter field. This will automatically number the serial numbers.</td>
</tr>
</tbody>
</table>
Setting Up Product Categories for Manufacturing (continued)

**Storage**

The option(s) selected in the Storage and Dedication locations sections allow you to enter the following options.

- Select the Location management check box to indicate whether products assigned to this category are managed with the warehouse with respect to their physical stocking location.
  - If selected, you can define a set of dedicated locations for this category. For example, products associated with this category may be stored within specific areas of a warehouse.
- The actual location is determined when items are received.
- You can customize the descriptions available for selection with the exception of the first three for Receipt, Storage, and Picking.

**Units of measure tab**

Use the Units of measure tab to define the various units of measure used for stocking, purchasing, selling, and packing.

- Releases in manufacturing, as well as production tracking, can be made in stock units (value suggested by default), or in unit launching (UL) which are defined in packaging units.
Setting Up Product Categories for Manufacturing (continued)

**Receipts tab**

Use the Receipts tab to define the stock management rules that apply to this specific product category. By default, all statuses associated with the type of product category you are creating display based on rules defined in Stock Management Rules. For more information, refer to your Distribution – Inventory course materials.

**Issue Flow tab**

Use the Issue Flow tab to define the stock management rules that apply to this specific product category as well as the allocation rules to use for such issues as shipments, internal movements, orders, work orders, etc. For more information, refer to your Distribution – Inventory course materials.

**Accounts/costs tab**

Use the Accounts/costs tab to define account information, as well as the valuation method to assign to products associated with the category. For more information, refer to your Distribution – Inventory course materials.

**Purchase/sales tab**

Use the Purchase/sales tab to define information, such as whether a product can be entered on a direct order, a minimum and maximum order quantity, and delivery tolerance percentage. All information can be changed when defining a specific product. For more information, refer to your Distribution – Inventory course materials.
Setting Up Product Categories for Manufacturing (continued)

**Planning tab**

Use the Planning tab to enter default values for the product-site record. The settings defined are used as part of the reordering process and include the demand and firm horizons for the product, the reorder process used, and how to handle shortages in manufacturing a product.

- In the horizon request, the forecast (SOS) is ignored and beyond the maximum (SOP+SOF), SOS is considered. **Note:** SOS is a suggested sales order, SOP is a planned sales order, and SOF is a firm sales order.

**Planning**

- You can enter the firm horizon in weeks or months providing a frozen time period in which planning (MPS/MRP) will not place suggestions.
- The Shrinkage percent is the percentage loss applied to a manufactured product planned by MPS/MRP provided that its reordering policy allows it.
Setting Up Products and Categories for Manufacturing (continued)

### Reorder

- In the Reorder section, products are restocked according to reordering methods (statistical reordering, MPS/MRP, or not at all):
  - If the reordering mode is MPS or MRP, then the reordering policy is required.
  - The Coverage field indicates to the planning algorithm that suggestions should not be generated for the normal planning bucket but to suggest for a series of buckets.
  - At the Suggestion Type field, select the type of suggestion proposed: No suggestion, Manufacturing, or Inter-site. If the suggestion is Inter-site, entry of a site is mandatory for proper planning.
  - The stock level information is used when making suggestions based on the reordering mode and policy.

### Manufacturing

- The Release if shortage check box indicates whether components necessary to manufacture will prevent the printing of the shop packet, if they are not available in stock.

- At the Automatic closing field, a component will be balanced work order/batch if its consumed quantity reaches within the percentage tolerance for close.
Setting Up Product Sites for Manufacturing

Use Products - sites (GESITF) in the Common data > Products block to create, modify, and view information associated with a product for a given site. You can override the rules of inventory control (sites management, restocking policies) and production for a given site.

- Some tabs are used to control the behavior for production, planning, and stock management at the site.
- There are also tabs used for inquiry, monthly/annual totals, inventory balances, calculated data, and count statistics.
- In the header section, select the product and site for which you are defining information and associating together.
### Setting Up Product Sites for Manufacturing (continued)

#### Management tab

Use the Management tab to set up the following concerning the manufacturing process:

<table>
<thead>
<tr>
<th>Management</th>
<th>Planning</th>
<th>Stock</th>
<th>Totals</th>
<th>Calculated Data</th>
<th>Manufacturing</th>
<th>Cost</th>
<th>Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warehouse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STOCK MANAGEMENT</td>
<td>QUALITY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock management</td>
<td>QC management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Managed</td>
<td>No Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managed</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Managed</td>
<td>Quality record</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Quality oper access</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### ABC Parameters

<table>
<thead>
<tr>
<th>ABC Class</th>
<th>Count mode</th>
<th>Stock withdrawal mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B, C</td>
<td>Annual Count</td>
<td>Immediate</td>
</tr>
</tbody>
</table>

#### Packaging

<table>
<thead>
<tr>
<th>Package</th>
<th>Picking capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Storage

<table>
<thead>
<tr>
<th>Location management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

#### Default Location

<table>
<thead>
<tr>
<th>Title</th>
<th>Type</th>
<th>Location by default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receipt</td>
<td>STO</td>
<td></td>
</tr>
<tr>
<td>Stock</td>
<td>STO</td>
<td></td>
</tr>
<tr>
<td>Picking</td>
<td>PIC</td>
<td></td>
</tr>
</tbody>
</table>

#### Managers

<table>
<thead>
<tr>
<th>Planner</th>
<th>Buyer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Recontrol/Expiration

<table>
<thead>
<tr>
<th>Check leadtime</th>
<th>Calendar days</th>
<th>Recontrol status</th>
<th>Recontrol quality record</th>
<th>UBD coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.000000</td>
</tr>
</tbody>
</table>

### Default location

- Use the Default location section to assign the default location based on the type of transaction.
Setting Up Product Sites for Manufacturing (continued)

<table>
<thead>
<tr>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Quality section, you can define whether a product must be controlled on receipt into stock. The quality control process for the product can be described through the use of a technical sheet.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sampling</th>
</tr>
</thead>
<tbody>
<tr>
<td>In the Sampling section, you can determine if the whole quantity received is quality controlled or only a single sample is pulled.</td>
</tr>
<tr>
<td>- If Single is selected at the Sampling field, you must select an acceptable quality level and a sampling mode.</td>
</tr>
<tr>
<td>- Select Global at the Sampling mode field to pull a sample quantity based on the quantity entered for the transaction.</td>
</tr>
<tr>
<td>- Select Lot at the Sampling mode field to pull a sample quantity based on the quantity entered for a single lot.</td>
</tr>
</tbody>
</table>
Setting Up Product Sites for Manufacturing (continued)

**Planning tab**

Use the Planning tab to enter lead times for production, quality control, multi-level, purchasing, and picking. The multi-level lead time is the cumulative lead time of all the BOM levels, considering the quality control lead times.

---

**Planning**

The options in this section allow you to set the following:

- The Firm Horizon field is used to set a frozen zone for planning reason during which MRP cannot place any suggestions.
- Inside the demand horizon the forecasts are ignored and beyond the max (SOP + SOF + SOS) are considered.
Setting Up Product Sites for Manufacturing (continued)

- The Trend Profile field is used to adapt the safety stock in the MRP process or to build calculated forecasts.
- At the Shrinkage Percent field, the loss percentage is applied to a produced good or purchased good in the MRP process as long as it is indicated in the reorder policy (Apply % loss check box is selected).

**Lead times**

The options in this section allow you to enter lead time information to use during MPS/MRP calculations.

- For the Production, quality control, and purchasing lead times, variables are taken into account in the MRP process and orders management.
- The Digressivity factor field, is applied to the order lead time in proportion to the economic order quantity (EOQ). It is used in the MRP process and the work order (technical lot).
  - Formula: Corrected lead time = LT*(1 + (quantity/lot - 1)* coefficient/100)
  - 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%)
- The Multi-level lead time field is the cumulative lead time. The Multi-level planning function can be used to calculate this lead time (Manufacturing > Planning > Multi-level planning).

**Parameter definition**

The options in the Parameter definition section allow you to set up the following:

- At the Assignment rules field, you should ask yourself “Does the component need to be linked to the parent?” and “Does the finished good need to be linked with the sales order?”
  - Assignment rules are pre-allocations and allow Sage ERP X3 to identify a requirement and pre-allocate an incoming resource before it is available for direct allocation.
  - Assignment rules are covered in more detail in the Manufacturing - Beyond the Basics course.
Setting Up Product Sites for Manufacturing (continued)

<table>
<thead>
<tr>
<th>Reorder</th>
</tr>
</thead>
<tbody>
<tr>
<td>The options in the Reordering section allow you to set the following. For more information, refer to your Distribution – Inventory course materials.</td>
</tr>
<tr>
<td>■ At the Reordering Policies field, you can determine if the products will be able to be reordered according to the reorder point, re-completion, or MRP/MPS methods.</td>
</tr>
<tr>
<td>■ If the choice is MRP or MPS, a reordering policy is entered.</td>
</tr>
<tr>
<td>■ If the Coverage field is defined and used, the requirement in each period is raised by the requirements in the defined future periods. Safety stock is ignored.</td>
</tr>
<tr>
<td>■ Coverage is defined in weeks.</td>
</tr>
<tr>
<td>■ Coverage can be globally ignored by with settings in Requirements parameters. Additionally, resources can be taken into account in Requirements parameters. Resources are normally only considered up to the current period.</td>
</tr>
<tr>
<td>■ Each bucket triggers a suggested order with a quantity equal to the sum of the “X” next week’s needs (SOP/F, MWP/F, etc.), even if the system is demand/supply balanced. This is called time period safety stock.</td>
</tr>
<tr>
<td>■ For example, if the product is class A, 15 days could be covered. If the product is class B, 30 days could be covered, and for class C, 90 days could be covered.</td>
</tr>
<tr>
<td>■ The nature of the planned order created by MRP/MPS depends on the choice made at the Suggestion Type field.</td>
</tr>
<tr>
<td>■ If the suggestion is Inter-site, the Reordering Site must be entered.</td>
</tr>
<tr>
<td>■ The safety stock is defined at the Safety Stock field, which is taken into account in the MRP process according to two conditions:</td>
</tr>
<tr>
<td>■ The reorder policy defines that it must be taken into account</td>
</tr>
<tr>
<td>■ The parameter of the MRP (Advanced)</td>
</tr>
<tr>
<td>■ The reordering point can be entered at the Reorder Point field if By ROP is selected at the Reordering Mode field.</td>
</tr>
<tr>
<td>■ An entry can be made at the Maximum stock field if periodical replenishment is chosen (if By Period is selected at the Reordering mode field and an entry is made at the Reorder Frequency field).</td>
</tr>
<tr>
<td>■ At the EOQ field, the economic lot can be an external, internal, or economical constraint.</td>
</tr>
<tr>
<td>■ External: Supplier capacity</td>
</tr>
<tr>
<td>■ Internal: Profitability of a mold or tank refill, for example</td>
</tr>
<tr>
<td>■ Economical: The Wilson formula can be used to refine the calculation of a manufacturing or purchase lead time.</td>
</tr>
<tr>
<td>■ You can adjust the size of the economic lot considering several points, including warehouse size, handling considerations, spoilage, staff needs, and wear of tools.</td>
</tr>
</tbody>
</table>
Setting Up Product Sites for Manufacturing (continued)

- EOQ is used as a minimum quantity for MRP or MPS and a default quantity for a direct work order.
- EOQ is also used in the cost calculation: the quantity for which each fixed cost is defined, such as overhead, fixed link component, setup time, etc.

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

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

Re-planning

The options in this section allow you to set up the following:

- At the Protection in process (replan) field, the orders in process can be excluded from re-planning.
- In process is based on having tracking activity recorded against the batch/work order.

Stock tab

Use the Stock tab to view information for internal and external stock movement based on the stock status. For example, you can view internal stock for stock status A, Q, and R. You can also view current stock allocations for each stock status and business partner allocation. For more information, refer to your Distribution – Inventory course materials.

Totals tab

Use the Totals tab to view receipt and issue totals for a specific fiscal year and period range. Click the Lookup button next to the Period end field to select a period range. For more information, refer to your Distribution – Inventory course materials.

Calculated data tab

Use the Calculated data tab to manually enter safety stock, reorder point, maximum stock, and EOQ or view the same totals calculated by MRP. Safety stock, ROP, maximum stock, and EOQ can be calculated using the Statistical reordering function accessed in the Inventory > Reordering block. Statistical reordering allows you to create reorder suggestions or calculations. For more information, refer to your Distribution – Inventory course materials.
Setting Up Product Sites for Manufacturing (continued)

Manufacturing tab

Use the Manufacturing tab to define information such as production and cost routing, automatic close percentage, and method of correction specific to the manufacturing process.

Routings

- The Production routing field is used for production and displays a routing only when it is different from the product and standard routing code.
- The Cost routing field is the alternate routing used for the cost calculation.
- Note: A cost routing can be created separately to add a cost for activities, such as preparation time.

Parameter definitions

- This section controls if the shrinkage should be considered when releasing a new batch or work order.
Setting Up Product Sites for Manufacturing (continued)

**Cost tab**

Use the Cost tab to define the valuation method specific to the product/site combination. You can also determine how other costs are defined (such as manually entered or calculated) and unit price information. For more information, refer to your Distribution – Inventory course materials.

**Counts tab**

Use the Counts tab to view information regarding physical counts performed, such as whether a count is currently in progress, the last global stock count, the number of counts, and the number of accurate counts.

**Adding a product to multiple sites**

While in the Products function, select Functions > Product-site creation in the Right panel to add the product to multiple sites at one time.

- Select the site(s) and then click Creation in the Right panel.
Material Costs - Standard Cost Entry/Inquiry

Use Standard costs (GESICD) under Product – costs in the Common data > Products block to view or modify the standard costs for a product. The standard cost is used to value the stock and the movements for a semi-finished, finished product, or raw material. The standard cost is unique for a product-site and year. For more information, refer to your Distribution – Inventory course materials.

- At the Product field, enter the product for which you want to view or modify the standard cost.
- Click Calculation to calculate the cost rollup of the product.
Production Bill of Materials

- A bill of material (BOM) is a summary that represents:
  - A hierarchical and quantified list used to produce/manufacture a product.
  - Relations between the components and the parent product (finished or subassembly/intermediate) expressed with a unit and link quantity/percent.
  - A link quantity/percent is typically expressed in the stocking unit but may use an alternate for formulations/BOMs that utilize specific gravity.
  - {sub heading BOM Formulation}
- A BOM/formulation is a collection of links as illustrated below.

![Diagram of BOM formulation]

- The Where-Used view indicates the manufactured products in which the component is used.
- The BOM level of a product locates the part in the BOM, while also indicating:
  - The stage at which the product is used.
  - The complexity of the parent product.
  - How much remains (levels) to be completed before production is complete.
Production Bill of Materials (continued)

- A BOM/formulation can include several levels, but it is defined one level at a time.

- The low level code of a product is the lowest level where it appears in the BOM/formula structure.
- If the product has a BOM, but does not have a where-used path, its low level code is 0 (like the products A, E, and F in the illustration above).
- It is important to run the Low level codes function (Common data > BOMs) regularly. Refer to your Distribution course materials for more information.

- BOMs are used in:
  - The definition of the products
  - Material requirements planning (MRP)
  - Master production schedule (MPS)
  - Cost calculations
  - Planning and release of work orders or batches
  - Product configurator
Production Bill of Materials (continued)

Setting up a bill of material

Use Production BOMs (GESBODP) in the Common data > BOMs block to create or modify a bill of material. You can also define several BOMs for a single product.

![Manufacturing BOM BOMP](image)

Parent

- At the Parent product field, enter the product number.
- At the BOM code field, several BOMs can be defined for a single product reference.
- The Reference date is the current date by default and can be overridden. This entry provides the ability to view the definition at a “point in time.”
Production Bill of Materials (continued)

- You can manage structures of different products according to their use: requirement calculation, sales order entry, production, etc.
  - For example, you can determine if the BOM can be used in the manufacturing process (work order controlled), cost calculations, MRP processing, and MPS processing.
  - Clicking the Selection icon at the BOM code launches the BOM code function as shown below.

The Management unit field allows you to define the quantity of the BOM components on a basis other than the product unit. You can enter a BOM for one product unit, 100 product units, 1000 product units, expressed as a percentage, or for a product lot size.
  - In the definition expressed as a percentage, the total of the quantities of the components must be equal to 100.

- The value at the Base qty field is entered depending on the management unit entered at the Management field.

- At the Use status field, select whether the status for using the BOM is in development or available to use.
Production Bill of Materials (continued)

- At the date range fields (Valid from and Valid to), enter the validity dates range associated with the components. If the start date is not entered, it signifies that the BOM is valid for a date less than the end date. If the end date is not entered, it signifies that the BOM is valid for a date greater than the start date.
  - The validity dates are also associated with the components, which are initialized at the Valid From and Valid To fields in the grid according to the dates in the header.

Related functions

- Use the Routings and Multi-level links in the Right panel to open the Routings function and a multi-level view of the formulation.

Components tab

Use the Components tab to enter component information, such as the component, sequence, component type, unit of measure, and quantity.

At the Sequence field, you can link a group of components of the same type. The additional number is used for sequence purposes.

