MICROSOFT® BUSINESS SOLUTIONS – NAVISION® 4.0

Course 8389A:
Microsoft Navision – Manufacturing Costing

Last Revision: July 2004

Appendix A: Answers to Test Your Knowledge Questions 87

INTRODUCTION TO MANUFACTURING COSTING

This training manual provides a conceptual and operational description of costing functionality in a manufacturing environment in Microsoft® Business Solutions–Navision® 4.0. The manual can be used both in the context of an instructor-led training course and as reference material for self-teaching, however, it is recommended that the manual is used in the context of an instructor-led training course.

Course Organization

When this training material is used to build upon a course, it is recommended that the course is taught over a period of one day.

The manual consists of the following chapters:

- Chapter 1: Concepts and Terms
- Chapter 2: Manufacturing Costing Principles in Microsoft Navision
- Chapter 3: Manufacturing Costing Functionality
- Chapter 4: Standard Cost Worksheet
- Appendix A: Answers to Test Your Knowledge Questions

Course Objectives

This course has been designed to provide consultants and implementers of Microsoft Navision with a focus on manufacturing and cost management a solid understanding of the principles and mechanisms that the program is built on. Based on this understanding, course participants develop confidence in how the program records and calculates all the relevant inventory costs in a manufacturing environment.

By the end of this course, you should be able to:

- Understand basic concepts and terms used in inventory accounting specific to manufacturing companies.
- Understand inventory, capacity and production order posting.
- Set up cost elements and calculate standard costs.
- Understand how costs incurred by manufacturing companies are accounted for.
- Determine inventory values.
- Post inventory costs to the general ledger.
- Perform an inventory revaluation.
- Use the standard cost worksheet to update standard costs.

Target Audience

This training manual is intended for Microsoft Certified Business Solutions Partners' consultants who implement and support Microsoft Navision for Manufacturing, with a focus on inventory management. Furthermore it is for employees of Microsoft-Subsidiaries who sell and support Microsoft Navision for Manufacturing.

Training Prerequisites

Participants must have passed the Microsoft Navision Inventory Costing and Microsoft Navision Manufacturing tests or have equivalent experience with the Microsoft Navision application.

Before beginning the course (self–teaching), you must install Microsoft Navision on your computer.

Course Overview

Every chapter of this manual includes an overview of the feature, explains the setup procedure and describes how the feature supports the associated processes involved in manufacturing costing. The chapters also include exercises to allow participants to practice using the functionality on their own.

The chapters in this training manual typically contain the following elements:

- Concepts: Concepts explain the business processes that can be managed using the manufacturing and costing functionality of the program.
- Scenarios: Scenarios represent the typical business situations where the application is used. Scenarios provide a basis for examples that give practical step–by–step descriptions of how to use the application.
- Test Your Knowledge: Test Your Knowledge sections allow the course participants (manual readers) to review the information from the chapters by answering questions.

Chapter 1, Concepts and Terms starts out by introducing some basic concepts and terms commonly used in inventory accounting that are specific to manufacturers. This introduction serves as a framework around which the rest of the course material is built.

Chapter 2, Manufacturing Costing Principles in Microsoft Navision, identifies the cost accounting aspects specific to a manufacturing environment and provides a general description of the principles employed by the program to handle these aspects.

Chapter 3, Manufacturing Costing Functionality, explains in detail the functioning of the manufacturing cost accounting mechanism in Microsoft Navision. It is important to emphasize that this is done only in relation to a standard cost environment, which is assumed to be the choice of most manufacturing companies. The topics included in this chapter range from setting up and calculating standard costs and determining cost of production orders, to establishing the value of Work In Progress (WIP) inventory, posting inventory cost to General Ledger (G/L), and revaluing WIP inventory. As all the topics are logically connected, it is recommended that the course (when build on this material) follows the suggested teaching path.

Chapter 4, Standard Cost Worksheet, describes the benefits and functionality of the standard cost worksheet.

Appendix A, Answers to Test Your Knowledge Questions, contains the solutions for the Test Your Knowledge sections of the different chapters.

Each aspect of the way manufacturing costing is implemented in Microsoft Navision is explained in detail, and is accompanied by comprehensive examples, both abstract and practical.

Demonstration Data

All scenarios and exercises in this material are based on the fictitious company Cronus International Ltd.

As the structure of the material reflects the cost flow pattern, examples included in the manual are also designed to show the interdependencies within such a flow. To be able to practice the examples in the program, it is recommended that you do so in the sequence suggested in the material.

Many examples included in this material involve the creation of different documents. For the sake of simplicity, all documents are built on the assumption that location code Blue is used (unless instructed otherwise).

To make sure that scenarios and examples can be followed and completed correctly, it is essential that every course is started on a clean database. To ensure that you always have a clean demo database, make a copy of the database on your hard disk before starting the course.

License Information

To run the examples included in this training material, you can use any Microsoft Navision license that allows documents to be posted on any posting date. Training license type 013 can be used to run training sessions for participants from a potential (not yet certified) Microsoft Business Solutions partner.

Further Information

The functionality of general inventory management, financial management, logistics and distribution, and manufacturing in Microsoft Navision is addressed in detail in,respectively, the Microsoft Navision Essentials, Financial Management, Distribution, and Manufacturing courses.

The dates in the course material are in the American format. To prevent any confusion when reading the material and following the exercises, you may want to consider changing the date format in Windows® before starting the training session.

The work date is set as 01/25/02 (January 25, 2002). It is important that you use this date when following the examples and doing the exercises included in the material, unless instructed otherwise.

Bibliography

The following text books have been used as reference material:

C.T. Horngren, G. Foster, and S.M Datar, *Cost Accounting. A Managerial Emphasis*. Upper Saddle River, N.J.: Prentice Hall, 1997.

W. T.Harrison Jr., C.T. Horngren, *Financial Accounting*. Upper Saddle River, N.J.: Prentice Hall, 2001.

Student Objectives

What do you hope to learn by participating in this course?

List three main objectives below:

1.

2.

3.

CHAPTER 1: CONCEPTS AND TERMS

This chapter introduces a number of basic concepts and terms commonly used in the inventory accounting area specific to manufacturing companies. This introduction serves as a framework around which the rest of the course is built.

This chapter contains the following sections:

- Overview
- Objectives
- Manufacturing Costs
- Cost Accounting for a Manufacturer

Overview

You can best understand the functionality behind inventory costing for manufacturing in Microsoft® Business Solutions–Navision® by first examining the underlying accounting concepts on which the functionality is based. This chapter starts at the most basic level by explaining the fundamentals of how finished goods inventory value is calculated. It then continues by exploring the different cost types that contribute to the overall manufacturing costs and explains the standard cost system as valuation base. After that it describes the different inventory accounts a manufacturing company must establish. The chapter ends by explaining the different ways of calculating standard costs for manufactured items.

Objectives

By the end of this chapter, you should be able to:

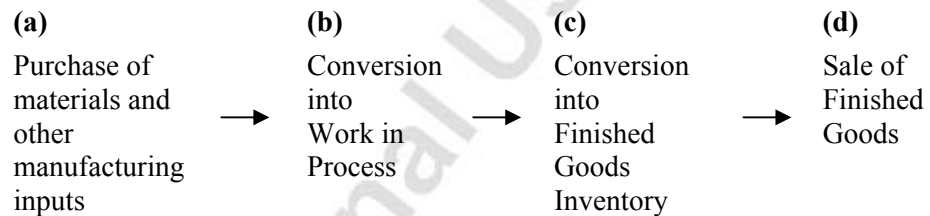- Understand the basic concepts behind the calculation of inventory value for finished goods.
- Understand the valuation of cost objects in relation to their direct and indirect manufacturing costs.
- Understand different types of manufactured inventory accounts.
- Understand recorded transactions in the General Ledger (G/L) accounts.
- Understand different methods of standard cost calculations.

Manufacturing Costs

A key distinction between companies in supply chain (such as distribution and manufacturing sectors) and service companies is that the former provide tangible goods and, as a result, hold inventories. Common to both distribution and manufacturing companies is that their inventory accounting is based on classifying capitalized costs into capitalized inventoriable and capitalized non-inventoriable costs.

The difference between distribution and manufacturing companies is that distributors sell products they have previously purchased in the same basic form from suppliers, while manufacturers sell products that they have converted to a different form from that of the products purchased from suppliers.

Schematically, the manufacturing process can be represented by the following sequence:

(a)		**(b)**		**(c)**		**(d)**
Purchase of materials and other manufacturing inputs	→	Conversion into Work in Process	→	Conversion into Finished Goods Inventory	→	Sale of Finished Goods

It is the existence of stages (b) and (c) that makes costing of manufacturing products more detailed than the costing of purchased goods.

As for a distribution company, the total cost of goods available for sale or use in a manufacturing company during a period must be allocated between the current period's usage (cost of goods sold) and the amounts carried forward to future periods (end-of-period finished goods inventory). However, as manufacturers add value to the purchased raw materials when changing their physical form into finished goods, they also incur additional costs that must be accounted for.

So, while a distributor has only one type of inventoriable cost to record and assign (represented by purchases), a manufacturer is concerned with accounting for manufacturing costs that include direct materials, other direct manufacturing costs, and indirect manufacturing costs.

The cost of goods sold in a manufacturing company is calculated as follows:

Beginning Finished Goods Inventory	+	Cost of Goods Manufactured	−	Ending Finished Goods Inventory	=	Cost of Goods Sold

The cost of goods manufactured refers to the cost of goods brought to completion, whether they were started before or during the current accounting period.

The valuation for the ending inventory appears on the balance sheet as an asset (Finished Goods Inventory), while the amount Cost of Goods Sold appears on the income statement as an expense of generating the sales revenue. In addition, at the end of the accounting period, the balance sheet of a manufacturer has inventory that can include direct materials and work in process.

The cost relationships for a manufacturing company are summarized in the following diagram:
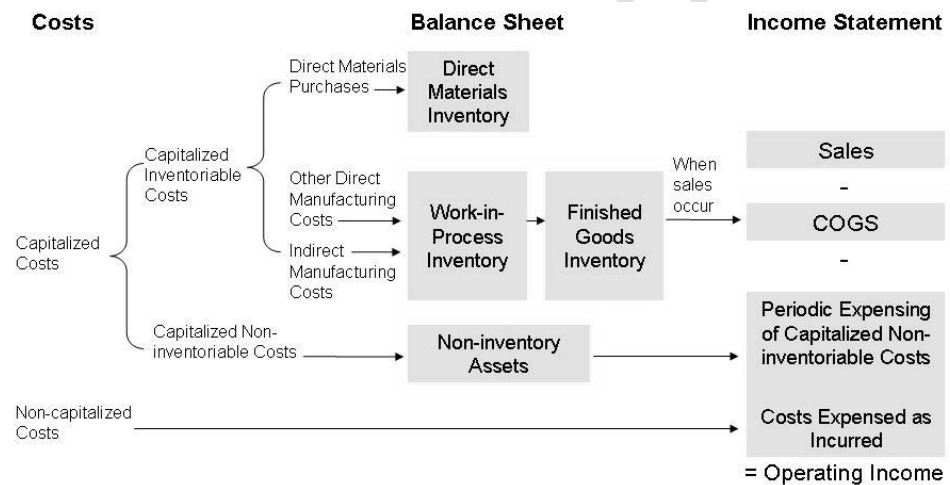
For a manufacturing company, the accounting task is twofold:

1. To record and calculate the manufacturing cost of produced items by tracing and allocating different types of direct and indirect manufacturing costs, and

2. To record and calculate the finished item withdrawals by constant tracing of costs removed from inventory.

When the production and withdrawal cost of each item is recorded, the ending inventory value (balance in the finished goods inventory account) is calculated according to the following formula:

Beginning Finished Goods Inventory	+	Cost of Goods Manufactured	-	Cost of Goods Sold	=	Ending Finished Goods Inventory
(known)		(recorded and solved for)		(recorded)		(solved for)

Cost Accounting for a Manufacturer

As manufacturers sell products that they have converted to a different form from that of the products purchased from suppliers, they have one or more of the following types of inventory:

- Raw materials inventory: This inventory consists of raw materials (components) awaiting use in the manufacturing process.
- Work-in-process inventory: This inventory contains goods partially worked on but not yet fully completed. A different term for this inventory is work in progress.
- Finished goods inventory: This inventory consists of goods fully completed but not yet sold.

Related to the above, the language of cost accounting has specific terms for manufacturing costs. Three terms in widespread use are: direct materials costs, direct manufacturing labor costs, and indirect manufacturing costs.

Direct materials costs are the acquisition costs of all materials that eventually become part of the cost object (units finished or in process), and that can be traced to the cost object in an economically feasible way. Acquisition costs of direct materials include freight-in charges, custom duties and so on.

Direct manufacturing labor costs include the compensation of all manufacturing labor that is specifically identified with the cost object, and that can be traced to the cost object in an economically feasible way. Examples include wages and fringe benefits paid to machine operators and assembly-line workers.

Indirect manufacturing costs are all manufacturing costs considered to be part of the cost object, but that cannot be individually traced to the cost object in an economically feasible way. Examples include power, supplies, indirect materials, indirect manufacturing labor, plant rent, plant insurance, property taxes on plants, plant depreciation, and compensation of plant managers. Other terms for this cost category include manufacturing overhead costs and factory overhead costs.

All the above costs are capitalized inventoriable costs; they are assigned to raw material, work-in-process or finished goods inventory until goods are sold. It is important to note that capitalized inventoriable costs include costs of assets that facilitate the manufacturing process and (typically) become part of indirect manufacturing costs in the form of depreciation.

Absorption versus Direct Costing

A cost inclusion question arises with respect to fixed manufacturing costs. Costs such as direct materials, direct labor, supplies, and similar costs vary in total with the number of units produced. Other costs, such as property taxes, insurance, and depreciation tend to be fixed for a period regardless of the number of units produced. Two viewpoints exist as to the treatment of fixed manufacturing costs.

- Absorption Costing: One viewpoint, referred to as absorption, or full costing, holds that both variable and fixed manufacturing costs should be treated as product costs. Fixed manufacturing costs provide a company with a capacity to produce a period, and variable manufacturing costs are incurred to carry out the actual production during the period. To manufacture products requires both, and both should be included in the product cost.

- Direct Costing: The other viewpoint, referred to as variable, or direct costing, holds that only variable manufacturing costs should be treated as product costs. Fixed manufacturing costs should be treated as expenses of the period in which costs are incurred.

The Standard Base of Inventory Valuation

As established in the Inventory Costing course, depending on the internal accounting procedures and general industry practices, companies choose to value their inventory according to one of or a combination of the following valuation bases:

- Acquisition cost
- Standard cost
- Net realizable value
- Replacement costs

Typically, manufacturing companies choose a valuation base of standard cost. With this in mind, a detailed explanation of the principles of an accounting system based on standard costs is the focus of this section. Definitions of the other valuation bases are included in the Inventory Costing course.

A standard cost system is one in which inventory unit cost is determined based on some reasonable historical or anticipated cost. In this way, studies of past and estimated future cost data provide the basis for standard costs. These costs are frozen until a decision is made to change them. Unavoidably, the actual cost to manufacture a product in many cases differs from the estimated standard costs. For management control purposes, the actual cost is compared to the standard cost for a specific item and differences (variances) are identified and analyzed.

Standard costs can be developed for both purchased and manufactured items. However, while the standard cost for purchased items consists of one component only – material costs (direct and, if required, overhead), the standard cost for produced items may consist of the direct material costs, other direct manufacturing costs, subcontractor costs, and overhead costs.

