Infor LN User Guide for Costing

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Table of Contents

About this document

This document describes the purpose and the use of costing in Manufacturing.

Objectives

The objectives of this book are to describe the purpose and the use of costing in manufacturing.

Intended Audience

This book is intended for those who want to learn how to use, and setup costing functionality.

Assumed Knowledge

Familiarity with the business processes involved in costing, and general knowledge of the LN functionality will help you understand this book. In addition, Standard Cost Calculation and Production Order Costing training courses are available to give you a head start.

How to read this document

This document was assembled from online Help topics. Consequently, references to other sections in the manual are presented as shown in this example:

Refer to the Table of Contents to locate the referred section.

Underlined terms indicate a link to a glossary definition. If you view this document online and you click on underlined text, you jump to the glossary definition at the end of this document. Non-underlined references do not represent a link to glossary definitions or other elements.

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Chapter 1
Introduction

Multiple financial companies in Manufacturing

The financial transactions of production orders can be posted to the <u>financial companies</u> of the following entities:

- Project
- Production order
- Work center
- Warehouse

These entities belong to certain <u>enterprise units</u> which are linked to financial companies.

How to define the enterprise units

Projects and production orders have <u>calculation offices</u> which determine the enterprise unit. See *Calculation Offices (p. 11)*.

A work center corresponds to a <u>department</u> with the same code as the work center. Define the enterprise unit of a work center in the Departments (tcmcs0565m000) session.

Define the department of an employee in the Employees - General (tccom0101m000) session.

Define the enterprise unit of a warehouse in the Warehouses (tcmcs0503m000) session.

Posting transactions

Orders for a project always have the company number of the project. LN posts all of the project's financial transactions to this company.

If the **Financial Transactions by Work Center** check box in the Production Order Parameters (tisfc0100s000) session is selected, LN posts <u>WIP transactions</u> related to work centers to the work center's financial company. Surcharges defined on end item level or production results are always posted to the company of the production order.

If the **Cover Labor Overhead Costs in Employee Department** check box in the People Parameters (bpmdm0100m000) session is selected, LN posts the overhead costs of operations to the company of

the employee's work center. The employee's work center can be different from the work center where the operation is carried out.

LN posts financial transactions that result from inventory transactions to the warehouse company. LN creates intercompany entries in Financials during posting.

Cost components in Manufacturing

Cost components are used to break down calculated prices into components that are meaningful to the user such as user-defined cost structure of standard costs, sales prices, and valuation prices. They are also used for the following:

- To compare estimated and actual production order costs.
- To express production variances.

Cost component codes are defined in the Cost Components (tcmcs0148m000) session, and assigned to one of the following cost types:

- **Material Costs**
- **Operation Costs**
- **Surcharge on Material Costs**
- **Surcharge on Operation Costs**
- **General Costs**
- **Not Applicable**

The cost component type **Not Applicable** is intended for use in Project and Service.

You must link a cost component of the applicable costing type to everything in LN that is accountable for costs: materials, operations, surcharges, labor, and so on.

Cost component structure

In the cost component structure, you determine how a price is broken down. You can choose to break down the costs for every cost component in LN. You can also aggregate the costs on the three cost components defined in the Items - Costing (ticpr0107m000) session. You can use the cost component structure, to break down the price to the level of detail you want: from completely aggregated to a detailed breakdown.

To set up a cost component structure: aggregated costs

In the Items - Costing (ticpr0107m000) session you must define three aggregated cost components for an item. The aggregated cost components are associated with the following costs:

- **Aggregated Material Cost Component** costs
- **Aggregated Operation Cost Component** costs
- **Aggregated Surcharge Cost Component** costs

If you do not enter a chart in the **Standard Cost Component Scheme** field in the Items - Costing (ticpr0107m000) session, or for Assembly Control in the Assembly Line Costing Data (ticpr0115m000) session, all costs are broken down on the aggregated cost components. This means in Job Shop Control

that if you report an order or a quantity as complete, and the items are received in the warehouse, the following happens:

- All cost linked to cost components of the **Material Costs** type are booked on the aggregated cost component for material costs.
- All cost linked to cost components of the **Operation Costs** type are booked on the aggregated cost component for operation costs.
- All cost linked to cost components of the **Surcharge on Material Costs** type or the **Surcharge on Operation Costs** type are booked on the aggregated cost component for surcharge costs.

To set up a cost component structure: detailed costs

If you want to break down your costs in a detailed way, you must, apart from the aggregated cost components, define detailed cost components in the Standard Cost Scheme Details (ticpr0110m000) session. The detailed cost components are linked to a chart that is defined in the Cost Component Scheme (ticpr0109m000) session. If you enter the chart with associated detailed cost components in the **Standard Cost Component Scheme** field in the Items - Costing (ticpr0107m000) session, or for Assembly Control in the Assembly Line Costing Data (ticpr0115m000) session, all costs are broken down according to the cost component structure (chart details) that you defined for the chart. This means in Job Shop Control that if you report an order or a quantity as complete, and the items are received in the warehouse, the following happens:

- Costs are booked to the matching cost component in the cost component structure.
- If costs were linked to a cost component in LN that does not exist in the end item's cost component structure, the costs are collected in the end item's aggregated cost component.

Booking costs on cost components

During production of a manufactured item, all costs are booked on the cost component to which the costs are linked. These cost components can differ from the cost components in the end item's cost component structure.

- Operation costs are booked on the cost component as defined in the Operation Rates (ticpr1150m000) session.
- Material costs are booked on the materials' cost components. You can view the cost components in the Item Inventory - Cost Details (whwmd2517m000) session.
- Surcharges are booked on the cost component as defined in the Item Surcharges (ticpr1110m000) session.

After production, if you report an order as complete and the items are received in the warehouse, the costs are booked on the cost components as defined in the end item's cost component structure. If the **Moment of Completion Posting** field in the Production Orders (tisfc0501m000) session is **Quantity Completed**, the costs are booked as soon as a quantity of the production order is reported completed.

Note

In Assembly Control, a chart with detailed cost components is linked to the assembly line instead of to the end item.

Example
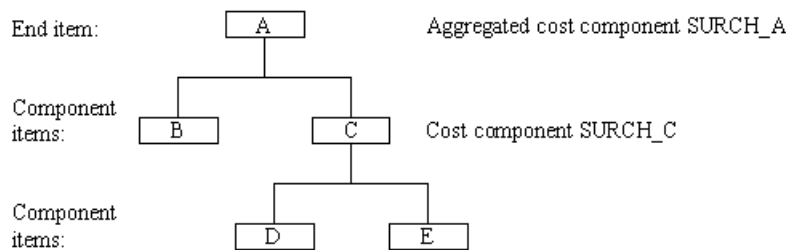
Explanation:

If you defined a detailed cost component SURCH_C for component item C in the Standard Cost Scheme Details (ticpr0110m000) session, and you want to report the costs that are posted to that detailed cost component SURCH_C separately for end item A, you must also define cost component SURCH_C in the chart details for end item A. If you do not define a cost component SURCH_C for item A, cost component SURCH_C will be part of item A's aggregated cost component SURCH_A. You must define the detailed cost components of an item's cost component structure in the Standard Cost Scheme Details (ticpr0110m000) session.

Calculating Estimated Costs

The calculation procedure of the estimated order costs is similar to the standard cost calculation. Only the differences are discussed.

1. The calculation of the estimated order costs uses other data sources. Estimated order costs are based on:
   - Ordered quantity in the production order
   - Estimated materials
   - Production planning
2. For the estimated order costs, only the item receipt surcharges (for end items) are calculated.
3. The fixed costs are excluded from the estimated order costs, if one of the following check boxes is cleared:
   - The **Include Fixed Costs in Valuation Price** check box in the Standard Cost Calculation Parameters (ticpr0100m000) session.
   - The **Include Fixed Costs in Project Valuation** check box in the Project Control Parameters (tipcs0100m000) session.
4. The calculation is influenced by the **Financial Transactions by Work Center** check box in the Production Order Parameters (tisfc0100s000) session. If the check box is selected, for every operation the estimated order cost is accumulated from the current operation and from previous operations. The amount is stored on the WIP transfer cost component.

5. Estimated order costs do not lead to financial transactions. The estimated order cost are used for:
    - The determination of the production results
    - WIP transfer prices
    - Preclosure posting of surcharges.

6. Subcontracting is the process of outsourcing a part of the production process to a supplier. Two types occur:
    - Unplanned subcontracting
    - Planned subcontracting

The order estimate always includes costs for subcontracting.

Calculation Offices

A calculation office is a work center that determines the enterprise unit for a PCS project or production order. The enterprise unit is linked to a financial company, which is financially responsible for a project or production order. Projects and production orders are always linked to a calculation office, so that LN can book the costs and production results of the production order or project to the financial company.

Note

Work centers and warehouses can belong to enterprise units other than the one linked to the calculation office. The financial transactions of the work centers and warehouses are posted to the financial companies of their own enterprise units.

Defining a calculation office

1. Define a department in the Departments (tcmcs0565m000) session. Set the department type to **Work Center**.
2. Specify the enterprise unit to which the calculation office belongs in the Departments (tcmcs0565m000) session.
3. Define a work center in the Work Centers (tirou0101m000) session. The code of the work center must be the same as the department.

Calculation offices for production orders

On a production order's calculation office, LN posts material costs, operation costs, surcharges, and subcontracting costs.

The calculation office that you define in the Default Production Order Data (tisfc0102m000) session is the default calculation office for a production order. You can change the calculation office for a specific production order on the **Costing** tab in the Production Orders (tisfc0501m000) details session.

Calculation offices for PCS projects

On a PCS project's calculation office, LN posts non-item project costs, such as project surcharges, hours posted on activities, and general project costs. Furthermore, the PCS project's calculation office is used to aggregate the total costs and revenues of the project.

If you define a project in the Projects (tipcs2101m000) session, you can select a calculation office for the project in the **Calculation Office** field.

Default calculation office for PCS projects

If you generate a PCS project on a sales order or service order, a calculation office for the PCS project can be defaulted in three ways, dependent on the value in the **Enterprise Unit for calc.off. used from** field in the Project Control Parameters (tipcs0100m000) session:

- **Department**
  The default calculation office for the PCS project is the calculation office that is linked to the enterprise unit of the sales office or the service department. You can define a default calculation office of a specific enterprise unit in the Enterprise Units (tcemm0130m000) session.

- **Warehouse**
  The default calculation office for the PCS project is the calculation office that is linked to the enterprise unit of the warehouse. You can define a default calculation office of a specific enterprise unit in the Enterprise Units (tcemm0130m000) session.

- **None**
  The default calculation office for the PCS project is determined by the number group and the order series of the sales order, service order, or production order for which the PCS project is created. You can use the Default Project Data by Number Group (tipcs0103m000) session to define calculation offices for combinations of number group and order series.

Note

If you do not specify a calculation office for an enterprise unit, LN uses the calculation office based on the order series.

Operation rates

An operation rate is a rate determined by labor costs, machine costs, or overhead costs. Operation rates are defined in the Operation Rates (ticpr1150m000) session, where these rates are linked to a cost calculation code and an operation rate code. The operation rates are registered by means of cost components of the **Operation Costs** type.

Four types of operation rates exist:

- **Labor** (average costs of one hour of labor).
- **Machine** (average costs for a machine for one hour).
- **Overhead on Man Hours** (indirect costs for one hour of labor).
- **Overhead on Machine Hours** (indirect costs for a machine for one hour).

For operation rate lines sequence numbers are defined, which allows for multiple operation rate lines. You can define a maximum of 999 lines for each operation rate.

The operation rate code with accompanying operation rates is linked to a work center in the Work Centers (tirou0101m000) session, and/or to a work center/task relationship in the Task Relationships (tirou0104m000) session. Whether the operation rates linked to the work center or to the work center/task relationship are used for cost calculation depends on the setting of the **Type of Operation Rates** field in the Standard Cost Calculation Parameters (ticpr0100m000) session.

Surcharges

In the Item Surcharges (ticpr1110m000) session, you can define two types of surcharges:

Item surcharges
- Surcharges by item group
- Surcharges by item

Warehouse surcharges
- General surcharges by warehouse
- Surcharges by item group/warehouse
- Surcharges by item/warehouse

Item surcharges are the basis for extra costs and discounts (in terms of percentage of fixed amounts) in the cost/valuation price structure for items. If you define surcharges by item as well as surcharges by item group, the surcharges by item group are ignored during cost calculation. If general surcharges by warehouse are defined, they are used in cost calculation on top of surcharges by item or surcharges by item group.

