

MODULE 3: PRODUCTION BILL OF MATERIALS (BOM)

Module Overview

A production *bill of materials* (BOM) is a list of all components that are required to produce a parent item. The list includes the description, quantity, and unit of measure of each component, in addition to other information.

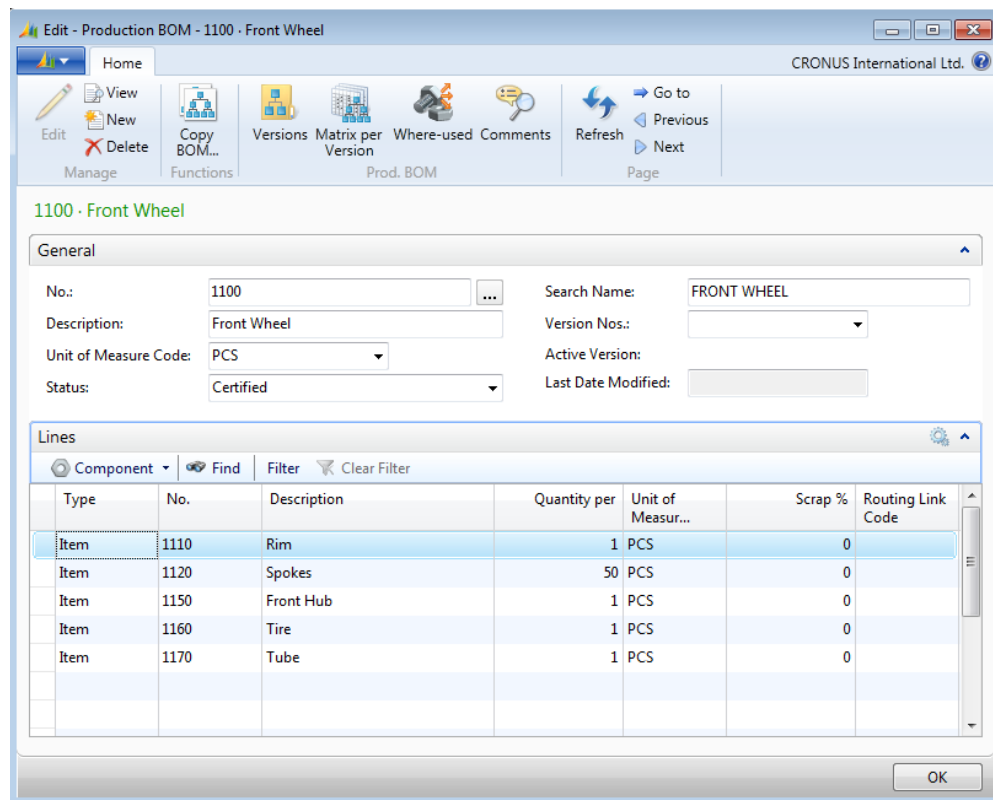


FIGURE 3.1: PRODUCTION BOM FOR THE FRONT WHEEL OF A BICYCLE

The front wheel BOM that is shown in the “Production BOM for the Front Wheel of a Bicycle” requires one rim, 50 spokes, and so on.

A BOM component can be a purchased item (raw material), a produced item (known as a *subassembly*), or another production BOM (known as a *phantom BOM*). Subassemblies and phantom BOMs can contain other subassemblies, phantom BOMs, and item components. This results in the hierarchical structure that is shown in the “Production BOM Structure for a Bicycle” diagram.

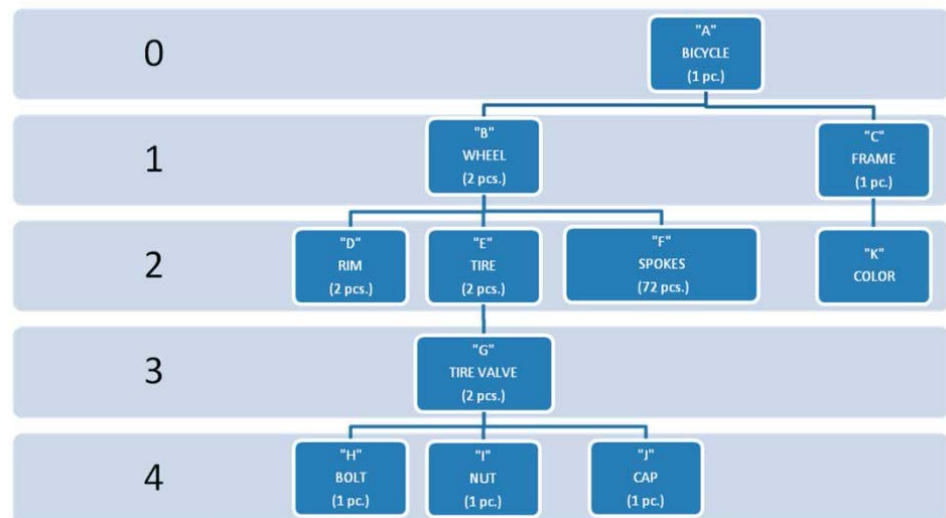


FIGURE 3.2: PRODUCTION BOM STRUCTURE FOR A BICYCLE

This diagram represents the production BOM for a bicycle. As the diagram shows, a bicycle consists of one frame, two wheels, and so on. One of the wheels that is referenced in the diagram is actually a front wheel. When it is used inside the bicycle production BOM, the front wheel is a subassembly. *Multilevel BOMs* are production BOMs that contain at least one subassembly or phantom BOM.

The parent item that is defined by the BOM can be either a finished good that is ready for sale, such as the bicycle, or a subassembly that is used to help build another item, such as the front wheel. Some items are both. For example, a front wheel can be part of a bicycle, and it can also be sold on its own as a replacement part.

A production BOM does not define the steps that are required to assemble or convert the components into the parent item. This is the role of a routing. For more information on routings, refer to “Basic Capacities and Routings” in this training material.

BOMs are used both in the creation of production orders and in materials requirement planning (MRP). These topics are covered in other modules in this training material.

Production BOMs seem simple on the surface, but as with many aspects of manufacturing, they must address certain complexities. For example, they must accommodate and track engineering changes. This results in different versions of the same BOM.

Module 3: Production Bill of Materials (BOM)

Microsoft Dynamics® NAV offers a robust and full-featured set of functionality for production BOMs. This includes the following features:

- Full support for multilevel BOMs up to 50 levels deep
- Full support for phantom BOMs
- The ability to handle all aspects of engineering changes, including version support
- The capacity to calculate raw material requirements that are based on calculation formulas
- The ability to track production BOMs and components within the product structure



Note: Microsoft Dynamics NAV also offers new Assembly Management functionality. This functionality is equivalent in some respects to light manufacturing.

Assembly management tasks might not be performed by manufacturing personnel. In many companies, they are the responsibility of warehouse personnel. As such, these tasks are not described in this manufacturing course. However, the components that are used by assembly items are of concern to manufacturing personnel, especially production planners. This component use is specified for each assembly item by its associated assembly BOM.

Assembly BOMs share many similarities to production BOMs. For example, they both list the item components that are required to produce a parent item. Therefore, when you read "Production Bill of Materials (BOM)", you should be aware that production BOMs are not the only form of demand on component items. Assembly BOMs and direct sales of component items represent other forms of demand.

You should also be aware that some component items that you specify on a production BOM could be assembly items, just as some of the component items that are specified on an assembly BOM could be manufactured items.

For more information on assembly management, refer to the Trade in Microsoft Dynamics NAV 2013 and Inventory Management in Microsoft Dynamics NAV 2013 (HOL) courses.

Before starting the lessons in this module, set your work date to January 23, 2014. Please perform all lessons, demonstrations, and labs in sequence.

Objectives

The objectives are:

- Describe the production BOM structure and its basic features.
- Explain and demonstrate production BOM advanced features.
- Show production BOM reports.

Production BOM Basic Features

A production BOM consists of one BOM header and one or more BOM lines.

You can create, copy, change, and if no longer used, delete production BOMs. As explained in the "BOM Header" topic of this lesson, BOMs can also have different statuses that determine how they are used.

Production BOMs sometimes change over time, usually because of changes to their components. You can make these changes directly to a production BOM, or you can create different versions of the BOM.

Because a BOM can have different versions, and multiple BOMs can use its components, Microsoft Dynamics NAV provides many features to help you track component usage at the BOM, BOM version, and BOM component levels.

BOM Header

A production BOM header consists of the following fields.

Field	Description
No.	Identifies the BOM. It must be unique and have no more than 20 characters. You can set the No. field automatically by using the Production BOM Nos. field in the manufacturing set up, or you can manually enter it. In a company where there is a 1:1 relationship between an item and a production BOM, the production BOM number typically equals the item number.
Description	Description of the BOM that makes it easier to identify. In a company where there is a 1:1 relationship between an item and a production BOM, the production BOM description typically equals the item description.
Unit of Measure	Unit of measure for the BOM. Also the unit of measure that is used as the basis for recalculation factors in the BOM line item. Before you can link a production BOM to an item, you must also set up this unit of measure in the Item Units of Measure page for the item.