Standard Costs versus Actual Costs

In some cases, manufacturing companies choose to implement an accounting system that is different from the standard or is based on a combination of different inventory valuation bases: standard costs for manufacturing items and actual, that is acquisition costs for purchased items.

NOTE: It should be noted that costs associated with manufacturing labor and capacity are always capitalized on the basis of standard costs. This, however, does not necessarily apply to the costs of capacity if bought from outside, that is subcontracted.

There can be a number of reasons to explain such a practice. One of the main reasons why manufacturing companies may use a valuation base that is different from standard is that specifying standard cost is a challenging task, especially for companies in a make-to-order (MTO) environment. Additionally, procedures as to when and how often to change the standard costs must be in place and well-defined when operating a standard cost accounting system. Therefore, many companies do not want to develop and maintain standard cost, due to the effort and resources required.

Finally, for manufacturing companies in industries where the material portion of an item's cost fluctuates considerably compared to the labor or capacity costs, the use of actual costs (for example, average cost) allows them to more accurately determine the cost of a produced item.
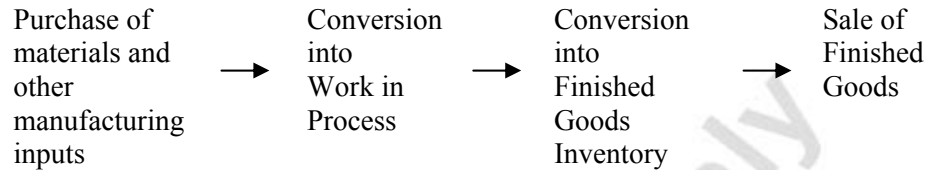
On the other hand, while inventory accounting based on actual costing requires much less effort to set up and maintain, there are a number of issues that a manufacturer must take into account.

The use of actual costs assumes that there is a time factor that may affect inventory cost calculations. Consider the following example: By definition, the actual cost of purchased items is based on the price of the purchase invoice. If a purchased item is put into production and completed before the vendor's invoice for this item is received, then the exact production order cost may not be known before a purchased item is invoiced and the cost is adjusted. On this basis, predetermined standard cost rates have the advantage of being more timely than actual cost, as they can be assigned to individual production orders/jobs on an ongoing basis rather than waiting until the end of the accounting period, when actual costs are known.

The principles and aspects of an inventory accounting system based on an actual cost valuation base are explained in detail in the Inventory Costing course.

Manufactured Inventory Accounts

As established earlier, transactions that occur during the manufacturing process can be tracked through the following stages:

Purchase of materials and other manufacturing inputs → Conversion into Work in Process → Conversion into Finished Goods Inventory → Sale of Finished Goods

Therefore, apart from regular inventory accounts, a manufacturer must establish a number of separate inventory accounts in order to record transactions at various stages of production.

The following is a list and description of these accounts:

- Raw Materials Inventory account: This account includes the cost of raw materials purchased but not yet transferred to production. The balance in the Raw Materials Inventory account indicates the cost of raw materials on hand in the raw materials warehouse. When raw materials move into producing departments, the cost of the materials is transferred from the Raw Materials Inventory account to the Work-In-Process Inventory account.

- Work-In-Process Inventory account: This account accumulates the costs incurred in producing units during the period. The Work-In-Process Inventory account is debited for the cost of raw materials transferred from the raw materials warehouse, the cost of direct labor services used, and the manufacturing overhead costs incurred, for example, factory utilities, insurance, and depreciation. The Work-In-Process Inventory account is credited for the total manufacturing cost of units completed in the factory and transferred to the finished goods warehouse.

- Finished Goods Inventory account: This account includes the total manufacturing cost of units completed but not yet sold. At the time of sale, the cost of units sold is transferred from the Finished Goods Inventory account to the Cost of Goods Sold account.

The following scenario illustrates the manufacturing process in terms of the movement of transaction costs between different accounts in the general ledger.

Scenario 1

The following events took place within an accounting period in a manufacturing company:

1. Purchase of raw materials, 100,000 LCY.

2. Usage of raw materials, 90,000 LCY, of which direct materials, 85,000 LCY, and indirect materials/overhead, 5,000 LCY.

3. Incurrence of liability for manufacturing labor, 60,000 LCY, of which direct manufacturing labor, 45,000 LCY, and indirect manufacturing labor, 15,000 LCY.

4. Payment of wages, 60,000 LCY.

5. Completion and transfer to finished goods, 130,000 LCY.

6. Allocation of manufacturing overhead, 40,000 LCY.

7. Cost of goods sold, 140,000 LCY.

Recording transactions in the G/L accounts

The T-account relationships created as a result of transactions in the manufacturing company in the above scenario are shown in the following.

The general assumption is that according to the company's costing system, the total cost of a finished production order is calculated on the basis of actual material costs (both direct and indirect), actual direct and allocated indirect labor costs, and a manufacturing overhead that is allocated to each production order. There is more than one production order initiated during the period.

Raw Materials			Work-In-Process	
1) 100,000	2) 90,000		2) 90,000	4) 130,000
			3) 60,000	
			Bal. 20,000	

Direct Cost			Indirect Cost (Allocated)	
	1) 100,000			3) 15,000
	3) 45,000			

Finished Goods			Cost of Goods Sold	
4) 130,000	6) 140,000		6) 140,000	
5) 40,000				
Bal. 30,000				

Manufacturing Overhead	
	5) 40,000

Explanations of transactions

1. Purchases of materials (direct and indirect).

2. Materials sent to the manufacturing plant floor, direct and indirect. It is assumed that costs incurred on the work in process "attach" to the work in process, thereby making it a more valuable asset.

3. Manufacturing labor wages liabilities incurred, direct and indirect. Labor time records are used to trace direct manufacturing labor to the individual job. The indirect manufacturing labor is, instead, being allocated to the individual job.

4. Completion and transfer of the individual jobs completed during the manufacturing process from work-in-process to finished goods. The amount includes actual materials, actual direct manufacturing labor, and budgeted labor overhead.

5. Allocation of manufacturing overhead to products (utilities and repairs, insurance and depreciation on equipment). The Finished Goods account is increased.

6. Cost of Goods Sold.

Standard Cost Shares

Standard cost for the manufactured items can be calculated on two bases:

- Single-level, and
- multi-level (rolled up)

The two methods differ in the way the portion of total cost of a parent item is assigned to its material, capacity and overhead cost elements. More specifically, the total cost of a manufactured – parent – item:

- On a single-level, consists of (a) material cost that is equal to the total cost of all individual components on the item's bill of material (BOM), (b) capacity cost that is equal to the labor and machine costs required to manufacture/assemble the parent item only, (c) overhead cost that is assigned to the parent item only.

- On multi-level (rolled up), consists of (a) material cost that is equal to the material cost of all individual purchased/subassembled items in the parent item's BOM, (b) capacity cost that is equal to the labor and machine costs required to produce all individual components on the parent item's BOM and the parent item itself, (c) overhead cost that is assigned to all individual components on the parent item's BOM and to the parent item itself.

The following example illustrates in abstract terms the principle of standard cost calculation on the two levels:

Example 1 – Standard Cost Shares

Consider a manufactured item A that is made of two subassemblies, item B and item C.

The different cost elements for the items in question are as follows:

Item	Material Cost	Capacity Cost	Overhead Cost
A		5 LCY	6 LCY
B	10 LCY	3 LCY	3 LCY
C	5 LCY	2 LCY	1 LCY

Single Level Cost Share: In a single level cost share calculation, the subassemblies are calculated first. Their total cost is then apportioned to the material cost of their parent item. In our example, the total cost for item B and item C is the material cost of item A, that is 24 LCY:

Rolled Up Cost Share: In a rolled up cost share calculation, the total cost of the subassemblies is divided into their different cost elements (material, capacity, and overhead) and added to the respective cost component of the parent item.

Only the material cost of the subassemblies is apportioned to the material cost of the parent item A, which then equals 15 LCY. The capacity cost for item A is equal to the sum of the capacity cost of item B and C and its own capacity cost, which is 10 LCY (3 + 2 + 5). The same applies to the calculation of overhead cost for item A, whose overhead cost share equals 10 LCY (1 + 3 + 6).

Test Your Knowledge – Concepts and Terms

1. What are the three capitalized inventoriable costs that make up manufacturing costs?

2. Which of the following inventory valuation bases is an estimate of what inventory items should cost based on studies of past and estimated future cost data?

   a. Acquisition cost

   b. Standard cost

   c. Net realizable value

   d. Replacement cost

3. Apart from regular inventory accounts, manufacturing companies need separate inventory accounts to record transactions at various stages of production? Name three inventory accounts and outline what they are used for.

4. When calculating standard costs for a manufactured item, what is the general difference between a single-level and a multi-level based calculation?

Quick Interaction: Lessons Learned

Take a moment to write down three Key Points you have learned from this chapter:

1.

2.

3.

CHAPTER 2: MANUFACTURING COSTING PRINCIPLES

This chapter contains the following sections:

- Overview
- Objectives
- Accounting for Manufactured Inventory in Microsoft® Business Solutions–Navision®

Objectives

By the end of this chapter, you should be able to:

- Understand how the program records quantity and value changes in entries.
- Understand production order costing.

Overview

The following equation for a manufacturing company forms the basis for calculating the inventory value in Microsoft Navision:

Beginning Finished Goods Inventory	+	Cost of Goods Manufactured	-	Cost of Goods Sold	=	Ending Finished Goods Inventory

As in the case of purchased inventory, it is generally assumed that the first element in the equation – beginning inventory – is known, since it is carried into the new financial period from the previous period. The cost of goods manufactured and the cost of goods sold must be calculated and recorded respectively in order to determine the value of the ending finished goods inventory.

As established earlier, the manufacturer would typically have one or more of the following types of inventory: raw materials inventory, work-in-process (WIP) inventory and finished goods inventory. The value of WIP inventory and raw materials inventory must be determined in order to calculate the cost of goods manufactured, which is calculated according to the following formula:

Cost of Goods Manufactured	=	Beginning WIP Inventory	+	Manufacturing Cost	-	Ending WIP Inventory

In this formula, the term 'Manufacturing Cost' refers to the cost incurred during a financial period and is considered to be a part of the WIP inventory.

As described in the previous chapter, the manufacturing costs include the following components:

Manufacturing Cost	=	Direct Materials Used	+	Direct Manufacturing Labor	+	Indirect Manufacturing Cost

This chapter explains how Microsoft Navision records and processes inventory costs in a manufacturing environment.

Accounting for Manufactured Inventory in Microsoft Navision

Determining the Value of Inventory

A manufacturing company needs to determine the value of three types of inventory:

- Raw Materials Inventory
- WIP Inventory
- Finished Goods Inventory

In the program, the calculations are principally based on the following equation:

Inventory	=	Beginning	+	Value of All	-	Value of All
Value		Balance of		Increases		Decreases
		Inventory				

where the program tracks the costs of all increases and decreases and then calculates the inventory value.

Depending on the type of inventory, increases and decreases are represented by different transactions:

	Increases	**Decreases**
Raw Materials Inventory	net purchases output of manufactured subassemblies negative consumption	materials consumed in manufacturing
WIP Inventory	materials consumed in manufacturing capacity consumed in manufacturing manufacturing overhead	output (cost of goods manufactured)
Finished Goods Inventory	output (cost of goods manufactured)	sales (cost of goods sold) negative output

The program records the values of increases and decreases in different types of manufactured inventory according to the same principal as for purchased inventory:

Every time a transaction of inventory increase or decrease takes place (is posted); the program creates a subsidiary and a general ledger (GL) entry for a corresponding amount.

As explained in the Inventory Costing course, a company may choose to set up the program to make general ledger entries simultaneously with entries in the subsidiary ledger accounts. Alternatively, entries in the subsidiary ledger accounts are made on a continuous basis and then reconciled with the general ledger at less frequent intervals by means of running the Post Inventory Cost to G/L batch job.

The act of recording transactions in the subsidiary ledger accounts is called inventory posting. While values of transactions related to purchased goods are posted as item ledger entries with related value entries, transactions associated with manufactured goods would in addition require capacity ledger entries.

The following two sections clarify the general principles of inventory and capacity posting. The concept of posting inventory to G/L is explained in the Inventory Costing course and, therefore, will not be repeated here.

Inventory and Capacity Posting

Inventory and capacity posting can be of two kinds: quantity and value.

Quantity posting describes the change of inventory and capacity in terms of quantity. In a manufacturing company, the following transactions/movements result in a change of inventory quantity:

- Purchases (includes purchase returns)
- Sales (includes sales returns)
- Transfers
- Inventory adjustments
- Material consumption
- Output (the last operation on the routing, where routing is used)

Every time one of the above transactions is posted, the program records the resulting change in inventory quantity as an item ledger entry of a corresponding type. The existence of the last transactions – consumption and output – is what differentiates a manufacturer from a distributor.

Value posting describes the change in inventory value. A change in inventory value occurs every time there is a change in inventory quantity and is recorded as a value entry of the type Direct Cost. However, a value may also change without quantity changes taking place. In this case, a separate value entry is created for the following value types:

- Direct costs, representing additional costs related to transactions of inventory increase, for example, a purchase, and cost adjustments related to transactions of inventory decrease, for example, a consumption

- Indirect costs

- Rounding

- Revaluations

- Variances

In this way, one or more value entries can exist per item ledger entry. Additionally, posting of the output line results in the program creating a capacity ledger entry. This type of ledger entry is a record of the consumed capacity in terms of quantity in either time or unit and is associated with WIP inventory.

The related value entry describes the increase of the WIP inventory value, which is the value of the conversion cost. One or more value entries can exist per capacity ledger entry.

Production Order Costing

In order to control inventory and production costs, a manufacturing company needs to measure the cost of production orders. As mentioned earlier, in a standard cost environment, it is the predetermined budgeted cost of a manufactured item that is capitalized in the balance sheet. The actual cost of a production order consisting of the following components:

- Actual material cost

- Actual capacity/subcontractor cost

- Manufacturing overhead

Is also posted to the order and compared to the standard cost in order to calculate variances. Variances are calculated for each of the item cost components: raw materials, capacity, subcontractor and manufacturing overhead. The variances can be analyzed to determine problems, like possible excessive waste, enabling the company to take corrective actions. In addition, analyzing variances helps a company to develop better standards.

Where a company uses the standard costing method, the costing of a production order is based on the following mechanism:

- On posting the last operation on the routing, the cost of the production order is posted to the item ledger and is set to the expected cost. This cost equals the output quantity posted in the output journal multiplied by the unit cost (which is a standard cost) copied from the item card. The cost is treated as expected until the production order is invoiced.

- On finishing the production order, the order must be invoiced by means of running the Adjust Cost – Item Entries batch job. As a result, the program calculates the total cost of the order based on the standard cost/rates of the materials and capacity consumed in connection with this order. Moreover it calculates and posts the variances between the calculated standard and actual production costs.

In other costing environments, it is the actual rather than the standard cost of a manufactured item that is capitalized on the balance sheet.

Test Your Knowledge – Manufacturing Costing Principles

1. A change in inventory value may take place without a corresponding quantity change. Name three examples of value types for which a separate value entry might be created.

2. True or False:
    Apart from time or quantity information, capacity ledger entries also hold all amount information.

3. A manufacturing company uses standard cost as their calculation base for manufactured items. Which costs of a production order are compared to the standard cost in order to calculate variances?