Surcharges can relate to fixed costs and variable costs and are entered under a cost calculation code. You can record surcharges and/or discounts for the total costs, or just for added costs.

Surcharges in the Standard Cost Calculation module are estimates and are posted by a cost component.

Surcharges are used as follows:
- To calculate the *Standard cost (p. 16)*
- To calculate the valuation price
- To do production order costing
- To determine the inventory value in case of actual costing methods

Booking triggered by

Item and warehouse surcharges are added to the Valuation prices during the receipt of the item into a warehouse or when the item is issued. The moment when costs are added is important for inventory valuation.

The standard cost includes item surcharges and does not depend on when costs are posted. Warehouse surcharges for the standard warehouse (the standard warehouse is defined in the Items (tcibd0501m000) session) are included in the standard cost, too. If an item is a component in the bill of material (BOM), LN uses the BOM warehouse to calculate the standard cost of the component item.

Receipt

Item surcharges are added to the Valuation prices during the receipt of the item into a warehouse. For purchased items, this is the moment of receipt into the warehouse (the Warehouse Receipt (whinh3512m000) session or the Warehouse Inspections Overview (whinh3122m000) session). For manufactured items, this is the moment of:

- Order completion.
- Order closing.
- Correcting the WIP value, based on actual costs.

Warehouse surcharges are added to the Valuation prices for inventory valuation at the moment of receipt into the warehouse.

Issue

Item surcharges are added to the Valuation prices at the moment the item is issued to work-in-process, or as a material on the service order.

A special case is the warehouse item transfer. During a transfer, the item code changes. Item issue and receipt surcharges are applied during these warehouse item transfers. The item surcharges are not used during item movements between warehouses. The item surcharges are only used once during the process flows.

Warehouse surcharges with realization moment Issue are added to the Valuation prices when the item leaves the warehouse. This total value is used as the cost of goods sold, transfer price, and so on. When subsequent warehouse transfers are carried out, the warehouse surcharges are included in the valuation price again and again. This means that when an item is moved back and forth between warehouses, the valuation price increases in case of actual costing. Not when the item is a FTP item.

For the price calculation code of type Sales Price, only item surcharges with the realization moment issue can be defined.

Aggregated cost components

Each item has three aggregated cost components that are defined in the Items - Costing (ticpr0107m000) session:

- **Aggregated Material Cost Component**
  The costs of raw materials.
- **Aggregated Operation Cost Component**
  The cost of operations and subcontracting for the finished end item, and all the required subassemblies.

- **Aggregated Surcharge Cost Component**
  All item surcharges and warehouse surcharges.

If you do not enter a **Standard Cost Component Scheme** in the Items - Costing (ticpr0107m000) session, production order costs, production order variances, and surcharges are posted by aggregated cost component.

Costing work centers

General

Costing work centers serve as an extra level on top of the planning work centers to make costing and planning more independent. With the introduction of costing work centers, you can change an operation 's work center during production planning when the estimated costs are already frozen, provided the new planning work center has the same enterprise unit as the costing work center. As a result, when you change a work center, you no longer need to change all work centers in the operation set and recalculate the estimated costs.

A costing work center has the following advantages:

- Provides more flexibility to update the planning manually.
- Facilitates the ad hoc subcontracting of an operation.
- Enables you to create one costing center for each enterprise unit.

Settings

To define a costing work center, take the following steps:

1. Because costing work centers are only interesting if financial transactions are kept on work center level, select the **Financial Transactions by Work Center** check box in the Production Order Parameters (tisfc0100s000) session. If financial transactions are registered by production order, the following steps are not useful.
2. Define a department of the Work Center department type in the Departments (tcmcs0565m000) session.
3. Specify the enterprise unit to which the (costing) work center belongs in the Departments (tcmcs0565m000) session.
4. Create a costing work center in the Work Centers (tirou0101m000) session with:
   - The **Work Center Type** field set to Costing Work Center.
   - An operation rate code entered in the **Operation Rate Code** field.
5. In the Work Centers (tirou0101m000) session, create a main work center or a sub- work-center, which are also referred to as planning work centers, and link the defined costing work center to the relevant planning work center in the **Costing Work Center** field.

Note

- The enterprise unit of the planning work center must be the same as the enterprise unit of the costing work center.

- If a costing work center is defined, the costing work center's operation rate is used for calculation purposes. If no costing work center is defined, the operation rate that is used can be the work center's operation rate, or the task relationship's operation rate, as defined in the **Type of Operation Rates** field of the Standard Cost Calculation Parameters (ticpr0100m000) session.

Functional explanation

When a production order is created, the estimated hours and associated costs are transferred to the costing work center that is linked to the planning work center. If no costing work center is linked, the estimated hours are transferred to the planning work center. If the estimated costs are frozen on a moment that is defined in the **Moment Freezing Estimates** field of the Production Order (tisfc0101s000) session, the end item unit costs are calculated. You can view the end item unit costs by costing work center in the End Item Unit Costs (ticst0510m000) session. When the estimated costs are frozen, the WIP transfers are also calculated. The WIP transfers take place between the costing work centers.

Note

After the costs are frozen, the planning work center can change as long as the new planning work center has the same enterprise unit as the costing work center. The costing work center cannot change after the costs are frozen.

If you decide to ad hoc subcontract an operation and decide to use an external work center instead of a planning work center, the only condition is that the external work center is linked to the same costing work center as the other work centers.

Standard cost

Every item in LN must have a standard cost before you can generate any orders for the item. The standard cost is valid for the whole logistic company, it serves as a basis for the item's valuation price. The standard cost can be calculated multiple times each day, and each calculation is stored.

In LN, the standard cost is calculated in the Standard Cost Calculation (CPR) module. If you want to examine the effect of changes of the item in LN, you can also simulate costs for an item in this module.

To calculate the standard cost of an item, LN requires standard information that affects the costs, such as the materials that are used for the item (derived from the BOM), the hours that are spent to produce the item (derived from the routing), and the surcharges that apply (derived from the master data).

BOM

The bill of material (BOM) is used in cost calculation to determine the required materials to produce an item. An item's BOM provides information on:

- The materials of which the item consists.
- The quantity of materials that is used for the item.
- The scrap and yield on the materials.

Routing

The routing is used in cost calculation to determine the number of man hours and machine hours required to produce an item. An item's routing provides information on:

- Which operations are carried out to produce the item.
- The operations' setup time and cycle time.
- The scrap and yield on the operations.

Surcharges

Surcharges are estimates to cover for indirect costs during production, for example, the costs of order intake, the costs of inspections, or the costs of depreciation of machines and buildings. Surcharges can be defined for items or warehouses. For more information, refer to *Surcharges (p. 13)*.

In LN, a price calculation code stores the price calculation data that is used to calculate the cost. The standard price calculation code specified in the Standard Cost Calculation Parameters (ticpr0100m000) session, stores data to calculate the standard cost. Other price calculation codes store the data for simulation purposes.

Displaying Item Standard Cost Details

Depending on how the cost structure is defined, you can use aggregated cost components and detailed cost components to report standard cost. The cost components that are listed in this session depend on the item's cost structure. For more information, refer to *Cost components in Manufacturing (p. 8)*.

The costs of the item can be broken down into variable costs and fixed costs. The added amounts (**Added AmountFixed** and **Added AmountVariable**) express the costs connected with the cost components for the item displayed in the session's header. If a cost component is not only used for the item displayed in the header, but also for some component items in the item's BOM structure, the costs connected to that cost component are expressed in the total amount columns (**Total AmountFixed** and **Total AmountVariable**).

Backflushing Requirements

Prerequisites

To backflush assembly parts and hours, the following conditions must be met:

- The line station orders must be **Completed**.

  The current session is, therefore, usually run when an assembly order is reported complete at a line station, from the appropriate menu of the Line Station - Assembly Orders (tiasl6510m000) session.

- The assembly parts must be allocated.

  Materials that were not allocated, can not be backflushed. Refer to Build Assembly Part Allocation (tiasc7240m000) for more information about the allocation of materials.

Functionality

During backflushing, the following happens for each line station order that is processed:

- The costs of different cost components are converted to the effective cost component structure by assembly line and item, defined in the Standard Cost Calculation (CPR) module.
- The number of assembly hours that must be backflushed is determined. The assembly hours are posted and backflushed in People automatically.
- The number of assembly parts that must be backflushed is determined. The inventory is adjusted for each assembly part in Warehousing.
- The planned stock transactions for each clustered line station order are reduced.
- The **Line Station Order Status** is set to **Closed**.

Parameters

The way backflushing is carried out, depends on the **Transaction Processing** parameter, which you define in the Assembly Control Parameters (tiasc0100m000) session.

- **Order Based** Requirements are backflushed for each individual assembly order.
- **Line Station Based** Requirements are backflushed for each line station, with requirements of all the line stations orders added together. LN determines to which clustered line station order and time bucket the materials belong. LN combines the backflushing of materials that belong to the same time bucket, for a certain line station.

Financial Transactions

Backflushing results in the following financial transactions:

- Transaction origin: ASC Production
- Financial int. transaction: issue

Debit	production WIP
Credit	inventory

- Transaction origin: ASC Production
- Financial int. transaction: operation costs

Debit	production WIP
Credit	absorbed labor costs

> **Note**
>
> Floor stock items are not backflushed in Assembly Control.

Actual costing for receipt postings in manufacturing

You can use actual costing in Manufacturing when the item's inventory valuation method is defined as LIFO, FIFO, MAUC, or lot controlled in the Item Data by Warehouse (whwmd2510m000) session, and the **End Item Receipt Posting** check box is selected in Production Order Parameters (tisfc0100s000) session. For information on how costing is performed when the **End Item Receipt Posting** check box cleared, refer to Standard costing for receipt postings in manufacturing.

For actual costing to work accurately, procedures must be defined that regulate the timely booking of costs. These are used in case operations or specific quantities on a production order are reported **Completed** while not all costs have been booked.

Correction factors must be defined that are applied in case of partial deliveries to distribute costs using the following methods:

- Correction for costs of completed but not yet received quantities
- Correction for high progress operations
- Correction for setup costs
- Correction for issued materials

If you use backflushing, this must be performed manually before quantities are reported complete in the Report Orders Completed (tisfc0520m000) session.

Otherwise, backflushing is performed after the end item is received in the warehouse, and the backflushed costs are not taken into account when the standard cost for the end item is calculated. For more information, refer to Actual costing and backflushing

Receiving production order items in a warehouse differs depending on the properties of both the warehouse and production order:

- **Receiving in warehouse with FTP**
  The difference between the actuals and FTP is booked with an FTP result and the end item is received in the warehouse at FTP value. Note: this is not allowed when project pegging is implemented.

- **Receiving in warehouse with actual costing**
  In this scenario no variances should occur. The end item is received against the value it was produced at.

Actualizing Standard Cost and Valuation Prices

Note

You cannot actualize the standard cost or valuation price for customized or <u>standard to order items</u>.

If the standard costs or valuation prices are actualized, LN:

- Revalues inventory on hand
- Updates the following fields in the Items - Costing (ticpr0107m000) session: **Standard Cost**, **Material Costs**, **Operation Costs**, **Last Calculation Date**.

Use the Archive Cost History (ticpr2230m000) session or select the **Delete Standard Cost History Data** check box in this session to remove the standard cost history data. Depending on the **Number of Years to Retain Standard Cost History** field in the Standard Cost Calculation Parameters (ticpr0100m000) session, data is deleted during the actualization process.

Chapter 2
Calculations

Cost calculation methods

The calculation method determines how the product structure is analyzed during the calculation of the standard cost and the valuation price. The BOM that follows is used to explain the calculation methods:
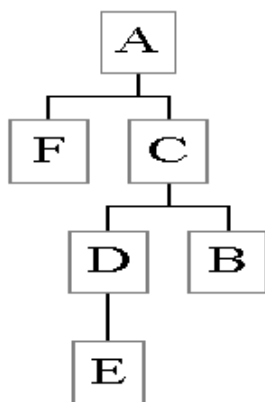
Top-down LN calculates the standard cost of each item that affects the standard cost of the selected item. During a cost calculation, LN analyzes the structure of the item by means of the Bill of Material (tibom1110m000) session.

Example

When the standard cost of item C in the example is calculated, LN calculates the standard costs of items E, D, and B in this sequence.

Single-level: similar to the top-down method, except the standard cost and the valuation price of the underlying structure that already exist, are adopted.

