# Management Accounting TFIN 20_2 Summary

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# Unit 1 – Introduction to Product Cost Planning

## *Lesson 1 – Overview of Product Cost Planning*

- At the start of the product's life cycle, only rough estimates and specifications are available. Product Cost Planning should be able to provide initial precise cost projections. These projections must be:
    - Delivered quickly
    - Flexible and variable
    - Made using existing, similar products or structures (where possible)
    - Without a large master data input
- During the product design and specification phase, costs increase when refinements are made to original specifications.
- After transition to the prototype stage, the first constructive data can be entered in the form of BOMs. During this phase, the need for integration and direct access to data in Logistics increases. Data that is not available in Logistics is added by the person responsible for product cost planning.
- After the products attain market maturity, the integration of master data for tangible goods has a significant impact. At this stage, the complete product range is costed regularly and precise cost shifts are monitored.
- If you plan a new product for which there is no master data in the SAP ERP, you can perform initial planning and cost projections by creating a Base Planning Object using Reference and Simulation Costing. Using this method, you manually plan the costs for an item.
- When the first material master data is created in the SAP ERP, you can use the Material Cost Estimate without Quantity Structure to manually plan the cost of goods manufactured and the cost of goods sold for the product. You can use the base object cost estimate as a reference for this.
- Two methods are available for material cost estimate planning without quantity structure, multi-level unit costing and single-level unit costing. Multi-level unit costing enables you to plan cost at the assembly level without requiring production bills of material.
- When the complete master data (BOMs and routings) is available in the system, you can create a Material Cost Estimate with Quantity Structure, which will automatically calculate the cost of goods manufactured and cost of goods sold from data existing in logistics applications.
- In the early stages of the product life cycle, unit costing and multi-level unit costing are the ideal costing methods
- When a cost estimate with quantity structure is created, the system uses master data from Logistics. This method costs individual products precisely and provides various analysis options to compare various alternatives.
- Costing runs are used to process mass data. They are used periodically to cost the entire product spectrum.
    Tangible goods:
    - Materials can be produced in-house, subcontracted, or procured externally. Data for these materials is located in the logistics components PP, PP-PI, and MM. This data is accessed when the materials are costed.
    - Product cost estimates can also be used for inventory valuation and comparison purposes in Cost Object Controlling.
    Intangible goods:
    - Shipping: Container repacking, storage, quality checking
    - Telecommunications: A one-minute long-distance call

- o   Consulting: A two-day CO overview
- o   Hospital: A heart operation
- o   Training: A product training session at customer premises

# Unit 2 – Material Cost Estimate without Quantity Structure

## *Lesson 1 – Overview of Product Cost Planning*

- The accounting and costing views are the most important views from the product costing perspective. These views are plant-dependent. For costing, with the exception of the base unit of measure and the material type, all other accounting and costing controls/field values can be established at the plant (valuation area) level.
- Material cost estimates are saved with reference to a plant. The valuation area determines the organizational level at which the material is valuated. To use material costing, it is mandatory that you establish each plant as a valuation area.
- In costing, the material master is involved in the calculation of material costs and updating prices.
- The Accounting, Costing, and MRP views are relevant to costing.
  Accounting view: -
  - o material valuation,
  - o material price control,
  - o account determination
  Costing view: -
  - o Contains control parameters for material costing
  - o Also contains characteristics required for Cost Object Controlling
  - o The Costing view should be maintained to be able to cost a material.
  MRP view:
  - o Material status in PP
  - o Scrap factors
  - o Special procurement
  - o Indicators: Co-product/Bulk material
  - o Production version



- The material type determines whether a costing view is allowed for a material. The material type contains default values that are used when a material is created.
- Lot size. The lot size entered here is used as the default value for the material cost estimate. The lot size can be overwritten in individual processing. It cannot be overwritten in mass processing.
- Valuation class. The valuation class controls account determination. The consumption account is determined, which also appears as the primary cost element in the itemization.
- Origin group as subgroup of a cost element. If an origin group is entered for a material, the combination of origin group and cost element is updated in the CO system. You can thus define the following:
  - o Overhead for specific material groups, such as input material groups

- o Cost components for specific raw material groups
- Overhead group: Key that groups materials manufactured for the same type of overhead application, based on the product.
- Planned Prices 1, 2 and 3: These can be maintained for raw materials and purchased parts and used to valuate materials in the cost estimate.
- Tax-based and commercial prices: These prices are entered for purchased parts in inventory costing to determine values such as the lowest value. An inventory cost estimate can use these prices for valuation and then update the costing results for finished and semi-finished products in these fields.
- Price control: Indicator for price control according to which the inventory of a material is valuated. The following options are available:
    - o Standard price
    - o Moving average price
- A standard cost estimate can be used to update the standard price.

## *Lesson 2 – Unit Cost Estimates*

- Material costing without quantity structure is designed to cost materials without accessing BOMs and/or routings. The costing results can be written to price fields in the material master.
- If BOMs or routings do not exist, you can manually enter the items that represent the quantity structure and value them with the cost estimate.
- Price selection and overhead calculation are determined automatically and are based on the valuation variant that is assigned to the costing variant.
- You can use material costing without quantity structure:
    - o When costing and updating prices for new materials
    - o When you want to perform costing using non-SAP production planning data
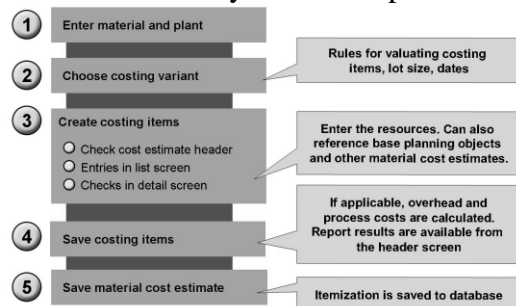


- Enter the material and plant for which the cost estimate should be created.
- Select a costing variant:
    - o When you select the costing variant, you establish the valuation strategy for costing items
    - o Also, the costing variant proposes validity dates for the costing variant and valuation dates for material and activity prices
    - o If you do not enter a lot size, the system uses the lot size from the material master.
- A cost estimate header is created automatically. This can be used to:
    - o Change the lot size
    - o Enter various text
- When you save the costing items, the overhead and process costs are calculated automatically. The itemization and cost component split are then available for analysis.
- After saving the costing items, the material cost estimate is updated to the database.

- Multi-level unit costing is a highly flexible screen that allows the hierarchical structure editing of base planning objects and materials without bills of material and routings. Single-level unit costing only supports editing a single base planning object or material.
- Multi-level unit costing can be used in the following scenarios:
    - Scenario 1: New product
        - You are creating new material masters or cost estimates for new materials.
        - As a rule, you create the structure from top to bottom by making further refinements.
    - Scenario 2: Similar product
        - You want to cost a new product that is similar to an existing one. You can copy the subordinate structure to the new product and make changes to the new (copied) structure.
    - Scenario 3: Product changes
        - You want to make changes to an existing product.
        - Copy the existing cost estimate and make changes to the copy.
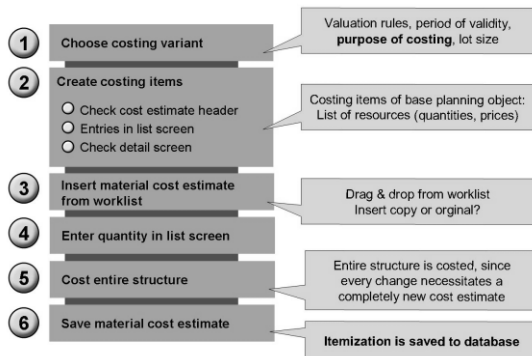


- Prerequisite: Material master with costing view (accounting view also recommended).
- Selecting the costing variant:
    - When you select the costing variant, you establish the valuation strategy for costing items
    - The costing variant is maintained in Customizing for material costing
    - You enter the costing lot size to be used as a base
- A cost estimate header is created automatically. This can be used to:
    - Change the lot size
    - Enter various text
- If you drag-and-drop a different material cost estimate from the work list, the system prompts you to specify if you want to insert the original cost estimate or make a copy. Subsequent changes in the copied structure do not affect the original cost estimate.
- Enter the missing quantity in the list screen of the unit cost estimate.
- If you are going to edit an entire change package, you should revaluate the whole structure to maintain a consistent status.
- After saving, the cost estimate is updated in the database.
- The screen for multi-level unit costing is divided into three areas:
    - Costing structure
      The system can simultaneously display and process a costed multi-level BOM, multiple material cost estimates (with and without quantity structure), and base planning objects in the costing structure.
    - Unit cost estimate or cost estimate header
      For base planning objects and material cost estimates without quantity structure, the unit cost estimate list screen is displayed. You can use the methods described in the Reference and

Simulation Costing unit. You can also alternate between the cost estimate header and the list screen. After the changes are made, the costing structure is automatically updated.
   o Work list or detail lists
   o The work list is designed so that frequently-used structures and resources are available to the cost planner. You can drag and drop substructures and individual costing items from the work list to the cost estimate in the costing structure.

- Costing results can be displayed and saved as an itemization. The report can include the cost element assigned to each item.
- The itemization provides detailed data about the resources required to produce a product. The costing information for each item includes details such as the quantity, unit of measure, and value.
- The following data is stored for a material:
   o Material and text
   o Plant
   o Quantity used
   o Price of material
- The following data is stored for an internal activity:
   o Cost center and text
   o Quantity used
   o Activity type
   o Price
- The display of costs for each component (assemblies and input materials) in the costed multi-level BOM is based on the structure and content of the BOM for the costed material.
- The cost component split groups cost elements in cost components. When a multi-level structure is costed, the cost component split is rolled up so that the original identity of the costs from the lower levels is retained for analysis.
- For each product, the cost component split provides information about:
   o The value added of the material (upper level)
   o The costs of subordinate materials in the BOM (lower level)
- The cost component split is available for material cost estimates with and without quantity structure.

# Unit 3 – Preparing for Product Cost Planning

## *Lesson 1 – Costing Variant*

- When you create a cost estimate, it is always linked to a costing variant, which contains all the information required to execute a material cost estimate.
- Please note that the costing variant for Base Object Costing contains only the parameters for the costing type and valuation variant.
- Update prices: You specify the prices that are updated in the material master with the results of the cost estimate.
- Except when updating in multiple valuation, you always use legal valuation.
- Date of update: Specifies the date on which the cost estimate is saved to the database.
- Cost portion for overhead. You specify the cost component view that should be the subject of overhead application (usually the cost of goods manufactured).
- Partner cost component split: Business unit that is part of the value-added chain. You can define a partner on a multi-dimensional basis from the following organizational units:
  o Plant, company code, profit center, and business area
- The valuation variant determines the prices that are used to value component materials, activity types, processes, subcontracting, and external activities. The valuation variant searches the various price sources listed for each strategy.
- The price sources are searched in the sequence in which they are entered in the strategy. The price that is first located from the strategy is selected for the cost estimate.
  o For purchased materials, assembly materials without a valid BOM and routing, or when creating cost estimates without quantity structure, the valuation variant selects a price from either the material master record or purchasing data.
  o For activity types and processes, the price is selected from either Cost Center Accounting or Activity-Based Costing.
  o The strategy to value an externally processed activity can be either the price from the purchasing information record or the price from the operation in the routing. The routing is available only when costing with quantity structure.
  o For subcontract materials, the prices are selected from purchasing data.
- In costing, date control can be used to create the quantity and value structures based on various dates. It specifies the following:
  o For material costing with quantity structure:
    ▪ The period of validity of the cost estimate
    ▪ The date on which the quantity structure is determined (quantity structure date)
    ▪ The date on which the quantity structure is valued (valuation date)
  o For material costing without quantity structure:
    ▪ The period of validity of the cost estimate
    ▪ The date on which costing items are valued (valuation date)

- Recommendation: If you want to calculate variances in Cost Object Controlling based on the cost estimate, ensure that the cost estimate is valid in the periods for which variances should be calculated. Similarly, if you want to value scrap or work-in-process with the results of the standard cost estimate, ensure that the cost estimate is valid in the periods pertaining to the variances/work-in-process calculation.