Quick Interaction: Lessons Learned

Take a moment to write down three Key Points you have learned from this chapter:

1.

2.

3.

CHAPTER 3: MANUFACTURING COSTING FUNCTIONALITY

This chapter contains the following sections:

- Overview
- Objectives
- Manufacturing Costs
- Production Order Costing
- Inventory Valuation
- Posting Inventory Costs to the General Ledger (GL)
- Inventory Revaluation

Objectives

By the end of this chapter, you should be able to:

- Set up the different cost elements of standard cost.
- Calculate standard cost on single and multi-level.
- Understand costing for purchase of raw material and its influence on inventory.
- Understand costing for production and its influence on inventory.
- Handle special manufacturing situations like using non-inventory items or by-products.
- Handle subcontract operations.
- Calculate the Work in Process (WIP) inventory value.
- Post inventory costs to General Ledger (GL).
- Revalue the WIP inventory.

Overview

As established in the previous chapter, the formula for calculating the manufacturing cost of a finished good is as follows:

Manufacturing Cost	=	Direct Materials Used	+	Direct Manufacturing Labor	+	Indirect Manufacturing Cost

An accounting task for a manufacturing company using a standard costing method is twofold:

1. To estimate a standard cost for a finished item and set it up in the program.

2. To record and allocate the actual cost of the manufacturing cost elements.

In this chapter, the way in which the program supports accountants in carrying out the above task is described in detail.

Manufacturing Costs

Setting up Standard Costs

As the standard cost of a manufactured item consists of multiple cost elements – material, capacity and subcontractor costs (direct and overhead) – standards must be developed for each of these elements. To determine the total cost of a finished item, the constituent costs must be summed up. However, it is not uncommon that an item may include subassemblies, which in their turn also consist of multiple cost components. Therefore, the task of developing and calculating the standard cost for a finished item may appear rather complex.

To assist accountants and production managers in this task, the program provides a function to easily calculate the standard cost of manufactured items. Before demonstrating this function, we look at each individual manufacturing cost component in terms of definition and setup.

The following are the three key cost elements that make up the manufacturing cost of a finished item: materials costs, capacity/subcontractor costs and manufacturing overhead.

Material costs

Material costs are costs associated with subassemblies and purchased raw material.

Unit Cost: Material unit cost may consist of direct and indirect cost elements. Direct material cost represents an invoiced amount for purchased raw materials or the manufacturing cost of a subassembly. Indirect material cost or overhead may, for example, represent inventory carrying costs for the finished item, once produced.

The setup of the material cost for purchased items with regard to direct and indirect cost depends on the costing method selected for the item in question. Irrespective of the costing method, the cost information is set up on the **Invoicing** tab of the item card.

1. Open the item card for item 1110 and click the **Invoicing** tab:

This item is valued at standard cost, which equals 1.05 LCY. This is the item's unit cost, which includes both the direct and indirect costs.

If a company can identify indirect costs associated with this item and wants to specify them separately, it must do so by entering a fixed overhead amount and/or indirect cost percentage in the **Overhead Rate** field and the **Indirect Cost %** field, respectively**.**

2. Assuming that for item 1110, out of the total standard cost of 1.05 LCY, approximately 0.30 LCY accounts for inventory carrying costs, enter 0.30 in the **Overhead Rate** field.

Note that the total standard unit cost of this item remains unchanged.

Scrap Cost: The cost of scrap is an additional factor in the total material cost that must be taken into consideration. When a certain amount of raw material is scrapped in the process of manufacturing an item, in general it would mean an increase in the quantity of components needed to produce this item. In turn, this increases the material cost of the component consumed while producing a parent item. Scrap cost for materials can be set up on either the production BOM or routing.

For example, consider a purchased component on a production BOM that has the following specifications: direct standard cost of 2.00 LCY, quantity required of 50, and a scrap percentage of 10%. Material cost is calculated as follows:

Material Cost = 50 * 2.00 LCY + (50 * 0.10) * 2.00 LCY = 110.00 LCY

The program takes into account the specified scrap percentage when calculating the required material quantity and the corresponding cost for the flushed consumption.

Single and Rolled-up Levels: The material cost of a manufactured item can be represented in two ways that correspond to the two standard cost calculation bases single-level and rolled-up (or multi-) level. If the single-level basis is assumed, then the material cost of a manufactured item is equal to the total cost of all of the items (purchased or subassembled) on that item's bill of material.

For example, the material cost of item 1000, whose production BOM consists of both purchased and subassembled items, is the sum of the single unit costs multiplied by the consumption need of all these items.
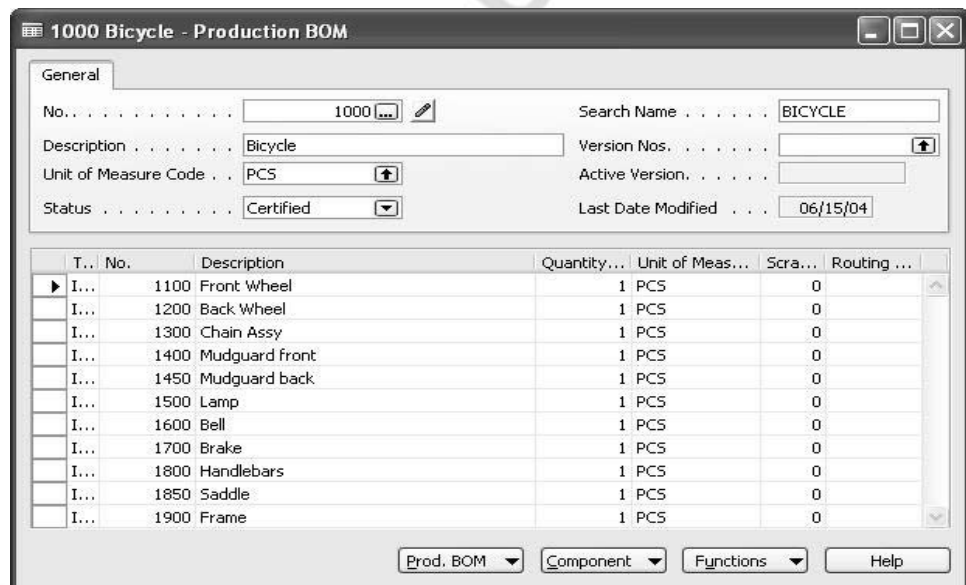
In a rolled-up level calculation, the material cost of a manufactured item is the sum of: 1) the material cost element in the total manufacturing cost of each individual subassembly, and/or 2) the cost of all purchased items on that item's bill of material.

For example, for item 1100, whose production BOM consists of both purchased and subassembled items, it's material cost on a rolled-up level is equal to the material cost of manufacturing item 1150, and the unit cost of other purchased components.

For overview and analysis purposes, the program provides two reports – Single-level Cost Shares and Rolled-up Cost Shares – that present the items' cost calculated on single-level and rolled-up level respectively. In addition, the Detailed Calculation report creates a cost list per item taking into account the scrap. To access these reports, in the Navigation Pane, click the **Manufacturing** button and click COSTING→REPORTS.

Capacity costs

Capacity costs are the costs associated with internal labor and machine costs. These costs must, therefore, be set up for each machine and internal work center on the routing. As with materials, companies may identify both direct and indirect elements of capacity cost. For example, the direct cost for a work center may be the established "shop rate" to perform a specific function. The indirect cost for a work center may represent some general factory expenses, such as lighting and heating. Like materials, capacity overhead may be expressed as an indirect cost percentage and/or a fixed overhead rate.

The setup of the capacity costs consists of the following elements:

- Unit cost (direct and indirect)
- Time and lot size setup

To illustrate this, follow scenario 2:

Scenario 2

The Cronus Company must set up capacity costs for machine center 110 and work centers 100.

The standard capacity cost for machine center 110 is estimated at the total cost of 0.55 LCY. The direct unit cost makes up 0.50 LCY, while an overhead amount is 0.05 LCY.

For work center 100 the indirect cost constitutes 25% of the direct cost.

1. In the Navigation Pane, click the **Manufacturing** button and click CAPACITIES→MACHINE CENTERS. Browse to machine center 110 and click the **Posting** tab.

2. In the **Direct Unit Cost** field, enter 0.50, and in the **Overhead Rate** field, enter 0.05.

The same procedure applies when setting up the unit cost for a work center.

3. From the **Manufacturing** menu, click CAPACITIES→WORK CENTERS. Browse to work center 100 and click the **Posting** tab.

Note that the unit cost for this work center consists only of direct cost, which is 1.20 LCY.

4. In the **Indirect Cost %** field, enter 25.

The total unit cost is now 1.50 LCY. When set up on a work center card, this unit cost represents the uniform calculation rate per capacity of a specific work center.

However, the cost rates of a work center may vary, depending on the operation/task. You can differentiate unit costs of a work center by defining the individual unit costs on the routing line. For the program to prioritize these costs, the **Specific Unit Cost** field on the **Posting** tab of the corresponding work center card must contain a check mark.

Time and Lot Size Setup. To calculate standard capacity cost, a manufacturing company also needs to establish the standard time rates necessary to perform operations on machine and work centers. The total time to complete an operation typically consists of setup and run time, as well as wait and move time.

The rates for each of these time types are set up per specific machine and work center on an individual routing.

To view rates for time types on a routing, from the **Manufacturing** menu, click PRODUCT DESIGN→ROUTINGS. Browse to routing 1000.
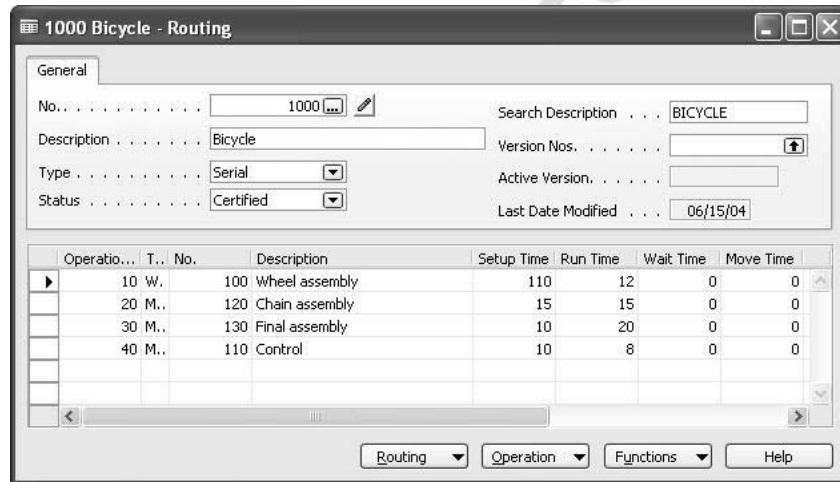
It is important to note that while run time rates apply per item unit produced, the setup time rates apply per lot rather than individual units. Therefore, the routing setup time for each operation must be prorated over the lot size. The lot size is specified in the corresponding field on the **Replenishment** tab of the item card. To illustrate how the item's capacity cost is calculated, consider the following abstract example.

The following information describes an operation on a routing specified for item A:

|	
Setup Time:	1 hour
Run Time:	1 hour
Unit Cost of the Operation:	20 LCY

Assume that the item is manufactured in a lot of 10 units.

The capacity cost of the operation is then calculated according to the following formula:

Capacity Cost = (Setup Time/Lot Size) * Unit Cost + Run Time * Unit Cost

The total capacity cost for item A is then equal to:
22 LCY = (1 hour/10) * 20 LCY + 1 hour * 20 LCY

Some companies may want to specify setup time on the routing for planning purposes, but do not want to include this expense in the standard cost calculation. This is done by removing a check mark in the **Cost Incl. Setup** field on the **General** tab in the Manufacturing Setup window.
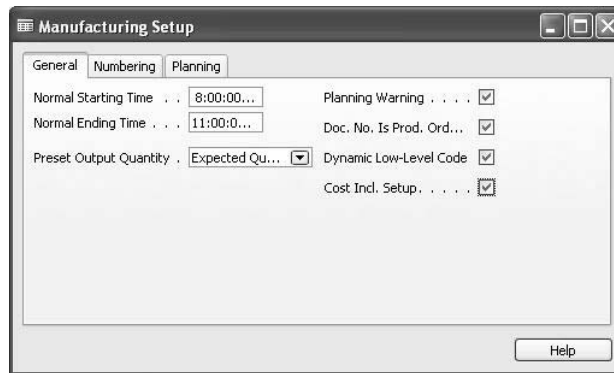
*NOTE: If in the program the standard costs of your manufactured items appear to be unrealistically high, make sure that you have defined a lot size for the items, while having a check mark in the **Cost Incl. Setu**p field.*

Single and Rolled-up Levels. On a single level, this is the labor cost required to manufacture the finished production item and is specified on the production item's routing. On a multi-level, this is the capacity cost specified for each individual manufactured item included in the parent item's BOM.

Subcontractor costs

Subcontractor costs are the costs associated with services provided by a company's outside vendors/subcontractors. Similar to material and capacity, subcontractor costs may consist of both direct and overhead amounts. Direct subcontractor cost represents the actual charge per unit of services provided. Overhead subcontractor cost may, for example, represent freight and/or handling costs incurred by the company in connection with a subcontracted order.

As subcontracting is in essence an outsourced capacity, the cost of subcontracting services (direct and indirect) is set up on the work center card representing the subcontract operation.

Scenario 3

The company has decided to utilize the services of vendor Service Electronics Ltd. for its manufacturing processes.

1. From the **Manufacturing** menu, click CAPACITIES→ WORK CENTERS. Press the F3 key to create a new work center and, in the **No.** field and in the **Name** field, enter Outside Process.

2. In the **Work Center Group Code** field, select 2 (Production Department).

3. Click the **Posting** tab and enter the information shown in the following window shot.

4. Click the **Scheduling** tab and, in the **Unit of Measure Code** field, select Minutes.

5. In the **Shop Calendar Code** field, select 1.

6. Click PLANNING→CALENDAR. In the Work Center Calendar window, click FUNCTIONS→CALCULATE. In the request form, enter the number of the work center you just created and click **OK** in order to create new calendar entries for the work center.

   For the following scenarios and examples to work correctly with the chosen work date, we also have to calculate calendar entries for all other work centers and machine centers.

7. From the work center card of the work center you just created, click PLANNING→CALENDAR→FUNCTIONS→CALCULATE. On the **Work Center** tab, leave the filter for the work center no. blank. On the **Options** tab, select 01/01/02 as a starting date and 12/31/02 as an ending date. Click **OK** in order to create new calendar entries for the work centers.

8. Repeat the previous step for machine centers.
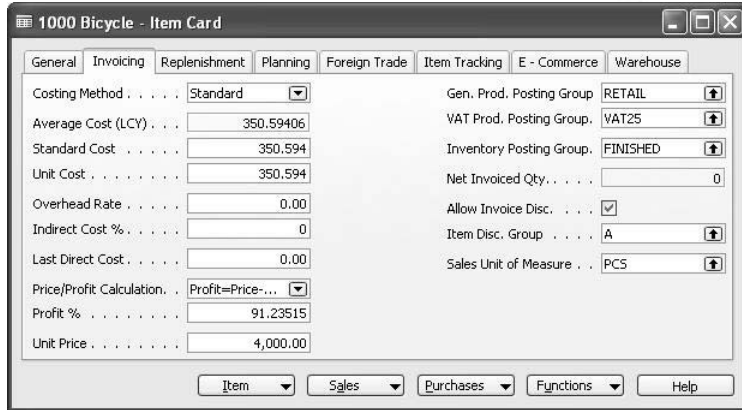
Calculating Standard Cost

As demonstrated in the previous section, while the standard cost of purchased items consists of material costs (direct and overhead) only, the standard cost of manufactured items typically consists of direct and indirect material and capacity (subcontractor) costs as well as manufacturing overhead. As a manufactured item may have a substantial number of components – both purchased and manufactured – on its production BOM, development and calculation of a standard cost for this item appears difficult. To help manufacturing companies in this task, the program provides a tool to easily calculate the items' standard cost. Manufacturers would typically distinguish the following two situations where standard cost needs to be calculated:

- A new item is added to the company's product portfolio. The item information, including cost, must be set up in the program by means of creating a new item card. The manufacturing cost of the item must be calculated based on the direct and indirect material and capacity cost involved in producing the item.