Example

When the standard cost of item C is calculated, LN reads the prices of items D and B in the Item - Standard Cost Details (ticpr2505m000) session.

Bottom-up LN searches the structure for items that are used in a bill of material at higher levels, by means of a where-used process. These items are included in the cost calculation process.

Bottom-up means that the price of each item is calculated, because of a change in the price of the chosen item. The prices of items that are on a lower level in the BOM are not calculated, but are read in the Item - Standard Cost Details (ticpr2505m000) session.

Example

When the price of item B in the above figure is calculated, the price of items A and C will also be calculated.

Cost calculation

The Standard Cost Calculation module consists of three parts:

- The definition of the master data
- The calculation of the standard cost
- The calculation of the sales prices

In the standard cost master data, you can maintain the following data:

- Cost Calculation Code
- Cost components
- Operation-rate codes
- Operation rates
- Subcontracting rates
- Surcharges
- Simulated purchase prices

For the calculation of the project costs in the Project Control module, the operation rates and the subcontracting rates for the estimated item-related costs can also be defined in the Standard Cost Calculation module.

In the second part (the calculation of the standard cost and the valuation price), and the third part (the calculation of the sales price), the following can be calculated for purchased items, manufactured items, cost items, and service items (not for subcontracting items):

- Item standard cost
- Item valuation prices
- (Simulated) item sales prices

During the production order costing in the Job Shop Control module, the master data of the Standard Cost Calculation module is used in the calculation of the estimated production order costs and the actual production order costs.

Calculating operation costs (labor, machine, overhead)

Labor, machine, and overhead costs are calculated to determine the operation costs.

If the work center is either a main work center or sub-work center, LN first checks the setting of the **Type of Operation Rates** field in the Standard Cost Calculation Parameters (ticpr0100m000) session. If the parameter value is **Work Center Rate**, LN reads the work center's operation rate code. A number of labor, machine, and overhead rates have been recorded using the above-mentioned operation rate code for the selected cost calculation code in the Operation Rates (ticpr1150m000) session.

Based on this data, LN calculates the labor and machine costs required to carry out the relevant operation using the following formulas:

```
Labor costs = man hours x labor rate

Machine costs = machine hours x machine rate
```

Depending on the method used to calculate overhead costs (set via the Operation Rates (ticpr1150m000) session), LN calculates the overhead costs on the basis of the man-hours or machine-hours. This is done using the following formula:

```
Overhead costs = man-hours or machine-hours x overhead rate
```

According to the direct costing principle, no overhead costs are included in the cost calculation code.

The operation costs for the operation comprise labor, machine, and overhead costs.

If the **Type of Operation Rates** field is **Task Relationship Rate**, LN reads the task's operation rate code and goes through the same cycle, as described above.

Cost calculation of purchased items

The total costs of a purchased item is the sum of the purchase costs, plus surcharges. Both are regarded as added cost (refer to Added costs).

The price calculation code lists, by priority, the type of purchase price used for cost calculation. The current and average purchase prices are retrieved from the Items (tcibd0501m000) session. The simulated purchase price is retrieved from the Simulated Purchase Prices (ticpr1170m000) session.

Surcharges are applied to the purchase price. Because the total costs equal the added cost, surcharges of the methods added costs and total costs result in the same amount.

Calculating Standard Cost and Actualizing Cost Component Scheme

To calculate standard cost and to actualize cost component structures, complete these steps:

1. Calculate standard cost for all your defined purchased items and manufactured items. Validate that LN calculates the standard cost accurately. You can use the Calculate Standard Cost (ticpr2210m000) session to automatically calculate the standard cost.

2. Actualize cost component structures for the defined <u>generic</u> and <u>FAS items</u>.

Defining assembly line costing data

Use the Assembly Line Costing Data (ticpr0115m000) session to store costing data that is related to an assembly line, or to a combination of an assembly line and an item. You can enter a cost component scheme to post costs on a detailed level. In the **Standard Cost Component Scheme** field, you can enter a scheme to which detailed cost components are linked.

If a cost component scheme is defined for an assembly line, costs are posted on the detailed cost components in the scheme. If the **Standard Cost Component Scheme** field is empty, all costs are posted to the aggregated cost components.

If the **Transaction Processing** field in the Assembly Control Parameters (tiasc0100m000) session is **Line Station Based**, you can enter costing data for an assembly line.

If the **Transaction Processing** field is **Order Based**, you can enter costing data for a combination of an assembly line and an item.

Actualizing assembly line costing data

Use the Assembly Line Costing Data (ticpr0115m000) session to actualize the assembly line costing data, which results in an effective cost component structure by assembly line and item.

The effective cost component structure contains the aggregated cost components that are defined for the item in the Items - Costing (ticpr0107m000) session. If you entered a chart for an assembly line, the detailed cost components that were defined for the chart are included in the effective cost component structure.

You can view the effective cost component structure in the Effective Cost Component Structure by Assembly Line and Item (ticpr3162m000) session. In the **Effective Date** field, the date on which the assembly line costing data is actualized is displayed.

Note

You must actualize the costing data for all lines that are part of your assembly line model.

Defining assembly line surcharge data

Use the Assembly Line Surcharges (ticpr1180m000) session to define surcharges for an assembly line. Surcharges are extra costs in an item's standard cost or valuation price, for example, handling costs or inspection costs. A surcharge serves as a discount if the amount or percentage entered is a negative value. If you use order-based transaction processing, surcharges are defined for a combination of an assembly line and an item. If you use line-station-based transaction processing, surcharges are defined for an assembly line. You cannot define a fixed surcharge amount for assembly-line-based transaction processing. The surcharges are posted to the assembly line when the line is closed. For order-based-transaction processing, the surcharges are posted to the assembly line by order.

Note

If the **Transaction Processing** field in the Assembly Control Parameters (tiasc0100m000) session is set to **Order Based**, you can enter surcharges for a combination of assembly lines and generic items.

If you select the **Line Station Based** option in the **Transaction Processing** field of the Assembly Control Parameters (tiasc0100m000) session, you can enter only surcharges for an assembly line.

Actualizing assembly line surcharges

Use the Actualize Assembly Line Surcharges (ticpr2280m000) session to actualize the assembly line surcharges and the assembly line surcharge bases. Effective assembly line surcharges and effective assembly line surcharge bases are created, which are used in assembly line costing. The effective date is the date on which the process is run. You can display the effective assembly line surcharges in the Effective Assembly Line Surcharge (ticpr3150m000) session. You can display the effective assembly line surcharge bases in the Effective Assembly Line Surcharge Base (ticpr3160m000) session.

Select your assembly line from the assembly line's from-to range. For other options, you can use default settings. Click **Actualize** to continue.

Note

You must actualize the surcharges for all lines that are part of your assembly line model.

Example of standard cost and valuation price calculation

This example describes how standard costs and valuation prices are calculated related to surcharges, defined on item level and on warehouse level. The difference between variable and fixed costs is ignored in this example.

In this example, item A has material costs of 10 dollars and operation costs of 6 dollars. Item A has been linked to warehouse 001 (in the general item data). The surcharges are defined as follows:

Surcharge sequence	1	2	3	4	5	6
Item	A	A	A	A	A	A
Warehouse	...	...	001	001	002	002
Realization moment	receipt	issue	receipt	issue	receipt	issue
Surcharge	2	4	3	5	1	6

Standard cost

The standard cost is the sum of the following:

- **Standard costs**
  All nonsurcharges
- **Valuation price on receipt in warehouse**
  All surcharges that are linked to the nonspecific warehouses (surcharges 1 and 2)
- **Valuation price on issue from warehouses 001 and 002**
  All surcharges that are linked to the standard warehouse 001 of the item (surcharges 3 and 4)

This results in the following calculation:

Nonsurcharges	16	(material and operation costs)
Nonspecific surcharges	6	(surcharge 1, 2)
Specific surcharges	8	(surcharge 3, 4)
Standard cost	30 dollar	

Item A is a material of item B. If item A is linked to item B in the BOM. The BOM warehouse is 003. To calculate the standard cost of main item B, the material costs of item A and the surcharges of BOM warehouse 003 are taken into account. The surcharges of item A's standard warehouse 001 are *not* used.

Valuation price (receipt)

The receipt valuation price is the sum of the following:

- **Standard Costs**
  All nonsurcharges
- **Valuation price on receipt in warehouse**
  All receipt surcharges that have not been linked to specific warehouses
- **Valuation price on issue from warehouses 001 and 002**
  All receipt surcharges that have been linked to the specific warehouse

This results in the following calculation:

warehouse	001	002
Nonsurcharges	16	16
Nonspecific receipt surcharges	2	2
Specific receipt surcharges	3	1
Receipt valuation price	21 dollar	19 dollar

Valuation price (issue)

The issue price of an item in a warehouse is the sum of the following:

- **Standard Costs**
  All nonsurcharges
- **Valuation price on receipt in warehouse**
  All receipt surcharges that have not been linked to specific warehouses
- All receipt surcharges that have been linked to the specific warehouse
- **Valuation price on issue from warehouses 001 and 002**
  All issue surcharges that have not been linked to specific warehouses
- All issue surcharges defined for that specific item/warehouse

This results in the following valuation and issue prices for item A in warehouses 001 and 002:

Warehouse	001	002
Nonsurcharges	16	16
NonSpecific receipt surcharges	2	2
Specific receipt surcharges	3	1
Nonspecific issue surcharges	4	4
Specific issue surcharges	5	6
Issue price	30 dollar	29 dollar

Calculating Sales Prices

The sales price is based on the cost plus method. The basis is a cost calculation according to a specified cost-calculation code. On top of the calculation code you must enter a sales price calculation code. This is the code under which specific sales price surcharges are stored. As a result, the standard costs are added to the sales prices surcharges.

Note

- Fixed costs are included in the sales price if the **Include Fixed Costs in Sales Price** check box is selected in the Standard Cost Calculation Parameters (ticpr0100m000) session.
- Simulated retail prices and simulated sales prices for standard items are stored. These prices can be used to establish of a customer sales price or a retail price.
- You cannot calculate the sales prices for customized items or standard to order items.
-

You can actualize the sales price in the Items - Sales (tdisa0501m000) details session. In this session simulated retail prices and simulated sales prices for standard items are stored. These prices can be used to establish a customer sales price or a retail price.

Use the Calculate Item Sales Prices by Project (tipcs2241m000) session to calculate the sales prices for budgeted items.

INCLUDE: baanerp_ti_onlinemanual_100013 Intermediate Results Calculations

Chapter 3

<div style="text-align: right">3</div>

Calculating Estimated Cost and Valuation Prices by project

Specify the range of projects and/or calculation groups for which you want to calculate the simulated standard costs or valuation prices. In the Calculate Standard Costs by Project (tipcs3250m000) session you can change the simulated price into an actual price.

For the calculation of estimated prices for customized items all items in the project are calculated. As a result the standard cost is always calculated according to the top-down method. So the order quantities for the components are derived from the end item quantity.

Procedure for Interim Revenue Recognition in Project Control

This topic describes the steps to calculate interim COGS and interim revenue for a PCS project.

Step 1: Project Details (tipcs2130m000)

In the Project Details (tipcs2130m000) details session, you must determine in the **Percentage of Completion Calculation Method** field which method is used to calculate the Percentage of Completion (POC) of the PCS project. The selected POC is used to calculate the interim COGS and revenue.

In the Project Control Parameters (tipcs0100m000) session, you can also select a POC method. This method is used as a default value in the project details of PCS projects that are generated from a sales order line by using the Generate (Project PCS) Structure for Sales Orders (tdsls4244m000) session.

Step 2: Calculate Interim COGS and Revenues by Project (tipcs3290m000)

To actually calculate interim COGS and revenues for one or more PCS projects, you must run the Calculate Interim COGS and Revenues by Project (tipcs3290m000) session. LN carries out the following steps:

1. The actual costs for the PCS project are calculated until the **Reference Date**, but the actual standard costs are not overwritten.
   - If the **Perform estimated cost calculation** check box is selected, the estimated standard cost for the PCS project is calculated. The estimated standard cost of the PCS project is based on the standard costs of items linked to the project, with the project quantity taken

into account, the estimated surcharges, and the estimated standard cost of the activities. Estimated costs for the PCS project that were already calculated, are overwritten.

- If the **Perform estimated cost calculation** check box is cleared, the estimated project costs are not calculated but they are taken from the Standard Cost by Project (tipcs3560m000) session.