- Quantity structure: You specify if the lot size should be passed on. This is necessary only for cost estimates with a quantity structure and in sales order costing.
- Additive costs: Material costs that you can manually enter in a unit cost estimate and then add to an (automatic) cost estimate with quantity structure.
- Update: Specifies if saving is permitted for the costing variant. If saving is permitted, the system always saves a cost component split. It is recommended that you also save the itemization and the error log. Without the itemization, you cannot display costed multi-level BOMs or itemization reports.
- Assignments: You can maintain the following settings and assignments of the costing variant:
    - Cost component structure
    - Costing version
    - If the cost component split is activated in the controlling area currency
    - If you require cross-company costing
    - Other: Error management
- Depending on the purpose of the cost estimate, you can create various results for the same material by making multiple costing variants with various settings for costing type, valuation variant, dates, and quantity structure determination.
- Purpose of various cost estimates:
    - Standard cost estimate: Valuation of the planned quantity structure with planned prices. Calculation of standard prices for the valuation of S-price materials.
    - Modified standard cost estimate: Valuation of current quantity structure with planned prices. Costing of material during the fiscal year to analyze cost developments.
    - Current cost estimate: Valuation of current quantity structure with current prices. Costing of materials during the fiscal year to analyze cost developments.
    - Inventory cost estimate: Valuation of actual quantity structure with tax-based and commercial prices. Establishment of valuation approaches for inventory valuation.


## *Lesson 2 – Cost Component Split*

- The purpose of a cost rollup is to ensure that the cost of goods manufactured (material and production costs) of all materials in a multi-level BOM are included in the cost estimate of the higher-level material. This is achieved by assigning the costs in a cost estimate to cost components.
- Cost components are established by grouping together cost elements. This provides transparency to the type of costs, such as material, activity types, or overhead that comprise a product.
- When a multi-level BOM is costed, the costs are rolled up. The cost components of the cost component split are passed up in the hierarchy to the cost estimate of the higher-level material.
- For each material, the cost component split provides information about:
    - The value added of the material (upper level)
    - The costs of the subordinate materials (lower level)
- A maximum of 40 cost fields can be rolled up in a cost component split.
- A cost component can carry fixed and variable costs.
- A cost component view consists of a combination of cost components based on various characteristics. In the cost estimate header, you can display up to 5 views as the initial costing result. You assign these views in the Settings menu in the cost estimate header.
- Views are available for material costing results in the following forms:
    - Cost component split

- o Itemization
- o Costed multilevel BOM
- Cost components divide costing results in groups of material costs, machine costs, personnel costs, production costs, overhead, and external activities.
- Cost elements are assigned to cost components in the cost component structure.
- For each cost component, you determine the following:
  - o If the costs are rolled up (if they appear in higher-level assemblies)
  - o If costs are included in the standard price or inventory price of the material
  - o The views of the cost estimate or information system in which the costs appear
  - o The cost component group to which the cost component is assigned
  - o If it is relevant to inventory and cost of goods manufactured
  - o If it should contain a total amount or if there should be a fixed or variable split
- A cost component structure is assigned to each costing variant.
- You can also assign various cost component structures for each company code and plant.
- For standard cost estimates (costing type 01), only one cost component structure is permitted for each company code. Similarly, a complete cost component structure should be used for cross-company code cost estimates.
- If the primary cost component split is activated and the primary costs for the cost center activity prices are from a different cost component structure than the component split for the product, it may be necessary to map the cost components together. In the folio, the cost component structure used in CCA uses two cost components for utilities (energy), but it is not a good idea to have that breakdown in product cost planning. It is possible to merge the two energy cost components together to form one cost component. This is only necessary if the primary cost component split was activated and an alternate cost component layout was used during the planning process.
- There are several requirements to create primary cost component splits, such as:
  - o You assigned a cost component structure in the CO version in cost center and process cost planning.
  - o You determined the prices through planned price iteration.
  - o You defined a cost component structure for the primary cost component split of Product Cost Planning.
  - o You defined a transfer structure for the transfer of cost components in cost centers and Activity-Based Costing to the cost components of the primary cost component split in Product Cost Planning.
- When you create a material cost estimate, you can decide if the system should create a cost component split only for the cost of goods manufactured, only a primary cost component split, or if both splits should be created simultaneously.

## *Lesson 3 – Overhead Costing Sheet*

- Overhead costing is one of the methods to allocate indirect costs to cost estimates. This involves applying a percentage or quantity-based fixed amount to a specified cost base. To determine overhead, you use the direct costs that were posted to the order.
- The rules to apply overhead are summarized in the overhead costing sheet.
- The base defines cost element(s) that are used to recognize a category of direct costs such as direct material costs. The origin group is useful if only specific types of materials in a cost element should be considered as the surcharge base.

- The overhead (or surcharge) key defines the rate of overhead to be applied against the value calculated in the base. The rate can be defined as a % of input costs or as an absolute value of input quantity. Quantity-based surcharges are a good method of applying machine overhead, because most machining overhead costs such as maintenance are incurred as a result of operating time and not operating expense. The overhead key can be defined using various dependencies, such as plant, company code, order type, or overhead key. Remind the overhead key is derived from the overhead group, which is found in the material master of the product being produced.
- The credit defines the secondary cost element for the credit of the overhead calculation. This cost element is then mapped to the cost component structure to define the overheads that are considered COGM and the overheads that are considered Sales and Administration. It also defines an overhead cost center, an overhead order, or a business process to receive the credit posting during actual production.
- The costing sheet should be sufficiently flexible to support all the products manufactured within a single company code, because it is possible to use only one costing variant for standards, per company code, per period.
- Calculation base:
  You can combine cost elements in base rows. You can also split cost elements by origin such as raw materials only with origin XYZ. Also, you can divide the calculation base as fixed and variable costs.
- Overhead:
  You can calculate overhead on the lines of the calculation base. You can define the overhead percentage so that it differentiates among planned costs, actual costs, and area of validity based on specific fields. You can also allocate quantity-based overhead such as USD 100 for every 30 pieces.
- Credit:
  You assign a credit key to each overhead line in the costing sheet. The amount of the overhead is credited to a cost center, business process, or order under a secondary cost element. The cost element is important in Product Cost Planning because it controls overhead costs. You can specify the percentage of the overhead that is fixed costs.

## Lesson 4 – Allocating Process Cost to a Product

- The purpose of activity-based costing and provide a few business examples of indirect costs that could be allocated more accurately on the basis of a statistical value such as the number of sales orders, credit checks, purchase orders, or goods receipts for a material. The purpose is to accurately account for indirect costs based on a specific cost driver. This is a more accurate method than the smoothing method of overhead allocation using the costing sheet. It requires more analysis and planning on the customer side to determine significant overhead costs and how they can be accurately applied to a product.
- Aims of ABC
  - Overhead transparency:
    - Use of resources by processes
    - Quantity-based allocation of overhead
  - Increased efficiency:
    - Use of capacity of indirect areas
    - Constant monitoring of internal processes
    - Interface management on a process-oriented basis
  - Accurate costing:

- ▪ Origin-based allocation of internal activities
        - ▪ Examples: Complexity costs, costs owing to product and process changes
- Material costing with quantity structure can allocate cost parts that are not contained in the BOM or routing.
- The two main areas are:
    - o Identifying overhead blocks and their costs.
    - o Identifying causal origin-based relationships with products that use these overhead blocks.
- The process can carry a price similar to an activity price, which can be applied to a product cost. By using OM allocation methods, the process receives costs that it can pass on to products. Operative ABC is an excellent method of allocating significant indirect costs such as indirect labor for warehousing, sales, and shipping or quality management
- The business process is one of the master data objects used in Activity-Based Costing. It is a measurement for output. Like cost centers, business processes can be planned on cost accounting lines.
- The system can calculate a price for the output quantity of a business process. To determine the price, the system uses an allocation cost element stored in the business process master.
- A process template can control the application of process costs. The template is linked to a type of cost driver to determine the amount of indirect costs to allocate to a product. The cost drivers for a process template can be located in various sources. It can use statistical key figures, LIS, and other sources, to determine the appropriate process values. The process template can include multiple processes or even multiple process templates to allocate as many indirect costs as appropriate.
- For each process identified in a process template, logic can be defined to determine if an appropriate process is allocated to a product and how to calculate the quantity of cost drivers that will determine the amount of indirect cost to apply to the product. The quantity formula can read values from the material master or order (or BOM or routing) to determine the number of movements, and if necessary, the amount of time (duration of order to determine storage costs).
- The process templates are assigned to the overhead sheet and overhead key, which enables the templates to be recognized as required. Note that it is possible to simultaneously use ABC, overhead sheets, and activity types as methods of overhead application. The assignment entry must define the controlling area and environment. The costing sheet and overhead key are optional.
- Also mention that process costs can also be allocated directly through a work center and work center formula. It is not necessary to allocate via through a template.
- Templates are centrally maintained tabular frameworks that are highly flexible and, through their use of formulas, dynamic.
- The Object column can contain business processes, cost centers/activity types, templates, or object formulas.
- The Quantity column is subdivided as plan and actual quantities, because the planned and actual quantities to be allocated have different sources.
- The Activation column is subdivided as plan and actual quantities.
- The use of formulas in templates provides a high degree of flexibility and efficiency in representing origin-based rules. These enable you to make decisions on allocation quantities and if allocation should take place at all.
- The standard system contains functions that assign environments to templates. The environment of a template supplies the system with information relevant to cost drivers. An environment basically provides only functions that are applicable in the context selected. For example, the standard SAP ERP contains environments for the following:
    - o Production,

- o   Product Cost by Period,
  - o   Sales orders, and
  - o   Reference and
  - o   Simulation Costing.
- The standard functions are arranged in function trees and contain short descriptions. The template is designed so that it can be enhanced by the user.
- You make settings to assign the costing sheet/overhead key to the template in Customizing.
- The overhead key is always assigned through the master data:
  - o   Material master → Overhead group → Overhead key
  - o   Base planning object, master record → overhead key

# Unit 4 – Material Cost Estimate with Quantity Structure

## *Lesson 1 – Basics of Material Costing with Quantity Structure*

- The term quantity structure refers to the use of production master data, such as BOM, routing, and recipe.
- The results of a material cost estimate with quantity structure do not differ from those without a quantity structure; they are identical from a costing point of view:
    - Cost component split
    - Itemization
    - Costed multilevel BOM
- Material costing with quantity structure can determine the product structure and production plans as entered in Logistics, and converts them to structures of the itemization and cost component split.
- It should be pointed out that with SAP, each assembly level of a multi-level BOM is maintained independently, and the system automatically constructs the multi-level structure. This is important to understand for knowing how to access and maintain a BOM.
- The bill of material (BOM) is a directory for an object and its constituent parts, containing information such as the name, reference number, quantity and unit of measure. BOMs are used in:
    - Material Requirements Planning for procuring parts
    - production for staging parts
    - costing for calculating material costs
- Costing levels are automatically determined by the system when you create a cost estimate.
- Assigning materials to costing levels ensures that costing is performed in the correct sequence: raw materials and purchased parts, followed by semi-finished products, followed by finished products.
- The BOM header contains information that applies to all the items in the BOM. The BOM status must be active for costing to enable the BOM to be read for a cost estimate.
- BOM status: If complex changes are made to a BOM, you can use the BOM status to control when the BOM is used, such as for a cost estimate.
- Area of validity: A BOM can be defined as valid for only a limited range of lot sizes, such as 1 to 1,000 units. You can then create a different BOM for lot sizes exceeding 1,000 units. Therefore, only one BOM can be used for the defined costing lot size.
- Alternative BOM: Alternative BOMs can describe different product structures that create a product with the same properties. For example, one alternative uses sheet metal A, while the other alternative uses sheet metal B
- That the usage indicator is a long term setting, that identifies the applications that may use the BOM. Further the status indicator can represent the current availability of a BOM, such as when the BOM is actually under construction by engineering and not yet available for MRP, costing or production control. For the status indicator, if the status does not indicate released for costing, then it cannot be selected forecast estimate planning. This is different than how the status indicator is used for routing selection.
- For the validity, mention that without the use of ECM, changes to BOM are not date relevant. The system can only see the current BOM, with the overall validity dates on the header.
- Alternative BOMS are generated when multiple BOMS are created for a material that contains the same usage and status indicators for a material. If the use of a specific alternative is desired for cost planning, then the alternative number should be identified directly in the costing view of the material master.