An individual component cannot appear twice with the same sequence.
Production Bill of Materials (continued)

- At the Component type field, select one of the following types:

<table>
<thead>
<tr>
<th>Normal</th>
<th>The component is always present in the BOM used in order entry. It is neither an option nor variant.</th>
</tr>
</thead>
<tbody>
<tr>
<td>By-Product</td>
<td>The quantity is fixed, regardless of the quantity requested for the component.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: It is possible to add 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.</td>
</tr>
<tr>
<td>Text</td>
<td>Allows you to add text.</td>
</tr>
<tr>
<td>Costing</td>
<td>Allows you to create a cost line without creating a product.</td>
</tr>
</tbody>
</table>

- The Coef UOM-STK field balances the way you store a component with how you use it.

- At the Quantity BOM UOM field, the quantity of the link gives the number of components needed for the base quantity of the component. It is entered in a variable format (number of decimals not fixed). For a management unit in percentage, the sum of the quantities of the links must be equal to 100.

- At the Link quantity code field, you can select one of the following. For an alternative sales type, the quantity is always set to proportional.

<table>
<thead>
<tr>
<th>Proportional</th>
<th>The quantity is multiplied by the quantity demanded of the component product used in the process.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td>The quantity is fixed, regardless of the quantity requested for the component.</td>
</tr>
</tbody>
</table>

- The Qty rounding field is used to manage the rounding method used for the quantity according to the decimal unit of the stock in the processes that use the BOM.
  - The rounding method can be nearest, greater than or less than.

- At the % scrap field, enter the loss percentage that is used to increase the link quantity which takes into account the loss incurred by the production process.

- The Validity from and Validity to fields indicate the start and end dates between which the component link is valid.

- The First lot field is the first lot for which this component link is valid.
Production Bill of Materials (continued)

- The Last lot field is the last lot for which this component link is valid for lot managed components.

- With the Routing oper field, the components can be linked to routing operations according to the manufacturing process requirements.
  - The operation can be chosen from the routing associated with the component in the BOM, if it has already been created.
  - Only the operations that are still valid on the reference date displayed in the BOM header appear.

- At the Operation LT field, enter the operation lead time to be used at the release and in the MRP calculation. This offsets the component requirement with respect to the production start date of the parent and is expressed in work days.

- The Valuation field determines whether this line contributes to the value of the component.

- The Materials requisition Printing field specifies whether the component must be printed on the material issue slip of the work order.

- The Pick list code field indicates the code available for the component, such as whether the component is weighed at the station or production.
Costing dimensions hold the hourly rate in dollars for each process. There are three types of costing dimensions: setup, runtime, and overhead. Each type can contribute to the standard cost or one of the planning buckets. When a cost rollup is performed, or when a work order is costed, the cost types are used to determine the rate for a particular work center. The calculation is then performed to determine the cost per the time and added to the cost of the work order. A costing dimension is attached to a production site and can be associated with various work centers.

Use Costing dimension (GESMWC) in the Common data > Costing block to set up the costing dimensions. The costing dimensions are used by the main and secondary work centers.
Costing Dimensions (continued)

- The Costing dimension field is used to link the work centers to the accounting system.
  - It contains information on hourly rates that are necessary for the cost calculations, and also the analytical dimensions.
  - Valuate the work center overheads linked to the valuation dimension.
  - Valuate the overheads for the materials or semi-finished products.
- The Site is used to filter analytical dimensions.

Parameter definition

The options in the Parameter definition section determine the overhead code to use.

- The Overheads field is used to select the overhead cost. This code is used in the expense and production cost calculation to perform the following:
  - Valuate the work center overheads linked to the valuation dimension.
  - Valuate the overheads for the materials or semi-finished products.
- At the Cost group field, the calculation of standard costs is used to break down the work center costs across three distinct machine subtotals and three distinct labor subtotals.
  - For example, you can define an assembly subtotal, a manufacturing subtotal, and a control subtotal in which work center costs will be distributed.

WO WIP interface

The options in the WO WIP interface section are used to specify the site accounting code.

- The Accounting code field is the default value used in the setting up of accounting journals.
  - The accounting code refers to the table listing a certain number of elements (collectives, accounts, or parts of accounts) that can be used to determine the accounting journals that will be posted.

Rate

The options in the Rate section are used to specify the rate type.

- The actual, simulated, and budget values correspond to the revised, simulated, and budget cost rollups.
- The Rate type field has two options: Unit and Fixed.
  - **Unit**: The cost is determined by multiplying the operation setup time by the adjustment rate and then multiplying the runtime by the operating rate. The rates are defined as hourly.
**Costing Dimensions (continued)**

- **Fixed**: The cost independent of time. The adjustment rate and the operating rate are added together to create the fixed machine/labor cost.

### Rate - Setup

The Setup options in the Rate section are used to specify the standard, actual, budget, and simulated setup times.

- ** Std set-up**: The standard schedule rate used to develop the setup time in calculating standard costs.
- ** Rev. std. set-up**: The updated schedule rate used to develop the adjustment time when calculating the standard updated cost.
- ** Bud set-up**: The budget schedule rate used to develop the adjustment time in calculating the budget cost.
- ** Sim set-up**: The simulated schedule rate used to develop the setup time in calculating the simulated cost.

### Rate – Run-Time

The Run-Time options in the Rate section are used to specify the standard, actual, budget, and simulated operation times.

- ** Std. run-time**: The standard schedule rate used to develop the operation time in calculating standard costs.
- ** Rev. std. run-time**: The updated schedule rate used to develop functional time when calculating the standard updated cost.
- ** Bud tun-time**: The budget schedule rate used to develop the functional time in calculating the budget cost.
- ** Sim run-time**: The simulated schedule rate used to develop the functional time in calculating the simulated cost.

### Analytical dimension grid

Use the grid to modify the analytical dimensions if needed. The dimensions are initialized with the default dimension setup in Setup > Financials block, under Accounting interface by selecting Default dimensions.
Work Centers and Groups

Work centers are used to define the workstation or manufacturing line where a production process takes place. There is a costing dimension associated with each work center and is used to perform cost calculations for standard cost and for production costing. Each work center has an availability schedule that is used for scheduling and to gage work center load against the available work center capacity.

Before setting up the work center, you should set up work center groups, costing dimensions, and capacity schedules.

Setting up work center groups

A work center group is a physical or fictitious entity that regroups several work centers of machine, labor, or sub-contracting type. The way you define work center groups depends on the organization of a company. For example, does the company organize by product lines or by types of labor/machines?

Use Work center groups (GESTWC), under Work centers, in the Manufacturing > Technical data block to identify all the production resources of the company.
Work Centers (continued)

- The display level defaults from the work center group when the work center is created. This level is useful when using add-on scheduling tools.
- The grid displays a list of work centers attached to a group.

**Setting up work centers**

Use Work centers (GESMWS) under Work centers in the Manufacturing > Technical data block to create individual work centers.

The objective of work centers is to perform the following:

- Define the maximum capacity.
- Define capacity variations for the work center.
- Define detailed data used by GANTT scheduling tools.
- Define placement of load during the manufacturing process.

The work center is attached to a work center group. It corresponds to a production resource on which a routing operation is carried out.
Work Centers (continued)

- A work center represents an entity for which the load needs to be planned and the production times need to be tracked.
- Each work center is associated with an assignment site.
- The manufacturing site that is selected influences the choice of work centers on which this operation is defined.

- The work center can be of type Machine, Labor, or Sub-contracting.
- The work centers of the Sub-contracting type are used to manage the operations carried out externally by sub-contracting suppliers.

- Enter the work center group to which the work center is assigned.
- You must enter a site for a standard operation. The production site associated with the user is displayed but can be modified.

Management tab

Use the Management tab to enter parameters for the work center.

Use the Parameter definition section to define the work associated with a product regarding the cost calculation and the calculation of the actual manufacturing costs.

- At the Structure field, define the capacity structure of the work center. This is used for scheduling jobs at the work center.
- Use the Costing dimension field to link the work centers to the accounting system. It contains information about hourly rates that are necessary for the cost calculations and analytical dimensions.
- The Location is local to the work center (staging location) if defined at this field.
Work Centers (continued)

- At the Automatic closing % field, the following operation is automatically closed when the quantity completed is within the automatic close percentage tolerance.

- Enter the number of resources for the work center. The number of resources is used to specify how many machines or laborers are at the work center.

- The components of the work center/batch associated with the operation using this work center are allocated from the location entered at the Location field according to the allocation and issued defined on the product’s category.

- The Display level field is used to filter the initial GANTT display. Within the Scheduling function, you can filter the work centers to be displayed as a function of this level.

- If the Grouping check box is selected, the work center is considered by the grouping procedure of the Sage ERP X3 optimization. This helps specify whether the work center can be subject to operation grouping in the Optimization/Scheduling functions and what horizon (horizon starting on the start date specified when launching the Scheduling function). A work center subject to grouping cannot be managed as a multiple resource work center. A routing operation using such a work center should specify which criteria leads to the grouping of the operations concerned.

- The Constraint field is used in the Optimization function (scheduling with infinite capacity). You can choose whether the replacement work centers are used during the optimization step in order to level the load and keep the objective on time. A constraint work order is considered by the Optimization function as a work center with finite capacity while a non-constraint work center has infinite capacity. If the Constrain check box is selected, the work center is associated with constraints in terms of finite capacity (machine or labor).

- Use the Qualification level field for informational purposes only, entering up to ten characters.

- The RCCP check box (Rough Cut Capacity Planning) is selected, the operation is identified as being critical during production. This is especially useful when generating macro-routings.

- The Distinction of the copies check box is used in the Scheduling function. If selected, all work center resources are displayed in several lines depending on the distinction criteria that are present on the operations linked to this work center. The distinction criteria are loaded onto the operations form the routing operations (Operation Scheduling tab).

In the Performances section:

- The % efficiency is the correction percentage associated with the operation time in the routing of a work order batch.

- The Shrinkage in % field indicates the amount lost during the production process. It can inflate the quantity requirements (based on parameter settings).
Work Centers (continued)

- In the Totals section:
  - Times expected are updated at release (creation, modification, and cancellation).
  - Times tracked out are updated at the time of tracking.

**Variation tab**

Use the Variation tab to enter information regarding capacity variations for a given period, work center structure, and number of available resources.

**Replacement tab**

Use the Replacement tab to replace the work center of an operation by one of the work centers defined on this tab, for example, in the event of overload. A priority is assigned to each replacement to provide a hierarchy and indicate a preference for substitution.

- The replacement work center must be different from the work center being replaced.
- The replacement takes place in the Work Order function, for example, in the case of overload.
- A priority is assigned to each substitute in order to indicate a preference for substitution.
Work Centers (continued)

**Load tab**

Use the Load tab to display the work center load curve.

**Reschedule button**

Use the Reschedule button in the Right panel to reschedule all the work orders that call this work center.
Overhead

Overhead is used in the calculation of the following:

- Provisional costs (standard, revised, standard, budget, and simulated)
- Production cost price (PCP)
- Costs upon aggregating production time tracking

Overheads can be posted on product codes and valuation dimensions and can be calculated as a cascade or in total and posted on stock receipt or issue. They are defined for the entire folder and can be distributed over a maximum of six cost natures, such as administrative costs, maintenance costs, etc. For each overhead nature, you can define a maximum of four formulas for the overhead calculation.

Use Overheads codes (GESOVE) in the Common data > Costing block to calculate overhead costs.

- The Overhead cost is used in expense and production cost price calculations.
- The Calculation method field allows you to determine if the overheads are calculated either by cascade or as a total.
Overhead (continued)

- The Overhead application only applies to material costs and determines whether overheads are posted upon stock receipt or issue. During the multi-level calculation of cost, the overheads of each level can only be posted on the material, labor, or sub-contract of a cost. In no case can the overheads be posted on other overheads.
  - The posting method on stock receipt means that costs are applied upon cost calculation of the product itself.
  - The posting method on stock issue means that costs are absorbed by the parent product that consumes the product with a code for this method. The costs are included in the production cost of the parent product.

Formula base

The Formula base options determine whether to calculate based on amount or overhead hours or quantities.

Overhead categories grid

- Use the grid to define calculation formulas. A calculation formula is coding that calls an expression to evaluate a result used in various functions of the product. When cost calculation runs, the formulas entered in the grid are used in the cost rollup.
- Overheads can be fixed. Four fee amounts can be generated by nature, which correspond to the various expense types.
Standard Operations

Standard operations are used to make the routing creation easier. Standard operations in Sage ERP X3 act as templates. These template operations are used to define the data for a production function independent of the routings. During the creation of the routing operations, you can choose a standard operation as a default and modify it for your own needs.

Use Standard operations (GESROT) under Routings in the Manufacturing > Technical data block to define standard operations that are used as templates for creating or modifying routing operations.

**Note:** Some of the fields in this function are similar to the fields on the Routing function. For more information, see Routings in the next topic.

- Use the Header section to enter information such as the standard operation, site, and description.
- 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.
Standard Operations (continued)

**Time tab**

Use the Time tab to define the work centers of the operation, along with the running times. The times of the standard operation are entered in a time unit chosen in hours or in minutes, and for a given stock or production unit.

- If the operation unit is mentioned in the standard operation, it is used again - otherwise, the stock unit of the product in the routing is used. The conversion coefficient, if it has not been entered, is taken from the coefficient table.
  - Time conversion is carried out (rate, setting time and operation time) if the time unit in the routing header is different from that of the standard operation.
  - The standard operation is referenced in the operation that used it as a template. Yet, when a standard operation is modified, the modification is not transferred to the associated operations.
- The scheduling of the operations looks at the availability of the work center entered at the Work center field.
- You can specify the number of operators for the operation at the Number field.
  - **Note:** You cannot allocate more resources than are at the work center level.
Standard Operations (continued)

- A labor work center can be associated with the machine-type principal work center. The labor work center times are calculated using a setting coefficient and operating coefficient.
  - The operating coefficient applies to the setting time and operating time of the main work center.
  - When creating a routing operation, verification is performed to make sure the site attached to the work center is the same as the site dedicated to the routing code, provided that the latter site is mentioned.
  - **Note:** This resource is considered as secondary and always available (or available at the same time as the main work center) and its load is managed for information purposes only via the coefficients applied to the time of the principal work center.
  - If the work center is of sub-contracting type, the operation is enabled for sub-contracting as well.
Standard Operations (continued)

**Management tab**

Use the Management tab to regroup technical information, such as tooling, workbench, and image, along with the information concerning the potential sub-contracting of the operation. The elements necessary to define the sub-contracting, either temporary or structural, are the sub-contracting product and the work center. You can also specify the preferred supplier to which the sub-contracting order will be entrusted along with a reference price.

- **Note**: The supplier can be modified on the routing, then on the work order. When entering the order, you can also choose a supplier other than the one proposed on the work order operation.

The technical sheet is used to record two types of information.

- The text describing the control process or the operating mode.
- A set of questions/answers in order to introduce a parameter entry during quality control or production tracking. The answers provided can be controlled via preset values and give rise to statistics.

- The operation fields are not associated with any application processing and cannot be entered as information.
- The tool is represented by a product reference whose category is of tool type.
Standard Operations (continued)

- The Fixture field is not associated with any application processing; it can be entered as information.

- The sub-contracting code is used to determine whether the operation is carried out internally or if it is sent outside to a sub-contracting supplier.

### Finite capacity tab

Use the Finite Capacity tab to enter detailed scheduling information regarding grouping.

![Finite Capacity Tab](image)

- The Grouping formula is the formula used to intervene in the formatting of the grouping code during release.
Routings

An operational routing defines the formalization of the steps required for a manufactured product (finished or semi-finished). It also provides a description of the various operations and activities involved in the production process, as well as the sequencing of the operations to be completed.

- The routing contributes to:
  - Load placed on a work center for released work orders/batches.
  - Calculation of the estimated costs (standard, budget, simulated etc.)
  - Calculation of the actual costs of production at the time of tracking.
  - Compare the estimated with actual costs.
  - Printing of instructions for the shop packet.

- An operation describes work to be carried out at a specific work center. It details:
  - The resources to be used.
  - Operational times, such as load (setup and run) and non-load (preparation, wait, and queue).
  - Procedure with instructions for completion.

- The following diagram shows the implications of the routing function in the software.
Routings (continued)

Setting up a routing

Use Routing management (GESROU) under Routings in the Manufacturing > Technical data block to define the production processes of finished products and sub-assemblies. The routing is a set of operations that must be performed in a particular order and set by scheduling. This function is used to create, view, and update the routing information.

- The routing is used to identify the product manufacturing process.
- The entry at the Routing code field must be a valid product ID.

  - The routing code provides definition of routings for manufacturing, cost calculation, planning, for example. In our case, the routing code is used to identify the product manufacturing process.
  - The routing code provides the ability to manufacture the same product with operational processes that differ according to the production site.
Routings (continued)

- The routing code allows you to manage several operational processes (in-house manufacturing or subcontracting) for the same product within a site.
- The reference date allows you to see the operations at a “point in time.”
- You must enter a site in the header. If the code being used is defined for a particular site, the routing automatically inherits it.
- At the Validity date fields, if the start date is not entered, it signifies that the routing is valid for a date prior to the end date. If the end date is not entered, it signifies that the routing is valid for a date later than the start date.
- At the Use status field, you can determine if the status of the routing is In Development or Available to Use.
  - The routing must be validated in order to change the status from In Development to Available to Use.
  - Additionally, a routing can only be validated if its scheduling is correct.
- The Time Unit section allows you to express the time unit in hours or minutes.
  - The time unit refers to the setting time, the operation time, and the rate of all the routing operations.
- At the Validated field, the status is “valid” when at least one operation exists and the scheduling is defined properly.