2. Actual hours are calculated. Project hours can originate from the PCS project, the PCS activities, JSC production orders, and service orders. If interim revenues and COGS for a specific project are determined for the first time, the estimated hours need to be entered manually in the Interim COGS and Revenues by Project (tipcs3190m000) session. The reason is that hours for JSC, service, and PCS cannot be estimated. Only using the estimated activity hours would be misleading. If you calculate interim COGS and revenue in subsequent periods, the number of hours is used that you entered manually the first time.

3. The estimated and actual COGS/revenues are determined. The sum of the most recent estimated revenues for sales, service, and warehousing is calculated. Furthermore, the sum of actual revenues is determined, and the sum of actual COGS for the PCS project, and the related sales orders, service orders, and warehousing orders.

4. The percentage of completion (POC) for the PCS project is calculated based on the method you chose in the **Percentage of Completion Calculation Method** field in the Project Details (tipcs2130m000) session. If you selected **POC (manual)** as POC method in the Project Details (tipcs2130m000) session, you can indicate in the **Stage of Completion** field the percentage of the work on the PCS project that is completed.

5. The **Interim COGS** and **Interim Revenue** are calculated.

Step 3: Interim COGS and Revenues by Project (tipcs3190m000)

You can view the calculated COGS and revenue in the Interim COGS and Revenues by Project (tipcs3190m000) session. Some of the calculated amounts and the POC percentage, you can adjust manually. For every PCS project one or more interim COGS/revenues can be listed.

From the appropriate menu, or with the buttons, you can handle the rest of the interim COGS and revenue procedure. This described in the next steps of the procedure.

Step 4: COGS by Cost Component (tipcs3191m000)

If for a PCS project the **Post Interim COGS and Revenues by Cost Component** check box in the Project Details (tipcs2130m000) details session is selected, you can view in the COGS by Cost Component (tipcs3191m000) session how the COGS is distributed over cost components. You must start this session from the appropriate menu of the Interim COGS and Revenues by Project (tipcs3190m000) session, or by clicking **Cost Components**.

If the interim COGS and revenue are not yet confirmed and/or posted, you can still modify the estimated costs and the confirmed interim COGS.

Step 5: Confirm interim COGS and revenue

After viewing and adjusting data in the Interim COGS and Revenues by Project (tipcs3190m000) session and/or the COGS by Cost Component (tipcs3191m000) session, you can confirm the data by clicking (de-) Confirm in the Interim COGS and Revenues by Project (tipcs3190m000) session. If after confirming, you still want to make changes, you can click (de-) Confirm again to deconfirm the data.

To confirm interim COGS and revenue, you can also start the Confirm and Post Interim COGS and Revenues by Project (tipcs3291m000) session, select the **Confirm Interim COGS and Revenues** check box, and run the session. Confirm and Post Interim COGS and Revenues by Project (tipcs3291m000)

Step 6: Post interim COGS and revenue

After confirming, the interim COGS and revenue must be posted to the General Ledger module in Financials. In the Interim COGS and Revenues by Project (tipcs3190m000) session, start the Confirm and Post Interim COGS and Revenues by Project (tipcs3291m000) session from the appropriate menu, or click **Confirm & Post**. Select the **Post Interim COGS and Revenues** check box, and run the session.

Displaying Item Standard Cost Details

Depending on how the cost structure is defined, you can use aggregated cost components and detailed cost components to report standard cost. The cost components that are listed in this session depend on the item's cost structure. For more information, refer to *Cost components in Manufacturing (p. 8)*.

The costs of the item can be broken down into variable costs and fixed costs. The added amounts (**Added AmountFixed** and **Added AmountVariable**) express the costs connected with the cost components for the item displayed in the session's header. If a cost component is not only used for the item displayed in the header, but also for some component items in the item's BOM structure, the costs connected to that cost component are expressed in the total amount columns (**Total AmountFixed** and **Total AmountVariable**).

Listing Costing Items

To add or change item costing data, start the Items - Costing (ticpr0107m000) details session. In the details session you can define and maintain the item's cost components and can calculate and view the item's standard cost.

Note

If you have started this session by zooming, you can only find and select a record. You can create new items in the Items (tcibd0501m000) session.

If the **Calculate and Actualize from Items - Costing Session Allowed** check box in the Standard Cost Calculation Parameters (ticpr0100m000) session is selected, you can calculate and actualize an item's standard cost and valuation price directly from this session.

To calculate and actualize an item's standard cost and valuation price, select the record, and click Actualize Cost Comp Structure for Configurable Item in the Items - Costing (ticpr0107m000) session.

Production order postings

During manufacture various costs are incurred that are posted to the production order. Different parts of production generate different costs.

- **Material Costs**

  Materials are issued against Valuation prices. The valuation price is stored on the actual WIP value on the aggregated cost components. The costs are labeled as non-added costs.

  When LN issues materials, a moving-average unit cost (MAUC) price is booked. The MAUC price in the Estimated vs. Actual Material Costs (ticst0501m000) session is the actual standard cost for the material line.

  JIT items are directly received in WIP without passing a warehouse. Special financial transactions exist for these items to enable direct receipt and billing on use. For these type of transactions the purchase result (when FTP valued item) is also entered into WIP.

  The postings for materials costs are done for the following origin/financial transactions:
  - Production/Issue
  - Production/Issue direct receipt
  - Production/Purchase result direct receipt

- **Operation costs**

  Operations cost can be split up in two parts:

  - **Hours costs**

    In the Estimated vs. Actual Hours Costs (ticst0502m000) session, the cost per operation are displayed.

    The actual hour costs are posted and processed from People. If the **Process Hours using** field in the Production Order Parameters (tisfc0100s000) session is Estimated rates, the hours cost are calculated by using the operation rate and the cost component from the Standard Cost Calculation module.

    If the **Process Hours using** field in the Production Order Parameters (tisfc0100s000) session is man and machine rates, the hours costs are calculated by using rates and cost components from the machine data in the Machines (tirou0102m000) session and the employee data in the Items (tcibd0501m000) session.

    The hours costs are disaggregated to labor costs, machine costs and overhead costs. For the posting of the overhead, LN checks the **Cover Labor Overhead Costs in Employee Department** check box in the People Parameters (bpmdm0100m000) session.

    The postings are generated on the moment of process hours accounting. The number of hours can be:
    - Entered manually
    - Generated by backflushing

    The operations costs are posted to the calculation office or to the enterprise unit of the work center. The postings for operations cost are done for the following transaction origin/financial transactions:

    - Production
    - Operation costs

Hours are posted against the detailed cost components that are defined in the operation rates. Price and <u>efficiency variances</u> are calculated based upon these detailed cost components.

- **Subcontracting costs**

  LN considers subcontracting as the purchasing of a subcontracting item. The purchase order price of the subcontracting item is calculated by using the subcontracting calculation method and the rate factor in the Standard Cost Calculation module.

  The postings are generated the moment when you receive the subcontracted intermediates and are posted to the JSC calculation office or to the enterprise unit.

  The subcontracting result is determined by comparing the estimated and the subcontract price. So the purchase order price and the actual amount on the purchase invoice are compared. Before you close the production order the purchase orders, generated for subcontracting operations must have been processed. If the order estimate does not contain any costs for subcontracting, you cannot determine subcontracting results.

  Both operation hours and subcontracting costs are regarded as operations costs.

- **WIP transfers**

  Work in process of a production order must be recorded at the work center where the actual work for the order took place. WIP transfers allow costs to be assigned to the right work centers.

- **Production surcharges**

  The surcharges related to the production orders are the item receipt surcharges. Surcharges are always posted to the <u>calculation office</u> and are considered as production WIP. The surcharges are posted when the order is completed. Surcharges are based upon the estimated order costs. Upon order closing, the actual order costs, the actual surcharges are calculated. Surcharges are always calculated and posted on the production order level by means of detailed cost components.

- **Production completion and receipt in inventory**

  The following phases can be distinguished:
  - Report a quantity completed
  - Report the order completed
  - Receive the items in the warehouse

  If the items are reported completed, LN activates a warehouse order. A warehouse order can have a certain inbound procedure. As a result there can be a time lag between the moment reporting completed and the moment the items are posted to the warehouse. This time lag reflects the WIP values.

  If a quantity of items are reported completed, these items are posted to the calculation office. A WIP transfer is carried out from the last operation/work center to the calculation office. The reported quantity stay on the calculation office until they are received in the warehouse. Upon receipt in the warehouse the WIP on the calculation office is decreased with the FTP value (minus warehouse receipt surcharges). Both postings are based upon the three aggregated cost components of the end item. The postings are carried out for the following transaction origin/financial transactions: Production. Completion Production. Receipt

  First the item is posted to stock with the FTP value. Because you do not know the actual production order cost the actual item (unit) costs cannot be calculated. The actual order costs are determined upon order closure.

- **Price, efficiency, and calculation variances**
  LN calculates a price variance, an efficiency variances and a calculation variances during the:
  - Closing of an operation
  - Intermediate calculation of production results
  - Closing of a production order

Calculate estimated end item unit costs of a production order

The end item unit costs are the planned costs of one end item for a specific production order. LN calculates the end item unit costs by means of the estimates for hours and materials (item surcharges included). The calculation of estimated end unit costs of a production order is described in the following paragraphs.

LN calculates the estimated end unit costs when:

- You change the production order status.
  Depending on the value of the **Moment Freezing Estimates** field in the Production Order (tisfc0101s000) session, LN calculates the estimated end unit costs as follows:
  - **During Creating Order**: When the production order is planned.
  - **During Releasing Order**: When the production order is released.
  - **Before First WIP Transaction**: Before the first WIP transaction is carried out.
- You use the Calculate Estimated End Item Unit Costs (ticst0210m000) session.
- You use the Print Differences between Frozen and Current Estimated Costs (ticst0411m000) session. If you use this session, the costs are only printed, not stored.

If you print the differences between the current estimates and the previous calculated values in the Print Differences between Frozen and Current Estimated Costs (ticst0411m000) session, LN calculates the estimated unit costs.

The operation costs and the material costs are determined when you create the production order. The operation costs and the material costs of the end item are calculated when the costs are frozen. The data in the Estimated vs. Actual Material Costs (ticst0501m000) and Estimated vs. Actual Hours Costs (ticst0502m000) session are already filled at this moment. LN does the following when you calculate the estimated end-item unit costs:

Step 1: Determines the operation costs

By means of the Estimated vs. Actual Hours Costs (ticst0502m000) session, LN determines the operation costs per end-item unit by using the production times and the operation rates. LN calculates the operation rates based on the total costs of wages, machines, and overhead.

LN stores the operation costs on the cost components. The operation costs are calculated per end-item unit end product. If results are calculated per work center (see the **Financial Transactions by Work Center** field in the Production Order Parameters (tisfc0100s000) session), LN calculates the costs per work center. The costs are aggregated in the item-based view of the calculation office by using the aggregated cost components.

Step 2: Calculates the material costs

LN determines the required materials stored in the Estimated vs. Actual Material Costs (ticst0501m000) session. By means of the standard cost, LN calculates the material costs per component.

The standard cost includes the warehouse-related surcharges assigned to the item. If the material is linked to another warehouse, you must change the warehouse surcharge part to this warehouse.

If the work center where the material is issued, is stored as a job shop warehouse, the job shop warehouse-related surcharges must be taken.
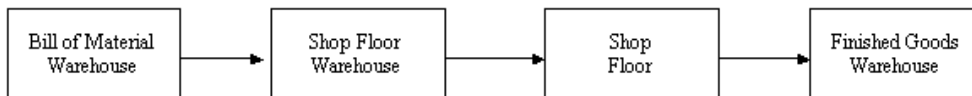
LN allocates the material to the job shop warehouse during the release of the order. Even if the calculation is carried out when the order status is not yet released, LN determines the job shop warehouse surcharge. If the material is of Direct Receipt in WIP type, no warehouse surcharge is determined.

If the standard cost is not calculated for a material, LN does not determine material costs.

If you calculate the estimated end unit costs by means of the Calculate Estimated End Item Unit Costs (ticst0210m000) session, you can select the **Check Existence of Material Standard Costs** check box. If this check box is selected, LN checks whether all material standard costs are available so that LN can make a correct estimation.

Step 3: Calculates the end-item surcharges

After all material and operation costs are calculated, LN calculates the surcharges. The surcharges are calculated in the sequence (item group, item and warehouse level) as defined in the Standard Cost Calculation module.