Field	Description
Status	<p>Status of a production BOM. The valid statuses are as follows:</p> <ul style="list-style-type: none"> • New – The status is automatically set to New when you create a new BOM. The BOM is editable. • Certified – You can use a certified BOM in production planning and production orders. An error message displays if you try to use a non-certified BOM. A certified BOM is not editable. • Under Development – Indicates that a certified BOM is undergoing edits. A BOM with this status is not used in the cost rollup for the item. Cost is not calculated with this status. • Closed – Indicates that the BOM is no longer used. This is similar to the Blocked option that is used elsewhere in Microsoft Dynamics NAV. A BOM with this status is not used in the cost rollup for the item.
Search Name	<p>Search criteria for a BOM when you do not remember its number. The field is initially copied from the description. However, you can edit it to create a name that is easier to remember. This field can have no more than 30 characters.</p>
Version Nos.	<p>Number series that you use to create a new version of the BOM. The program automatically takes the next number from this number series to create a new version. If you leave this field blank, you must manually assign the version code.</p>
Active Version	<p>Version currently in use. The active version is determined by its starting date. Also, the active version must be certified.</p>
Last Date Modified	<p>Date that the BOM was last edited or changed.</p>

BOM Lines

BOM lines identify the components that are required to produce the parent item. As described in the module overview, you can use purchased items, produced items (subassemblies), or phantom BOMs as components.

BOM lines include the following fields.

Field	Description
Type	<p>Type of production BOM line. Valid types include the following:</p> <ul style="list-style-type: none"> • Item – Specifies an inventory item for the BOM line. If the item is a subassembly (a produced item that has a production BOM), the components are automatically considered when the BOM is exploded. • Production BOM – Specifies a phantom BOM for the line. • <Blank> – Used to add a comment on a production BOM line. Comments are not copied to production orders.
No.	<p>Number that is based on the type that you selected in the Type field. For the Item type, enter an item number. For a Production BOM type, enter a production BOM number.</p>
Description	<p>Description of the BOM line. For the Item type, the name of the item is used. For a Production BOM type, the name of the BOM is used. If you leave the Type field blank, you can enter a comment in this field. Use no more than 30 characters for a comment. This includes both numbers and letters.</p>
Quantity per	<p>Quantity of the component that is required to produce one parent item. If you enter a calculation formula, the program calculates the quantity based on the specifications in the Calculation Formula field.</p>

Field	Description
<p>Calculation Formula</p>	<p>Formula that is used to determine how the Quantity field is calculated. Select one of the following options:</p> <ul style="list-style-type: none"> • Blank: the quantity is not calculated but is set to equal Quantity per • Length: $Quantity = Length * Quantity\ per$ • Length * Width: $Quantity = Length * With * Quantity\ per$ • Length * With * Depth: $Quantity = Length * With * Depth * Quantity\ per$ • Weight: $Quantity = Weight * Quantity\ per$ <hr/> <p> Note: The Quantity field is in the BOM Line table, but it is not visible to the user. It is used internally by the program.</p>
<p>Unit of Measure Code</p>	<p>Unit of measure that is used by the BOM line. This is initially copied from the item or production BOM card. You can use a different consumption unit of measure by entering new information in the Item Units of Measure table.</p>
<p>Scrap %</p>	<p>Scrap percentage for the component in the BOM line.</p> <p>Scrap represents the quantity or amount of the component that is likely to be discarded during the manufacturing process. For example, if the scrap percentage is 20 (20 %), the quantity per is 1, and the quantity of the parent item is 10, then the scrap is $10 \times .20 = 2$ components. Therefore, in order to produce 10 parent items, 12 components are required.</p> <p>Other types of scrap calculation are entered elsewhere in the program.</p>

Module 3: Production Bill of Materials (BOM)

Field	Description
Routing Link Code	Code that links the BOM line to a routing operation. The due date of the BOM line then is set to equal the starting date of the linked operation. The link also supports just-in-time flushing (consumption) of components.
Position/Position 2/Position 3	Specification for the position of components in the BOM that represent a specific process.
Lead-Time Offset	Time that is required to prepare the component for production. Use D for Days, Y for Years, and so on. During replenishments planning, the value in this field offsets the due date of the component on the production BOM line. The program makes the following calculation: <i>Component Due Date = Finished Good Starting Date - Component Production Lead Time</i>
Starting Date and Ending Date	Specifies the valid dates for the component. For example, if you want to replace component X with component Y effective January 23, 2013, set the ending date for component X to January 22, 2013, and set the starting date for component Y to January 23, 2013. The values in these fields are used in the Exchange Production BOM item and Delete Expired Components batch jobs.

Demonstration: Create Production BOM

Scenario: CRONUS decides to create a new product called a Basic Bike. Oscar, the process engineer, must set up a production BOM for the new product to specify the components that are required to manufacture it.

Demonstration Steps

1. Create the BOM Header.
 - a. In the **Search** box, type "production BOM", and then select the related link.
 - b. On the **Home** tab of the **Production BOM** list page, click **New**. On the **General FastTab** of the **Production BOM** page, notice that the **Status** field is set to New.

- c. In the **No.** field, type "1003".
- d. In the **Description** field, type "Basic Bike".
- e. In the **Unit of Measure Code** field, select PCS. In order to link the BOM to an item, you must set up this unit of measure in the **Item Units of Measure** page for the item.

2. Create the BOM lines.

- a. On the **Lines** FastTab, enter the following lines.

Type	No.	Description	Quantity Per	Unit of Measure
Item	1100	Front Wheel	1	PCS
Item	1200	Back Wheel	1	PCS
Item	1300	Chain Assy	1	PCS
Item	1400	Mudguard front	1	PCS
Item	1450	Mudguard back	1	PCS
Item	1700	Brake	1	PCS
Item	1800	Handlebars	1	PCS
Item	1850	Saddle	1	PCS
Item	1900	Frame	1	PCS


- b. Notice that the **Description** and **Unit of Measure Code** fields automatically populate when you enter the item number.

Module 3: Production Bill of Materials (BOM)

Type	No.	Description	Quantity per	Unit of Measure Code	Scrap %	Routing Link Code
Item	1100	Front Wheel	1	PCS	0	
Item	1200	Back Wheel	1	PCS	0	
Item	1300	Chain Assy	1	PCS	0	
Item	1400	Mudguard front	1	PCS	0	
Item	1450	Mudguard back	1	PCS	0	
Item	1700	Brake	1	PCS	0	
Item	1800	Handlebars	1	PCS	0	

FIGURE 3.3: NEW PRODUCTION BOM FOR THE BASIC BIKE

3. Certify the BOM.
 - a. On the **General** FastTab, in the **Status** field, select Certified.
 - b. Click **OK** to close the new BOM.

 **Note:** To use a BOM in production orders, MRP, and item cost calculations, you must set its status to Certified.

Demonstration: Copy BOM

You can streamline creating a new production BOM by using the **Copy BOM** function. This function copies the BOM lines from a source BOM to the current BOM. It also deletes the existing lines, if any, in the current BOM. You can then change the copy.

Scenario: Oscar, the process engineer, hears that a new variation of the Basic Bike will soon be produced. To prepare for this, he creates a second production BOM for the Basic Bike, which is Basic Bike 2. As a starting point for the new BOM, he copies the Basic Bike BOM.

Demonstration Steps

1. Create the new BOM.
 - a. In the **Search** box, type "production BOM", and then select the related link.
 - b. On the **Home** tab of the **Production BOM** list page, click **New**.
 - c. On the **General** FastTab of the **Production BOM** page, in the **No.** field, type "1004".
 - d. In the **Description** field, type "Basic Bike 2".
 - e. In the **Unit of Measure Code** field, select PCS.
2. Copy the BOM lines from BOM 1003, Basic Bike, to the new BOM.
 - a. On the **Home** tab, click **Copy BOM**.
 - b. On the **Production BOM List** page, select the line for BOM 1003, Basic Bike, and then click **OK**. When the program returns you to the **Production BOM** page, notice that all the components from BOM 1003 are copied to the new BOM.
3. Certify the new BOM.
 - a. On the **General** FastTab, in the **Status** field, select Certified.
 - b. Click **OK** to close the new BOM.

Demonstration: Change a Production BOM

To change a production BOM, you have the following options:

- If changes are not tracked, change the production BOM itself.
- Create a new version of the BOM. This is required if the company tracks engineering changes.

This demonstration shows how to make changes directly to the BOM. Versions are described in the "Production BOM Versions" topic in this lesson.

To change a production BOM, the status of the BOM must be New (the starting default) or Under Development. If the current status of the BOM is Certified, the required sequence of tasks is as follows:

1. Change the BOM status to Under Development.
2. Make your changes to the BOM.
3. Change the BOM status back to Certified.

Module 3: Production Bill of Materials (BOM)

Scenario: To support a special promotion, CRONUS decides to change the Basic Bike for February, 2014 by adding item 1600, a bell, and removing items 1400 and 1450 (the two mudguards). However, the company still wants to sell the bike in its original configuration before and after February, 2014.

To prepare for this situation, Oscar, the process engineer at CRONUS, has already created BOM 1004, Basic Bike 2, because he wants to leave BOM 1003, Basic Bike, in its original state.

One drawback to this approach is that Oscar must change the production BOM that is associated with the Basic Bike item (not yet created) at the start of February (to change to BOM 1004), and again at the start of March (to change back to BOM 1003).