- The item category settings in BOM are different item categories than are used within the itemization for controlling. For the costing relevancy indicator is only relevant for cost planning, not actual. This is a useful indicator in an either or situation, i.e.: either material x or y can be used, but not both. For planning purposes, only one should be included in the cost roll-up, not both. The validity indicator is useful for recognizing component changes based on a specific validity date (using ECM). By default, items marked as bulk components are not included in cost planning, since it is expected that they will be issued to some overhead cost center.
- Item category:
    - L = stock item, valuation in accordance with material valuation strategy or separate cost estimate
    - N = non-stock item
    - R = variable-size item, valuation in accordance with material valuation strategy or separate cost estimate
- Fixed quantity indicator: This indicates whether the quantity entered is dependent on the lot size. It applies mainly to unavoidable material loss at the start of the production process.
- Planned scrap:
- Relevancy to costing indicator: If this indicator is not selected, the system ignores the BOM item in the material cost estimate. For standard cost estimates, modified standard cost estimates, and current cost estimates, the only decision to be made is whether or not the item will be costed X or " ". For inventory costing, a relevancy to costing indicator can be entered here that has a devaluation factor in Customizing. This enables you to devaluate BOM items, such as packaging materials, on a flat-rate basis for inventory or commercial purposes.
- The settings in the BOM usage and BOM item categories enable you to specify whether this field contains a default value and whether this value can be changed when the BOM is maintained.
- Bulk material: Bulk material is usually posted as consumption at production cost centers as soon as it is procured. Therefore, it is not included in the cost estimate in the standard system. A user exit is available for costing bulk materials.
- Non stock materials are identified by the item category N. They can be identified as a material master, in which case the costing information can be determined from the accounting view, or they can list only a description, which will then require the user to define the unit of measure, and the purchasing data, to include price, pricing unit and cost element. Following are some of business scenarios that may use this item category:
    - Due to material storage requirements, it may not be possible to stock some items prior to the production requirement.
    - Some items may have an extremely short shelf life, and to deliver prior to immediate need would risk expiration of the product.
    - Certain components may be specified only for a unique requirement, such as in an engineer to order environment.
- Non-stock materials have either no material master or are maintained with a non-stock material master for the entry tool.
    - For non-stock materials without a material master, data that is relevant to costing (such as prices) is entered directly in the BOM item (purchasing data).
    - For non-stock materials with a material master, no prices can be maintained and materials are valuated in accordance with the strategy specified in the costing variant. The price shown in the BOM need not be the same as the price in the cost estimate selected in accordance with the valuation strategy.
- the routing identifies 3 essential elements regarding the manufacturing process:
    - Where the work should be performed - work center

- o The expected duration of each standard value for each operation, such as labor, setup, processing
  - o Which controlling activity is expected to be used to perform the standard value?
- Routings have many different names in SAP: rate routing, recipe, task list, inspection plan, and service or maintenance task. But they all indicate the same 3 elements.
- Production costs are determined through the routing, the work centers at which the operations are performed, the cost centers, and the relevant activity types.
- A routing consists of one or more operations. Each operation contains information about the work center, production resources, and tools, material assignments, operation texts, and standard values (how long, how much).
- Rate routings and recipes can be used for repetitive manufacturing and process manufacturing.
- Work center can represent machines, people, a person (common with maintenance), or an assembly team. It simply indicates some area or person that needs some type of work planning and management.
- Work centers are used in plans (routings, networks, inspection plans, maintenance task lists, and rough-cut planning profiles).
- Machine group and capacity planner group are synonyms for work center.
- Work centers are defined with reference to a plant.
- Work centers are assigned to cost centers.
- The most critical definition within a work center is the standard value key. This controls how the activities for a work center can be planned and measured.
- The standard value key is configured to allow up to 6 measurable standard values and activities to be planned for a work center.
- Also critical to controlling, is the assignment of the work center to a cost center (or business process). This provides the cost link for the work center. At any one time, a work center can only be assigned to one cost center.
- Based on the standard values that are allowed for a work center, up to 6 activity types can be defined for the work center. These activity types will default to a routing, when the work center is indicated.
- A 7th activity type can be defined for the work center, for the sole purpose of applying additional costs for production. This can provide a method of applying an indirect cost allocation, using a formula that can be defined in configuration.
- The benefit of this over the overhead sheet is that this allocation can be based on the output quantity of the operation. This is not possible when using the costing sheet, since the costing sheet is based on input quantity and costs. This does not apply to PP/PI work centers. In addition, this is normally the only standard value used for PS work centers.
- The standard value key enables you to define up to six standard values for an operation. The system assigns a parameter key to the standard values of the operation and the work in the network activity. This parameter key specifies the following:
  - o Keyword appearing with the standard value on the screen, such as setup, machine, personnel, teardown, and so on.
  - o Dimension (time, quantity, volume, and so on) in which the standard values must be maintained.
  - o At the same time, the parameter key represents the names of the formula parameters. You can use the formula parameters to represent the standard values in a formula to determine the following: execution time, capacity requirements, and costs.
- The control key specifies the business functions you want to execute with an operation:
  - o Scheduling

- o Capacity planning
- o Costing: This ensures that the operation is included in costing.
- o Confirmation: Here you specify whether and how the operation is confirmed.
- o External processing: Here you specify whether the operation is processed internally, externally, or both.
- The performance efficiency rate is the ratio of target duration time to actual time attained. The standard times used by capacity planning and costing are modified by this rate.
- Material /plan assignment: A routing can contain multiple materials involved in the same production process.
- You use a task list usage to assign routings to various work areas. This way, you can create several routings to produce one plant material. These routings are differentiated in your task list usage.
- Routing status: You use this status to indicate the processing stage of a plan. For example, you could indicate whether the plan is still at the creation stage, or whether you have already released it.
- Relevancy to costing:
  - o If the control key specifies that the operation is not relevant to costing, the relevancy to costing indicator is ignored in the operation.
  - o If the control key specifies that the operation is relevant to costing, you can override it `with the relevancy to costing indicator in the operation.
- Assignment of activity types/business process: If the reference indicator is turned off in the work center, you can overwrite the standard values of the work center in the routing. Linking the standard times with the activity types is performed using the formulas in the work center.
- In order for the system to calculate production costs, the routing is used to determine work centers, which are assigned to one specific cost center. For each operation, the routing must specify where the work is to be performed (work center), what production activities will be performed, and the duration of those activities. Via activity type planning, CO must provide a $rate to charge when this activity is performed at the cost center. The activity types that are used for costing must be planned for the cost center, while the actual time that the activity is to be performed is defined in the routing. The formula determines how the total execution time for the standard value should be calculated, i.e.: setup (lot size qty independent) vs. machine time (lot size qty dependent).
- You can have up to six standard values in the operation. If no activity type has been entered for a standard time, it is not included in the cost estimate.
- In the itemization for the cost estimate, an internal activity for the cost center/activity type is displayed. Furthermore, the assignment to the operation and work center is saved in the itemization.
- Production versions are common in repetitive manufacturing. They define a combination of routing, BOM and lot size.
- You can maintain the production version in the material master:
  - o MRPview4
  - o Costing view 1
- Quantity structure control is a process by which the system searches for alternatives if multiple BOMs and/or routings exist for a material.
- You enter the quantity structure control ID in the costing variant. This ID describes a list of priorities for the BOM and routing through the BOM application and routing selection keys.
- The BOM application determines (by means of a selection ID) which BOM usage is selected first. It enables you to prefer an alternative of a multilevel BOM from a certain date and specifies whether the status is relevant for the BOM selection.
- Standard criteria:
  - o Period of validity: The BOM must be valid on the quantity structure date.

- o  Lot-size range: The costing lot size must fall within the lot size range.
  - o  The status allows costing.
- If a production version is found or defined, the routing contained in it is used. The selection ID for the routing determines which routing is selected first, the parameters being the task list type, task list usage, and plan status.
- Standard criteria:
  - o  Period of validity: The routing must be valid on the quantity structure date.
  - o  Lot-size range: The costing lot size must fall within the lot size range.
  - o  The status allows costing.
- The PP-PI equivalent of a BOM and routing is a recipe. It contains both the operations and materials list within one master record. Also, within PP-PI, work centers are referred to as resources. A recipe can produce many different products simultaneously. These products are identified as co-products and by-products.
- The process industry uses a master recipe instead of a routing.
- The production version in the material master defines a fixed and unique link between an alternative of the recipe group and an alternative of a multiple BOM.

## Lesson 2 – Material Cost Estimate

- Prerequisite: Material master with costing view and accounting view.
- When you create a cost estimate with a quantity structure, you enter the costing variant, the material and the plant.
- The dates are proposed from the costing variant and determine the following:
  - o  The validity period of the cost estimate (costing date from/to)
  - o  The determination of the quantity structure (quantity structure date)
  - o  The valuation date for materials and activities (valuation date)
  - o  The system determines and values the quantity structure automatically.
  - o  The cost estimate is not updated in the database until it is saved.
- Error log: There are two options for analyzing the error messages of a cost estimate:
  - o  Overall log: Contains the complete list of messages for all the materials costed. The error log contains display variants that enable you to perform summarized analysis of the error(s).
  - o   If you double-click the material in the header of a cost estimate or in the status display, the messages are displayed.
- You can analyze the costing results with standard reports and display variants.
- Recommendation:
  - o  Define your own display variants and initial variant.
  - o  Use the navigational options to access reports.
  - o  Navigate through the multilevel BOM to the reports and error logs
- The explanation facilities enable the cost planner to do the following:
  - o  Quickly access data and information in the costing environment.
  - o  Remain in the cost estimate or the analysis while accessing the above data.
- You can access the facilities by choosing the Info icon in the cost estimate header.
- You can branch from the itemization, costed multilevel BOM, and unit cost estimate list screen to the master data of the selected object(s).
- You also have the option of double-clicking, for example, the costing variant in Customizing (in material costing).

## *Lesson 3 – Prices in Material Master*

- Price control: Indicator that controls which price is used to valuate the inventory of a material. The following options are available:
  - o Standard price
  - o Moving average price
  - o These prices are used to valuate goods movements within the SAP ERP and to valuate inventories.
- A standard cost estimate can be used to update the standard price.
- You can analyze the different cost estimates and write the results to price fields in the material master depending on the purpose of costing.
- You can update the following:
  - o The result of the standard cost estimate as the standard price.
  - o The results of the modified standard cost estimate or the current cost estimate as planned prices 1, 2, and 3.
  - o The results of the inventory cost estimate as commercial prices 1, 2, and 3 or tax-based prices 1, 2, and 3.
- The standard price is updated in the material master in two steps:
  - o Marking a standard cost estimate
  - o Releasing a standard cost estimate
- When a cost estimate is created, it has a status KA (or KF). When a marking transaction is executed for a cost estimate, not only is the material master future standard price field updated, but also the cost estimate's status changes from KA to VO. This is what the release program checks, in order to determine if the cost estimate is available for releasing. Once released, the status is changed to FR.
- Reiterate that it is possible to repeatedly mark a future standard for a material, the system will merely issue a warning stating that a marked standard exist. However, once the cost estimate is released, the system will not allow another cost estimate to be created for the same period/costing variant/version.
- Price control plays a crucial role in material valuation. When the price control indicator is set to S, the inventory is valuated at standard price.
- If the standard price was updated by a standard cost estimate, it can be used in Cost Object Controlling.
- The system can use the itemization of standard cost estimates to determine the target costs for manufacturing orders. The difference between target cost and actual cost can be analyzed at the level of variance categories, such as quantity or price variances. The saved itemization provides the basis for the variance calculation.
- In Profitability Analysis, you can use standard cost estimates (or other material cost estimates) to compare the revenues of the billed quantity with the cost component split of the product.
- A standard price is also required in the Material Ledger to determine the actual price.
- Update of Standard Price – Procedure
  - o Execute material cost estimate:
  - o Accuracy of costing results: The system can notify the user of possible errors via the technical status.
  - o Recommendation: In the Product Cost Planning reporting, use object lists which can be compared with material master prices and set the inspection severity in accordance with your requirements.