Step 4: Calculates transfer prices

The WIP transfers can only be calculated when, in the Production Order Parameters (tisfc0100s000) session, the **Financial Transactions by Work Center** checkbox is selected and the **Transfer WIP method** is **Always** or **Only upon Completion**. The calculated price is the incremental price up to the last operation of the delivering work center.

Example

Work Center 1

	operation 10	operation 20
yield %	100	50
qty plan in	200	200
qty plan out	200	100
net mat per 10 pcs	1 pcs	3 pcs
estimated material qty	20 pcs	60 pcs
cost per pcs	$ 5	$ 10
total costs	$ 100	$ 600
per pcs, per work-center	$ 1.00	$ 6.00

Quantity Ordered = 100 pcs

Work Center 2

	operation 30
yield %	100
qty plan in	100
qty plan out	100
net mat per 10 pcs	2 pcs
estimated material qty	20 pcs
cost per pcs	$ 6

total costs	$ 120

per pcs, per workcenter	$ 1.20

The transfer price from work center 1 to work center 2 =

```
($100 + $600) / 100 = $7.00
```

The transfer price from work center 2 to calculation office =

```
 $7.00 + $1.20= $8.20
```

The base for calculation are all cost components of material and operation costs. The amounts are aggregated together and stored in a transfer price on the transfer component **WIP Transfer Cost Component** that is defined in the Production Order (tisfc0101s000) session.

Refer to the Help of the JSC Financial Transactions (ticst3500m000) session and the PCS Financial Transactions by Transaction Origin and Financial Trans. (tipcs3500m000) session for details about financial transactions.

Displaying Estimated vs. Actual Hours Costs

If the **Process Hours using** field in the Production Order Parameters (tisfc0100s000) session is **Estimated Operation Rates**, the hours cost are calculated by using the operation rate, and the cost component from the Standard Cost Calculation module.

If the value of the **Process Hours using** field in the Production Order Parameters (tisfc0100s000) session is **Actual Man and Machine Rates**, the hours costs are calculated by using rates and cost components from the machine data in the Machines (tirou0102m000) session, and employee data from the Items (tcibd0501m000) session.

The hours costs are disaggregated to labor cost, machine cost, and overhead cost. For posting the overhead, LN checks the **Cover Labor Overhead Costs in Employee Department** parameter in the People Parameters (bpmdm0100m000) session.

The postings are generated on the moment of Process Hours Accounting. The number of hours are:
- Entered manually
- Generated by backflushing
- Entered with direct time recording

The operations costs are posted to the calculation office or to the work center's enterprise unit. The postings for operations costs are done for the following transaction origin/financial transactions:
- Production
- Operation costs

Hours are posted against the detailed cost components that you have defined in the operation rates. Price and efficiency variances are calculated based on these detailed cost components.

Note

If you have started Estimated vs. Actual Hours Costs (ticst0502m000) by zooming, you can only find and select a record.

Calculation of cost/valuation prices for standard/customized/STO items

An item's standard cost is a calculated price that provides an estimation of the item's value. The standard cost of a manufactured item consists of material costs, operation costs, and end-item surcharges. For more information, refer to *Standard cost (p. 16)*.

Note

If multisite functionality is active, standard cost is calculated per combination of item and enterprise unit.

Use the Calculate Standard Cost (ticpr2210m000) session to calculate standard costs and valuation prices. Depending on the value of the **Standard Cost Calculation Method** field, LN determines how the product structure is analyzed during cost calculation. For more information, refer to *Cost calculation methods (p. 21)*.

A price calculation code stores the price calculation data that is used to calculate the cost. The standard price calculation code specified in the Standard Cost Calculation Parameters (ticpr0100m000) session stores data to calculate the standard cost. Other price calculation codes store the data for simulation purposes. For more information, refer to Cost Calculation Code.

The topic below describes a single-level cost calculation by ERP for items of the following types:
- Standard items
- Customized items
- Standard-to-order (STO) items

The costs of a routing's last operation are calculated first. After that, the previous operations are calculated, one by one. For a schematic overview refer to Cost calculation flow chart.

Calculation of Estimated Material and Hour Cost in Repetitive Manufacturing

Estimated material and hour cost are calculated based on the period defined in a work cell cost document. In the cost document interval schedule lines are planned, or active during shifts. The calculation date for the estimates can be any date and time in the cost document period.
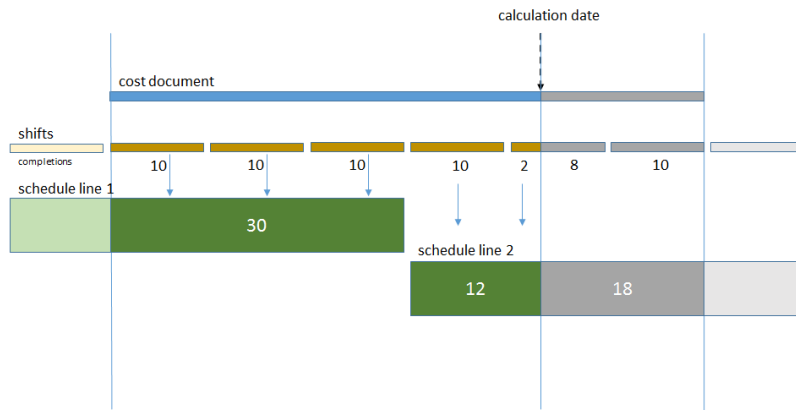
Part of the production for schedule line 1 takes place in the cost document interval, 30 units are produced in three shifts. The material and labor costs estimates are calculated, based on standard cost of the produced item.

The estimated costs for schedule line 1 are based only on *actual* produced quantity that falls in the cost document interval, because all production for schedule line 1 was completed before the calculation date.

Part of the production for schedule line 2 falls in the cost document interval, but production will continue after the cost document interval end. The calculation is performed while a shift is in progress. In the figure, one shift is completed and 2 units reported complete on an active shift before the calculation date. Based on the 12 units completed, the amount of materials and labor cost is estimated, using standard cost as the basis.

The above calculations account for the estimates based on the *actual produced* quantity. The expected production for the remaining shifts is calculated from the remaining available production hours and the production rate of the used production model.

The expected quantity of future production is 18 units. This quantity is used to calculate estimated costs based on *expected production.*

The total cost estimated for schedule line 2 is the sum of estimated cost based on *actual* production and the *expected* production.

Note

- At any time before or after the interval of the cost document, the calculation may be executed. As time progresses, the actual and estimated quantities carry over.
    - At the start of the cost document interval the complete view is based on estimated production.
    - At the end of the interval it is based on actual production.
- Calculated estimates may vary considerable due to changes in the schedule line planning on the work cell during the cost document interval.
- When the cost document is closed, The (final) calculation on a cost document is done using the end date of the cost document interval as the calculation date. The estimates are based completely on actual production.

COGS and revenue postings for PCS projects in a multisite environment

If you work on a PCS project in a multisite environment where sales offices, service departments, and warehouses belong to different financial companies, you can choose where financial transactions for PCS related COGS and revenues must be posted:

- **On the financial company of sales office, service department, and/or warehouse**
  You can choose to use the PCS project to monitor costs and for tracking purposes, while PCS related COGS and revenues are posted on the financial companies of the service department, sales office and/or warehouse. You must then clear the **COGS and Revenues restricted to Financial Company of PCS Project** check box in the Project Control Parameters (tipcs0100m000) session.

- **On the financial company of the PCS project**
  You can choose to post all PCS related COGS and revenues on the financial company of the PCS project's calculation office. As a result, the financial departments of sales orders, service orders, and warehouse orders must be in the same financial company as the PCS calculation office. You must select the **COGS and Revenues restricted to Financial Company of PCS Project** check box in the Project Control Parameters (tipcs0100m000) session if you want to post PCS related COGS and revenues on the financial company of the PCS project's calculation office.

If PCS related COGS and revenues are posted on the sales office, service department, or warehouse instead of on the PCS project's calculation office, which means that the **COGS and Revenues restricted to Financial Company of PCS Project** check box in the Project Control Parameters (tipcs0100m000) session is cleared, you must allow for the following:

COGS distribution

The general COGS is distributed among several departments instead of only on the PCS project's calculation office. You must use the **COGS Distribution based on** field in the Project Control Parameters (tipcs0100m000) session to choose whether you want to enter the COGS distribution manually, or that LN calculates the COGS distribution based on the revenue of the sales order, service order, and/or warehouse order. Use the Project COGS Distribution (tipcs3110m000) session to view and maintain the COGS distribution.

> **Note**
>
> The general PCS *results* are always posted on the PCS calculation office, because they are assumed to be always related to the PCS calculation office.

Revenue recognition

If you calculate interim COGS and revenues for a PCS project, and the PCS project has sales orders, service orders, and warehouse orders linked to several financial companies, the calculated COGS and revenues are distributed among various departments. You can view the distributed COGS and revenues by department in the COGS and Revenues by Project and Order (tipcs3192m000) session.

> **Note**
>
> If COGS and revenues for a PCS project are restricted to the financial company of the PCS project, which means that the **COGS and Revenues restricted to Financial Company of PCS Project** check box in the Project Control Parameters (tipcs0100m000) session is selected, the interim COGS and revenues are posted to the PCS calculation office. The 'real' COGS and revenues, however, are posted to sales offices, service departments, and warehouses.

Internal invoices

If financial transactions are posted on the financial company of a sales office, service department, and/or warehouse, you can also send an additional invoice for general COGS from the PCS project to the sales office, service department, or warehouse. For this purpose, you must define an intercompany trade relationship between the PCS project and the sales office, service department, or warehouse in the Intercompany Trade Relationships 360 (tcitr2300m000) session.

In Invoicing (SLI) and Accounts Payable (ACP), the general COGS on the internal invoice is indicated by a cost item. You must define a default cost item in the Project Control Parameters (tipcs0100m000) session. Furthermore, PCS project order number is specified on the internal invoice, which is generated based on the number group and series that are defined in the Project Control Parameters (tipcs0100m000) on the **Settings for COGS** tab.

> **Note**
>
> Internal invoices are optional. You can have financial transactions posted to the correct financial company without internal invoice.

Chapter 4

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Printing Project Costs and Revenues

- If the report type is **Actual**, only actual costs and revenue are printed.
- If the report type is **Interim and Actual**, actual costs and revenue as well as interim amounts are printed. If revenue recognition functionality is used for PCS projects, this report type provides overviews.

If you select the **Include Costs and Revenues from Sub Projects in Main Project** check box, the costs of goods sold (COGS) and revenue are printed for main projects as well as for subprojects.

If you select report type Actual, you can choose to print several types of reports. These report types are listed below. Financial transactions for these reports are read from table tipcs300, PCS WIP and Inventory Transactions. Financial transactions can be viewed in the PCS Financial Transactions by Transaction Origin and Financial Trans. (tipcs3500m000) details session.

- **Project Costs and Revenues (Detailed)**
  This type of report gives a detailed overview of the project costs and revenues directly related to the PCS project, sales orders, service orders, and warehouse orders. The following data is included in the report:

  - **PCS related**
    Financial transactions with transaction origin **Project (PCS)**: **Cost of Goods Sold** and **Additional Cost of Goods Sold**.

    The expected and realized gross profit equal the COGS, multiplied with -1.

  - **Sales/Service related**
    The **Cost of Goods Sold** financial transactions for the transaction origins **Sales Order** and **Service Order**. For sales, the expected revenue is based on the amount on the sales order that is linked to the PCS project. In the report, the realized revenue is split in Goods Invoiced and Invoiced Installments not Settled.

    Based on the revenue and COGS, the gross profit is calculated as follows:

    - ```
      Expected Gross Profit = Expected Revenue -/- Costs
            of Goods Sold
      ```

-
  ```
  Realized Gross Profit = Realized Revenue -/- Costs
        of Goods Sold
  ```

-
  ```
  To be Invoiced = Expected Revenue -/- Realized
        Revenue
  ```

- **Warehousing related**
  In the report, a split is made between warehouse transfers with invoicing and warehouse transfers without invoicing. For orders *with* invoicing, the COGS are determined in the same way as they are determined for sales and service orders. For orders *without* invoicing, the COGS are based on the issue transactions, and the revenues on receipt transactions. The expected revenue is based on order amount.

- **Project Costs and Revenues (Summarized)**
  If you choose to print a summarized report for project costs and revenues, only one line per project is printed. However, the underlying calculations are done in the same way as for the detailed report.

