QAD Enterprise Applications
Standard & Enterprise Edition

Training Guide

Product Structures and Formulas

70-3025C
QAD 2011 Standard & Enterprise Edition
Lab: Enterprise Edition 2010 - Addons r03 - Training
Workspace: 10USA > 10USACO
March 2011

ProductStructuresAndFormulas_TG_v2011SE_EE.pdf/njm/hes

QAD Inc.
100 Innovation Place
Santa Barbara, California 93108
Phone (805) 566-6000
http://www.qad.com

Contents

About This Course

Course Description

QAD designed this course to cover the basics of preparing to implement the product structures and formulas module of QAD Enterprise Applications. The course includes:

- An introduction to the product structures and formulas module
- An overview of key business issues
- Setting up the product structures and formulas module
- Operating the product structures and formulas module
- Activities and exercises throughout the course for students to practice key concepts and processes in the product structures and formulas module

Course Objectives

Students learn how to:

- Analyze some key business decisions before setting up the product structures and formulas module
- Set up and operate the product structures and formulas module

Audience

- Implementation consultants and members of implementation teams
- Key users

Prerequisites

- *Initial Setup* training course
- Basic knowledge of QAD Enterprise Applications as it is used in the business
- Working knowledge of the manufacturing industry in general

Course Credit & Scheduling

- This course is valid for 6 credit hours
- This course is designed to be taught in one-half day

Virtual Environment Information

The hands-on exercises in this book should be used with the “Enterprise Edition 2010 - Addons r03 - Training” environment, in the “10USA > 10USACO” workspace.

QAD Resources

If you encounter questions or problems on QAD software that are not addressed in this book, several resources are available.

Product Help

All QAD products ship with integrated help systems. A properly installed QAD application will display help when you press the Help key (F1), or access it through the menu. The help covers the normal use of the product.

QAD Web Resources

The QAD website provides product and company overviews. The Print Solution option on the opening page provides a means of compiling desired content into a document specialized to your industry, business implementation, and needs.

http://www.qad.com/

From QAD's main site, you can access QAD's Learning or Support sites.

QAD Learning Portal for Training Opportunities

To view available training courses, locations, and materials, use the QAD Learning Portal. Choose Learning under the Global Services tab to access this resource.

QAD Support for Product Documentation and the QAD Knowledgebase

To access release notes, user guides, installation and conversion guides by product and release, visit the Support website. Support also offers an array of tools depending on your company's maintenance agreement with QAD. These include the Knowledgebase and direct links to QAD Support experts.

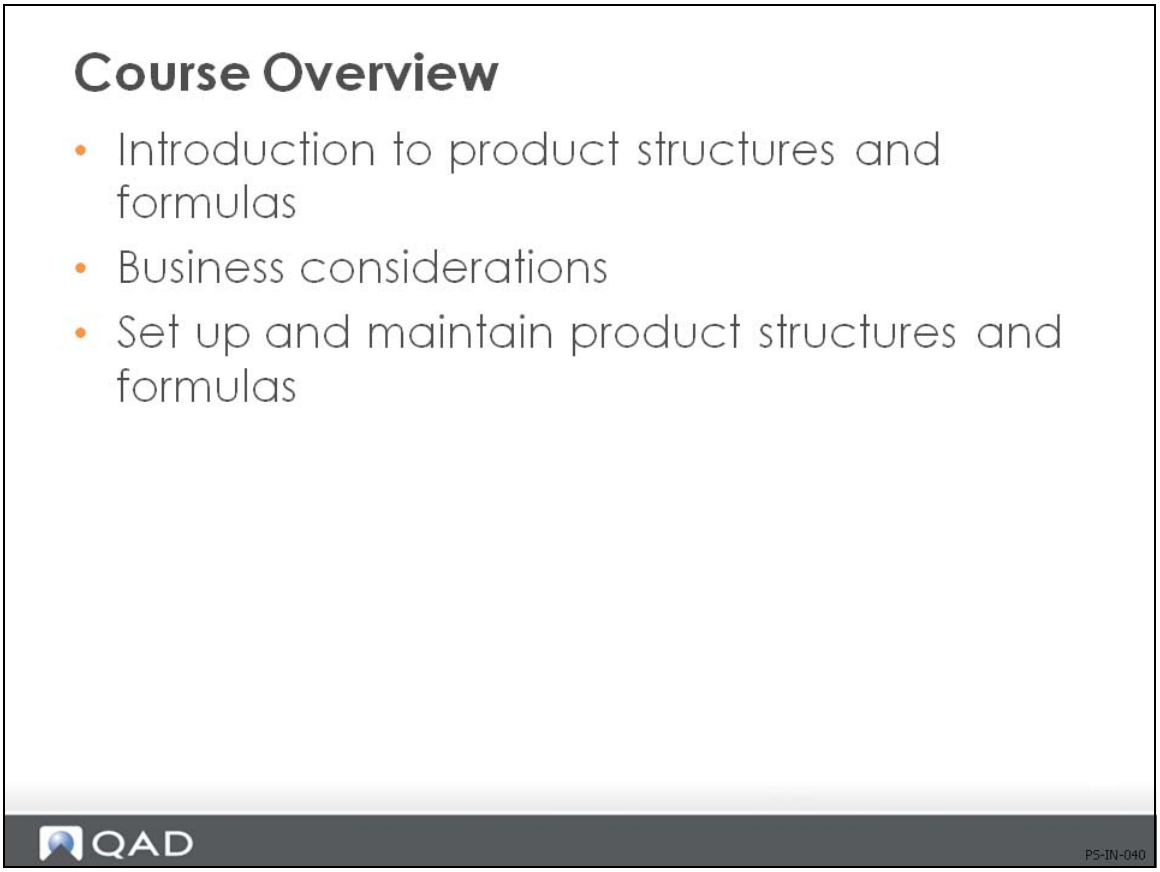
Choose Support under the Global Services tab.

Any QAD customer can register for a QAD web account by accessing the Support web site and clicking the Accounts link at the top of the screen. Your customer ID number is required. Access to certain areas is dependent on the type of agreement you have with QAD.

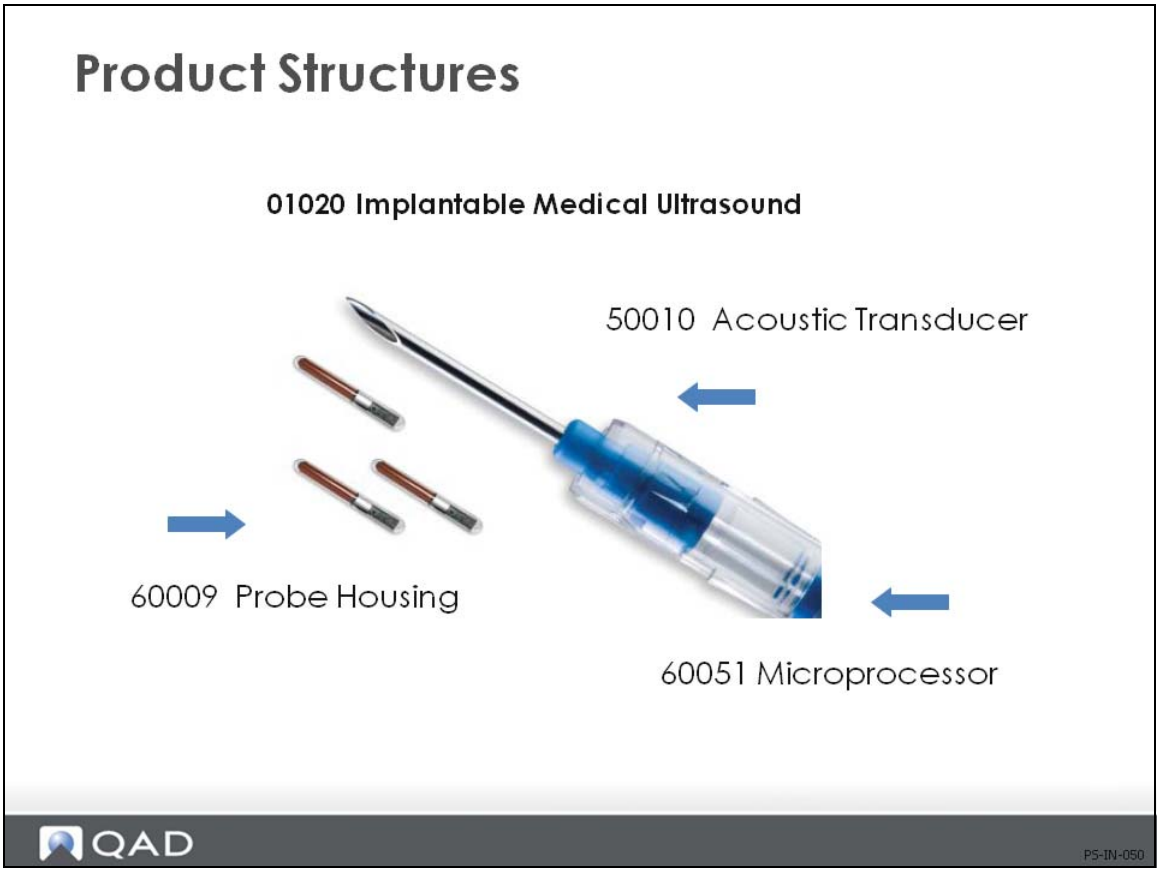
Chapter 1

Introduction to Product Structures and Formulas

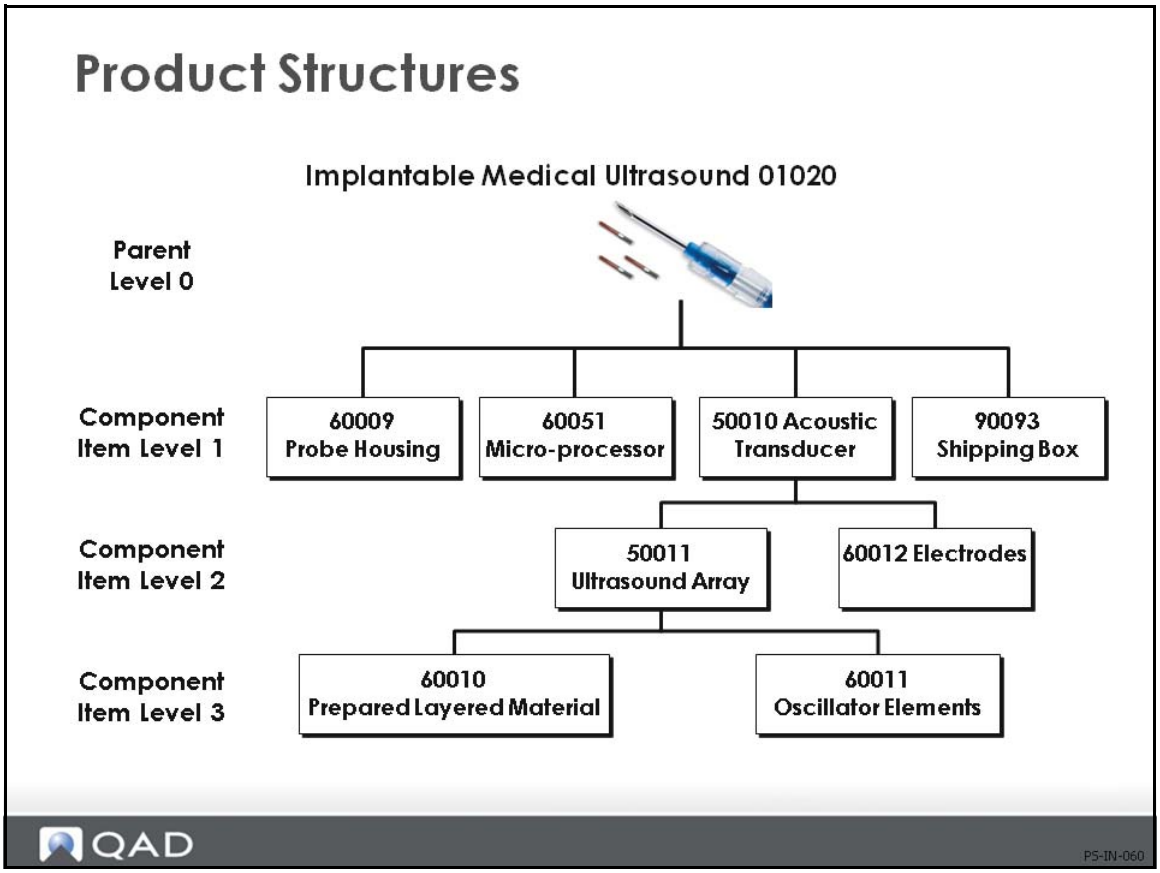
Overview


Course Overview
• Introduction to product structures and formulas
• Business considerations
• Set up and maintain product structures and formulas
QAD
PS-IN-040

Product Structures

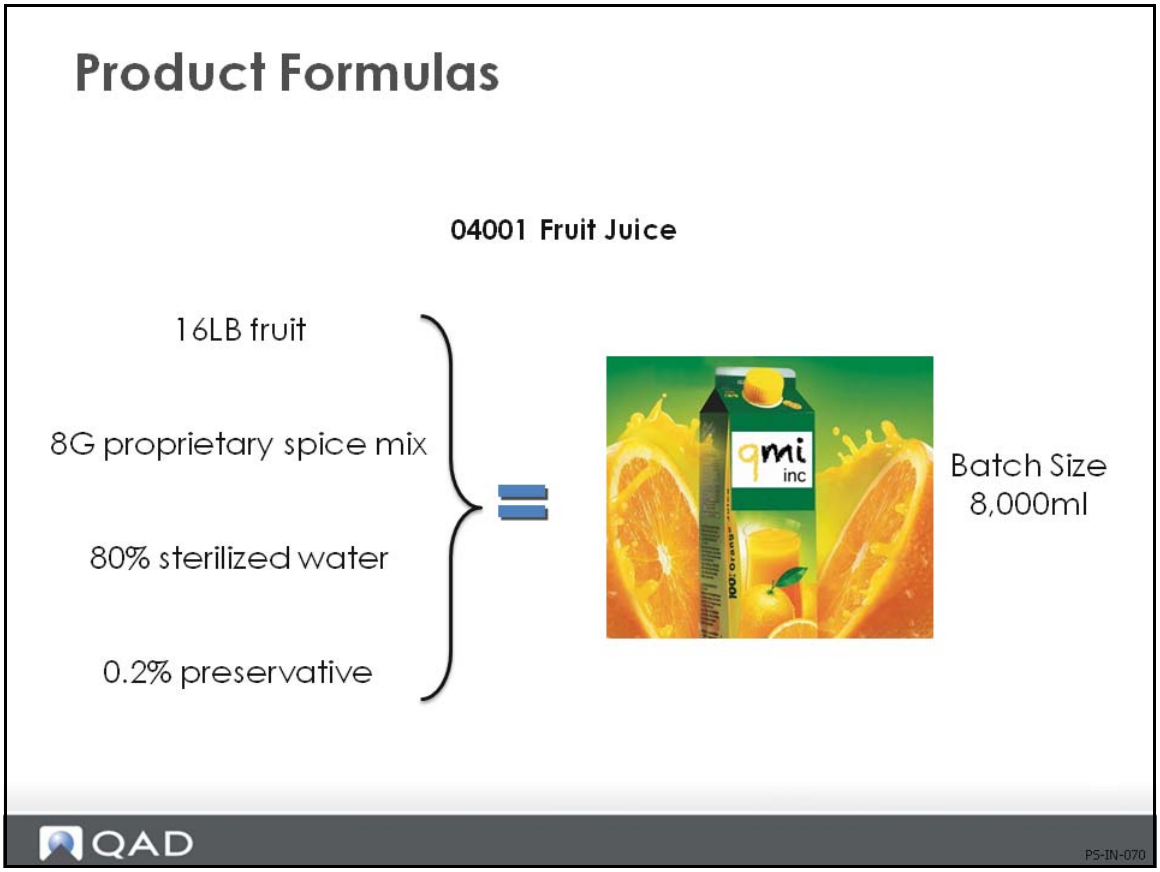


- A listing of all the subassemblies, components, and raw materials in a parent assembly
- Sometimes called a bill of materials (BOM) or a formula



- You can see this product structure in your training environment
- The maximum is 99 levels

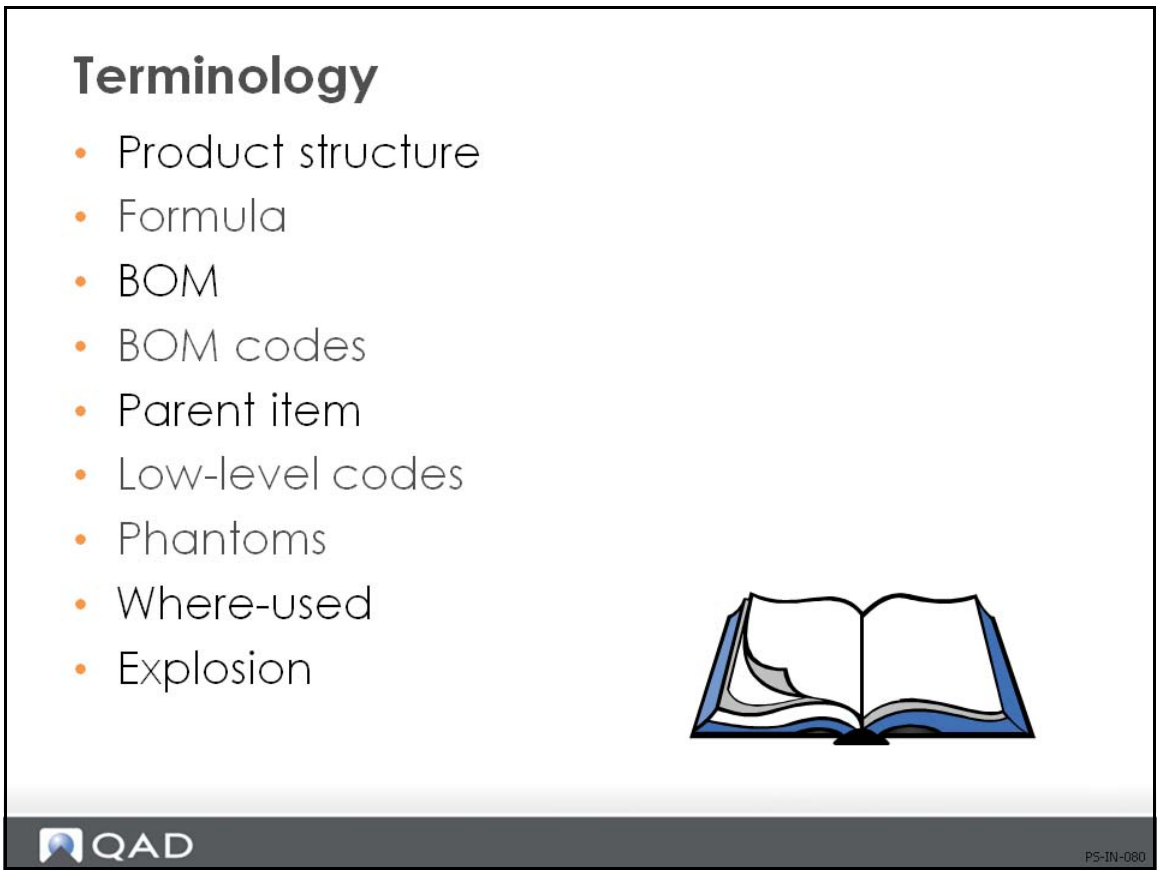
Formulas



Formula:

- A listing of ingredient usage as a quantity per batch or percent of batch
- Used in process industries

Terminology



Product structure

A product structure is a method of identifying all raw materials, components, and subassemblies in a product.

Recorded as a single-level relationship between a parent item and component, a product structure determines when and how many component items are needed.

A product structure may also be called a bill of material, parts list, or formula.

Formula

A formula is an expression of ingredient usage as a quantity per batch or percent of batch. It may also include processing instructions and ingredient sequencing directions.

Bill of Material

A bill of material (BOM) is a listing of all subassemblies, components, and raw materials of a parent assembly. A BOM shows the quantity of each required to make one parent assembly.

A BOM is used with a master production schedule to determine items for which purchase requisitions and production orders must be released.

BOM Codes

A BOM code is a code that uniquely identifies a product structure or formula.

Parent Item

A parent item is an item that is a final product in itself, for which an order or independent requirement exists. It can be a component of a different parent item. It may also be called an end item.

Low-level Codes

Low-level codes represent the lowest level in a product structure at which a particular component can appear. Net requirements for an item are not calculated until gross requirements are calculated down to that level.

Low-level codes are normally calculated and maintained automatically by the system.

Phantoms

Phantoms are items or subassemblies directly consumed into parent items and not planned or stocked upon completion. Normally, lead time is zero and lot sizing is lot for lot.

While retaining the ability to net against any subassembly inventories, phantoms permit material requirements planning (MRP) to drive requirements through the phantom item to its components.

Phantoms facilitate the use of common product structures for engineering and manufacturing.

Where-used

A where-used list is a listing of every parent item that calls for a given component, and the respective quantity required, from a BOM file.

Implosion is the process of determining the where-used relationship for a given component. It can be:

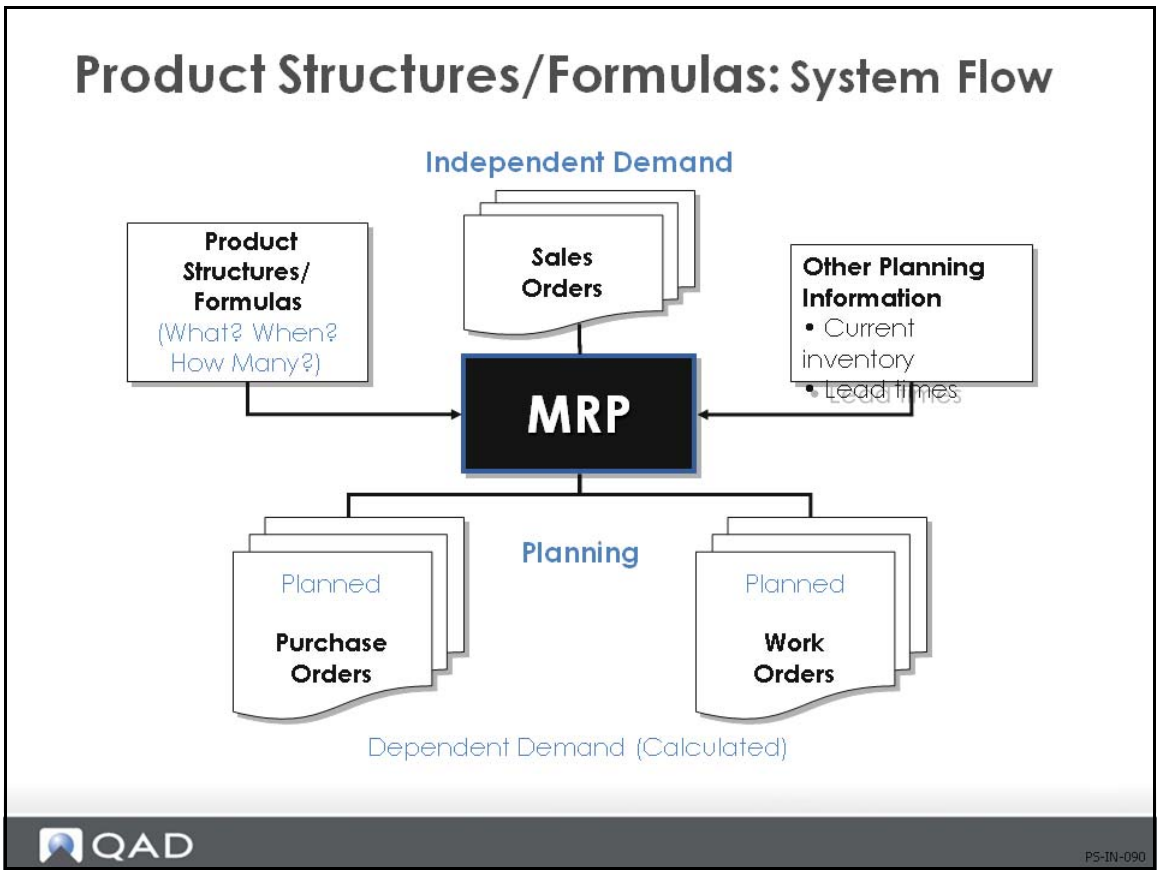
- Single-level, showing only the parents on the next higher level, or
- Multilevel, showing the ultimate top-level parent

Source: APICS Dictionary, 11th Edition, 2005

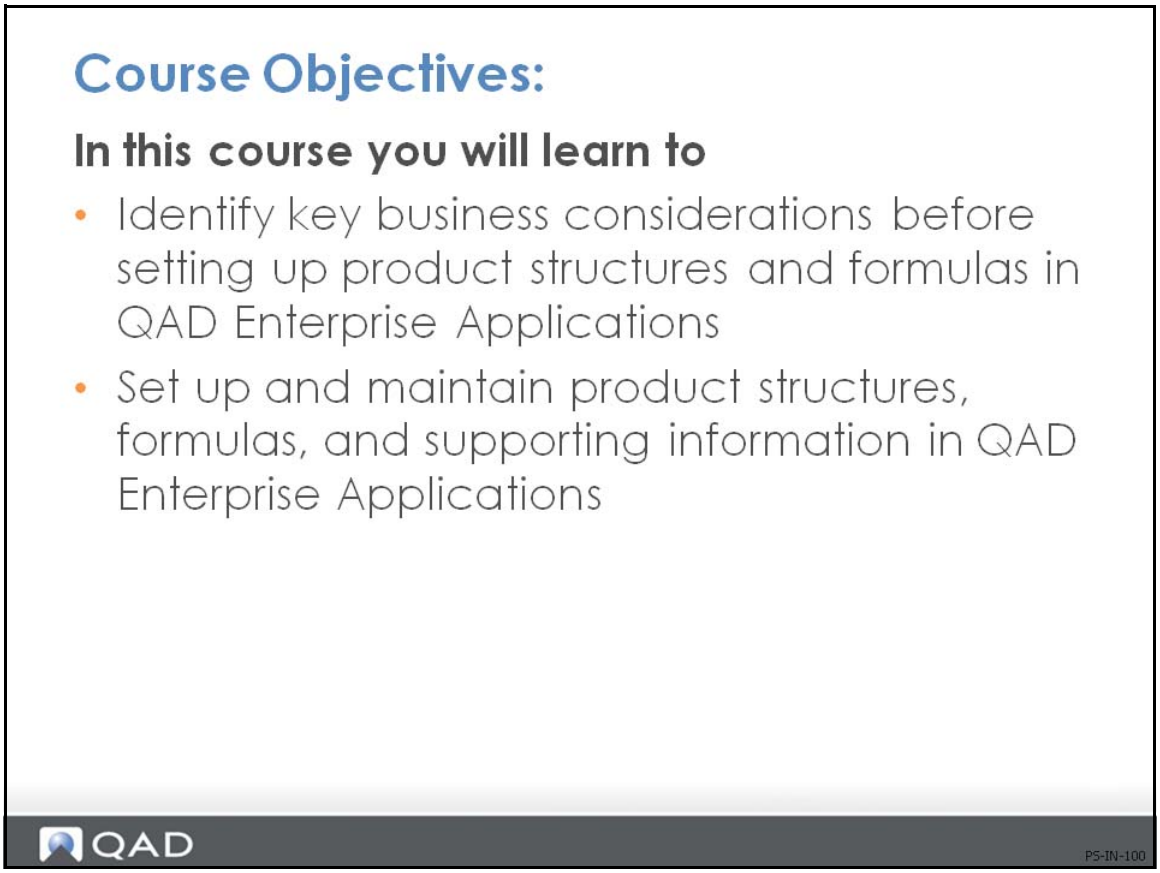
Explosion

An explosion represents demand for components of a parent item calculated by multiplying parent item requirements by component usage quantity specified in a BOM.