- o Update allowed: You must grant an allowance once for the business period. This is carried out for the company code, valuation variant and costing version. Ensure that the valuation variant is also used in your costing variant.
- o Marking: Once the above steps have been carried out, the material cost estimate can be marked. The future planned price is updated in the material master and linked to the standard cost estimate.
- o Release: You can only release cost estimates once. It can also only be carried out in a period corresponding to the valid from date.
- o Revaluation: If the material has inventory, the inventory is revalued. The valuation class (and its account determination) in the material master control how the system finds the balance sheet accounts and profit and loss accounts.
- Price change without affecting the released standard cost estimate
  - o You change the S price with price change transaction MR21.
  - o The standard system does not allow this type of price change if a released standard cost estimate exists. Authorization may be granted via user-defined error management in Customizing for the Material Ledger to allow this.
  - o  Changing the material price creates a document from which you can go to the accounting documents generated.
  - o The standard price is changed. However, the released standard price and its link to the standard cost estimate remain. Note the effects of the price change in Cost Object Controlling and in the valuation in Profitability Analysis.
- Price change with effect on released standard cost estimate
  - o Delete the cost estimate. Use the menu option Delete Test Data for this. When you delete the current standard cost estimate, the cost component split and itemization are removed from the database. Similarly, the link to the material master is deleted, and the current planned price is set to _. The standard price is unaffected.
  - o • Execute a new, corrected standard cost estimate and proceed with the price update process described above.

# Unit 5 – Costing Run

## *Lesson 1 – Costing Run in Product Cost Controlling*

- The costing run is a tool used for mass processing in Product Cost Planning.
- The following situations are examples of using the costing run:
    - Standard cost estimate of all the materials in one plant.
    - Standard cost estimate of all the materials in all plants.
    - Monthly modified standard cost estimate of all materials.
    - Current cost estimate of all materials of a product group.
    - Current cost estimate of a highly complex product structure.
- The costing run organizes the processing steps and checks the material cost estimates generated. After a costing run and its processing steps are successfully completed, it can be deleted. The administrative data in the costing run is also deleted, but the material cost estimates generated by a costing run remain and can be reorganized and/or archived, if required
- After each processing activity, you can study the activity in the message log, and, if required, repeat the activity until costing is free of errors.
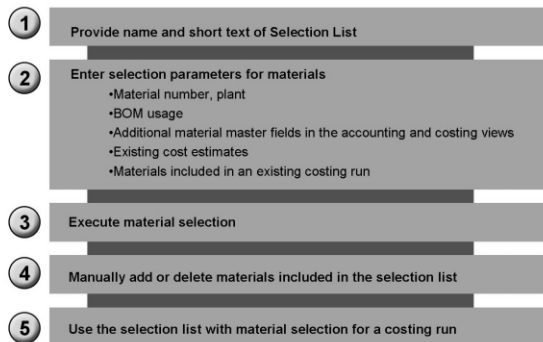


- There is a separate transaction to maintain the parameters to select materials and generate the selection list (transaction CKMATSEL).
- The selection of materials can be restricted through the following characteristics:
    - Material number, plant
    - BOM usage
    - Additional material master fields found in the accounting and costing views
        - Profit Center
        - Valuation Class
        - Special Procurement Type
    - Criteria for existing cost estimates
        - Profit Center
        - Valuation Class
        - Special Procurement Type
    - Referencing materials from an existing costing run
    - After the initial material list is created, it is possible to manually edit the selection list (transaction CKMATCON) by adding or deleting materials from the selection list.
- The selection list can be used to select materials for a costing run (transaction CK40N) by assigning the selection list to the Selection step.
- A costing run is identified by its name and the costing run date.: Use the long text to explain the purpose of costing

- Processing activities are categorized as Change parameters and Execute.
- The functions of the Parameters column (Change parameters) enable you to check or maintain the options of the activity (for example, the material numbers for selection).
- By choosing Execute, the processing activity is initiated or scheduled.
- Other columns that are used to execute a function are Authorization and Log.
- The symbol in the Authorization column indicates if marking/release is permitted (open or closed padlock) or if issuing authorization is not possible (red cross). If you choose the padlock, you are taken to the screen that is used to issue authorization. The Authorization column is displayed only for standard cost estimates.
- If you choose the Log column, you are taken to the log.
- The Background processing option enables you to specify if processing should take place online or in the background. When you choose Execute, the system either starts the activity or schedules it in the background.
- Statistics are generated for each activity.
- The Costing results area enables you to analyze the results of a processing activity. You can obtain an overview of the material selected or check the results of individual cost estimates.
- Three reports are available:
    - Costing levels: Provides an overview of the number of materials selected and costing levels created. The lowest level contains the material components, purchased parts and raw materials. If you select specific costing levels and go to the material list, the system displays the materials of only the selected levels.
    - Material list: Contains the selected materials. You can also check the status of the cost estimate for the material.
    - Analysis: This report is generated by the identical processing activity in the Analysis area. It enables you to compare costing results with the results of other costing runs or with the prices in the material master.
    - Recommendation: SAP recommends the use of the Analysis option to compare new standard cost estimates with the standard price.
- You can access these reports either in the costing run by choosing the menu option Settings or through the Information System (outside of the costing run).
    - Results of Costing Run: Displays the results of a costing run.
    - Price versus Cost Estimate: You can compare the selected cost estimates with one of the prices in the material master. You can simulate the revaluation of inventories that would result if the selected cost estimates were released.
    - Variances Between Costing Runs: Enables you to compare two costing runs.
    - Exceptions: Checks the value against which the threshold values should be calculated. If the comparison value is a material master price, you need to enter the price to be checked under Output.
- The Analysis option in the costing run enables only one mass report. When analysis is performed again, the old result is overwritten.
- Costing by costing level: When you cost mass data for the first time and you anticipate numerous errors or the quality of the master data is poor, it is recommended that you execute costing by costing level.
    - In the parameters for the Costing activity, select the relevant costing levels and proceed with costing. Process the errors and remove their causes. Perform costing again until the results are satisfactory.
    - In the parameters of the same costing run, select the higher costing levels. The material cost estimates of the lower levels are automatically included.

- o Cost estimates with errors only: This procedure is recommended when few errors are anticipated or for the above situations for one or more selected costing levels.
  - o For repeated cost estimates, set the indicator Cost tests with errors only in the Costing parameter.
- In mass processing, logged messages and errors are the rule and not the exception. Message numbers (and consequently message causes) generally account for a small proportion of the logs.
- If extremely large costing runs are executed, you can create a log for each costing level to assist the analysis process.

# Unit 6 – Cost Object Controlling

## Lesson 1 – Overview of Cost Object Controlling

- The entry and allocation of overhead costs according to cause are supported by the following components in Overhead Cost Controlling (CO-OM = Overhead Management).
- Cost Center Accounting (CCA) examines where overhead costs are incurred within the organization.
- Overhead orders (OPA = Order Process Accounting) gather and control costs incurred from measures taken by the organization.
- CO-ABC (ABC = Activity-Based Costing) not only enables you to improve your business process performance, but also provides you with an information base for strategic decision-making processes.
- Cost Element Accounting (CEL = Cost Element Ledger) makes sure that only expenses and income that fulfill the criteria for costs and revenue (in terms of the operative purpose, based on period and that can be valuated) enter CO.
- Product cost controlling:
  - Valuates material movements
  - Provides cost component splits for valuation in Profitability Analysis
  - Allocates overhead costs from cost centers and business processes to cost objects (such as production orders, sales orders, networks)
  - Determines WIP
  - Determines variances and their settlement in Profitability Analysis

**Product Cost Controlling: Benefits**

| Management Requirements | Legal Requirements |
|---|---|
| • Support of **cost reduction** concepts <br> • Support of **strategic** decision-making: <br>   – Which products <br>   – Where or how to produce <br> • Support of **operative** decision-making: <br>   – Pricing <br>   – Manufacturing efficiency | • Valuation of: <br>   – Raw materials <br>   – Semi-finished goods <br>   – Finished goods <br> • Work in process <br> • Reserves for imminent losses |

With Product Cost Controlling, you have the following benefits:
- Valuation of manufacturing efficiency
  - Set relevant standards to measure performance
  - Variance analyses
  - Reports for individual plants, product groups, products or orders
- Supports strategic decision-making
  - (Primary) cost component split, cost component splits by organizational unit
  - Scrap costs, full integration of activity-based costing
- Inventory valuation
  - Alternative valuations - according to ((commercial) law, group, profit center)
  - Three parallel currencies
  - Standard costs
  - Actual costs using the Actual Costing/Material Ledger (AC/ML) component
- Valuation of finished and semi-finished goods

- o   Standard prices provided by cost estimates
  - o   Creation of alternative cost estimates for balance sheet purposes for closing activities
- Determination and valuation of work in process at period-end closing
- Period-based accrual calculation with provisions for imminent losses
  - o   In a make-to-order environment
  - o   Corresponding updates of balance sheet and profit and loss statements
- Product Cost Planning refers to the costing of goods manufactured and services.
- This occurs without any reference to a production order (costing is carried out independent of any production order). If a quantity structure (bill of material and routing) is available in the PP (Production Planning) module of the SAP ERP system, you can carry out costing automatically based on the PP data. If there is no quantity structure, you can manually enter the costing items in a unit costing or ad-hoc costing. You can also use the batch input method to transfer the quantity structure from a remote system to the SAP ERP system.
- In Cost Object Controlling, the costs incurred during the creation of a product or service is collected on a cost object (such as a production or sales order).
- Which cost object is used depends on your controlling requirements. Possible cost objects are sales orders, production orders, process orders, product cost collectors, and projects, among others.
- Cost Object Controlling allows for
  - o   simultaneous costing (mapping and valuation of logistical quantity flows) and
  - o   final costing (period-based accrual calculation and variance calculation).
  The calculated values can be settled in Financial Accounting and Profitability Analysis.
- Actual Costing is used to calculate the actual cost of goods manufactured at the end of the period. The result may be saved in the material master as a periodic average price for the closed period.
- What can Cost Object Controlling do for me?
  - o   What actual costs did we incur in our area during the current period?
  - o   What costs were we expecting based on the quantity manufactured?
  - o   Are some product groups performing significantly better than others?
  - o   What is causing these variances?
  - o   What are the scrap costs of our new production line?
  - o   Did continuous improvements have an effect on costs?
  - o   What kind of profit is brought about by a concrete sales order?
- Cost Object Controlling – Preliminary Costing
  - o   Product Costing uses the data in logistics to determine the foreseen material consumption (BOM) and the activities required (routing). This data forms the quantity structure.
  - o   Product costing valuates this quantity structure with the following information:
    - Material costs
    - Production costs
    - Process costs
    - Overhead on the direct material and production costs
    - Overhead for sales and administration costs
  - o   The results are saved as a cost component split and an itemization (optional, but recommended), and are also used by other applications.
- Cost Object Controlling – Simultaneous Costing
  - o   The actual costs of the cost object result from the following processes:
    - Goods movements in Materials Management
    - Invoice receipts in Financial Accounting
    - Confirmations in production (Production Planning)
    - Reposting and allocation of overhead in Cost Accounting

- o You can enter material withdrawals from the warehouse, confirmations, and goods receipts in separate operations.
  - o You can use the control key of the operation to specify that a goods receipt is to be posted automatically when the operation is confirmed (normally the last operation). You can also assign consumable materials to an operation and specify that a goods issue for these materials is automatically posted with the confirmation. You can create the confirmation on the order or operation level.
  - o Confirmation on the operation level is recommended for calculation of WIP and variances later
- Period end closing
- Template allocation is a new allocation technique for activities and processes in Cost Object Controlling (and also in Profitability Analysis). Essentially, it can use all information as a cost driver to assign overhead costs strictly according to cause. Template allocation is even possible between Overhead Cost Controlling objects.
- If an actual price calculation is performed in Overhead Cost Controlling, the activities and processes calculated onto cost objects can be revalued with these actual prices.
- Overhead allocation is a traditional method of calculating overhead costs of cost centers onto cost objects using surcharges on direct costs.
- Work in process can either be determined on the basis of actual costs (when using full settlement) or on the basis of target costs (when using periodic settlement).
- Variance calculation determines the target costs of an order, and on that basis, the target/actual comparison. The scrap is calculated on the basis of the target costs.
- For objects that cannot deliver to the warehouse, a Results Analysis will be performed instead of a WIP and variance calculation.
- Settlement is the last step of period-end closing in Cost Object Controlling. The values determined are settled in other components (such as FI and CO-PA) and at the same time, the appropriate line items are created (in the Material Ledger as well).
- Product Cost by Order is used when the controlling focus is on concrete quantities. For this, you must use a cost object that can include an output quantity. Examples are CO and PP production orders.
  - o Costs for goods issues, confirmations and goods receipts are posted to the cost object (such as a production order).
  - o The settlement rule has the settlement type FUL.
  - o For period-end closing, either WIP or variances will be calculated depending on the status of the cost object.
    - If the order has neither been delivered (DLV) nor technically completed (TECO), work in process (WIP) is calculated on the basis of actual costs. The difference between all debits and credits of the order is the size of the WIP.
    - If the order has been delivered (DLV) or technically completed (TECO), any existing work in process will be cancelled and the system interprets the entire remaining order balance as variances where various variance causes are examined and represented by appropriate variance categories.
    - Product Cost by Order does not realize variances until the last period of production.
- Product Cost by Period is used when the controlling focus is not on concrete quantities, but more on a successive, continuous production process. Many cost objects only use cost by period (such as product cost collectors). Some cost objects that are normally based on lot sizes can be changed to cost by period.