- **Project Costs (Summarized)**
  This report prints the COGS for each project. The costs of goods sold are split into parts related to:
  - Project
  - Sales
  - Service
  - Warehouse (transfers with invoicing)
  - Pseudo COGS for Warehousing (transfers without invoicing)

- **Project Revenues (Summarized)**
  This report prints the revenues for each project. The revenues are split into parts related to:
  - Sales
  - Service
  - Warehouse (transfers with invoicing)
  - Pseudo COGS for Warehousing (transfers without invoicing)

Calculating Item Sales Prices by Project

To calculate the sales price of the item LN:

1. Retrieves the standard cost of a budget item from the Standard Cost by Customized Item (tipcs3550m000) session.

2. Adds the surcharges to these costs, if you selected the **Item Sales Surcharges** check box. Also, depending on the value of the **Budget Surcharges** check box the budget surcharges will be added to the costs.

3. Updates the sales price when the new amount is different to the old amount and not equal to zero.

Standard Cost Calculation by Project

You can make a simulated standard cost for all project types. During a simulation, LN calculates, and updates the standard costs of customized items in the Standard Cost Calculation module. In the Project Control module, inventory is not revalued and the project price and the customized item price are not updated.

You can perform:

- Simulated standard cost calculations
- Estimated standard cost calculations
- Actual standard cost calculations

The following steps are taken if an estimated calculation of the standard cost is calculated:

Step 1:

LN calculates the standard cost of all customized items. The standard costs are updated in the Standard Cost Calculation module.

Note LN calculates the standard cost of customized items by using the cost calculation code of the project. This code is stored in the Projects (tipcs2101m000) session.

Step 2:

LN revalued inventory for all warehouses with the standard cost valuation method.

Note Budgets do not have inventory.

Step 3:

LN updates the standard costs of all customized items of the current project in the Project Control module.

Note For budgets, LN uses the data as stored in the Item - Standard Cost Details (ticpr2505m000) session. For other project types, LN uses the data as stored in the Item - Standard Cost Details (ticpr3505m000) session.

Step 4:

LN calculates the estimated project costs. Estimated project costs consist of the following costs:

- Item costs of all project parts in the Project Parts (tipcs2111m000) session. For standard project parts, LN uses the standard cost that is valid on the date as entered in the **Freeze Standard Cost on Date** field of the Project Parts (tipcs2111m000) session. Standard parts are moved into the project on the three aggregated cost components. For customized parts,

the estimated item costs are calculated as described above. These are stored in the detailed cost component in the Standard Cost by Customized Item (tipcs3550m000) session.

Note Main projects do not have items assigned to them.

- Activity costs. Activity costs are produced if you perform activities as defined in the Activities (tipcs4101m000) session. The <u>operation rate code</u>, linked to the task or work center of the activity (dependent on the value of the **Type of Operation Rates** parameter in the Standard Cost Calculation Parameters (ticpr0100m000) session), is used to determine the activity costs. LN does not take activity costs into account if:
    - The **Engineering Allowed** check box in the Projects (tipcs2101m000) session is not selected.
    - The **Activity Estimation** check box in the Activities (tipcs4101m000) session is not selected.
- Estimated project surcharges. If no estimated surcharges are defined for a sub project, LN takes the surcharges assigned to the main project. When estimated project charges cannot be found for a specific project, LN determines the estimated general surcharges for projects.

LN does not take surcharges for projects into account when the **Engineering Allowed** check box in the Projects (tipcs2101m000) session is not selected.

- For a main project, the costs of all sub projects are added to the costs of the main project.

Step 5:

LN stores the estimated project costs in the Standard Cost by Project (tipcs3560m000) session.

For main, sub, and single projects, the budgeted costs are filled with the estimated costs of the linked budget (from which the project is derived). For a budget, the budgeted costs are always empty. Only the estimated costs are filled.

Step 6:

LN updates the last calculation date for projects of the Budget type.

> **Note**
>
> LN calculates the standard cost of customized items by using the cost calculation code of the project. This code is stored in the Projects (tipcs2101m000) session.

- **Standard to order items**
  If a <u>standard item</u> with the order policy <u>standard-to-order (STO)</u> item is linked to a <u>project</u>, the cost calculation program analyzes the complete standard to order structure.

  This complete standard to order structure is analyzed as if it were a customized item product structure. This product structure is then automatically exploded to the generic items level. This means that standard items made to order do not have to be included in the product structure to perform a correct calculation of material and operation costs.

As a result, any advantages resulting from batch production, in relation to setup costs, are not visible in the estimated project calculation. This applies if the same standard item made to order is linked to the project structure several times.

- **Standard phantom items**
  Comments referring to standard items made to order, also apply to standard phantom items linked to a project. The standard phantom structure is automatically analyzed by the cost calculation program. During this process, material and operation costs are included in the cost calculation of the project for phantoms. Comments made regarding batch production and lowering setup costs do not apply to phantoms.

Procedure for Interim Revenue Recognition in Project Control

This topic describes the steps to calculate interim COGS and interim revenue for a PCS project.

Step 1: Project Details (tipcs2130m000)

In the Project Details (tipcs2130m000) details session, you must determine in the **Percentage of Completion Calculation Method** field which method is used to calculate the Percentage of Completion (POC) of the PCS project. The selected POC is used to calculate the interim COGS and revenue.

In the Project Control Parameters (tipcs0100m000) session, you can also select a POC method. This method is used as a default value in the project details of PCS projects that are generated from a sales order line by using the Generate (Project PCS) Structure for Sales Orders (tdsls4244m000) session.

Step 2: Calculate Interim COGS and Revenues by Project (tipcs3290m000)

To actually calculate interim COGS and revenues for one or more PCS projects, you must run the Calculate Interim COGS and Revenues by Project (tipcs3290m000) session. LN carries out the following steps:

1. The actual costs for the PCS project are calculated until the **Reference Date**, but the actual standard costs are not overwritten.
   - If the **Perform estimated cost calculation** check box is selected, the estimated standard cost for the PCS project is calculated. The estimated standard cost of the PCS project is based on the standard costs of items linked to the project, with the project quantity taken into account, the estimated surcharges, and the estimated standard cost of the activities. Estimated costs for the PCS project that were already calculated, are overwritten.
   - If the **Perform estimated cost calculation** check box is cleared, the estimated project costs are not calculated but they are taken from the Standard Cost by Project (tipcs3560m000) session.
2. Actual hours are calculated. Project hours can originate from the PCS project, the PCS activities, JSC production orders, and service orders. If interim revenues and COGS for a specific project are determined for the first time, the estimated hours need to be entered manually in the Interim COGS and Revenues by Project (tipcs3190m000) session. The reason is that hours for JSC, service, and PCS cannot be estimated. Only using the estimated activity hours would

be misleading. If you calculate interim COGS and revenue in subsequent periods, the number of hours is used that you entered manually the first time.

3. The estimated and actual COGS/revenues are determined. The sum of the most recent estimated revenues for sales, service, and warehousing is calculated. Furthermore, the sum of actual revenues is determined, and the sum of actual COGS for the PCS project, and the related sales orders, service orders, and warehousing orders.

4. The percentage of completion (POC) for the PCS project is calculated based on the method you chose in the **Percentage of Completion Calculation Method** field in the Project Details (tipcs2130m000) session. If you selected **POC (manual)** as POC method in the Project Details (tipcs2130m000) session, you can indicate in the **Stage of Completion** field the percentage of the work on the PCS project that is completed.

5. The **Interim COGS** and **Interim Revenue** are calculated.

Step 3: Interim COGS and Revenues by Project (tipcs3190m000)

You can view the calculated COGS and revenue in the Interim COGS and Revenues by Project (tipcs3190m000) session. Some of the calculated amounts and the POC percentage, you can adjust manually. For every PCS project one or more interim COGS/revenues can be listed.

From the appropriate menu, or with the buttons, you can handle the rest of the interim COGS and revenue procedure. This described in the next steps of the procedure.

Step 4: COGS by Cost Component (tipcs3191m000)

If for a PCS project the **Post Interim COGS and Revenues by Cost Component** check box in the Project Details (tipcs2130m000) details session is selected, you can view in the COGS by Cost Component (tipcs3191m000) session how the COGS is distributed over cost components. You must start this session from the appropriate menu of the Interim COGS and Revenues by Project (tipcs3190m000) session, or by clicking **Cost Components**.

If the interim COGS and revenue are not yet confirmed and/or posted, you can still modify the estimated costs and the confirmed interim COGS.

Step 5: Confirm interim COGS and revenue

After viewing and adjusting data in the Interim COGS and Revenues by Project (tipcs3190m000) session and/or the COGS by Cost Component (tipcs3191m000) session, you can confirm the data by clicking (de-) Confirm in the Interim COGS and Revenues by Project (tipcs3190m000) session. If after confirming, you still want to make changes, you can click (de-) Confirm again to deconfirm the data.

To confirm interim COGS and revenue, you can also start the Confirm and Post Interim COGS and Revenues by Project (tipcs3291m000) session, select the **Confirm Interim COGS and Revenues** check box, and run the session. Confirm and Post Interim COGS and Revenues by Project (tipcs3291m000)

Step 6: Post interim COGS and revenue

After confirming, the interim COGS and revenue must be posted to the General Ledger module in Financials. In the Interim COGS and Revenues by Project (tipcs3190m000) session, start the Confirm and Post Interim COGS and Revenues by Project (tipcs3291m000) session from the appropriate menu, or click **Confirm & Post**. Select the **Post Interim COGS and Revenues** check box, and run the session.

Defining Cost Component Charts

If you link a chart to an item in the Items - Costing (ticpr0107m000) session, to an item group in the Items - Costing Defaults (ticpr0108m000) session, or to an assembly line in the Assembly Line Costing Data (ticpr0115m000) session, the detailed cost components that you define in this session are reported in the effective cost-component structure for a specific item.

In the Items - Costing (ticpr0107m000) session and the Assembly Line Costing Data (ticpr0115m000) session, you can choose from the appropriate menu to display the effective cost-component structure of the item. LN stores the effective cost-component structures by item and by date.

Making detailed cost components effective

LN stores the effective cost component structures by item and by date. Before you can see the latest changes to the detailed cost components in the Effective Cost Component Structure (ticpr3101m000) session, you must successively use the following sessions to actualize the cost components:

- Calculate Standard Cost (ticpr2210m000)
- Actualize Standard Cost and Revalue Inventory (ticpr2220m000)

Note

Instead of using the Actualize Standard Cost and Revalue Inventory (ticpr2220m000) session, you can also only use the Calculate Standard Cost (ticpr2210m000) session, and select the **Actualize Standard Cost and Revalue Inventory** check box.

Defining Assembly Line Surcharges

Surcharges are extra costs in an item's standard cost or valuation price, for example, handling costs or inspection costs. A surcharge serves as a discount if the amount or percentage entered is a negative value.

If you use order based transaction processing, surcharges are defined for a combination of an assembly line and an item.

If you use line station based transaction processing, surcharges are defined for an assembly line. You cannot define a fixed surcharge amount in case of assembly line based transaction processing.

The surcharges are posted to the assembly line when the line is closed. In case of order based transaction processing, the surcharges are posted to the assembly line by order.

You define a surcharge base if the surcharge calculation method for the assembly line surcharge is **Selective (Total Costs)** or **Selective (Added Costs)**. The surcharge calculation method is defined in the Assembly Line Surcharges (ticpr1180m000) session.

Chapter 5

5

Assembly Order Costing

Costing is a crucial aspect of the Assembly Control module. The manner in which costing is performed depends partially on how you define your cost components. Other aspects of costing that are described here are:

- Transaction-processing methods
- WIP transfers
- Calculation of final results
- Differences between Assembly Control module costing and Job Shop Control (JSC) module costing.
- Where to view financial data in the Assembly Control module.

Note

The aspects of financial costing that are described here have no relation to the theoretical, mathematical costs associated with line sequencing.

Cost components

There are three types of cost components:

- Materials
- Operations
- Surcharges

Cost components can be posted on an aggregated level, detailed level, or on a combination of aggregated and detailed level. When costs are posted on an aggregated level, all the costs for a cost component are combined into one sum, such as all the individual material costs being added into a single sum. To post cost components at a detailed level, you must define cost component charts. Detailed cost components result in a price structure in which all costs have been broken down.

Transaction-processing methods

The Assembly Control module is intended for use by companies that produce many variants of complex products in a flow-assembly line. Assembly Control can also be used for low-volume assembly if you

select **Order Based** transaction processing. Select your transaction-processing method in the **Transaction Processing** field in the Assembly Control Parameters (tiasc0100m000) session.