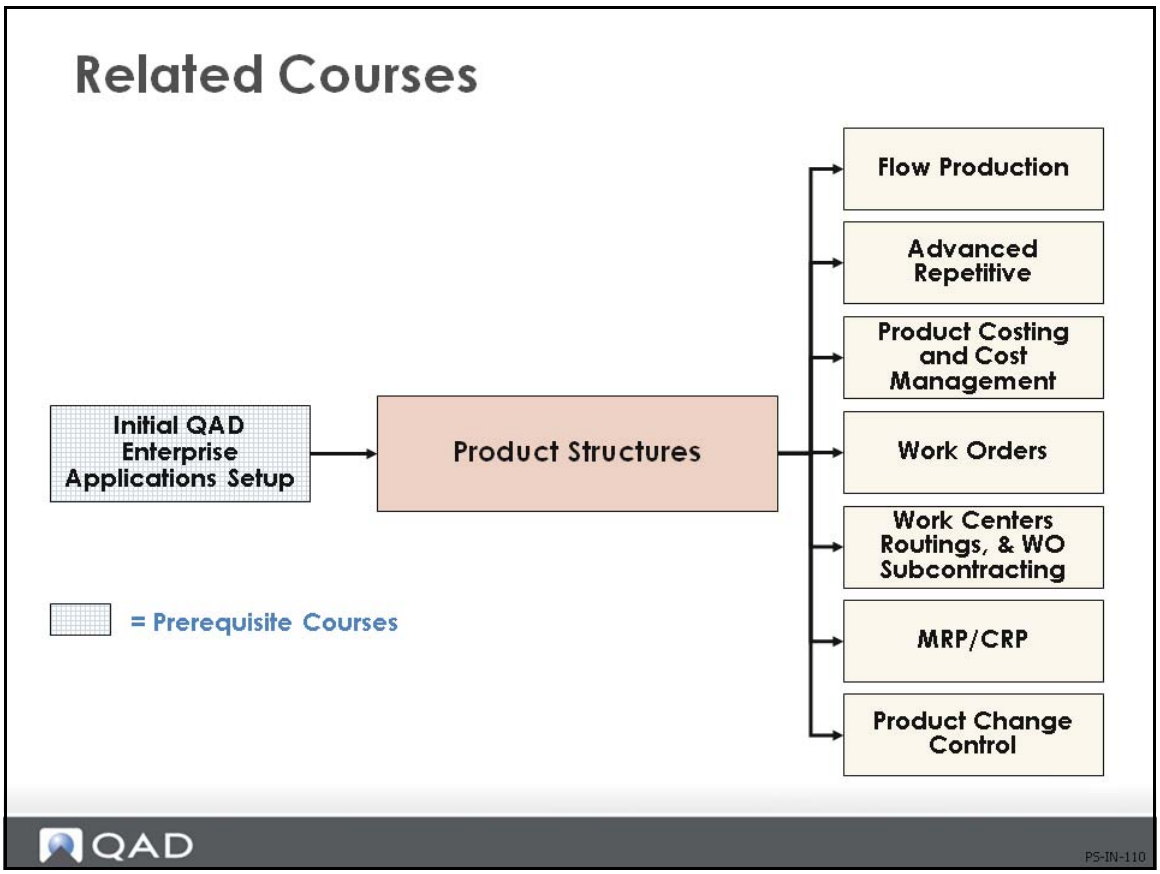
System Flow


Product Structures/Formulas: System Flow
Independent Demand
Product Structures/ Formulas
(What? When? How Many?)
Sales Orders
Other Planning Information
• Current inventory
• Lead times
MRP
Planning
Planned Purchase Orders
Planned Work Orders
Dependent Demand (Calculated)
QAD
PS-IN-090

Course Objectives



Related Courses



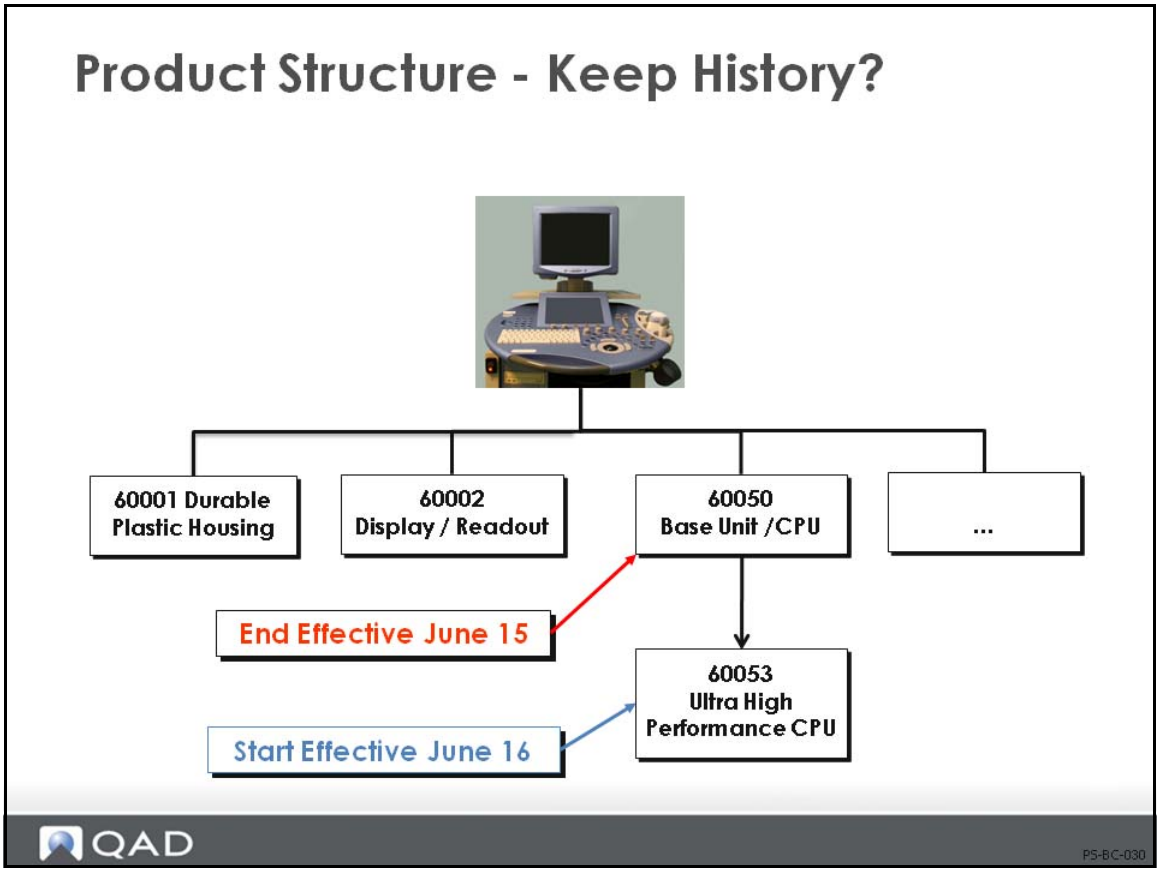
Chapter 2

Business Considerations

Course Overview

Business Issues

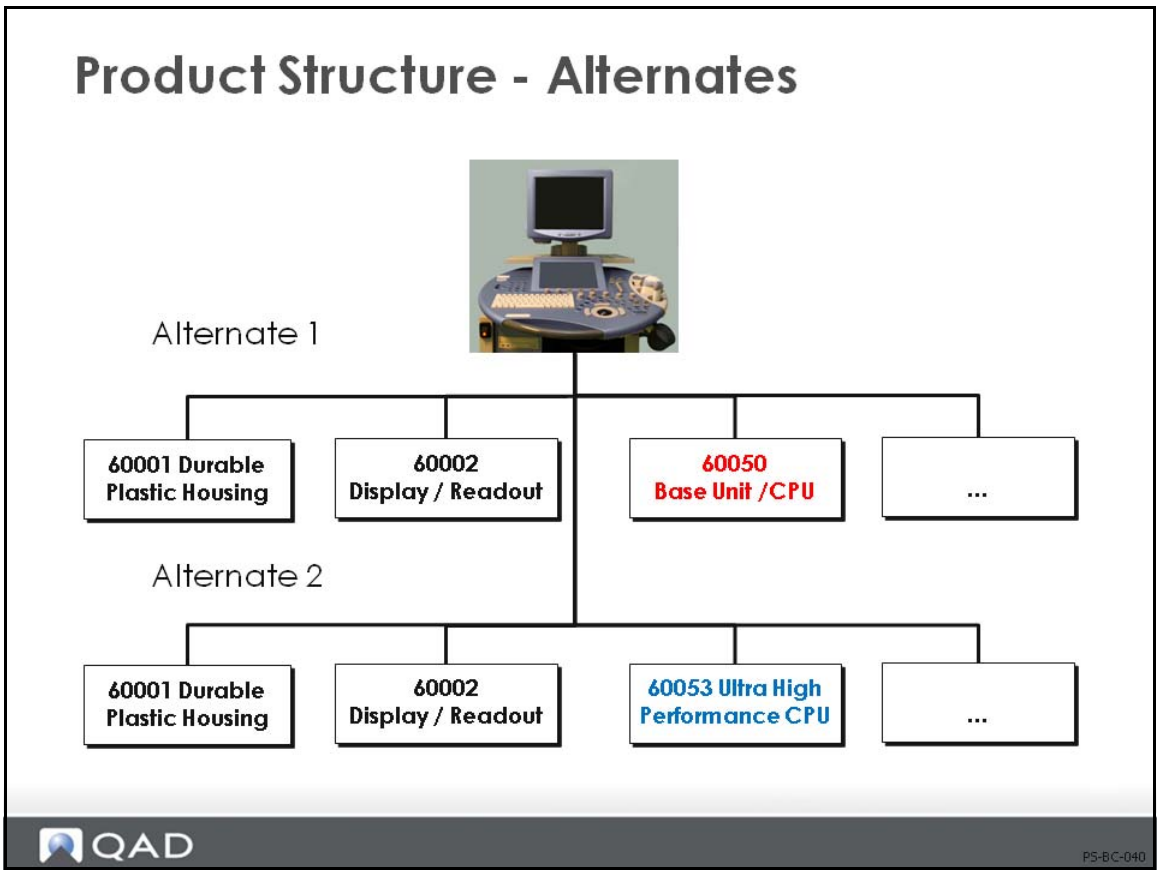
Keep History



Keeping history is critical to tracing product cost changes and variances in the system. Many companies keep structure history as long as possible

- In this example, you keep history by entering the new component with an effective date of June 15, and change the end date of the current item to June 16, with appropriate year in each case.
- You could simply edit the current item on June 16, but you lose history this way
- The Product Change Control module automatically uses effective dates and end dates to indicate when changes are to become effective
  - Additional details of the change are held in the Product Change Control module

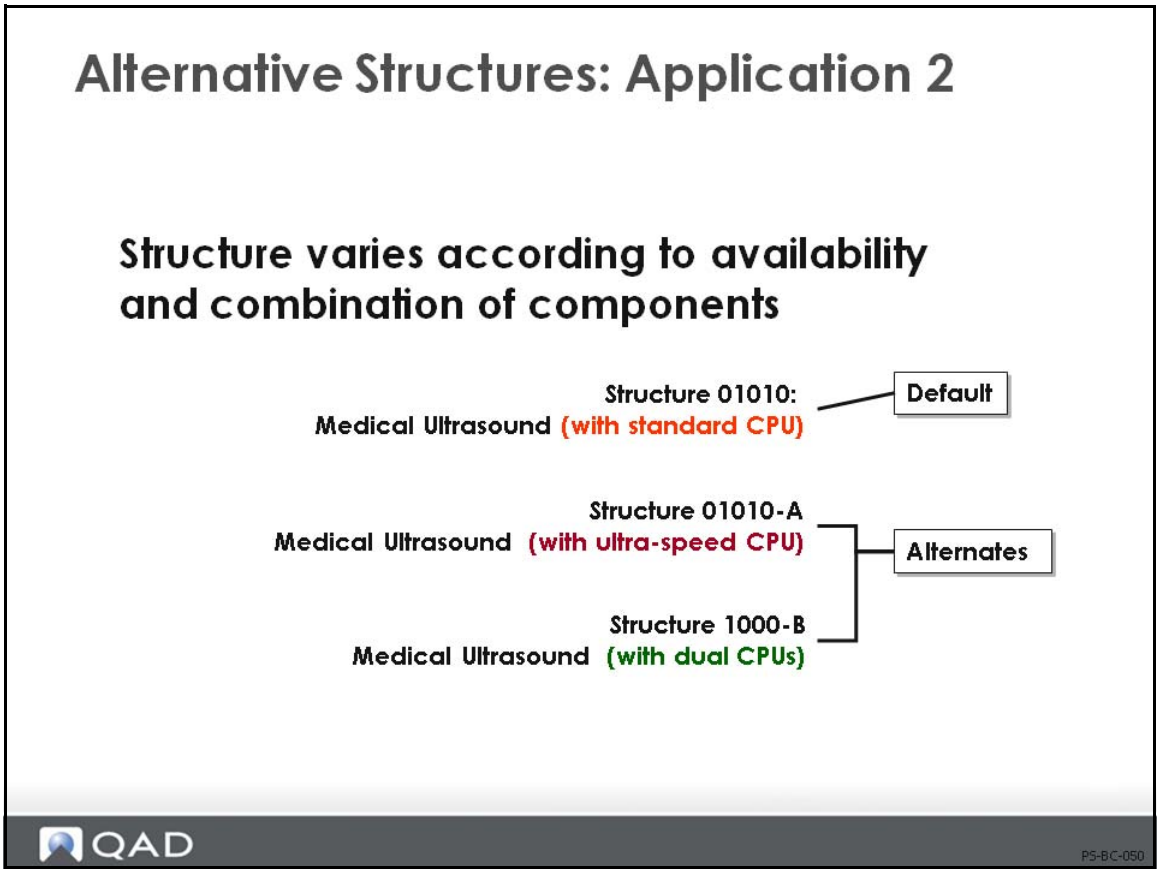
Alternate Structures



Application 1 - Different Structures at Each Site

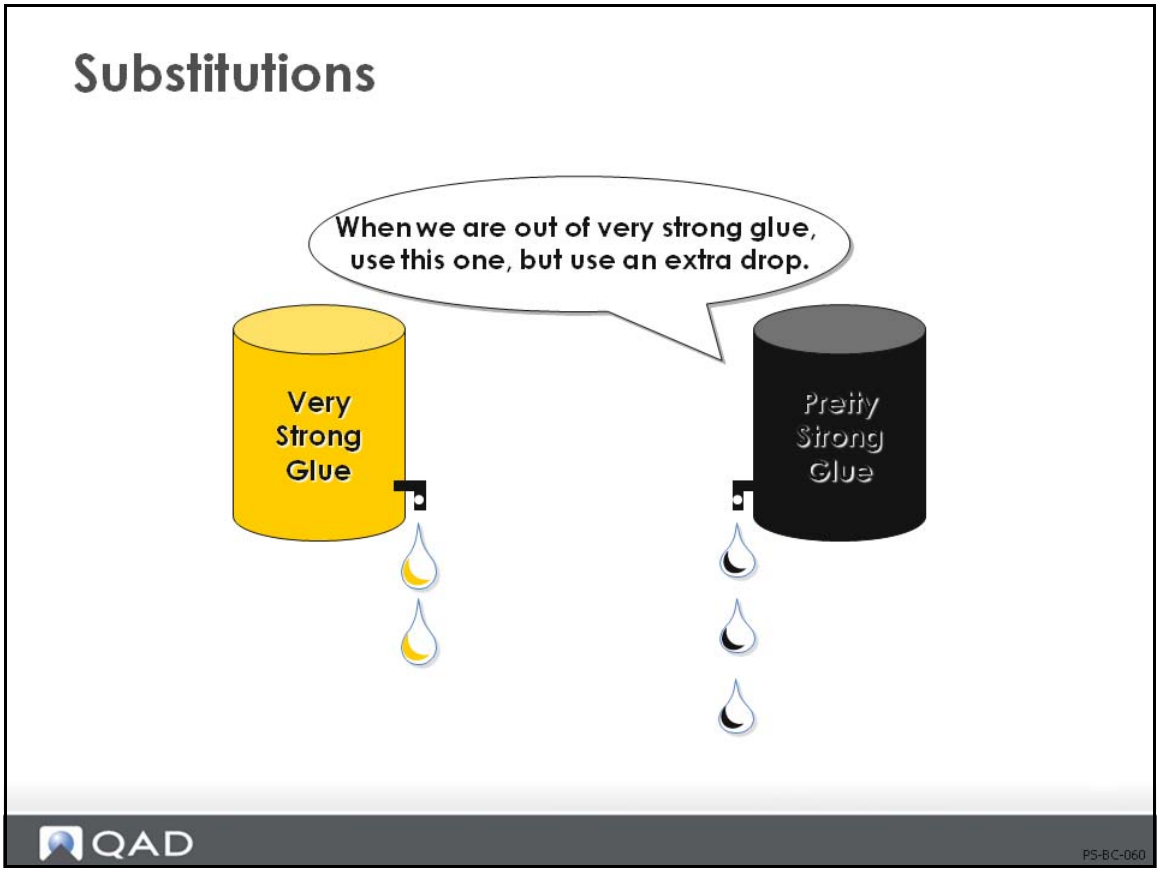
- After creating the base product structure, you create alternates
- You assign the relevant alternate as the default at a site in Item-Site Planning Maintenance.

Application 2 – Structures Depend on Availability



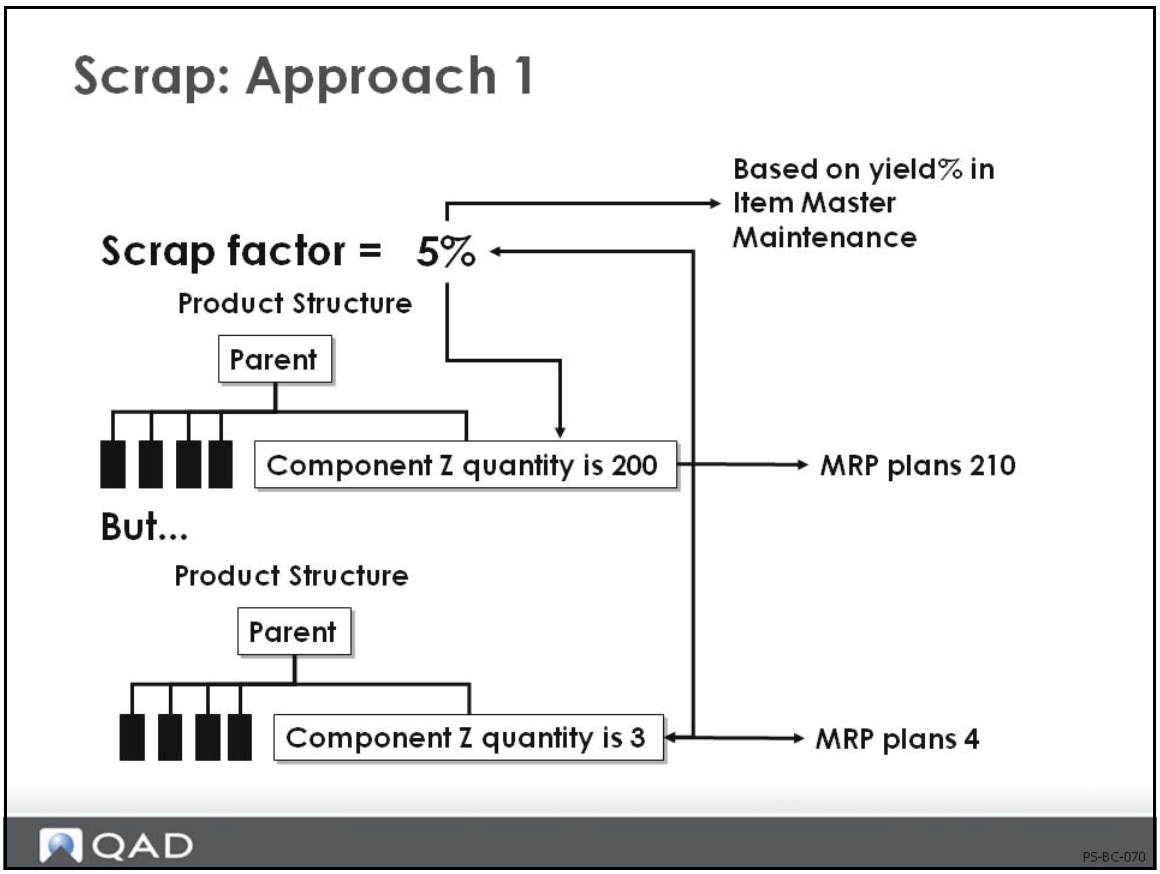
- Availability of items components can affect the product structure or formula
- Varying one component can cause changes to others

Substitutions



- You can direct the system to use a substitute item when the base item runs out
- You may need to change the quantity; for example, to 1.5 times the normal amount.

Scrap

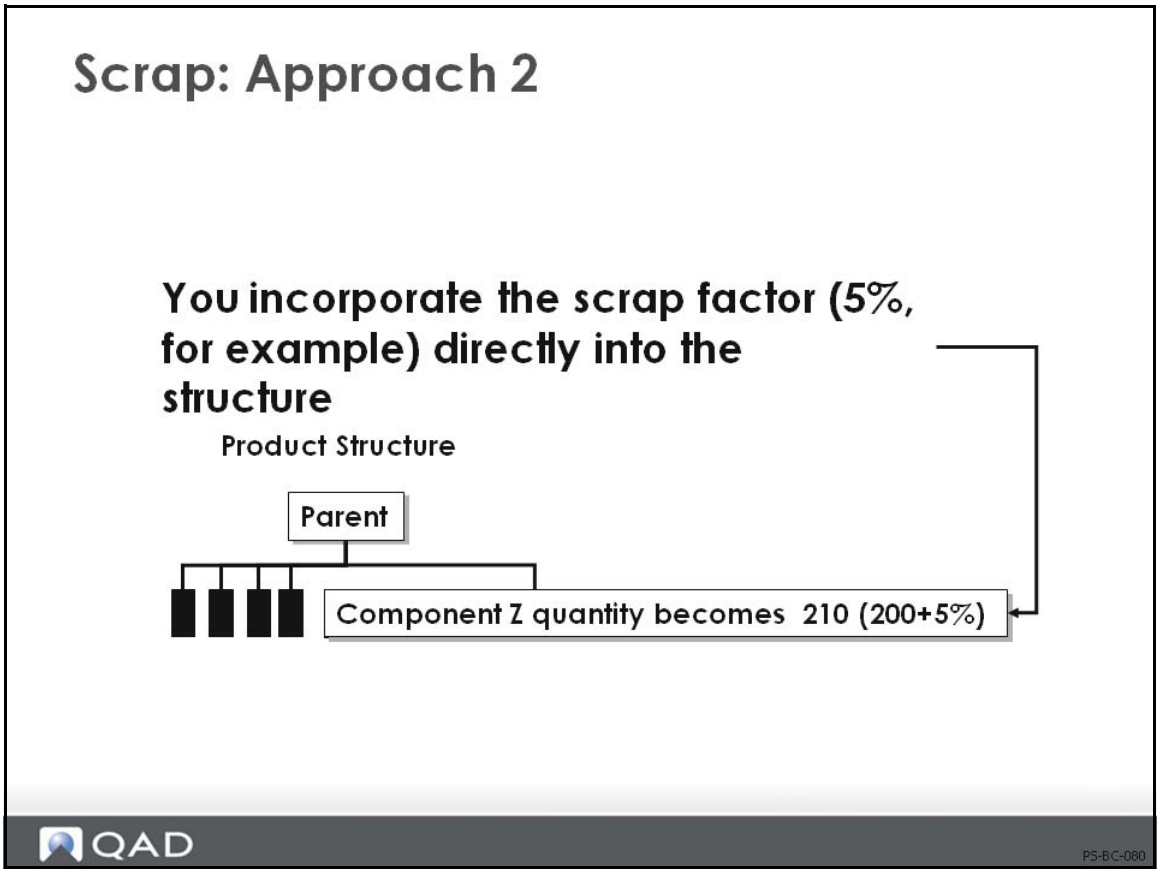


Approach 1– Percentage Factor

- You can establish a percentage factor for scrap
- This works well when scrap is predictable and consistent
- Keep in mind that when the unit of measure is each, QAD Enterprise Applications does not round to the nearest whole unit
- This may promote waste and hide issues of poor quality

Note The system relieves inventory by the quantity per adjusted by the scrap factor during backflushing.

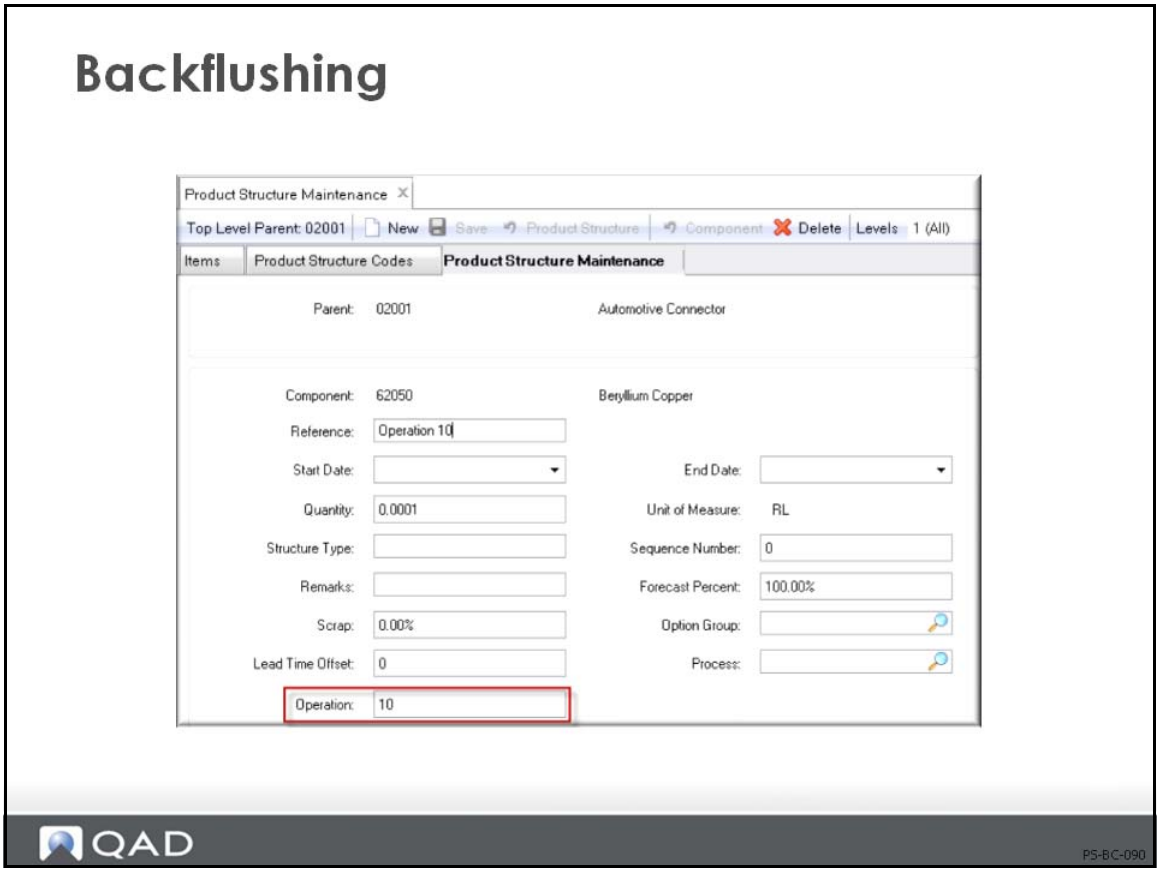
Approach 2 – Incorporation



- You can incorporate the scrap amount directly into the product structure
- This approach is inappropriate for components used in small or discrete quantities
- This works best when the scrap is stable and predictable
- This may promote waste and hide issues of poor quality

The parent item's cost includes the planned scrap during product structure roll-up. Scrap/Yield are covered in detail in the QAD Enterprise Applications Product Costing and Cost Management module.

Backflushing



- Backflushing is the automatic recording of component/raw material issues based on
  - The quantity of end items completed, and
  - The quantity per of the component in the BOM or in the work order bill
- Backflushing can be used for both work order and repetitive production
- To setup backflush specify the operation at which the component is consumed in Product Structure Maintenance

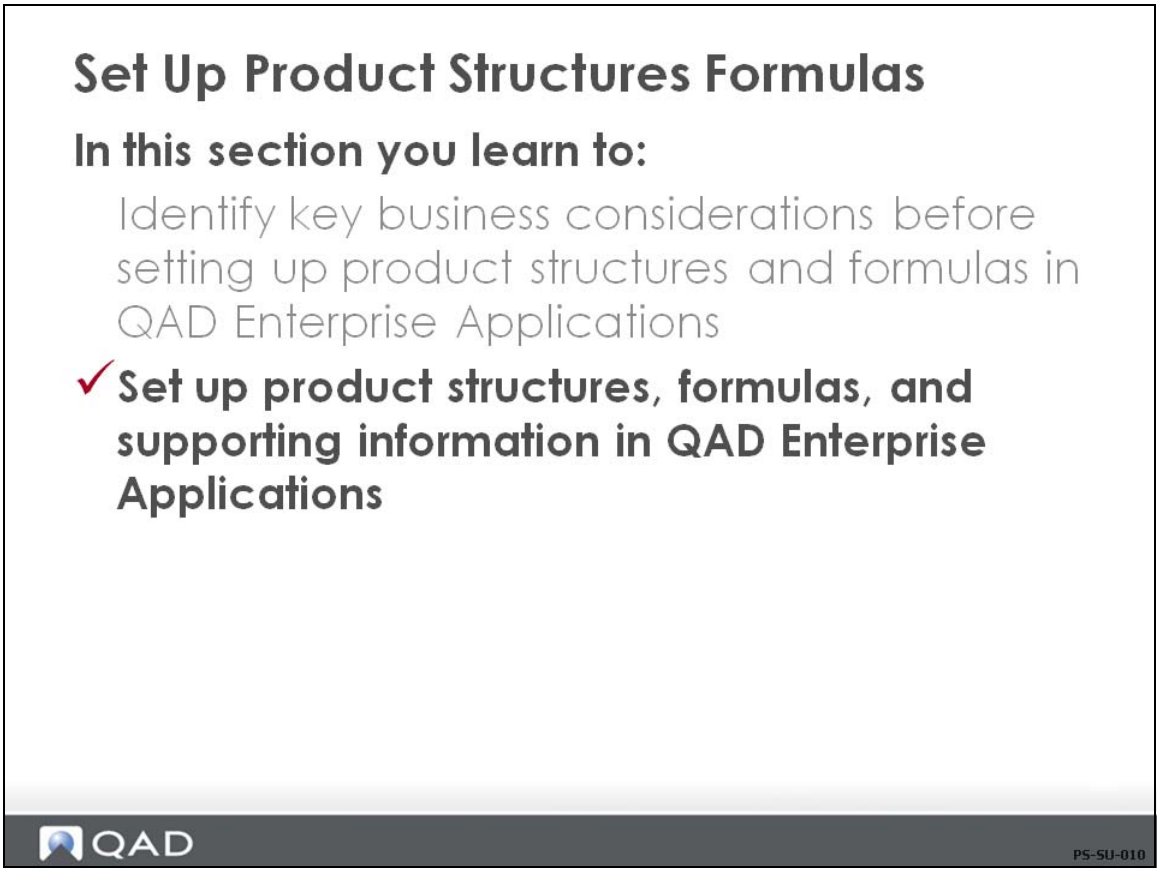
Summary


Review
Processes and procedures
Reporting requirements
Customer expectations
Product configuration
QAD
PS-BC-100

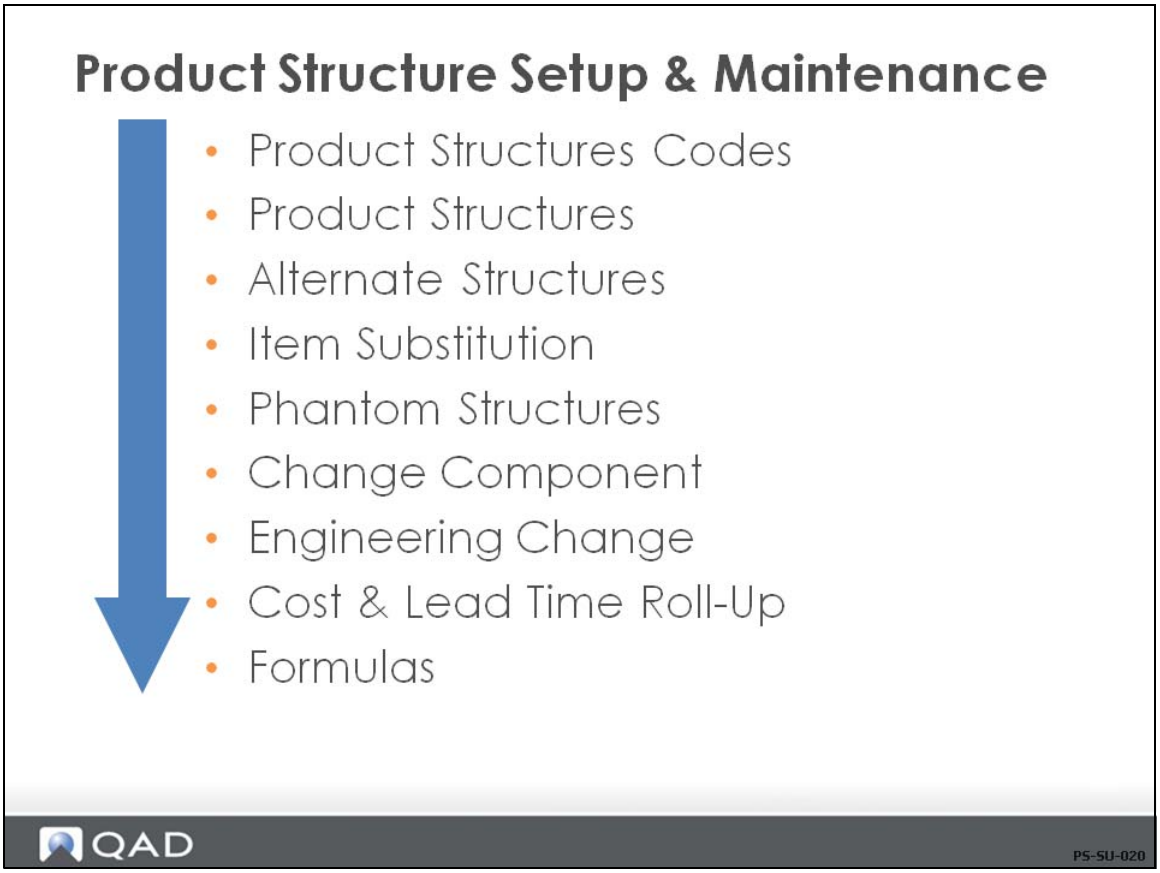
Chapter 3

Setup and Maintenance

Course Overview



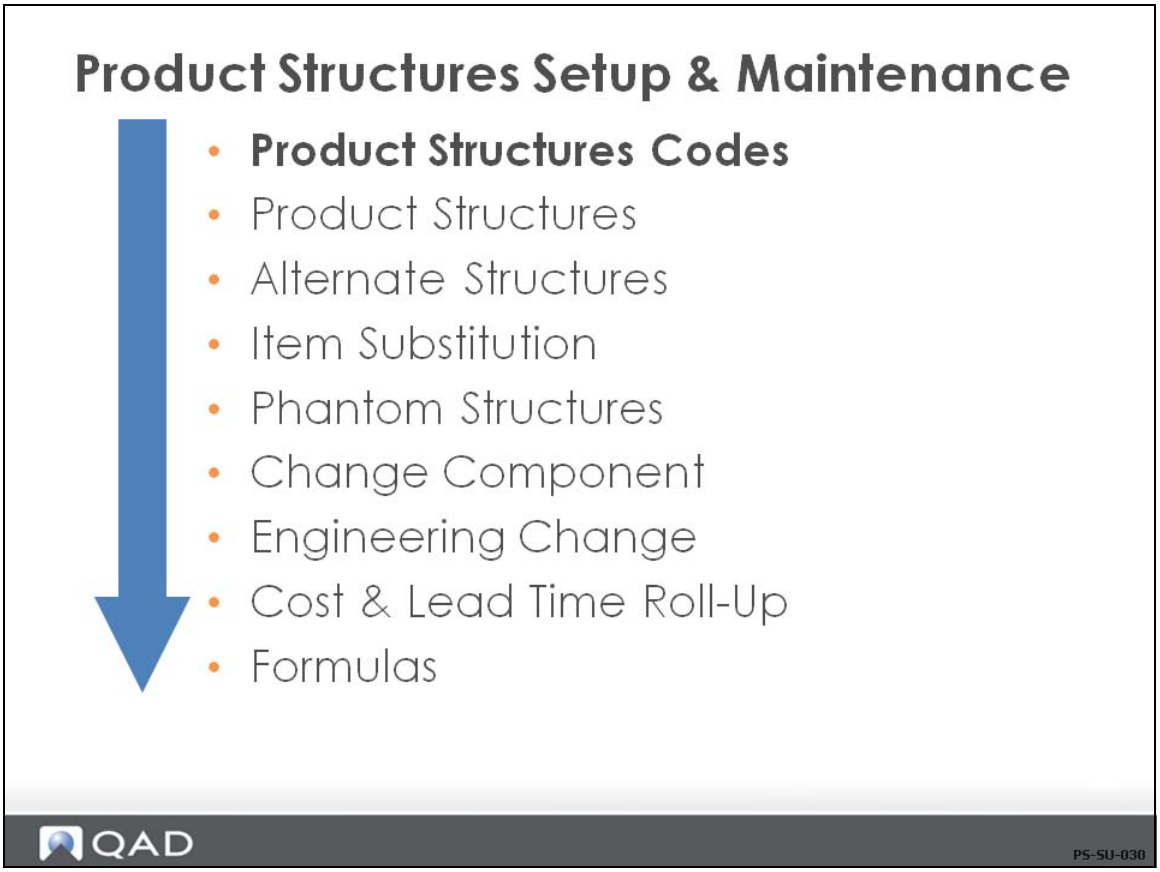
Lesson Sequence



The diagram above shows the logical sequence of the topics in this lesson.