- o Costs for goods issues, confirmations and goods receipts are posted to the cost object (such as product cost collectors).
- o The settlement rule has the settlement type PER.
- o For period-end closing, work in process is calculated in target costs and variances simultaneously.
  - For repetitive manufacturing you must enter reporting point back flushes for operations. For production and process orders controlled by period, you must enter confirmations for the operations. The product cost collector is the recommended cost object for repetitive manufacturing.
  - The system determines the target costs of the cost object based on costing that you can specify with a valuation variant in Customizing. Based on this, work in process and scraps are calculated at target cost.
  - Variances result from deducting work in progress and scrap at target cost from the balance, where various variance causes are examined and represented by appropriate variance categories.
  - Variances are realized by period in Product Cost by Period.

| Functions | Product Cost by Lot | Product Cost by Period | |
|---|---|---|---|
| Settlement type | FUL | PER | |
| Work in process | WIP calculated based on actual costs | WIP calculated based on target costs | |
| Variances | Variances = actual costs - delivery value | Variances = actual costs - delivery value - WIP | |
| Settlement | Should be performed by period | Must be performed by period | |
| Cost objects | Production order, process order | Production order, process order | Product cost collector, cost object hierarchy |
| | Product Cost by Order | Product Cost by Period | |

- Sales-Order-Related Production is used when the activity output does not take place until after a sales order has been received. With make-to-stock production, items are first manufactured to stock and sold later, while with sales-order-related production, they are first sold, and then manufactured. With "sales-order-related production with cost by sales order", a sales order item is a cost object.
- Both scenarios are possible for the production and retail of goods. However, a service can only be mapped as sales-order-related production.
- If the sales order alone does not provide all functions or options for integration that you desire, you can combine the sales order with other cost objects, such as projects or networks. This is especially recommended for complex make-to-order production scenarios, such as:
  - o Make-to-order production to customer specifications
  - o Complex products like structures, ships, etc.
  - o Large-scale variant manufacturing
- Product Cost by Sales Order and Customer Project allow you to:
  - o Calculate and analyze planned costs and actual costs by sales order item or WBS element
  - o Calculate and analyze planned revenue and actual revenue by sales order item or WBS element (depending on the operating indicator of the WBS element)
  - o Calculate the value of your stock of finished and semi-finished products
  - o Create reserves automatically
  - o Transfer data to Financial Accounting (FI)
  - o Transfer data to Profitability Analysis (CO-PA)
  - o Transfer data to Profit Center Accounting (EC-PCA)
- If a sales order is added to a Product Cost by Order or by Period, work with the objects mapping the production does not have to change.

- For especially complex scenarios, it can be advantageous to add a project. In such a scenario, the project takes on the role of the cost object, while the sales order is attached to a billing element of the project as a purely logistical object.
- Generally, Controlling takes place on order level. This means that each logistical object (such as a production order) is also a cost object. Depending on the cost object used, cost by order or period can be carried out.
- You can also specify that Controlling should take place on a higher level, that is, on product level. In this case, logistical objects (such as production orders) are not cost objects, rather the costs are posted on a separate product cost collector (decoupling scenario). A product cost collector may exist for each product of a plant and then collects all costs, which are posted to the logistical object of the respective product. Logistical objects are not cost objects in this case!
- The following can be used as Controlling levels:
  - Production version
  - Routing/BOM combination
  - Product and plant
- As the product cost collector only allows for Controlling by period, such a scenario can only be realized as Controlling by period. Logistical objects can still contain production quantities

# Unit 7 – Sales Order Related Production Scenario

## *Lesson 1 – Sales Order Related Production Scenario*

- In Sales, each of these process steps creates electronic documents that are linked with each other and represent a document flow, which can be used for evaluations.
    - The process can begin with pre-sales activities. In response to a Request for Quotation (RFQ), you create and send a quotation.
    - Create a sales order when you receive the order from the customer. The system can check availability and create delivery proposals.
    - A procurement process will be triggered if the contents of the order are no longer in stock or cannot be in stock (such as materials or services not kept in stock). The system distinguishes between internal and external procurement. For internal procurement, the system can trigger a production process, for example. For external procurement, the system can determine the correct vendor and procurement conditions based on any data stored in Purchasing. The relevant documents are generated when carrying out the procurement process.
    - Delivery to the customer generates a delivery document. Creating a transfer order includes copying information from the delivery document to the transfer order which is essential for controlling the movement of goods within your warehouse.
    - For billing, you create a billing document. Billing is the point at which the turnover is set in Controlling.
    - When the payment is received, the amounts received are posted to Financial Accounting (FI).

- For make-to-order production (sales-order-related production, engineer-to-order production), the requirement for a make-to-order material is planned using the sales order item number and thus a separate segment is created in the planning run of requirement planning. In this planning segment, the requirements and stocks of the sales order items are managed separately. Thus, various customer-specific variants of a product can be managed using only one material number.
- Starting from the sales order, single-item planning can be carried out for any level of the BOM structure. Therefore, it is also possible to procure assemblies and components specifically for the sales order and manage this stock individually for the sales order. This is of particular importance if components can also be configured for the production of the individual customer product.
- Make-to-Order: Controlling Scenarios
    - Important Decisions
    - Make-to-Order Production with or without Product Cost by Sales Order?
    - Do you want to maintain your sales order stock valuated or unvaluated?
    - Decision: Without Product Cost by Sales Order
    - Environments
        - Production controlling focused on product groups
        - High volume production
        - Product cost by sales order similar to make-to-stock
    - Examples:
        - Assemble to order
        - Make-to-order with packaging variants

- o This procedure fits perfectly to a make-to-stock environment or make-to-order production that only requires the sales order for logistical reasons. No additional period-end closing activities have to be performed for the sales order.
  - o In such a situation, Sales Controlling is carried out by Profitability Analysis.
- If the sales order is only important to you logistically, you can also use the sales order without the cost object property.
- The sales order could have a purely logistical significance if:
  - o The sales order creates the independent requirement for you logistically
  - o The sales order is required for variant configuration
- A sales order cost estimate is possible in both cases. However, the estimate results are only updated on the cost object as plan values if it is a cost object. The results of sales order costing are used for:
  - o Sales and pricing decisions
  - o Planned costs (only for cost objects)
  - o Methods of Results Analysis based on the percentage of completion (only for cost objects)
- Sales order costing with quantity structure supports the cost component split and provides a costing structure, a cost element itemization, and an itemization.
- If you use a project in addition to the sales order (customer project production), use the project as the cost object. In this case, the sales order is created without the cost object property
- Product Cost by Sales Order is recommended if the following information is important for your business:
  - o How high is my profit margin for this particular sales order?
  - o How can I map special sales costs?
  - o How high is my funds commitment? Is this sales order performing well from a costing point of view?
  - o Where did late customer changes greatly affect my production costs?
- You can also use Results Analysis to:
  - o Automatically create reserves for expected losses
  - o Manually add reserves for foreseen risk
  - o Calculate goods in transit where goods have been shipped but not yet invoiced
- Product cost by sales order is necessary if you want to work with unevaluated sales order stock (not recommended).
- The new SAP ERP functions for valuated sales order stock (or project stock) introduced in Release 4.0 mean that the system handles make-to-order production in a similar way to make-to-stock production.
- All deliveries to sales order or project stock credit the delivering object and form an accounting stock. All consumption from the sales order and project stock debit the consumer and reduce the accounting stock.
- This enables you to:
  - o Calculate production variances of related production orders
  - o Settle these variances to Profitability Analysis
  - o Provide a cost component split for the cost of goods sold

Valuated Stock

- Because the inventories assigned to sales orders and projects carry costs as well as quantities, goods movements for these inventories generate postings in Financial Accounting. The costs of the materials can be determined by costing the sales order or production order. The stock value can therefore be shown immediately in Financial Accounting - a material cost estimate in the Controlling module is not necessary. The valuated goods movements result in debits and credits to the affected objects.

- The goods receipt, including the stock value, is valuated using a predefined valuation strategy sequence.
- The first goods receipt prompts a valuation on the basis of one of the subsequent strategies and serves as the valuation basis from this point onwards:
  - The system calculates the standard price on the basis of customer exit COPCP002 material valuation for valuated sales order stock.
  - The system calculates the standard price using a pre-designated sales order costing. This sales order costing can be based on a unit costing or on a product costing.
  - The system determines the standard price using the costing for the production order or the planned costs for the WBS element. If there are multiple production orders for the same sales order item, the system uses the standard price that results from the production order that delivers first.

Non-valuated Sales Order Stock

- The quantity flow is separate from the value flow
  - The quantity flow (goods receipts, goods issues) is made via individual customer stock
  - The value flow is made directly with the sales order item and all assigned orders
- Costs are not posted to the sales order item until order settlement or until the invoice is received for purchased goods
- No variance calculation on assigned production orders
- Cost Object Controlling by Sales Order is necessary!
- As individual requirements material kept in stock is withdrawn from sales order or project stock without being valuated, these costs are missing in the production orders of a multi-level production process.
- The value of the goods that are in sales order or project stock on a quantity basis is activated for delivery to the customer as work in process (WIP).
- With the two values of the " Valuation of Sales Order Stock" and "Product Cost by Sales Order" criteria, there are theoretically, four possible combinations:

| Product Cost by<br>Sales Order Stock | Without | With |
|---|---|---|
| Valuated | X | X |
| Unvaluated | Not supported | X |

SAP Recommendation

# Unit 8 – Product Cost by Period

## *Lesson 1 – Master Data and Preliminary costing*

- To perform product cost by period,
    - Use either a cost object that allows for controlling by period, or
    - Use a product cost collector that takes on the role of the cost object. The logistical production objects (such as production orders) are not cost objects.