Demonstration Steps

1. Change the status for BOM 1004 to Under Development.
 - a. In the **Search** box, type "production BOM", and then select the related link.
 - b. On the **Production BOM** list page, double-click the line for BOM 1004, Basic Bike 2.
 - c. On the **General** FastTab of the **Production BOM** page, in the **Status** field, select Under Development.
2. Delete the two mudguards from the BOM.
 - a. On the **Lines** FastTab, right-click the line for item 1400, and then click **Delete Line**.
 - b. On the request message, click **Yes** to confirm the deletion.
 - c. Repeat steps a and b to delete the line for item 1450.
3. Add a new component line, for item 1600, to the BOM.
 - a. Right-click the line for item 1700, and then click **New Line**.
 - b. On the new line, in the **Type** field, select Item.
 - c. In the **No.** field, type "1600".
 - d. In the **Quantity per** field, type "1".

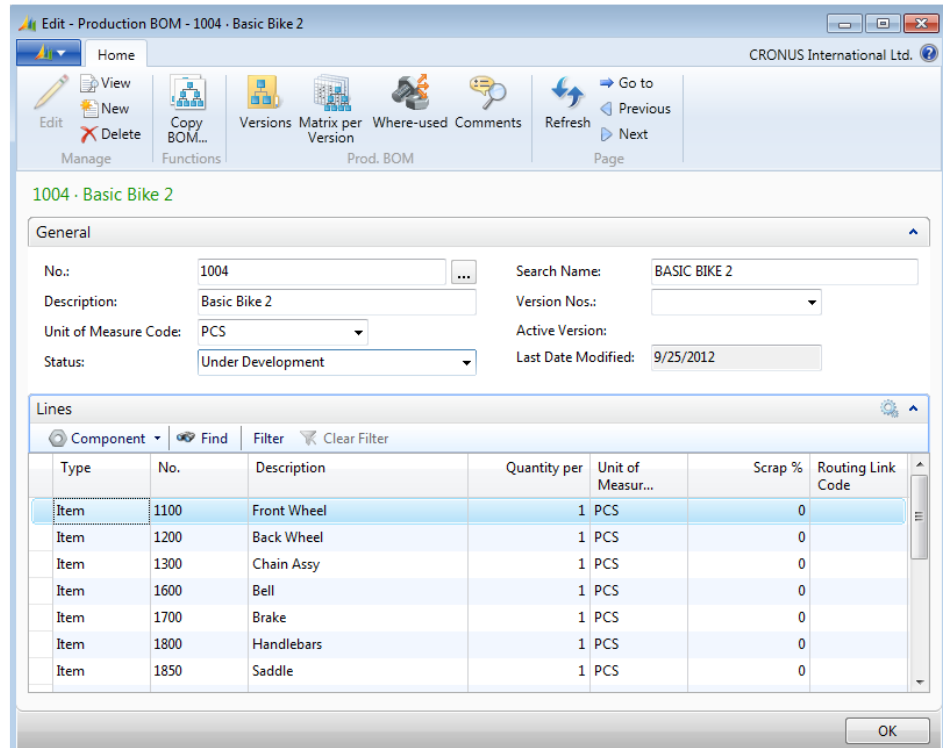


FIGURE 3.4: PRODUCTION BOM FOR BASIC BIKE 2 AFTER THE CHANGE FOR FEBRUARY, 2014

4. Certify the BOM.
 - a. On the **General** FastTab, in the **Status** field, select Certified.
 - b. Click **OK** to close the page.

Demonstration: Change a BOM by Using Starting and Ending Dates

In addition to adding and deleting BOM component lines and changing field values in a line, you can specify a starting date and ending date for individual lines. This lets you plan and implement changes to BOM lines on specific dates.

For example, if you want to replace component X with component Y on January 23, 2014, you can set the ending date for component X to January 22, 2014, and the starting date for component Y to January 23, 2014.

Scenario: After Oscar, the process engineer at CRONUS, learns of Microsoft Dynamics NAV's ability to schedule changes to component lines, he decides to delete the Basic Bike 2 production BOM. He plans instead to use this scheduling capability to handle the February promotion requirements in the Basic Bike BOM.

Module 3: Production Bill of Materials (BOM)

Demonstration Steps

1. Delete the production BOM 1004, Basic Bike 2.
 - a. In the **Search** box, type "production BOM", and then select the related link.
 - b. On the **Production BOM** list page, double-click the line for BOM 1004, Basic Bike 2.
 - c. On the **General** FastTab of the **Production BOM** page, in the **Status** field, select Closed.
 - d. On the request message, click **Yes** to accept the status change.
 - e. Click **OK** to close the **Production BOM** page.
 - f. On the **Production BOM** list page, make sure that the line for BOM 1004, Basic Bike 2, is still selected.
 - g. On the **Home** tab, click **Delete**.
 - h. On the request message, click **Yes** to confirm the deletion. Notice that the line for BOM 1004, Basic Bike 2, is deleted from the list.



Note: You cannot delete a production BOM if its status is set to *Certified*. You can delete it only if its status is *New*, *Under Development*, or *Closed*.

2. Open the Basic Bike production BOM, and then change its status to Under Development.
 - a. On the **Production BOM** list page, double-click the line for BOM 1003, Basic Bike.
 - b. On the **General** FastTab of the **Production BOM** page, in the **Status** field, select Under Development.
3. Implement the February, 2014 edition of the basic bike by using the **Starting Date** and **Ending Date** fields.
 - a. On the **Lines** FastTab, use the **Choose Columns** function to add the **Starting Date** and **Ending Date** fields.
 - b. On the line for item 1400, in the **Ending Date** field, select January 31, 2014.
 - c. On the line for item 1450, in the **Ending Date** field, select January 31, 2014.
 - d. Right-click the line for item 1700, and then click **New Line**.
 - e. On the new line, in the **Type** field, select Item.
 - f. In the **No.** field, type "1600".
 - g. In the **Quantity per** field, type "1".
 - h. Set the **Starting Date** field to February 01, 2014.
 - i. Set the **Ending Date** to February 28, 2014.

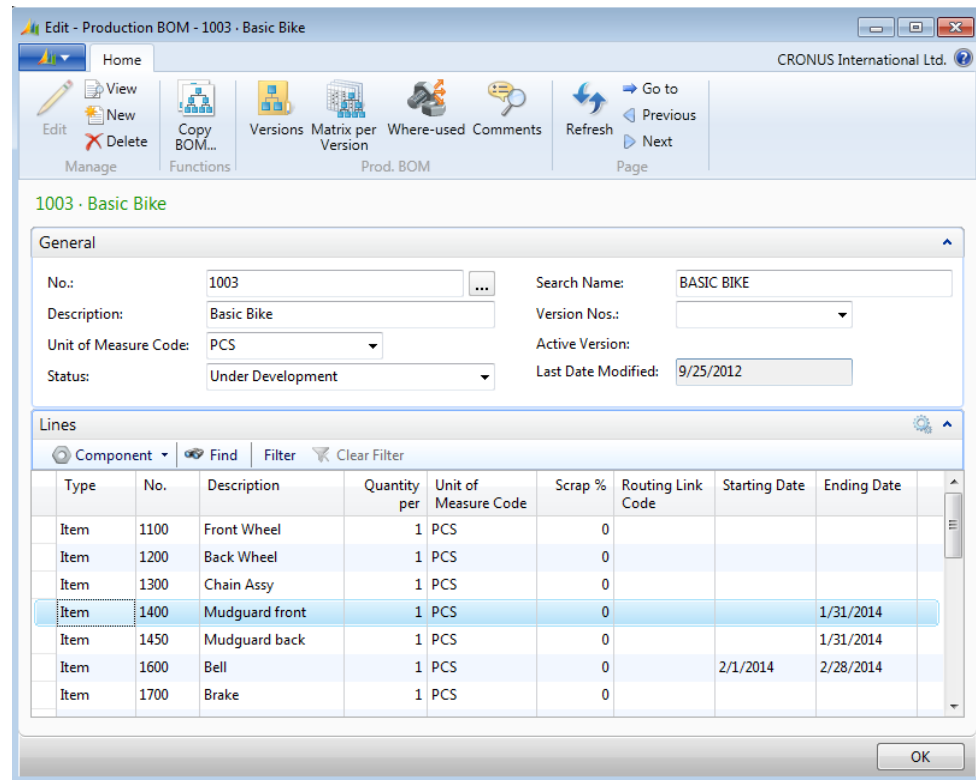


FIGURE 3.5: PRODUCTION BOM LINES WITH STARTING AND ENDING DATES

4. Certify the BOM.
 - a. On the **General** FastTab, in the **Status** field, select Certified.
 - b. Click **OK** to close the page.

Production BOM Versions

Sometimes a company must change a production BOM, but does not want to lose the information that is contained in the existing BOM. Or the company does not want to create a new BOM to handle changes because this requires changes to the product structure, such as having to change the BOM that is associated with the Basic Bike item to use the Basic Bike 2 BOM for February, 2014.

Using starting and ending dates only partly resolves these problems. For example, if at the end of February, 2014, Oscar decides to change the Basic Bike production BOM back to its original state, all historical record of the February BOM changes is lost. He can partly fix this problem by adding new lines for the two mud guards and setting their starting dates to March 01, 2014. However, this approach can result in cluttered sets of BOM lines because the same components can be listed many times.

Fortunately, Microsoft Dynamics NAV offers BOM versions as another solution. Versions usually start as a copy of the production BOM or another version of that BOM, and then changes are made to the copied data.

Module 3: Production Bill of Materials (BOM)

Version codes and starting dates identify each version. A BOM version automatically becomes active on its starting date, and all versions with a starting date older than this date become invalid. To be *active* means that the version is automatically used in place of the BOM as of that date.