- Before setting up product structures and formulas, you must have item masters and cost data already in the system
- The Product Structure Codes step is optional, but will be covered in this course.

Product Structure Codes



Product structure codes need to be defined only when you want to create a product structure that does not use the item master record of the item being produced as the parent item.

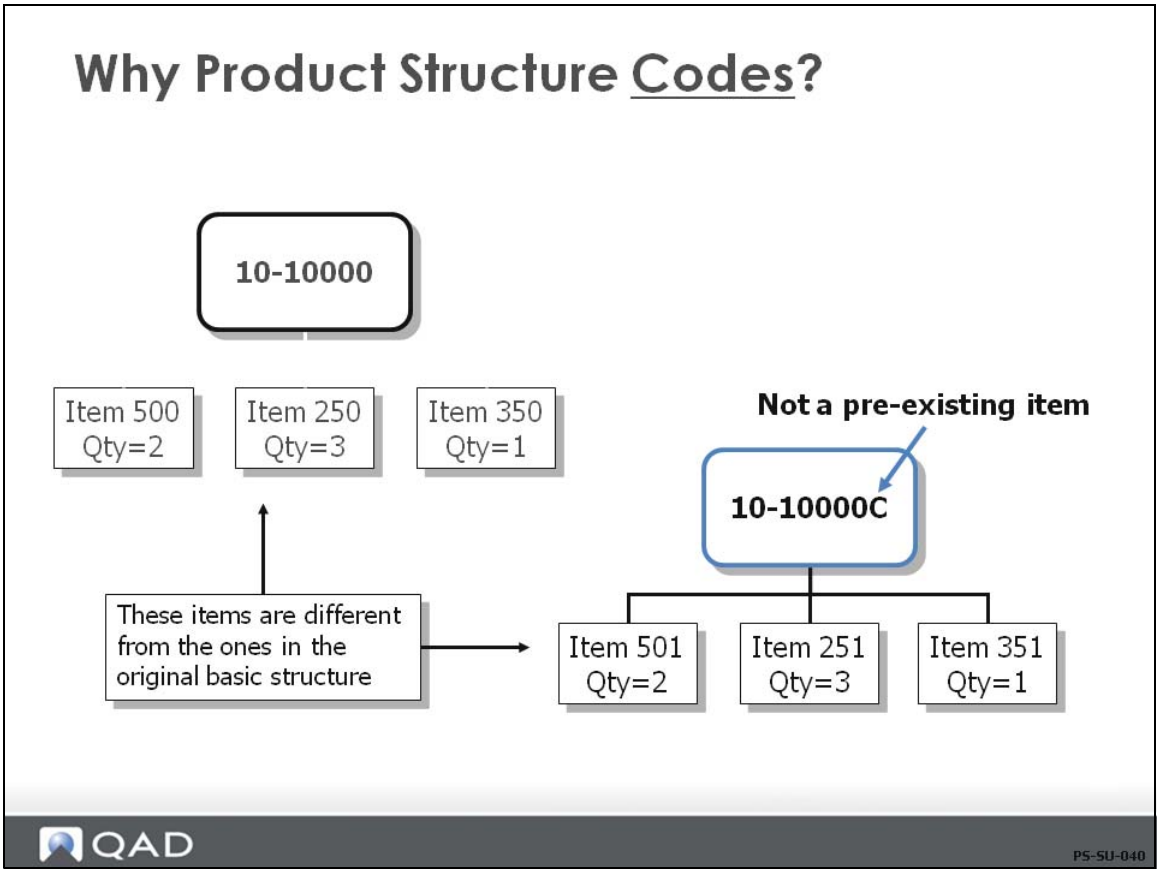
You must link them to the item number of the parent, either in Item Planning Maintenance or Item-Site Planning Maintenance, if they are to be used for costing, planning, or manufacturing. Once defined, they can be used like an item number in the system

- Product structure codes can be used anywhere in the product structure that item numbers can be used

Use them to create alternate structures

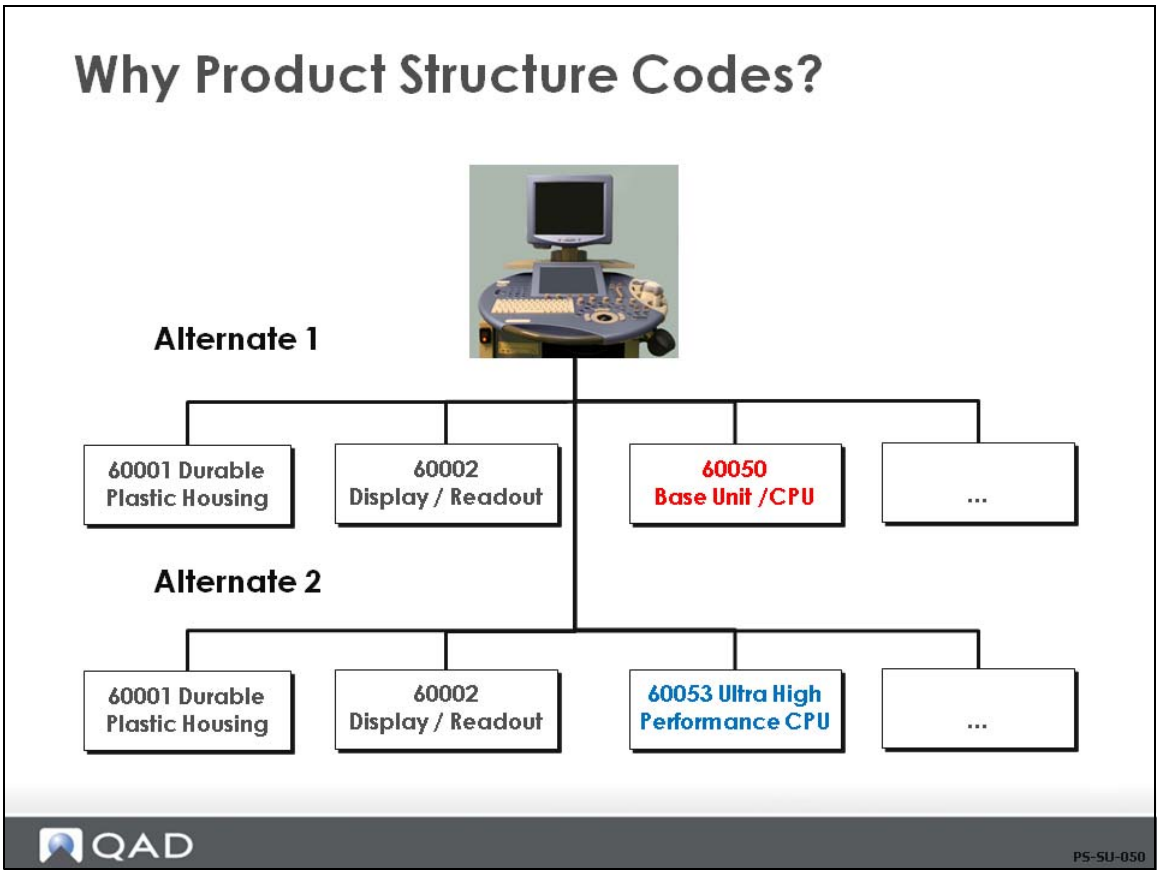
See in this training guide “Phantom Structures” on page 56 and “Cost and Lead Time Roll-Up” on page 70

Why Product Structure Codes?



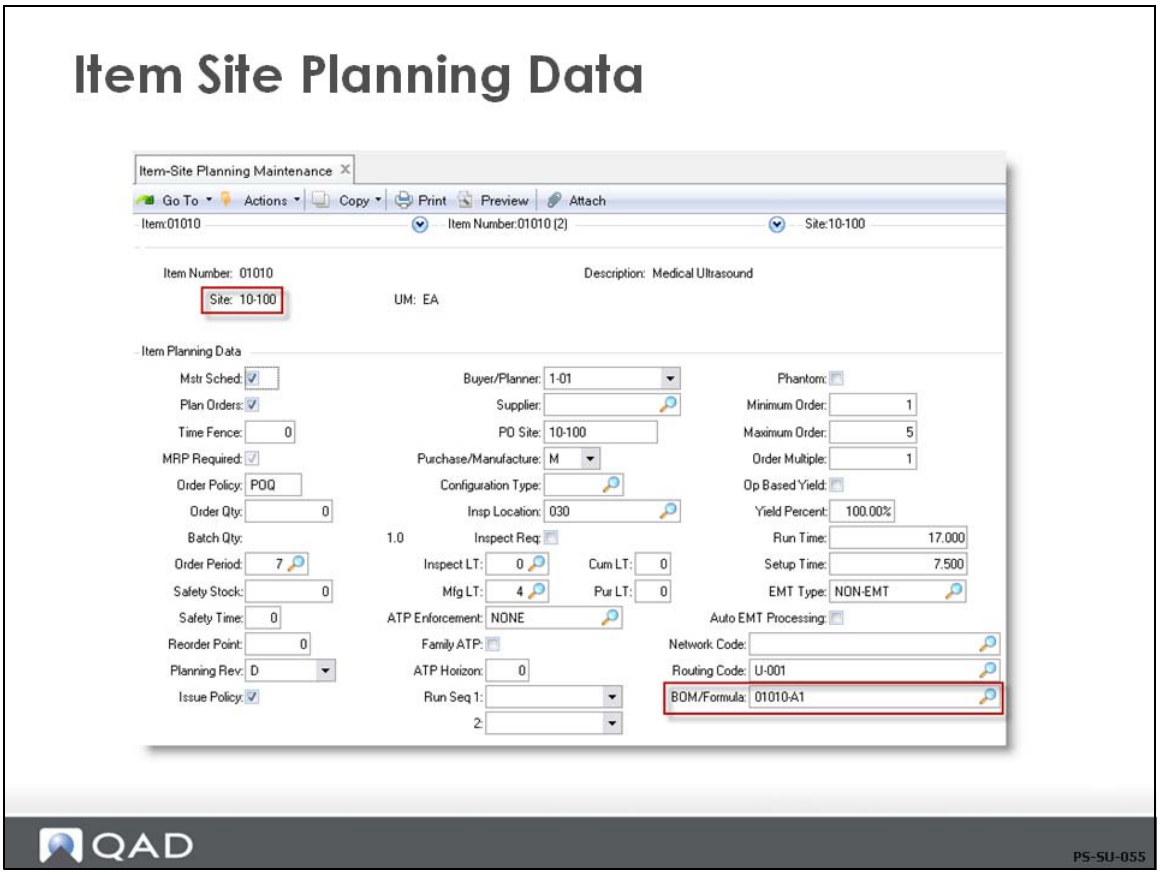
Part 1

Product Structure codes that do not correspond to parent items enable you to create alternate structures for manufacturing the same product with different components.



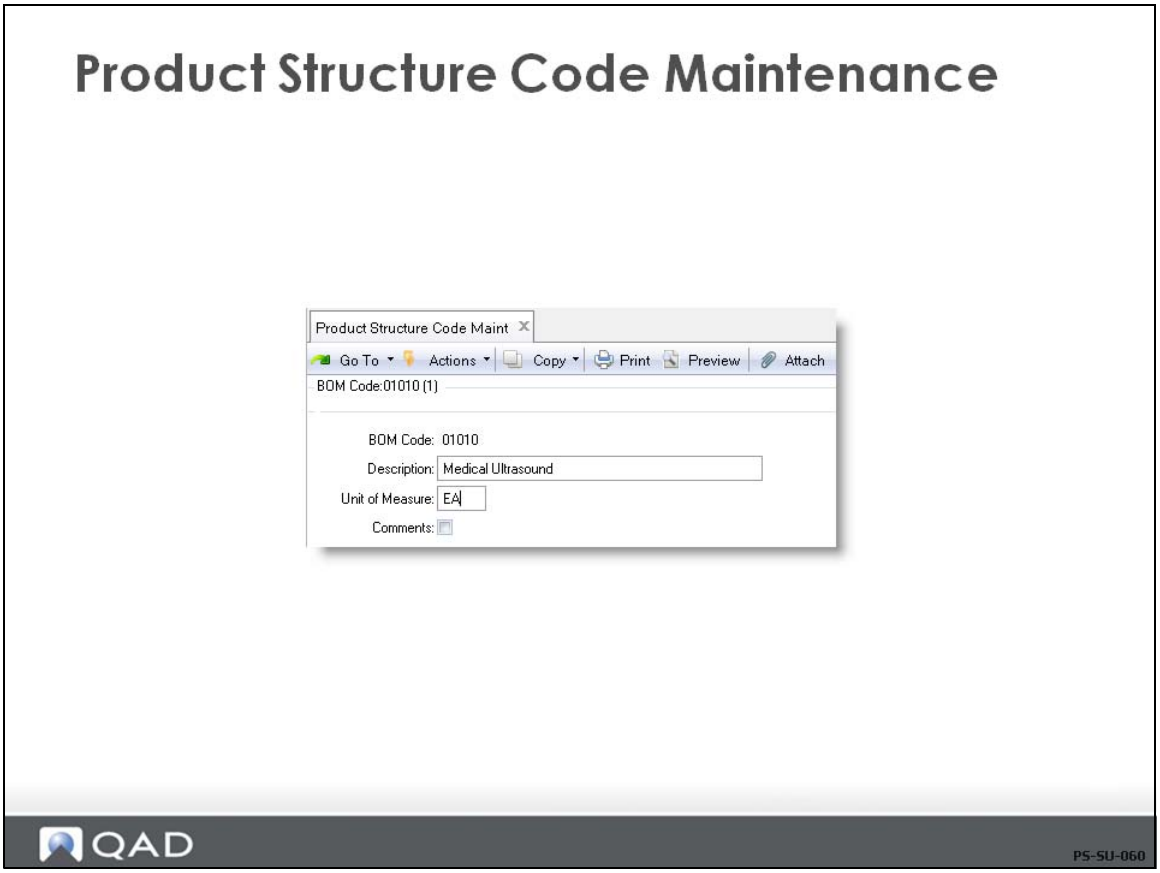
Part 2

One use of the alternately coded structure is to set up the same product in Item-Site Planning Maintenance in a different site where the components are different.



Use Item Site Planning Data 1.4.17 to link the site code and the Product Structure Code (BOM). This will make the alternate the default at this site.

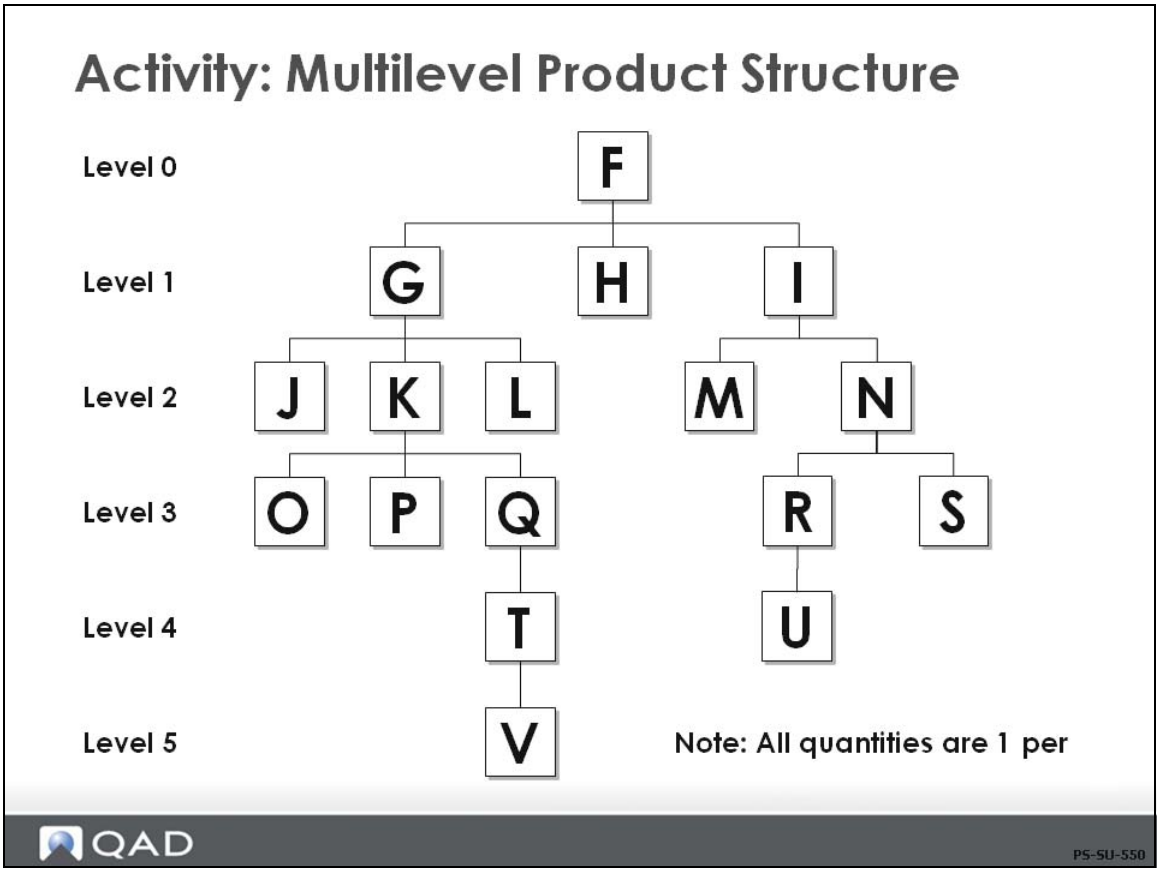
Product Structure Code Maintenance



Use to set up a BOM/Formula which is not an item number, specifically for:

1. *Alternate Structures*: If one item has several structures, each can have a different BOM/Formula, each linked to the item using Alternate Structure Maintenance, or linked to a specific item and routing using Alternate Routing Maintenance.
2. *Site-Specific Structures*: To make the same item at multiple sites using slightly different components at each site, create a BOM/Formula for each site, then link the structures to the item sites.
3. *Common Structures*: If several structures use exactly the same components with different routings, set up a BOM/Formula and attach the structure to it.

Exercise: Multilevel Product Structure



Description: In this exercise, you calculate a plan for a given component in this product structure. MRP actually does this plan for you, but this exercise helps you understand the system.

1 There is a gross requirement of 50 units for F. What is the net requirement for Item V given the following on-hand quantities?

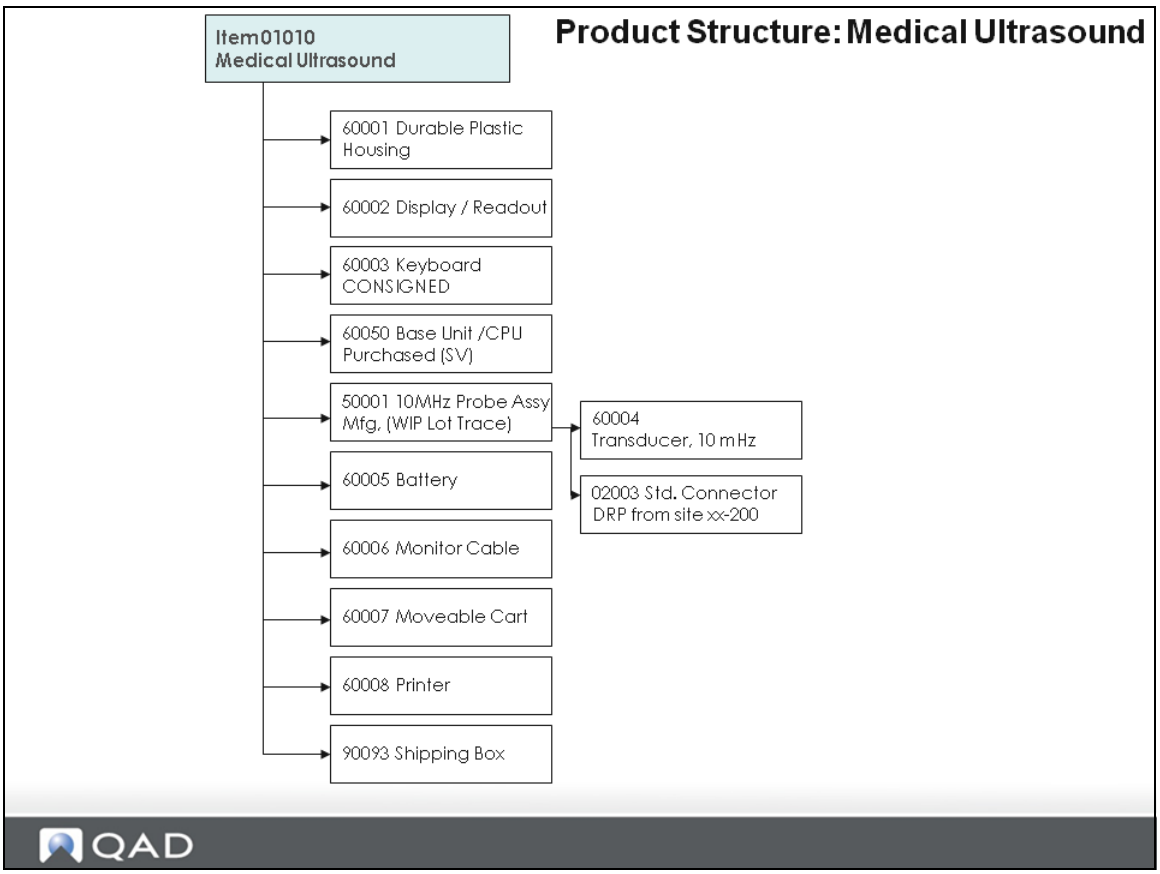
Items/Assembly	On-Hand
F	3
G	4
K	2
O	7
P	9
Q	6
T	4
V	4

2 Referring to the multilevel product structure, if 50 units of Item F are to be shipped in Week 30, when must Item V be ordered given the following lead times?

Items/Assembly	On-Hand
F	3
G	3

Items/Assembly	On-Hand
K	4
O	2
P	2
Q	1
T	1
V	3

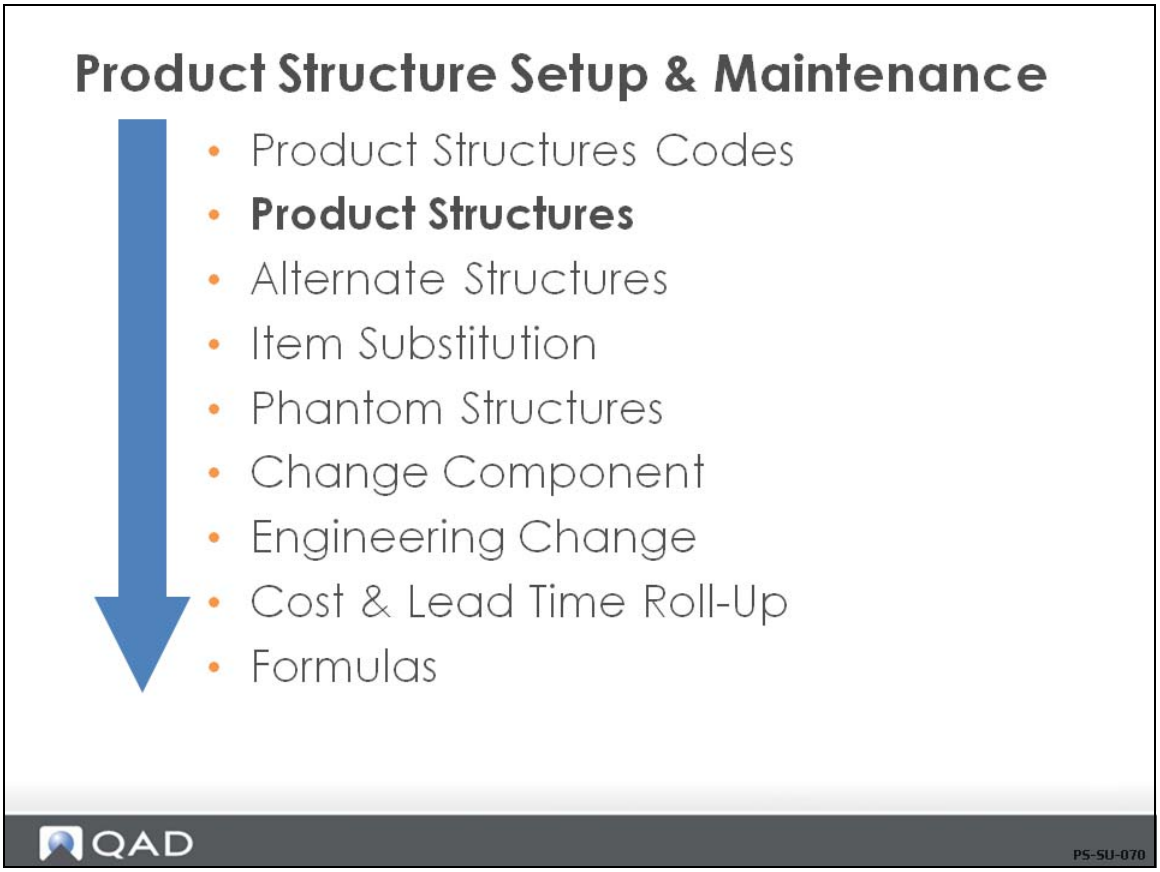
Exercise: Product Definition – Discrete



Quality Manufacturing International Inc. (QMI) is a manufacturer of ultrasound equipment. The Portable Medical Ultrasound Machine (item 01010) is the company's most popular offering, used in doctor's offices and hospitals worldwide.

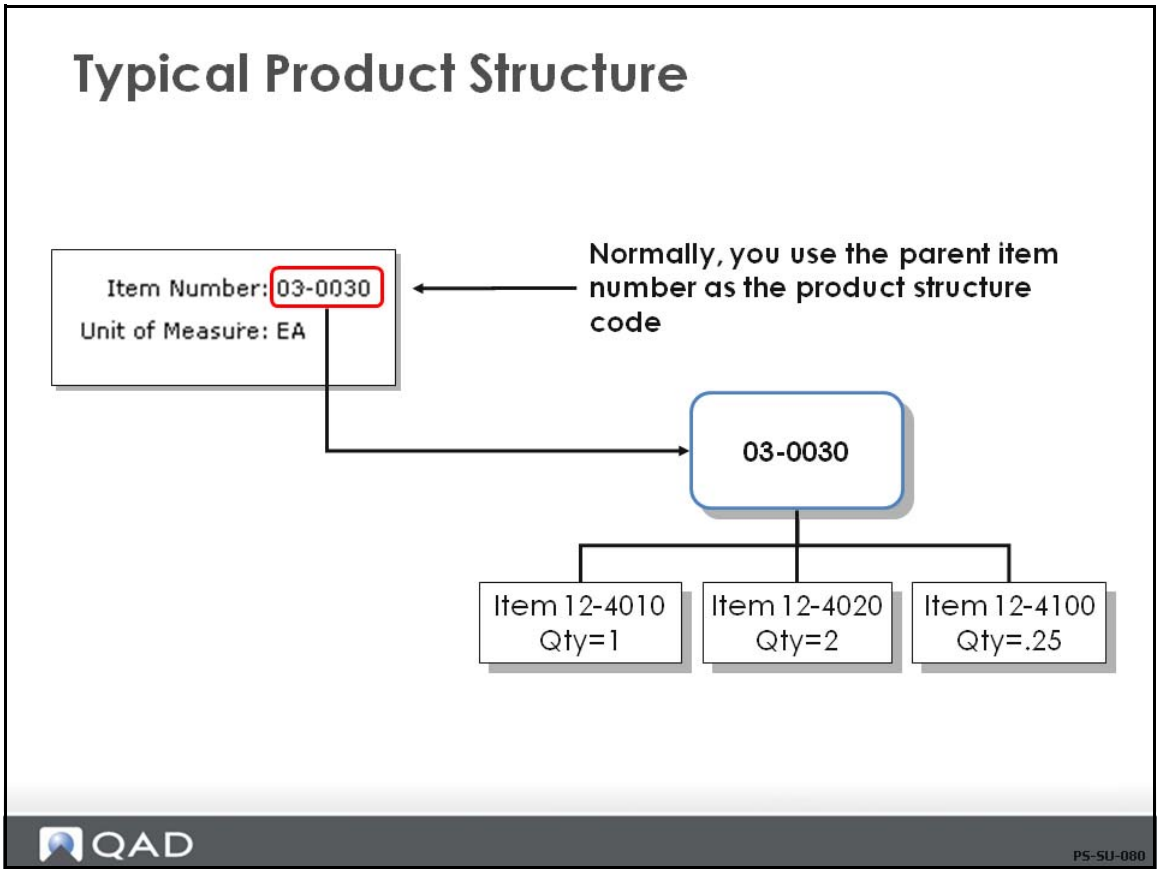
Use Product Structure Inquiry (13.6) to review the product structure of Portable Medical Ultrasound (item 01010). Use Product Structure Maintenance (13.5) to familiarize yourself with the screen handling.