- According to their established procedures, manufacturing companies review and modify standard costs for some or all of their existing items on an annual, semi-annual or quarterly basis. In this connection, the relevance of the standard cost calculation functionality is twofold: (1) before introducing changes, accountants need to know the existing standard cost (inventory value) of the item in question. (2) Since a change in the standard cost of, for example, a purchased component affects the cost of a parent item, the latter's unit cost and inventory value must also be recalculated. As this routine practice of modifying standard cost is referred to as inventory revaluation, the function of calculating standard cost is implemented in the revaluation journal. A demonstration of this function is included in the "Inventory Revaluation" section.

Calculation of the standard cost in the first situation is done by using the Calc. Standard Cost function on the item card. This is, therefore, mostly relevant for items with zero inventory, as the newly established cost information affects only future transactions.

Once the standard cost is calculated, the cost is automatically entered in the **Standard Cost** field on the **Invoicing** tab of the item card of the manufactured item.

1. From the **Manufacturing** menu, click PRODUCT DESIGN→ITEMS. Browse to item 1000 and click the **Invoicing** tab.

The current standard cost for this item does not yet reflect the changes to
the material overhead of one component on the production BOM and capacity overhead of one machine center on the routing (these changes were introduced earlier in this section).

To update the standard cost of the item, do the following:

2. On the item card, click ITEM→MANUFACTURING→CALC. STANDARD COST.

3. In the window that appears, select Single level and confirm by clicking OK.

The program recalculates and updates the standard cost of the item in question by taking into account the changes of the capacity rates only on the level of the manufactured item itself.

4. Open the item card for item 1000 to view the recalculated standard cost.

As the above standard cost calculation was performed only on the level of the parent item, this calculation did not include the changed material and capacity cost on the level of subassemblies.

Before updating the cost on all levels, set up the following cost information for the machine centers that are included in the routing for item 1100:

Machine Center No.	Direct Unit Cost	Indirect Cost % / Overhead Rate
410	1.00	0.10
420	0.50	10%
440	1.50	-

5. Update the standard cost of item 1000 on all levels and view the updated standard cost on the **Invoicing** tab of the item card.

Production Order Costing

The focus of this section is to explain and demonstrate how the costs incurred by manufacturing companies are accounted for in Microsoft Navision. This is done only in relation to companies operating in a standard cost environment. The topics covered in this section are organized in a way that follows the logical cost flow through a manufacturing process, starting from purchase of raw materials, consuming them in production and outputting finished items.

Examples illustrating the above-mentioned transactions are based on handling a production order for manufactured item 1100 in our demonstration company Cronus.

Purchasing Raw Materials

Scenario 4

Cronus has received a sales order from a customer for five units of item 1100.

Since item 1100 is a manufactured item, it must be produced at one of the company's plants (set up as location Blue in the program).

First, purchase the components needed to produce item 1100 at the designated location. Note that the actual acquisition cost of some of the components differs from the established standard cost.

1. Create a purchase order from vendor 10000 with the information shown in the following window shot.

2. Post the order as received and invoiced.

Now, view the value entries created, for example, for item 1110 as a result of posting this purchase transaction.

3. From the **Manufacturing** menu, click PRODUCT DESIGN→ITEMS. Browse to item 1110 and click ITEM→ENTRIES→VALUE ENTRIES.

4. In the Value Entries window, set the filter 01/25/02 on the **Posting Date** field.

While the actual acquisition cost of this purchase is 46 LCY, that is (2 LCY + 0.30 LCY)*20, the inventory value is capitalized on the basis of the standard unit cost set up on the item card, that is 1.05 LCY. The difference of 25 LCY is posted as a value entry of the type Variance.
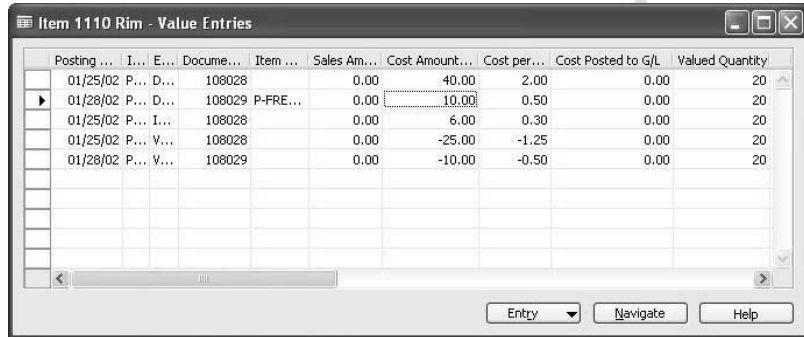
If the actual cost of this purchase changes at a later date, the program correspondingly updates the variance. Consider the situation where the direct acquisition cost of the purchase changes as a result of an additional cost – a freight invoice – posted to this purchase.

5. Create a new purchase order from vendor 10000 and add a purchase line for item charge P-FREIGHT with a direct unit cost of 10 LCY as shown in the following window shot.

6. Assign the item charge to the line of the first purchase order, which handles the receipt of 20 units of item 1110.

7. Post the purchase order as received and invoiced.

    View the value entries created for item 1110 as a result of the last transaction.

	Posting ...	I...	E...	Docume...	Item ...	Sales Am...	Cost Amount...	Cost per...	Cost Posted to G/L	Valued Quantity
	01/25/02	P...	D...	108028		0.00	40.00	2.00	0.00	20
▶	01/28/02	P...	D...	108029	P-FRE...	0.00	10.00	0.50	0.00	20
	01/25/02	P...	I...	108028		0.00	6.00	0.30	0.00	20
	01/25/02	P...	V...	108028		0.00	-25.00	-1.25	0.00	20
	01/28/02	P...	V...	108029		0.00	-10.00	-0.50	0.00	20

The program created a value entry of the type Direct Cost to account for the additional freight cost and updated the amount of variance based on the new actual cost by creating a new value entry for the adjustment amount.

On posting a purchase transaction as received and invoiced, the purchased components are now considered to be a part of the raw material inventory.

The next section illustrates the way the program records and allocates costs that are incurred during the manufacturing process. As established in the previous chapters, these costs are associated with the Work-in-Process inventory.

Processing Production Order

Processing Output

All components needed to produce the requested item 1100 have been purchased. Cronus now can start to manufacture five units of the item with a due date of 02/01/02 at the Blue location.

1. From the **Manufacturing** menu, click EXECUTION→RELEASED PROD ORDERS. Press F3 to create a new released production order and enter the information given above. Remember to fill in the **Location Code** field on the **Posting** tab.

2. Click FUNCTIONS→REFRESH to fill in the production order line.
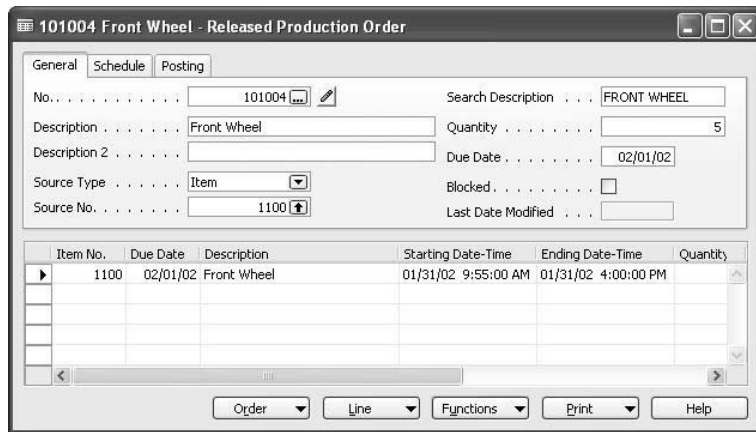
Now, assume that two days before the production order's due date all operations but the last one have been performed on this order. A shop manager assistant must register the capacity consumed and the output produced.

3. From the **Manufacturing** menu, click EXECUTION→OUTPUT JOURNALS.

4. In the **Posting Date** field, enter 01/30/02 and, in the **Prod. Order No.** field, select the productions order you just created. Click FUNCTIONS→EXPLODE ROUTING.
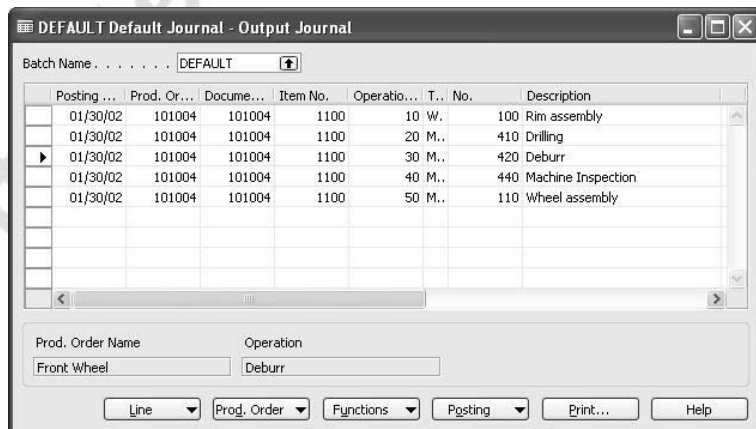
The program fills in the output journal with the lines representing the operations to be performed on the order, as specified on the routing for the item in question.

As is often the case in a real manufacturing environment, the actual time needed to carry out different manufacturing operations on the item in question varies as compared to the standard time rates established on the routing for the item.

5. In the Output Journal window, enter the following setup and run time values and mark each operation as finished:

6. Post the output journal lines.

    From a financial point of view, the result of this posting is that the actual value of the item being produced has increased by the cost of work involved in its manufacturing. This cost is now regarded as part of the WIP inventory value.
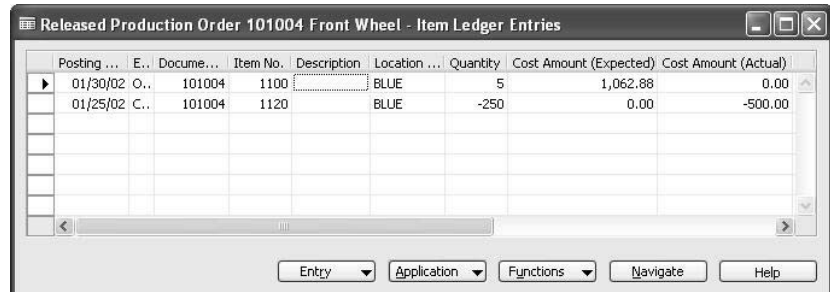
    Technically, on posting the last operation on the routing, the program has registered the complete transaction of output in the form of two types of ledger entries:

    –   An item ledger entry of the type Output for the manufactured item. This entry is associated with two cost objects: the production order and the item.
    –   Capacity ledger entries. These entries are associated with two cost objects: the production order and the machine/work centers whose capacity was used to manufacture the item.

7. From the **Manufacturing** menu, click EXECUTION→RELEASED PROD. ORDERS and browse to the production order you just created. Click ORDER→ENTRIES→ITEM LEDGER ENTRIES.

The first line is the record of the posted output for five completed units of item 1100. Let's analyze the fields containing the value amounts. Use the Show Column function to make the **Cost Amount (Expected)** field visible.

Note that the **Cost Amount (Actual)** field does not contain any value. That is because the production order has not been posted as invoiced at this point.

NOTE: To understand the concept of a not-yet-invoiced production order, the analogy can be drawn to a purchase order. From the accounting point of view, when posted only as received, the cost of a purchased item does not yet become part of the inventory value. It only does so when a purchase is posted as invoiced.

As shown earlier, a production order is invoiced when the Adjust Cost – Item Entries batch job is run. The precondition for invoicing a production order is that the material and capacity consumption have been posted as invoiced to the order in question. Only then can it be considered finished (the status is changed to Finished). Until the production is invoiced, all the costs incurred during the manufacturing process are part of WIP inventory.

In our example, the consumption of components has not yet been posted to the production order and, therefore, the order is not considered to be finished. Therefore, the program has posted the expected value of the manufactured item by inserting the corresponding amount in the **Cost Amount (Expected)** field. This amount is based on the standard unit cost of the item in question (open the item card for item 1100 to see the standard unit cost).

NOTE: A production order is recognized as finished and thus ready for being invoiced when you change it's status to Finished. The change of the status cannot take place if material and/or capacity consumption but no output has been posted to the production order.

8. From the released production order, click
    ORDER→ENTRIES→CAPACITY LEDGER ENTRIES.

Item No.	Description	Quantity	Output ...	Scrap Q...	Direct Cost	Overhead Cost	
1100	Rim assembly	60	5	0	72.00	18.00	
1100	Drilling	50	5	0	50.00	5.00	
1100	Deburr	50	5	0	25.00	2.50	
1100	Machine Inspection	20	5	0	30.00	0.00	
1100	Wheel assembly	90	5	0	45.00	4.50	

These are the records of the actual time (quantity) spent on performing the operations on the item's routing and their costs (direct and indirect) as based on the standard capacity unit cost.

Consuming Raw Materials

To register the completion of the production order in question, the consumption of components must be posted to the order.

Assume that during the production of item 1100, an additional unit of item 1170 was required above the standard quantity predefined on the production BOM for this item.

1. From the **Manufacturing** menu, click EXECUTION→
    CONSUMPTION JOURNALS.

2. Click FUNCTIONS→CALC. CONSUMPTION.

3. On the **Production Order** tab of the request form, select the number of the production order created before.

4. On the **Options** tab, enter 01/29/02 as the posting date and select Actual Output as the basis for calculation. Select Blue as the picking location and confirm by clicking OK.

5. On the consumption line for item 1170, in the **Quantity** field, change the quantity from five to six.
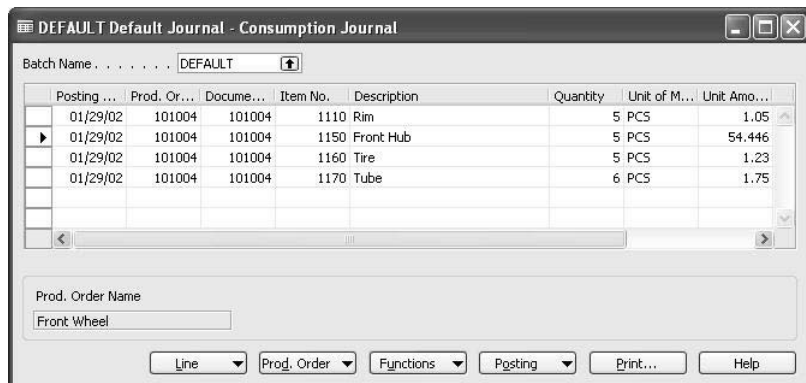
Note that the program filled in the consumption journal with lines that represent only four out of a total of five components specified on the BOM for item 1100. This is because the consumption of component 1120 was forward flushed at the time when the production order was released as based on the expected output. As a result of flushing material consumption, the program created an item ledger entry of the type Consumption and one or more related value entries.