- Use **Line Station Based** transaction processing when you do not need to trace back to the original assembly order. Costs are posted to the assembly line. Results are calculated by period by assembly line.
- Use **Order Based** transaction processing when you want your costing performed on the basis of individual assembly orders. Costs are posted by order by assembly line. Results are calculated by order by assembly line.

WIP transfers

WIP transfers consist of:

- **Generating the transfer order**
  A WIP transfer generates a transfer order. However, if the transfer occurs between line stations that are in different logistical companies, a sales order and a purchase order are generated.
- **Performing the material issue**
  A WIP issue may unblock or immediately process the transfer warehousing order, dependent on your parameter settings. In multisite situations, the normal sales procedure must be followed in order to ship the goods.
- **Performing the receipt**
  A WIP receipt acknowledges the receipt of the WIP transfer order at a main assembly line that has received work from a supplying assembly line. Warehousing processes the inbound line automatically. If the assembly lines are from two different logistical companies, it is necessary to use sales orders and purchase orders (rather than WIP transfer orders). In multisite situations, the normal receipt procedure must be followed in order to receive the goods.

You can select whether you want these processes to occur automatically, semiautomatically, or manually.

Calculation of financial results

When you close an assembly line with the Close Assembly Lines (tiasc7220m000) session, the production results of the line are calculated. All the line station orders must have the status **Closed**. The financial results are the WIP transactions (which are estimated costs) minus the actual costs.

Differences between costing in Job Shop Control and Assembly Control

- In Assembly Control, the quantity completed is always one.
- There is no scrap and yield in Assembly Control.
- WIP transfers are only created between different assembly lines, and not between line stations (of the same line).
- There is no set-up time in Assembly Control.
- End item unit costs (estimated material costs and hours costs for an order) are not calculated for an assembly order. This is not necessary because each end item uses the same assembly line, so there is no point in creating separate surcharges for each item.

- In case of **Line Station Based** transaction processing, variances are calculated for an assembly order and not for a generic item.
- Production results are not split into price variances and efficiency variances in Assembly Control.
- Financial results in Assembly Control are posted to the cost component of the assembly line.

Where to view financial data in Assembly Control
- Financial Transactions (tiasc7510m000)
- Print Financial Transactions (tiasc7410m000)
- Print Financial Transactions by Assembly Line (tiasc7414m000)
- Print Costing by Assembly Order or Assembly Line (tiasc7411m000)

Defining Assembly Line Costing Data

You can enter a scheme to which detailed cost components are linked in the **Standard Cost Component Scheme** field of the Assembly Line Costing Data (ticpr0115m000) session.

- If a cost component chart is defined for an assembly line, costs are posted on the detailed cost components in the scheme.
- If the scheme is defined for the selected assembly line, the **Standard Cost Component Scheme** field remains empty, and all costs are posted to the aggregated cost components.

If the **Transaction Processing** field in the Assembly Control Parameters (tiasc0100m000) session is **Line Station Based**, you can enter costing data for an assembly line. If the **Transaction Processing** field in the Assembly Control Parameters (tiasc0100m000) session is **Order Based**, you can enter costing data for a combination of an assembly line and an item.

Note

Detailed cost components are defined for a chart in the Standard Cost Scheme Details (ticpr0110m000) session.

Validating Assembly Lines

The validate/actualize process checks assembly line model integrity.

For example, the validate/actualize process can check that:

- There are no divergent line structures and segments present.
- There is correct usage of cost components and calculation office.
- The definition of the line segment structure. For example, if it start with a buffer, connected in a chain and so on.
- The definition of the work centers. The supplying line must feed a line station on the main line.
- The definition of assignments is correct. For example, one or more active average and non-average assignments must be present.

- There must be no gaps in the assembly lines.
- There must be no loops in the assembly line cycles.
- There must be one <u>enterprise unit</u> present for each assembly line.

Start the Assembly Lines (tiasl1530m000) session:

1. Select the assembly line. Click **Validate** on the <u>appropriate</u> menu. The Validate Assembly Lines (tiasl1230m000) session starts.

   Note that clicking **Validate** is not a mandatory step. This step is automatically performed when you actualize the assembly lines, which is a step to be completed later on in the process. This intermediate **Validate** option allows you to check the assembly line structure.

2. Ensure that main line and supplying line are specified in the selection range.

3. Click **Validate**. Check the report. If the process runs without errors, LN sets the status of the assembly line structure to *Validated* for the main line and supplying lines.

4. Check that your lines have the Validated status. When a line is created/validated/actualized, lines undergo a change and are set/reset to the Modified status.

Actualizing Assembly Lines

Start the Assembly Lines (tiasl1530m000) session:

1. Select the assembly line. Click **Actualize** on the <u>appropriate</u> menu. The Actualize Assembly Lines (tiasl1231m000) session starts.

2. Click **Actualize**. Check the report. Analyze and correct issues, if required. If the process runs without errors, LN sets the status of the assembly line structure to *Actualized* for the main line and supplying line.

Calculating Standard Cost and Actualizing Cost Component Scheme

To calculate standard cost and to actualize cost component structures, complete these steps:

1. Calculate standard cost for all your defined purchased items and manufactured items. Validate that LN calculates the standard cost accurately. You can use the Calculate Standard Cost (ticpr2210m000) session to automatically calculate the standard cost.

2. Actualize cost component structures for the defined <u>generic</u> and <u>FAS items</u>.

Defining assembly line costing data

Use the Assembly Line Costing Data (ticpr0115m000) session to store costing data that is related to an assembly line, or to a combination of an assembly line and an item. You can enter a cost component scheme to post costs on a detailed level. In the **Standard Cost Component Scheme** field, you can enter a scheme to which detailed cost components are linked.

If a cost component scheme is defined for an assembly line, costs are posted on the detailed cost components in the scheme. If the **Standard Cost Component Scheme** field is empty, all costs are posted to the aggregated cost components.

If the **Transaction Processing** field in the Assembly Control Parameters (tiasc0100m000) session is **Line Station Based**, you can enter costing data for an assembly line.

If the **Transaction Processing** field is **Order Based**, you can enter costing data for a combination of an assembly line and an item.

Actualizing assembly line costing data

Use the Assembly Line Costing Data (ticpr0115m000) session to actualize the assembly line costing data, which results in an effective cost component structure by assembly line and item.

The effective cost component structure contains the aggregated cost components that are defined for the item in the Items - Costing (ticpr0107m000) session. If you entered a chart for an assembly line, the detailed cost components that were defined for the chart are included in the effective cost component structure.

You can view the effective cost component structure in the Effective Cost Component Structure by Assembly Line and Item (ticpr3162m000) session. In the **Effective Date** field, the date on which the assembly line costing data is actualized is displayed.

Note

You must actualize the costing data for all lines that are part of your assembly line model.

Defining assembly line surcharge data

Use the Assembly Line Surcharges (ticpr1180m000) session to define surcharges for an assembly line. Surcharges are extra costs in an item's standard cost or valuation price, for example, handling costs or inspection costs. A surcharge serves as a discount if the amount or percentage entered is a negative value. If you use order-based transaction processing, surcharges are defined for a combination of an assembly line and an item. If you use line-station-based transaction processing, surcharges are defined for an assembly line. You cannot define a fixed surcharge amount for assembly-line-based transaction processing. The surcharges are posted to the assembly line when the line is closed. For order-based-transaction processing, the surcharges are posted to the assembly line by order.

Note

If the **Transaction Processing** field in the Assembly Control Parameters (tiasc0100m000) session is set to **Order Based**, you can enter surcharges for a combination of assembly lines and generic items.

If you select the **Line Station Based** option in the **Transaction Processing** field of the Assembly Control Parameters (tiasc0100m000) session, you can enter only surcharges for an assembly line.

Actualizing assembly line surcharges

Use the Actualize Assembly Line Surcharges (ticpr2280m000) session to actualize the assembly line surcharges and the assembly line surcharge bases. Effective assembly line surcharges and effective assembly line surcharge bases are created, which are used in assembly line costing. The effective date is the date on which the process is run. You can display the effective assembly line surcharges in the Effective Assembly Line Surcharge (ticpr3150m000) session. You can display the effective assembly line surcharge bases in the Effective Assembly Line Surcharge Base (ticpr3160m000) session.

Select your assembly line from the assembly line's from-to range. For other options, you can use default settings. Click **Actualize** to continue.

Note

You must actualize the surcharges for all lines that are part of your assembly line model.

Appendix A
Glossary

A

appropriate menu

Commands are distributed across the **Views**, **References**, and **Actions** menus, or displayed as buttons. In previous LN and Web UI releases, these commands are located in the *Specific* menu.

assembly line

A set of consecutive line stations in which FAS (Final Assembly Schedule) items are manufactured. The items are manufactured by passing the items from line station to line station and by carrying out operations at each line station. An assembly line is subdivided into a number of line segments separated by buffers. An assembly line can be either a main line or a supplying line.

bill of material (BOM)

A list of all parts, raw materials, and subassemblies that go into a manufactured item and show the quantity of each of the parts required to make the item. The BOM shows the single-level product structure of a manufactured item.

bucket

A quantity of time used for planning and backflushing.

calculation group

A code representing a group of projects the user wants to compare financially.

You can assign a calculation group to:
- A budget
- A main project (as long as the calculation group is not assigned to another project or single project)
- A single project (as long as the calculation group is not assigned to another main project or single project)

calculation office

A work center that determines the enterprise unit for a project or production order and that has an administrative function.

For production orders, operations can be carried out in the calculation office, because the calculation office can act as a regular work center.

CLSO

See: *clustered line station order (p. 58)*

clustered line station order

Represents all the material requirements for a line station for a day. A CLSO consists of user-defined buckets. The material requirements are combined for each bucket.

In Assembly Control, transactions can be carried out per line station and per period, instead of per order. LN can combine the same materials for a specific period into one material line. After doing so, the cumulated quantity is stored in the CLSO. This accumulation reduces the number of transactions that are necessary, because the transactions are performed for a specific bucket.

Acronym: CLSO

See: bucket

COGS

See: *cost of goods sold (p. 59)*

cost calculation code

A specification of how a standard cost, valuation price, or sales price is calculated. The code stores specific cost calculation data.

The price calculation code that is defined in the Standard Cost Calculation Parameters (ticpr0100m000) session determines the standard cost. Other cost calculation codes are used for simulation purposes. The price calculation code for customized items is stored by project.

Example
- Specific operation rates
- Subcontracting rates
- Simulated purchase prices
- Surcharges

cost component

A cost component is a user-defined category for the classification of costs.

Cost components have the following functions:

- To break down an item's standard cost, sales price, or valuation price.
- To create a comparison between the estimated production order costs and the actual production order costs.
- To calculate production variances.
- To view the distribution of your costs over the various cost components in the Cost Accounting module.

Cost components can be of the following cost types:

- **Material Costs**
- **Operation Costs**
- **Surcharge on Material Costs**
- **Surcharge on Operation Costs**
- **WIP Transfer Costs**
- **General Costs**

Note

If you use Assembly Control (ASC), you cannot use cost components of the **General Costs** type.

costing work center

A work center, linked to a planning work center, that is used to calculate the end item unit costs, WIP transfers, and production results used to hold the financial transactions related to production orders.

The link between a costing work center, and a planning work center enables you to replan production order operations again. If required, you can change the work center that is used to carry out an operation without modifying the costing process.

cost item

An administrative item that is used to post extra costs to an order. Extra costs are, for example, accounting expenses, clearance charges, design costs, and freight expenses.

Cost items are not used for production and cannot be held in inventory. They are also referred to as expense items.

cost of goods sold

The expense a company incurs in order to manufacture, create, or sell a product. It includes the purchase price of the raw material as well as the expenses of turning it into a product.

Abbreviation: COGS

customized item

An item produced on a customer specification for a specific project. A customized item can have a customized BOM and/or a customized routing and is normally not available as a standard item. A customized item can, however, be derived from a standard item or a generic item.

cycle time

In LN, the time between completion of two separate units of production. For example, the cycle time of motors assembled at a rate of 120 per hour is 30 seconds.

The cycle time is also equal to the time that a product stays in one position on a assembly line, or the time that an operation is carried out on an item in a work station (excluding setup time).

department

A company's organizational unit that carries out a specific set of tasks, for example, a sales office or a purchase office. Departments are assigned number groups for the orders they issue. The department's enterprise unit determines the financial company to which the financial transactions that the department generates are posted.

efficiency variances

A part of the production result that is created by differences between the estimated and actual material quantities and hours.