Product Structures



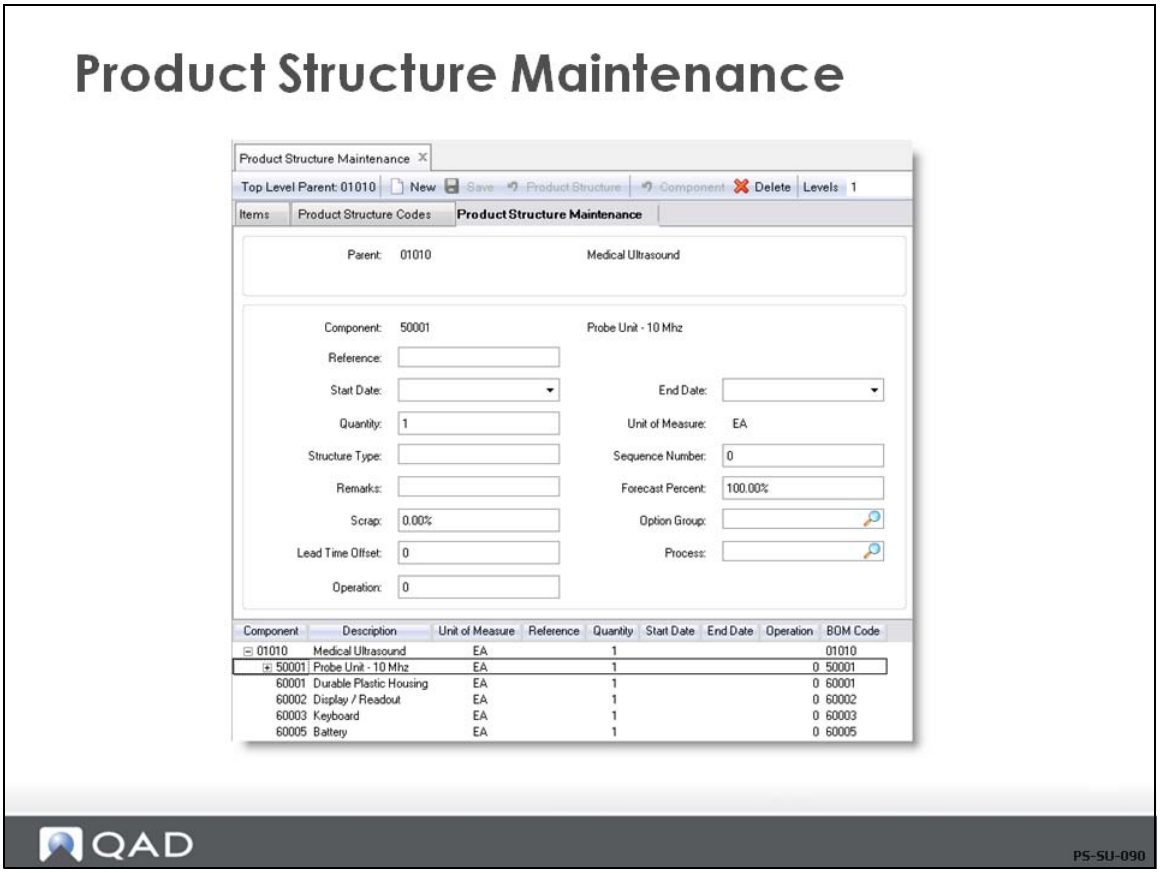
- A product structure is a listing of all the subassemblies, components, and raw materials going into a parent assembly, with the quantity of each required to make one assembly
- Product structures are used in many industries, and the terminology varies
  - Other terms for product structures include bill of material (BOM), formula, formulation, and recipe
- In QAD Enterprise Applications, there are three ways to record this information: as product structures, as formulas, and as configured products
  - This class covers product structures and formulas

Typical Product Structure



- If the parent item exists in the item master, use its number as the product structure code
- For alternate structures, you need to create a new number to use as the code, in Product Structure Code Maintenance.

Product Structure Maintenance



Define Product Structures before using Work Orders, Repetitive, or MRP.

- Structures need to be in place for material cost roll-ups
- Purchased items are not normally entered as parent items
- Product structures identify raw materials or subassemblies in a product, recording them as single-level relationships between a parent item and a component item
- Typically, the parent exists in the item master and when entered here, becomes the code for the product structure; for alternate structures, you use a code that does not exist in the item master
- The top level parent item is a finished product; at lower levels the parent item is a subassembly
- The quantities entered for each component are used to determine how much each manufactured product costs

Parent Item / Description. The parent of a product structure or formula must be either a valid item number or a predefined BOM or formula code.

- The BOM/Formula or base process for a Co-Product/By-Product structure must be a valid item number
- For configured items, must be a valid item number with a purchase manufacture code of C

Component Item. The item code identifying the component item in this product structure.

- Product structures are entered as parent/component relationships
  - A parent item may be a finished product, or some intermediate item

    - Parent item may be *sunglasses* and the component items may be *lens* and *frame*, or
    - Parent item may be *frame* and the component items may be *arms*, *basic frame*, *hinge*, and *screws*
- At each level of the product structure or formula, the component items include only those items used directly at that level
    - Multiple levels of a structure exist when a component in one relationship is a parent of another
- Parent/component relationships are used throughout the system for manufacturing planning and control
- Both parent and component item can be used to select information to appear on a variety of reports and inquiries

Rev. Display only, from the item master.

Reference. Uniquely identifies a parent/component relationship, allowing the same component to appear in a bill more than one time in the same parent.

- In a product structure for a discrete product, the reference identifier is often a position indicator: on a printed circuit board a particular resistor may be located in 4 places, identified on the bill using the reference designator
- Use it also for drawing/document references
- Use it on alternate structures to identify the situation when the alternate is appropriate

You can also use this to keep history by tracing quantity changes in the structure

Start and End Effective . These govern the item's dates in use

Qty Per. The quantity of the component item required to make one unit of the parent item.

Component quantity per is used throughout the system for manufacturing planning and control.

Structure Type . Identifies the component's usage in the structure.

- *A* – Set by the system identifying an alternate bill
- *D* – These items are not planned, costed, or exploded
    - Use this to record miscellaneous expense items or documents associated with this bill
    - For example, if you subcontract the painting of a part, you can enter the part as a type D to reflect the actual content of the product, but prevent any planning and costing effects
- *J* – Indicates a Co-Product/By-Product relationship
    - A Co-Product/By-Product relationship cannot be modified using Product Structure Maintenance or Formula Maintenance
- *X* – A local phantom

  See in this guide "Phantom Structures" on page 56 and "Activating Phantoms Locally" on page 61
- *P* – A component in a planning bill
- O - Optional item in configured product

Scrap. Shows the percentage of this component item you expect to be scrapped when making the parent product.

- Component quantity per and scrap percentage are used throughout the system for manufacturing planning and control
- For manufacturing demand for the parent item, the component requirements are determined by multiplying the order quantity by the component quantity per, and then adjusting this upward to account for any scrap percentage
  - Material planning uses this demand quantity used by material planning
  - This quantity prints on picklists and other reports
- Quantity per and scrap percentage are also used by the Product Structure Cost Roll-Up for calculating the cost of the parent item

Note Use scrap percentage carefully, especially on discrete items, since both MRP and inventory backflush calculations use it. If you put a 2% scrap rate on a discrete item – engine – and you have a requirement for 80 engines, the system calculates the demand quantity to be 81.6. You may want to enter an Order Multiple in Item Planning Maintenance to ensure you get discrete order quantities.

LT Offset . Shows the number of working days required from the start of production on the parent item until this component is required.

Op . Shows the routing or process operation at which this component or Co-Product/By-Product is used.

- For co-products/by-products, this field is for reference only and may appear on some selected reports and inquiries
- For components, this field
  - Determines whether this component is backflushed during repetitive production transactions
  - Enables cost by operation calculations
  - Leaving this field blank results in the material cost being yielded as though it is used at the first operation
  - Determines whether this prints on Repetitive Picklist Print. If Op is entered here, the component can be picked
- When the same component is required more than once in an operation, the operation for each occurrence should be different

Sequence Number. An optional sequence number for this parent/component or BOM/Formula relationship. It is used in the Product Structure by Number Report.

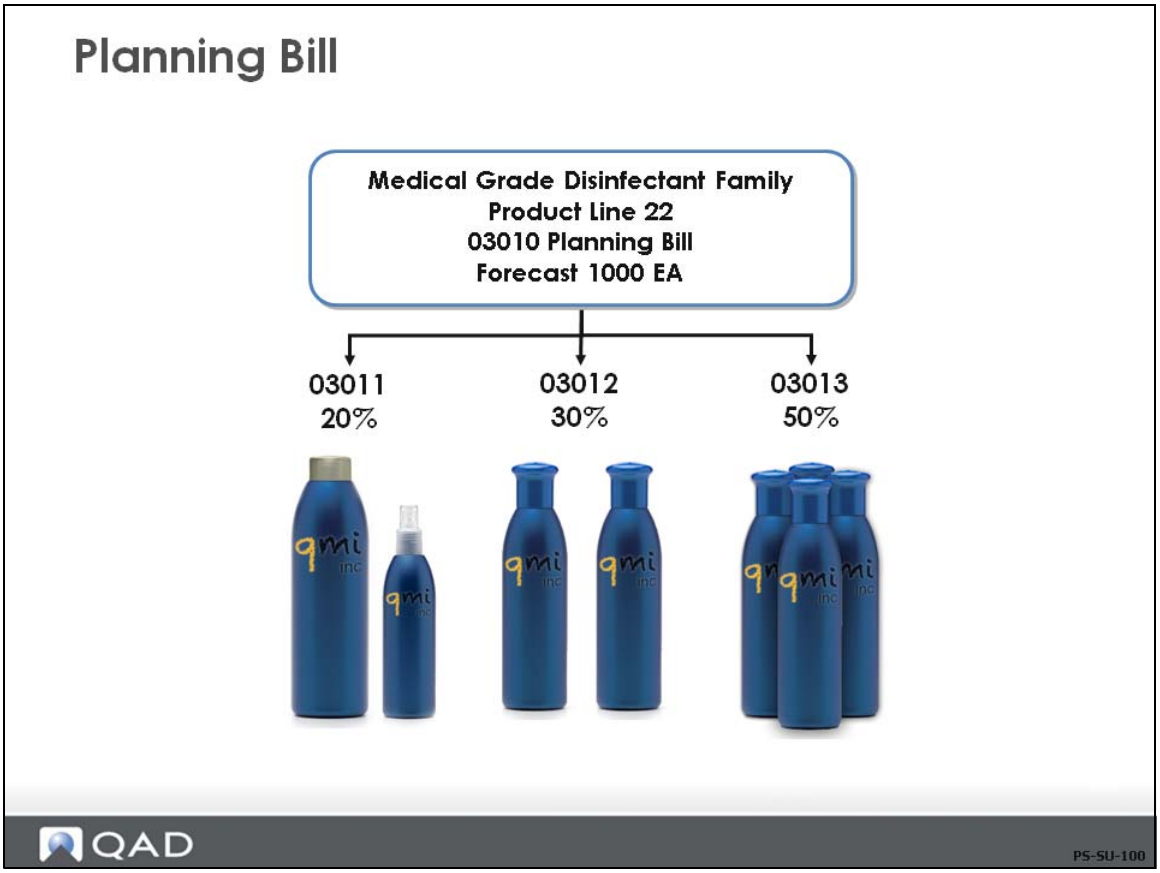
- Normally, component and Co-Product/By-Product items are listed in sequence by item number
  - A special report, the Product Structure by Number Report, can list components and Co-Products/By-Products in sequence by this number

Forecast. The forecast percentage for this component item within planning bills.

Option Group and Process. Optional; for repetitive production, it groups components on a product structure.

- These fields can be used to group components for selective backflushing with Receipts - Backward Exploded

Planning Bills



You establish a product structure for the family item and set up its subassemblies as type *P* (planning) components

In this example, the medical grade disinfectant family item 03010 has the Purchase/Manufacture Code of F (family) item. The three component items have the Code P (planning) in the Product Structure for the Family Item 03010.

You enter the percentage of each subassembly in the Forecast field. A forecast of 1000 of the medical grade disinfectant family would result in 200 of the 03011, 300 of the 03012, and 500 of the 03013.

Note Also discussed in the Forecast Simulation Training Module

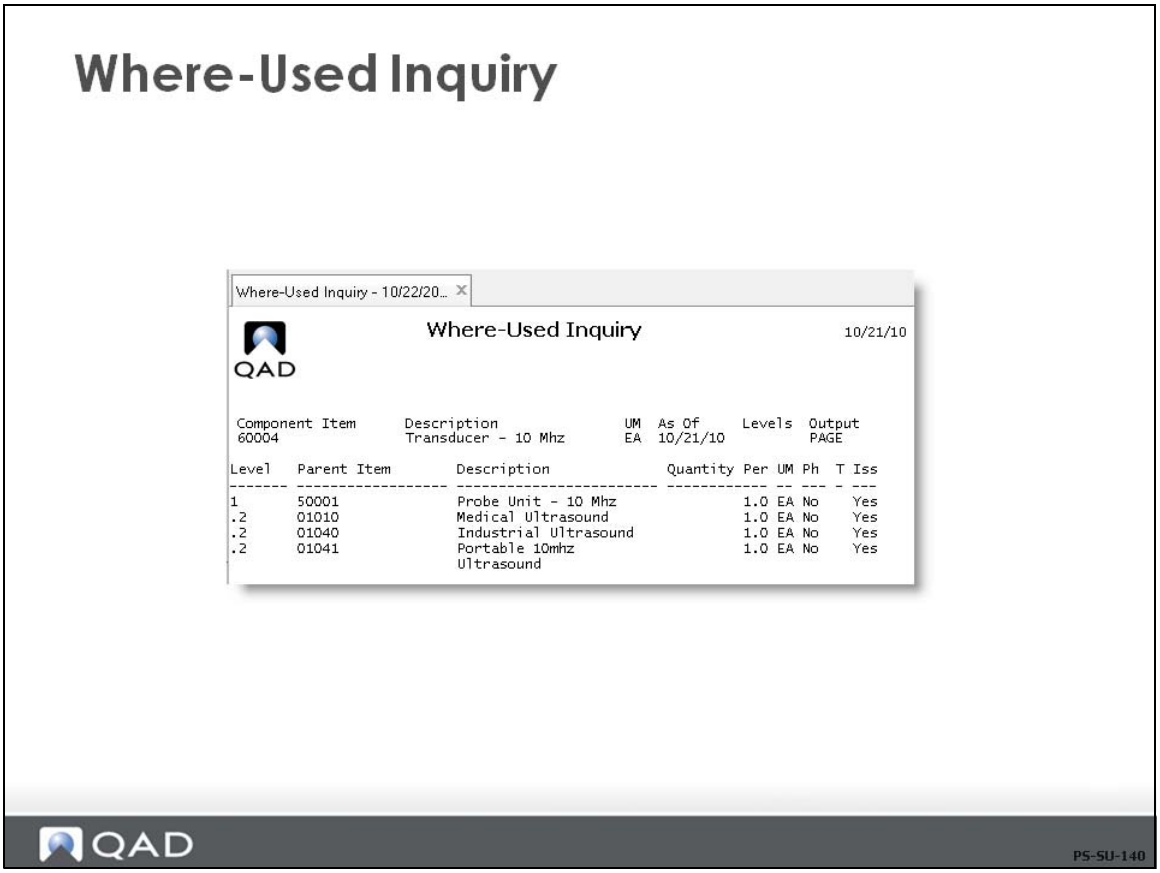
Product Structure Inquiry

Use this function for a quick look at selected product structures. As with all QAD Enterprise Applications inquiries, you have a range of selection criteria.

Levels. Leave this blank to explode all subassemblies or enter the maximum number of levels to explode.

Rev. This field works with the Product Change Control (PCC) module to print the product structure as at the selected revision level.

Where-Used Inquiry



This program enables you to see the product structures that use a specified item.

Levels. Enter the maximum number of levels to display, or leave blank to see all levels.

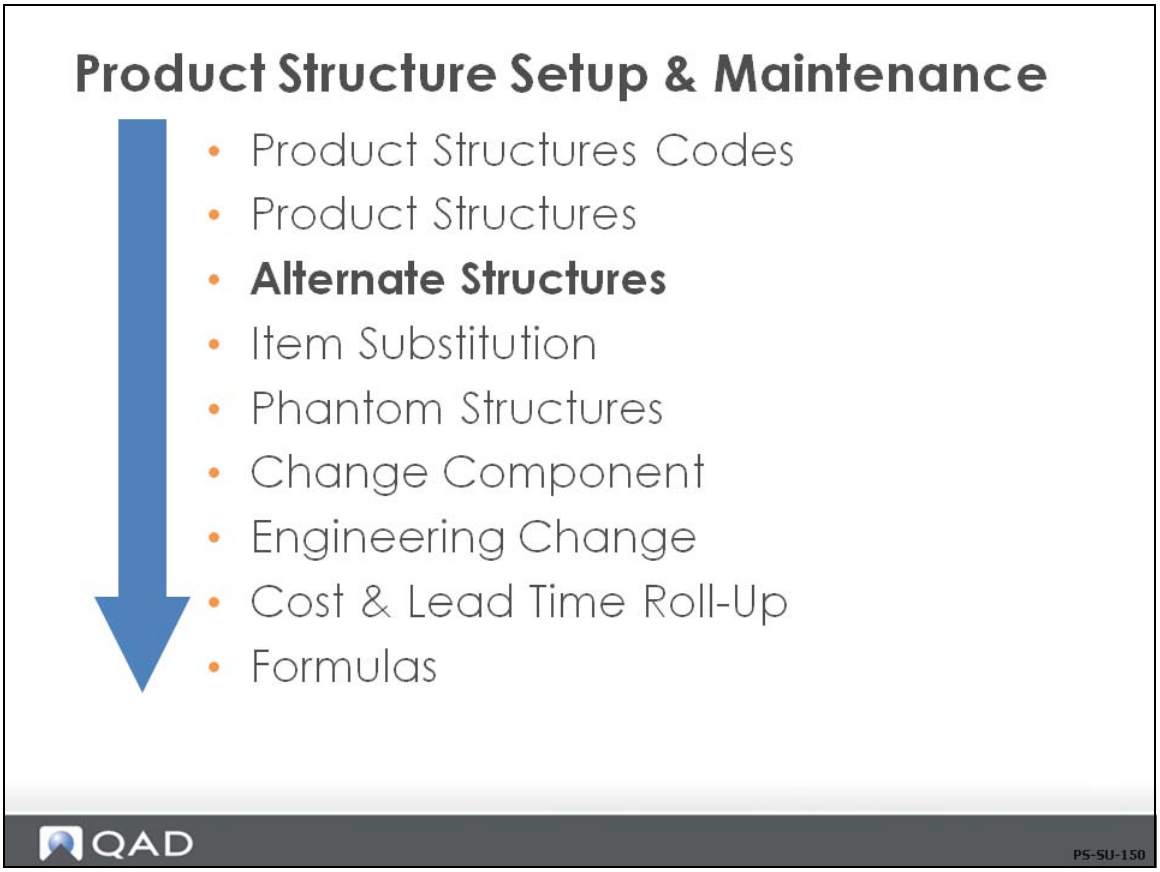
The *Ph* column shows whether the item is a phantom.

- BOM codes (with no equivalent item number show *BOM* in this column)

The *T* column shows this structure type.

The *Iss* column shows No for floor stock items, or a BOM code.

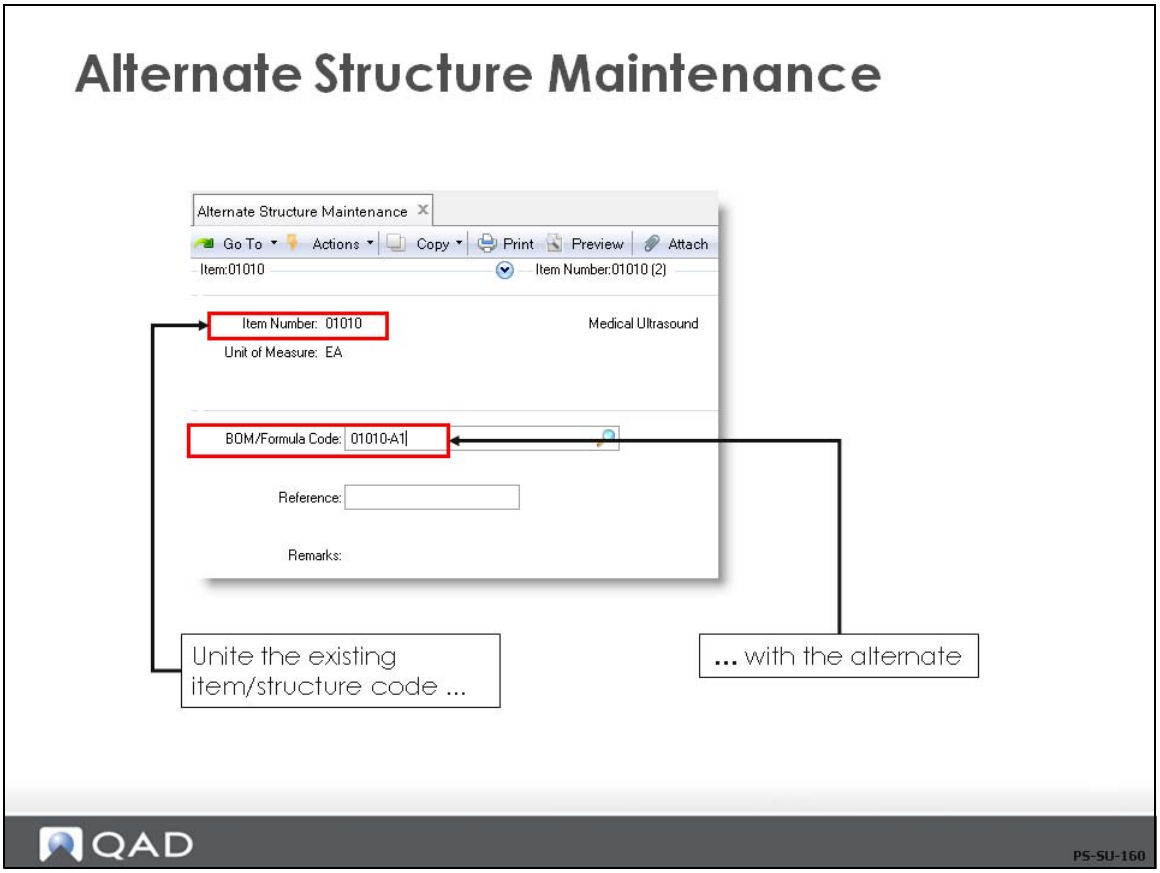
Alternate Structures



Here we cover the creation and use of alternate structures, including how to establish them as defaults.

Note Using alternate structures results in legitimate manufacturing variances.

Alternate Structure Maintenance



This program attaches a product structure code to an item.

Alternate structures enable you to produce the same item using different sets of components.

- This includes different recipes for different batch sizes, or the substitution of a group of components with an equivalent group

Alternate structures are also used when a co-product may be produced from more than one base process.

There are three steps:

1 Create the alternate's BOM code in Product Structure Code Maintenance, 13.1

2 Enter a Product Structure for the Alternate Code in Product Structure Maintenance 13.5

3 Use Alternate Structure Maintenance 13.6 to attach alternates to Items.

Item Number. The number of the item / structure code set up in Item Master Maintenance.

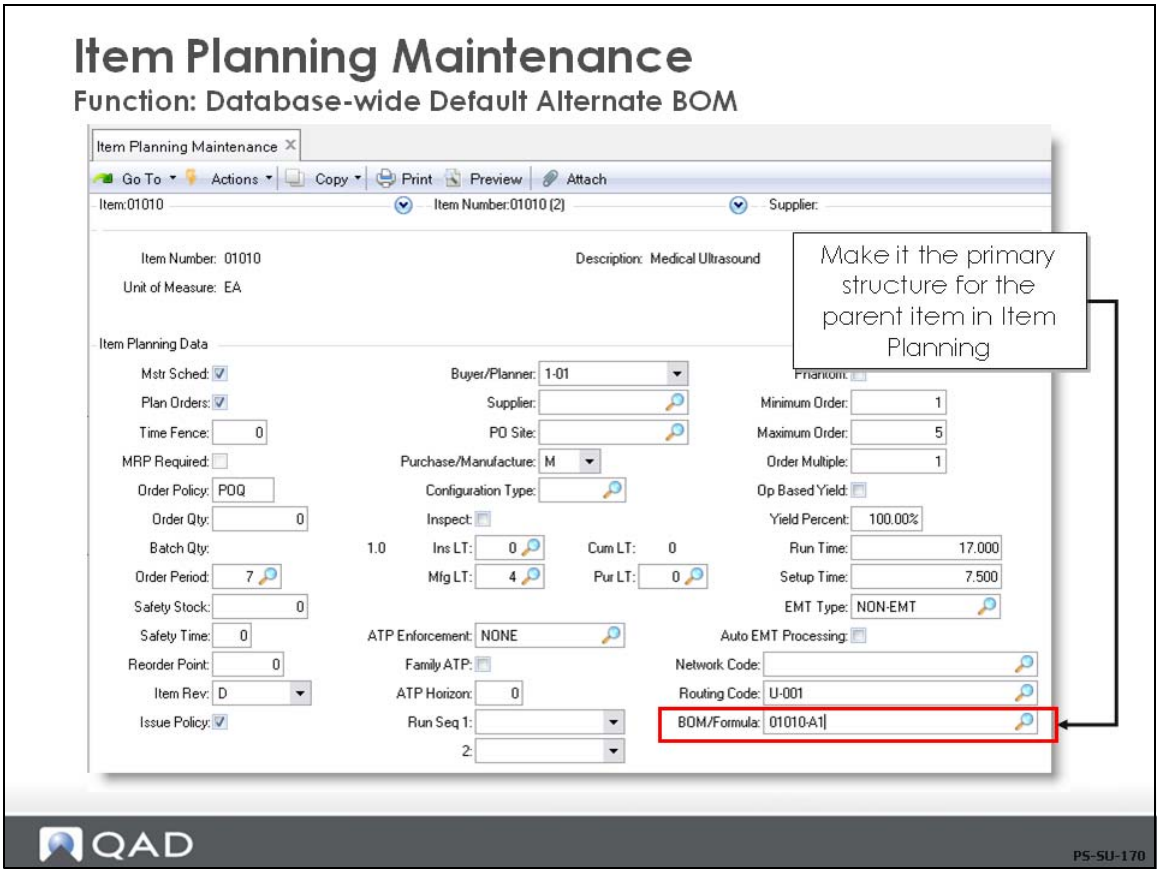
BOM/Formula. A code identifying the alternate product structure.

Reference. A code uniquely identifying a parent/component relationship.

- Each parent/component relationship is uniquely identified by the combination of the parent item, component item, and reference (feature) code

- This allows the same component to appear in a bill or formula more than one time at the same level

Default Product Structure Codes: Domain-Wide

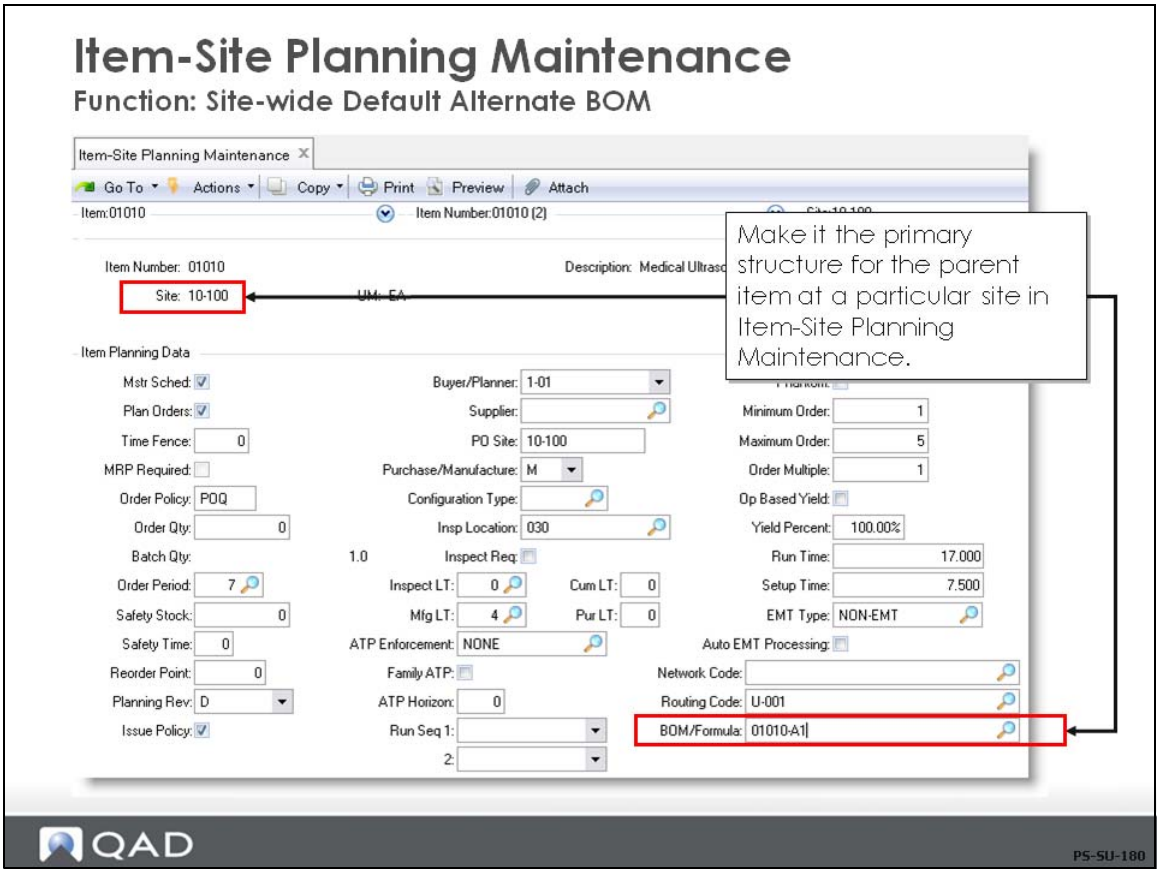


Method 1

You can establish an alternate product structure as the default for the entire domain by entering it for the item in Item Planning Maintenance.