Related functions

From the Right panel select the following related functions.
- Select Graph to view the operation sequence in GANTT chart format.
- Select Where-used to view a list of products produced with this routing.
- Select Multi-level to view the multi-level routing in graphical or tabular form.
Routings (continued)

**Header tab**

Use the Header tab to enter general information about the routing.

![Header tab diagram](image)

**Work order management mode**

Use the options in this section to prohibit or authorize the modification of the BOM components and routing operations when creating a work order.

**Release criteria**

Production releases can be constrained by quantity minimums and maximums.

**Last release**

The fields in this section are for informational purposes only.

**Documents**

These fields contain the name of the workbench and image associated with the routing.
Routings (continued)

**Routings tab**

Use the Routings tab to describe the characteristics and steps of the routing operations. The operations contain the detailed information for each stage of the routing: work center, technical operation times, operation mode, tools, sub-contracting, non-financial unit, etc.

<table>
<thead>
<tr>
<th>OPERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

- The lines in the grid represent different operations for the production process.
- The standard operation is the “template” operation used to create or modify the routing operations. Use the Standard operation field to simplify the management of routings using an operations template.
  - The template operations are used to define the data for a production function independent of the routing.
  - The definitions of the fields for a standard operation are similar to those of a routing operation.
  - If the routing is modified, you can change the standard operation that was initially selected.
  - The standard operation times are expressed in the time unit that may be different from the time unit entered in the routing header. In this case, the standard operation times are converted based on the routing time unit.
  - The link between the routing operation and the standard operation used when it is created is saved for information purposes. If the standard operation data is changed, there is no update of the routing operations that were created with the use of the standard operation.
Routings (continued)

- The operation has two available work centers:
  - **Main work center:** This work center can be of machine, labor, or sub-contracting type. The scheduling of the operations looks at the availability of the work center. You can specify a number of resources at this work center necessary to carry out the operation at the Number of Resources field. If the work center is of sub-contracting type, the sub-contracting operations are managed with a lead-time described in the sub-contracting product record. The operation times are used to manage the load equivalent in hours, sent to the sub-contractor for information purposes (not used for scheduling).
  - **Labor work center:** This work center is associated with the main work center and for which no scheduling is carried out. This resource is considered to be secondary and always available at the same time as the main work center. Its load is managed for information purposes only using the coefficients applied at the time of the main work center. You can specify the number of resources required for the operation at the No. Lab res. field.

- The value at the Setup time field is the fixed amount of time to prepare the work center.
  - The setup time is part of the work center load and is expressed in the time unit specified either in the routing header (for a routing operation) or in the standard operation itself.
Routings (continued)

- The Operation time code field allows you to select from the following production time entry options:

<table>
<thead>
<tr>
<th>Proportional</th>
<th>The production time is proportional to the released quantity. It is expressed in hours and minutes (based on the time unit) for a given number of units (based on the management unit and the basic quantity).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>The production time is proportional to the released quantity. The rate is used to express the time in number of units per hour or minute, depending on the time unit. With a rate time type, the production time is entered in the rate section and the operation time, management unit, and basic quantity cannot be assigned.</td>
</tr>
<tr>
<td>Fixed</td>
<td>The production time is independent of the released quantity. It is expressed in hours or in minutes depending on the management unit. With a fixed time type, the production time is entered in the operation time section and the management unit, basic quantity, and rate cannot be assigned.</td>
</tr>
</tbody>
</table>

- The entry at the Base quantity field depends on the management unit.
  - If the time is expressed for 1 unit, 100 units or 1,000 units, the basis quantity is forced, respectively to 1, 100 or 1,000 units. However, if the time is expressed for a lot, the basis quantity can be entered. If the processed routing code is dedicated to a site, it is initialized by the lot size of the product-routing for this site.
Routings (continued)

**Definition of time data**

Operational times associated with a routing step break down as follows:

Only the load generated on the work center is used when viewing capacity. Non-operational time affects scheduling based on calendar time not the work center capacity calendar.
Routings (continued)

Routing operation detail

Select Routing Operation Detail from the Actions icon on a line on the Routing tab to view the routing operation detail and manage sub-contracting information. The Form mode routings function displays as shown below.

- Enter valid start and end dates for the operation.
- The main work center corresponds to the production resource on which the routing operation is performed.
Routings (continued)

- A labor work center can be associated with the machine-type main work center. The labor center times are calculated using the setting coefficient and the operating coefficient (applied to the setting time and operating time) of the main work center.
  - The labor work center is not a scheduling constraint and is regarded as available at the same time as the machine work center. The load generated by the labor work center is managed for information purposes.
  - When creating a routing operation, verification is performed to make sure the site attached to the work center is the same as the site dedicated to the routing code.
  - This resource is considered to be secondary and always available at the same time as the main work center. Its load is managed for information purposes only using the coefficients applied at the time of the main work center.
  - If the main work center is of the sub-contracting type, there cannot be any associated secondary work center.

- Use the Management tab to manage sub-contracting information for the operation.

- The technical sheet is used for the collection of in-line quantity data.
- The fields in the Description and Miscellaneous sections are for information purposes.
- When the By Exception option is selected, the operation is carried out as usual, but may be outsourced in the event of capacity overload.
Routings (continued)

- When the Normal option is selected, the operation is defined as a sub-contract operation. The company itself does not have the resources or tools in-house to perform the operation.
- Use the Detailed scheduling tab to define the sequence and behavior of operations during production.

You can enter a formula code associated with a formula to be used in routing operations, for example. The code defines the location where the formula can be used.
- When using multi-resource work centers, you can split the work center into several sub-posts.
Routings (continued)

**Scheduling tab**

Use the Scheduling tab in the Routings functions to define the sequence between operations and production tracking, including:

- The work order tracking type by operation.
- Whether or not this is a productive operation.
- The sequencing of the operations if the general parameter allows for non-linear sequencing.
- The linking of the operations in reference to the next operation.

- The Milestone field is used to define the production tracking type per operation.
- During the validation of the scheduling grid, the program checks for information consistency:
  - The last operation must not have a next operation.
  - There must not be a loop.
  - At least one production operation must have been declared.
Routings (continued)

- The following options are available at the Milestone field:

<table>
<thead>
<tr>
<th>None</th>
<th>The operation does not allow for manual tracking (Normal tracking).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Tracking:</td>
<td>Each operation is tracked individually.</td>
</tr>
<tr>
<td>Range</td>
<td>Tracking of the operation implies the automatic tracking of all the previous non-tracked operations, and this, until the first operation being the subject of a manual tracking or acting itself as a range is encountered.</td>
</tr>
</tbody>
</table>

- At the Production step field, you can define whether the production reporting (receipt of stock of the finished product) can follow the end of the time entry.
  - For a given routing, the scheduling is only correct and the routing validated if there is at least one production step.

**Scheduling mode example**

The following diagram is an example of the possible scheduling modes available for operations:

![Scheduling diagram example](image-url)
Standard Cost Calculation

Use Standard cost calculation (CALCSTSTD in the Costing > Cost calculations block to calculate the following:

- Standard cost of a product
- Selection of products
- All the products at a site from a cost type routing alternate
- Cost type BOM, with or without immediate update

The standard cost is used to value the stock and the movements for semi-finished or finished products. The standard cost is unique for a product-site and year. The standard cost calculation uses the routing data (time) and the valuation dimension data for the work centers associated with the routing during the processing. When the calculation is carried out on a raw material, the process makes an attempt to determine the receipt overheads for the material.

You can also print a document summarizing or detailing the calculation.

- The Storage site field displays the site associated with the user by default, but can be changed.
- The Unique option must be selected when a product reference has been entered.
Standard Cost Calculation (continued)

- At the Product field, enter the product on which the standard cost calculation is carried out.
- At the Calculation quantity field, if a product reference is entered, this field initializes to the quantity of the economic lot, technical lot, or defaults to 1.
- The Fiscal year field refers to the fiscal year set up in the Fiscal Years function.
- The Date calculated field is the date stored in product-cost. This field defaults to the current date and is not necessarily included in the calculation year (for example, the calculation of the 2011 budget performed in 2010).
  - This date is used as a reference for the validity dates of the BOM links that will be taken into account.
- The BOM type field is used to distinguish between the sales BOMs and the BOMs used by production management.
- Several BOMs can be defined for a single product reference.
- The BOM code options allow you to manage structures of different products according to their use: requirement calculation, sales order entry, production, etc.
  - The Fixed costs distribution field makes it possible to consider whether the fixed cost components will be multiplied by the calculated product quantity/economic lot quantity combination or whether the fixed costs will be posted by total amount.
  - The Dimension type field provides a choice of four dimension rates for the time valuation: standard rate, updated, budget, or simulated.
  - The Overhead column field allows you to select one of the four columns describing the overhead costs.
- In the Update section, the following options can be selected:

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>No update – only printing is possible.</td>
</tr>
<tr>
<td>Deferred</td>
<td>The update can be performed using the Update calculated cost function.</td>
</tr>
<tr>
<td>Immediate</td>
<td>The update of the Product-cost table is performed at the end of the process.</td>
</tr>
</tbody>
</table>
Requirements Parameters

Use Requirements parameters (GESPCB) in the Setup> Stock block to specify how MRP and MPS run. It is very important to understand each field and what effects they have on MRP.

- The site must be a warehouse.
Requirements Parameters (continued)

**MRP calculation tab**

Use the MRP Calculation tab to define parameters for the MRP calculation.

![MRP Calculation Tab](image)

**Processing**

The options in the Processing section are used to indicate the alternate BOM used in the calculation, and define the weekly structure, re-planning duration, load calculation duration, and other parameters.

- The BOM code is used in the MRP or MPS calculation.
Requirement Parameters (continued)

- The Weekly structure field is a set of values, each specifying the hourly capacity of a day in the week. The weekly structure is used in the calendar management.

- The Replanning analysis field is used to enter the duration of the re-planning analysis period in weeks. The period starts from beyond the firm horizon for a product, if it exists.

- At the Load calculation field, if the BOM code permits it, the load calculation duration needs to be indicated. If this duration is null, this means the processing will not calculate scheduling.
  - It’s important to note that certain calculations of manufacturing load made by MRP and MPS are represented by document codes within the program. The CRP method (Capacity Requirements Planning) produces OWS manufacturing load records. The RCCP method (Rough Cut Capacity Planning) used by MPS produces ORS manufacturing load records. You will learn more about these codes in the Manufacturing – Beyond the Basics course.

- At the Production lead time field, the type of production lead time used by the processing should be indicated. If a routing is not associated with the product, the data used is always that of the product-site record.
  - **Routing/product lead times:** The processing uses the routing data within the load calculation horizon, and the data of the product-site record outside of this horizon.
  - **Always routing lead times:** The processing always uses the routing data.

- The Maximum stock analysis check box determines if the maximum stock at the end of the period is considered. If so, a record is issued in MRP.

- The MPS and MRP products check box determines if the management type of the products is considered by the processing.

- The Journal print-out check box determines if the printing of the MRP and MPS journal is created at the end of the calculation.

- The Exclusive selection check box determines if the requirements of a previous MPS calculation should be disregarded. Only the requirements of the current calculation are taken into account.

### Buckets

The options in the Buckets section are used for grouping net requirement calculations.

- The Days, Weeks, and Months fields allow you to enter the periods (days, weeks, and months) used for grouping net requirement calculations.
  - The requirement calculation groups the requirements by period and generates purchasing or manufacturing suggestions (POS or WOS) relating to these requirements.
  - You can perform a requirement calculation with one or more period types, but always in the order of day/week/month.
Requirement Parameters (continued)

- The total number of periods is limited to 2,000 days.
- According to the calculation start date, the number of periods will automatically be re-adjusted so the “week” period begins on the first day of the week, and the “month” period includes a whole month to the nearest week.
  
  ■ The Automatic adjustment check box determines if the periods need to be readjusted according to the calculation reference date.
    
    - If a number of days and weeks are entered, the number of days will be increased so that the first week begins on a Monday.
    
    - If a number of weeks and months are entered, the number of weeks will be increased to end at the end of the month.
    
    - If a number of days, weeks, and months are entered, the two previous rules successively apply.
  
  ■ The Specific parameter field is used for specific, custom inventory processes and is not used in the standard Sage ERP X3 application.

Resources

The options in the Resource section are used to consider specific requirements and resources in the MRP or MPS calculations.

Starting stock

Use the options in the Starting stock section to determine whether to set the starting stock to the Accepted quantity.

■ The Physical stock check box is used to set the starting stock equal to only the status A (Accepted) quantity.
  
  - If this check box is selected, the starting stock is set equal to the status A quantity minus any allocations that exist for the product.

■ The remaining check boxes (Rejected, Transfers, and Stock phantoms) are not selected by default, indicating that those quantities will not be included. The Stock phantoms check box is usually not selected because stock phantoms are not considered as products on hand.

Requirements

The options in the Requirements section are used to consider specific requirements in the MRP or MPS calculations.

■ If you select the Forecast offset check box, the sales forecast adjustment must be carried out in the firm horizon. This only concerns those products where a demand horizon has been defined at the site level. The following adjustment principles apply:
  
  - In the firm horizon, the forecasts are ignored.
Requirement Parameters (continued)

- Outside of the horizon, the greater of the two values between the sales and forecasts and the firm orders is taken into account.

- The Forecast offset check box works in conjunction with the Demand horizon field in the Product-site function.

- You can set the Demand horizon field to zero (0) or more weeks. This set a time line from today to some point in the future if it is not set to zero. That point in the future is critical and is used to support the projected stock calculation. In general, the available stock is determined by subtracting the stock needed for orders from the stock on hand for each day between today and the future point. After that point, the greater of the firm horizon and the forecast. If the Forecast check box is not selected, then only the firm orders are used to calculate available stock between today and the horizon.

**MRP calculation 1 tab**

Use the MRP calculation 1 tab to define additional MRP calculation information.
Requirement Parameters (continued)

- Use the “Order in process protection” field to deactivate the replanning of orders in process.
- Select the “Ignore reorder policy in replanning” check box to ignore the net quantity type reorder strategy.

**Miscellaneous**

The options in the Miscellaneous section are used for:

- Select the Ignore safety stock check box if you want the safety stock to be ignored, regardless of the parameter setting in the reorder policy associated with a product.
- Select the Ignore link % scrap check box if the loss percentage for the level of the BOM links must be ignored.
- Select the Ignore coverage check box if you want the coverage duration to be ignored for all products that are processed.
- Select the Sug. in firm hor. check box if only the suggestions that are created within the firm horizon are required.
- Select the Resources in cov. check box for the products managed with coverage if the resources must be deducted for the coverage of requirements.
- At the Replace safety stock field, indicate whether to adjust the behavior of the calculation regarding the safety stock.
  - **Always**: The calculation suggests a replenishment once the projected stock is less than the safety stock.
  - **At first requirement**: The calculation waits for the first requirement to suggest a replenishment taking into account the safety stock.

**Suggested orders**

Use the options in the Suggested Orders section to specify which types of suggested replenishment orders should be generated by the MRP/MPS process. The specific suggestion that is produced for a product depends on the suggestion type that is set in the product-site record.

- Purchase Order Suggestion (POS)
- Work Order Suggestion (WOS)
- Inter-site Request Suggestion (TRS)
- Sub-contracting Suggestion (EOS)

The process may also generate a Miscellaneous Suggested Order (VDS), which represents overstock or expired-quantity suggestions.
Requirement Parameters (continued)

**Statistics**

The options in the Statistics section show the last calculation date that MRP ran and the time in minutes that it took to run MRP. This provides an indication of the scope and complexity involved.

**Replanning rules**

Use the options in the Replanning rules section to determine (for each resource) the coherence of the replanning with the requests and suggestions made. This also allows for optimizing the resource with regard to the requirements.

- At the Method field, define the parameters for each resource.
  - **No processing**: The processing will not analyze the resource coherence.
  - **Messages Only**: For the resource concerned, a message displays if the resource is not necessary, if it must be shifted in time, and if the quantity needs adjustment.
  - **Simulation**: A re-planning message is submitted if necessary, and the processing also simulates its recommendations in terms of date and quantity on the resources concerned.

- Use the Delay forward and Delay backward fields to define the times within which resources can be replanned.

- The Replan quantities and Replan date fields are used to define the re-planning type that must be carried out.
  - The choices at the Replan quantities field are None, Decrease, Increase, or Decrease/Increase.
  - The choices at the Replan dates field are None, Early, Late, or Early/Late.
  - **Note**: The re-planning rule is only applied for those products whose reorder policy allows re-planning.

**MPS calculation tab**

Use the MPS calculation tab to define parameters for the MPS calculation. The tabs for the MPS calculation are similar to the MRP process. Refer to the MRP screens previously discussed for more information.
The Demand forecasts function allows you to enter and view the demand forecasts for a product at a given site. This function generates orders of the type SOS (suggested sales order). Forecasts can be entered manually period by period or automatically based on the distribution information which can include the seasonality curve linked to the product or by duplicating the forecasts for another product.

Sales forecasts are used to drive MPS/MRP to make suggestions to cover a forecasted sales period so out-of-stock occurrences are minimized. Forecasts are usually entered for “purchase for resale” and “finished good” items.