Typically, you use BOM versions to either schedule future engineering changes or to track past engineering changes. For example, to improve the quality of a product, engineers can decide to change one of its components. This is known as an *engineering change order (ECO)*. By creating a BOM version for this change instead of a whole new BOM, engineers obtain the following benefits:

- They can schedule the implementation date for the new version by setting its starting date. The program then automatically uses the new version of the BOM when that date is reached. This removes the need for engineers to remember when a new version of a BOM must be implemented.
- They do not have to change the product structure by changing the production BOM that is associated with items. For example, if 17 items use production BOM 1003, and you create a new BOM to implement changes, you must manually change the 17 items to use the new BOM. This is not required when you use BOM versions because the system automatically uses the active version.
- They do not clutter the BOM lines for a version with the starting and ending dates for components. Each version can have only the components it requires.
- They can retain the old version of the BOM in the database. Although older versions of a BOM are no longer used in planning or production after a new version is active, engineers can still refer to the older versions. Because the older versions still exist in the database, the company can also use them to determine whether an ECO achieved the results that they want. The company can do this by analyzing, for example, return and repair data following the implementation of a new version.

Demonstration: Create a BOM Version

Scenario: After learning about the version functionality in Microsoft Dynamics NAV, Oscar, the process engineer at CRONUS, decides to use versions to manage the Basic Bike promotion for February, 2014. This requires him to first change the Basic Bike production BOM back to its original state. Then he can create two new BOM versions for the Basic Bike: one for the February promotion, and one effective March 01, 2014. The version that is effective March 01, 2014 will be identical to the original production BOM. This does not cause Oscar much work because he can create the March 01, 2014 version by copying the original production BOM. Then he can set the starting dates for the two versions. The program then will implement everything on schedule without Oscar taking any additional actions. Additionally, this approach provides Oscar with a complete,

time-specific record of BOM changes to the Basic Bike.



Note: You do not actually create the version effective March 01, 2014 in this demonstration.

Demonstration Steps

1. Change the Basic Bike production BOM back to its original state.
 - a. In the **Search** box, type “production BOM”, and then select the related link.
 - b. On the **Production BOM** list page, double-click the line for BOM 1003, Basic Bike.
 - c. On the **General** FastTab of the **Production BOM** page, change the **Status** field to Under Development.
 - d. On the **Lines** FastTab, delete the values in the **Ending Date** field for component items 1400 and 1450.
 - e. Right-click the line for component 1600, and then click **Delete**.
 - f. On the request message, click **Yes** to confirm the deletion.
 - g. On the **General** FastTab, in the **Status** field, select Certified.

2. Create the new version of BOM 1003 for the Basic Bike.
 - a. On the **Home** tab, click **Versions**.
 - b. On the **Home** tab of the **Prod. BOM Version List** page, click **New**.
 - c. On the **General** FastTab of the **Production BOM Version** page, in the **Versions Code** field, type “02”.
 - d. In the **Description** field, type “February 2014 Edition”.
 - e. In the **Unit of Measure Code** field, select PCS.
 - f. In the **Starting Date** field, select February 01, 2014.
 - g. On the **Actions** tab, click **Copy BOM Header**.
 - h. On the request message, click **Yes** to copy the components from the production BOM. Notice that the component lines match the component lines from BOM 1003. You can also manually build the version’s component lines, if you want.



Note: In this example, you manually enter a value of “02” in the **Version Code** field. As with most number/code fields in Microsoft Dynamics NAV, you can have the program automatically assign a number in this field. You do this by selecting a number series in the **Version Nos.** field of the production BOM header. For more information, refer to Help.

Module 3: Production Bill of Materials (BOM)

3. Make the required changes to the version's component lines. These are the same changes that you made previously to the production BOM.
 - a. On the **Lines** FastTab, right-click the line for item 1400, and then click **Delete Line**.
 - b. On the request message, click **Yes** to confirm the deletion.
 - c. Repeat steps a and b to delete the line for item 1450.
 - d. Right-click the line for item 1700, and then click **New Line**.
 - e. On the new line, in the **Type** field, select Item.
 - f. In the **No.** field, type "1600".
 - g. In the **Quantity per** field, type "1".

Type	No.	Description	Quantity per	Unit of Mea...	Scrap %
Item	1100	Front Wheel	1	PCS	0
Item	1200	Back Wheel	1	PCS	0
Item	1300	Chain Assy	1	PCS	0
Item	1600	Bell	1	PCS	0
Item	1700	Brake	1	PCS	0
Item	1800	Handlebars	1	PCS	0
Item	1850	Saddle	1	PCS	0
Item	1900	Frame	1	PCS	0

FIGURE 3.6:FEBRUARY PROMOTION VERSION OF THE BASIC BIKE BOM

4. Certify the new BOM version.
 - a. On the **General** FastTab, in the **Status** field, select Certified.
 - b. Press **Esc** three times to close all open pages.

Active BOM Version

For each production BOM, only one version can be active at one time. As mentioned in the “Production BOM Versions” topic in this lesson, a BOM version automatically becomes active on its starting date, and all versions with a starting date older than this date become invalid.

The active version is indicated in the **Active Version** field of the production BOM header. To review the active version for production BOM 1003, follow these steps.

1. In the **Search** box, type “production BOM”, and then select the related link.
2. On the **Production BOM** list page, double-click the line for BOM 1003, Basic Bike.
3. On the **General** FastTab of the **Production BOM** page, notice that the **Active Version** field is blank. This indicates that the original production BOM is the active version.

In the “Create a BOM Version” demonstration, you set the starting date for the February 2014 Edition BOM version to February 01, 2014. To make this the active version, follow these steps.

1. Click **OK** to close the **Production BOM** page.
2. Set the work date to February 01, 2014.
3. Reopen the **Production BOM** page for BOM 1003.
4. Notice that the **Active Version** field now shows 02.
5. Click **OK** to close the **Production BOM** page.
6. Set the work date back to January 23, 2014.

Matrix per Version Functionality

The **Matrix per Version** page is used to compare all of the existing versions of a production BOM. This page offers a view of the components on either a single level or multilevel basis (multilevel means to explode subassemblies and phantom BOMs into their underlying components).

To fully appreciate the value of the **Matrix per Version** page, first create a new version of production BOM 1003 by following these steps.

1. In the **Search** box, type “production BOM”, and then select the related link.
2. On the **Production BOM** list page, double-click the line for BOM 1003, Basic Bike.
3. On the **Home** tab of the **Production BOM** page, click **Versions**.
4. On the **Home** tab of the **Prod. BOM Version List** page, click **New**.

Module 3: Production Bill of Materials (BOM)

5. On the **General** FastTab of the **Production BOM Version** page, in the **Versions Code** field, type "03".
6. In the **Description** field, type "Test Edition".
7. In the **Unit of Measure Code** field, select PCS.
8. In the **Starting Date** field, select December 31, 2014.
9. On the **Actions** tab, click **Copy BOM Version**.
10. On the **Prod. BOM Version List** page, select the line for version 02, February 2014 Edition, and then click **OK**. On the **Lines** FastTab of the **Production BOM Version** page, notice that the component lines populate with the component lines from BOM version 02.
11. On the component line for item 1600, Bell, change the **Quantity per** field to 2.
12. On the **General** FastTab, in the **Status** field, select Certified.
13. Click **OK** to close the **Production BOM Version** page.
14. Click **Close** to close the **Prod. BOM Version List** page.

Production BOM 1003 now has two versions, 02 and 03. To view these versions in the matrix that is generated from the **Matrix per Version** page, follow these steps.

1. On the **Home** tab of the **Production BOM** page, click **Matrix per Version**.
2. On the **Options** FastTab of the **Prod. BOM Matrix per Version** page, set the **Levels** field to Single.
3. On the **Home** tab, click **Show Matrix**.

Item No.	Description	02	03
1100	Front Wheel	1	1
1200	Back Wheel	1	1
1300	Chain Assy	1	1
1400	Mudguard front		
1450	Mudguard back		
1600	Bell	1	2
1700	Brake	1	1
1800	Handlebars	1	1
1850	Saddle	1	1
1900	Frame	1	1

FIGURE 3.7: MATRIX PER VERSION MATRIX PAGE FOR PRODUCTION BOM 1003 AT THE SINGLE COMPONENT LEVEL

The matrix assembles a master list of components on the left-hand side, and then creates one column for each version on the right-hand side. In this example, the matrix clearly shows that production BOM version 03 uses one additional bell compared to version 02, and that neither version includes mudguards.

This matrix shows the components at a single level. To see the components in exploded form, regenerate the matrix using the Multi option by following these steps.

1. Click **Close** to close the **Prod. BOM Matrix per Version Matrix** page.
2. On the **Options** FastTab of the **Prod. BOM Matrix per Version** page, set the **Levels** field to Multi.
3. On the **Home** tab, click **Show Matrix**.

Now the matrix shows subassemblies like the front wheel exploded into their components.

Item No.	Description	02	03
1110	Rim	2	2
1120	Spokes	100	100
1151	Axle Front Wheel	1	1
1155	Socket Front	1	1
1160	Tire	2	2
1170	Tube	2	2
1251	Axle Back Wheel	1	1
1255	Socket Back	1	1
1310	Chain	1	1
1320	Chain Wheel Front	1	1
1330	Chain Wheel Back	1	1
1400	Mudguard front		
1450	Mudguard back		

FIGURE 3.8: MATRIX PER VERSION MATRIX PAGE FOR PRODUCTION BOM 1003 AT THE MULTI COMPONENT LEVEL

In this matrix, it is possible to see that the single level requirement for one front wheel and one back wheel explodes to a requirement for two rims, 100 spokes, and so on.