- This makes the product structure code the default throughout the domain (unless you set up different ones at the site level)
- MRP uses the default product structure code to plan components

Default Product Structure Codes: Site-Wide

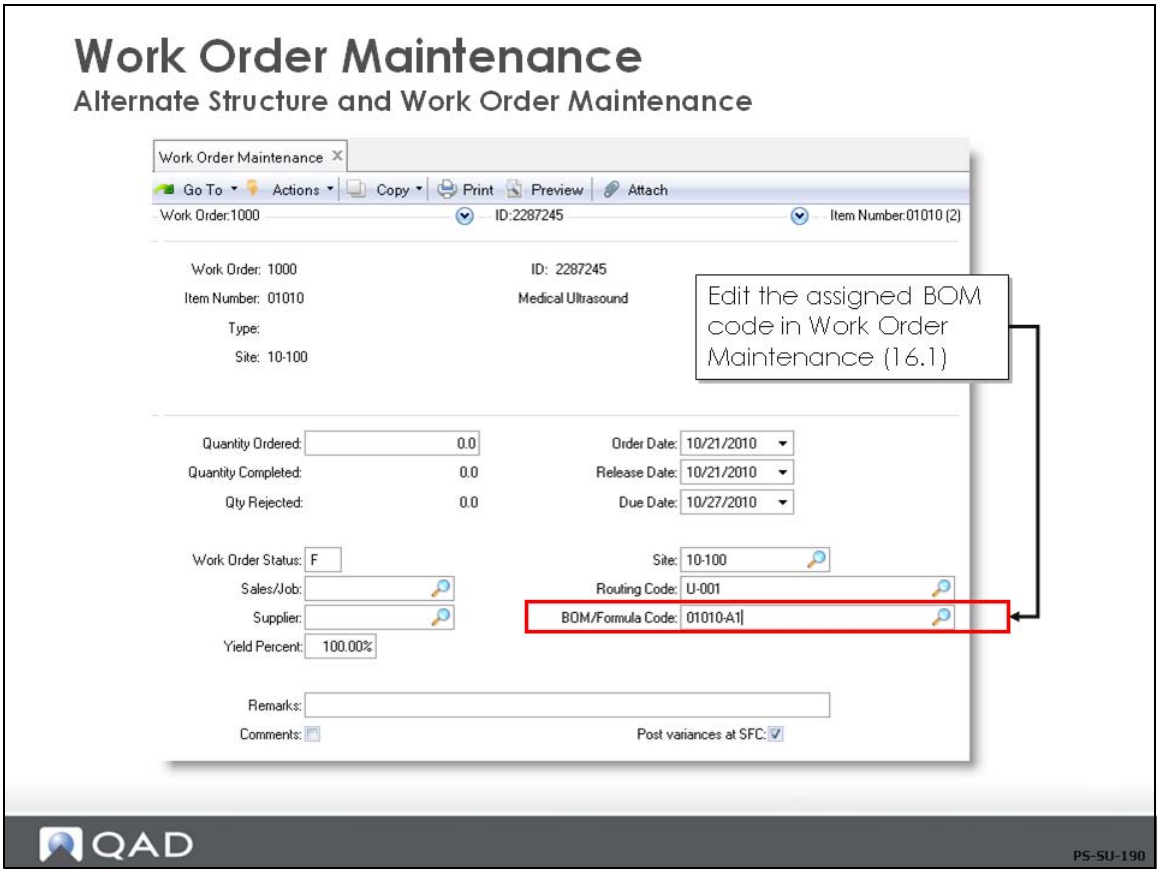


Method 2

You can set a default product structure code at the site level in Item-Site Planning Maintenance.

- This makes the alternate the default for the product at the specified site, overriding any domain-level default
- MRP uses this product structure code to plan component requirements at this site

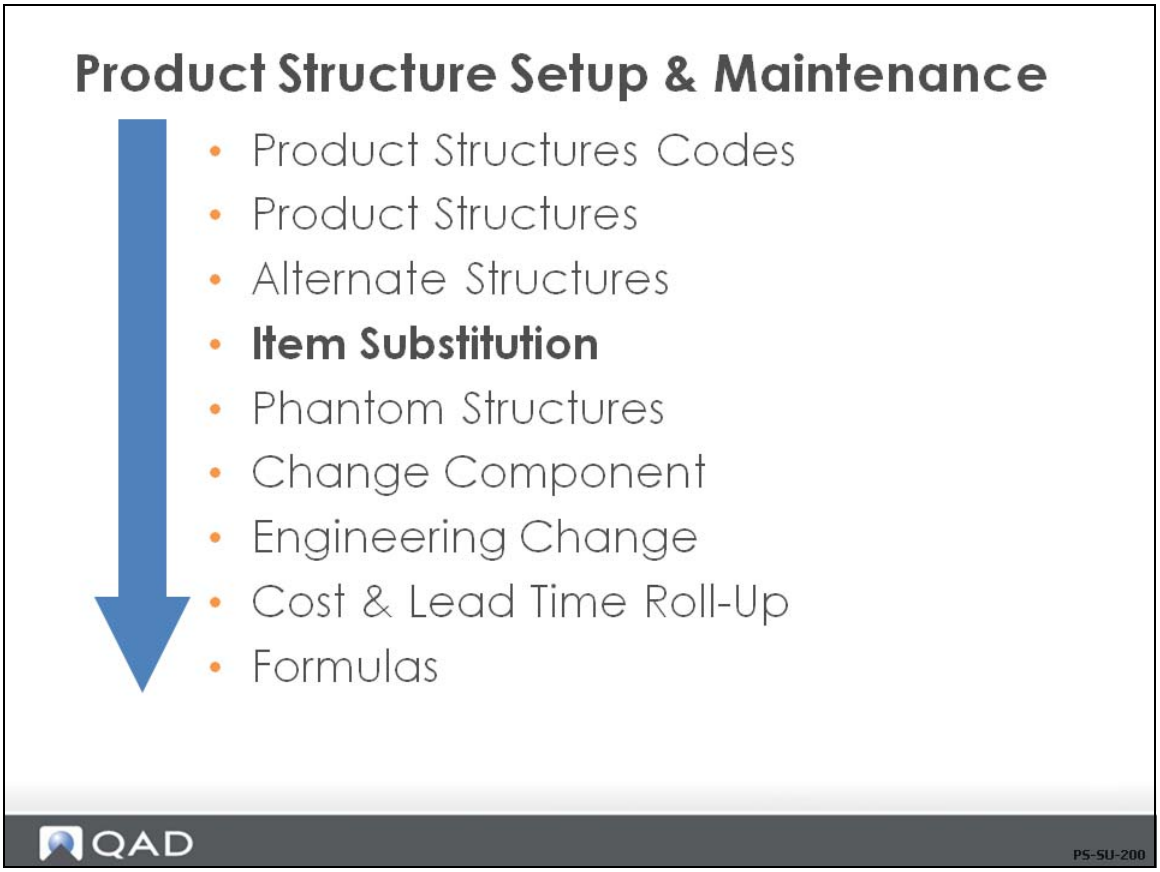
Alternate Structures and Work Orders



Method 3

- This enables you to assign the alternate structure on work orders and repetitive schedules
- Selected browses and reports list alternate structures for selection or comparison
- The system uses the alternate only for this work order or repetitive schedule

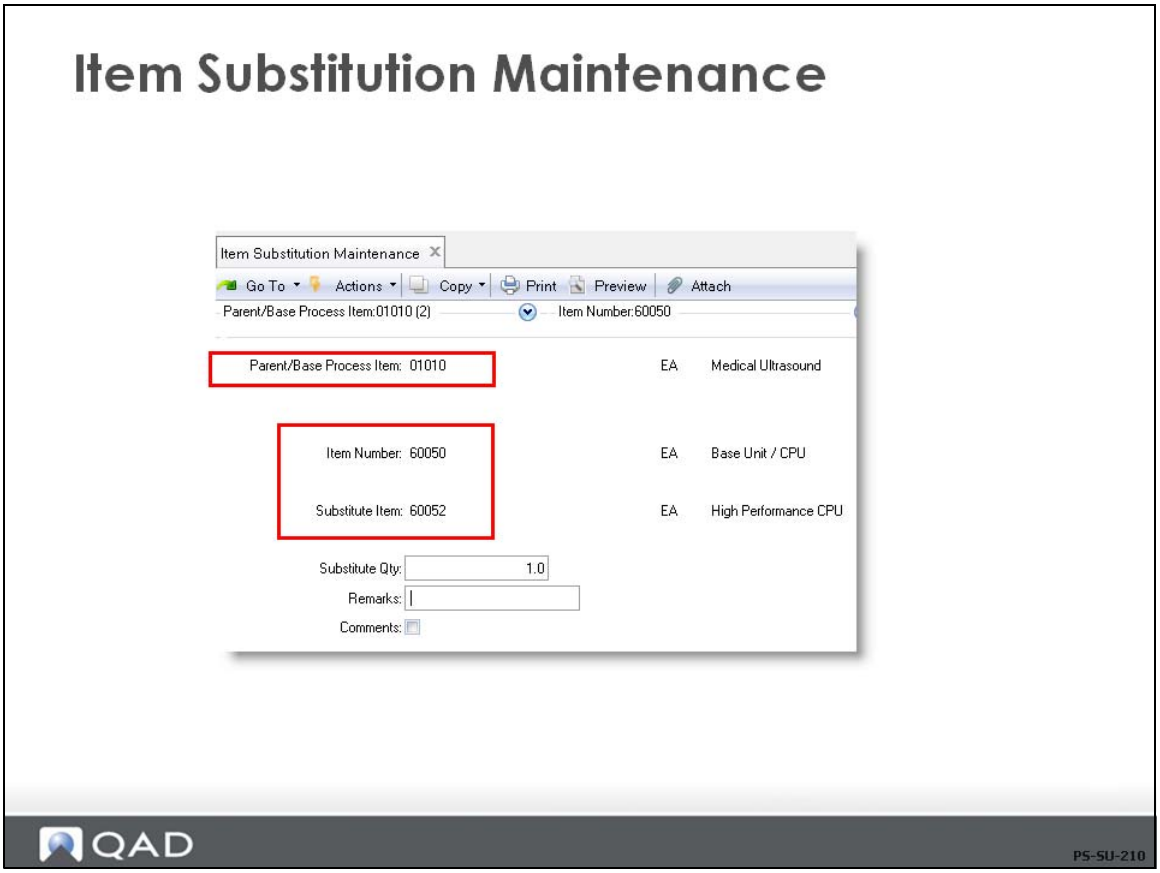
Item Substitution



Item substitution is a convenient way to choose suitable or approved items in place of standard items

Note Use of item substitution causes legitimate manufacturing variances.

Item Substitution Maintenance



Substitute items can be used when issuing components and when receiving co-products/by-products. Substitute items may be issued to work orders and referenced when modifying a backflush transaction.

- Issuing an allowable substitute decreases the requirement for the preferred component
- In the case of component issues, a substitute item may be specified when a standard component is short or defective
- In the case of Co-Product/By-Product receipts, a substitute item may be specified when a co-product or by-product that is produced is a different grade (and item number) than expected
- Item substitution facilitates using different components in work orders or repetitive
  - To limit component issues to components defined in the product structure or to validate substitutes specified here you must use the compliance module

Parent/Base Process Item. The parent item or base process item (BOM code) of the product structure or Co-Product/By-Product structure in which this substitute item may be used.

- Leaving this field blank means that this substitute relationship may be used anywhere
  - For example, *Distilled Water* can be substituted for *Purified Water* in any formula or product structure which calls for purified water
- Other substitutions may only apply to particular assemblies or end products: you may substitute two 6-pin connectors for one 12-pin connector in one assembly, but not in other assemblies

- Entering a parent or base process item restricts a substitution to just that assembly

Item Number. The item to be replaced by the substitute.

Substitute Item. The item to be used in place of the one specified in *Item Number*.

Substitute Quantity. The quantity of the substitute item equivalent to one unit of the preferred component item.

- In the example of the glue, the substitute glue is not as strong as the normal glue, so the quantity is higher for the substitute
- Remarks
- Optional remarks regarding this substitute item relationship.
- This field is for reference only and may appear on selected reports and inquiries
- Remarks may help identify situations when this substitute item may or may not apply

Comments. Specifies whether comments are to be entered regarding this substitute item relationship.

- Use this feature to enter more extensive comments than are allowed in the *Remarks* field
- If *Yes*, the next screen prompts you to review and enter comment information about this substitute item
- If *No*, the comment screen does not display

Note Substitute items are ignored by MRP, Work Orders and Repetitive.

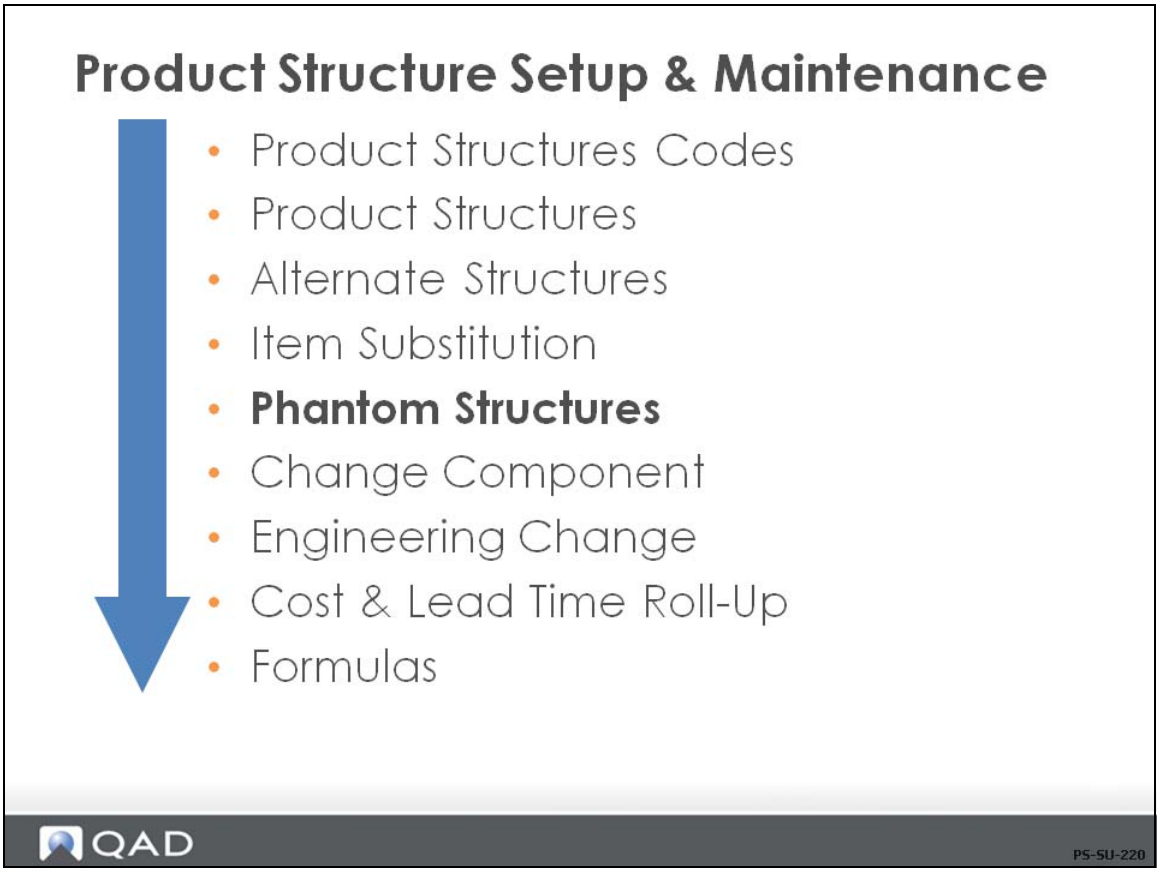
Exercise: Alternate Structure

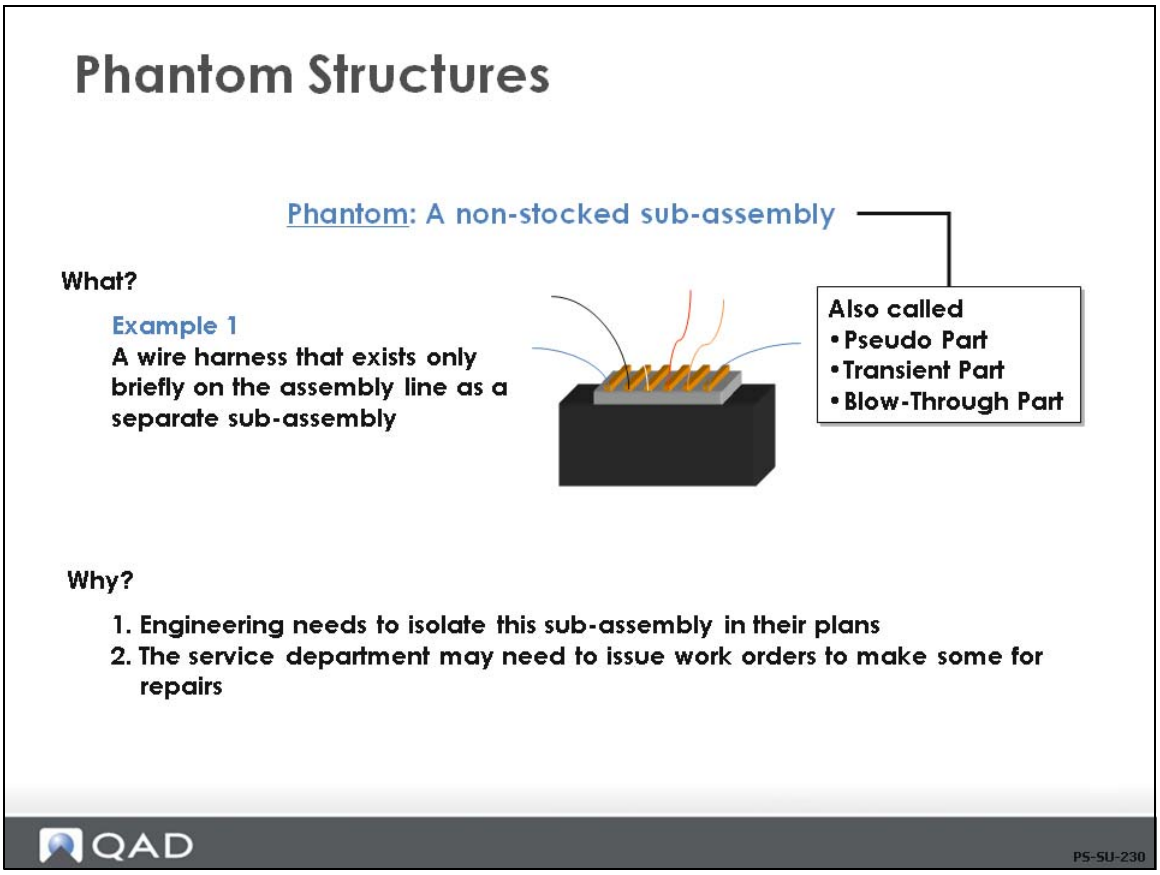
In this activity, you will create an alternate structure and a substitute item.

To improve the performance of the Medical Ultrasound machine, QMI is going to replace the current Base Unit/CPU in the product with a high-performance CPU.

1. Use Item Master Copy (1.4.12) to create a new item Ultra High Performance CPU (60053), from the existing item Base Unit/CPU (60050). All data for the two items are the same except for the item number and the description (Ultra High Perf CPU).
2. Use Product Structure Code Maintenance (13.1) to create BOM Code 01010-A1 with the description “Medical Ultrasound Alt 1” and unit of measure “EA”.
3. Use Product Structure Copy (13.9) and Product Structure Maintenance (13.5) to create a product structure for code 01010-A1. The product structure is the same as that for code 01010 except that item 60050 is replaced by item 60053.
4. Use Product Structure Inquiry (13.6) to review your work.
5. Use Item Site Planning Maintenance (1.4.17) to assign this alternate structure to item 01010 at Site 10-100.
6. Use Item Substitution Maintenance (13.19) to create a generic substitution of item 60053 for item 60050.

Phantom Structures





Phantom.

A subassembly that is directly consumed into its parent and is not planned to be stocked upon completion

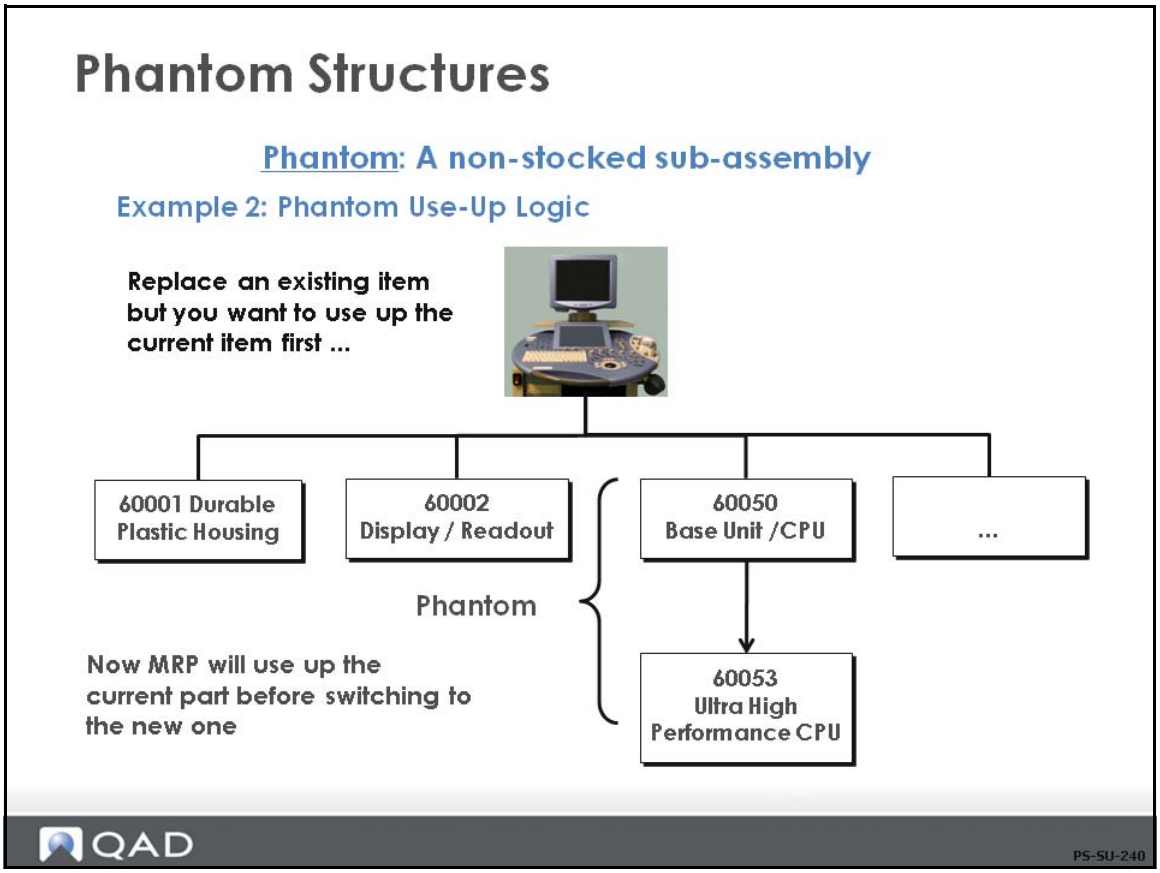
Phantom Bill of Material.

A bill of material coding and structuring technique used primarily for transient (non-stocked) subassemblies

- This is also known as a made in process item

MRP Planning - when MRP finds a phantom item in a product structure it does not plan an order for that item, but rather “blows through” the item and plans for its components to be issued directly to the end item. Should there be any of the phantom item in inventory, the system will consume those first, then issue the components for any remaining requirement.

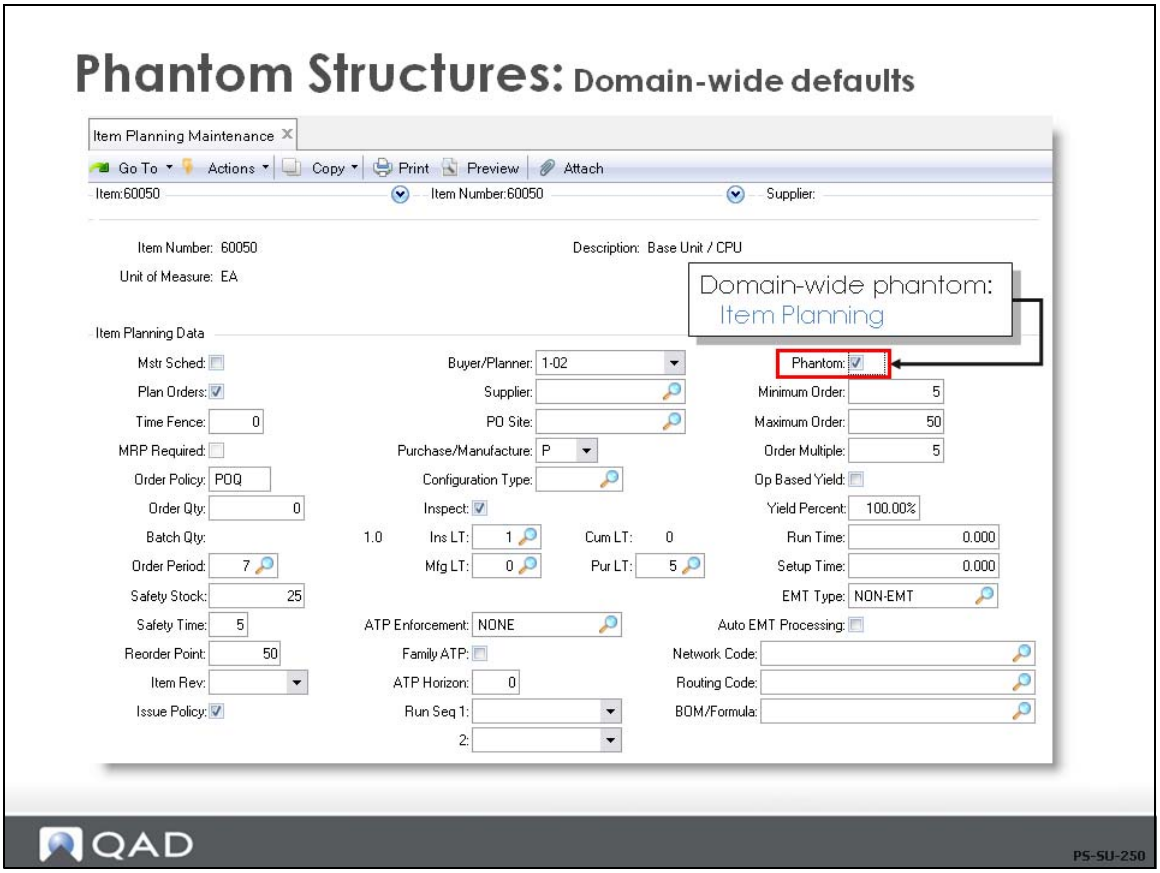
Phantom Use-Up Logic



To do this you make the current item a Phantom in Item Planning Maintenance 1.4.7 or Item Site Planning Maintenance 1.4.17, then create a product structure where the new item is a component of the old item.

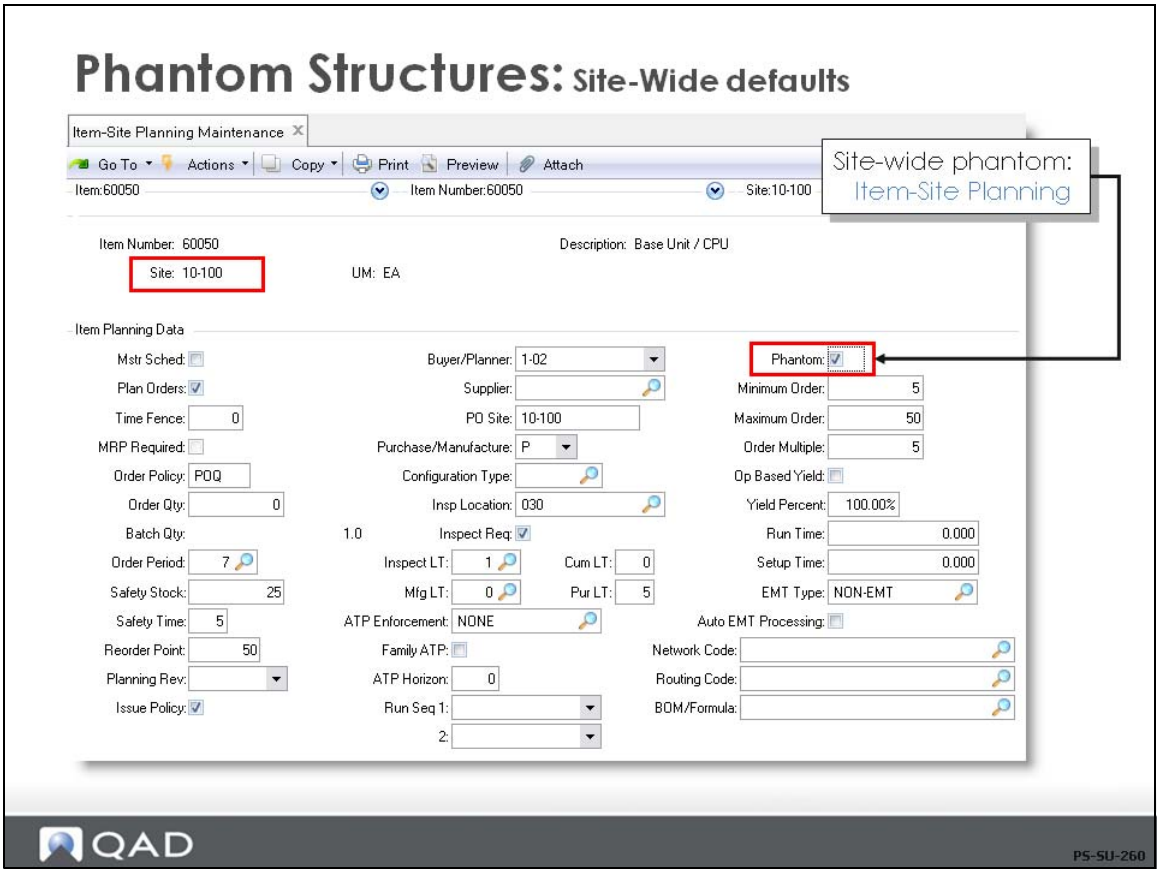
Because the system is trying to get rid of the phantom items (non-stocked sub-assembly) it consumes all of the old items, then immediately and automatically begins issuing the new item to the parent assembly.

Activating Phantoms as Defaults



Use Item Planning Maintenance to set a phantom as the default for the entire domain.