6. Post the consumption journal lines.

Now, open the item ledger entries associated with our production order to view the consumption journal postings.
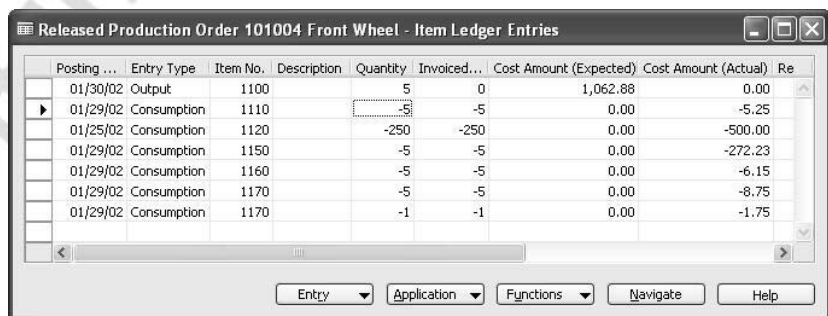
The values in the **Cost Amount (Actual)** field for the entries of the type Consumption are calculated on the basis of the standard unit cost set up on the item cards of the components. Note that the additional unit of component 1170 consumed during the production of the parent item 1100 is posted as a separate entry.

Production Order Cost

At this point, all the manufacturing costs represented by the consumed components and capacity are part of WIP inventory. Remember that the produced item has not yet been invoiced – the value of the manufactured items is contained in the **Cost Amount (Expected)** field rather than the **Cost Amount (Actual)** field.

Invoicing of the production order takes place when the Adjust Cost – Item Entries batch job is run. The precondition for this is that the status of the order is set to Finished.

When running the Adjust Cost – Item Entries batch job, the posting date of the adjustment value entries is set equal to the posting date of the original entry, unless that entry is in a closed accounting period. When the original entry is in a closed accounting period, the program gives the adjustment entry the posting date that you enter on the request form for the batch job in the **Closed Period Entry Posting Date** field. In this way, changes to the inventory value are recognized in and posted into the period when they have actually occurred.

1. From the **Manufacturing** menu, click EXECUTION→RELEASED PROD. ORDERS and browse to the production order you just created. Click FUNCTIONS→CHANGE STATUS.

2. In the Change Status on Prod. Order window, enter a posting date of 02/01/02 and click **Yes** to confirm.

3. In the Navigation Pane, click the **Financial Management** button and click INVENTORY→COSTING→ADJUST COST – ITEM ENTRIES. Click **OK** to confirm.

From the **Manufacturing** menu, click HISTORY→FINISHED PROD. ORDERS and browse to the production order you just finished. Click ORDER→ENTRIES→ITEM LEDGER ENTRIES in order to view the item ledger entries associated with the finished production order.

Entry Type	Item No.	Quantity	Invoiced...	Cost Amount (Expected)	Cost Amount (Actual)	Completely Invoiced	F
Output	1100	5	5	0.00	1,062.88	✔	
Consumption	1110	-5	-5	0.00	-5.25	✔	
Consumption	1120	-250	-250	0.00	-500.00	✔	
Consumption	1150	-5	-5	0.00	-272.23	✔	
Consumption	1160	-5	-5	0.00	-6.15	✔	
Consumption	1170	-5	-5	0.00	-8.75	✔	
Consumption	1170	-1	-1	0.00	-1.75	✔	

Finished Production Order 101004 Front Wheel - Item Ledger Entries

The invoicing of the production order makes the program clear the WIP inventory and move the manufacturing cost to the finished goods inventory. A check mark in the **Completely Invoiced** field indicates the corresponding status of an item ledger entry.

It is important to emphasize that until the batch job is run, a production order is considered to be open for adjustments. These adjustments may represent changes to the manufactured item's production BOM or configuration of the routing. In turn, these changes affect the standard unit cost of an item.
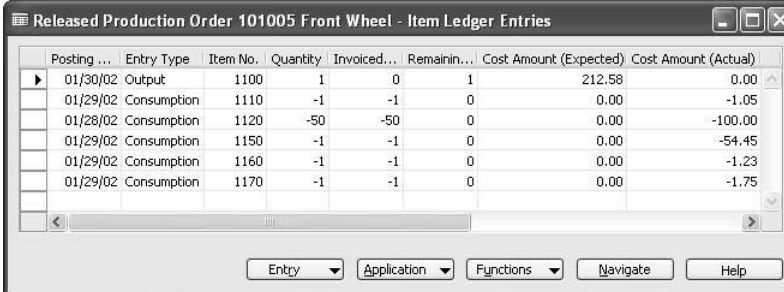
The principle of considering a not-yet-invoiced production order as open for adjustments manifests the convention that the cost of the order is financially recognized as a part of the finished goods inventory only upon the action of invoicing. This principle recognizes the fact that there can often be a time difference between the physical (quantity) transaction and the financial (value) transaction. If during this period the item's standard unit cost changes, it is the new standard cost that the inventory value is capitalized on.

NOTE: To understand the above principle, an analogy can be drawn to a purchase order. You can change the direct unit cost of a purchased item on the received purchase order line, invoice the order and the resulting value entry is based upon the new cost.

This situation is illustrated in the following example.

Example 2 – Accounting for changes to a standard unit cost

A released production order for one unit of item 1100 has been created and the consumption and output transactions based on the predefined production BOM and routing have been posted to the order. The following are the item ledger entries created as a result of these postings:


Posting ...	Entry Type	Item No.	Quantity	Invoiced...	Remainin...	Cost Amount (Expected)	Cost Amount (Actual)
01/30/02	Output	1100	1	0	1	212.58	0.00
01/29/02	Consumption	1110	-1	-1	0	0.00	-1.05
01/28/02	Consumption	1120	-50	-50	0	0.00	-100.00
01/29/02	Consumption	1150	-1	-1	0	0.00	-54.45
01/29/02	Consumption	1160	-1	-1	0	0.00	-1.23
01/29/02	Consumption	1170	-1	-1	0	0.00	-1.75

As the item has been produced but not yet invoiced, the program treats it's cost as expected and calculates it on the basis of the standard unit cost set up on the item card.

Now, assume that since the order was put into production, an additional component – called Extra Item, with a standard unit cost of 5 LCY – has been added to the standard production BOM:
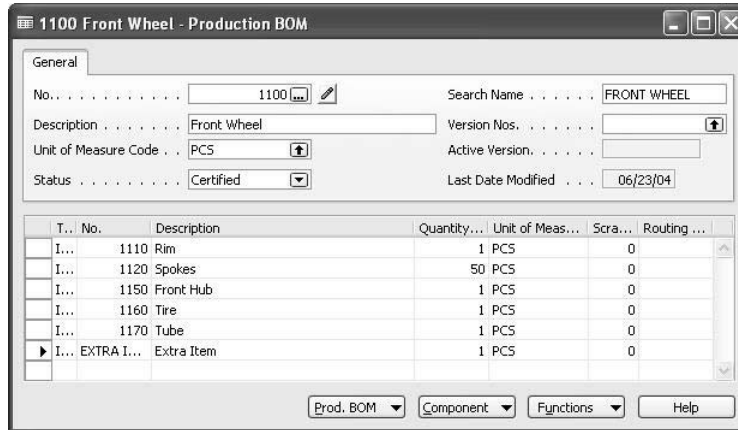

The standard unit cost has been updated on the item from 212.58 to 217.58 LCY:
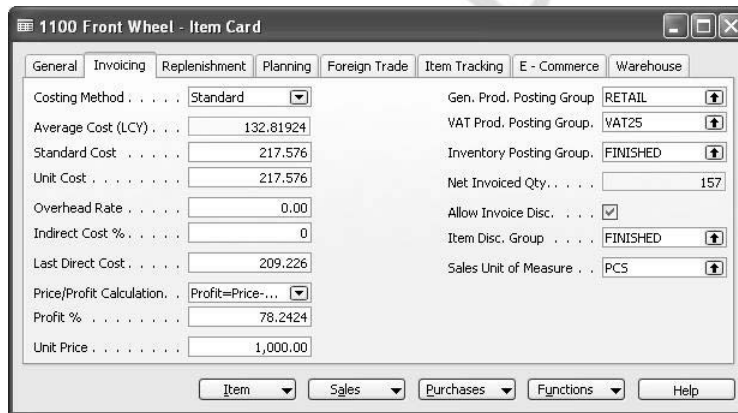
The production order has then been posted as invoiced by means of running the Adjust Cost – Item Entries batch job.

The amount in the **Cost Amount (Actual)** field of the item ledger entries associated with the production order indicates that the inventory value of the produced item 1100 is capitalized on the basis on the new standard cost that is 217.58 LCY:
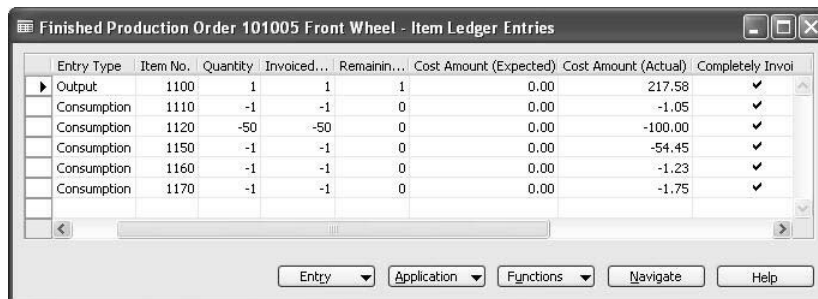
Production Order Statistics

The Production Order Statistics window contains all the relevant information concerning the cost of a specific production order. In this window, the cost information is presented in terms of standard, expected and actual costs per individual cost element. In addition, the deviations from the standard cost are calculated and specified as variances.

From the **Manufacturing** menu, click HISTORY→FINISHED PROD. ORDERS and browse to the production order you finished in scenario 4. Press the F9 key to view the production order statistics.

The amount of the total actual cost and the output quantity of the last posted production order are used in calculating the direct unit cost for the item manufactured in connection with this production order. Based on this unit cost, the program updates the **Last Direct Cost** field on the item card for the item in question.

Average Cost Calculation

As explained in the Inventory Costing course, the item's average cost is calculated for each item, irrespective of the selected costing method. However, while in the actual cost environment the average cost is used in relation to inventory decreases (to initially value the inventory decrease for items with the FIFO/LIFO costing method, or to assign costs to inventory decrease for items with the Average costing method), in the standard cost environment the average cost is largely used for statistical purposes.
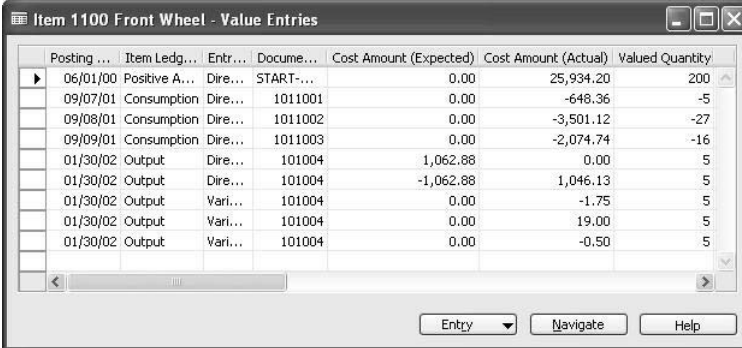
The average cost of a manufactured item – contained in the **Average Cost (LCY)** field on the item card – is calculated in the same way as for a purchased item; that is as the sum of the actual cost amount divided by the sum of the invoiced quantity for the item's value entries:

Average Cost = $\sum$ Cost Amount (Actual) / $\sum$ Invoiced Quantity

The program offers you the possibility to view all the source value entries on which basis an average cost for a specific item has been calculated.

1. Open the item card for item 1100. The **Average Cost (LCY)** field contains the amount of 132.31 LCY.

2. In the **Average Cost (LCY)** field, click the **AssistButton**. The program opens the Value Entries window containing all the records used in calculating the average cost.

Posting ...	Item Ledg...	Entr...	Docume...	Cost Amount (Expected)	Cost Amount (Actual)	Valued Quantity
06/01/00	Positive A...	Dire...	START-...	0.00	25,934.20	200
09/07/01	Consumption	Dire...	1011001	0.00	-648.36	-5
09/08/01	Consumption	Dire...	1011002	0.00	-3,501.12	-27
09/09/01	Consumption	Dire...	1011003	0.00	-2,074.74	-16
01/30/02	Output	Dire...	101004	1,062.88	0.00	5
01/30/02	Output	Dire...	101004	-1,062.88	1,046.13	5
01/30/02	Output	Vari...	101004	0.00	-1.75	5
01/30/02	Output	Vari...	101004	0.00	19.00	5
01/30/02	Output	Vari...	101004	0.00	-0.50	5

Item 1100 Front Wheel - Value Entries

Handling Special Manufacturing Situations

Use of Non-inventory Items

Manufacturing companies sometimes find themselves in a situation where in order to complete a specific production order they need a particular item which is not a part of their regular inventory. As such an item is typically "order-specific" and is probably never used in any other manufacturing processes; companies tend not to register each and every item in the inventory by setting up item cards.

Instead, they set up one – generic – item card, which is used for all non-inventory items. It is important that the item is assigned a costing method that represents an acquisition (for example, FIFO or Specific), rather than a standard valuation base. This is because, by definition, the same item card is used in transactions of principally different items that have different costs, and it is the actual cost of each purchase that must be capitalized.

However, as the same item card represents different items, the same item number may have a great number of inbound item ledger entries due to the purchases of these different items. In view of this, it is important for the company's accountants to ensure that when a specific non-inventory item is consumed in connection with a certain production, its cost must be that of the item in question. This is ensured by making a fixed application between the outbound item ledger entry (item consumption) and the inbound item ledger entry (item purchase).

The following example illustrates the handling of the situation described above.

Example 3 – Material Consumption of Non-inventory Item

1. Create a new item with the following specifications:

No.	NON-INV
Description	Non-inventory Item
Base Unit of Measure	PCS
Costing Method	FIFO
Gen. Prod. Posting Group	RAW MAT
VAT Prod. Posting Group	VAT25
Inventory Posting Group	RAW MAT
Unit Cost	1.00
Unit Price	2.00

Now, assume that the production planner needs to acquire a special non-inventory item for a particular production order. In Cronus, the item is purchased under the name of NON-INV item.

2. Create a purchase order for vendor 10000 at location Blue with a posting date of 01/25/02, for ten pieces of item NON-INV. In the **Vendor Invoice No.** field, enter INVOICE3.

   The vendor invoices this purchase at a cost of 90 LCY per unit.

3. On the purchase line, in the **Direct Unit Cost Excl. VAT** field, enter 90.

4. Post the order as received and invoiced.

   Now, assume that some time later the production planner needs another special item in connection with another production order. The NON-INV item is again used to register the purchase transaction in the program:

5. Create a purchase order for vendor 50000 at location Blue with a posting date of 01/30/02, for 30 pieces of item NON-INV. In the **Vendor Invoice No.** field, enter INVOICE4.

   The vendor invoices this purchase at a cost of 3 LCY per unit.

6. On the purchase line, in the **Direct Unit Cost Excl. VAT** field, enter 3.

7. Post the order as received and invoiced.

The following inbound item ledger entries have been created as a result of the two above transactions:

Now, the planner creates a released production order where the second non-inventory component is to be used.