The efficiency variance shows how efficiently materials and resources are used.

end item

An item that is ready to be delivered to a warehouse. An end item is produced at the end of a dangle routing (co-products and by-products) or a main routing.

enterprise unit

A financially independent part of your organization that consists of entities such as departments, work centers, warehouses, and projects. The enterprise unit's entities must all belong to the same logistic company, but a logistic company can contain multiple enterprise units. An enterprise unit is linked to a single financial company.

When you carry out logistic transactions between enterprise units, these are posted in the financial companies to which each enterprise unit is linked. You can define intercompany trade relationships between enterprise units to determine the terms for internal trade between these units. To use invoicing and pricing between enterprise units, you must link the enterprise units to internal business partners.

You can use enterprise units to do separate financial accounting for parts of your business. For example, you can define enterprise units for separate parts of your organization that belong to one logistic company, but that are located in different countries. The accounting of each enterprise unit is performed in each country's national currency, and in the financial company linked to the enterprise unit.

estimate

A statement of probable cost for supplying certain goods or services. An estimate is created in anticipation of receiving an order.

FAS item

A generic item with the FAS (Final Assembly Scheduling) order system.

FAS items are produced in a mixed model flow process on an assembly line.

FIFO

See: *first in, first out (FIFO) (p. 61)*

financial company

A company that is used for posting financial data in Financials. You can link one or more enterprise units from multiple logistic companies to one financial company.

first in, first out (FIFO)

An inventory valuation method for accounting purposes. The assumption is that the oldest inventory value (first in) is the first to be used or sold (first out). However, this method assumes no necessary relationship with the actual physical movement of specific items.

FIFO can also be an outbound method that determines the physical outbound priority of a specific item. The oldest inventory is the first to be issued, taking into account the ordered packaging level, that is leading over the inventory date.

Example

A box containing 10 pieces is ordered and you have the following inventory:
- 5 pieces, receipt date 01-01
- 1 box containing 10 pieces, receipt date 05-01
- 1 box containing 10 pieces, receipt date 10-01
- 7 pieces, receipt date 15-01

If the outbound priority of the item is FIFO, the box with receipt date 05-01 is issued.

Abbreviation: FIFO

fixed costs

Expenses that do not vary with the production volume. Examples of these costs are the depreciation costs of machines and buildings, rent, and property taxes. Operation rates and surcharges can be attributed to the variable costs or the fixed costs.

Antonym: variable costs

fixed costs

See: *variable costs (p. 69)*

floor stock

A stock of inexpensive material present in the job shop that can be used in production without recording each issue of material individually. Floor stock is not backflushed and is not part of the estimated costs.

FTP inventory valuation method

Fixed transfer pricing is an inventory valuation method. The fixed transfer price is a calculated inventory value, based upon calculated material costs, operation costs, and surcharges. The FTP valuation price includes the surcharges by warehouse.

generic item

An item that exists in multiple product variants. Before any manufacturing activities are performed on a generic item, the item must be configured to determine the desired product variant.

Example

Generic item: electric drill

Options:

- 3 power sources (batteries, 12 V or 220 V)
- 2 colors (blue, gray).

A total of 6 product variants can be produced with these options.

intercompany trade relationship

A "from and to" relationship between two parts of an organization. When an intercompany trade relationship is defined, the transactions between the from and the to-part of the relationship are regarded as intercompany trade. Consequently, specific cost and revenue bookings are posted for the from and the to-part.

The from-part incurs costs for goods delivered or services rendered to the to-part. The to-part is indebted to the from-part. The from-part invoices the to-part to be compensated for the costs incurred, if specified in the intercompany trade agreement.

The parts constituting an intercompany trade relationship can be:
- A financial company
- An enterprise unit
- An entity

A trade relationship between two parts applies to the underlying entities linked to these parts. For example, a trade relationship between two enterprise units applies to the entities linked to these enterprise units.

An intercompany trade relationship is linked to one or more intercompany trade agreements. In turn, each intercompany trade agreement is linked to an intercompany trade scenario. In this way, transfer pricing rules are defined for each trade scenario that is linked to the trade relationship. The transfer pricing rules determine the amounts of the intercompany trade transactions and, if specified, the internal invoices.

issue

The transaction type that is used to withdraw goods from inventory.

JIT item

See: *just-in-time item (p. 63)*

just-in-time item

An item of which the procurement is controlled using purchase schedules instead of ordinary purchase orders. The purchase schedule corresponds to a regular series of deliveries during a certain time period.

Acronym: JIT item

last in, first out (LIFO)

An inventory valuation method for accounting purposes. The assumption is that the most recently received value item (last in) is the first to be used or sold (first out). However, this method assumes no necessary relationship with the actual physical movement of specific items.

LIFO can also be an outbound method that determines the physical outbound priority of a specific item. The newest inventory is the first to be issued, taking into account the ordered packaging level, that is leading over the inventory date.

Example

A box containing 10 pieces is ordered and you have the following inventory:

- 5 pieces, receipt date 01-01
- 1 box containing 10 pieces, receipt date 05-01
- 1 box containing 10 pieces, receipt date 10-01
- 7 pieces, receipt date 15-01

If the outbound priority of the item is LIFO, the box with receipt date 10-01 is issued.

Abbreviation: LIFO

LIFO

See: *last in, first out (LIFO) (p. 64)*

line station order

Production order for an assembly line station.

lot

A number of items produced and stored together that are identified by a (lot) code. Lots identify goods.

machine hours

The machine capacity in hours required to carry out the operation.

The formula LN applies to calculate the machine hours depends on whether or not the operation has a fixed duration. If the operation has a fixed duration, LN applies the following formula to calculate the machine hours:

Machine hours = (setup time * machine occupation) + (cycle time * machine occupation / routing quantity)

If the operation does not have a fixed duration, LN applies the following formula to calculate the machine hours:

Machine hours = (setup time * machine occupation) + (cycle time * quantity planned input * machine occupation / routing quantity)

man hours

The man capacity in hours required to carry out the operation.

The formula LN applies to calculate the man hours depends on whether or not the operation has a fixed duration. If the operation has a fixed duration, LN applies the following formula to calculate the man hours:

Man hours = (setup time * man occupation for setup) + (cycle time * man occupation for production / routing quantity)

If the operation does not have a fixed duration, LN applies the following formula to calculate the man hours:

Man hours = (average setup time * man occupation for setup) + (cycle time * quantity planned input * man occupation for production / routing quantity)

moving average

The average value of the present inventory, which is used in order to calculate the administrative price when you issue inventory. The inventory value is based on historical purchase prices.

moving-average unit cost (MAUC)

An inventory valuation method for accounting purposes.

The MAUC is the average value for each unit of the current inventory. For each new receipt the MAUC is updated.

multisite

Relating to the flow of goods or information between multiple sites.

Typically, these sites are located in various regions or countries, but they belong to the same group of companies.

These sites are modeled as financial or logistical companies within LN.

operation

One of a series of steps in a routing that are carried out successively to produce an item.

The following data is collected during a routing operation:
- The task. For example, sawing.
- The machine used to carry out the task (optional). For example, sawing machine.
- The place where the task is carried out (work center). For example, woodwork.
- The number of employees required to carry out the task.

This data is used to compute order lead times, to plan production orders and to calculate standard cost.

operation rate

A rate that is determined by labor costs, machine costs, or overhead costs. The operation rate can be linked to work centers or tasks by an operation rate code.

operation rate code

A code that identifies operation rates (labor costs, machine costs, or overhead costs). The code can be linked to a task or work center. Each standard cost calculation code can comprise multiple operation rate codes and associated operation rates.

operation set

A set of operations consecutively carried out at the same work center.

phantom

An assembly that is produced as part of a manufactured item, and that can have its own routing.

A phantom is usually not held in inventory, although occasionally some inventory can exist. The planning system does not create material requirements for a phantom, but drives the requirements straight through the phantom item to its components. Phantoms are mainly defined to create a modular product structure.

Example

The door of a refrigerator is defined as a phantom item in the bill of material of a refrigerator. The materials of the door are listed on the production order's material list for the refrigerator.

price variances

The price variance of a production order is the part of the production result created by differences between the estimated and actual price of an item or hour.

The price variance indicates the effect of changing rates and prices on the production result.

production order

An order to produce a specified quantity of an item on a specified delivery date.

project

A collection of manufacturing and purchasing actions that are performed especially for a particular customer order. A project is initiated to plan and coordinate the production of these items.

For a standard-to-order production, the project is only used to link the item with the customer order. Otherwise, a project can include:
   ■   Customized item data (BOMs and routings)
   ■   Project planning (activity planning)

A budget is a special type of project. A budget is used to plan and estimate, not to carry out production.

receipt

The physical acceptance of an item into a warehouse. A receipt registers: received quantity, receipt date, packing-slip data, inspection data, and so on.

result

The financial results of, for example, a project or a production order. The results are reported in terms of variances. A variance is the difference between the expected (budgeted or planned) value and the actual value. You can distinguish between price variances, efficiency variances, and additional calculation-office variances.

routing

The sequence of operations required to manufacture an item.

For each operation, the task, machine, and work center are specified, as well as information about setup time and cycle time.

sales price

The price for which an item is sold.

scrap

Unusable material or rejects of intermediate products, for example, because of faulty components, or products lost in cutting or sawing operations. The gross material requirements and/or an operation's input quantity must be increased to account for anticipated scrap.

In the BOM, you can define scrap as a percentage of the net material requirements, which is the scrap factor, and as a fixed quantity, which is the scrap quantity. A scrap quantity is mostly used to define the amount of material that is lost every time when you start producing, for example, to test the equipment.

For an operation, you can only define the scrap as a fixed quantity.

simulated purchase prices

A simulated purchase price can be used to experiment with purchase prices and to compute the results.

simulation

The process of doing calculations using simulated figures instead of the actual ones to see what would be the result if certain figures were changed. Opposite term is actual or operational.

standard cost

The sum of the following item costs as calculated by the standard cost calculation code:

- Material costs
- Operational costs
- Surcharges

Prices that are calculated against other price simulation codes are simulated prices. The standard cost is used for simulation purposes and in transactions when no actual price is available.

Standard cost is also an inventory valuation method for accounting purposes.

standard item

A purchased item, material, subassembly, or finished product that is normally available.

All items that are not built according to customer specification for a specific project are defined as standard items. Opposite term is customized item.

standard-to-order (STO)

The production of non-customized items after receiving a customer order.

subcontracting rate

The rate that is used to calculate the subcontracting costs. How LN uses the subcontracting rate in the calculation depends on the calculation method:

- **Fixed Amount by Product**
- **Operation Rate**
- **Man Hour Rate**
- **Machine Hour Rate**

surcharge

The indirect costs of an item, for example, overhead costs, storage costs, handling costs, and machine-maintenance costs. Surcharges can be defined as a percentage or as a fixed amount and can contribute to fixed and variable costs.

valuation price

The actual price of an item, which is used in all financial transactions that involve the item.

The transactions include:
- Standard cost of goods sold
- Inventory transfer
- Issue to work-in-process value

The valuation price must be distinguished from the standard cost, which is used for other purposes.

The valuation price is calculated by using one of the actual costing methods (LIFO, FIFO, MAUC and Lot costing), or by using a fixed transfer pricing (FTP) method.

variable costs

Expenses that vary with the production volume. The materials needed for the production of end items, are always variable costs. Operation rates and surcharges can be attributed to the variable costs or the fixed costs.

Antonym: fixed costs

WIP transaction

Any action that affects the work in process (WIP) of a production order or work center.

WIP transactions can be any of the following:

- Issue of materials for a production order.
- Booking of hours on a production order.
- Delivery into inventory of finished products.
- WIP transfers between work centers.
- Application of a surcharge.

WIP transfer

The transfer of the value of the work in process from one work center to the next, in accordance with a physical transfer of a subassembly to the work center where the next operation must be performed.

work center

A specific production area consisting of one or more people and/or machines with identical capabilities, that can be considered as one unit for purposes of the capacity requirement planning and detailed scheduling.

yield

The usable output from a operation expressed as a percentage of its input.

Example 1: An operation in the production process for light bulbs has a yield of 98%. So, out of every 100 light bulbs produced, 98 are good on average. The remaining light bulbs are faulty, and will therefore be rejected.

Example 2: Steel wires are twisted together to produce a steel cable. Due to the twisting, the cable is 10% shorter than the wires from which it is produced. So, the yield is set to 90%.

Index