The following illustrates the demand and sales forecast concept in the program.

- Forecasts can be defined in the following buckets:
  - Weekly
  - Every second week
  - Every third week
  - The last week of the month
  - Combinations of the above

- To simplify the distribution of forecasts, a calculation process can be used to distribute a quantity over a defined period of time. The program allows for one forecast to be entered per week to cover the week.
Demand Forecasts (continued)

Use Demand forecasts (GESORZ) in the Manufacturing > Planning block to enter and view the demand forecasts for a product at a given site.

- A product has a separate forecast record for each site.
- The Product field references the product for which the forecast is being carried out and must be defined for the selected site.
- At the Date range field, enter the start and end dates to run the forecast against.
  - The start date is initialized by the horizon end date for the request or by the current date if there is not one.
- The request horizon, the seasonality curve, the economic lot, and the technical lot are loaded after selecting the product.
- On the grid, the quantities are detailed by week for each month. The last two columns specify the start and end dates for the month.
  - For each forecast line, the totals by month are displayed at the end of the line entry, and at the end of the general entry, the percentage information is displayed.
  - These forecasts can be modified directly in the grid, deleted, or modified.
  - If the firm and/or planned orders have been requested, they are inserted in the forecast succession.
Demand Forecasts (continued)

**Grouping criteria**

- Click Criteria in the Right panel in the Demand forecasts window to group by different selection criteria. This allows you to:
  - Display the forecast for another product at the same site.
  - Display forecasts for the product on a different date range.
  - Display the customer orders, firm and/or planned. These orders are inserted amongst the forecasts.

![Demand forecasts Criteria](image)
Demand Forecasts (continued)

- If you selected to display the customer firm or planned orders, you can click the graph icon in the grid to view the information in graphical format as shown below.

![Graph Image]

- If you selected the Log check box, during the forecast validation, a log displays the demand forecasts entered, calculated, and not modified.
- You can also create a memo in order to save these settings for future use.
Demand Forecasts (continued)

Regrouping forecasts

- Click Regroup in the Right panel in the Demand forecasts window to group several forecasts within a period.

- First, indicate the start and end months for the regrouping. For the end month, you can select the End of grid check box to load the end month with the date of the last forecast.
- Next, select the grouping and rounding methods to use.
Demand Forecasts (continued)

Calculating the forecast

- Click Calculate in the Right panel in the Demand forecasts window to enter the information needed to run the calculation, such as:
  - The date range (the calculation period is pre-loaded with the horizon entered in the main window).
  - The quantity to be distributed (initialized by the total amount for each line).
  - The distribution method for this quantity in the horizon (week by week, all on week 1 of the month, all on week 2 of the month, all on week 3 of the month, or all on the last week).

- Enter the total quantity to be distributed at the Total quantity field.

- At the Seasonality field, you can associate a seasonality curve on this data. This is an allocation curve used to create forecasts, based on a seasonality variation structure.

- The forecast quantity is distributed according to the distribution method selected and the period defined.

- After clicking OK, the distributed forecasts can be viewed and adjusted in the Demand Forecast grid.

- Click Save in the Demand forecast window to create the new forecast. A message displays indicating that the existing forecast will be replaced with the new one. Click OK.
Lesson Practices

Complete the following lesson activities in the order shown.

Create a product category

In this practice, create three product categories based on existing product categories. You will create the FGMTR (Finished Goods) and SFMTR (Semi-Finished Goods) product categories using the parameters (without site). Additionally, you will create the RAWTR (Raw Material) product category.

1. In the Common data > Products block, select Product categories.
2. In the Left list, select the FINIS (Finished Product) product category. (This product category will be used as a base to create a new one.)
3. At the Category field, type the new category code of FGMTR.
4. Clear the entry at the Product sequence field (because you will create your own product IDs in the Products function in a later Practice).
5. Click Create.
6. Click Continue to confirm the duplication.
7. Verify FGMTR has the following settings (you will be using the values for SFMTR and RAWTR in a later step).

<table>
<thead>
<tr>
<th>Category code</th>
<th>FGMTR</th>
<th>SFMTR</th>
<th>RAWTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Header]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description (adjacent to the Category field)</td>
<td>Finished good - training</td>
<td>Semi finished good - training</td>
<td>Raw material - training</td>
</tr>
<tr>
<td>[Description tab]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short title</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types of flow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stock &lt; 0 authorized</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Management mode</td>
<td>Available Stock</td>
<td>Available Stock</td>
<td>Available Stock</td>
</tr>
<tr>
<td>Count mode</td>
<td>Cycle Count</td>
<td>Cycle Count</td>
<td>Cycle Count</td>
</tr>
<tr>
<td>Lot management</td>
<td>Not managed</td>
<td>Not managed</td>
<td>Not managed</td>
</tr>
<tr>
<td>Serial No. management</td>
<td>Not managed</td>
<td>Not managed</td>
<td>Not managed</td>
</tr>
<tr>
<td>QC management</td>
<td>No Control</td>
<td>No Control</td>
<td>No Control</td>
</tr>
<tr>
<td>Storage - Location management</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Lesson Practices (continued)

<table>
<thead>
<tr>
<th>Category code</th>
<th>FGMTR</th>
<th>SFMTR</th>
<th>RAWTR</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Issue Flow tab]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Global allocation</td>
<td>Allow A</td>
<td>Allow A</td>
<td>Allow A</td>
</tr>
<tr>
<td>Order</td>
<td>ALL01</td>
<td>ALL01</td>
<td>ALL01</td>
</tr>
<tr>
<td>Work order</td>
<td>ALL01</td>
<td>ALL01</td>
<td>ALL01</td>
</tr>
<tr>
<td>Shipment</td>
<td>ALL01</td>
<td>ALL01</td>
<td>ALL01</td>
</tr>
<tr>
<td>Material consumption</td>
<td>ALL01</td>
<td>ALL01</td>
<td>ALL01</td>
</tr>
<tr>
<td>Internal movement</td>
<td>ALL01</td>
<td>ALL01</td>
<td>ALL01</td>
</tr>
<tr>
<td>[Accounts/costs tab]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valuation method</td>
<td>STD</td>
<td>STD</td>
<td>STD</td>
</tr>
<tr>
<td>[Planning tab]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reorder mode</td>
<td>By MRP</td>
<td>By MRP</td>
<td>By MRP</td>
</tr>
<tr>
<td>Reorder policy</td>
<td>BNT</td>
<td>BNT</td>
<td>BNT</td>
</tr>
<tr>
<td>Suggestion type</td>
<td>Manufacturing</td>
<td>Manufacturing</td>
<td>Purchase</td>
</tr>
<tr>
<td>EOQ</td>
<td>200</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Technical lot</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

8. Click Save, if needed.

9. Next, select SFINI (Semi Finished) in the Left list in order to create the SFMTR (semi-finished good) product category using the settings (without site) in the table above. Be sure to clear the entry at the Product sequence field.

10. Then, select RAWMA (Raw Material) in the Left list to create the RAWTR (raw material) product category, also using the settings (without site) in the table above. Be sure to clear the entry at the Product sequence field.

11. Click Create for each new product category.

12. Return to the Navigation page.
Lesson Practices (continued)

Create products using the product categories

In the Products function, create products ZB1, ZB2, ZB3, ZSF1, and ZFG1 using the product categories you previously created. Make sure to put these products into the correct product categories using the following diagram as an aid.

FGMTR, RAWTR, SFMTR = product categories
ZFG1, ZSF1, ZB1, ZB2, ZB3 = products

1. Select Products in the Common data > Products block. Note: Make sure View is selected at the drop-down.

2. Click New.
3. At the Category field select FGMTR (Finished good – training). Click OK if prompted.
4. Type ZFG1 as the product and the product description and press the TAB key.
5. Make sure Active is selected as the product status.
6. On the Identification tab, enter TRAFMG at the Search Key field and press the TAB key.
7. Click the Financials tab and select NOR at the Tax level 1 field, if it is not already selected.
Lesson Practices (continued)

8. Click Create.

9. Click New to create the ZSF1 product with product category SFMTR (Semi-finished good – training) using the same steps above, making note of the following differences:
   - On the Identification tab, type TRAINSF for the search key.

10. Click Create.

11. Click New to create the ZB1, ZB2, and ZB3 products with product category RAWTR (Raw material – training) using the same steps above, making note of the following differences:
   - On the Identification tab, type TRAINRW for the search key.
   - Click the Suppliers tab.
   - In the grid, select NA053 (American Supply, Inc.) as the supplier.
   - Enter ZB1 (or ZB2, ZB3) at the Supplier product field.
   - Click Create.
   - Repeat for ZB2 and ZB3 for their respective parts.

12. When complete, you should have the following products listed in the Left list:

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Category</th>
<th>Product Category</th>
<th>UOM</th>
<th>Search Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZB1</td>
<td>ZB1</td>
<td>RAWTR</td>
<td>Active</td>
<td></td>
<td>TRAINRW</td>
</tr>
<tr>
<td>ZB2</td>
<td>ZB2</td>
<td>RAWTR</td>
<td>Active</td>
<td></td>
<td>TRAINRW</td>
</tr>
<tr>
<td>ZB3</td>
<td>ZB3</td>
<td>RAWTR</td>
<td>Active</td>
<td></td>
<td>TRAINRW</td>
</tr>
<tr>
<td>ZFG1</td>
<td>ZFG1</td>
<td>FGTR</td>
<td>Active</td>
<td></td>
<td>TRAINFG</td>
</tr>
<tr>
<td>ZSF1</td>
<td>ZSF1</td>
<td>SFMTR</td>
<td>Active</td>
<td></td>
<td>TRAINSF</td>
</tr>
</tbody>
</table>


Next, set the valuation method to allow for null costs in preparation for later lessons.

1. In the Setup > Stock block, select Valuation methods.
2. In the Valuation methods Left list, select STD (Standard Cost).
3. Next to the Method 1 field, click the Selection icon (magnifying glass).
4. In the Valuation method window that is displayed, select the Null cost allowed check box, if it is not already selected.
5. Click OK.
6. Click Save and return to the Navigation page.
Lesson Practices (continued)

Set up a product site

In this Practice, set up a product site for each product that you created previously (ZB1, ZB2, ZB3, ZSF1, and ZFG1).

1. In the Common data > Products block, select Products.
2. From the Left list, select ZB1. (You will repeat these steps for all the products you previously created.)
3. Under Functions in the Right panel, select Product-site creation.
4. In the Product-site creation window that is displayed, select the NA012 Bike & Toy Product site.
5. Select the Log check box.
6. Click Creation.
7. Review the log that appears to ensure the product site is created for product ZB1.
8. Close the log window.
9. Close the Product-site creation window.
10. In the Products window, click Product-site in the Right panel to ensure the association has been made between the product and the site.

11. Click the Planning tab, and add 4 days of purchasing lead time at the Purchase lead time field.
12. Also make sure By MRP is selected as the reorder mode and Purchase as the suggestion type.
13. Press the TAB key and then click Save.
14. Exit the Product-site function.
15. Repeat these steps for the remaining products that you previously created using the following information:
   - In the Products window, associate all the products with site NA012.
   - For the ZB2 and ZB3 products, add 4 days of purchasing lead time in the Product-site window.
   - For the ZSF1 product, add 5 days of production lead time in the Product-site window.
Lesson Practices (continued)

16. For the ZFG1 product, add 10 days of production lead time in the Product-site window. Also enter 500 at the Safety stock field.

17. Click Save.

18. Return to the Navigation page.

**Set up standard costs**

In this Practice, set up standard costs for the products you previously created.

1. In the Common data > Products block, under Products costs, select *Standard costs*.
2. Click *New*.
3. Select the *ZB1* product.
4. Select the *NA012 Bike & Toy Products* storage site.
5. At the Fiscal year field, select 01/01/(current year).
6. On the Level Cost tab, at the Components field, enter 1.
7. At the Calculation quantity field, enter 1.
8. Click *Create*.
9. Repeat these steps for products *ZB2* and *ZB3*, making sure to enter the component and level material cost shown below.

<table>
<thead>
<tr>
<th>Product</th>
<th>Components</th>
<th>Cost (Material)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZB1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ZB2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>ZB3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

10. Return to the Navigation page.

**Create a production bill of materials**

In this Practice, create two production BOMs for the ZSF1 and ZFG1 products that you previously created.

**Note:** If a message displays indicating the BOM is not valid for the date range, click *OK*. Additionally, you may need to enter 12/15/14 at the Reference date field.

1. Select *Production BOMs* in the Common data > BOMs block.
2. Click *New*.
3. Enter *ZSF1* (It is good practice to start with the lowest level product first.)
4. Select 40 (*Manufacturing*) for the BOM code.
5. Clear the reference date.
Lesson Practices (continued)

6. At the Management unit field, select One and press TAB. (Notice the Base qty field displays 1.)

   **Note:** The “To” date fields provide a validity range of dates. For now, we will keep these fields blank, which opens the range to all dates.

7. Select the Available to Use option, if it is not already selected.

8. Click the Sequence field in the Component product grid. Notice that 5 displays for the first operation line.

   **Hint:** After clicking the Sequence field, press the TAB key to move to the next available field.

9. Tab to the Component field and enter ZB2 for the first operation line. Also enter ZB2 for the Description field.

10. At the Quantity BOM UO field, enter 1 for the quantity for ZB2 (see the figure below).

11. Tab through the remaining fields for the first line.

12. Repeat steps 9 and 10 for ZB3. At the Quantity BOM UO field, enter 2 for the quantity for ZB3.

13. The entries for ZB2 and ZB3 should look similar to the following.

14. Click Create.
Lesson Practices (continued)

15. Click the New button and repeat the steps above for ZFG1, entering the same information as you did for manufacturing the ZSF1 product, except for the entries in the Component Product grid, which should look similar to the following.

16. Click Create.

17. Click Multi-level to view the component structure of the BOM.

18. In the Multi-level BOM function, select the NA012 site.

19. Take a few minutes to expand the levels in the Components section and explore the information in the window.

20. Return to the Navigation page.

Perform a cost calculation rollup

In this Practice, perform a cost calculation rollup on the ZFG1 product.

1. In the Costing > Cost calculations block, select Standard cost calculation.

2. Select the NA012 storage site.

3. Select the Unique option, if it is not already selected.

4. Select the ZFG1 product.

5. Make sure the appropriate fiscal year is selected.

6. At the BOM code field, select 40 (Manufacturing).

7. If prompted with a message about valuation of material only or calculation on BOM, click OK.

8. At the Routing code field, select 40 (Production).

9. Select to calculate all BOM levels.

10. Select to update immediately (select the Immediate option in the Update section).

11. Accept all other defaults and click OK.

12. The Selection Print codes window appears. Select the NA- ITMCOST report.

13. At the Product range First value field, enter ZB1.

14. At the Product range Final value field, enter ZSF1.

15. At the Destination field, select PREVISU, if it is not already selected.

16. Click Print.
Lesson Practices (continued)

17. Download and open the report when prompted.

18. Take a few minutes to view the Single Level BOM report that appears. Locate the information for product ZFG1.
   • What is the total cost of the ZSF1 material under the ZFG1 product? Explain this result.

19. Close the report window and log window.

20. Return to the Navigation page.


22. At the Product field, select ZFG1.

23. Take a few minutes to explore the cost information for the product.


Create a cost dimension

In this Practice, create new costing dimensions based on an existing costing dimension.

1. In the Common data > Costing block, select Costing dimension.

2. In the Left list, select CLAB001 (Labor Assemb Cost) for site NA012.

3. Change the Costing dimension name to ASSEMLAB and press the TAB key.

4. Make sure LAB is selected at the Overheads field.

5. Click Create.

6. Click Continue to confirm the duplication.
Lesson Practices (continued)

7. Repeat steps 2 through 7 to create the following:
   - Type ASSEMMAC and select site NA012. Select MAC at the Overheads field. Enter Machine assembly cost for the description.
   - Type BLENDLAB and select site NA012. Select LAB at the Overheads field. Enter Blend labor cost for the description.
   - Type FABLAB and select site NA012. Select LAB at the Overheads field. Enter Fabrication labor cost for the description.

8. Click Create to for each of these costing dimensions.


Create a work center group

In this Practice, create a work center group.

1. In the Manufacturing > Technical data block, under Work centers, select Work center groups.
2. Click New.
3. Type TRAIN for the work center group.
4. Type Training for the description.
5. Select Level 1 for the display level.
6. Click Create.
7. Return to the Navigation page.
Lesson Practices (continued)

Create a work center

In this Practice, create four work centers and assign them to the work center group you created in the previous Practice.