8. Create a released production order for four units of item 1100 with a due date of 01/27/02 at the Blue location.

Now, post material consumption:

9. Create the consumption lines with quantities calculated on the basis of the expected output, with picking location Blue and a posting date of 01/27/02.

10. In the consumption journal, create an additional consumption line for the special component, item NON-INV, as shown in the following window shot.

As the item is valued on the basis of actual acquisition cost, this consumption transaction (inventory decrease) is initially valued at the unit cost of 1.00 LCY, as specified in the **Unit Amount** field. When the cost is adjusted – as a result of running the Adjust Cost – Item Entries batch job – the program applies the cost of the first open inbound item entry, according to the FIFO cost flow assumption. This adjustment takes place unless there is a fixed application between the consumption line and the specific inbound item entry. The fixed application between the entries is ensured that the consumption is valued at the cost at which the component in question was purchased.

11. In the **Applies-to Entry** field of the line, select the entry
representing the purchase of the needed component:

12. Post the consumption journal lines.

13. Run the Adjust Cost – Item Entries batch job.

The amount in the **Cost Amount (Actual)** field of the item ledger
entries associated with the production order indicates that item NON-
INV is valued at the cost at which it was purchased with the second
purchase order, which is 3.00 LCY.

Accounting for By-products

The general assumption with regard to a manufacturing process is that certain
quantities of materials are consumed in order to produce a finished good and,
therefore, a consumption transaction represents a decrease of the raw materials
inventory. However, some manufacturing processes may in fact result in an
output of additional materials/items. When this is the case, the output goods are
regarded as by-products and represent an increase of the raw material/finished
goods inventory.

To account for by-products in Microsoft Navision, manufacturing companies
must use the regular consumption journal and create a consumption record with a
negative quantity. The quantity represents the number of raw material items
produced as a result of the manufacturing process.

When posted, the value of the negative consumption line is debited to the Raw
Material or Finished Goods account (depending on the inventory posting group
selected for the item in question) and credited to the WIP account.

Clearing WIP when the entire output is scrapped

Manufacturers may sometimes encounter situations where at the end of the production process the entire output must be scrapped. When handled in the program, such a situation may represent a problem for the company from the financial viewpoint for the following reasons:

As the produced quantity of finished goods is recorded and posted from the output journal, when the scrap quantity is equal to the output quantity, the total output is posted with zero quantity, and thus cost. However, regardless of the fact that nothing has been output, a certain quantity of raw materials and capacity was consumed to produce the scrapped goods. These manufacturing costs remain part of WIP inventory, even after the related production order has been invoiced due to zero output quantity. In practical terms, this implies that a certain amount is accumulating on the WIP account while there is no output to assign this cost to, and thus move the cost from WIP to finished goods inventory.

To resolve the above situation, accountants may choose to do the following:

1. Even though the entire output is scrapped, post the output journal with a quantity of one.

   In this way, when the production order's output gets invoiced, the program moves the associated manufacturing costs from WIP to the finished goods inventory account.

2. Make a negative adjustment for the quantity of one for the finished item in question, and create a fixed application between the adjustment line and the output line to ensure the correct cost reversing.

Subcontract Operations

It is a common practice among manufacturers to outsource some or all of their production operations to third-party producers. In Microsoft Navision, these producers are termed subcontractors and subcontracting is treated as a purchase of additional capacity.

As for the in-house capacity, subcontracted capacity is associated with and is set up as a work center, which is then added to the routing for the item in question. The actual transaction of subcontracting is handled by means of creating and posting a purchase order. The cost of these outside services is then added to the total cost of the production order. The following example illustrates the way the subcontracting cost is handled in the program.

Example 4 – Subcontracting Cost

This example is based on handling the existing released production order for ten units of manufactured item 1000 in our demonstration company Cronus.

1. Open the released production order no. 1011004.

    Assume that an additional production process must be performed on this item, and this process is to be subcontracted. With this in view, the subcontracted process must be added to the item's routing as an additional operation.

2. In the released production order, click LINE→ROUTING.

3. Create a new routing line with the following specifications:

No.	35
Work Center	Outside Process
Move time	60 minutes

    Now, update the production order.

4. Click FUNCTIONS→REPLAN. On the **Options** tab select Back as the scheduling direction and Plan No Levels.

5. Click **OK** to replan the order with the modified routing.

    Now, calculate all subcontracts in the subcontracting worksheet.

6. From the **Manufacturing** menu, click PLANNING→ SUBCONTRACTING WORKSHEETS.

7. Click FUNCTIONS→CALCULATE SUBCONTRACTS. On the **Prod. Order Routing Line** tab set the filter for the order no. 1011004. On the **Options** tab, enter 09/22/01 as order date. Click **OK**.
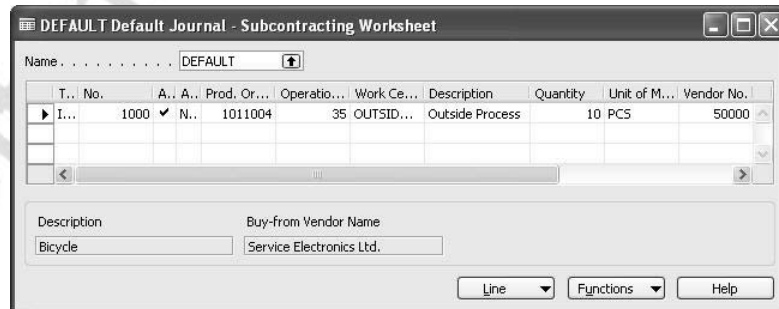
8. Click FUNCTIONS→CARRY OUT ACTION MESSAGE to create a purchase order for the subcontracting worksheet line.

    Process the purchase order for the subcontracted capacity that you have just created.

9. Browse to the purchase order for the subcontracted services.

10. In the purchase header, enter 09/22/01 as posting date and in the **Vendor Invoice No.** field, enter INVOICE5. In the **Direct Unit Cost Excl. VAT** field of the purchase line, enter 200. Post the order as received and invoiced.

    Based on this transaction, the program creates a capacity ledger entry, which is associated with the production order in question and the work center representing the subcontractor's capacity.

    When posted to G/L, the amount of the direct cost is credited to the Direct Cost Applied account and debited to the WIP account.

    Note that when the production order is finished and invoiced, a subcontracted variance is posted to the general ledger for the difference between the standard cost of the subcontract work and the purchase invoice cost of this work.

11. Complete the processing of the production order no. 1011004 by posting components and capacity consumption as well as output to the order. Change the status to Finished.

12. Run the **Adjust Cost – Item Entries** batch job to invoice the production order.

View the value entries created in relation to the item ledger entry for the output item:

The amount in the **Cost Amount (Actual)** field for the entry of type Variance and variance type of Subcontracted is equal to –2,000 LCY. As the standard routing layout for item 1000 does not include any subcontracted operations, the variance amount is the same as the direct (invoiced) cost of the subcontracted capacity.

Inventory Valuation

A manufacturing company needs to determine the value for three types of inventory:

- Raw Materials inventory
- WIP inventory
- Finished Goods inventory

Typically, the first and the third inventory types are regarded as one and are referred to as non-WIP inventory as opposed to WIP inventory.

By definition, inventory valuation is the determination of the cost assigned to an inventory item. Regardless of the inventory type, calculation of the inventory value is principally based on the following equation:

Inventory Value	=	Beginning Balance of Inventory	+	Value of All Increases	-	Value of All Decreases

In practical terms, the program tracks the costs of all increases and decreases and then calculates the inventory value.

To determine the value of WIP inventory, the above equation can be rewritten in the following way:

Ending WIP Inventory	=	Beginning WIP Inventory	+	Manufacturing Cost	-	Cost of Goods Manufactured

In this formula, the term manufacturing cost refers to the cost incurred during a financial period and represents an inventory increase, while cost of goods manufactured is the cost of the finished manufactured items that represent an inventory decrease.

The mechanism according to which the program records the values of increases and decreases in different types of manufactured inventory is the same as for the purchased inventory. This mechanism is described in detail in the Inventory Costing course and, therefore, is not repeated here. However, the general principle on which inventory valuation is based is highlighted hereunder, with focus on WIP inventory.

First, it is the value entries that provide the basis of the inventory valuation. The calculation is made using the values in the **Cost Amount (Actual)** field of the item and capacity value entries associated with a production order.
Second, the purpose of WIP inventory valuation is to determine the value of the items whose manufacturing has not yet been completed on a given date. Therefore the WIP inventory value is based on the value entries related to the consumption and capacity ledger entries. Consumption ledger entries must be completely invoiced at the date of the valuation.

The Inventory Valuation – WIP report includes the value of WIP inventory at a certain date or period, which you can specify on the request form. This report is placed in the **Manufacturing** menu under COSTING→REPORTS.

Example 5 – Inventory Valuation

To determine the value of the WIP inventory during the period between 01/25/02 and 01/29/02, follow these steps:

1. From the **Manufacturing** menu, click
   COSTING→REPORTS→INVENTORY VALUATION WIP.

2. On the **Options** tab, enter 01/25/02 as a starting date and 01/29/02 as an ending date. Click **Preview** to see the report.

Note that the costs representing the WIP inventory value in the specified period are divided into two categories: consumption and capacity.

Posting Inventory Costs to the General Ledger

As explained at the beginning of the course, the value entries making up the inventory costs are created as a result of inventory posting. If the program is not set up to make automatic posting to G/L, then the inventory costs must be reconciled with the records of the general ledger.

The type of the item ledger entry and value entry is used to determine which general ledger account to post to. Generally, where the standard cost is used as an inventory valuation base, the program posts the costs incurred in the manufacturing process in the following manner:

Entry type Purchase: Costs of the item ledger entries of the type Purchase are debited to the Inventory account in the balance sheet. The credit is posted to the following balancing accounts in the income statement:

- The Direct Cost Applied account for the value entries of the type Direct Cost.

- The Overhead Applied account for the value entries of the type Indirect Cost.

- The Purchase Variance account for the value entries of the type Variance.

Entry type Consumption: Costs of the item ledger entries of the type Consumption are credited to the Inventory account and debited to the WIP account in the balance sheet.

Entry type Output: Costs of the item ledger entries of the type Output are debited to the Inventory account in the balance sheet and credited to the following balancing accounts:

- The WIP account for the value entries of the type Direct Cost.

- The Overhead Applied account for the value entries of the type Indirect Cost.

- The Material Variance account for the value entries of the type Variance and of the variance type Material. This account accumulates the difference between the direct cost of materials used in production and the direct (standard) cost of materials specified on the manufactured item's BOM.

- The Capacity Variance account for the value entries of the type Variance and of the variance type Capacity. This account accumulates the difference between the direct cost of capacity consumed during production and the direct (standard) cost of capacity specified on the routing for the manufactured item.

- The Capacity Overhead Variance account for the value entries of the type Variance and of the variance type Capacity Overhead. This account accumulates the difference between the overhead cost of capacity consumed during production and the overhead (standard) cost of capacity specified on the routing for the manufactured item.

- The Subcontracted Variance account for the value entries of the type Variance and of the variance type Subcontracted. This account accumulates the difference between the direct cost of subcontracted services purchased for a specific production order and the standard cost of subcontracted services specified on the subcontractor (work center) card.

- Manufacturing Overhead Variance account for the value entries of the type Variance and of the variance type Manufacturing Overhead. This account accumulates the difference between the actual overhead cost incurred in manufacturing the item and the standard overhead cost specified on the item card for the item in question.

The values of the capacity ledger entries are debited to the WIP account in the balance sheet and the credit is posted to the following balancing accounts in the income statement:

- The Direct Cost Applied account for the value entries of the type Direct Cost.
- The Overhead Applied account for the value entries of the type Indirect Cost.

The manufacturing companies must ensure that all the relevant G/L accounts are set up in the program before undertaking inventory and production order postings.

The G/L accounts on the income statement must be set up in the General Posting Setup window, while the Inventory, WIP and Production Variance accounts are set up in the Inventory Posting Setup window.

The following tables provide an overview of all the G/L accounts required in connection with inventory and production cost management:

G/L Accounts in the General Posting Setup	Purpose
COGS Account	To post the inventory decrease, due to sales, to the income statement.
COGS Account (Interim)	To post the expected inventory decrease, due to sales, to the income statement. Only when using expected cost posting.
Inventory Adjustment Account	To post inventory increases and decreases, due to adjustments, revaluations and rounding, to the income statement.
Inventory Accrual Account (Interim)	To post expected inventory increases and decreases.
Direct Cost Applied Account	To post the direct costs (purchased materials, capacity and purchased subcontractor's services) to the income statement.
Overhead Applied Account	To post the indirect costs (purchased materials, capacity and purchased subcontractor's services) to the income statement.

G/L Accounts in the General Posting Setup	Purpose
Purchase Variance Account	To post the difference between the standard cost and the direct cost of the purchased inventory to the income statement.
Inventory Account	To post the inventory value of purchased materials and manufactured items to the balance sheet.
Inventory Account (Interim)	To post the expected inventory value to the balance sheet.
WIP Account	To post the value of the WIP inventory to the balance sheet.
Manufacturing Overhead Variance Account	To post the difference between the actual overhead cost incurred in manufacturing the item and the standard overhead cost specified for the item to the income statement.
Capacity Overhead Variance Account	To post the difference between the overhead cost of capacity consumed during production and the overhead (standard) cost of capacity specified on the routing for the manufactured item to the income statement.

NOTE: Appendix 1, Controlling Accounts Posted to the General Ledger, included in the Costing White Paper, provides a list of all possible combinations between different types of value entries, the account and the balancing account posted to in the general ledger.

General Posting Setup

The General Posting Setup window contains records of combinations of the general business posting group and the general product posting group. The general business posting group becomes the property of a value entry and is copied from the corresponding field on the **Posting** tab of a production order.

The general product posting group must be set up for each item and each machine/work center to become a property of value entries created as a result of posted purchases and capacity.

Typically, as far as manufacturing costing is concerned, a general posting setup must at least include records for material purchases, capacity postings and/or subcontractor purchases. The following is an example of a minimum general posting setup:

Inventory Posting Setup

The inventory posting setup is used to specify the combination between location code, inventory posting group and the Inventory, WIP and different production variance accounts required in the standard costing environment. In this case, the Inventory and WIP accounts are balance sheet inventory accounts while the variance accounts that accumulate expenses related to "cost of goods manufactured" belong to income statement accounts.

Manufacturing companies must specify an inventory posting setup for at least two inventory posting groups: raw material and finished goods. The following is an example of a minimum inventory posting setup:

Post Inventory Cost to G/L Batch Job

The program reconciles inventory entries and the general ledger by means of the Post Inventory Cost to G/L batch job. This batch job posts inventory costs to the general ledger based on the values in the **Cost Amount (Actual)** field on the value entries.

When posting inventory costs to the general ledger, the program calculates the inventory value by summing up the actual cost amounts in the value entries that are related to each item ledger entry. In this way, it is ensured that, for example, additional costs posted as item charges and rounding residuals are included in the inventory value.

The batch job can post inventory value in the general ledger per ledger entry or per posting group. If posting is done per ledger entry, a detailed specification is provided as to how a specific transaction has influenced the general ledger. In this case, however, numerous G/L entries are created. If posting is done per posting group, then business posting groups as well as item posting groups and locations are taken into consideration.