Where-Used Feature

The where-used feature shows where a production BOM is used throughout the product structure (a similar feature is available for routings), or which items use a component.

To see where a production BOM is used throughout the product structure, follow these steps.

1. Close all open pages.
2. In the **Search** box, type "production BOM", and then select the related link.

3. On the **Production BOM** list page, double-click the line for BOM 1000, Bicycle.
4. On the **Home** tab of the **Production BOM** page, click **Where-used**.

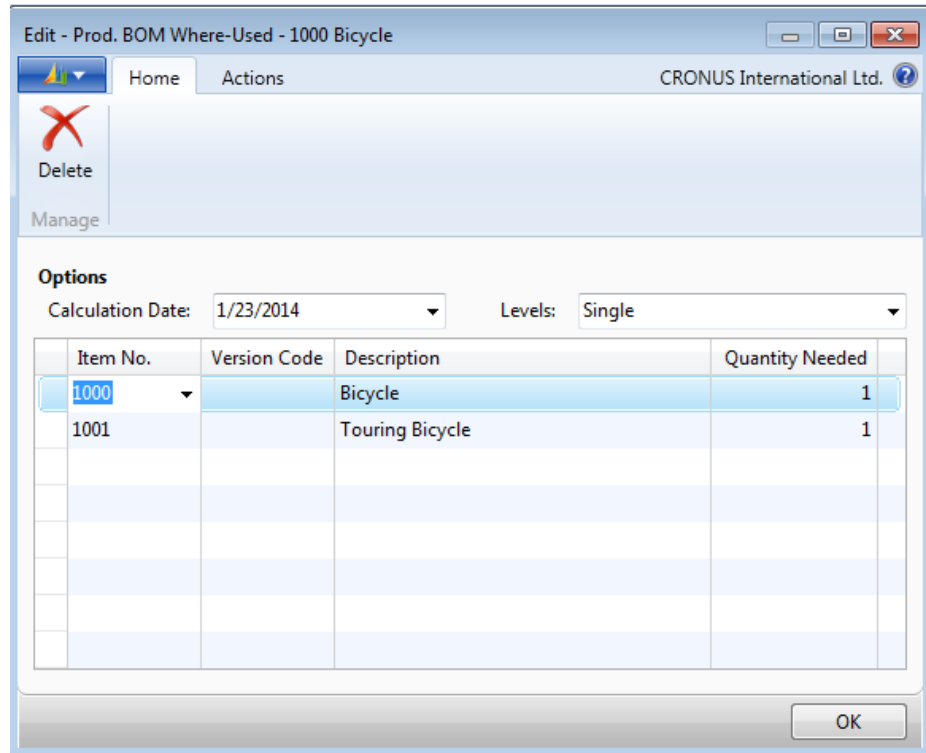


FIGURE 3.9: PRODUCTION BOM WHERE-USED PAGE FOR BOM 1000, BICYCLE

As the **Prod. BOM Where-Used** page shows, production BOM 1000 (Bicycle) is used by item 1000 (Bicycle) and by item 1001 (Touring Bicycle). Similar functionality is available for BOM Versions.

To see which items use a component, follow these steps.

1. Press **Esc** two times to return to the **Production BOM** list page.
2. Double-click the line for production BOM 1150, Hub.
3. On the **Lines** FastTab of the **Production BOM** page, select the line for item 1151, Axle Front Wheel.
4. Click **Component**, and then click **Where-Used**.
5. Under the Options heading of the **Prod. BOM Where-Used** page, in the **Levels** field, select Multi. The multilevel results show that item 1151, Axle Front Wheel, is used in the Front Hub. The Front Hub is used in the Front Wheel. And the Front Wheel is used in items 1000 and 1001.

Module 3: Production Bill of Materials (BOM)

Figure 3.10 shows the 'Edit - Prod. BOM Where-Used - 1151 Axle Front Wheel' window. The window displays a table with the following data:

Item No.	Version Code	Description	Quantity Needed
1150		Front Hub	1.05
1100		Front Wheel	1.05
1000		Bicycle	1.05
1001		Touring Bicycle	1.05

FIGURE 3.10: PRODUCTION BOM WHERE-USED PAGE AT THE COMPONENT LEVEL



Note: The **Quantity Needed** field includes scrap percentage from the production BOM line.



Note: If you are wondering why item 1003, Basic Bike, is not in these results, this is because the item does not yet exist. Only production BOM 1003 exists, and the where-used feature shows where BOMs or components are used in items, not in production BOMs.

6. Press **Esc** two times to close all open pages.

Lab: Create a New Production BOM and BOM Version

Scenario

CRONUS has decided to add another bicycle to its product line: item 1005, Safety Bike. This bike is identical to item 1000, Bicycle, except that it also includes item 1710, a Hand rear wheel Brake, and does not have mudguards (items 1400 and 1450). Due to new safety regulations effective July 01, 2014, a second version of the Safety Bike is also required. This includes item 1720, a Hand front wheel Brake.

Oscar, the process engineer at CRONUS, must set up a new production BOM to define the initial component requirements for the Safety Bike. He must then set up a new BOM version, with a starting date of July 01, 2014, to satisfy the new safety regulations.

Exercise 1: Lab Exercise Title

High Level Steps

1. Create a new production BOM for the Safety Bike.
2. Copy the BOM components from production BOM 1000.
3. Change the components for the new production BOM as described in the scenario.
4. Certify the new BOM.
5. Create a new production BOM version for the Safety Bike.
6. Copy the component lines from the production BOM into the new BOM version.
7. Add item 1720, Hand front wheel Brake, to the version components.
8. Certify the new BOM version.

Detailed Steps

1. Create a new production BOM for the Safety Bike.
 - a. In the **Search** box, type "production BOM", and then select the related link.
 - b. On the **Home** tab of the **Production BOM** list page, click **New**.
 - c. On the **General** FastTab of the **Production BOM** page, in the **No.** field, type "1005".
 - d. In the **Description** field, type "Safety Bike".
 - e. In the **Unit of Measure Code** field, select PCS.
2. Copy the BOM components from production BOM 1000.
 - a. On the **Home** tab, click **Copy BOM**.
 - b. On the **Production BOM List** page, select the line for BOM 1000, Bicycle, and then click **OK**.

Module 3: Production Bill of Materials (BOM)

3. Change the components for the new production BOM as described in the scenario.
 - a. On the **Lines** FastTab of the **Production BOM** page, right-click the line for item 1400, and then click **Delete Line**.
 - b. On the request message, click **Yes** to confirm the deletion.
 - c. Repeat steps a and b to delete the line for item 1450.
 - d. Right-click the line for item 1800, and then click **New Line**.
 - e. On the new line, in the **Type** field, select Item.
 - f. In the **No.** field, type "1710".
 - g. In the **Quantity per** field, type "1".
4. Certify the new BOM.
 - a. On the **General** FastTab, in the **Status** field, select Certified.
 - b. Leave the **Production BOM** page open.
5. Create a new production BOM version for the Safety Bike.
 - a. On the **Home** tab, click **Versions**.
 - b. On the **Home** tab of the **Prod. BOM Version List** page, click **New**.
 - c. On the **General** FastTab of the **Production BOM Version** page, in the **Versions Code** field, type "02".
 - d. In the **Description** field, type "Front and Back Brakes".
 - e. In the **Unit of Measure Code** field, select PCS.
 - f. In the **Starting Date** field, select July 01, 2014.
6. Copy the component lines from the production BOM into the new BOM version.
 - a. On the **Actions** tab, click **Copy BOM Header**.
 - b. On the request message, click **Yes** to copy the components from the production BOM.
7. Add item 1720, Hand front wheel Brake, to the version components.
 - a. On the **Lines** FastTab, right-click the line for item 1800, and then click **New Line**.
 - b. On the new line, in the **Type** field, select Item.
 - c. In the **No.** field, type "1720".
 - d. In the **Quantity per** field, type "1".

8. Certify the new BOM version.
 - a. On the **General** FastTab, in the **Status** field, select Certified.
 - b. Click **OK** to close the **Prod. BOM Version** page.
 - c. Press **Esc** two times to close all open pages.

Production BOM Advanced Features

The advanced features of production BOMs include the following:

- Phantom BOM
- Calculation formulas
- The ability to replace BOM components by using a batch job
- The ability to delete expired BOM components by using a batch job
- Flexible unit of measure features
- Low-level codes

Phantom Bill of Material (BOM)

A *phantom BOM* is a BOM that is used for non-stocked subassemblies. In Microsoft Dynamics NAV, a phantom BOM is a production BOM that is used as a component in another production BOM.

A phantom BOM represents a group of items that are assembled immediately before use in production. Instead of entering each phantom BOM's components in the parent BOM, users can enter the phantom BOM.

Phantom BOMs let the MRP process account for the components without creating an Item card or a separate production order for the subassembly. They also simplify creating and reviewing some production BOMs.

The time that is required for assembling a phantom BOM is considered to be zero or is allowed for in the master item routing.

Deciding whether a subassembly should be set up as a phantom BOM or as an item is a matter of opinion. Typically, engineers or production managers make this decision.