1. In the Manufacturing > Technical data block, under Work centers, select *Work centers*.

2. Click *New*.

3. Create four work centers (WC1, WC2, WC3, and WC4) using the following settings:

<table>
<thead>
<tr>
<th>Work Center</th>
<th>WC1</th>
<th>WC2</th>
<th>WC3</th>
<th>WC4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing site</td>
<td>NA012</td>
<td>NA012</td>
<td>NA012</td>
<td>NA012</td>
</tr>
<tr>
<td>Description</td>
<td>Training WC1</td>
<td>Training WC2</td>
<td>Training WC3</td>
<td>Training WC4</td>
</tr>
<tr>
<td>Short title</td>
<td>WC1</td>
<td>WC2</td>
<td>WC3</td>
<td>WC4</td>
</tr>
<tr>
<td>Work center group</td>
<td>TRAIN</td>
<td>TRAIN</td>
<td>TRAIN</td>
<td>TRAIN</td>
</tr>
<tr>
<td>Type</td>
<td>Machine</td>
<td>Labor</td>
<td>Labor</td>
<td>Labor</td>
</tr>
<tr>
<td>Structure</td>
<td>5 x 8 hours</td>
<td>5 x 8 hours</td>
<td>5 x 8 hours</td>
<td>5 x 8 hours</td>
</tr>
<tr>
<td>Costing dimension</td>
<td>ASSEMMAC</td>
<td>ASSEMLAB</td>
<td>BLENDLAB</td>
<td>FABLAB</td>
</tr>
<tr>
<td>No. of resources</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Constraint</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

4. Accept all other defaults.
5. Click *Create*.
6. Return to the Navigation page.
Lesson Practices (continued)

Create a routing

In this Practice, create a routing.

1. In the Manufacturing > Technical data block, under Routings, select Routing management.
2. Click New.
3. Select the ZFG1 routing and then press the TAB key.
4. Select 40 (Production) for the routing code.
5. Select the NA012 site.
6. Remove the reference date if one displays.
7. Type ZFG1 Process for the header title.
8. In the Time unit section, select the Hours option.
9. At the Use status field, select the Available to Use option.
10. On the Header tab, select the Change Materials and Operations option.
11. Click the Routings tab.
12. Select the No. field in the grid and press the TAB key. Notice that 5 displays in the No. field.
13. Tab to the Work center field and enter WC1 for the first work center.
14. At the Operation description field, provide a name for the operation, METAL.
15. Accept the all defaults as you tab through the remaining fields on the first line.
16. Repeat these steps for work centers WC2, WC3, and WC4. Provide a name for the operations, such as DRILL, MEASURE, and CUT.

<table>
<thead>
<tr>
<th>No.</th>
<th>Index</th>
<th>Start date</th>
<th>End date</th>
<th>Site op</th>
<th>Work center</th>
<th>Operation description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
<td>TRAIN</td>
<td>WC1</td>
<td>METAL</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td></td>
<td></td>
<td>TRAIN</td>
<td>WC2</td>
<td>DRILL</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td></td>
<td></td>
<td>TRAIN</td>
<td>WC3</td>
<td>MEASURE</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td></td>
<td></td>
<td>TRAIN</td>
<td>WC4</td>
<td>CUT</td>
</tr>
</tbody>
</table>
Lesson Practices (continued)

17. Click the Actions button on the first line and select Routing Operation Detail and enter the following:
   - At the Operation type field, select Rate, if it is not already selected.
   - At the Setup time field, enter 5.
   - At the Operational time field (in the Charged time section), enter 1.5 hours.
   - At the Rate field, enter 100.
   - At the % efficiency field, enter 100%.
   - At the Shrinkage in % field, enter 0.
   - Click OK if prompted to check that the times are still correct.

18. Click the Line text tab and type Step 1 (Step 2 for line 2, etc.)

19. Click OK.

20. Repeat these steps 16 through 18 for work centers WC2 through WC4.

21. In the Routings window, click Create.

22. Next, make a routing for product ZSF1 by copying the ZFG1 routing.

23. Click Create and confirm the duplication.


Cost calculation rollup on machines and labor

In this Practice, perform a cost calculation rollup on the ZFG1 product. Previously, when we ran the cost calculation, the only impact was the cost of materials. Now let’s view the impact of the cost of machines and labor.

1. In the Costing > Cost calculations block, select Standard cost calculation.
2. Select the NA012 storage site.
3. Select the Unique option, if it is not already selected.
4. Select the ZFG1 product.
5. If prompted to overwrite a cost that already exists, click OK.
6. Make sure the appropriate fiscal year is selected.
7. Enter 1000 for the calculation quantity.
8. Select 40 (Production) for the routing code.
9. Select 40 (Manufacturing) for the BOM code.
10. Select to calculate all BOM levels.
11. Select to update immediately (select the Immediate option in the Update section).
12. Accept all other defaults.
13. Click OK.
Lesson Practices (continued)

15. At the Products First value field, enter ZB1.
16. At the Products Final value field, enter ZSF1.
17. Select PREVISU for the report destination.
18. Click Print.
19. From the print drop-down in the Upper bar, select to download the report.
20. Open the report and click through the pages. Pages 4 and 5 of the report for the parent product, ZFG1, should look similar to the following.

![Single Level BOM Report]

21. Take a few minutes to view the Single Level BOM report and then close the report window.
22. Return to the Navigation page.
23. View the standard cost for each product: In the Common data > Products block, under Products – costs, select Standard costs.
24. In the Left list, select the ZFG1 product for storage site NA012. Be sure to select the latest calculation if you have run the calculation more than one time.
Lesson Practices (continued)

25. Take a few minutes to explore the cost information for the product.

Note: Be sure to look at the new standard cost record and not the previous one.

- What are the values of the Machine and Labor fields?
- What is the value of the Valuation cost field?


Enter a demand forecast

In this Practice, enter a demand forecast for product ZFG1.

1. In the Manufacturing > Planning block, select Demand forecasts.
2. In the Demand forecasts Left list, select the ZFG1 product for site NA012.
3. Select Show list from the Actions icon at the graph.

4. Add three to your current month and enter the following values:

<table>
<thead>
<tr>
<th>Product</th>
<th>Graph (month)</th>
<th>Week</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZFG1</td>
<td>Current calendar month + 3 (For example, if this month is January, January + 3 = April. In this example, the entry would be 4.)</td>
<td>3</td>
<td>250</td>
</tr>
<tr>
<td>ZFG1</td>
<td>Current month + 3</td>
<td>4</td>
<td>300</td>
</tr>
<tr>
<td>ZFG1</td>
<td>Current month + 1</td>
<td>1</td>
<td>250</td>
</tr>
<tr>
<td>ZFG1</td>
<td>Current month + 2</td>
<td>2</td>
<td>300</td>
</tr>
</tbody>
</table>
Lesson Practices (continued)

5. Your grid should look similar to the following, depending on which month you are currently in. In the example below, the current month is September.

<table>
<thead>
<tr>
<th>Year</th>
<th>Graph</th>
<th>Quantity week 1</th>
<th>Quantity week 2</th>
<th>Quantity week 3</th>
<th>Quantity week 4</th>
<th>Quantity week 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>6</td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>300</td>
<td></td>
</tr>
</tbody>
</table>

6. Click *Save*.

7. Click *OK* if prompted that new forecasts will replace exiting forecasts.

8. Click *Criteria* and then select the *Display customer firm orders* check box.

9. Click *OK*.

10. Click *Calculate* to calculate the forecast.

11. In the Calculate forecasts window that appears, click *OK*.

12. Click the icon in the Actions button for the grid to display the graph.

13. Click *Save*.

Lesson 4
MRP/MPS Planning

In the following topics, you will learn about the material requirements planning (MRP) and master production schedule (MPS) planning tools, how to work with enterprise planning and workbench tools, how to group orders, as well as how to view MPS and MRP inquiries and reports.

The topics in this lesson include:
- Understanding Planning Concepts
- MRP Processing
- MPS and MRP Results
- Enterprise Planning
- Planning Workbench
- Order Grouping
- Inquiries and Reports
- Lesson Practices
Understanding Planning Concepts

Planning in manufacturing involves the process of using the tools to define the total level of the manufacture demand – plan of production in order to support the firm sales and possible sales (forecasts).

- The following are used in Sage ERP X3 regarding planning in manufacturing.
  - The strategic plan – Master Production Schedule (MPS)
  - The industrial plan – Material Requirements Planning (MRP)
  - Behavior based on parameters

- Sage ERP X3 has an operational type planning comprising of the following functions:
  - Management of the forecasts
  - Management of the Master Production Schedule
  - Calculation of the net requirements
  - Work order management

- The following diagram shows a high-level view of the planning sequence in a manufacturing system:

<table>
<thead>
<tr>
<th>PLANNING SEQUENCE</th>
<th>MATERIAL DRIVEN</th>
<th>CAPACITY DRIVEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRODUCT</td>
<td>PRODUCT</td>
</tr>
<tr>
<td></td>
<td>• S&amp;OP*, Forecast, MPS*...</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PRIORITY PLANNING</td>
<td>CAPACITY PLANNING</td>
</tr>
<tr>
<td></td>
<td>• MRP*...</td>
<td>• Finite capacity</td>
</tr>
<tr>
<td>3</td>
<td>CAPACITY PLANNING</td>
<td>MATERIAL PLANNING</td>
</tr>
<tr>
<td></td>
<td>• Finite capacity</td>
<td>• MRP</td>
</tr>
</tbody>
</table>

- S&OP = Sales & Operation Planning
- MPS = Master Production Scheduling
- MRP = Material Requirements Planning
Understanding Planning Concepts (continued)

**MRP and MPS planning tools**

There are two main planning tools available: Material Requirements Planning (MRP) and Master Production Schedule (MPS).

- **MRP**: The primary goal of MRP is to consider current demand for a given period, attempt to cover that demand using existing resources (firm work order), or to make a replenishment suggestion to cover the demand while maintaining inventory levels above the safety stock minimum.
  - MRP calculates the results based on the parameter settings of both the product-site record and the requirement parameters.
  - MRP calculates the net requirements by site concerning the products subjected to dependent demand. MRP uses bill of material and inventory information, and the Master Production Schedule (MPS) to calculate the requirements for materials.
  - Suggestions are then made to release replenishment orders for material and to reschedule open orders as needed.
  - The following diagram shows the logical flow for the calculation of net requirements in MRP:
Understanding Planning Concepts (continued)

- The following diagrams depict an MRP calculation:

![Diagram of MRP calculation]

**Table: MRP Calculation**

<table>
<thead>
<tr>
<th>Product</th>
<th>Type</th>
<th>Type Suggestion</th>
<th>Fab Time / Time of Purchase</th>
<th>Link Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>PF1</td>
<td>Finished Prod</td>
<td>Fab</td>
<td>10 J</td>
<td></td>
</tr>
<tr>
<td>SF1</td>
<td>Semi-Fini</td>
<td>Fab</td>
<td>5 J</td>
<td>1</td>
</tr>
<tr>
<td>A1</td>
<td>materl 1</td>
<td>Purchase</td>
<td>10 J</td>
<td>1</td>
</tr>
<tr>
<td>A2</td>
<td>materl 2</td>
<td>Purchase</td>
<td>13 J</td>
<td>2</td>
</tr>
<tr>
<td>A3</td>
<td>materl 3</td>
<td>Purchase</td>
<td>25 J</td>
<td>2</td>
</tr>
</tbody>
</table>

Departure = 0 diagram = 35 hours
Understanding Planning Concepts (continued)

- **MPS**: MPS calculates the requirements for finished goods, generating a proposed production schedule. Net requirements are calculated by site concerning products that are subjected to independent demand, such as customer orders and commercial forecasts.
  - The MPS process is usually set up in batch to run each evening.
  - Planning is done on a daily basis and the MPS results are reviewed to react to any scheduling changes.

### Order types

Orders can affect the supply and demand balance in manufacturing.

- **Demand/needs**:  
  - Customer
  - Internal
  - Inter-site (inter-company)

- **Supply/resources**:  
  - Supplier
  - Internal
  - Inter-site (inter-company)
Understanding Planning Concepts (continued)

- Orders can be identified by three letters comprising of a document type and status.
  - A document type: two letters (WO, SO, PO)
  - A status: one letter (F, P, S)

- The following diagrams further define the order types available in Sage ERP X3:

<table>
<thead>
<tr>
<th>Nature</th>
<th>Status</th>
<th>Stock Estimated</th>
<th>Description</th>
<th>Operative event</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO Sale order (Sale)</td>
<td>S</td>
<td>N</td>
<td>Commercial forecast (SOS)</td>
<td>Forecast consumption</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td></td>
<td>Customer order planned (SOP)</td>
<td>Customer order</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>Firm customer order (SOF)</td>
<td></td>
</tr>
<tr>
<td>PO Purchase order (Purchase)</td>
<td>S</td>
<td>P</td>
<td>Purchase order suggestion (POS)</td>
<td>Calculation of the needs</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td></td>
<td>Purchase order planned (POP)</td>
<td>Purchase Demand</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>Purchase order firm (POF)</td>
<td>Order supplier</td>
</tr>
<tr>
<td>WO Work order (manufacture)</td>
<td>S</td>
<td>P</td>
<td>Work order suggestion (WOS)</td>
<td>Calculation of the needs</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td></td>
<td>Work order planned (WOP)</td>
<td>Lot of planned manufacture</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>Work order firm (WOF)</td>
<td>Production release</td>
</tr>
<tr>
<td>MW Materials working (reserve - traces - material)</td>
<td>S</td>
<td>P</td>
<td>Trace suggested manufacture (MWS)</td>
<td>Calculation of the needs</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td></td>
<td>Reservation Planned material (MWP)</td>
<td>Lot of planned manufacture</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>Firm reservation material (MWF)</td>
<td>Launching of manufacture</td>
</tr>
</tbody>
</table>

S = Suggested, P = Planned, F = Firm
N = Need R = Resource

<table>
<thead>
<tr>
<th>Nature</th>
<th>Status</th>
<th>Stock Estimated</th>
<th>Description</th>
<th>Operative event</th>
</tr>
</thead>
<tbody>
<tr>
<td>BW By product working (manufacture)</td>
<td>S</td>
<td>P</td>
<td>Trace suggestion manufacture (BWS)</td>
<td>Calculation of the needs</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td></td>
<td>Planned manufacture (BWP)</td>
<td>Manufacturing batch planned</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>Launched manufacture (BWF)</td>
<td>Launching of manufacture</td>
</tr>
<tr>
<td>TR Transfer request (site applicant)</td>
<td>S</td>
<td>P</td>
<td>Order suggested inter-site (TRS)</td>
<td>Calculation of the needs</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td></td>
<td>Order planned inter-site (TRP)</td>
<td>Planning global Work Scheme Open Order</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>Firm order inter-site (TRF)</td>
<td></td>
</tr>
<tr>
<td>TP Transfer provider (site supplier)</td>
<td>S</td>
<td>P</td>
<td>Ask suggested inter-site (TPS)</td>
<td>Calculation of the needs</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td></td>
<td>Ask inter-site suggested (TPP)</td>
<td>Planning global Work Scheme Petitioning site</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>Ask firm inter-site (TPF)</td>
<td></td>
</tr>
<tr>
<td>SC (Or EO) Sub-contract (subcontracting)</td>
<td>S</td>
<td>P</td>
<td>Not managed in stock (SCS)</td>
<td>Calculation of lead (CRP)</td>
</tr>
<tr>
<td></td>
<td>P</td>
<td></td>
<td>Reservation product S/treatment planned (SCP)</td>
<td>Launching Fab Product with Operation Reference (Firm / Planned)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>Reservation product S/treatment firm (SCF)</td>
<td></td>
</tr>
</tbody>
</table>
Understanding Planning Concepts (continued)

<table>
<thead>
<tr>
<th>Nature</th>
<th>Status</th>
<th>N / R</th>
<th>Stock Estimated</th>
<th>Description</th>
<th>Operative event</th>
</tr>
</thead>
<tbody>
<tr>
<td>VR</td>
<td>S</td>
<td></td>
<td>Only in the result MPS</td>
<td>Trace overstock</td>
<td>(VRS) Calculation of the needs</td>
</tr>
<tr>
<td>VD</td>
<td>S</td>
<td></td>
<td>Only in the result MRP</td>
<td>Trace time limitation in the period</td>
<td>(VDS) Calculation of the needs</td>
</tr>
<tr>
<td>CR</td>
<td>F</td>
<td></td>
<td></td>
<td>Customer Reservation</td>
<td>(CRF) Customer Reservation</td>
</tr>
</tbody>
</table>

S = Suggested, P = Planned, F = Firm
N = Need R = Resource

- The following diagram shows the affects created by firm resource (WOF), planned resource (WOP), and suggested resource (WOS).

- Use the Automatic Release function accessed from Manufacturing > Batch processes to change the status of work orders in mass from suggested to planned or from planned to firm. You can use a formula or filters to select groups of work orders.
  - WOS becomes WOP
  - WOP becomes WOF
MRP Processing

As mentioned previously, Material Requirements Planning (MRP) is a process for defining the component requirements with respect to the demand for parent products. MRP makes it possible to draw the difference between component and parent product requirements (independent and dependent requirements). It is run separately for each warehouse.

MRP processing is also used to issue suggestions (ordering, manufacturing) on requirements, which will be scheduled over time and quantified with respect to the established rules and parameters.

MRP processing in Sage ERP X3 is multi-site, successive regeneration processing that uses a special routing and BOM (MRP type code). Depending on the various parameterizations, it can generate a load, draw up a suggestion analysis, submit a rescheduling message, and generate various suggestions (over-stock analysis, expiry date). MRP processing deals with the various requirements that generate various resources. Requirements and resources can be of Suggested, Planned, Firm type.

Only those products associated with a reorder mode by MRP are taken into account (requests or requirements) by the calculation. The following parameters must be assigned:

- Scheduling parameter
- MRP parameter
- The reorder policy mentioned on the product-site record
- The management rules described on the product-site
MRP Processing (continued)

Use MRP processing (FUNMRPG) in the Manufacturing > Planning block to enter the information for the MRP calculation, such as the start date and which site to run the calculation against.