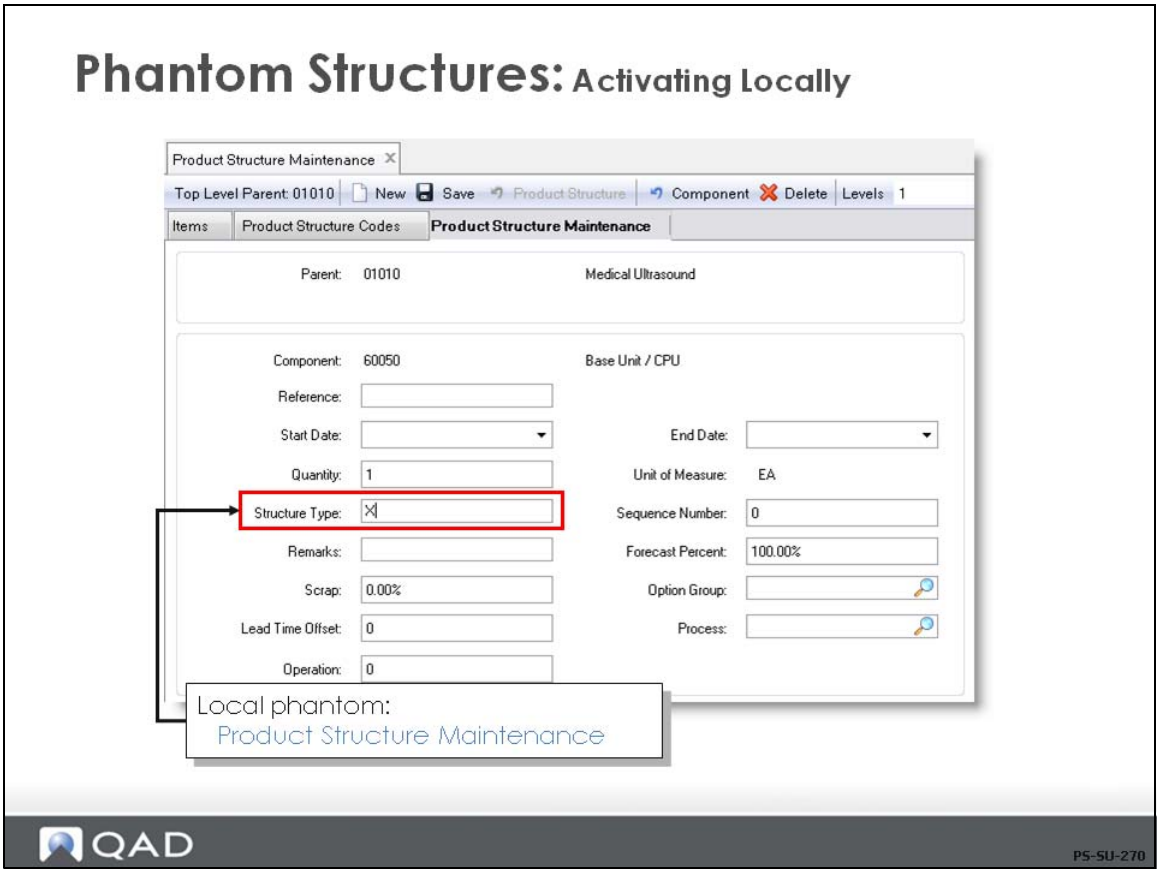
Activating Phantoms at Specific Sites



Use Item-Site Planning to set the phantom as the default for a specific site.

- This overrides the domain default at the selected site

Activating Phantoms Locally



A local phantom affects the item only in the specified product structure; everywhere else in the system, the item is treated as normal.

Note Local phantoms cause manufacturing variances, their this level labor and overhead costs are rolled up into the parents cost. They do not support use up logic and cannot be used with the repetitive modules. For these reasons their use should be discouraged

Exercise: Phantoms

In this activity you will create a phantom use up structure. It has been decided to replace the base unit/CPU with the high-performance CPU, but QMI wants to ensure all existing stock of the old CPU is used up before starting the use of the new one.

1. Use Product Structure Maintenance (13.5) to create a structure for the base unit/CPU (60050) with only one component—high-performance CPU (60052).
2. Use Item Planning Maintenance (1.4.7) to make item 60050 a phantom item.
3. Use Inventory Detail by Item Browse (3.2) to check if there are at least 200 on-hand quantity of both item 60050 and item 60052 at site 10-100.

   If not, do the following:

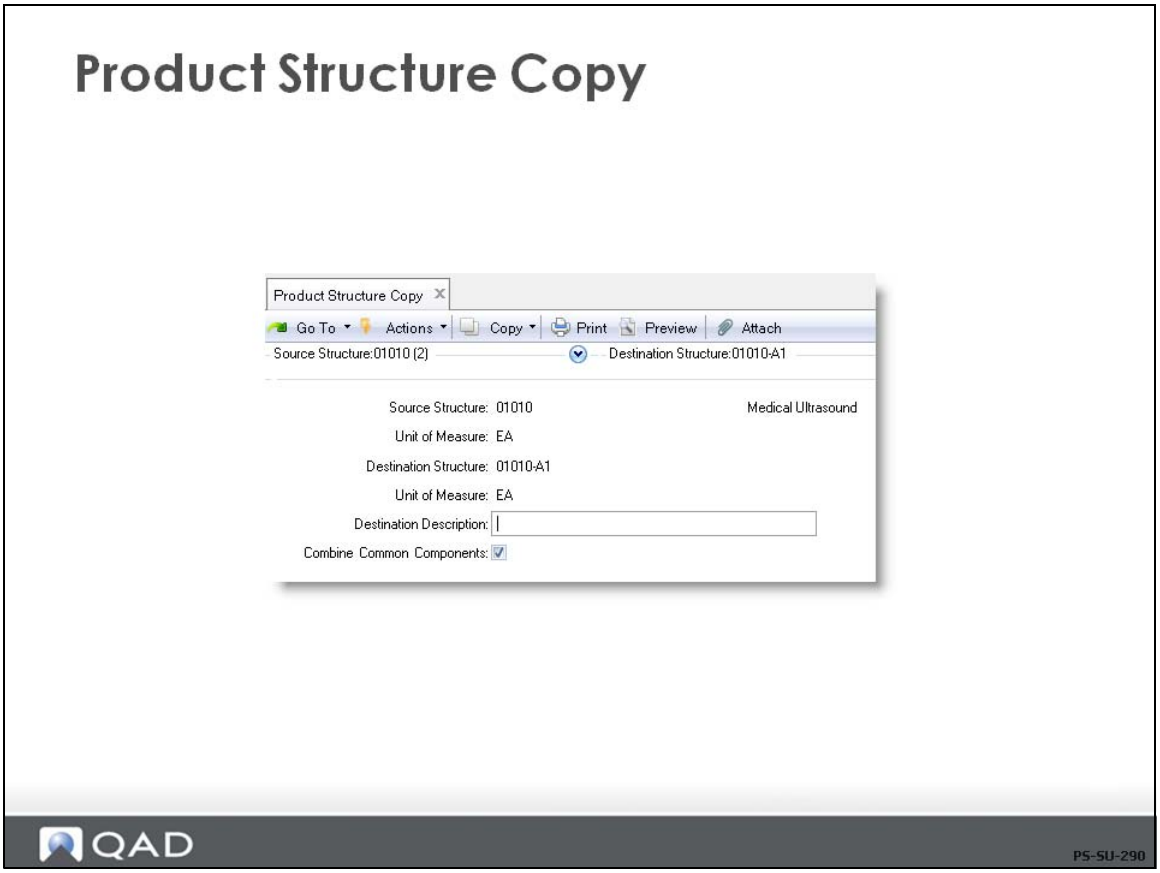
   a. For easy demonstration of the phantom use-up logic in this exercise, use Item Master Maintenance (1.4.1) to remove lot/serial control for items 60050 and 60052.

   b. Use Receipts - Unplanned (3.9) to receive a quantity of item 60050 to equal 100 items into site 10-100.

   c. Use Receipts - Unplanned (3.9) to receive a quantity of item 60052 to equal 100 items into site 10-100.
4. Use Work Order Maintenance (16.1) to create a work order of 150 of Medical Ultrasound (01010).
5. Use Work Order Release/Print (16.6) to release the work order and print the pick list to your monitor.

- What does the pick list indicate for items 60050 and 60052?

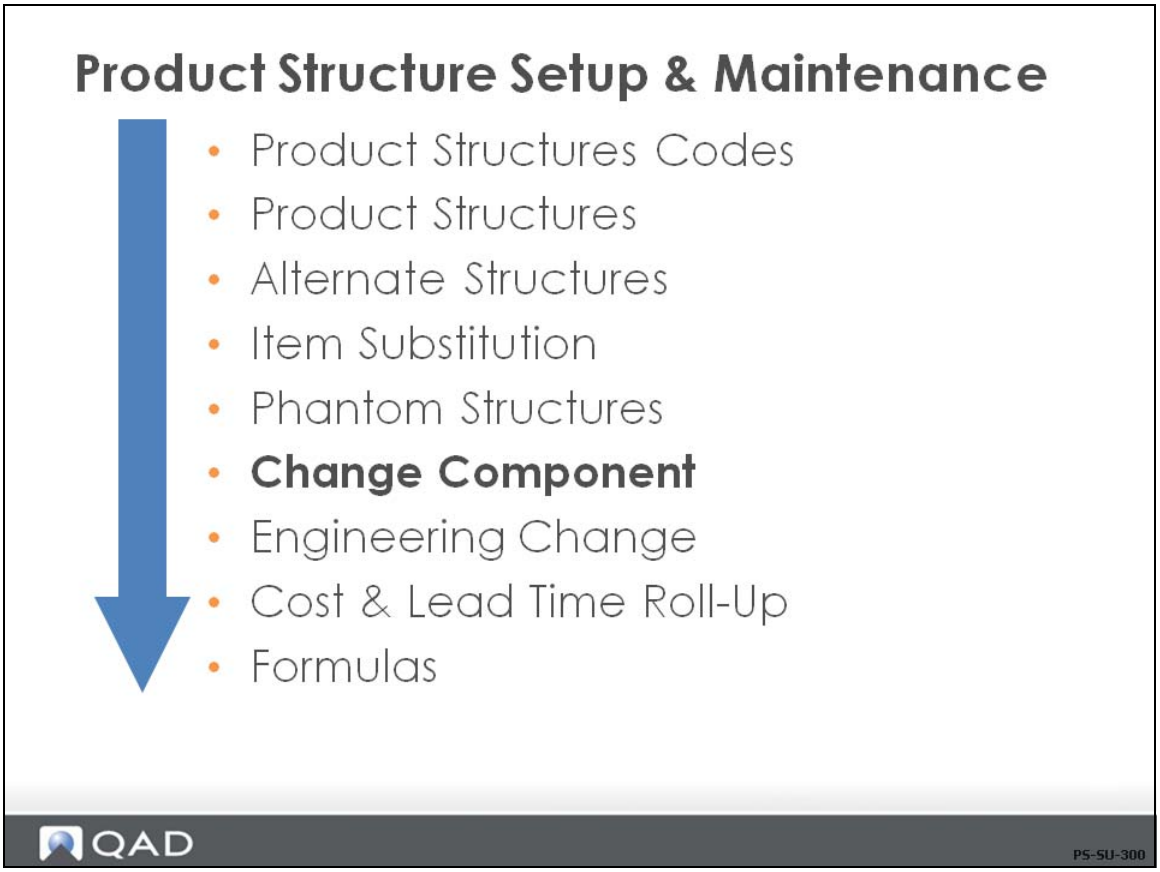
Product Structure Copy



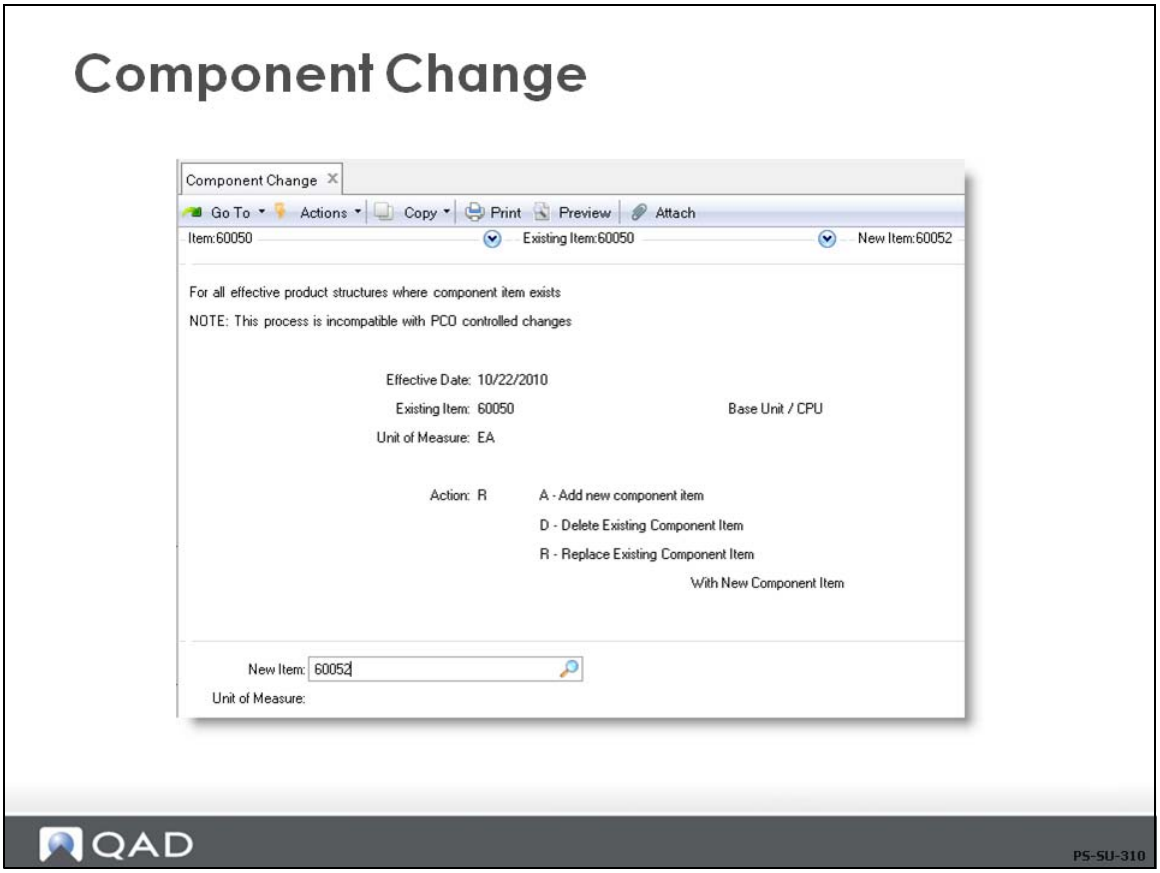
Used to create a new product structure by copying another one. This is useful when items share similar structures or to create alternates. Once the source structure is copied use Product Structure Maintenance 13.5 to modify the new structure as required.

Note Running product structure copy more than once for the same item adds to the *Qty Per.*

Change Component



Component Change

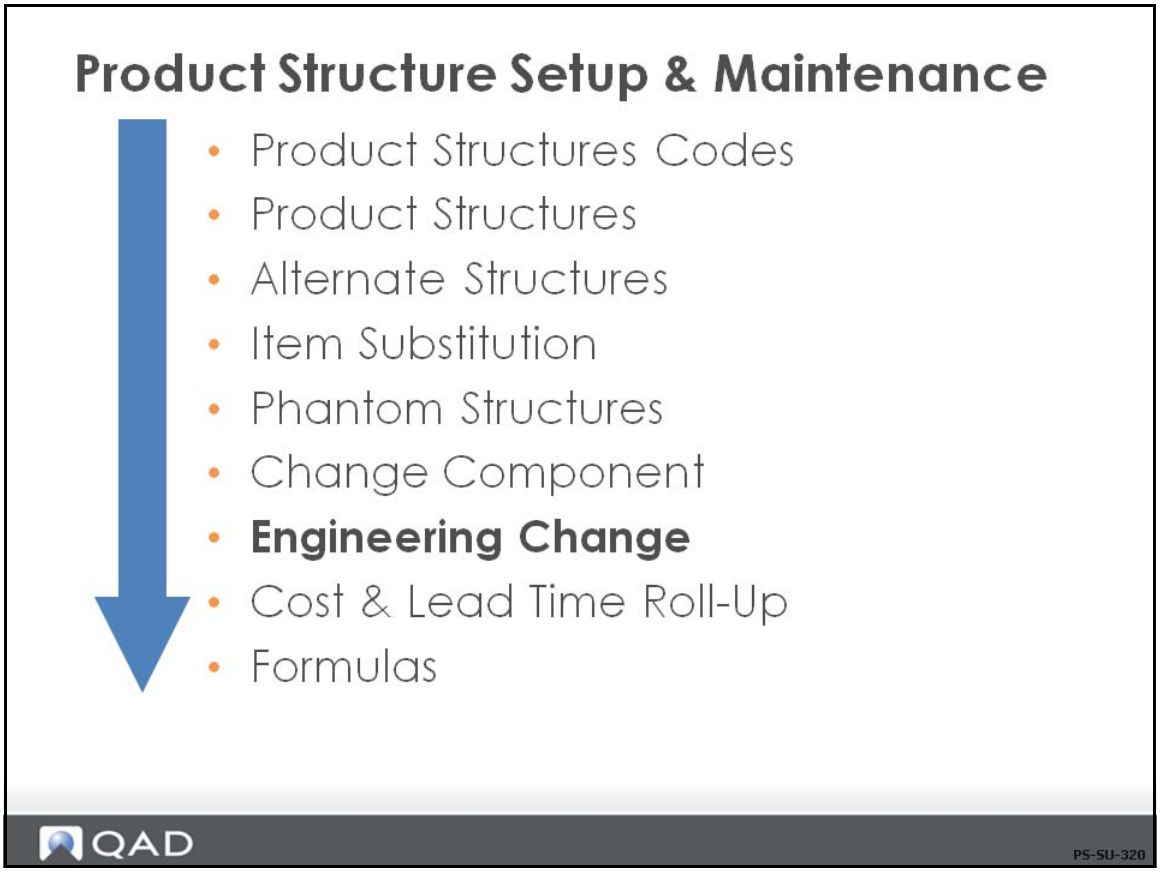


With a single step, Component Change lets you add, delete, or replace a specified component in all product structures or formulas.

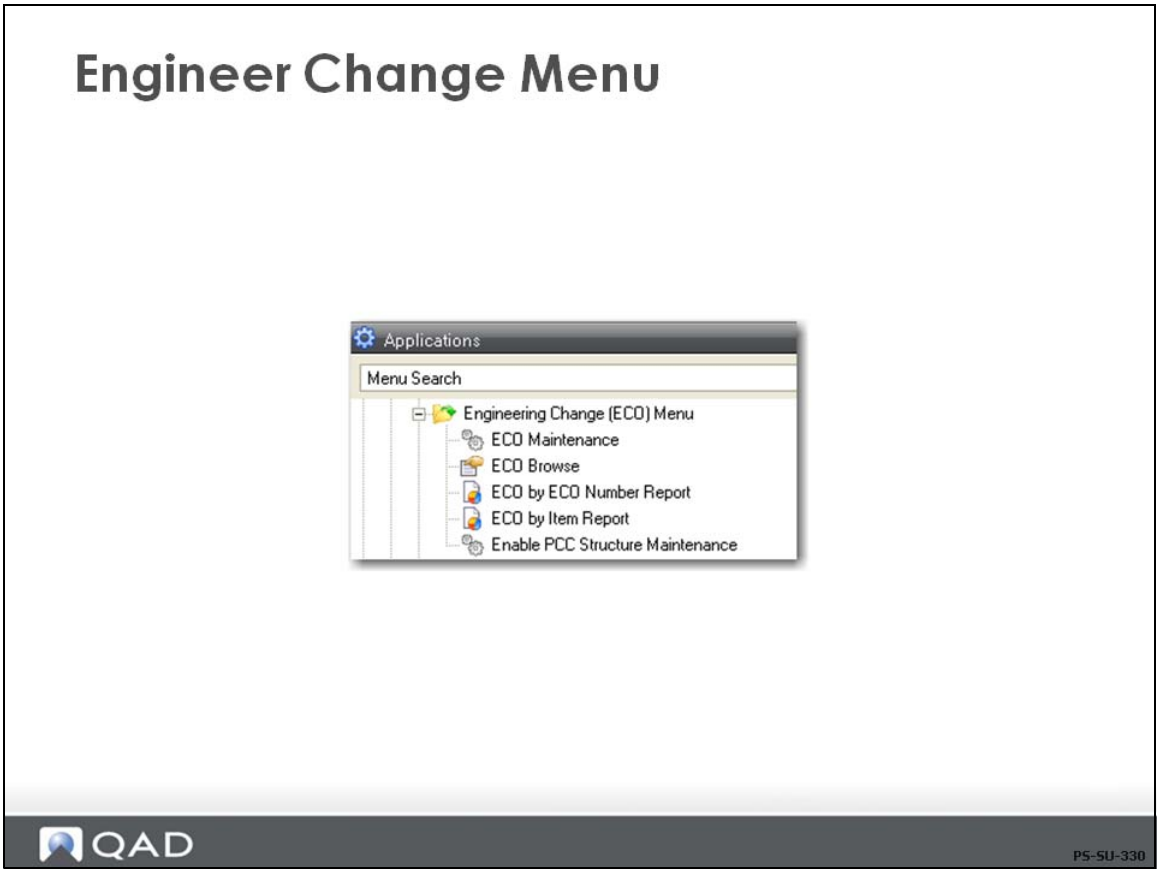
- This may take some time to process
- As this process modifies all occurrences of a component in all structures it is imperative that steps be taken to ensure the global nature of the change.
- This process in not compatible with any level of engineering change control and should never be used with lot, serial or batch controlled items.

Note Product Change Control (PCC) does not reflect changes made here, so you should limit access to this function. Also, this function deletes relevant historical information.

Engineering Change



Engineering Change Menu



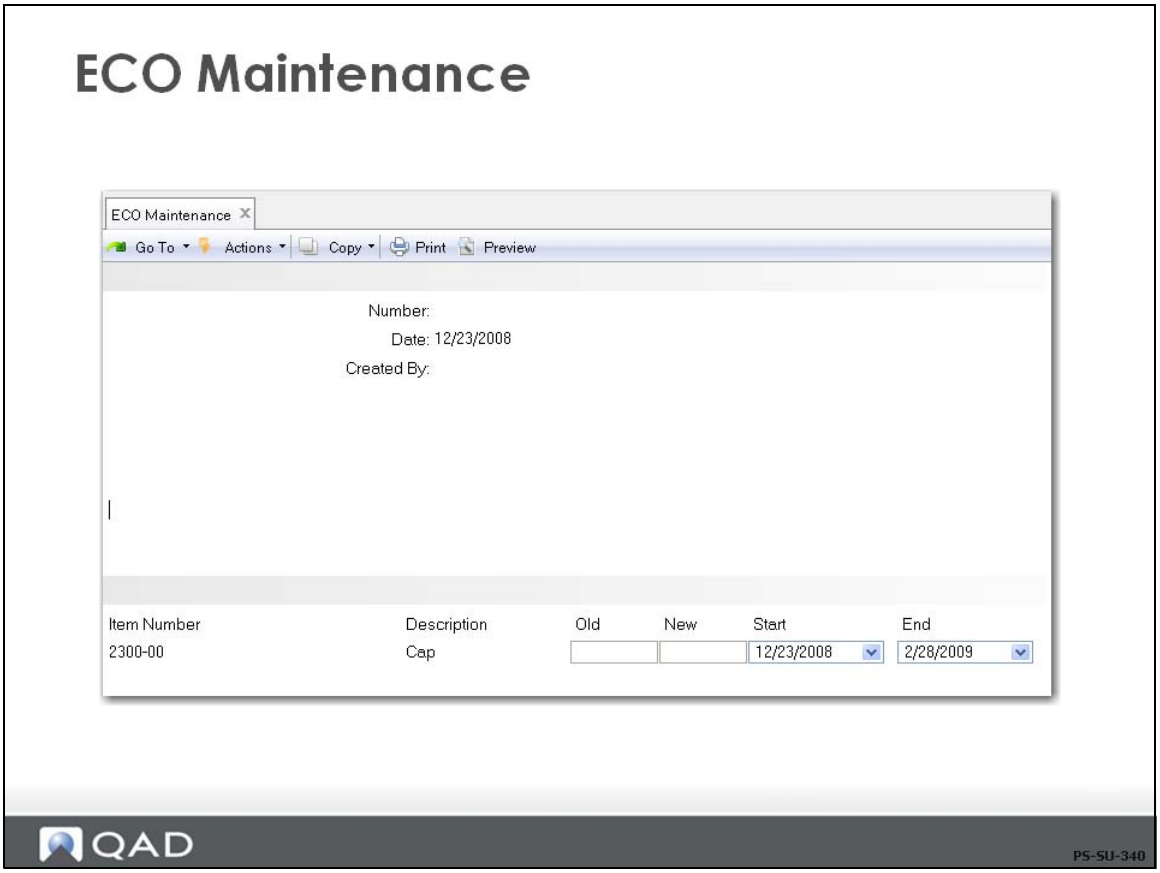
Enable PCC (Product Change Control) Structure Maintenance, formerly called the Engineering Change Control module, allows you to make changes to item data, product structures, routings, formulas, processes, and item specifications in a controlled environment without affecting production processes.

Discussed in the following Training Guide: Product Change Control

In this guide, we look at the more limited ECO Maintenance program.

Warning Activating PCC prohibits use of ECO programs.

ECO Maintenance



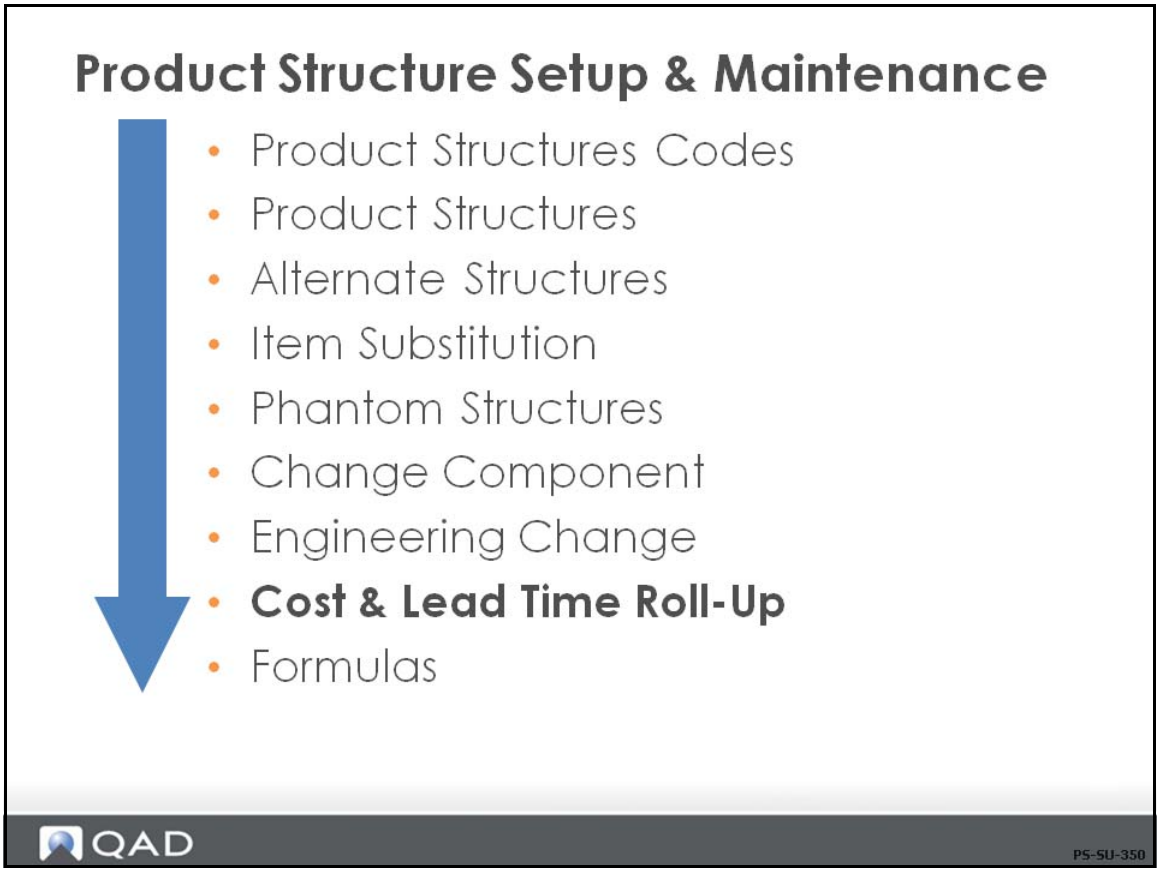
Engineering change orders can be used to document changes in items and product structures. The new revision number can be updated into the item master by this function. For more formal engineering control implement the PCC module.

Exercise: Product Structure Copy

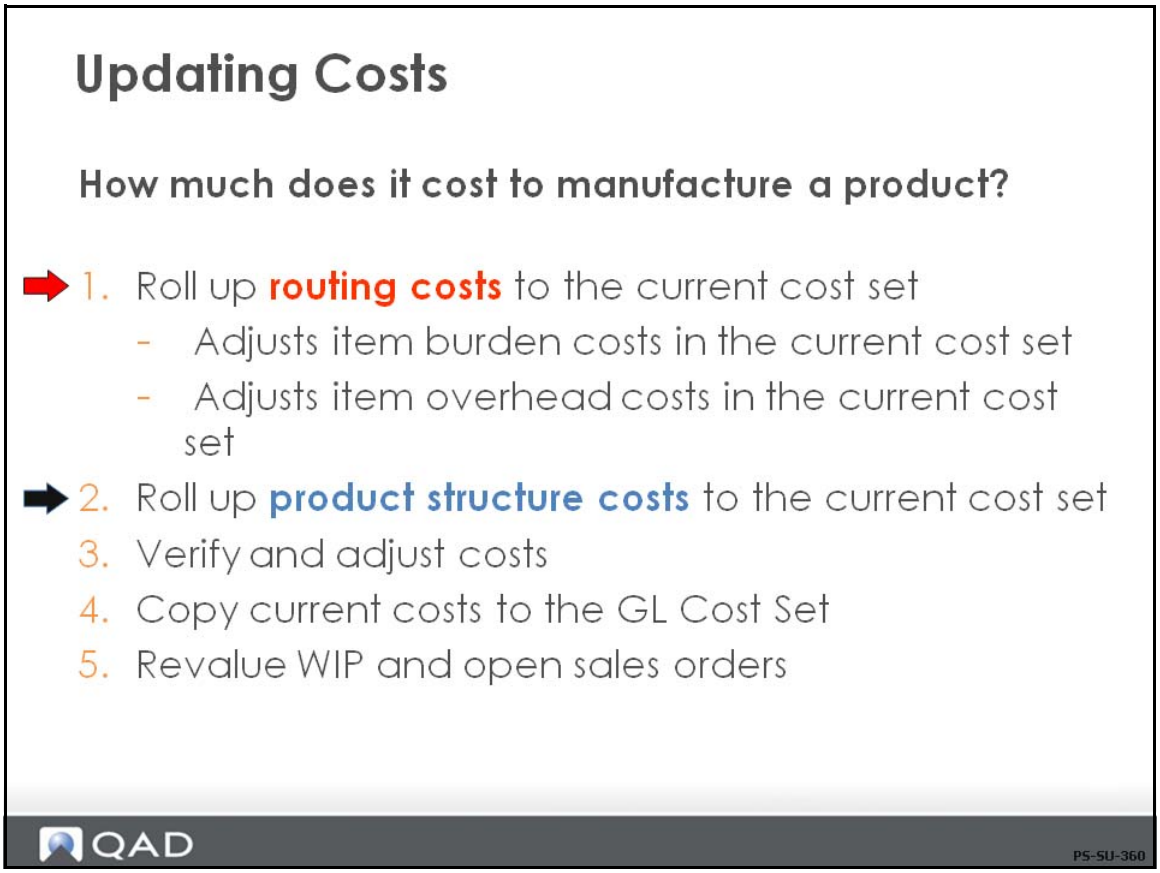
In this activity you will create a new product structure by coping and then modifying an existing structure.

1. Use Product Structure Copy (13.9) to copy structure 01010 to create structure 01010-A2, Medical Ultrasound Alt 2.
2. Use Product Structure Maintenance (13.5) modify the new product structure 01010-A2.
   a. Delete printer (60008).
   b. Change the quantity per for the battery (600005) from 1 EA to 2 EA.
3. Use Product Structure Inquiry (13.6) to check your work.