  Postings in Materials Management, Production, and Financial Accounting result in actual costs.
    - You post confirmations, goods issues and goods receipts with reference to the production order. You configure the orders so that these costs are assigned to the product cost collector automatically.
    - You can assign other costs, such as process costs or material overhead, directly to the product cost collector. All period closing activities are performed using the product cost collector.
- Periodic actual costs from the cost object can be grouped as follows:
    - Costs for products for which a goods receipt in the warehouse has been listed in the current period ("delivery to stock").
    - Costs for work in process. These are target costs for the production quantities that have been confirmed for the operations but not yet delivered to stock.
    - Production variances that are calculated using the following formula:
      Variances = actual debit - goods receipt - work in process.
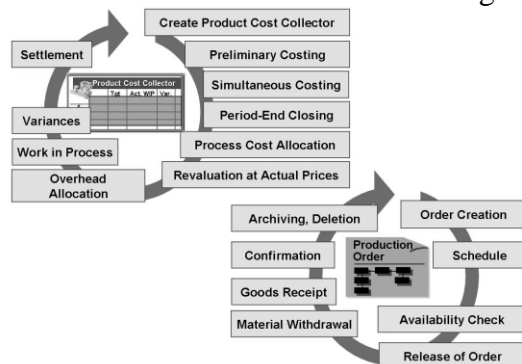


- In Product Cost by Period, costs are collected and analyzed on the product cost collector. Production orders do not serve as cost objects; they are used only for logistical processing.
- You must manually create a product cost collector before you start production. When the manufacturing order is created, it is linked to the product cost collector automatically.
- If you neglect to create a product cost collector, the costs are collected on the manufacturing order. In this case, it is only possible to link the manufacturing order to the product cost collector as long as no actual costs have been updated to the manufacturing order.
- Product cost collectors are linked to production orders and to the production versions in repetitive manufacturing in the same way.
- Production orders that are linked to product cost collectors receive the status PCC.
- There is a separate controlling level for each plant material and process category. The relevant process category in Cost Object Controlling is production.
- When you create the product cost collector, you decide on which level the costs should be collected on the product cost collector. You can choose from the following levels:
    - Production version

- o Any BOM/routing combination
- o Material per plant
- If you are using the controlling level Production version, the product cost collector is created for the characteristics material, production plant, planning plant, and production version. SAP recommends this controlling level whenever you are using production versions. In repetitive manufacturing, you should always use this controlling level.
- If you are using the controlling level BOM/Routing, the product cost collector is created for the characteristics material, production plant, planning plant, BOM, and routing. BOM/Routing should only be used if the material does not have any production versions. The BOM is identified by the BOM usage and the alternative BOM. The routing is identified by the task list type and task list group.
- If you are using the controlling level Production Plant/Planning Plant, the product cost collector is created for the characteristics material, production plant, and planning plant. These product cost collectors have a number of features. For example, it is not possible to create a preliminary cost estimate for a product cost collector. This affects subsequent functions. Problems may arise if you make changes to the reporting points of the production versions.
- A product cost collector is an order. The order type of the product cost collector must belong to order category 05 (product cost collector).
- For product cost collectors, default rule STR (strategy for tracing factor determination) is specified in the table Cost-Accounting-Relevant Default Values for Order Types and Plants. This default rule is linked to settlement type PER (periodic).
- As a result, the settlement rule for the product cost collector receives settlement type PER. Default rule STR also ensures that the values to be settled from a product cost collector can be distributed.
- A results analysis key must be specified in all product cost collectors for which you want to calculate work in process.
- For preliminary costing and simultaneous costing, enter the costing variant and valuation variant in the order type. This defines the valuation procedure for materials, internal activities, external activities, and business processes. It also determines which overhead structure is used to calculate overhead.
- A preliminary cost estimate can be generated for the production order but the results cannot be saved to the production order as planned values. This cost estimate is for information purposes only). If you do not want the system to create this cost estimate, you don't need to enter the costing variant or valuation variant.
- Default rule PP2 (periodic) must be specified for the order type of the production order.
- No results analysis key is specified in the order type because WIP is calculated on the product cost collector.
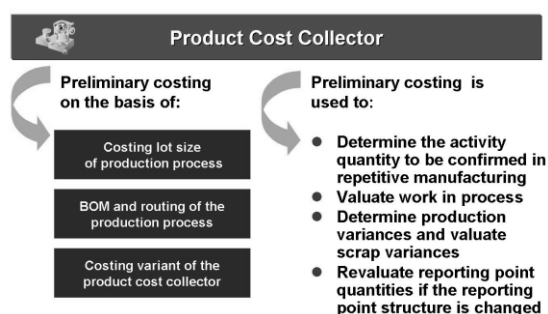


- You can create a preliminary cost estimate for a product cost collector. The preliminary cost estimate costs the quantity structure defined by the production process. If you are using the controlling level

"Material by Production Plant/Planning Plant", you cannot create a preliminary cost estimate for the product cost collector.

- In repetitive manufacturing, the activity quantities determined in preliminary costing can be used as default values for the confirmations.
- Target costs can be calculated on the basis of preliminary costing to:
  - Valuate WIP with the WIP calculation function
  - Valuate the scrap variances in the variance calculation function
- In repetitive manufacturing, if the reporting point structure of your routing changes, you can update the preliminary cost estimate to convert the quantities confirmed at the reporting points to the new reporting point structure.
- To calculate direct materials costs, the input quantities of the materials determined by the BOM are multiplied by the prices selected through the valuation variant.
- The system uses the BOM of the production process.
- To calculate the direct costs of production, the system multiplies the planned setup times, machine times and labor times by the prices selected in accordance with the valuation variant.
- The standard values are specified in the operations in the routing and can be defined as either fixed or variable (lot-size-dependent) values.
  - Lot-size-dependent standard values (such as labor and machine time) are multiplied by the costing lot size and divided by the base quantity on which the standard values are based.
  - Fixed standard values (such as setup costs) are independent of the production quantity and are known as ordering costs. They can still indicate stepped costs for technical reasons (such as a tool change required above a certain order quantity). These are known as semi variable costs.
- The exact algorithm is stored in formulas for the work center, which is assigned to the individual operations of the routing. The cost center and the activity type for each operation are in turn assigned to the work center. This determines the price of the activity.
- The template allocation technique allocates ABC processes and activity types of the cost centers. In principle, all information in the system can be used as the cause value (cost driver).
- The process template is determined dynamically based on the following parameters:
  - The costing sheet for the application of overhead is selected with the valuation variant.
  - The overhead key is either entered directly in the cost object or derived from the overhead group from the material master (costing view 1).
  - With the combination of overhead key and costing sheet, you can assign a template in Customizing.
- In preliminary costing for the product cost collector, the system uses the costing sheet specified in the "planned" valuation variant. In simultaneous costing for the product cost collector, the system uses the costing sheet specified in the "actual" valuation variant. This is the costing sheet that is displayed in the product cost collector.

## *Lesson 2 – Simultaneous Costing*

- The following business transactions can result in actual costs on cost objects:
  - G/L account postings in FI;
  - goods movements in MM;
  - repostings of primary costs;
  - repostings of line items;

- o internal activity allocations;
        - o repostings of internal activity allocations;
        - o direct assignment of personnel costs to cost objects using time sheets;
        - o process cost allocation;
        - o manual process allocation;
        - o template allocation;
        - o calculation of overhead;
        - o revaluation of activities at actual prices;
        - o confirmations in Logistics that result in activity allocations;
        - o subcontracting.
- Logistical functions such as goods issues and confirmations are still performed with reference to the manufacturing order (or, in repetitive manufacturing, with reference to the production version). The resulting costs are updated to the product cost collector.
- The price control of the material is specified in the material master record:
    - o Price Control Indicator V: The material is valuated at the moving average price (unit price). The moving average price changes with each goods movement or when orders from Cost Object Controlling are settled. The value of the goods receipt is determined by the valuation variant for delivery.
    - o Price Control Indicator S: The material is valuated at the standard price. In make-to-stock production, this price is usually calculated in a standard cost estimate for the material. In sales-order-related production with a valuated sales order stock, the valuation price is selected using a predefined valuation strategy and acts like a standard price.
    - o For materials whose price control is S, receipts into stock are valuated at the standard price. The credit applied to the product cost collector is the quantity received into inventory multiplied by the standard price.
    - o For materials whose price control indicator is V, the receipt into inventory and the credit to the product cost collector is controlled by the valuation variant for delivery
- When the goods receipt is entered, the system automatically debits the balance sheet account and credits the inventory change account. The product cost collector is credited using the primary cost element that corresponds to the plant activity account (inventory change account).
- For internally manufactured materials, SAP recommends valuation at the standard price.


## *Lesson 3 – Period End Closing*
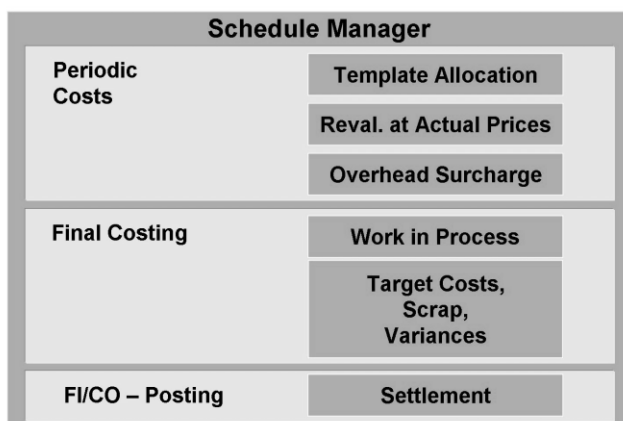


- Functions in the period-end closing process for product cost collectors:

- o Template allocation for automatic allocation of process costs and activity types.
- o Revaluation, at actual prices, of activity types and business processes with which cost objects were debited.
- o Allocation of overhead.
- o Calculation of work in process (WIP): In Product Cost by Period, the work in process is calculated at target cost.
- o Variance calculation: The variance calculation function investigates the causes of the order's balance. This function provides answers to questions such as: Why did the production process cost more than anticipated?
- o Settlement
  - ▪ The work in process is settled to Financial Accounting and Profit Center Accounting
  - ▪ The order balance is settled to Financial Accounting and Profit Center Accounting (also to the Material Ledger, if active)
  - ▪ The variance categories are settled to Profitability Analysis
- you must define a template in which you use the function ORDER_TARGET_PROCESS_QUANTITY to calculate the actual process quantity. In this function, the target costs of the process are calculated on the basis of the current standard costs.
- You can determine the actual prices for activity types and business processes at the end of the period. The actual prices are the actual costs divided by the activity and process quantities consumed.
- You control whether revaluation at actual prices is possible in Customizing in the parameters for the actual version that depend on the fiscal year, as well as in the master data of the activity type.
- You calculate actual prices in Overhead Cost Controlling.
- Revaluation at actual prices is performed in the period-end closing process for the product cost collector. The cost object is charged with the difference between the actual price and the price originally allocated to it.
- You can revaluate activities and business processes at actual prices in the following components:
  - o In Cost Object Controlling, for all cost objects (product cost collectors; production orders and process orders, sales order items (if they are being used as cost objects), internal orders; cost object hierarchies; general cost objects)
  - o In the Project System (projects (WBS elements), networks, network activities)
- Overhead is allocated to cost objects using quantity-based or percentage allocation rates.
- The overhead calculation process generates the following postings:
  - o Overhead costs are charged to the cost objects (product cost collectors, manufacturing orders, or general cost objects).
  - o The Overhead Cost Object (cost center, order, process) is credited.
- The costs are updated using the secondary cost elements specified in the credit rows in the costing sheet.
- Actual overhead calculation uses the costing sheet entered in the product cost collector.
- Calculating the WIP means valuating the unfinished goods (work in process).
- In Product Cost by Period, work in process is valuated at target cost. The operation quantities confirmed for the manufacturing orders or production versions are valuated at the target cost of the operation provided that the quantities are not scrap and no goods receipt has been entered.
- In Customizing, you can use a valuation variant to define which cost estimate should be used to calculate the target costs for the valuation of the work in process and the scrap. If you are using a product cost collector, in many cases it is appropriate to calculate the target costs using the preliminary costing for the product cost collector.