- Enter the start date of the MRP calculation at the Reference date field.
- MRP can be run for multiple sites.
- All the orders to be processed showing a date earlier than the reference date are assigned to this date.
  - Based on the calculation periods and the start date, the number of periods will be readjusted.
- If a problem arises during the MRP calculation, select the Display progression check box to display the product being processed.
MRP Processing (continued)

- After clicking OK to run the calculation, a log similar to the following is displayed. The log shows a recap of how parameters were set up when MRP was run.

- Be sure to review the log for any errors that may have occurred during processing.
- You may need to scroll down to view all the information in the log.
- Click Delete to permanently delete the log (optional).
MPS and MRP Results

Use MRP results (CONSSCBPD1) and MPS results (CONSSCBCB1), under Reorder results, in the Manufacturing > Inquiries block, to view the MRP and MPS results for a specific product and site. The inquiries are for single site and products only. It provides a way to track MRP results on a product by product basis.

- Use the header section to specify the main selection criteria for the inquiry, such as the site, product, category, date calculated.

MRP – MPS results tab
- For the product selected, the system reproduces the principal information concerning the management method for the product for the reorder, with BOM having served as an aid to the following:
  - Requirements calculation
  - Management method
MPS and MRP Results (continued)

- Suggestion type reproduced by the MRP
- Possible coverage
- Reorder site
- Reorder strategy for the product
- Demand horizon and firm horizon
- Starting stock taken into account by the calculation
- Percentage loss for the product

The system also reproduces the principal stock data for the product: total internal stock, stock waiting put-a-way, total loaned stock, total stock at sub-contractor, cumulative allocated quantities, and cumulative suspended stock.

In the MRP – MPS results grid, you can view the following for each order:
- The document number
- The requirement date, end date, start date
- The requirement or resource quantity
- This quantity is negative when it is a requirement, it is positive when it is a resource.
- The projected stock that makes it possible to see the progress of the stock
- The remaining quantity represents the quantity taken into account in the MRP process (resources, demands)
- The allocated quantity on the firm resource or the firm demand
- The order and the order number with the requirement source
- Source product
- The MRP message
- The MRP date (end date calculated at the time of analysis with re-planning, uniquely in simulation)
- The MRP quantity (quantity calculated at the time of analysis with re-planning, uniquely in simulation)

### Related functions

- Click Search to view the results of the MRP.
- Click Criteria to access and set additional selection criteria.
- Click WIP to view the status of the order in process.
- Click Site stock to view the stock total for the product. This launches the Stock by Site Report function.
- Click Re-order policy to view the reorder policy for the product. This launches the Replenishment policy function.
- Click Product to view the product information. This launches the Products function.
MPS and MRP Results (continued)

- Click Product site to view the product site information. This launches the Product site function.

### Understanding MRP messages

The following table shows the possible MRP messages and suggested actions.

<table>
<thead>
<tr>
<th>Message from MRP</th>
<th>MRP suggests the following action…</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Action</td>
<td>No action required. This means that “No extraordinary action is required.</td>
</tr>
<tr>
<td>Advance</td>
<td>Change the date to an earlier date.</td>
</tr>
<tr>
<td>Delay</td>
<td>Change the date to a later date.</td>
</tr>
<tr>
<td>Increase</td>
<td>Increase the quantity.</td>
</tr>
<tr>
<td>Reduce</td>
<td>Reduce the quantity.</td>
</tr>
<tr>
<td>Cancel</td>
<td>No longer necessary and can be deleted.</td>
</tr>
<tr>
<td>Advance/Increase</td>
<td>Change the date to an earlier date and increase the quantity.</td>
</tr>
<tr>
<td>Advance/Reduce</td>
<td>Change the date to an earlier date and reduce the quantity.</td>
</tr>
<tr>
<td>Delay/Increase</td>
<td>Change the date to a later date and increase the quantity.</td>
</tr>
<tr>
<td>Delay/Reduce</td>
<td>Change the date to a later date and reduce the quantity.</td>
</tr>
<tr>
<td>Delay Firm Horizon</td>
<td>Late compared to the objective date.</td>
</tr>
<tr>
<td>Obsolete Product (end of life)</td>
<td>Expired product</td>
</tr>
<tr>
<td>Overstock</td>
<td>Stock level is over the maximum level (the option Maximum stock level must be selected in Inventory Requirement Parameters).</td>
</tr>
<tr>
<td>Late</td>
<td>Associated with SOF if not shipped out on time.</td>
</tr>
<tr>
<td>Shortage</td>
<td>Associated with SOF if insufficient stock.</td>
</tr>
</tbody>
</table>
Enterprise Planning

Enterprise planning is a tool for decision making provided to planners, schedulers, and material managers. The main objectives of the Enterprise planning function is to highlight the critical events and act on MRP messages for orders subjected to re-planning. This is the “big picture” view of MRP using all products, warehouses, sales orders, etc.

The Enterprise planning workbench serves as a work queue for the planner. This allows the planner to review work order suggestions generated from MRP to make planning decisions for the manufacturing process. The planner can also make production decisions based on material shortages, current inventory levels, and current demand.

The following functionality is also available:

- The definition of profiles differing according to the role of the manager (planner, supplier, buyer, etc.).
- Offers a multi-site and multi-product view of all the activity to be managed over a given period of time.
- Allows action on the restored orders.

Use Enterprise planning (FUNGBENCH) in the Manufacturing > Planning block to view critical events and act on MRP messages. After selecting Enterprise planning, a Transaction Selection window is displayed allowing you to select the transaction template to use.
Enterprise Planning (continued)

After selecting the transaction template, the following window appears.

- Enter the site for which you want to view the production planning information.
- At the User field, enter the user responsible for performing the production planning and ordering.
- Enter the product and date ranges to use for the search.
- The End date field makes it possible to filter the orders to be loaded.
Enterprise Planning (continued)

**Viewing results**

- Click Search in the Right panel in Enterprise planning to view the results based on the selection criteria. You can filter the results based on site, user, product, and date range.
Enterprise Planning (continued)

**Selecting additional criteria**

- Click Criteria in the Right panel in Enterprise planning to access additional selection criteria on which to filter the results.

- You can build a formula from the sections of WIP, product, and product-site tables.
- Click Memo to create a memo allowing you to use the settings again at a future time.
- Click Recall to select from memos that were previously saved.
Enterprise Planning (continued)

Creating purchase/delivery requests or purchase orders

- Click Supply in the Right panel in Enterprise planning to create a purchase request, delivery request, or purchase order.
  - The delivery request or the purchase order can be of inter-site or inter-company type depending on the selected supplier.

- Click Suggest to create suggested procurement orders.
Enterprise Planning (continued)

Creating work orders

- Click Manufacturing in the Right panel in Enterprise planning to create a new work order, planned (WOP) or firm (WOF).

- Click Suggest to create suggested procurement orders.

Creating sub-contract orders

- Click Subcontract in the Right panel in Enterprise planning to create a sub-contracting order.
Enterprise Planning (continued)

Accessing the planning workbench

- Click Planning workbench in the Right panel in Enterprise planning to view the projected stock information.

For more information about the Planning workbench, see the Planning Workbench topic in this document.
Enterprise Planning (continued)

Accessing the grouping workbench

- Click Regroup in the Right panel in Enterprise planning to access the grouping workbench. For example, this feature can be used to identify products purchased from the same supplier and consolidate them into the same lines.

- Enter the criteria and then click Search. In the grid, select the product you want to group.

- For more information, see Order Grouping in this lesson.
Enterprise Planning (continued)

Viewing component availability

- Select Stock from the Actions icon on the suggested work order line in the Enterprise planning grid to view the component availability.
Enterprise Planning (continued)

- You can also check the availability of the finished good and review the current inventory levels by selecting Available stock from the Actions icon in the Stock by site window.

The Available stock function displays the following information for you to view:

- Current inventory levels
- Existing resources
- Total demand for the item
- Available to promise amount
Enterprise Planning (continued)

Generating a work order

After a work order suggestion (WOS) is reviewed and verified for production by the planner, a work order can be generated from the workbench.

Steps for generating a work order:

1. In Enterprise planning, click the Actions icon for the work order suggested (WOS) line and select Plan / Initiate.

2. Select the All (Full entry) entry transaction.

3. Modify the quantity and change the requirement date as needed.

4. Accept the default BOM and routing codes.

5. Click Release to make a firm work order (WOF).

6. Review all the work order suggestions in the workbench and repeat these steps until all planning is completed.

Deleting a work order

When reviewing the MRP results, a planner can make a decision on whether to manufacture an item or remove the suggested work order from the work queue.

Steps for deleting a work order:

1. In Enterprise planning, click the Actions icon for the work order suggested (WOS) line and select Plan / Initiate.

2. Click Delete.

3. A confirmation window appears followed by a second deletion confirmation.

4. The work order suggestion is now removed from the planning window.

Note: If there are demand requirements for the item being planned, the work order suggestion is re-created the next time MRP is processed.
Planning Workbench

The planning workbench helps in the decision-making process by further filtering data to provide a snapshot of the projected stock by product and by site over a given period. When entering additional criteria to filter the results on, you can enter formulas that use the WIP, product, and product-site tables. Unlike MRP results, orders are acted on and updates are made instantly. In contrast to Enterprise planning, Planning workbench only uses one warehouse and one product. It is similar to Enterprise planning, but on a smaller scale.

Use Planning workbench (FUNDBENCH) in the Manufacturing > Planning block to view the projected stock.
Planning Workbench (continued)

- After selecting the transaction template, the following window appears.

![Planning workbench ALL: Full entry]

- Similar to the Enterprise planning function, you can select Search, Criteria, Supply, Manufacturing, Subcontract, Planning, and Regroup in the Right panel.
Enterprise Planning (continued)

Selecting additional criteria

Click Criteria in the Right panel in Enterprise workbench to access additional selection criteria to filter the results on.

- At the Selection Formula field, enter a formula code representing, for example, a routing operations calculation.

Filters

The options in the Filters section are used for the following.

- **Ignore pending issues**: Select this check box so that suspended transactions are not subtracted from the available starting stock.

- **Include the stock under QC**: Select this check box so that controlled stock is included in the available stock.

- **Ignore previous lost sales**: Select this check box to ignore sales forecasts of which the date is before the current date.

- **Apply % loss**: Select this check box if the remaining quantities of work orders must be reduced in the percentage of product-site loss.

Suggestion filter

Use the Suggestion Filter options to filter the suggestions based on MPS, MRP, or both.

Display

Use the Classification field to display the criteria by date or requirement date.
Order Grouping

Use Grouping (FUNMPICK) in the Manufacturing > Planning block to group and cover the requirements with a single reordering order. This completes the order in the planning workbench and global planning.

Depending on the template you select, the fields in the transaction entry window will be different.

- Select a transaction and click OK.

- The header section is used to select the current orders that are being grouped.
  - Enter the site for which grouping will occur.
  - Enter the user responsible for performing production planning or product ordering.
  - Enter a range of products for which orders are selected.
  - The end dates are used to define the horizon for the orders to be processed.
Order Grouping (continued)

- Select the Pick check box to select the product for grouping purposes.
- The Qty. taken in STK field is the quantity to be taken into account in the grouping process.
- The Start date and End date fields identify the first and last days of the period over which an allocation is defined.
  - You can define up to 53 periods.
  - Periods must be consecutive and without gaps.
  - The curve must be defined from 01/01 to 12/31.
- The MRP quantity field indicates the planned quantity, expressed in sales unit, for this contract product. This field is for information purposes and is used during price list searches.
- The Allocated quantity field indicates the quantity allocated to the order line.
- The Shortage field indicates the shortage quantity.
- The Total actual quantity field is the total quantity carried out, including the rejected quantity. This quantity is expressed in operation units.
- The Priority field is used to assign a priority to the supplier in the selections.
- The BOM code field identifies the single product reference that is used by several BOMs. These codes are used to:
  - Manage structures of different products according to their use
  - Requirement calculations
  - Sales order entry
  - Production
- At the Operation number field, the components can be linked to routing operations according to the manufacturing process requirements.
- The Planner/approv. field is used to activate actions on the work orders.
- At the Buyer field, enter the operator in charge of reordering the product for the considered site. Several processes refer to this code:
  - Buyer’s product planning workbench
  - Supplier order entry
- After the selections are entered, click Search to load the orders.
Order Grouping (continued)

Nature of generated order

After all the WIPs to be grouped have been selected, (with quantities), click Generate to create an order. The nature of the generated order depends on the role assigned to the transaction on which the grouping is based, whether it is a planned or firm work order, planned or firm sub-contracting order, purchase request, or planned or firm inter-site replenishment order.

- A work order or sub-contracting order covering sales orders or production or sub-contracting requests increments the "Quantity taken into account at release" field of these orders.
- The production release is made according to the release transaction dedicated to the automatic release, a transaction based on the current Enterprise Planning Workbench transaction, and in its absence on a general parameter. The selected scheduling method is the one planned at the level of the automatic release transactions and it cannot be modified.
- The sub-contracting release is made according to the release transaction dedicated to the automatic release, a transaction based on the current Enterprise Planning Workbench transaction, and in its absence on a general parameter.
- The creation of a planned or firm purchase order is carried out with the following groupings:
  - A firm delivery request is generated for each planned delivery request
  - A firm purchase order by supplier
  - An order line by product / project.
- Note: In order to keep a log of the requirements taken into account, a planned work order (WOP) coming from a grouping is of type WOP* and can no longer be the object of a grouping to a planned order.

Grouping grid

Use the grid to enter the following:

- The document number and line identify the source of the stock movements, such as:
  - Supplier receipt
  - Customer delivery
  - Work order
  - Receipt movement
There are many inquiries available in Sage ERP X3 for viewing MRP and MPS manufacturing information. These inquiries contain a wealth of information.

**Viewing inquiries**

The MRP/MPS inquiries are located in the Manufacturing > Inquiries block.
Lesson Practices

Complete the following lesson activities in the order shown.

**Run the MRP process**

In this Practice, run the MRP process for site NA012.

1. In the Manufacturing > Planning block, select *MRP processing*.
2. At the Reference date field, enter today’s date.
3. Select the *Display progression* check box.
4. In the grid, enter the NA012 site.
5. Click *OK*.
6. Review the log that appears and verify that no errors occurred during processing.
7. Close the log and return to the Navigation page.

**Run the MRP results**

In this Practice, run the MRP results for each product you created previously.

1. In the Manufacturing > Inquiries block, under Reorder results, select *MRP results*.
2. Select the NA012 site, if it is not already selected.
3. Select product ZB1 and click *Search*.
4. Answer the following questions:
   - How many do I need? ____________________
   - How many do I have? ____________________
   - What is the work order number? ____________
5. Repeat the previous steps for all the products you created (ZB2, ZB3, ZSF1, and ZFG1).
6. Return to the Navigation page.
Lesson Practices (continued)

Review a set of requirements using a product range

In this Practice, review a set of requirements using a product range.

1. In the Manufacturing > Planning block, select Enterprise planning.
2. In the Transaction Selection window, select ALL (Full entry).
3. At the Site field, select NA012.
4. At the Product field, select ZB1. In the adjacent field, select ZSF1.
5. Click Search in the Right panel. Notice the suggested orders that are displayed.
6. Return to the Navigation page.

Preview the MRP suggestion list

In this Practice, preview the information on the MRP Suggestion List.

1. In the Printouts > Prints/group block, under Manufacturing, select Reorder.
2. In the Selection window, select CBNSUG - MRP suggestions list.
3. At the Site range, select NA012 for the first and final values.
4. Set the beginning and ending date ranges for the current year.
5. Keep all other defaults.
6. At the Destination field, select PREVISU.
7. Click Print.
8. Open the report and take a few minutes to view the information on the MRP suggestions list.
9. Close the MRP suggestions list and then return to the Navigation page.
Lesson 5
Production Orders

In the following topics, you will learn about work order concepts and how to create work orders suggested from MRP. You will also learn how to automatically allocate and schedule several work orders at one time.

The topics in this lesson include:

- Understanding Work Orders
- Setting Up Entry Transaction Parameters
- Work Order Creation
- Automatic Allocations
- Automatic Scheduling
- Multi-Level Planning
- Lesson Practices
Bill of materials, routing, and product information is used when creating a work order.

A work order is a document like a sales order that represents the approval to produce a good or subassembly. It is given to production to manufacture the product.

After a work order is created, the data involved, such as bill of materials and routing are duplicated. At that point, changes made to the theoretical bill of materials and routing have no effect on an existing work order.

A work order can comprise of several different documents, such as a paper work order, routing sheet, materials list, QA sheets, etc. Some companies, however, print a combined document with this information.
Understanding Work Orders (continued)

- Work orders can be generated from many different sources:

![Diagram showing features of a work order]

**Features of a work order**

The following diagram shows a high level view of the features of a work order.

- The site must be a production site.
- The work order can be manual.
- The release can be:
  - Complete release
  - Partial release (materials and operations only)
Understanding Work Orders (continued)

**Lifecycle of a work order in manufacturing**

The following diagram shows a high level view of the complete flow of a work order in the manufacturing process.