Demonstration: Create a Phantom Bill of Material

Scenario: CRONUS decides to add a new bicycle that is named "Mountain Bike" to its product list. The production BOM for the new bike has the same component requirements as production BOM 1005 (Safety Bike), except that it requires front and back mudguards (items 1400 and 1450).

Module 3: Production Bill of Materials (BOM)

After he reads about phantom BOMs, Oscar, the process engineer at CRONUS, decides to include production BOM 1005 as a phantom BOM in the production BOM for the new bike.

Demonstration Steps

1. Create the initial production BOM for the new bike.
 - a. In the **Search** box, type "production BOM", and then select the related link.
 - b. On the **Home** tab of the **Production BOM** list page, click **New**.
 - c. On the **General** FastTab of the **Production BOM** page, in the **No.** field, type "1006".
 - d. In the **Description** field, type "Mountain Bike".
 - e. In the **Unit of Measure Code** field, select PCS.

2. Add the components for the two mudguards to the new production BOM.
 - a. On the **Lines** FastTab, in the **Type** field of the first line, select Item.
 - b. In the **No.** field, type "1400".
 - c. In the **Quantity per** field, type "1".
 - d. On the second line, in the **No.** field, type "1450" (the **Type** field should automatically select Item).
 - e. In the **Quantity per** field, type "1".

3. Add production BOM 1005 as a phantom BOM.
 - a. On the third line, in the **Type** field, select Production BOM.
 - b. In the **No.** field, type "1005".
 - c. In the **Quantity per** field, type "1".
 - d. In the **Starting Date** field, select January 23, 2014. Because this date is the work date, this makes sure that the current version of the phantom BOM is used.

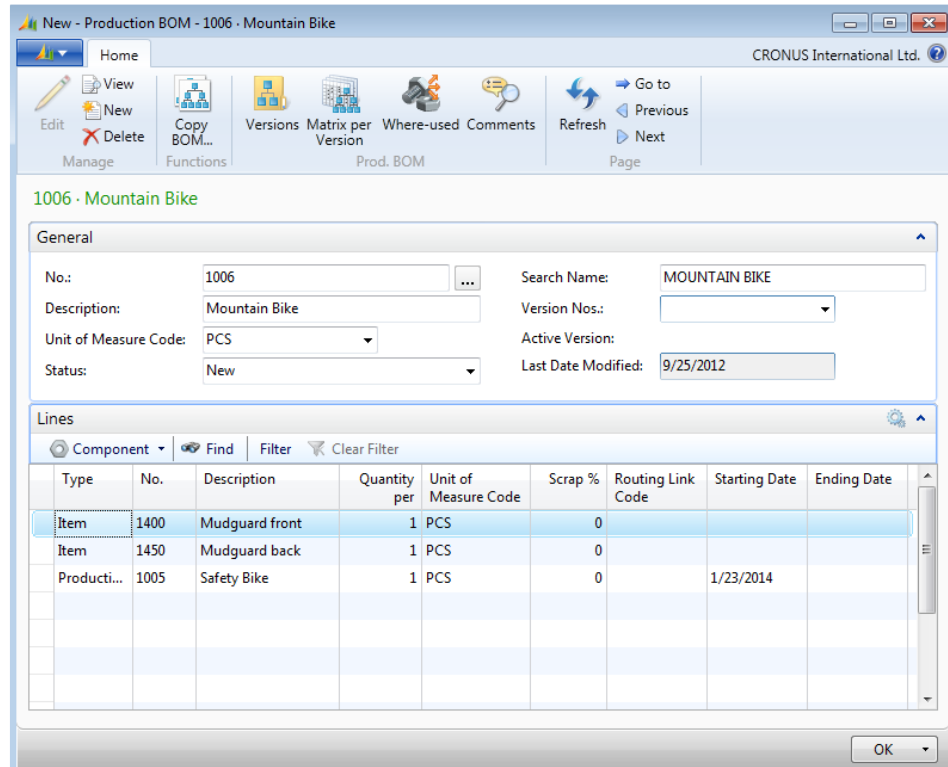


FIGURE 3.11: PRODUCTION BOM WITH A PHANTOM BOM AS A COMPONENT

4. Certify the BOM.
 - a. On the **General** FastTab, in the **Status** field, select Certified.
 - b. Click **OK** to close the production BOM.

Calculation Formula

You must use a calculation formula to specify some component quantity requirements in a production BOM. For example, steel can be stored in sheets and consumed in square feet. When operators in a manufacturing operation cut the required square footage from a sheet, they have to know the length and width of the intended rectangle.

The **Calculation Formula** field lets you define the required quantity of a BOM component in a formula instead of a single value. You can use the following formulas:

- **Blank:** The quantity is not calculated but is set to equal Quantity per.
- **Length:** $Quantity = Length * Quantity\ per$
- **Length * Width:** $Quantity = Length * With * Quantity\ per$
- **Length * With * Depth:** $Quantity = Length * With * Depth * Quantity\ per$
- **Weight:** $Quantity = Weight * Quantity\ per$



Note: The **Quantity** field is in the **BOM Line** table but is not visible to the user. It is used internally by the program.

Demonstration: Create and Use a Calculation Formula

Scenario: To learn how calculation scenarios work, Oscar, the process engineer at CRONUS, decides to add a steel component to the new Mountain Bike production BOM. Steel is stored in sheets and consumed in square feet.

As part of this learning exercise, Oscar must create a new steel item and two new units of measure (SHEET and SQFT). He then must add steel as a component to the Mountain Bike production BOM, and use a calculation formula to define its quantity requirements.

Demonstration Steps

1. Create the new units of measure.
 - a. In the **Search** box, type "units of measure", and then select the related setup link.
 - b. On the **Home** tab of the **Units of Measure** page, click **New**.
 - c. In the **Code** field, type "SHEET".
 - d. In the **Description** field, type "Sheet".
 - e. Repeat steps b through d for the SQFT unit of measure. Use "Sq. Feet" for the description.
 - f. Click **OK** to close the **Units of Measure** page.

2. Create the new Steel item, and add SHEET and SQFT as two of its item units of measure. Then assign SHEET as the item's base unit of measure.
 - a. In the **Search** box, type "items", and then select the related link.
 - b. On the **Home** tab of the **Items** list page, click **New**, and then press **Enter** to automatically assign a new item number.
 - c. On the **General** FastTab of the item card, in the **Description** field, type "Steel".
 - d. In the **Base Unit of Measure** field, click the drop-down arrow, and then click **New**.
 - e. On the **Item Units of Measure** page, in the **Code** field, select SHEET. Leave the **Qty. per Unit of Measure** field at its default value of 1.
 - f. On the second line, in the **Code** field, select SQFT.
 - g. In the **Qty. per Unit of Measure** field, type ".00667". This represents 1/150th of the size of a sheet (there are 150 square feet per sheet).

- h. Select the line for the SHEET unit of measure again.
 - i. Click **OK** to assign the SHEET unit of measure as the base unit of measure for the item.
 - j. Click **OK** to close the item card.
3. Add the Steel item as a component in the Mountain Bike production BOM (1006).
 - a. In the **Search** box, type "production BOM", and then select the related link.
 - b. On the **Production BOM** list page, double-click the line for BOM 1006, Mountain Bike.
 - c. On the **General** FastTab of the **Production BOM** page, in the **Status** field, select Under Development.
 - d. On the **Lines** FastTab, on a new line, in the **Type** field, select Item.
 - e. In the **No.** field, click the drop-down arrow, and then click **Advanced**.
 - f. On the **Item List** page, use the filter capabilities to locate and select the Steel item, and then click **OK**.
 - g. On the **Lines** FastTab of the **Production BOM** page, on the line for the Steel item, in the **Quantity per** field, type "1".
4. Enter the calculation formula for the new component.
 - a. Use the **Choose Columns** function to add the **Length**, **Width**, and **Calculation Formula** fields. Position these fields after the **Unit of Measure Code** field.
 - b. On the line for the Steel item, in the **Unit of Measure Code** field, select SQFT.
 - c. In the **Length** field, type "3".
 - d. In the **Width** field, type "5".
 - e. In the **Calculation Formula** field, select Length * Width. See the "Production BOM Component That Uses a Calculation Formula" image for an example.

Module 3: Production Bill of Materials (BOM)

Type	No.	Description	Quantity per	Unit of Measure Code	Length	Width	Calculation Formula
Item	1400	Mudguard front	1	PCS	0	0	
Item	1450	Mudguard back	1	PCS	0	0	
Producti...	1005	Safety Bike	1	PCS	0	0	
Item	70061	Steel	1	SQFT	3	5	Length * Width

FIGURE 3.12: PRODUCTION BOM COMPONENT THAT USES A CALCULATION FORMULA

5. Certify the BOM.
 - a. On the **General** FastTab, in the **Status** field, select Certified.
 - b. Click **OK** to close the page.



Note: There are two hidden effects to the steps that are applied in this demonstration. The first is that the **Quantity** field in the BOM Line table is set to 15 for the Steel component for the Mountain Bike production BOM. The **Quantity** field is not visible to users. This results from the formula: Quantity = Length * Width * Quantity per.

Because you defined the SQFT unit of measure as a percentage of the base unit of measure (SHEET) in the **Item Units of Measure** page (one square foot is equal to 1/150th or .00667), the program can also calculate the consumption of steel sheets used for each Mountain Bike: 15 square feet * .00667 = .1 sheet of steel.