Cost and Lead Time Roll-Up



Updating Costs

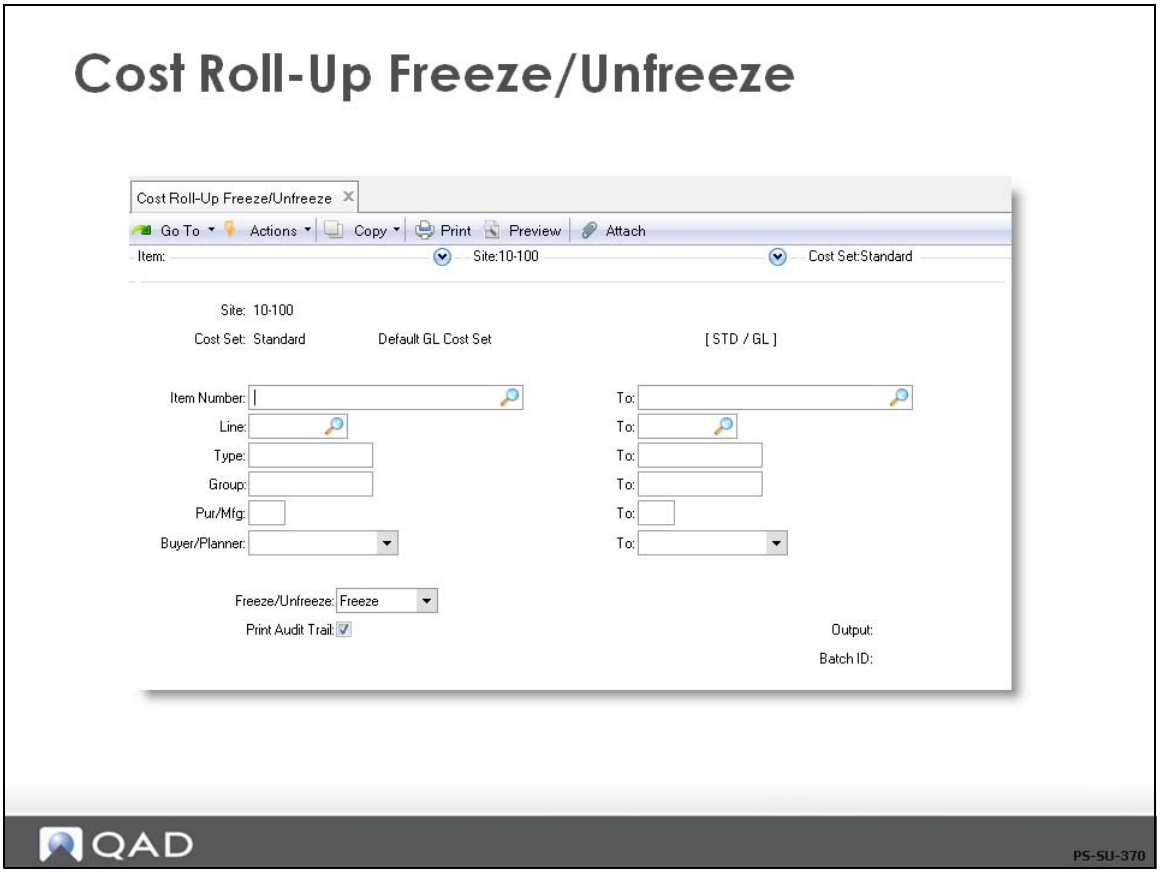


Product Structure Cost Roll-Up uses the elemental or categorical costs of each component to calculate the cost of the component's usage and sums the total for all components in the structure by category or, optionally, by element.

It is customary (but not required) to do the roll-up in the current cost data set, then copy the results to the General Ledger Cost set

Using the Cost Management Module you can run this process with a simulated cost set instead of the current cost set.

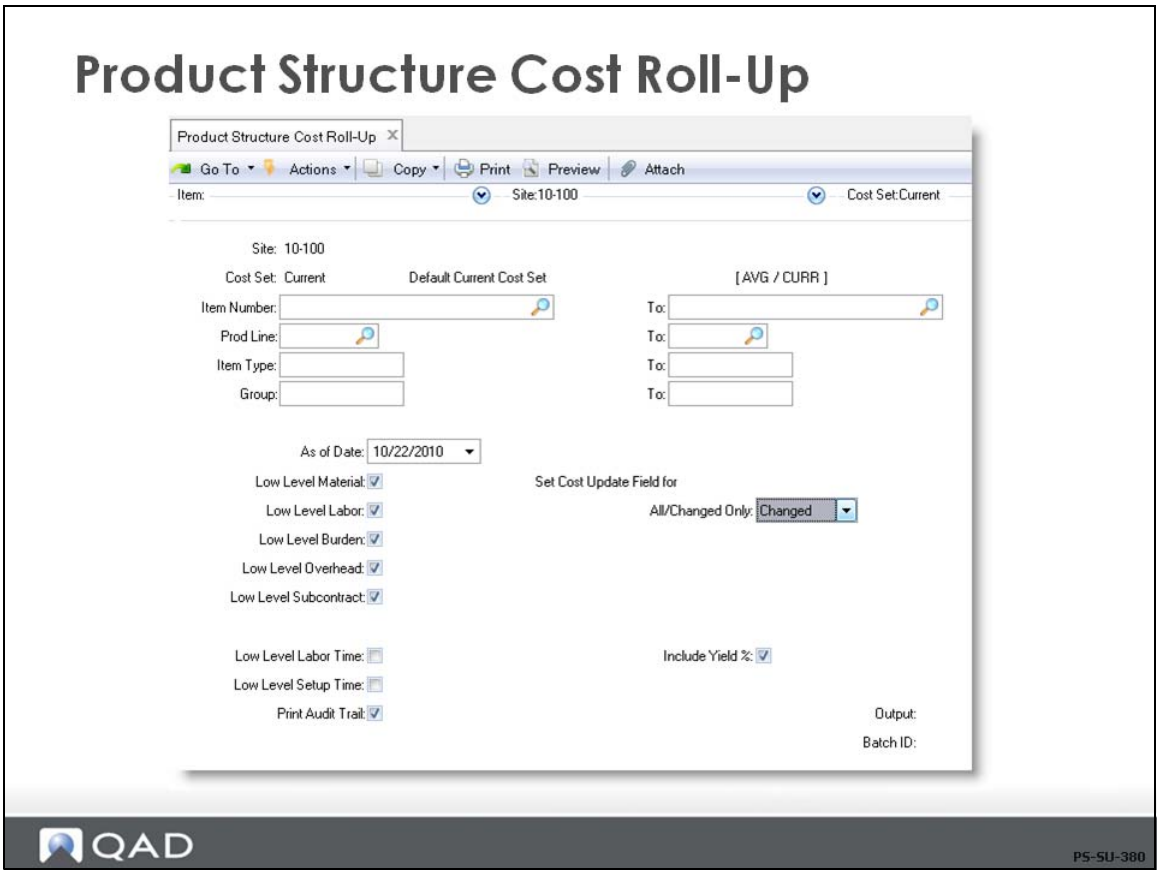
Cost Roll-Up Freeze/Unfreeze



- Flags or unflags selected items against cost changes caused by Product Structure Cost Roll-Up or Routing Cost Roll-Up
- Selectively unfreezes items to allow cost updates only for new or revised items

Note If a product structure is not fully rolled up, a manufacturing variance occurs in work orders. In a standard cost environment it is normal to freeze the standard cost set (the GL Cost Set) to prevent unintended roll-ups from changing standards.

Product Structure Cost Roll-Up



This program rolls up only those items that have changed since the last roll-up.

- Run this program *after* rolling up routing costs
- This program posts cumulative lower-level costs for all cost categories at each assembly level
- This program should be password-protected

Site. The site for which the roll-up is to be performed.

Cost Set. The cost set to be used.

Item / Prod Line / Item Type / Group. Use these fields to select the cost data to be rolled up.

- Leaving fields blank selects all in the category

As of Date. The effective date to use when selecting which parent/component relationships to display.

- The default is the system date
- Parent/component relationships are defined as effective over a period of time
- Effective dates phase in engineering changes and maintain product structure history online
- Manufacturing planning and control functions always use the product structure information in effect on that date

Low Level Costs

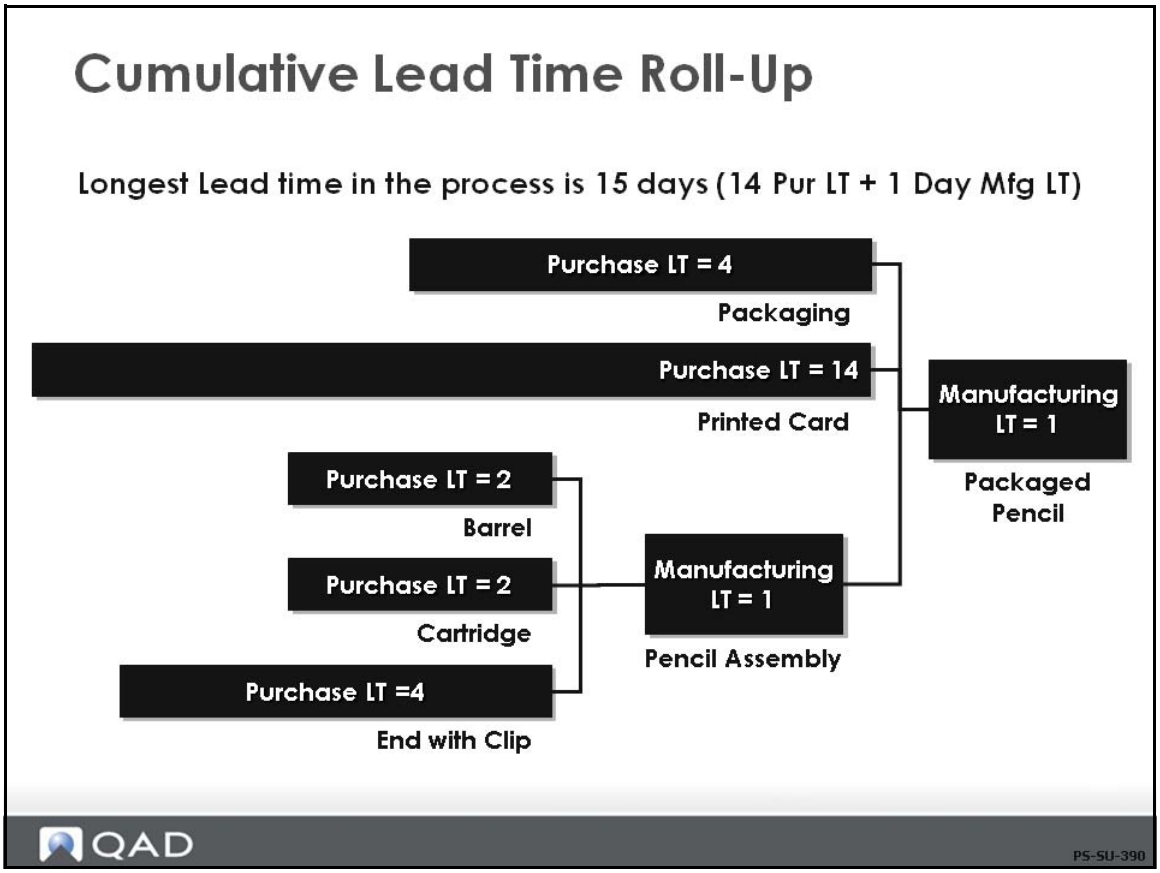
Set these fields to *Yes* to include them in the cost roll-up. If you leave some costs out of the roll-up process, make sure you understand the effect.

Low Level Material *Low Level Labor*
Low Level Burden *Low Level Overhead*
Low Level Subcontract *Low Level Labor Time*
Low Level Setup Time *Print Audit Trail*
Include Yield%.

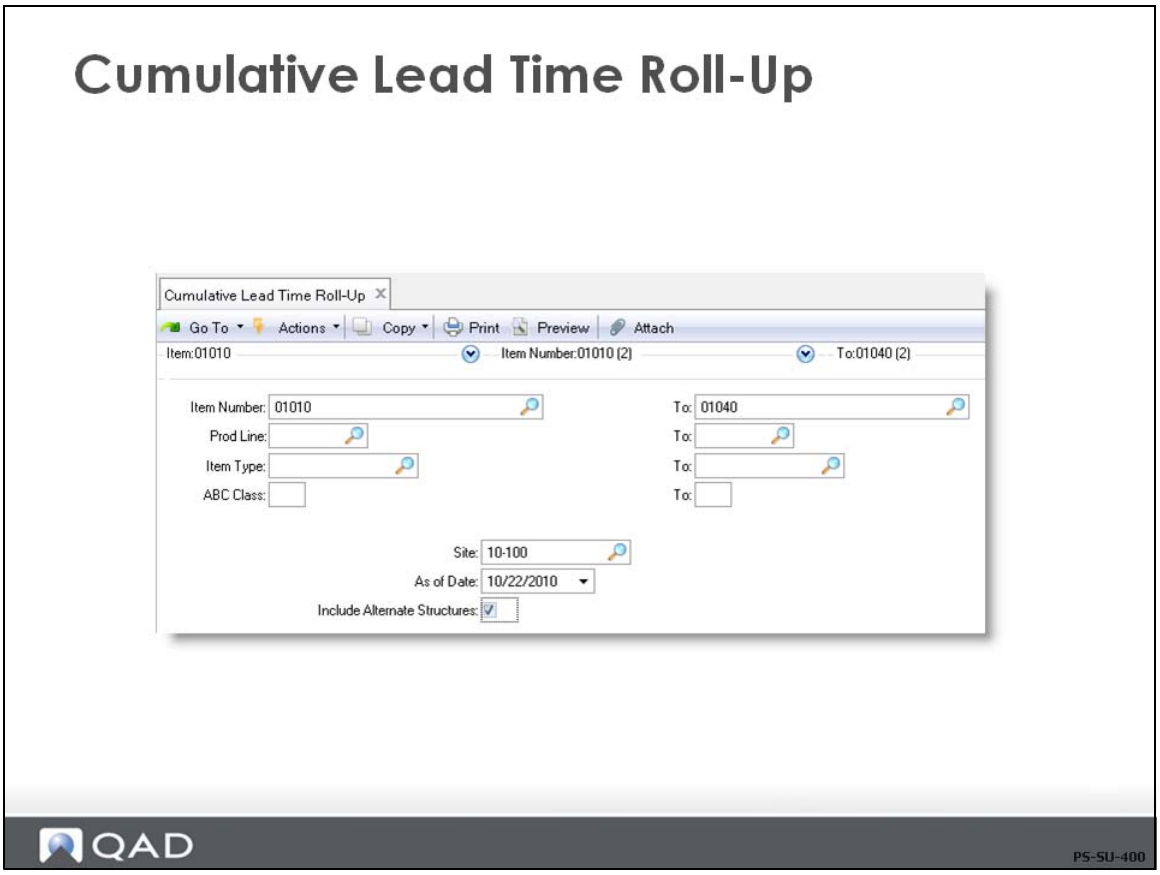
Note Rolling up average costs upsets the averaging process. The system allows you to do this, but displays a warning first.

Note Discussed in the Product Costing training guide

Cumulative Lead Time Roll-Up



- The cumulative lead time is the longest time it can take to assemble a product, the critical path
- The calculations are done as though there are no raw materials available; they must be purchased
- Each item's lead time (manufacturing or purchasing) is added to generate the lead time for each leg
- Set the MRP Horizon in the MRP Control File to a value longer than the longest cumulative lead time

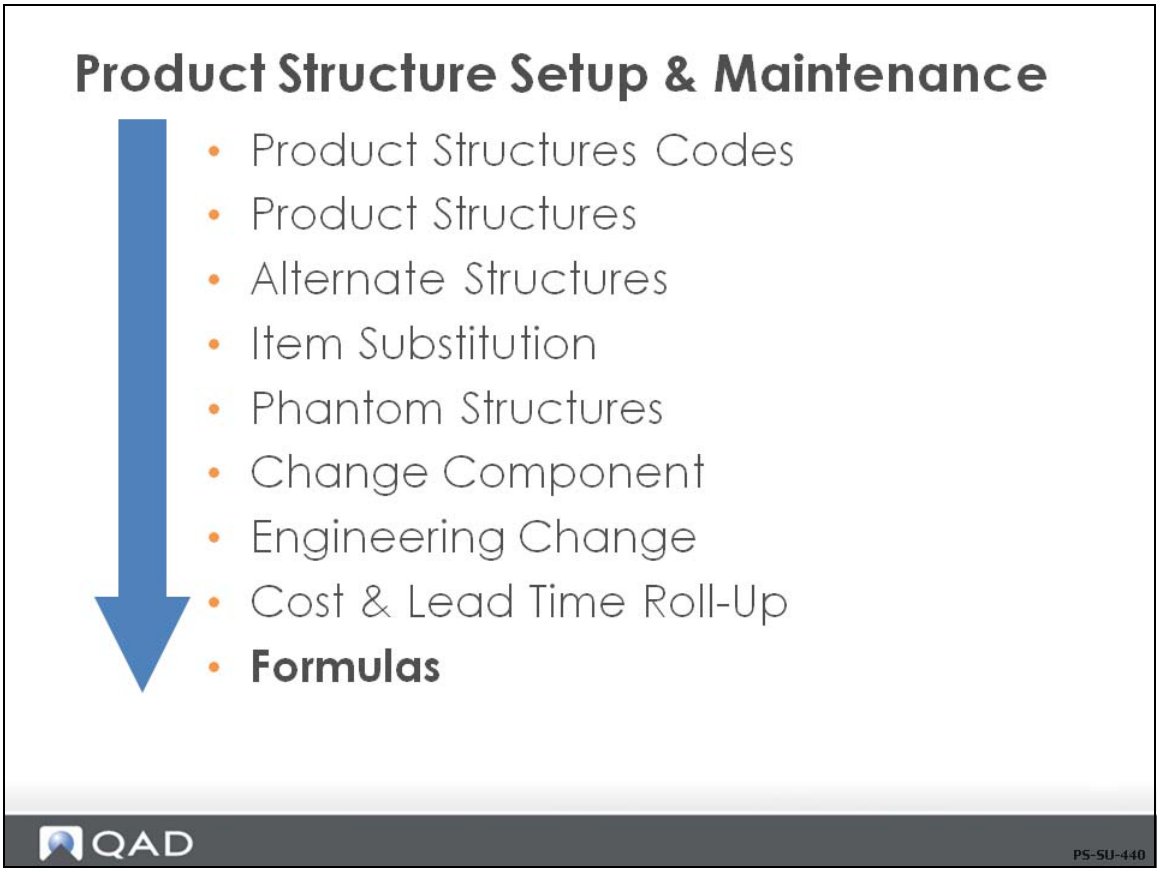


Cumulative lead time represents the longest time it would take to produce a product without raw materials or sub-assemblies in stock.

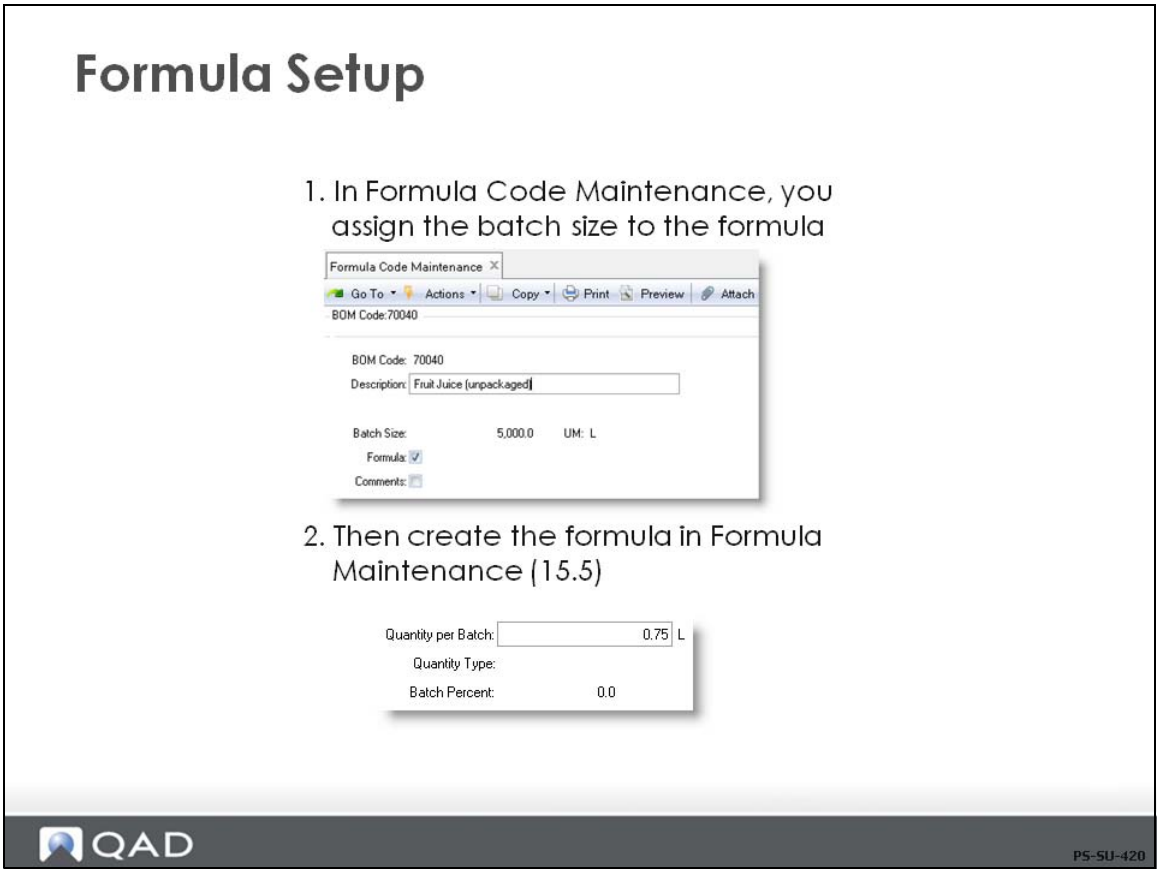
- The Cumulative Lead Time Roll-Up calculates this using lead times of all components
- Cumulative lead time defines the minimum planning horizon for an item, and can be a guideline for order promising

Note Recalculate the lead time whenever structures, purchasing and inspection lead times, shop calendar hours, or DRP transit times change.

Formulas


Product Structure Setup & Maintenance
Product Structures Codes
Product Structures
Alternate Structures
Item Substitution
Phantom Structures
Change Component
Engineering Change
Cost & Lead Time Roll-Up
Formulas
QAD
PS-SU-440

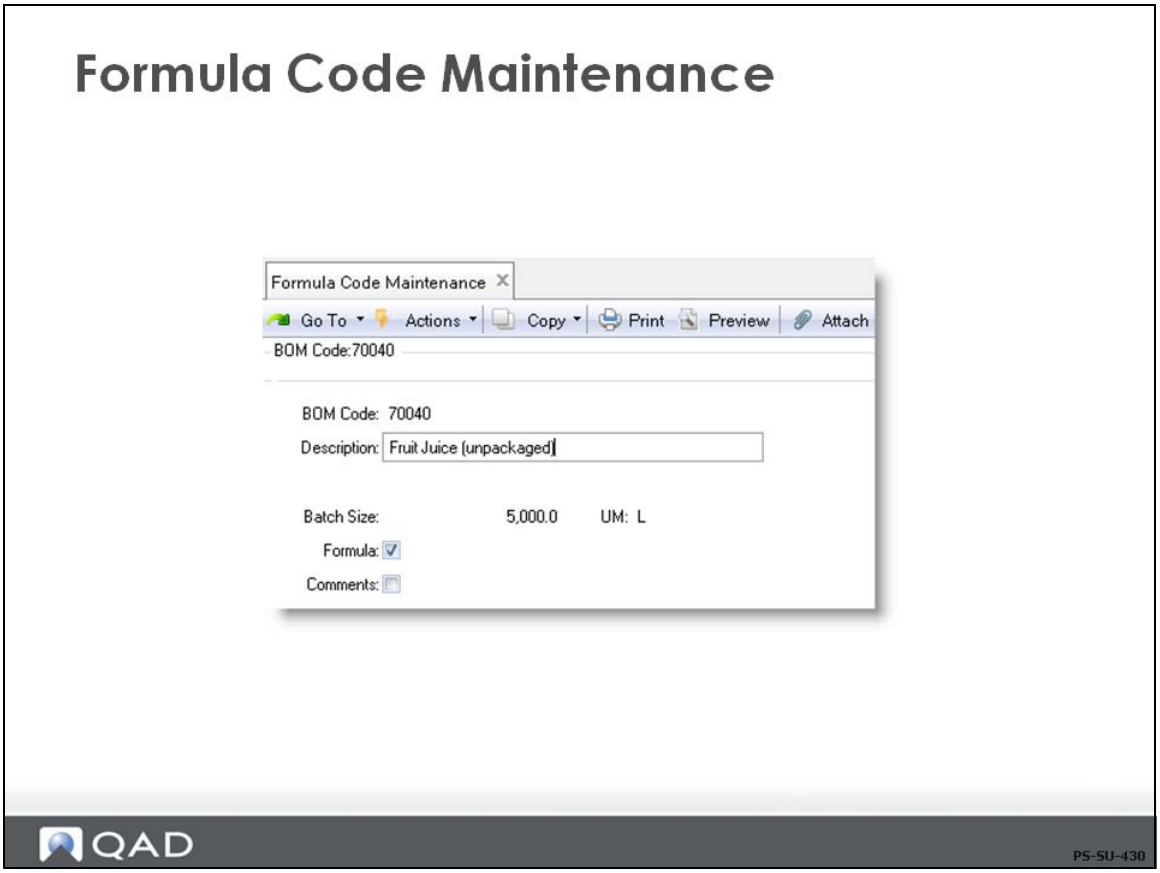
Formula Setup



Formula codes identify the formula to the system. Formulas are product structures for non-discreet items such as liquids and granular materials. Formulas are used extensively in food, pharmaceuticals, chemicals, and raw material processing.

Use Formula Code Maintenance to assign the BOM code for the formula, then create the formula in Formula Maintenance. As with discreet product structures the BOM code will normally be the item number.

Formula Code Maintenance

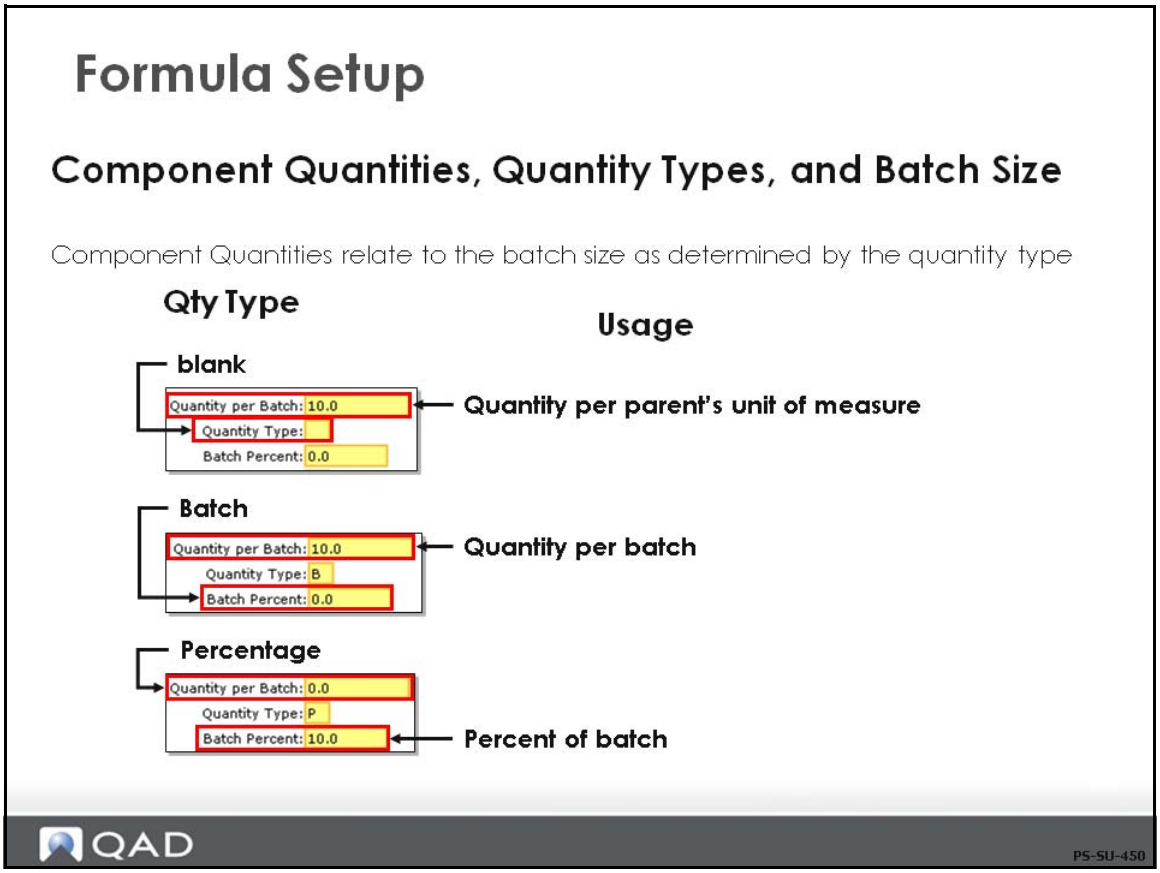


Use this function to define the batch size before setting up the formula with Formula Maintenance.

- Like product structure codes, formula codes can be used to define a code that does not correspond to an item number
- Unlike product structure codes, formula codes define the code as a formula and specify the batch size

Note Batch sizes can be changed only through Batch Quantity Change

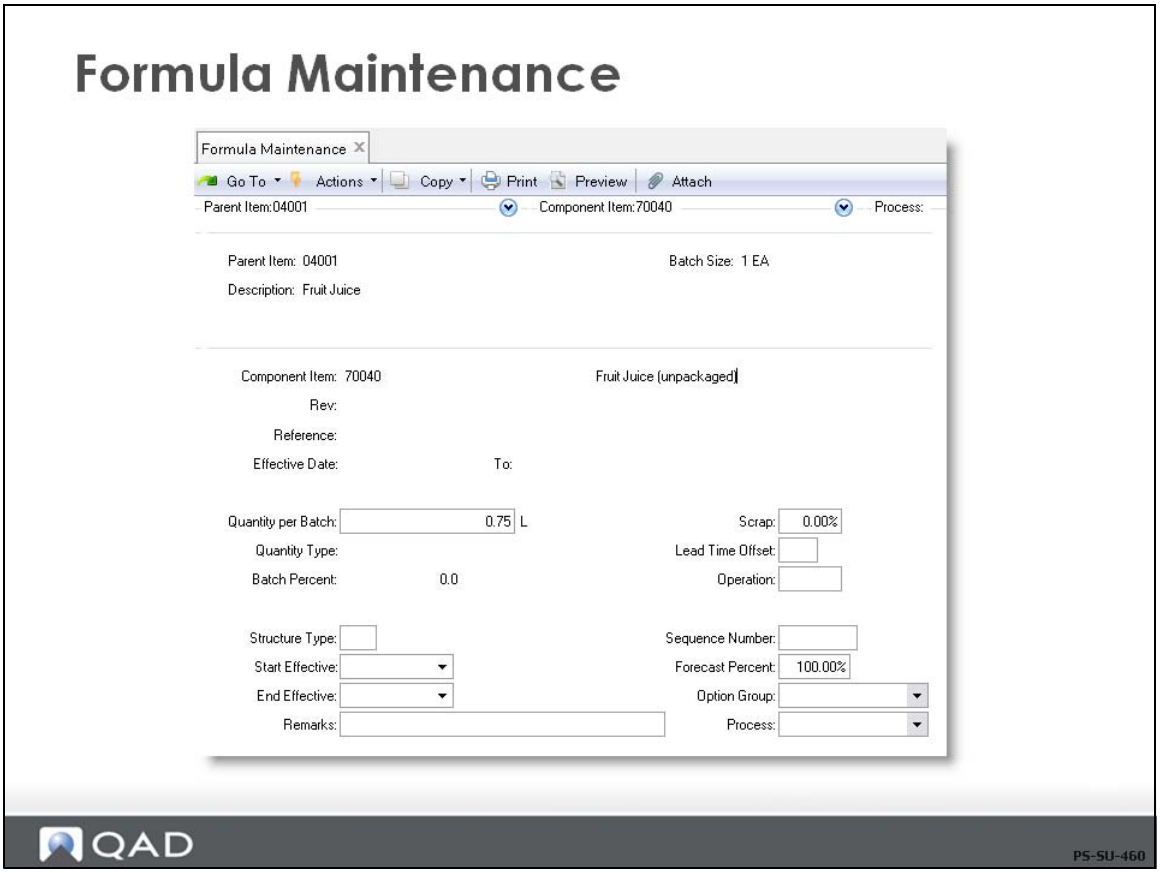
Formula Setup: Batch and Quantity Types



The graphic shows how the quantity type determines the usage of the quantity per.