- **Work order flow:**
  - WO Planned is not a mandatory step.
  - Scheduling is not mandatory and can be performed automatically at work order creation.
  - Allocation can be performed automatically at work order creation (firm only). This can be mandatory depending on general parameters.
  - Printing can be performed automatically at work order creation. This can be mandatory depending on general parameters.
  - Time tracking can be performed automatically at the time tracking of the following operation or at the work order closure.
  - Material tracking can be performed automatically at the time tracking, the production tracking, or at the work order closure.
  - Time tracking can be performed automatically at the time tracking or at the work order closure.
  - Work order closure can be re-opened.
  - Work order cost can no longer be modified.
Understanding Work Orders (continued)

Possible work order flows in Sage ERP X3

The following diagram shows the different work order flows possible in Sage ERP X3 for managing the manufacturing process.

- The first flow has a stock change point. This refers to the location change you can do to provide the component from the stock area to the manufacturing production area.
- The second flow shows a different way to do the tracking and is more appropriate if each tracking is recorded in mass at the same time.
- The last flow shows the simplest flow you can do in Sage ERP X3. After the first tracking, even if it is a partial one, you can generate the missing tracking at the closure.
Understanding Work Orders (continued)

**Work order statuses**

The following diagram shows the three possible statuses of a work order during the manufacturing process.

- The Planned status has the following consequences:
  - The components cannot be allocated.
  - The operations impact the load and can be scheduled.
  - The lot number can be set (defined).
  - There is impact on MRP and MPS.
  - The WOP can be optimized.
  - The work order shop packet cannot be printed.
  - The re-planning analysis can be applied on WOP.

- The Firm status has the following consequences:
  - The components cannot be allocated.
  - The technical data can be updated according to the RELUPD general parameter.
  - The shop packet can be printed.
  - The operations impacting the load can be scheduled.
  - The lot number can be set (defined).
  - There is impact on MRP and MPS.
  - WOF can be optimized.
  - The re-planning analysis can be applied on WOF.

- Closed means no more tracking.
Understanding Work Orders (continued)

**Line statuses**

The following diagram shows the line statuses possible during the work order flow.

- **Pending**: Work order created
- **Suspended**: No load
- **Printed**: Work order shop packet printed
- **In progress**: At least one tracking has been done
- **Competed**: No more WIP (load, allocation, MWF = Material Requirement, WOF = incoming receipt, WIP costed). New tracking or modification is still possible.
- **Close and costed**: No modification can be done
Understanding Work Orders (continued)

**Time fences and horizons**

The following diagram depicts the concept of time fences and possible actions you can take.

![Diagram](image_url)

- DTF = Demand Time Fence
- PTF = Planning Time Fence
- LT = Lead Time
Understanding Work Orders (continued)

The following diagram depicts the short term and long term horizon logic.
Setting Up Entry Transaction Parameters

Under Entry transactions in the Setup > Manufacturing block you can define the data entry screens for the following functions. How you set up the entry transaction parameters has an impact on work flow and data entry. There are many entry transaction functions as listed below:

- Work orders
- Production tracking
- Enterprise planning
- Planning workbench
- Grouping
- Time tracking
- Material tracking plan
- Production plan
- Reintegration plan
- Technical sheet plan
- Managing the tracking plans

These functions are used to control all aspects of work order and production tracking data. Some are mentioned in this course. For more information working with entry transaction functions, refer to your Common Tools course materials.
Work Order Creation

Use Work order (GESMFG) in the Manufacturing > Planning block to manually create a work order. To use this function, you must first have the following setup or defined:

- A product and product site set up for finished goods and raw materials
- A bill of materials defined
- A routing defined

Work orders can be created either from suggestions generated from MRP or entered manually. In certain cases, it may be necessary to create a work order manually.

At the Planning site field, enter the code identifying the planning site. This can be different from the production site.

The work order number is a unique identifier that is generated automatically for each work order creation.

At the Order status field, enter the status of the work order as planned or firm. Selecting Firm allows for allocation and scheduling of a work order; whereas, selecting Planned does not allow for material allocation.
Work Order Creation (continued)

- At the Release mode field, enter the code that defines the release mode.
  - **Complete**: The material requirements and the operation loads are generated.
  - **Materials only**: No operation loads are generated.
  - **Operations only**: No material requirements associated with the release are generated.

**Header tab**

Use the Header tab to assign a priority to the work order, enter the planned start and end dates of the work order, and enter the scheduling mode.

![Header tab image]

**Lead-time**

In the Lead-time section, enter the following options.

- At the Scheduling mode field, select from the following scheduling methods. The method selected is usually backward scheduling.
  - Backward scheduling: Requires an end date with the start date being calculated according to the routing times.
  - Forward scheduling: Requires a start date with the end date being calculated according to the routing times.
Work Order Creation (continued)

- The Start date field makes the components and operations present in the order according to their validity date (if the order is not scheduled).
- The duration (manufacturing lead time) is first taken from the product site. It can be adjusted by the digressivity factor, a factor that has impact on the lead time. Secondly, as soon as the routing code is known, this duration can be set by the scheduling.
  - Note: If the transaction is set with automatic scheduling, the work order is scheduled at the time of its creation.
- Inter-operation times can be reduced or increased depending on the workshop situation. The compressed factor can be entered or not depending on the transaction. Planned lead time calculated by MRP can be adjusted by this factor.
- The % LT reduction field is used to apply an increase or decrease of the slack times to all the operations of the work order.
- The Priority field entry affects the finite scheduling. This field defaults to Normal and is used for batch allocation of work orders.

Routing

In the Routing section, the routing information belonging to the associated routing alternative is displayed with the bill of materials alternative set up on the Products Released grid.

- The routing code is the product released code or production routing according to the product-site parameter settings.
- If the release is multi-product, the routing of the first released product is proposed.
Work Order Creation (continued)

Components tab

The Components tab lists the components required for the manufacturing of the released product.

- The Actions icon for each line provides access to:
  - Material detail
  - Projected stock
  - Global and manual allocation
  - Tracking status
  - Assignment functions

- The WO expected quantity field provides the quantity that is expected to be produced.

- The Producible quantity field indicates the maximum of a product that can be produced with the resources available.

- The list of the generated materials when creating the work orders is translated into the WIP as gross material requirements, MWF, and MWP type orders.

- The BOM sequence field, which is the BOM sequence of a component in the work order line, is null if the component was added after the order was created.
Work Order Creation (continued)

**Operations tab**

The Operations tab lists the operations.

- The scheduling mode and status is displayed as a reminder.
- The Actions button for a line in the grid provides access to the operation detail as well as the tracking status.

- The list of operations generated upon work order creation is translated into the workload as OWF and OWP type orders.
- Operation-related data is initialized based on the routing data.
Work Order Creation (continued)

Documents tab

Use the Documents tab to print the documents for the traveler packet.

The following shows the five documents associated with work orders:

<table>
<thead>
<tr>
<th>Title</th>
<th>Crystal Report</th>
<th>Content</th>
<th>Usual number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Issue Slip</td>
<td>BSM</td>
<td>Lists all materials</td>
<td>1 per order</td>
</tr>
<tr>
<td>Routing Sheet</td>
<td>FICHHSUI</td>
<td>Lists all operations</td>
<td>1 per order</td>
</tr>
<tr>
<td>Job Ticket</td>
<td>BONTRV</td>
<td>Detail of operation</td>
<td>1 per operation</td>
</tr>
<tr>
<td>Production Slip</td>
<td>RECETTE</td>
<td>Detail of operation with materials</td>
<td>1 per operation</td>
</tr>
<tr>
<td>Technical Sheet</td>
<td>FICHUI</td>
<td>Questions of technical sheet</td>
<td>1 per operation with technical sheet</td>
</tr>
</tbody>
</table>
Work Order Creation (continued)

**Printing the work order packet**

Steps for printing the work order packet

1. In the Work orders function, select the work order from the Left list.

3. Accept all the defaults and click Print.
4. Each report displays in preview mode.
5. To send a report to the printer, click the Printer button on the toolbar and select the report.

**Material allocation status**

Work orders to be released should be scheduled and allocated. When a work order is created, the materials components can be set to automatically allocate to the work order (setup can be changed to not allocate).

- Click Allocation in the Right panel in the Work orders function to view the work order allocation status. If the status is complete, the materials are allocated without shortages.
  - You can look at the inventory in the warehouse to determine if you have enough material to complete the work order.
  - This method is used for allocating one work order at a time.

**Scheduling status**

When work orders are created, the work orders can be scheduled automatically. (However, in Transaction Entry, this can be changed so the work orders are not scheduled automatically).

- View the schedule by clicking Scheduling in the Work orders function.
- The scheduling dates for each operation can then be viewed.
Automatic Allocations

Use Allocation (FUNMAUTA) in the Manufacturing > Batch processes block under Allocation/deallocation to allocate several work orders at one time.
Automatic Allocations (continued)

- After selecting your criteria and clicking OK, a log similar to the following is displayed.

```
Log Reading F11906

<table>
<thead>
<tr>
<th>08/05/14 11:29:55 (ADMIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3 Automatic allocations</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5 Selection criteria</td>
</tr>
</tbody>
</table>
| 6 Production site         :
| 7 Requirement cutoff      :
| 8 Selection formula       |
| 9 Priority to shortages   |
| 10 Allocation type        :
| 11 Start - end range      |
| 12 Priority               :
| 13 Work order no.         |
| 14 Project                |
| 15 Destination            |
| 16 Order no.              |
| 17 Released product       |
| 18 Material               |
```

73 Results Display: 26 1 2 3
Automatic Allocations (continued)

**Other ways to automatically allocate**

- You can also set parameters to force documents to automatically allocate.
  - Select Stock in the Setup > Stock block.
  - Click the Backorder Management tab.
  - Select the Auto process shortages check box. This allows for automatic allocation the moment it becomes available.
Automatic Scheduling

Use Scheduling (FUNMAUTJ) under Scheduling/descheduling in the Manufacturing > Batch processes block to track scrap and work order efficiency through routing to determine how long and when to start producing.

- Use the Selection formula field to further refine your selection criteria.
- Use the Processing section to schedule and/or reschedule work orders suggested, planned, or firmed.
Multi-Level Planning

Use Multi-level planning (MULTIWOX) in the Manufacturing > Planning block to view different levels of the BOM structure. This is a planning tool for the master production schedule beyond short term planning, which can also be used this if you are not using MRP. Multi-level planning is discussed in more detail in the Manufacturing – Beyond the Basics course.

Planning and process

In the Planning and Process sections choose which status to generate the work order with (Planned or Firm) and what quantity to release. You must also specify the BOM alternative as well as the routing to use in the releases.

- Click OK to display the orders that are being proposed to the BOM levels.
Viewing the List of Work Orders

Use List of WOs (CONSMFG) in the Manufacturing > Inquiries block to view a list of work orders according to the criteria entered, such as status, start and end date, work order number, released product, routing, project, original document, component, and work center.

- You can view various selection formulas for products, materials, and operations.
- The grid displays lines by work order for the criteria selected.
  - If the Materials detail or Operations detail check boxes are selected, the grid displays the materials or operations for each work order.
- The color codes of the work order lines are as follows:
  - **Green**: Firm work orders
  - **Grey**: Planned work orders
  - **Red**: Closed work orders
- The Criteria button allows you to access additional selection criteria, such as BOM codes, routing codes, original document type, and work order status.
Lesson Practices

Complete the following lesson activities in the order shown.

Enter a manual work order

In this Practice, enter a manual work order and allocate the components.

1. In the Manufacturing > Planning block, select Work order.
2. Select All (Full entry).
3. Click New.
4. At the Planning site field, select NA012, if is not already displayed, and then press the TAB key.
5. At the Production site field, enter NA012 site.
6. At the Order status field, select Firm, if it is not already selected.
7. At the Release mode field, select Complete.
8. In the Products released grid, at the Product field, select ZSF1. This is the item being produced.
9. Tab through the fields, accepting all other defaults for the line.
10. Select 40 for the BOM code.
11. Enter today’s date as the end date. Click OK if prompted that the end date comes before the current date.
12. Click Create. If prompted to reschedule, click Yes.
13. View and close the log window.
14. In the Enter report parameter window that appears, select PREVISU as the destination and click Print.
15. Preview the WO cost detail report that appears.
16. Answer the following questions.
   - How many products were released? _______________________________
   - Why was this quantity released? _______________________________
17. Write down the work order number. _______________________________
18. Close the report.
19. Repeat these steps to create a work order for the ZFG1 product.
20. Return to the Navigation page.
Lesson Practices (continued)

**View list of work orders**

In this Practice, view a list of firm or planned work orders.

1. In the Manufacturing > Inquiries block, select *List of WOs*.
2. Select *NA012* as the production site.
3. Select *Firm* and *Planned* as the order status.
4. Select the *Materials detail* check box.
5. Click *Search*.
6. What do the green results indicate? ________________________________
7. Clear the *Materials details* check box and click *Search* again.
8. Explain why the results are different. ______________________________
Lesson 6
Production Reporting/Tracking

In the following topics, you will learn how to track released work orders, complete and close firm work orders in process, and reactivate a closed work order.

The topics in this lesson include:
- Production Tracking
- Work Order Status
- Work Order Close
- Work Order Reactivation
- Tracking Plans
- Reintegration Plan
- Lesson Practices
Production Tracking

Use Production tracking (GESMTK) in the Manufacturing > Production tracking block to track the work orders released to the workshop. You can also view production times, material consumption, and production reports.

It is not possible to work with a work order until it is firm and allocated (at least globally). Production Tracking was designed to optimize the automation of the work order tracking; however, you can also manually track work orders. Sage ERP X3 also has mass work order tracking functions to allow you to track several work orders at the same time as well as perform production tracking without a work order.

- Enter the site for which you want to track production.
- The tracking number is automatically assigned by the system.
- If the transaction selected allows you to use several tracking types, (material and operation tracking, production reporting), a check box and a tab are activated for each tracking type.
- In the event of material consumption and production reporting, the corresponding stock transactions are posted on the tracking date.
  - The system validates that the entered date falls in a period for which stock update is authorized.
Production Tracking (continued)

**Operations tab**

Use the Operations tab to enter the time devoted to the operations of a work order. All the fields that can be entered on this tab are pre-loaded by the transaction.

- The Operation fields show the range of operation numbers that are being tracked.
- The Filter field filters whether to track operations that are closed or not closed.
- The Tracked qty field is used for an initial tracking with the planned quantity in the work order.
- In automatic tracking, the quantity carried out by each operation is loaded by default with the quantity remaining to be produced in the work order. The operation completion is proposed by default.
- If the information in the grid is acceptable, all that is needed is to create the tracking record by recording the time spent.
- If the information in the grid is not acceptable, the actual quantity, actual rejected quantity, unitary time, operation time, setup time, completion, ID number, messages, and scrap messages can be assigned. Production times are automatically adjusted.
- The actual quantity is the total quantity produced for the operation. It includes the rejected or “under quality control” quantity coming from the operation.
- If a rejected quantity is entered, you can associate up to 15 different reject messages by clicking the Actions icon at the Actual rejected qty and Reject message fields.
Production Tracking (continued)

**Manufacturing tab**

Use the Manufacturing tab to carry out the receipt of stock of production. This stock movement uses the parameters of the tracking transaction.

- The Tracked qty field shows the planned quantity of the work order. If production follows operation tracking, this field defaults to the quantity to be tracked/planned on the Operations tab and cannot be modified.
- All the fields in the grid are pre-loaded by the tracking transaction.
  - The lot, sub-lot, status, serial number, and transaction description fields are accessible, if needed, according to the tracking transaction used.
Production Tracking (continued)

Components tab

Use the Components tab to carry out material stock issues.

Backflushing

Backflushing is the process that assumes a certain amount of raw material consumption based on the quantity of the finished goods produced. For example, if you are an automobile manufacturer and need to produce 100 automobiles, you can conclude that you will need 400 tires. Enter the needed information and the system calculates how much of a component is needed for the finished goods.
Work Order Status

Use WO status (FUNMSITU) in the Manufacturing > Production tracking block to view a summary of the work order progress, including released products, materials, and operations.
Work Order Status (continued)

**General tab**

Use the General tab to view the work order header information, as well as view a summary of general information.

<table>
<thead>
<tr>
<th>General</th>
<th>Products</th>
<th>Components</th>
<th>Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning site</td>
<td>Released routing</td>
<td>Routing code</td>
<td>Last tracking</td>
</tr>
<tr>
<td>NAB23</td>
<td>FIN502</td>
<td>40</td>
<td>Closing date</td>
</tr>
</tbody>
</table>

**LEAD TIMES**

- Scheduling mode: Backward
- Start date: 12/03/13
- End date: 12/13/13

**POSITION**

- Position: Pending
- Scheduling status: Not Scheduled
- Allocation status: Not Allocated

**QUANTITIES**

- Stock unit
- Planned quantity: 4000
- Remaining quantity: 4000
- Total actual quantity
- Remaining quantity: 4000

- The Scheduling mode field specifies the scheduling method.
  - The production lead-time is calculated based on the product data. This lead-time is applied at the start or end date of the work order.
Work Order Status (continued)

**Products tab**

Use the Products tab to view information about the released product, such as the status regarding the availability of the product.

- **Note:** Several BOMs can be defined for the same product reference.
- You can view planned and completed quantity information for products in graphical format.
  - You can also click a bar to display options allowing you to remove a component or export the information in the graph to Microsoft Excel.
Work Order Status (continued)

**Components tab**

Use the Components tab to view work order material information.