Exchange Production BOM Item Batch Job

The **Exchange Production BOM Item** batch job replaces items that are obsolete in production BOMs. You can exchange an item with a new item or a new production BOM. You also can create new versions when you exchange an item in a BOM. The program automatically generates these new versions.

To run the batch job, type "exchange production bom item" in the **Search** box, and then select the related link.

The screenshot shows the 'Edit - Exchange Production BOM Item' dialog box. The title bar includes the text 'Edit - Exchange Production BOM Item' and standard window controls. Below the title bar is an 'Actions' pane with 'Refresh' and 'Clear Filter' buttons. The main area is an 'Options' section with the following fields:

- Exchange**
 - Type: [dropdown]
 - No.: [dropdown]
- With**
 - Type: [dropdown]
 - No.: [dropdown]
- Create New Version:
- Multiply Qty. with: [text box] 1
- Starting Date: [dropdown] 1/23/2014
- Recertify:
- Copy Routing Link:
- Delete Exchanged Component:

At the bottom of the dialog are 'OK' and 'Cancel' buttons.


FIGURE 3.13:THE EXCHANGE PRODUCTION BOM BATCH JOB REQUEST PAGE

Module 3: Production Bill of Materials (BOM)

The batch job request page provides the following options.

Field	Description
Exchange Type	Item or Production BOM.
Exchange No.	Item number or production BOM number that you want to replace.
With Type	Type that you want to use as a replacement (Item or Production BOM). Leave this field blank to expire or delete a component without replacing it.
With No.	Item number or production BOM number that you want to use as the replacement.
Create New Version	Field that you select if you want to make the exchange in a new production BOM version. First, the version is copied and then the exchange is made. The old version remains unchanged. Use the value in the Starting Date option field as the starting date for the new version.
Multiply Quantity With	Value of a quantity. If the quantity is unchanged, type "1". If you type "2", the new quantity is doubled in comparison with the original quantity.
Starting Date	Date that the changes take effect.
Recertify	Exchange batch jobs automatically change the status of the current BOM to Under Development. Select this field if you want the program to recertify the BOM after the change.
Copy Routing Link	Check box that you select if you want the routing link copied to the new component.

Field	Description
Delete Exchanged Component	Check box that you select to delete the exchanged component if you do not decide to create a new BOM version. The value in the Starting Date option field is copied to the production BOM line.

 **Note:** If you do not want to create a new version or delete the exchanged component, then use both the **Starting Date** and **Ending Date** fields on the production BOM lines to specify when you want the old and new components to take effect. To delete the old items, refer to the “Delete Expired Components Batch Job” topic.

Delete Expired Components Batch Job

You can use the **Ending Date** field in a BOM component line to stop a production BOM or a BOM version from using the component after a specified date. However, over time, the expired components can create clutter in your BOM lines.

To clean up the expired components, you can use the **Delete Expired Components** batch job.

To run the batch job, type “delete expired components” in the **Search** box, and then select the related link.

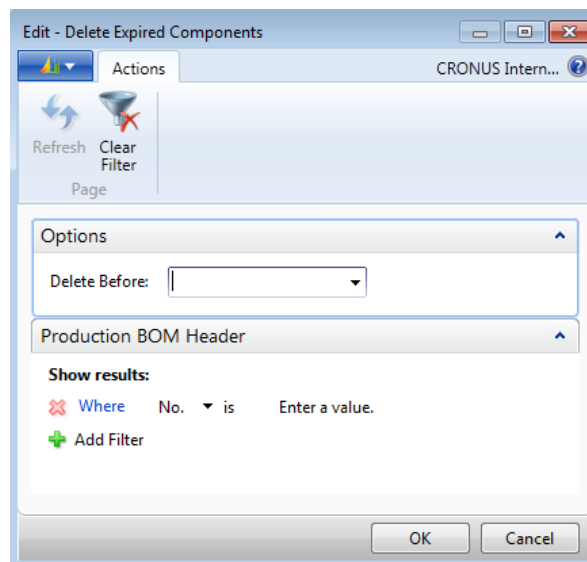


FIGURE 3.14:THE DELETE EXPIRED COMPONENTS BATCH JOB REQUEST PAGE

Module 3: Production Bill of Materials (BOM)

On the **Options** FastTab, in the **Delete Before** field, you can define the date up to which all components are deleted.

The filters in the **Production BOM Header** FastTab determine which components are deleted. You can set filters for all fields on the production BOM header. The column order does not affect the batch job.

Inventory and Manufacturing Units of Measure

The item card has a **Base Unit of Measure** field in the **General** FastTab. This field defines the unit of measure in which an item is stored in inventory.

The production BOM has a **Unit of Measure** field in its **General** FastTab. This unit of measure defines the quantity in which an item is manufactured.

These two units of measure can differ. For example, an item's base unit of measure can be pounds (lbs.).

However, a company might want to produce the item in tons. In this case, it is helpful to record the production BOM component requirements that are based on producing tons of the parent item instead of pounds.

When the production BOM unit of measure is not the same as the item unit of measure, you must set up the production BOM unit of measure in the **Item Unit of Measure** table. For an example, see the "Create and Use a Calculation Formula" demonstration in this training material.

In addition to defining a production BOM unit of measure, you can create units of measure for sales and also for purchasing.

Low-Level Codes

As described in the module overview, a production BOM can consist of up to 50 levels of items, subassemblies, and phantom BOMs.

The different levels within the BOM define the parent-component relationships in a multilevel BOM. Every component occupies a certain level within this hierarchy and is assigned a low-level code (a number from 0 to 49) to reflect this level.

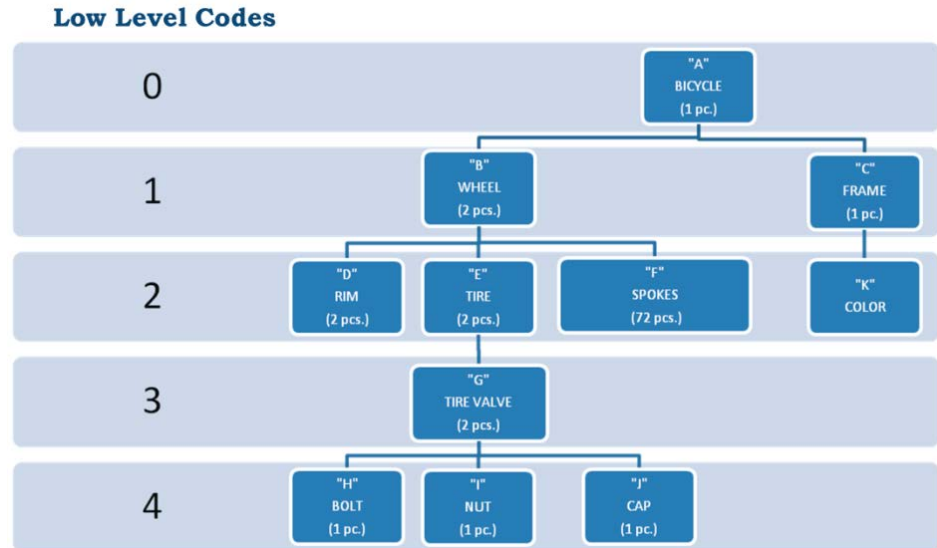


FIGURE 3.15:LOW-LEVEL CODES FOR THE PRODUCTION BOM OF A BICYCLE

Parent items are usually assigned a low-level code of zero ("0"). The components that are shown on the first level in the parent item production BOM are assigned a low-level code of "1", and so on.

Low-level codes are necessary for the planning process to work correctly. Incorrect low-level codes mean that the quantity that is suggested by the planning process could be incorrect.

Low-level codes are calculated dynamically if you select the **Dynamic Low-Level Code** field on the **General** FastTab of the **Manufacturing Setup** page. For more information about manufacturing setup, refer to "System Setup" in this training material.

If you do not select the **Dynamic Low-Level Code** field in setup, you must run the **Calculate Low-Level Code** batch job before you calculate a supply plan.

Production BOM Reports

The following production BOM reports are available from the **Report** tab of the Production BOM list, and from the Reports section of the **Manufacturing->Product Design** menu:

- Quantity Explosion of BOM
- Where-Used (Top Level)
- Compare List

Quantity Explosion of BOM Report

The **Quantity Explosion of BOM** report prints an indented production BOM listing for items that are specified in the item filters. The BOM is exploded for all levels.

To view the report, type “quantity explosion of bom” in the **Search** box, and then select the related link.