*NOTE: Starting from Microsoft Navision 4.00, when running the Post Inventory Cost to G/L batch job with posting method Per Entry, the posting date of the G/L entries is set equal to the posting date of the original entry, unless that entry is in a closed accounting period. When the original entry is in a closed accounting period, the program gives the G/L entry the posting date that you enter on the request form for the batch job in the **Closed Period Entry Posting Date** field.*

The amount posted to the G/L is calculated from the value entry as:
Cost Amount (Actual) – Cost Posted to G/L

After posting to the general ledger, the entire amount in the **Cost Amount (Actual)** field on the item ledger entry is now posted, and the value entry is updated accordingly:
Cost Posted to G/L – Cost Amount (Actual)

A report created as a result of running the Post Inventory Cost to G/L batch job shows all the different postings done against Inventory.

*NOTE: Starting from Navision 3.60, for the Post Inventory Cost to G/L batch job, you have the option of simulating the posting before performing actual posting to G/L. This option is activated by removing a check mark in the **Post** field on the **Options** tab of the request form for the batch job and clicking the **Preview** button. The program then generates a posting report, but does not insert G/L entries.*

*In the previous versions of Navision, the Post Inventory Cost to G/L batch job performed actual postings as soon as you clicked the **Print** or **Preview** buttons on the request form for the batch job.*

The Post Inventory Cost to G/L batch job allows you to post adjustments recognized after closing the accounting period to be posted into an open accounting period. This is an advantage, as these adjustments can be posted without reopening a closed accounting period. A disadvantage is that balances in the inventory and general ledger are only guaranteed to be equal at the moment when the reconciliation is made.

Example 6 – Inventory Posting to G/L

1. Run the Adjust Cost – Item Entries batch job.

2. From the **Financial Management** menu, click
   INVENTORY→COSTING→POST INVENTORY COST TO G/L. On the **Options**
   tab of the request form, select Posting Method as Per Entry. In the
   Closed Period Entry Posting Date field, enter 02/01/02 and in the
   Post field, place a check mark.

---

*NOTE: For more details about filling in the request form for the Post Inventory
Cost to G/L batch job, read the topic "Post Inventory Cost to G/L Batch Job" in the
Online Help.*

---

3. Click **Preview**.

   The program generates the Post Inventory Cost to G/L report
   specifying the amounts posted to the relevant G/L accounts.

   The program also updates the value entries for the individual items
   that were included in the batch job.

4. Open the value entries for the finished production order for five units
   of item 1100.

Posting ...	Item Ledg...	Entry Type	Docume...	Cost Amount (Actual)	Cost Amount (Expected)	Cost Posted to G/L
► 01/25/02	Consumption	Direct Cost	101004	-500.00	0.00	-500.00
01/30/02		Direct Cost	101004	72.00	0.00	72.00
01/30/02		Indirect Cost	101004	18.00	0.00	18.00
01/30/02		Direct Cost	101004	50.00	0.00	50.00
01/30/02		Indirect Cost	101004	5.00	0.00	5.00
01/30/02		Direct Cost	101004	25.00	0.00	25.00
01/30/02		Indirect Cost	101004	2.50	0.00	2.50
01/30/02		Direct Cost	101004	30.00	0.00	30.00
01/30/02		Direct Cost	101004	45.00	0.00	45.00
01/30/02		Indirect Cost	101004	4.50	0.00	4.50
01/30/02	Output	Direct Cost	101004	0.00	1,062.88	0.00

Finished Production Order 101004 Front Wheel - Value Entries

[Entry ▼] [Navigate] [Help]

   Now the **Cost Posted to G/L** field contains the same values as the
   Cost Amount (Actual) field, indicating that the general ledger has
   been updated with the corresponding amounts.

   Let's analyze the postings performed by the program to the G/L
   accounts.

5. Navigate to the G/L entries for the finished production order for five
   units of item 1100.

First, consider the G/L entries created as a result of posting material and capacity consumption:

The costs incurred in connection with these production order transactions have been posted to the following accounts in the general ledger:

1. Inventory accounts 2120 (Finished Goods) and 2130 (Raw Material) – depending on the inventory posting group set up for the item – are credited for the total cost of each component used in production, that is, 277.48 LCY and 516.65 LCY respectively.

2. The WIP account 2140 is debited for the total cost of each component used in production, which equals 794,13 LCY (277.48 LCY + 516.65 LCY).

3. The WIP account 2140 is also debited for the total cost (222 LCY of direct and 30 LCY of indirect costs) of capacity consumed on each operation on the parent item's routing.

4. The direct and indirect capacity costs are posted to the balancing accounts: Direct Cost Applied account 7791 and Overhead Applied account 7792, respectively.

A summary of the postings analyzed above can be presented as follows:

Finished Goods		Raw Materials		WIP	
5.25		500.00		277.48	
272.23		6.15		516.65	
277.48		8.75		222.00	
		1.75		30.00	
		516.65		1046.13	

Direct Costs Applied		Overhead Applied	
72.00		18.00	
50.00		5.00	
25.00		2.50	
30.00		4.50	
45.00			
222.00		30.00	

Now, consider the G/L entries created as a result of posting the output and invoicing the production order in question:

Inventory account 2120 (Finished Goods) is debited for the total actual costs of five manufactured items 1100 and debited or credited for the variances between the actual and standard material and capacity consumption, as well as the respective overhead variances.

5. These variances are posted to the balancing variance accounts: Material Variance account 7890, Capacity Variance account 7891 and Capacity Overhead Variance account 7893.

The material variance is equal to 1.75 LCY. This amount is derived from an additional unit of item 1170 consumed during production of the parent item 1100. Specifically, according to the BOM, the standard cost of consumed item 1170 is 8.75 LCY (5 units * 1.75 LCY), while the production order actually consumed 10.50 LCY (6 units * 1.75 LCY).

The capacity variance is equal to –19.00 LCY. This amount is derived from the less capacity time (setup and run time) actually consumed by different operations on the routing as compared to their standard cost. Specifically, the standard capacity consumption cost is calculated as 241.00 LCY, while the consumed capacity cost is calculated as 222.00 LCY.

The capacity overhead variance is equal to 0.50 LCY. This amount is derived from the difference in the actually consumed and standard capacity on operations for the production order in question. Specifically, the standard capacity overhead cost is calculated as 29.50 LCY, while the actual overhead based on the consumed capacity cost is as 30.00 LCY.

The WIP account 2140 is credited for the total actual costs of five manufactured items 1100 at the time of invoicing the production order.

A summary of the postings analyzed above can be presented as follows:

Finished Goods		Material Variance		Capacity Variance	
1,046.13		1.75			19.00
19.00	1.75				
	0.50				
1,062.88					

Cap. Overhead Var.		WIP	
0.50		1,046.13	
			1,046.13

Posting Expected Inventory Value

Microsoft Navision offers companies the option of posting the expected value of inventory increase or decrease to the general ledger. This option is useful in situations where only the quantity part of an inventory transaction has been posted. More specifically, unless the option of posting the expected cost to G/L is activated, the expected cost amount in the value entries are not posted to the corresponding accounts in G/L.

In the Inventory Costing course, a number of cases where this option becomes relevant are identified in relation to the business activities of the reselling/distribution companies. This course also provides a detailed explanation of the mechanism of posting the expected cost to G/L. As this mechanism is the same as regards accounting for the expected cost of the manufactured inventory, its operation is not repeated here.

However, the general principles on which the posting of expected cost is based are highlighted hereunder, with focus on manufacturing cost:

- Companies may want to post expected cost to G/L in order to get an estimate of the cost of: (1) the received items (components) before receiving the actual invoice; (2) the production order with posted but not yet invoiced output. In this manner, they can more or less accurately estimate the value of their assets at a given date.

- This option is activated by placing a check mark in the Expected Cost Posting to G/L field on the **General** tab of the inventory setup.

- The expected costs are posted to interim accounts at the time of: (1) order receipt/shipment in case of respective purchase and sales orders; and (2) posting the output (last output operation on the routing, if routings are used). When the order has been completely invoiced, the interim accounts are balanced, and the actual costs are posted to the regular accounts.

In summary, the advantage of using an expected cost is that in this way companies avoid the situation where the non-invoiced cost of a single component postpones the posting of manufactured items in terms of value. This is especially true for a make-to-order environment with short lead-time or components purchased especially for each production order.

Inventory Revaluation

The value of a company's inventory can change over time, for example, as a result of deterioration, age or changed market conditions. Therefore, to reflect the inventory value most accurately, companies may need to revalue the inventory. The practice of revaluing inventory is applicable to both inventory valued on the basis of both acquisition cost and standard cost. Likewise, the revaluation can be made for both non-WIP and WIP inventory.

The working of the revaluation mechanism of non-WIP inventory is described in detail and illustrated in Chapter 4, Inventory Costing Functionality, of the Inventory Costing course and, therefore, are not repeated here. However, the general principles on which inventory revaluation in Microsoft Navision is based are recapitulated in the following paragraph before moving to the major focus of this section – revaluation of WIP inventory.

Regardless of the inventory type, the inventory revaluation:

- Can be implemented at any date, also back in time.

- Is based on revaluable quantity, which is calculated as the sum of quantity for item ledger entries of inventory decrease and increase with a posting date equal to or earlier than the revaluation posting date.

- Only includes completely invoiced item ledger entries.

- Is performed in the revaluation journal.

- Has no effect on the variance calculation as this only changes the inventory value.

WIP Inventory Revaluation

As pointed out earlier, revaluation can be performed for WIP inventory. In essence, revaluation of WIP inventory implies the revaluation of components that at the time of revaluation are registered as part of WIP inventory.

With this in mind, it is important to establish conventions as to when an item is considered part of the WIP inventory from a financial point of view. In Microsoft Navision, these conventions are as follows:

- A purchased component becomes part of the raw material inventory from the time of posting a purchase as invoiced.

- A purchased/subassembled component becomes part of the WIP inventory from the time of posting its consumption in connection with a production order.

- A purchased/subassembled component remains part of the WIP inventory until the time when a production order (manufactured item) is invoiced.

The way the valuation date for the value entry of consumption is set, follows the same rules as for non-WIP inventory and is explained in detail in the Inventory Costing Course.

WIP inventory can be revalued as long as the revaluation date is not later than the posting date of the corresponding item ledger entries of type Consumption and as long as the corresponding production order has not been invoiced yet.

As established earlier in relation to non-WIP inventory, a revaluation of existing inventory affects the value of all the outbound transactions involving this inventory. The rules for how the program determines whether an inventory decrease is affected by a revaluation as regards non-WIP inventory are explained in detail in the Inventory Costing course.

The following example illustrates the mechanism of revaluing WIP inventory.

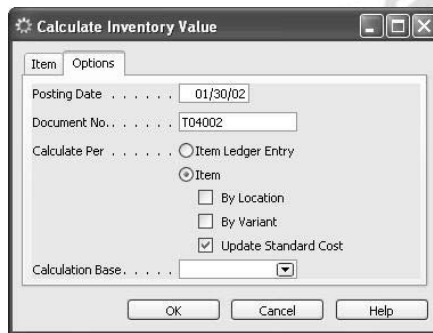### *Example 7 – Revaluing WIP Inventory*

Consider the released production order for four units of item 1100 that you created earlier. Assume that an additional unit of item 1160 is required above the standard quantity predefined on the production BOM for this item.

1. From the **Manufacturing** menu, click EXECUTION→ CONSUMPTION JOURNALS.

2. In the consumption journal line, fill in the information from above with a posting date of 01/31/02. Post the journal line.

At this point, only material consumption has been posted to the order. This implies that the components associated with the production order in question are part of WIP inventory and are, therefore, available for revaluation.

Now revalue one of the components – item 1160 – on the BOM for item 1100. Assume that the revaluation takes place on 01/30/02.

3. From the **Manufacturing** menu, click COSTING→REVALUATION JOURNALS. In the Revaluation Journal window, click FUNCTION→CALCULATE INVENTORY VALUE. and confirm that you want to continue with the revaluation.

4. On the **Item** tab of the request form, filter on item 1160 and location code Blue, and then fill in the **Options** tab with the following information:
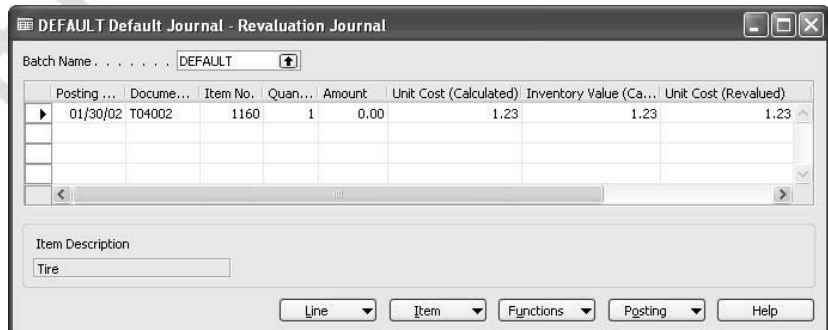
5. Click **OK** to retrieve the journal line.

6. On the journal line, change the amount in the **Unit Cost (Revalued)** field from 1.23 to 2.00 LCY.

7. Post the journal line.

The value of the existing stock in WIP inventory of item 1160 has now increased compared to its value at the time of purchase. Open the item ledger entries for item 1160.

In the line for the entry of type Purchase, the value in the **Cost Amount (Actual)** field has been updated to 13.07 LCY (10 * 1.23 + 1 * 0.77). There are two entries of type Consumption for our production order. Both are still on an item cost of 1.23 LCY. Because the revaluation took place after the posting date of the first consumption, only the consumption of one unit, posted on 01/31/02, is to be affected by the new item cost, regardless of whether the related output is posted and invoiced before or after the revaluation posting date.

Now, complete handling of our production order by first posting the output and then invoicing the order.
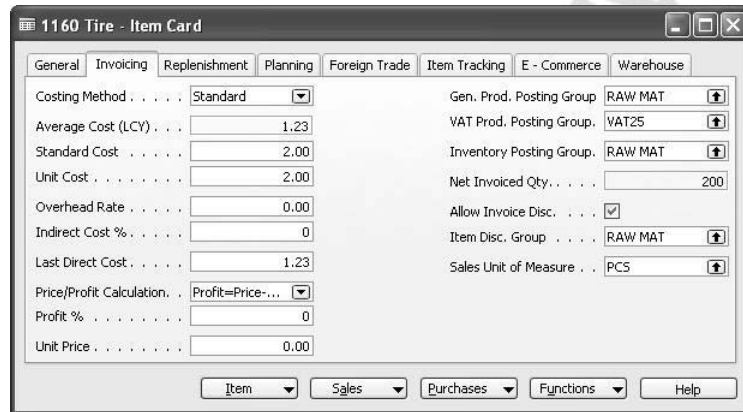
8. Post the output for the production order with the posting date of 02/02/02.

9. Change the status of the released production order to Finished.

10. Run the Adjust Cost – Item Entries batch job.

Now analyze the impact of the revaluation on the cost of the consumed item 1160. Open the item ledger entries for item 1160 sorted according to the entry number.

For the ledger entry of type consumption on 01/31/02, the value of the **Cost Amount (Actual)** field has been corrected to -2.00 LCY. The valuation date of the related value entry caused by the revaluation is that of the corresponding consumption posting. The cost of the first consumption transaction remains unchanged.