- Click a bar in the graph to remove a component or export the data in the graph to Excel.
- You can view the required and consumed information for components in graphical format.
Work Order Status (continued)

**Operations tab**

Use the Operations tab to view work order operation information.

You can view the expected quantity and total achieved quantity information for operations in graphical format.
Work Order Close

Use WO close (FUNMCLOSE) in the Manufacturing > Production tracking block to complete and close the firm work orders in process which have been tracked beforehand.

- The Complete option in the Right panel specifies the status Completed for each operation, material, and product line released.
  - The WO status field changes automatically from In process to Completed.
  - It is possible to continue tracking a work order completed but not yet closed.
- The Close option in the Right panel changes the work order status from Firm to Closed.
- It is normally impossible to save consumption or work movements when the status is Closed; however, the WO Reactivation function can be used to continue tracking a work order, provided that no price cost has been calculated for this work order.
Work Order Close (continued)

**General tab**

Use the General tab to view information, such as the work order status (pending, printed, in process, completed), and last tracking and the closing dates.

![General tab](image)
Work Order Close (continued)

**Products tab**

Use the Products tab to view a summary of the information related to the work order concerning the released products.
Work Order Close (continued)

**Components tab**

Use the Components tab to view summary information regarding the work order components, including the component status and required date.

- You can show or hide a component on the graph by selecting or clearing the check box for the component in the grid.
Work Order Close (continued)

**Operations tab**

Use the Operations tab to view summary information regarding the work order operations, including the operation line status (Pending, In progress, Ordered, Received or Closed), work center and work center group, and type of work center, such as machine, labor, or sub-contract.
Work Order Close (continued)

**WO tracking inquiry**

Click Tracking detail in the Right panel to view the production tracking detail information for the work order.

- For each tracking number, you can view the product produced, the quantity produced, the rejected quantity, the release unit.
- For each tracking line, the Actions icon allows you to view:
  - The production trackings
  - The movements
Work Order Close (continued)

**Viewing the log**

- After clicking Close, the Production Cost Calculation log may appear if you clicked Yes at the Production Cost Calculation message.
Work Order Reactivation

Use WO reactivation (FUNMREACT) in the Manufacturing > Utilities block to reactivate a closed order. The reactivation of the work order consists in changing the status of (the work order switches from the Closed status to the Firm status) in order to authorize additional tracking. This reactivation can only take place on work orders whose cost price has not been calculated yet.
Work Order Reactivation (continued)

**General tab**

Use the General tab to select the product site. The site associated with the user is displayed by default.

**Products tab**

Use the Products tab to view information about the released product, such as the released quantity and line status (Active, Development, On hold, Not renewed, Expired, and Not usable).

**Components tab**

Use the Components tab to view the component details of the product, such as component type (Normal, Sub-product, Text, and Valuation), required date, and quantity allocated.

**Operations tab**

Use the Operations tab to view the operation lines for the product. You can view information such as the line status, the planned work center and work center group, and type of work center (machine, labor, or sub-contract).
Use Managing the tracking plans in the Manufacturing > Production tracking block to track time, material, manufacturing, reintegration, and technical sheet plan information. These functions can also be accessed directly from the Production tracking block as shown below.

**Note:** These tracking plans are discussed in more detail in the Manufacturing – Beyond the Basics course.
Reintegration Plan

Use Reintegration plan (FUNBENCHCHR) in the Manufacturing > Production tracking block 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.
Lesson Practices

Complete the following lesson activities in the order shown. **Note:** Before continuing, you may need to enter detailed stock and production information and perform manual allocation.

Track a work order

In this Practice, track a work order in the production process.

First, ensure there is enough stock for products ZB1, ZB2, and ZB3 using Miscellaneous receipts.

1. In the Stock > Receipt/issue transactions block, select *Miscellaneous receipts*.
2. When prompted for a transaction, select *ALL* and click *OK*.
3. Click *New* to start a new transaction.
4. Select *NA012* as the storage site.
5. Enter today’s date as the allocation date.
6. Select *020 (External)* as the transaction group and leave the remaining fields blank.
7. On the Lines tab, select the *ZB1* product.
8. Enter *100* as the quantity.
9. Verify the status is ‘A’ and accept the default location information.
10. Select *STO* for the location type.
11. Accept all other defaults and click *Create*.
12. Now select products ZB2 and ZB3 and enter the same information. Select product ZSF1 and enter *100* for the quantity.
13. Close the Miscellaneous receipts function.

Next, make sure the components are allocated.

14. Now let’s check to see if components have been allocated.

15. Open the work orders (Manufacturing > Planning) you previously created in order to allocate the components.

   - Click the Components tab for each work order and scroll to the Qty allocated field.
   - If there are not components allocated, click Allocation in the Right panel.
   - Click Allocate.
   - Select Detail for the allocation type.
Lesson Practices (continued)

Now, perform the production tracking.

16. In the Manufacturing > Production tracking block, select Production tracking.
17. Select the STD (Complete tracking) transaction.
18. Click New.
19. Select NA012 as the production site.
20. Tab to the Order no. field and select the work order associated with the ZSF1 product.
21. Select the Operation tracking, Completed quantity, and Material tracking check boxes, if they are not already selected.
22. Click the Components tab. If the components are red, click the Actions icon for each component and select Enter detail quantities. View the information and modify if necessary and click Save. Close the window.
23. In the Production tracking window, click Create.
24. Click the Operations tab. The Operations grid should look similar to the following:

<table>
<thead>
<tr>
<th>Tracking type</th>
<th>Operation</th>
<th>Split</th>
<th>Std oper</th>
<th>Type</th>
<th>Actual work center</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WO</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>Mic</td>
<td>WC1</td>
<td>WC1</td>
</tr>
<tr>
<td>WO</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>Lab</td>
<td>WC2</td>
<td>WC2</td>
</tr>
<tr>
<td>WO</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>Lab</td>
<td>WC3</td>
<td>WC3</td>
</tr>
<tr>
<td>WO</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>Lab</td>
<td>WC4</td>
<td>WC4</td>
</tr>
</tbody>
</table>

25. Notice the pencil icon in the Right panel. This icon indicates the work order is completed and modifications are no longer allowed.

26. Write down the tracking number. _____________________________________
27. Repeat these steps for the ZFG1 product.
Lesson Practices (continued)

View the work order status

In this Practice, view the work order summary information.

1. In the Manufacturing > Production tracking block, select **WO status**.
2. Select **NA012** as the production site.
3. In the Left list, select a work order you previously created.
4. Take a few minutes to view the information.
   - How many of the product was made? ____________________
5. Click the **Components** tab.
6. Click Actions icon to display the graph if necessary.
7. Remove the ZB1 component from the graph (clear the check box for component ZB1). Add the ZB1 component back to the graph. **Note**: You may need to refresh the page.
8. Click the Actions icon for the graph and select **Excel export**.
9. In the Export Excel window that is displayed, click **Export**. Click the Excel icon.

10. Open the Excel spreadsheet.
11. If prompted to download the Sage ERP X3 for Excel add-in, click the link and following the instructions.
12. Take a few minutes to view the information and then close the Excel window. Do not save the file.
14. Click **Tracking detail** in the Right panel of the Work Order Status window.
   - What tracking order is associated with the work order? ____________________
15. Return to the Navigation page.
Close a work order

In this Practice, close a work order.

1. In the Manufacturing > Production tracking block, select WO close.
2. Select the NA012 production site.
3. Select the work order associated with the ZSF1 product.
4. Review the information on the tabs for completeness.
5. Click Tracking detail in the Right panel to review the detail information.
7. In the Right panel, click Close.
8. At the message verifying if you want to close the work order, click Yes.

9. If a Production Cost Calculation message displays, click No. (Clicking Yes will perform the final cost calculation for the work order. We’d like to click No for now so that we can perform the reactivation Practice on the next page.)

10. Notice the WO status field now displays Closed.
Lesson Practices (continued)

Reactivate a closed work order

In this Practice, reactivate a closed work order.

1. In the Manufacturing > Utilities block, select *WO reactivation*.
2. At the Production site field, enter *NA012*. The closed work orders for site NA012 are displayed in the Left list.
3. Select any one of the closed work orders.
4. Click *Reactivate* in the Right panel.
5. Click *Yes* when prompted to reactivate the work order.
6. Notice the status at the WO status field now displays *Firm*.
7. Return to the Navigation page.
In the following topics, you will learn how to view the breakdown by cost type of the production cost price, view work order valuation information, how to value the production WIP for one or more work orders or sub-contract orders, view variances between actual and standard cost, and how to pass the work order information to the accounting module. You will also learn how to compare multiple costs.

The topics in this lesson include:

➢ Production Cost Inquiry
➢ WIP Cost Inquiry
➢ Cost Comparison
➢ Multiple Cost Comparison
➢ WIP Validation
➢ WIP Cost Finalization
➢ WIP Accounting Interface
➢ Lesson Practices
Use Production cost inquiry (GESMFC) in the Costing > Production costs block to view the breakdown by cost type of the production cost price for a work order.
Use WIP cost inquiry (GESMWI) in the Costing > Production costs block to view the work order valuation information and to compare the actual costs with those that were planned at the time of the release.

![WIP cost inquiry](image)

**Order no.**
WONA0120090

**Site**
NA912

**Tracking flag**
Closed + Costed

**QUANTITIES**

<table>
<thead>
<tr>
<th>Entry type</th>
<th>Planned</th>
<th>Completed</th>
<th>Reject</th>
<th>Remaining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work Order</td>
<td>4000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WO</td>
<td></td>
<td>4000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DATES**

| Start date | 06/01/13 |
| End date   | 06/26/13 |
| First tracking | 06/26/13 |
| Last tracking | 06/26/13 |

**Totals**

<table>
<thead>
<tr>
<th>Material</th>
<th>Actual</th>
<th>Standard</th>
<th>Reject</th>
<th>Variance</th>
<th>Variance (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WONA0120090</td>
<td>30128.7982</td>
<td>30128.7954</td>
<td></td>
<td>-0.0028</td>
<td>0.00</td>
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<tr>
<td></td>
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<td>2070.00</td>
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<td>-0.00</td>
<td>0.00</td>
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<tr>
<td>Machine</td>
<td>13200.00</td>
<td>13200.00</td>
<td></td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>SUB-CONTRACTED</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overhead</td>
<td>7672.00</td>
<td>60998.93</td>
<td></td>
<td>288970.2</td>
<td>473.75</td>
</tr>
<tr>
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<td>45408.4714</td>
<td>45458.7955</td>
<td></td>
<td>288818.044</td>
<td>0.83</td>
</tr>
</tbody>
</table>

**Actual**

**Standard**

**Reject**

**Variance**

**Variance (%)**
Cost Comparison

Use Cost comparison (COMPCOUT) in the Costing > Performance analysis block to compare two provisional costs or production costs that have been calculated for a single site or two different sites. You can measure the variances for material, machines, labor costs, subcontracts, and overhead.

![Cost comparison screenshot](image)
Multiple Cost Comparison

Use Multiple cost comparison (COMPCOUTM) on the Costing > Performance analysis to view multiple costs. The settings in this function allow you to compare the costs for a selection of products from two different warehouses or costs from a different source within the same warehouse. A report is generated comparing the many costs based on the criteria entered.
WIP Valuation

Use WIP valuation (ORDWIPVAL) in the Costing > WIP block to value the production WIP for one or more work orders or sub-contract orders, according to the calculation parameters.

The production WIP corresponds to the value of the products in production for which the raw material has been consumed, time has been entered, and stock receipts have been carried out.
Manufacturing Fundamentals

WIP Finalization

Use WIP finalization (FUNWIPMFC) in the Costing > Production costs block to determine the production cost price (PCP) for a completed work order and to underline a variance between the actual cost and the standard cost (cost based on the data in the BOM) or the cost based on the work order data.

- Select WO filter at the Actions icon at the Order no. field to filter on work orders.

---

**WIP finalization**

**SELECTION**

- Simulation
- Cost update
  - Order no.
  - Order close

**REPORT**

- Print out
  - No
  - Detail
  - Summary
- Variance source
  - Standard Data
  - Work Order Data
- Provisional cost print
- Print of non-achieved planned

---

**Object selection**

**Fields**

<table>
<thead>
<tr>
<th>Fields</th>
<th>Descriptions</th>
<th>Operators</th>
<th>Values</th>
<th>Memo parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>And</td>
<td>Or</td>
<td>Equal</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

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WIP Accounting Interface

Use In-process posting (WIP accounting interface) (FUNWIPACC) in the Costing > WIP block to pass the work order WIP records that have resulted from production tracking, as well as any variance or adjustment records generated during the production cost calculation to the accounting module. It is possible to transfer the WIP records to accounting for work orders that have not yet been closed. It is also possible to transfer the WIP generated from reporting without work order.

All elements from production are transferred to the accounting module by this method, including material issues, stock receipts, operational expenses (machine, labor and subcontractor), and overheads. Stock movements coming from production management are therefore not posted by the stock interface.

- After selecting the needed criteria and clicking OK, a log window appears.
Lesson Practices

Complete the following lesson activities in the order shown.

View work order valuation information

In this Practice, view the work order valuation information for a product.

1. In the Costing > Production Costs block, select WIP cost inquiry.
2. In the Left list, select the work order associated with the ZSF1 product.
3. Take a few minutes to review the information.
   • What is the labor actual cost amount? ________________________________
   • What is the machine actual cost amount? ______________________________
   • What is the total actual cost amount? _________________________________
   • What is the labor variance cost amount? ______________________________
   • What is the machine variance cost amount? _____________________________
   • What is the total variance cost amount? ______________________________
4. Return to the Navigation page.

Perform WIP finalization

In this Practice, perform the WIP finalization process and view the results in WIP Cost Inquiry.

1. In the Costing > Production costs block, select WIP finalization.
2. At the Site field, select NA012, if it is not already selected.
3. At the Order no. field, select the work order associated with the ZSF1 product.
4. Accept all other defaults and click OK.
5. Take a few minutes to review the information on the log that displays.
   • Has the WIP balance been generated? _________________________________
   • Is the production cost price (PCP) calculation finished? ______________
6. Return to the Navigation page.
7. Access WIP cost inquiry to view the results: In the Costing > Production costs block, select WIP cost inquiry.
8. In the Left list, select the work order associated with the ZSF1 product.
9. Take a few minutes to review the information.
10. Return to the Navigation page.
Lesson Practices (continued)

Pass cost information to the general ledger

In this Practice, use the In-process posting (WIP accounting interface) function to pass information to the general ledger.

**Note:** You may first need to ensure the batch server is running by going to the Usage > Batch server block under Server activation. Also access the Usage > Batch server block select Accounting task to verify the status (Run now > Update).

1. In the Costing > WIP block, select *In-process posting*.
2. In the WIP posting window, select *NA012* as the production site.
3. Select *Work Order* as the entry type, if it is not already selected.
4. At the order range fields, select the work order associated with the ZSF1 product.
5. Click *OK*.
6. Review the log that appears and then return to the Navigation page.
7. Check the general ledger to ensure the material was copied to the accounting module. In the Financials > Journals block, select *Journal entry*.
8. In the Transaction selection window that appears, select *STDCO*.
9. In the Left list, select the journal you created (journal type is WIPCS).

<table>
<thead>
<tr>
<th>WIPCS</th>
<th>WIP000002</th>
<th>WPCO</th>
<th>08/06/14</th>
<th>WP</th>
<th>WIP</th>
<th>STDCO</th>
</tr>
</thead>
</table>

10. Take a few minutes to review the journal information.
Lesson 8
Reports

In the following topics, you will about some of the key reports available in Manufacturing.

The topics in this lesson include:

- Printing Manufacturing Reports
There are several reports available that detail information on settings and transactions entered in Manufacturing.

### Printouts > Prints/group > Manufacturing

There are several different areas in the Prints/group block under Manufacturing that categorize the reports specific to technical data, production documents, reorder, valuation, and analysis.

- The Technical data function includes reports that are specific to reports or forms that are used for routings and work centers. They include such reports/forms as the Standard operations listing, Routings, Weekly structure listing, and Work center listing.
- The Production documents function includes reports that are specific to production such as Job tickets, Material issue notes, Routing sheet, Technical sheet, and Production slip.
- The Reorder function includes reports that are specific to MRP and MPS. They include the MRP suggestion list, MPS suggestions list, Suggestion list ex-mrp, and Reorder policy listing.
- The Valuation function includes reports that are specific to work order cost and cost dimension. They include the WO cost detail and Cost dimension listing.
- The Analyses function includes reports providing information on lead time and material, operating, and resource yield. They include the Lead-time analysis, List of WOs, WO detail list, Tracking list, Material yield, Operating yield, Resource yield, Late order analysis, Time analysis report, Resource utilization report, and Work load listing.

### Preview Reports

In this Practice, take a few moments to view different Manufacturing reports.

1. From the blocks and functions discussed above, preview various reports.
2. When completed, close all windows.
Summary

You have learned:

- About manufacturing concepts and processes.
- About the manufacturing planning tools.
- How to set up manufacturing requirements.
- How to process material requirements planning and view the results.
- How to create work orders and perform allocations and scheduling.
- How to track the production process.
- How to view the work order status.
- How to close the work order.
- How to view actual costs compared to planned costs.
- How to determine the production cost for a completed work order.
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