- The difference between the work in process in the current period and the work in process in the previous period corresponds to the inventory change of unfinished goods and is transferred to financial accounting when you settle.
- You can specify a valuation variant to select the cost estimate for the valuation of work in process and scrap variances at target cost.
- Target costs can be calculated on the basis of:
    - Planned costs (that is, the costs calculated in preliminary costing for the manufacturing order or for the product cost collector).
    - Based on an alternative material cost estimate (such as a modified standard cost estimate or an actual cost estimate). To identify the costing, enter a costing variant and costing version.
    - The current standard cost estimate.
- You assign a valuation variant for work in process and scrap to a combination of controlling area, Results Analysis version, and Results Analysis key.
- The only Results Analysis keys that are relevant are those used for the calculation of work in process at target cost.
- You assign the following cost elements to line IDs:
    - All cost elements with which an order is debited and credited.
    - With work in process at target cost, all cost elements in the costing used for the calculation of target costs for the valuation of work in process (such as all cost elements listed in the preliminary cost estimate for the product cost collector).
    - For valuation-relevant costs (such as direct material costs), you must create line IDs of category ""K" (costs).
    - If you want no work in process to be created for entire line IDs (for example, because the costs are accrued), you must assign these line IDs to category ""N:"" (not included).
    - The line IDs break down the costs incurred for the order into direct materials costs, direct production costs, material overhead, and so on. These groups can be based on the structure of the cost of goods manufactured in the cost component structure (cost component split), for example. You can specify a percentage that cannot be capitalized separately for each line ID.
    - You can mask your entries. The entry 00004+++++ includes the cost elements from 400000 to 499999. If you want particular cost elements to be treated separately, enter them unmasked (example: 0000415000).
- In the step of Update Table, you specify with a Results Analysis category how the Results Analysis is handled and which Results Analysis cost elements of type 31 the Results Analysis is saved under on the cost object.
    - For valuation-relevant costs (such as direct material costs), you must create line IDs of category "K"" (costs).
    - If you want no work in process to be created for an entire line ID (for example, because the costs are accrued), you must assign this line ID to category "N" (not included)
- In the step of Posting Rules Table, you specify to which G/L accounts in Financial Accounting work in process is settled. The assignment is carried out:
    - By Results Analysis category: In many cases it will be sufficient to generate a posting rule for the work in process with a requirement to capitalize (category WIPR).
    - By Results Analysis cost element.
- You assign a balance sheet account and an account of the income statement to each Results Analysis category (such as each Results Analysis cost element). You cannot create cost elements in CO for the G/L accounts that you specify in the posting rules.

- When the work in process is settled, a posting document is generated in FI. When the system capitalizes the work in process, it debits Unfinished Goods Inventory (WIP) (balance sheet account) and credits Changes in Unfinished Goods Inventory (WIP) (income statement account).
- If you have specified a profit center in the product cost collector, data is also transferred to Profit Center Accounting.

| Target Cost Version | Calculation of Target Costs | | Comp. of Target Costs with | WIP | Scrap | Variance Input Side | Variance Output Side |
|---|---|---|---|---|---|---|---|
| | | | **Control Costs** | | | | |
| 0 | Actual quantity | Std. cost est. material | Actual Costs | ✓ | ✓ | ✓ | ✓ |
| 1 | Actual quantity | Prelim. cost est. order* | Act. costs | ✓ | ✓ | ✓ | ⊖ |
| 2 | Plan order quantity | Std. cost est. material | Prelim. cost est. Produc-tion order | ⊖ | ⊖ | ✓ | ✓ |
| 3 | Actual quantity | Alternative mat. cost est. | Actual costs | ✓ | ✓ | ✓ | ✓ |

\* Product cost collector or production order

**Net Actual Costs = Actual Costs – WIP – Scrap**

- You can deduct the scrap variances from the actual costs for the calculation of control costs. The scrap variation is calculated by valuating the unplanned scrap quantities with the target costs minus the planned scrap costs. The unplanned scrap quantity is the difference between the actual scrap quantity of the operation and its target scrap quantity.
- In variance calculation, target cost versions are used mainly to control the type of variance (total variance, production variance, or planning variance). They can also be used to valuate the scrap variances. The standard system uses the following target cost versions:
    o Target cost version 0 (total variance). The total variance equals the order balance. For this version, choose actual costs as the control costs and standard cost estimate as the target costs.
    o Target cost version 1 (production variance). For this version, choose actual costs as the control costs and planned costs as the target costs.
    o Target cost version 2 (planning variance). With target cost version 2, the costs in the preliminary order cost estimate are interpreted as control costs. For this version, choose planned costs as the control costs and current standard cost estimate as the target costs. You cannot calculate planning variances for product cost collectors.
    o Target cost version 3 (production variance of the period). You compare the planned costs of the period calculated on the basis of an alternative material cost estimate (such as a modified standard cost estimate) with the actual costs of the period on the basis of the yield delivered to inventory in the period. The base quantity for variance calculation is the yield. For this version, choose actual costs as the control costs and alternative material cost estimate as the target costs.
- In Product Cost by Period, WIP and scrap variances are always deducted from the actual costs.
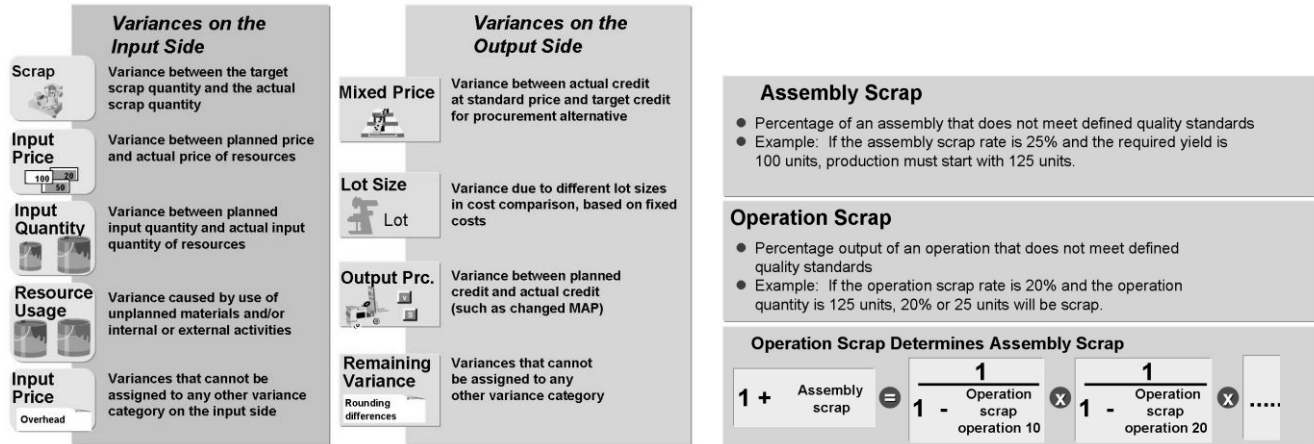
- Examples for variance categories:
  - Input price variances:
    Raw material 1 was valuated at 10 in the standard cost estimate. When the material was withdrawn from inventory, however, the goods movement was valuated at 11 (the price control specifies that valuation is at the moving average price). This results in a price variance of 1.
  - Input quantity variance:
    Machine time of 15 minutes was planned, but 17 minutes were confirmed. The activity price for the machine time is 5 per minute. This results in a quantity variance of 10.
  - Resource-usage variance:
    Raw material 2 is used instead of raw material 1. The costs for both raw materials are reported as resource-usage variances.
  - Remaining input variance:
    Because the price for material 1 changed, the material overhead is higher than planned. The difference between the planned and actual material overhead expense is reported as a remaining input variance.
  - Mixed-price variance:
    If the standard price of a material was costed using multiple procurement alternatives (mixed cost estimate), a later production without variances will still have a difference to the standard price. This is the mixed-price variance.
  - Lot size variance:
    If another quantity was used for production than previously generated in the product costing, the fixed costs are adjusted proportionally with another quantity, that is, the fixed costs per piece change. This is the lot size variance.
  - Output price variance:
    The material is transferred to inventory at a price other than the standard price (such as a moving average price). The difference is determined as an output price variance.
  - Remaining variance:
    If the system cannot determine the target costs, it will determine only remaining variances.
- Component scrap refers to materials that are faulty before they enter the production process. Component scrap increases the quantity of input materials.
- Planned operation scrap is the scrap that is expected to be incurred in an operation.
- Assembly scrap can be calculated by the system on the basis of the operation scrap. Assembly scrap increases the planned order quantity and also the quantity of the input materials
- The scrap variance is the value of the scrap variance quantity. The scrap variance quantity is the difference between the target scrap quantity (planned scrap quantity converted to yield) and the

actual scrap quantity (confirmed scrap quantity). The scrap variance quantity is valued at target cost less planned scrap cost.

- Lot size variances can be calculated for all target cost versions that report variances on the output side.
- Lot size variances are calculated in the following formula:
  - Lot size variance = Lot size-independent target costs x (1 − Control quantity / Planned quantity).
- Lot size variances are only calculated if the planned quantity does not equal the confirmed quantity (the delivered quantity).
- If you want to perform mixed costing in Product Cost Planning, you must create a procurement alternative for each production version and then define a mixing ratio. The mixed cost estimate calculates a mixed price. This price can be written to the material master as the standard price.
- Mixed-price variances arise when the system updates the mixed price as the standard price in the material master and valuates the stock with it. The mixed-price variance results from the difference between the target credit (actual quantity x standard cost of procurement alternative) determined in the variance calculation process and the actual credit posted at the time of the goods receipt (actual quantity x standard price).
- If you have not activated the field mixed-price variance in the variance variant, mixed-price variances are reported as output price variances.
- You always enter the valuation variant for scrap in target cost version 0. Even if you calculate variances in a different target cost version (such as target cost version 1), the scrap variance may be valuated with the valuation variant specified in target cost version 0.
- You normally use the same valuation variant for the valuation of work in process at target cost and for the valuation of scrap variances.
- In the variance variant, you specify which variance categories you want the system to report. You link the variance variant to the target cost version.
- Variances can only be calculated on a cost object if you have stored a variance key in its master record. You specify the variance key in the costing view of the material master record; it is transferred from there into the product cost collector (in Product Cost by Order, it is transferred into the manufacturing order). You can specify the variance key as a plant-based default value in Customizing for Product Cost by Period or Product Cost by Order. The variance key is then transferred into all material master records created in the plant in question.
- If the price control indicator is set to S, settlement debits the price difference account and credits the inventory change account. The value of the total variance is posted.
- If the price control indicator is set to V, settlement debits the inventory account and credits the inventory change account.
- Settlement also transfers the work in process to Financial Accounting.
- The value of the total variance and the work in process can also be transferred to Profit Center Accounting.
- The value of the total variance is also updated in the Material Ledger (if active).
- You can settle the variance categories to Costing-Based Profitability Analysis (CO-PA). The only variances that are relevant for settlement to Profitability Analysis are those calculated on the basis of target cost version 0. The value fields are assigned to the variances for each category and cost element.
- If the price difference account has a corresponding cost element, the price difference is settled to Account-Based Profitability Analysis in a similar way as to Financial Accounting.

- The settlement profile for a product cost collector must allow settlement to a material. If you want to settle variances to Profitability Analysis, the Variances indicator must be selected and settlement to a profitability segment must be allowed.
- The settlement profile also has fields for the allocation structure and the PA transfer structure. These structures control settlement to costing-based Profitability Analysis.
- In the settlement structure, you indicate whether you want to settle with source cost elements or with settlement cost elements
- In the PA transfer structure, you specify which variance category and cost element groups are assigned to which value fields in Profitability Analysis.
- Values and quantities must be transferred into different value fields. The values can either be differentiated by the fixed/variable indicator or transferred as a sum (Fixed/variable indicator = 3).

# Lesson 4 – Addendum: Repetitive Manufacturing and Material Valuation

- Repetitive manufacturing refers to production planning and control without the use of production orders.
- The planned requirements for repetitive manufacturing are normally created automatically by material requirements planning (MRP), although they can also be created manually. Production planning and control uses the planned orders for capacity planning and scheduling.
- The goals of repetitive manufacturing are as follows:
    - Creation and revision of production quantities on a period and quantity basis (reduction in individual lot and order-specific processing)
    - Reduction in production control and simpler back flushing tools (with the option of using the full scope of the PP functionality)
- Cost object controlling is carried out for the controlling level of the material. With repetitive manufacturing, the controlling level is normally the production version or material.
- The production version(s) are created in the material master record. You require a BOM and a routing. Costs are recorded on a product cost collector.
- The repetitive manufacturing profile in the master data of the MRP view determines whether
    - Activities are back flushed
    - Reporting points are used
    - A goods receipt is automatically posted after the last reporting point has been confirmed
- If you do not want to post any activities through reporting point confirmations, you can enter an internal activity allocation in the Controlling module and specify the product cost collector for the material (and production version, if necessary).
- If you want to calculate work in process and scrap during period-end closing, you must record back flush quantities at the reporting points.
- If the activities are to be back flashed, you define in the repetitive manufacturing profile whether the standard cost estimate for the material or the preliminary cost estimate for the product cost collector should be used to determine the activity quantities for the back flush. The price is determined by the Actual valuation variant for the product cost collector.
- The standard price remains valid for at least one period. The period is defined in Materials Management (MM)
- For internally manufactured materials, you can define a valuation variant for the valuation of the goods receipts.