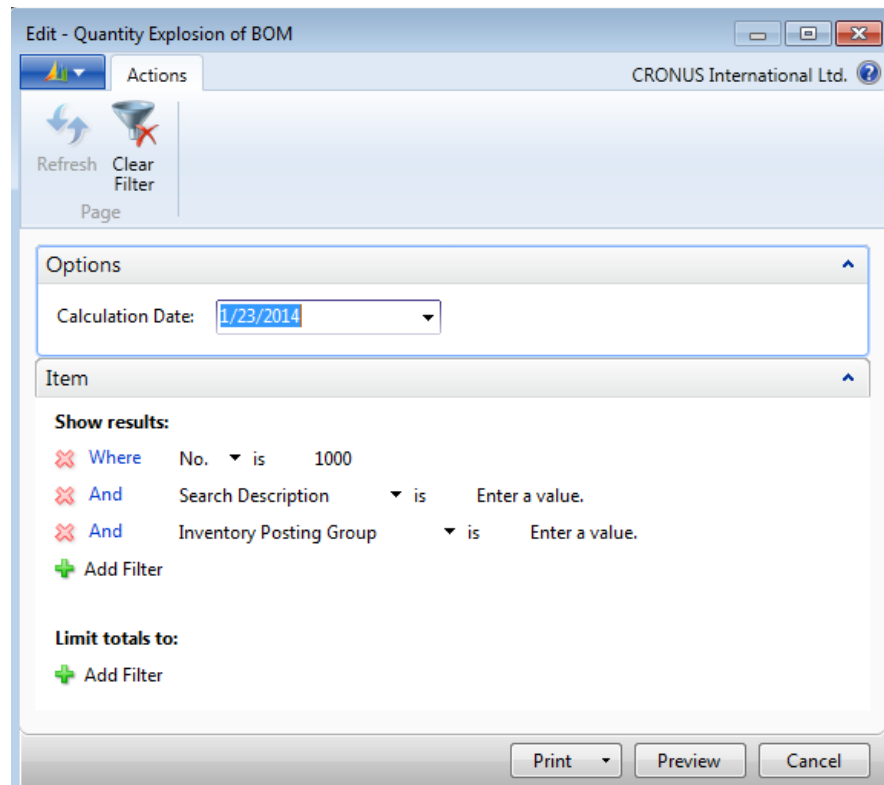


FIGURE 3.16: QUANTITY EXPLOSION OF BOM REPORT REQUEST PAGE

On the **Options** FastTab, in the **Calculation Date** field, enter the date on which you want the BOM Explosion based. This date determines the version of the production BOMs and the component lines that are exploded.

Use the **Item** FastTab to specify filters to narrow the report results.

The "Quantity Explosion of BOM Report" image shows an example of the report.

Level	No.	Description	BOM Quantity	Unit of Measure Code	Total Quantity
1000		Bicycle			
1	1100	Front Wheel	1	PCS	1
2	1110	Rim	1	PCS	1
2	1120	Spokes	50	PCS	50
2	1150	Front Hub	1	PCS	1
3	1151	Axle Front Wheel	1	PCS	1
3	1155	Socket Front	1	PCS	1
2	1151	Axle Front Wheel	1	PCS	1
2	1155	Socket Front	1	PCS	1
1	1151	Axle Front Wheel	1	PCS	1
1	1155	Socket Front	1	PCS	1

FIGURE 3.17: QUANTITY EXPLOSION OF BOM REPORT

The report includes the fields described in the following table.

Field	Description
Level	Number and an indentation that indicates the level within the BOM structure.
No.	Item number or production BOM (phantom BOM) number.
Description	Description that uses text from the item master data or the description of the production BOM that is in effect as of the calculation date.
BOM Quantity	Quantity of the item or production BOM that you must have to make one parent item.
Unit of Measure Code	Code for the unit of measure.
Total Qty.	Total quantity required of the component.

Where-Used (Top Level) Report

The **Where-Used (Top Level)** report shows the location and quantities of items that are used in the product structure. The report output is restricted by the items that are specified in the report filters.

The report shows only the item as where-used when the base item is used as the top-level item. For example, if item A is used to produce item B, and item B is used to produce item C, the report shows item B if you run this report for item A. If you run this report for item B, then it shows item C.

The levels that are shown in this report are the opposite of those in the **Quantity Explosion of BOM** report. This means that they are "bottom up," instead of "top down."

This report is especially useful in the following two cases:

- Quality control – After a production run, it is standard for the Quality Department to take a sample to make sure that the finished goods comply with manufacturing specifications (materials used, quantity, type) and legal requirements, when applicable.
- Recall – If an error occurs during the manufacturing process, for example, if wrong or defective components are used, this report enables the production manager to trace and recall items that have been manufactured in error. This saves time and money for the company.

To view the report, type "where-used (top level)" in the **Search** box, and then select the related link.

On the **Options** FastTab, in the **Calculation Date** field, enter the date on which you want the product structure based. This date determines the version of the production BOMs that are used to determine the product structure.

Use the **Item** FastTab to specify filters to narrow the report results.

The "Where-Used (Top Level) Report" image shows an example of the report.

October 3, 2012
Page 1
CONTOSO\Administrator

As of 01/23/14
CRONUS International Ltd.

Level	No.	Description	Exploded Quantity.
No. 1100 Description Front Wheel			
1	1000	Bicycle	1
1	1001	Touring Bicycle	1
No. 1110 Description Rim			
1	1100	Front Wheel	1
2	1000	Bicycle	1
2	1001	Touring Bicycle	1
1	1200	Back Wheel	1
2	1000	Bicycle	1
2	1001	Touring Bicycle	1
No. 1120 Description Spokes			
1	1100	Front Wheel	50
2	1000	Bicycle	50
2	1001	Touring Bicycle	50
1	1200	Back Wheel	50
2	1000	Bicycle	50
2	1001	Touring Bicycle	50

FIGURE 3.18:WHERE-USED (TOP LEVEL) REPORT

The report includes the fields described in the following table.

Field	Description
Level	Number and an indentation that indicate the level within the product structure.
No.	Item number.
Description	Item description.
Exploded Quantity	Quantity of the item that is required to make one parent item.

Compare List Report

This report compares the components for two selected items. To view the report, type "compare list" in the **Search** box, and then select the related link.

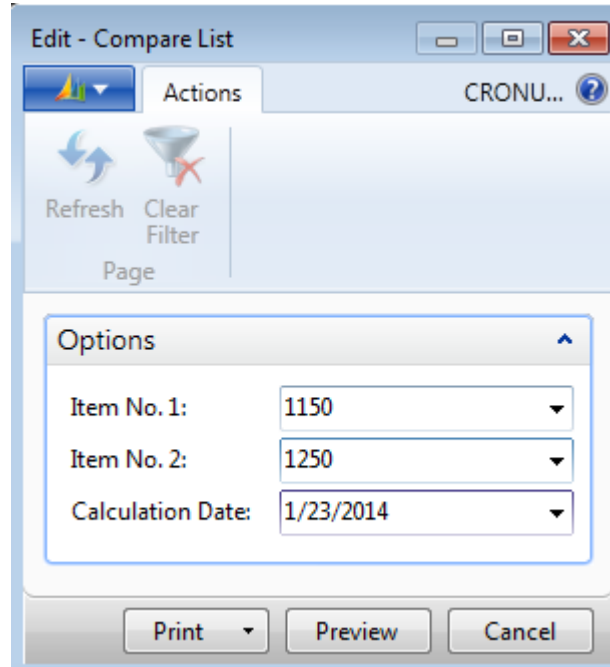


FIGURE 3.19:COMPARE LIST REPORT REQUEST PAGE

On the **Options** FastTab, select the two items that you want to compare. In the **Calculation Date** field, enter the date on which you want the comparison based. This date determines the version of the production BOM that is used for the comparison.

The "Compare List Report" image shows an example of the report.

No.	Description	Unit Cost	Item No. 1 1150		Item No. 2 1250		Difference Cost	
			Exploded Quantity	Cost Share	Exploded Quantity	Cost Share		
1151	Axle Front Wheel	0.45	1	0.45	0	0.00	0.45	
1155	Socket Front	0.77	1	0.77	0	0.00	0.77	
1251	Axle Back Wheel	0.33	0	0.00	1	0.33	-0.33	
1255	Socket Back	0.90	0	0.00	1	0.90	-0.90	
Total Cost Difference								-0.01

FIGURE 3.20:COMPARE LIST REPORT

The report shows the following fields:

- Components
- Unit costs
- Exploded quantities
- Cost shares (unit cost multiplied by exploded quantity)
- Total cost difference

The report uses the **Unit Cost** field from item cards.

If you use a costing method other than Standard Cost, you must run the **Adjust Cost-Item Entries** batch job to update the unit cost before running this report.

Module Review

Production bill of materials (BOM) is one of the foundation elements of manufacturing software.

Microsoft Dynamics NAV provides many tools and features to efficiently manage creating and managing production BOMs. These features include the automatic implementation of scheduled changes that involve BOM versions and component lines.

Advanced features, such as phantom BOMs, calculation formulas, and low-level codes, make it possible to handle most BOM requirements out of the box.

A strong suite of interface functions and reports helps BOM users review, track, and analyze related data on both the production BOM and product structure levels.

Test Your Knowledge

Test your knowledge with the following questions.

1. What is a production bill of materials (BOM)?

2. What are the two types of components that you can enter on a production BOM line?

3. What does a calculation formula do?

4. What are production BOMs that include at least one subassembly or phantom BOM called?

- Complex BOMs
- Multilevel BOMs
- BOM hierarchies
- BOM matrices

5. What is the maximum number of levels a production BOM can have?

- 30
- 40
- 50
- 60

Test Your Knowledge Solutions

Test Your Knowledge

1. What is a production bill of materials (BOM)?

MODEL ANSWER:

A production bill of materials (BOM) is a list of all the components that are required to produce a parent item. The list includes the description, quantity, and unit of measure of each component, in addition to other information.

2. What are the two types of components that you can enter on a production BOM line?

MODEL ANSWER:

Items and production BOMs.

3. What does a calculation formula do?

MODEL ANSWER:

It lets you define the required quantity of a BOM component in a formula instead of a single value.

4. What are production BOMs that include at least one subassembly or phantom BOM called?

Complex BOMs

Multilevel BOMs

BOM hierarchies

BOM matrices

5. What is the maximum number of levels a production BOM can have?

30

40

50

60