As the result of revaluing the component in the revaluation journal, the program also updated the **Standard Cost** field on the item card:

The standard cost of the parent item must also be updated now, due to the changes in the standard cost of its components. An update of the parent item's cost can also be implemented from the revaluation journal. In this case, the program calculates the inventory value of the item's quantity on hand as based on the old unit standard cost, and then also recalculates the inventory value as based on the standard cost of the revalued component.

Perform the revaluation of item 1100 on the same date as the revaluation of its component, which is 02/02/02.

11. In the Revaluation Journal window, click FUNCTION→CALCULATE INVENTORY VALUE. and confirm that you want to continue with the revaluation.

12. On the **Item** tab, filter on item 1100 and location Blue, and then fill in the **Options** tab with the following information (the value of the **Calculation Base** field is set to Standard Cost – Manufacturing):

By selecting Standard Cost – Manufacturing in the **Calculation Base** field, you ensure that the cost of the production BOM components are included in the calculation.

13. Click **OK**.

The value in the **Unit Cost (Revalued)** field contains the new recalculated standard cost of item 1100 due to the increase of the unit cost of its component, item 1160, by 0.77 LCY.

14. Post the revaluation journal line.

The program correspondingly updates the **Standard Cost** field and the **Unit Cost** field on the item card for manufactured item 1100.

Test Your Knowledge – Manufacturing Costing Functionality

1. Subcontractor costs are one of the key cost elements that make up the manufacturing cost of a finished item.
   Where do you set up the costs of subcontracting services?

2. The material cost of a manufactured item can be represented in two ways that correspond to the two standard cost calculation bases single-level and rolled-up (or multi-) level.
   Explain in short words for each of the two bases which cost elements are contained in the material costs.

3. What are the two types of ledger entries, which are created on posting the last operation on a routing? Which cost objects are related to each of them?

4. True or False:
   Invoicing of a production order takes place when its status is changed to Finished.

Quick Interaction: Lessons Learned

Take a moment to write down three Key Points you have learned from this chapter:

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CHAPTER 4: STANDARD COST WORKSHEET

This chapter contains the following sections:

- Overview
- Objectives
- Using the Standard Cost Worksheet

Objectives

By the end of this chapter, you should be able to:

- Update costs at the component and capacity levels.
- Consolidate and roll up component and capacity costs.
- Implement the cost update for standard cost and inventory value.

Overview

As stated earlier, standard costing is widely used by manufacturing companies. This requires that the companies periodically review and update their standard costs. To support this process it is important that you can:

- Prepare the changes in advance of the date where they have to take effect.
- Simulate the effect on the cost of the manufactured item if the standard costs for consumption and/or capacity usage are changed.
- Execute the changes at a given date and let it take effect immediately throughout the program.

The standard cost worksheet is an efficient tool for companies who carry out the periodic task of reviewing and updating standard costs. The worksheet allows them to work with standard cost updates in a similar way as they would do in, for example, an Microsoft® Excel spreadsheet, but within the framework of the application.

By providing an overview of the current standard costs, the worksheet becomes a convenient space where the preparation for cost update can take place without taking immediate effect in the program. This preparation that usually starts from cost updates for both the purchased components and capacity can be carried out using different sorting criteria in several worksheets simultaneously with the possibility of consolidating them into one. Simulating the effect on the cost of the manufactured item due to changes in components and/or capacity usage cost in the worksheet represents an efficient way of getting a required overview and helps ensure that many potential errors are identified and avoided.

The facility to execute the changes at a given date and to ensure that any revaluation resulting from cost changes is dealt with in the program is the cornerstone of the standard cost worksheet. This provides a company's controllers with a reliable and efficient means to maintain accurate and up-to-date inventory costs.

Using the Standard Cost Worksheet

The process of updating standard costs would typically consist of three tasks as follows:

1. Updating costs at the component and capacity levels.
2. Consolidating and rolling up the component and capacity costs to calculate the total manufacturing cost of the items.
3. Implementing the changes in the program in terms of updating the unit cost on the item card and performing inventory revaluation.

Implementing the above mentioned tasks in the standard cost worksheet is illustrated in the following.

Consider the following scenario:

Scenario 5

An internal controller at Cronus is responsible for reviewing and updating standard costs of all the items. Suppose that some months before the calendar year end the controller initiates the update process.

With this in view, she contacts the purchaser and the production manager/planner to require input on standard cost changes for the components and production capacity respectively.

Standard Cost Update at the Component and Capacity Levels

A purchaser starts working in a separate worksheet:

1. From the Manufacturing menu, click COSTING→STANDARD COST WORKSHEETS.

2. In the **Name** field, click the **AssistButton**. In the Standard Cost Worksheet Names window, create a new line and assign the name Purch 2003. Confirm by clicking **OK**.
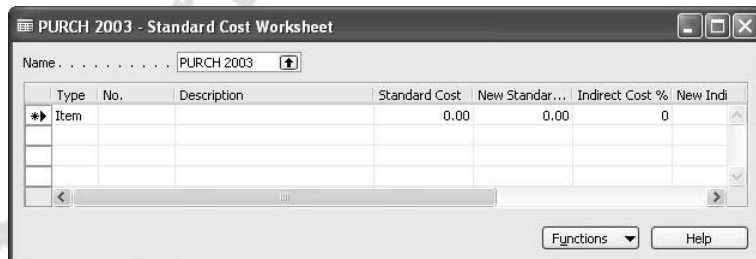
As several users can work with cost updates simultaneously using different worksheets, another purchaser (for example, responsible for a different product line) can be carrying out updates in a separate worksheet.

Now, the purchaser needs to get an overview of the current standard unit cost for components. To retrieve the costs, use the batch job:

3. Click FUNCTIONS→SUGGEST ITEM STANDARD COST.

4. In the request form, set the filter for items with Purchase as replenishment system and Standard as costing method. Set the filter to retrieve items from 1000..1900.

Now, assume the standard unit cost for the specified items must be increased by 10%:

5. On the **Options** tab, in the **Adjustment Factor** field enter 1.1 for the standard cost line.

   Note that adjustments can also be done for other cost shares – overhead and indirect cost %.

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*NOTE: To change standard unit costs by absolute amounts, use the Rounding Method table accessible from the **Options** tab of the request form.*

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6. Click **OK** to fill in the worksheet.

The program retrieves the current standard unit costs from the item cards for the specified items and calculates the new costs based on the adjustment/rounding factor. Remember that at this point, the changes have not yet taken effect in the program. The purchaser may carry out further updates in the worksheet. The procedure is complete when the purchaser finds the update results satisfactory.

Suppose now that at the same time a production manager initiates the update of the capacity-related costs in a separate worksheet.

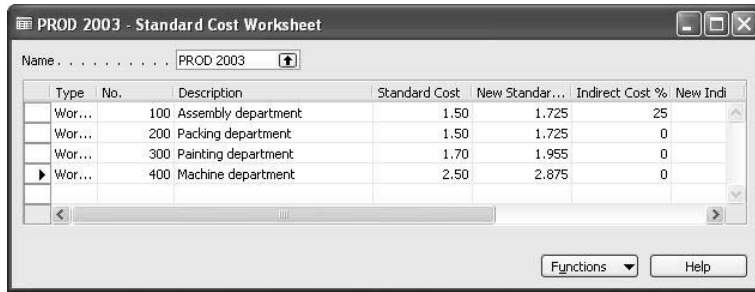1. Create a new standard cost worksheet, assign the name Prod 2003 and select it in the **Name** field.

   To retrieve the current standard unit cost for capacity, use the batch job:

2. Click FUNCTIONS→SUGGEST WORK/MACH CTR STD COST.

3. In the request form, set the filter for work centers from 100 to 400. Set the blank filter for machine centers.

   Assume the standard unit cost for the specified work centers must be increased by 15%:

4. On the **Options** tab, enter 1.15 in the **Adjustment Factor** field for the standard cost line.

5. Click **OK** to fill in the worksheet.

The program retrieves the current standard unit costs from the cards for the specified work centers and calculates the new costs as based on the adjustment/rounding factor. The procedure is complete when the production manager finds the update results satisfactory.

Consolidation and Roll-up

Suppose the purchaser and production manager notify the internal controller that they have completed cost updates in their respective areas. The controller now wants to preview the impact of those updates on the cost of produced items.

1. Create a new standard cost worksheet, assign the name Total 2003 and select it in the **Name** field.

    The controller now may choose to consolidate the updated components and capacity costs into one worksheet before simulating the cost roll-up for the produced items. This is done by means of a batch job:

2. Click FUNCTIONS→COPY STANDARD COST WORKSHEET.

3. In the request form, first select worksheet Purch 2003 and click **OK**. Repeat the step for worksheet Prod 2003.

    The program copies the current and new standard unit costs from the specified worksheets.
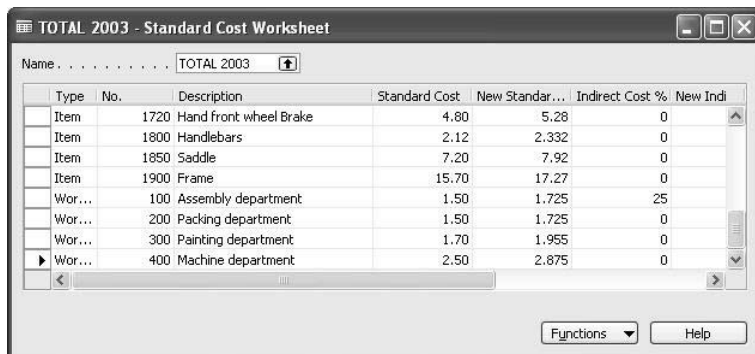
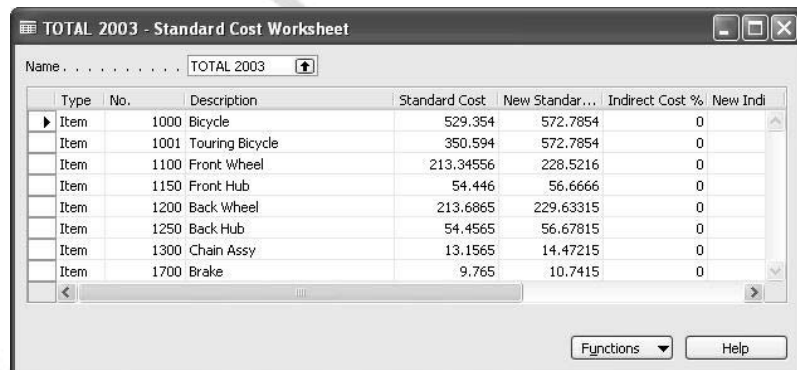Now, to initiate a preliminary cost roll-up the controller must use the Roll up Standard Cost batch job.

4. Click FUNCTIONS→ROLL UP STANDARD COST.

5. In the request form set the filter for items with Prod. Order as replenishment system and Standard as costing method. On the **Options** tab, in the **Calculation Date** field, enter 12/01/03.

NOTE: The calculation date on the request form for the Roll up Standard Cost batch job determines which version of the production BOM must be included in the calculation.

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6. Click **OK**.

    The program rolls up the costs for the produced items and inserts lines in the worksheet accordingly. To ensure a good overview, the controller may choose to filter the records only for produced items:

7. Set the filter for the **Replenishment System** field to Prod. Order.

Upon verifying that the new standard costs are acceptable, the controller is ready to implement the changes on a given date.

Implementing Cost Update

Suppose that the date arrives where the new standard costs are to take effect in the program.

The changes are implemented in a twofold manner:

1. Update of the standard unit cost and cost shares on the item card. This affects the future invoicing.

2. Update of the inventory value. This is done through creating revaluation journal lines for all invoiced item ledger entries.

To implement the changes, the controller must use the batch job:

1. Click FUNCTIONS→IMPLEMENT STANDARD COST CHANGES.

   The controller may choose to partially implement the changes to the costs (for example, only component or work center costs) by setting respective filters on the request form.

   The fields on the **Options** tab of the request form define the way for the program to create revaluation journal lines:

2. In the **Posting Date** field, enter 12/01/03. Select REVAL as an item journal template, and DEFAULT as a journal batch name.

3. Click **OK** to execute the standard cost changes.

   The cost changes take place on the item and SKU cards.

NOTE: The unit cost on the SKU card is updated to the same value as on the item card.

To implement the inventory revaluation, the controller must post the revaluation journal.

The standard cost update procedure has now been completed.

The worksheets created during the update process do not get deleted and thus contain the cost history.

Test Your Knowledge – Standard Cost Worksheet

1. True or False:
   In a standard cost worksheet only the standard cost can be changed for specific items and work/machine centers.

2. How do you consolidate different standard cost worksheets?

3. True or False:
   As soon as the Implement Standard Cost Changes batch job has been executed, the costs on the item card as well as the inventory value is changed according to the standard cost changes in the standard cost worksheet lines.

Quick Interaction: Lessons Learned

Take a moment to write down three Key Points you have learned from this chapter:

1.

2.

3.

APPENDIX A: ANSWERS TO TEST YOUR KNOWLEDGE QUESTIONS

The following sections contain the answers to the questions that appear in the Test Your Knowledge sections throughout the manual.

Chapter 1 –Concepts and Terms

1. The three capitalized inventoriable costs that make up manufacturing costs are direct materials costs, direct manufacturing labor costs and indirect manufacturing costs.

2. b. Standard cost is an estimate of what inventory items should cost based on studies of past and estimated future cost data.

3. The separate inventory accounts needed are the Raw Materials Inventory account, the Work-in-Process (WIP) Inventory account and the Finished Goods Inventory account.
    The Raw Materials Inventory account includes the cost of raw materials purchased but not yet transferred to production.
    The Work-In-Process (WIP) Inventory account accumulates the costs incurred in producing units during the period.
    The Finished Goods Inventory account includes the total manufacturing cost of units completed but not yet sold.

4. The two methods differ in the way the portion of total cost of a parent item is assigned to its material, capacity and overhead cost elements.

Chapter 2 – Manufacturing Costing Principles

1. Separate value entries might be created for direct costs, indirect costs, rounding, revaluation or variances.

2. False. Capacity ledger entries only hold information about capacity usage in terms of time or quantity. All amounts are listed in the related value entries.

3. The actual cost of a production order is compared to standard cost in order to calculate variances.

Chapter 3 – Manufacturing Costing Functionality

1. As subcontracting is in essence an outsourced capacity, the cost of subcontracting services (direct and indirect) is set up on the work center card representing the subcontract operation.

2. If the single-level basis is assumed, then the material cost of a manufactured item is equal to the total cost of all of the items (purchased or subassembled) on that item's bill of material (BOM). In a rolled-up level calculation, the material cost of a manufactured item is the sum of:

   1) the material cost element in the total manufacturing cost of each individual subassembly, and/or
   2) the cost of all purchased items on that item's bill of material.

3. Technically, on posting the last operation on the routing, the program has registered the complete transaction of output in the form of two types of ledger entries:

   Item ledger entries: An item ledger entry of the type Output for the manufactured item. This entry is associated with two cost objects: the production order and the item.

   Capacity ledger entries: These entries are associated with two cost objects: the production order and the machine/work centers whose capacity was used to manufacture the item.

4. False. A production order is invoiced when the Adjust Cost – Item Entries batch job is run after the status of the production order has been changed to Finished.

Chapter 4 – Standard Cost Worksheet

1. False. You can change the standard cost as well as indirect cost % and overhead rate.

2. You can use the Copy Standard Cost Worksheet batch job to retrieve the worksheet lines of a specific standard cost worksheet.

3. False. You must post the revaluation journal lines to revalue the inventory according to the standard cost changes in the standard cost worksheet lines.