**Addendum: Valuation of Materials at Standard Price**

| Advantages | Disadvantages |
|---|---|
| • Standard cost accounting | • Inventories are valued consistently with planned costs |
| • Analysis of the effects of changes in the production scenarios | |
| • Allocation of variance categories to costing-based Profitability Analysis (CO-PA) | • Products with widely fluctuating purchase prices or frequent changes in the production process should often be valued at actual cost |

**Therefore:**

Valuation at standard price is recommended for materials manufactured in-house.

**Addendum: Valuation of Materials at Moving Average Price**

| Advantages | Disadvantages |
|---|---|
| • Variances caused by different purchase prices of externally procured materials are included in inventory valuation. | • If material movements and order settlements overlap, the moving average price may be incorrect. |
| • Variances arising during the production of materials are included in inventory valuation. | • Variances are not rolled up through the production structure. |
| | • It is not possible to settle variance categories to CO-PA. |

**Therefore:**

Valuation at moving average price is not recommended for materials manufactured in-house.

- If the price control indicator is set to S (standard price) in the material master record, a price difference account is debited with the total variance of the product cost collector for the period.
- The material is not revaluated when the variances for the product cost collector are settled to FI. During settlement, the system calculates a new statistical moving average price and transfers this statistical value to the accounting view of the material master record.
- If the price control indicator is set to V in the material master record, the inventory account for the material is debited with the total variance of the product cost collector for the period.
- The moving average price is re-calculated during settlement, updated in the accounting view of the material master record and the inventory revalued accordingly. The corresponding revaluation document is generated in FI.
- If the inventory quantity is equal to or greater than the quantity produced by the order, the full order balance is posted to the inventory account.
- If no goods were received into inventory during the period, the actual costs are settled to the price difference account. If the inventory quantity is less than the quantity received into inventory from the order, the system settles the difference to the price difference account.

# Unit 9 – Make to Order Production with controlling by Sales Order

## *Lesson 1 – Master Data and preliminary costing*
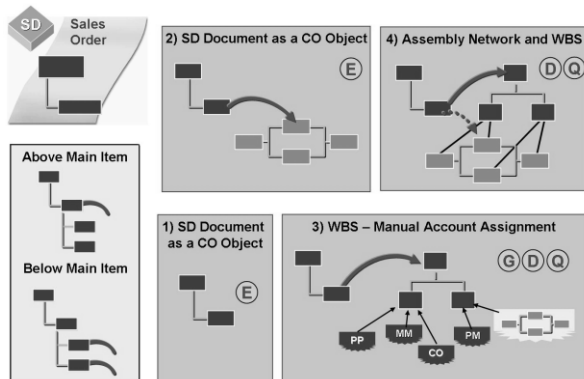


- In addition to the sales order, other cost objects and combinations of multiple cost objects are available for sales-order-related and engineer-to-order production. As per the graphic above, the following options are available:
  - • 1 and 2 represents processes of make-to-order production
    - For 1, the sales order item serves as the sole account assignment object for costs and revenue, which is useful when the provided functions of the sales order item suffice for representing the Cost Object Controlling scenario. If this is not the case, such as when BOMs and routings are to be processed or a detailed planning is to take place, additional cost objects can be added to the scenario. The typical account assignment category is "E".
    - For 2, a network was added. The network contributes a logistical quantity structure (such as internal activities, external activities, material) that can also be used for automatic planning (cost estimate). Scheduling and capacity monitoring are also possible. The costs can be assigned to the sales order item as well as network operations. The network is generally settled to the sales order item. Revenue is also assigned to the sales order item using billing. The typical account assignment category is "E".
    - 
  - 3 and 4 represents processes of customer project production.
    - For 3, a project is created in addition to the sales order. This is useful if typical abilities of the project are required in the Cost Object Controlling scenario: such as budgeting, availability control, PS Cash Management, Easy Cost Planning, employee assignment, division of the endeavor into various subprojects that can represent various tasks, responsibility areas and assignments (profit center, company code). In this scenario, the project is the leading object. That means, the sales order item is not controlled as a cost object but assigned to a billing element of the project. Costs and revenue are assigned to accounts on the project. The typical account assignment categories are G, D and Q.
    - For 4, a network is automatically immediately created using the sales order. A project is automatically created for this network (derived from a standard network and a standard project). This is called assembly processing. This option is useful if you

already know that a network and a certain project with a certain structure will be required when the sales order item is created, without having to consider other alternatives for procurement and representation. The typical account assignment categories are D and Q (with KZVBR = P).

- The account assignment category D requires you to use unvaluated sales order stock.
- You can use Project Builder to create or change objects of the project (project definition, WBS elements, activities, activity elements, PS texts, documents, milestones, material components). You can work with detailed screens, lists, or with graphics (hierarchy graphics, network structure graphics) (1 - 4).
- Work breakdown structures are the basis for further planning steps in the project. The focus is on the planning, analysis, description, control, and monitoring of costs, basis dates, and the budget. Dates, costs, and outgoing payments are often planned with activities that are assigned to WBS elements.
- Use operative indicators to set the properties of a WBS element and to specify which tasks the WBS element takes on in the project execution.
  - Classify WBS elements as planning elements on which you want to manually plan costs.
  - Classify WBS elements as account assignment elements on which you want to post actual costs.
  - Classify WBS elements as billing elements on which you want to post revenue.
- The Statistical indicator determines whether a WBS element is only used for statistical purposes or whether it can be debited with real costs.
- The sales order can be billed and customer or activity-specific or condition records can be taken into account. You can choose various forms of billing:
  - Starting from a standard price, a sales price is derived using the price determination schema of the SD.
  - Starting from the costing result of the sales order or project, a sales price is derived using the price determination schema of the SD.
  - The sales price is found based on the actual expense in resource-related billing.
- The billing can be carried out based on planned revenue (with or without a billing plan) or based on the actual costs with a resource-related billing which generates so-called  dynamic items  from the cost information (for example, costs for material and personnel). Before a billing request is created, you will be shown an overview screen containing relevant information that you can modify that enables you to determine what the billing request should look like.
- The dynamic item processor is a tool that the system uses to summarize data on dynamic items during resource-related quotation creation and billing
- You can use the DIP profile for creating quotations and billing (both resource-related and flat-rate).
- Assignment to the DIP profile is performed in the service order header or in the sales order item. You can enter the default profile when making customizing settings for service order types or sales document item types.
- You can plan the costs of a service with a unit cost estimate. You use them like spreadsheets to make costing decisions and to access information on material costs, internal activity prices, purchasing costs, overhead, and process costs. For existing cost estimates, you can refer to these and copy the relevant items into the unit cost estimate.
- If the unit costing includes a material item with a cost estimate, you can explode this cost estimate to display the items that make up the material cost. Likewise, if you enter a base-planning object as an item, you can explode its cost estimate.
- When Easy Cost Planning is run, the user is asked for the value of the characteristics. The system then plans the resources according to the template. The quantities entered or calculated are valuated with prices or rates.

- The network primarily contains operations that describe work and project steps. Operations are linked by relationships to set a casual and temporal order. If you plan dates and resources in the operations of the network, the system automatically determines the corresponding planned costs.
- The planned costs are determined for the following objects:
    - o Activity inputs for internal processing operations (internal activity)
    - o Primary costs for external processing and service operations (external activity)
    - o Primary costs for cost activities
    - o Primary costs for material components.
- Activity elements are treated as operations for the costing.
- Internal Processing Operation: - If no distribution key has been maintained in the operation or work center, the costs are distributed equally over the earliest dates of the operation. The valuation is done with the price according to the valuation variant. Depending on the strategy, the system can determine the most current date.
- Cost Activity: - If an invoicing plan has been maintained, the values are put into periods according to the invoicing plan. Otherwise, the operation value is distributed to periods according to the distribution key in the operation. If there is no distribution key, the costs are distributed equally over the earliest dates of the operation.
- External Processing and Service Operations: - If an invoicing plan has been maintained, the values are put into periods according to the invoicing plan. Otherwise, the values are put into the period of the latest operation start date. The invoicing plan has priority for the values. If there is no invoicing plan, the system determines the prices from the purchasing info record or the operation value.
- Material Components: - If an invoicing plan is present, the periods and values are taken from the invoicing plan. If no invoicing plan is present, the values are taken from the unit cost estimate, purchasing info record, or price from the material master according to the valuation variant. In this case, the period is that of the requirement date of the material.

## *Lesson 2 – Simultaneous Costing*

- You post the goods issue for the material needed for the service. The sales order item is debited with the cost of the material.
- You can use the Cross-Application Time Sheet (CATS) for the allocation of the internal activities of your employees. You can also post the activities with a direct activity allocation. If you use routings, you can enter confirmations for the operations.
- CATS is an integrated function for entering actual times that are important in the HCM, PS, PM, SM, CO, or MM-SRV areas. You can use data entry profile to set the layouts.
- Reports transfer the released (and, if necessary, approved) data to the various applications. The actual times can be important for various applications at the same time. This causes multiple transfers to various applications.
- Time recording is carried out for one of more employees.
- Work list for employees by:
    - o Operations to which the employee is assigned with the work center or distribution of work to employees (for PS, PM, CS)
    - o Operations with the pool of confirmations (for PS, PM, CS)
    - o Objects that the employee is currently processing (with the CATS database)
    - o Objects with user exits

- If you use a project to realize an endeavor, you can enter and evaluate other data in addition to costs and revenue. To enter actual data, you must release the project.
- The following postings are possible:
    - Internal activity allocation (for internal activities)
    - Direct process allocation (for processes)
    - Reservation (for material items)
    - Goods issue (for material components)
    - Purchase requisition (for material items, external activity items, service items, variable items)
    - Purchase order (for material items, external activity items, service items, variable items)

## *Lesson 3 – Period End Closing*

- You can use the Results Analysis to calculate the costs and revenue of the cost object based on the period by various methods and to form stock and reserves if required. For sales orders, the Results Analysis is carried out for each sales order item. For projects, it is carried out on the billing elements for the entire project hierarchy including assigned objects.
- The revenues and costs of the sale are settled to Profitability Analysis, where as stock and reserves are settled to Financial Accounting and Profit Center Accounting.
- If a sales order is given the status  Final billing , no more revenue is expected for that sales order item. Only debit memos and credit memos can be entered. For this reason you can normally cancel all stock and reserves on the revenue side. The same is valid for the status  technically completed  on the cost side.

## *Lesson 4 – Customizing*

- The account assignment category  B  specifies that consumption postings are posted directly on the sales order item, but no separate sales order stock is kept.
- If you use method 14 , the cost of sales is derived from the resource-related billing. For this, the following applies: All line items of cost postings that have already been billed are cost of sales. Those that have not yet been billed are costs in stock (WIP). The revenues are calculated in SD pricing on the basis of the billed line items.
- The DIP profile (the profile of the dynamic item processor) takes on the control of the resource-related billing, which you can use for creating quotations as well as billing. You decide on the type of sales documents that are to be generated (quotation, billing request and credit memo request) per usage. In addition, you can determine if the system should perform a warranty check during billing. All other data should be entered when you are creating a document.
- Characteristics relevant to the determination of dynamic items are fixed for each usage. In addition, various characteristic attributes, and the way in which they are presented during the processing of the billing request, are defined. You can define your own characteristics and enter values for these characteristics using the customer exit AD010003.
- The sources define the data used to determine dynamic items (for example, the actual costs of line items or totals records, planned costs and so on).
- You can define which service materials are determined from characteristic values for billing request items or quotations. The selection criteria here are also entered in the form of sets.

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