- Normal product structures entered in Product Structure Maintenance always have quantity type blank
- Quantity type cannot be changed on existing lines

Formula Maintenance



Formulas identify ingredients or intermediates in a product, and are recorded as single level relationships between a Parent Item and a Component Item

- At the top level Parent Item is a finished product
- At lower levels the Parent Item is an intermediate item

Formulas determine Component Item quantities and need dates, and what each manufactured product costs.

Product structures that are created in Product Structure Maintenance can be maintained in Formula Maintenance.

Formulas created in Formula Maintenance cannot be maintained in Product Structure Maintenance. This is due to the unique requirements in managing Quality Type and usage.

Parent Item. The parent of a formula must be either a valid item number or a predefined formula code.

Component Item. The code identifying the component item in a formula.

- Formulas are entered as parent/component relationships
- At each level of the formula, the component ingredients include only those items used directly at that Level
  - Multiple levels of a structure exist when a component in one relationship is a parent of another

Reference. A code uniquely identifying a parent/component relationship.

- Each parent/component relationship is uniquely identified by the combination of the parent item, component item, and reference (feature) code
- This allows the same component to appear in a bill or formula more than one time at the same level
- In a formula, often reference identifier indicates the point in the process at which this ingredient is needed

Qty Per. The quantity of the component ingredient required to manufacture the parent item.

- This may be expressed as a quantity per unit or per batch
- The parent item's batch quantity is defined using the Batch Quantity Change function
- Must be zero if Qty Type = *P*

Qty Type. A code specifying how the Qty Per is used for this formula.

- *Blank* or *B* allows entry of qty and the Batch Percent is zero
- *P* allows entry of Batch Percent and the Quantity Per Batch will be calculated
- The system maintains the total percentage of all ingredients in the batch and displays a warning when it exceeds 100 percent

Note Qty Type may not be changed after adding a record.

Batch Percent. The quantity of the component ingredient required to manufacture a batch of the parent item, expressed as a percentage of the batch.

- It must be zero if *Qty Type* is *B* or *blank*
- The component's actual quantity per is calculated by the system
  - If batch size is 1000 and percent of batch is 10, then 100 units of this component are required

Note Component quantity per may only be expressed as a percent of the batch if the unit of measure of the component matches the unit of measure of the parent.

Structure Type. The structure code defining how this parent/component or BOM/Formula relationship is used.

- Structure code is normally left blank
- Other codes indicate special relationships
  - *A*. Set by the system identifying an alternate bill
  - *D*. These items are not planned, costed, or exploded. Use this to record miscellaneous expense items or documents associated with this bill
  - *J*. Indicates a Co-Product/By-Product relationship. A Co-Product/By-Product relationship cannot be modified using Product Structure Maintenance or Formula Maintenance
  - *X*. A local phantom. Local phantoms are costed and exploded, but never planned as component requirements. The explosion logic always blows through these items, displaying their components on the picklist. Phantom use-up is not available for local phantoms. Phantoms are useful for identifying such things as repair kits, which are sometimes sold separately and also sold as part of the finished item
  - *P*. A planning item in a planning bill

- *O.* An optional component

Start Effective / End Effective. The dates control the first and last dates the item is used.

- These dates are inclusive and cannot overlap one or both dates
  - They can be left blank

Remarks. Optional remarks regarding this parent/component or BOM/Formula relationship.

- This field is for reference only and may appear on selected reports and inquiries

Scrap. The percentage of this component item expected to be scrapped during the process of making the parent product.

- Component quantity per and scrap percentage are used throughout the system for manufacturing planning and control
  - When a manufacturing demand is created for the parent item, the component requirements are determined by multiplying the order quantity by the component quantity per, and then adjusting this upward to account for any scrap percentage
  - This is the demand quantity used by material planning
  - This quantity prints on picklists and other reports

LT Offset. The number of working days required from the start of production on the parent item until this component is required.

- Manufacturing picklists and MRP determine dates for component requirements using lead time and lead time offset
- A negative lead time offset may be entered for a component required before the release date of the parent item
- When the same component is required more than once with different leadtime offsets, the operation for each occurrence should be different
  - Otherwise, the component requirements for orders will be summarized by operation, and when this happens, the requirement for the component will be based on the shortest leadtime offset for the component
- Lead time offset is useful for long production lead times and expensive components – saving money by delaying the acquisition or production of an expensive component until the latest possible time – or if components have a limited shelf life

Op. The routing or process operation at which this component is used.

Sequence Number. An optional sequence number for this parent/component or BOM/Formula relationship.

- Normally, component items are listed in sequence by item number
- A special report, the Product Structure by Number Report, can list components and Co-Products/By-Products in sequence by Number

Forecast. The forecast percentage for this component item.

Option Group. An optional code grouping components on a product structure.

Process. An optional code grouping components according to process.

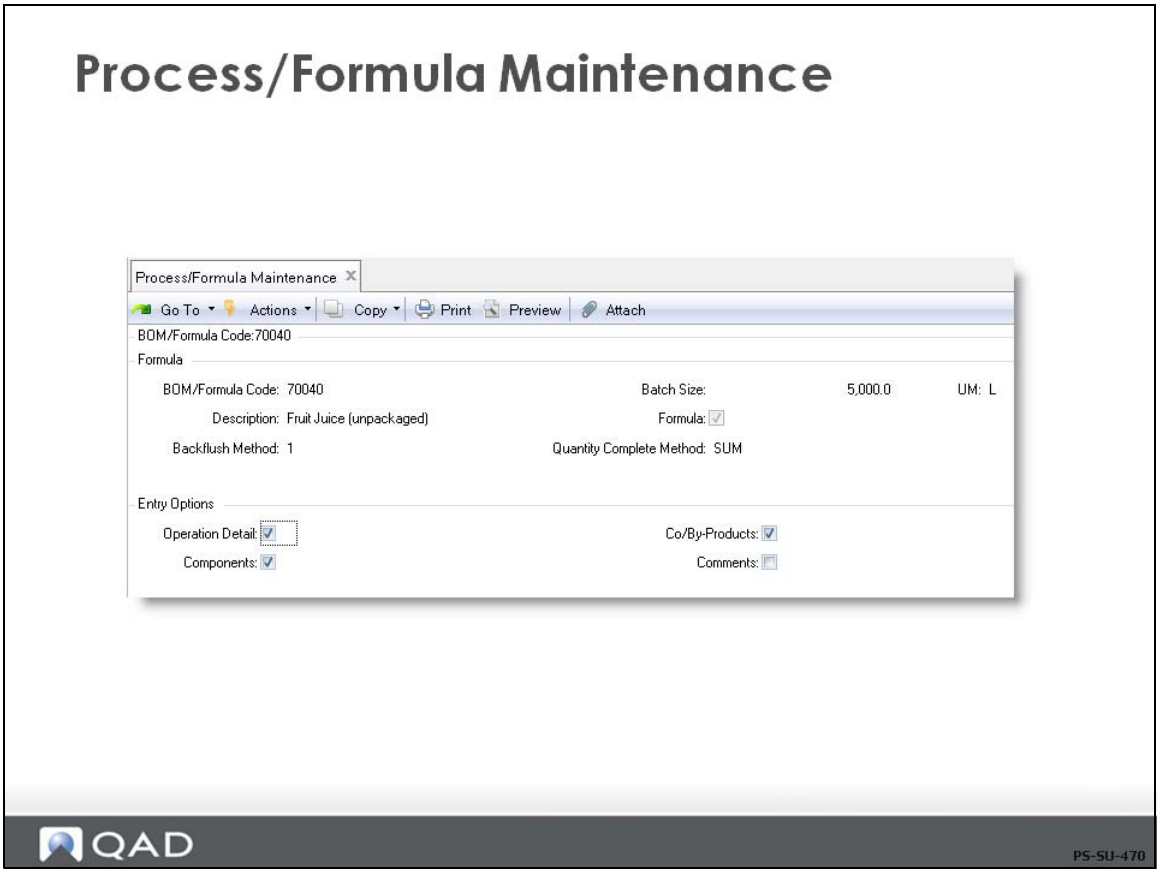
How much?

Manufacturing and planning look only at components effective on the order or plan date

Qty Per, Batch Percent, and Scrap Percentage determine the quantity (and backflush quantity) on manufacturing orders and the MRP planning quantity

Note When planning components with structure type *P* or *O*, the system also looks at the Forecast Percentage to determine how much of the item to plan, since this specifies that the component is only added to a certain percentage of the finished products.

Process/Formula Maintenance



A Process is the Formula equivalent of the Routing used with Product Structures.

Process/Formula Maintenance lets you enter formula, batch, process, and co-/by-product information.

- The Formula frame records the code for the parent and is the same as Formula Code Maintenance

See in this training guide: *Formula Code Maintenance* on page 79

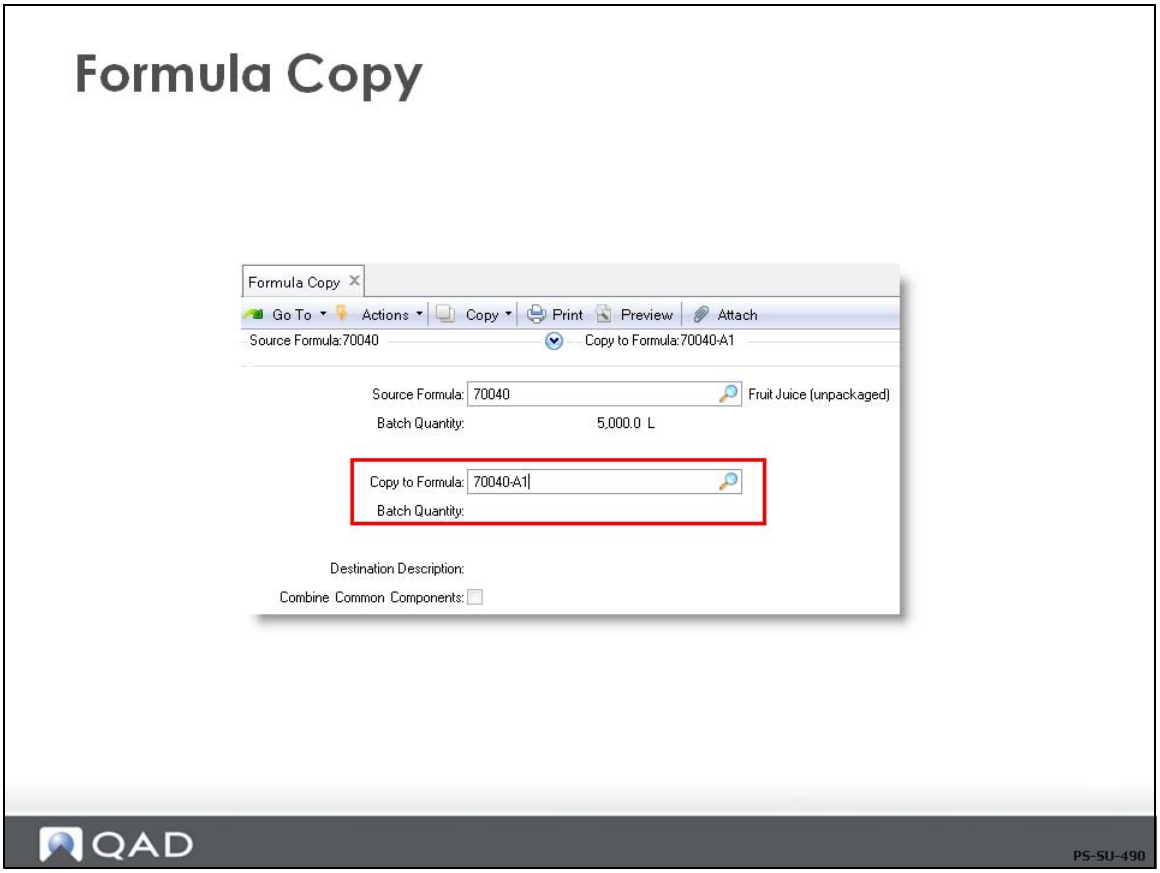
- The Entry Options frame lets you specify which other frames to display
  - The Process Operation Detail frame records information about the operations associated with the formula code and is the same as Process Definition Maintenance

Discussed in the following Training Guide: Work Centers, Routings, and WO Subcontracting

  - The Components frame records information about the components used at each operation and is the same as Formula Maintenance

See in this training guide: *Formula Maintenance* on page 81

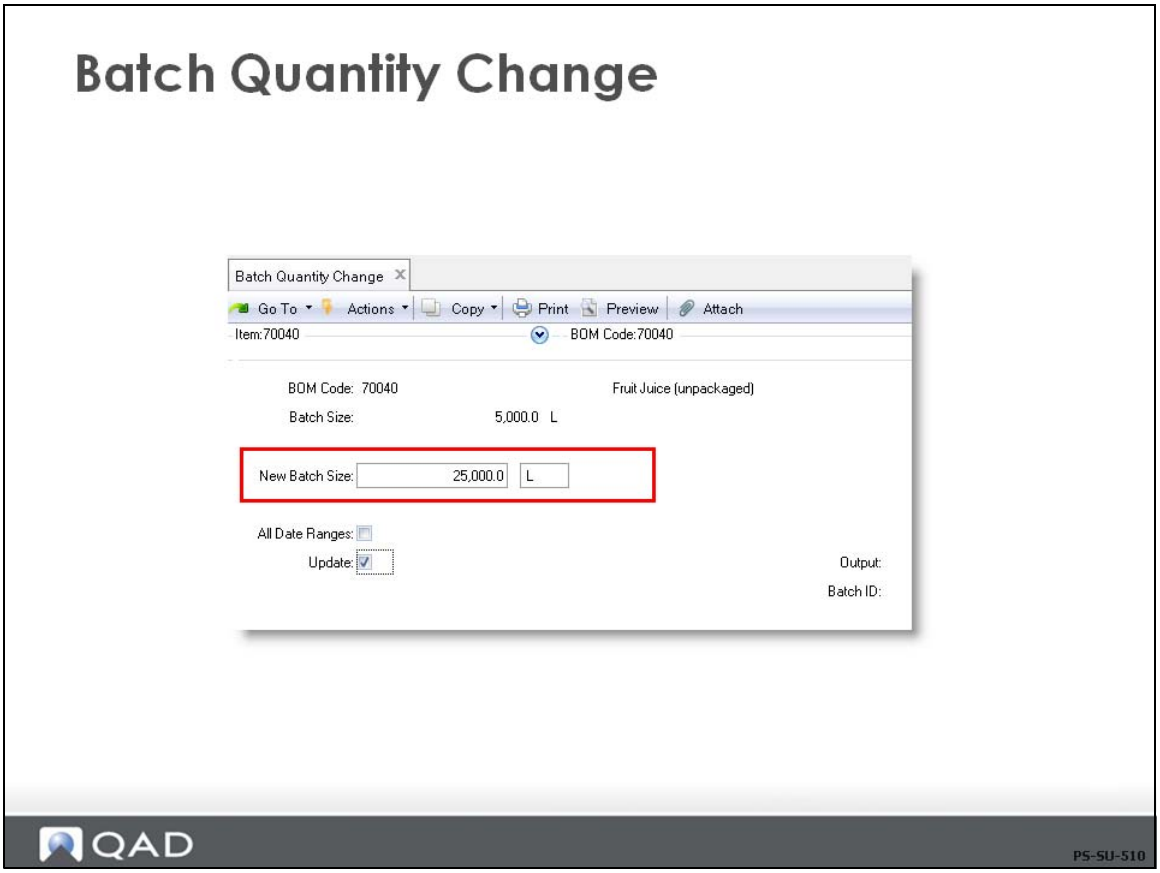
Formula Copy



Formula Copy creates a new formula by copying another one. This is useful when items have similar formulas or for creating alternates.

- Components are copied from the source formula to the destination
- You can modify the results by adding, deleting, or changing requirements
- If you are creating a new formula, the new formula's BOM code assumes the same batch size as the source formula's
  - Change this in Batch Quantity Change

Batch Quantity Change



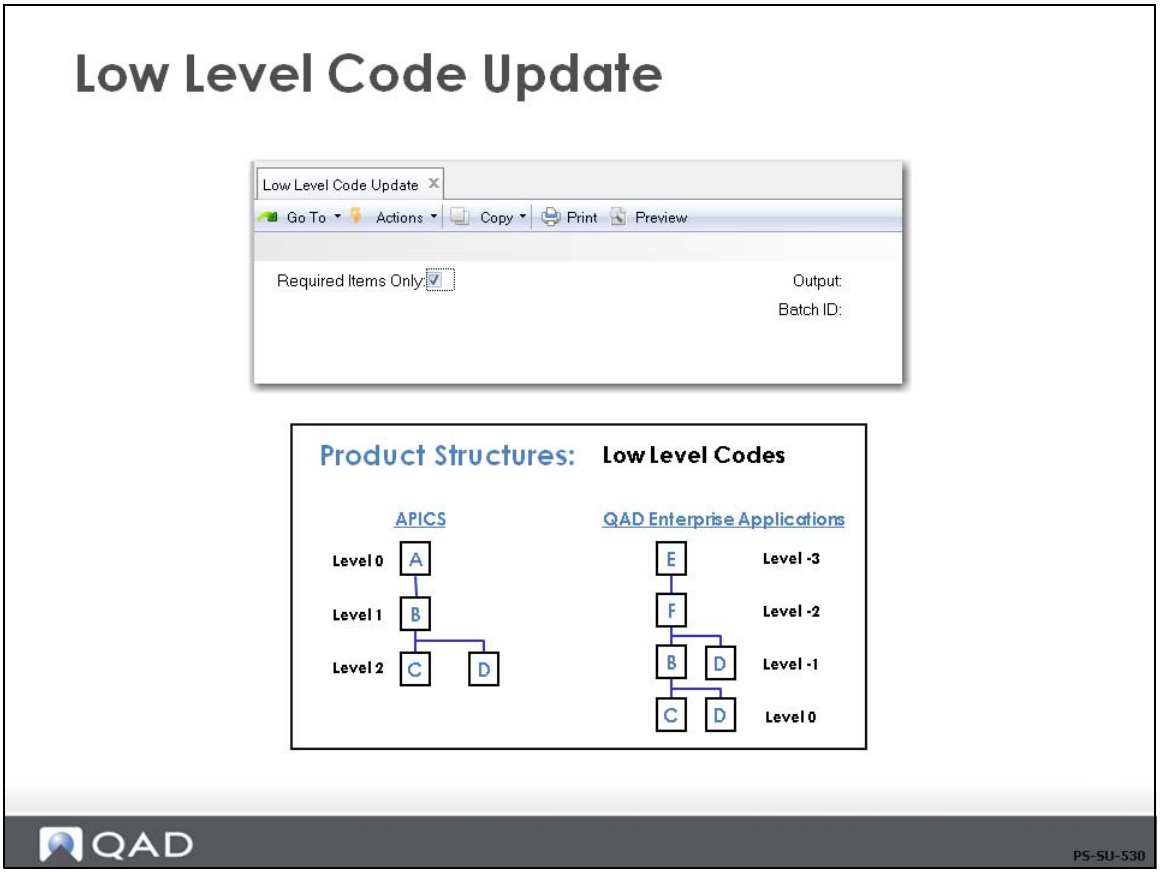
Batch Quantity Change is the only way to change the batch size of existing formulas.

Use to recalculate the quantity per for all items with quantity type B.

- Formulas, processes, and Co-Product/By-Product structures are defined by batch size
- If the batch size changes, make adjustments to component quantities and relationships as well as Co-Product/By-Product structure quantities and relationships with Batch Quantity Change
- You can run this twice: once with Update = No, review the report, then with Update = Yes

Note When the batch quantity is different from the order quantity in item planning, the system reports manufacturing variances on work orders and repetitive schedules.

Low Level Code Update



Use to rebuild the low level codes.

Note This function can take a long time to load

- Under normal conditions, you would never need Low Level Code Update 23.22 because QAD Enterprise Applications automatically updates the low level codes whenever you add or modify product structures however.
  - During implementations, you may import structures without input controls; this program relocates low level codes for such structures
  - If you import product structures from a CAD/CAM system this program will update the low level codes.
  - If you suspect MRP is not correctly planning items, this program may fix the problem
- Items with a low level code of 0 should always be purchased items

First Activity: Preliminary Setup

First Activity for QAD Enterprise Applications Standard Edition Courseware

If you are working in a Standard Edition environment, please perform the following verifications on your domain and calendar setup.

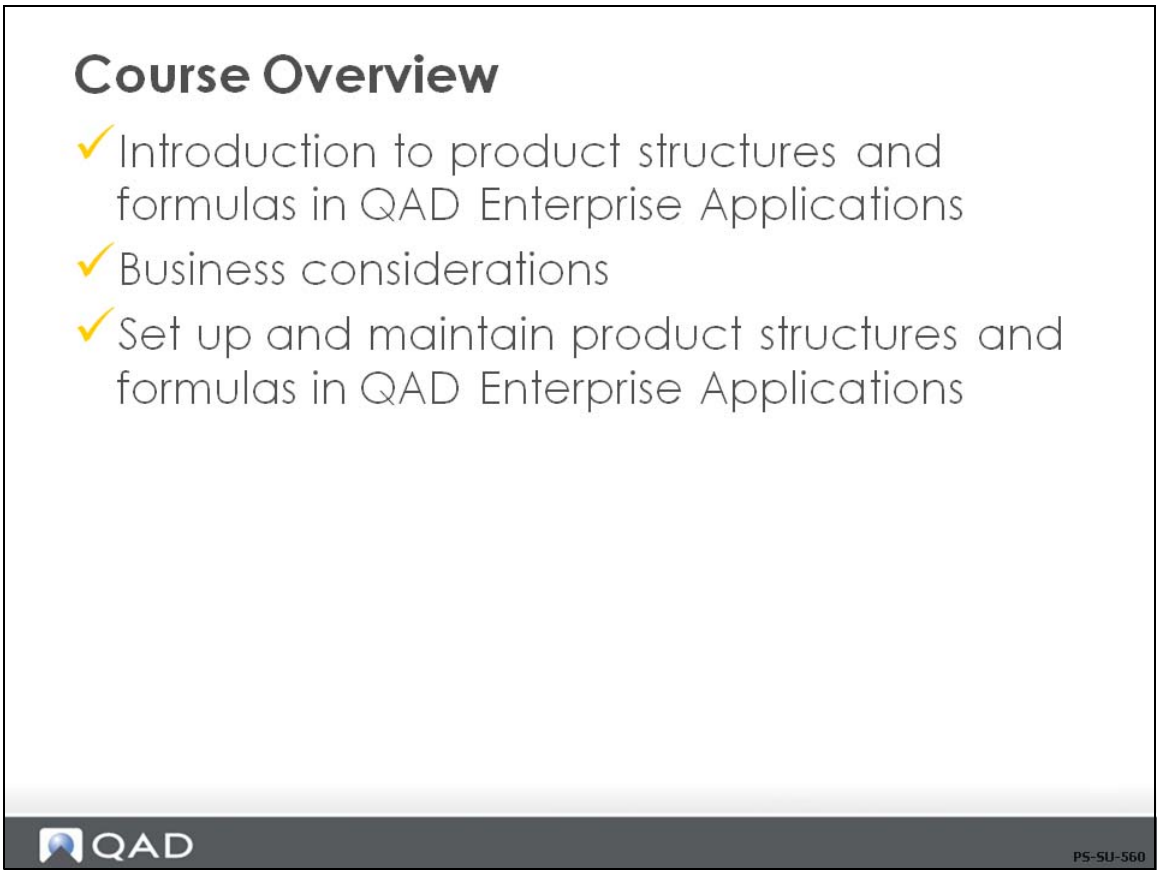
1. Verify Domain: From the workspace menu select Training.
   - c. Note the domain name appears in the top window frame.
2. Verify GL Calendar Period
   - a. Use GL Calendar Browse (25.3.5) or (33.1.1)
   - b. Start search at current year
   - c. You should see a list of months for the current year
   - d. If you find “No Records” continue to step three.
3. Use GL Calendar Maintenance (25.3.4)

   Enter the current year, then as a short cut enter one period whose dates will cover the term of your training event.

   The data used in these exercises may not be exactly the same as the data shown in the screen captures in this lesson.

Exercise: Formula Maintenance

1. Use Item Master Copy (1.4.12) to create a new Item, bio-engineered fruit (80054), from item fruit (80050). All attributes are the same except the description.
2. Use Item Master Copy (1.4.12) to create a new Item, proprietary sweetener (80055), from item proprietary spice mix (80051). All attributes are the same except the description.
3. Use Formula Code Maintenance (15.1) to setup the formula code 70041, bio-eng fruit juice, with a batch size of 8,000 L.
4. Use Formula Maintenance (15.5) to create the new formula for item 70041, which is composed of the following:
   - 16LB bio-engineered fruit (80054)
   - 8G proprietary spice mix (80051)
   - 8% sterilized water (80052)
   - 0.2% preservative (80053)
   - 3G proprietary sweetener (80055)
5. Use Formula Inquiry (15.6) to check your work.
6. Use Simulated Batch Ingredient Check (15.7.17) to see how much of each material would be required for a batch of 10,000 L bio-engineered fruit juice.
7. Use Where-Used Inquiry (13.7) to find all the items that use sterilized water (80052).


Course Overview
Introduction to product structures and formulas in QAD Enterprise Applications
Business considerations
Set up and maintain product structures and formulas in QAD Enterprise Applications
QAD
PS-SU-560

Appendix A

Workshops and Study Questions

Product Structures

Product Structures Study Questions

1 List two situations where you would use a BOM code as a parent in a product structure rather than the item number.

2 A certain resistor that you use in making several of your products has been found defective. What function would you use to find out which products use this resistor?

Menu Number/Name:

3 A lead time offset of 3 indicates that you need this component item three days before production of the parent item begins.

True or False

4 List two situations in which lead time offsets can be used.

Product Structures Workshop

Let us consider the company that makes battery-powered and electric blenders. Both of these products use the same components, except for the power adapter. Both use a blender jar, lid, plastic case, six power/speed push buttons, and motor. One uses a battery-power adapter unit, and the other uses an electric-power adapter unit and a cord. They buy all of these component items.

1 Set up the product lines, items, and product structures you need to make both blenders. Use a different item number for each of the finished items, and make both lot traceable.

2 Historically, this company has found that two percent of the electric power adapter units they purchase fail incoming inspection. Where would you indicate this?

Menu Number/Name:

Field Name:

3 Lately, they have been having quality problems with the push buttons; the color has been inconsistent and they must throw out about five percent of them. Where would you indicate this?

Menu Number/Name:

Field Name:

4 Customers are reporting that there is a major problem with the blender; the glass jar explodes if it is overfilled. You need to immediately switch production to use a plastic jar. What do you do in QAD Enterprise Applications? List all of the functions you think you would need to use in the sequence you would use them.

5 The old lid can be used with the new plastic jar, but engineering has designed a new one that fits better. How would you set this up so that your costs are minimized?

Formulas

Formulas Study Questions

1 What three options do you have for expressing quantity per?

2 Material requirements planning (MRP) does not consider the scrap percentage you enter on a formula.

True or False

3 Processing operations can be entered in Routing Maintenance or in Process Definition Maintenance even if the item batch size is greater than 1.

True or False

4 How can you prevent a formula from being modified using Product Structure Maintenance?

Formulas Workshop

We will make some beer. Our beer is made with water, barley, hops, and a secret ingredient.

1 Beer is made in batches of 480 30 cl (300ml) bottles. Set this up in QAD Enterprise Applications. What two fields did you have to update? What function did you use to update each?

Menu Number/Name:

Field Name:

Menu Number/Name:

Field Name:

2 Set up the formula to make beer. We use 25 kilos of barley and 3 kilos of hops in each batch, and just a little bit of the secret ingredient, 100ml per batch. Of course, about 95 percent of each bottle of beer is water! The solid ingredients increase the volume of the brew batch, but we then loose some to evaporation, so the water quantity is the same as the total bottle capacity.

Which Qty Type option did you use to express each of these quantities? And how much water do we need?

Qty Type:

3 How do you indicate on the formula the point in the process at which an ingredient is used?

4 Add the bottle and case into the item file. Add the bottle and case into the BOM for beer. Can you enter this using Product Structure Maintenance?

Yes or No?

Why?

5 We did some test runs and found out that the batch size of 480 bottles of beer is too large. We have to cut the batch size in half. What do you need to do to indicate this?

Alternate Product Structures and Formulas

Alternate Product Structures and Formulas Study Questions

1 List three situations where you would need to set up alternate product structures or formulas in your company.

2 The QAD Enterprise Applications modules _____ and _____ always plan component requirements based on the standard BOM and routing for the item.

Alternate Product Structures and Formulas Workshop

1 Set up an alternate formula and process (perhaps use a different set of ingredients and a different production line for making beer).

2 Look at the Formula Browse/Inquiry. How does the alternate formula appear?

Answers to Workshops and Study Questions

Answers to Product Structures Study Questions

1 BOM codes would be used to identify product structures that are:
- common to several items
- alternates for a given item
- batch quantity specific
- site specific

2 Where-Used Browse/Inquiry or Where-Used Report.

3 False. -3 says you need it before, +3 says you need it after.

4 Lead time offset applies when you have:
- Long lead time items
- Expensive components, not needed until late in the process
- Components that need preparation

Answers to Product Structures Workshop

1. [Set up product lines - no answer applicable]
2. Item Planning Data Maintenance 1.4.7 or Item Site Planning Data Maintenance 1.4.17, the field is Yield Percent.
3. Item Planning Data Maintenance 1.4.7 or Item Site Planning Data Maintenance 1.4.17, the field is Yield Percent.
4. Check status of current finished goods inventory and issue to rework orders using Work Order Maintenance 16.1.

   Add the new item; Item Master Maintenance, 1.4.1

   Modify the Product Structure 13.5, to delete the current item and add the new jar. Use stop and start effectivity dates to track the change. Use 16.13.1 to modify any Work Order BOMS currently in production.

   Use Inventory Detail Maintenance 4.8.16 to change the inventory status of any current glass jar inventory to a status code that will prevent them being issued, until final disposition can be arranged.

   Determine processing steps to rework current finished goods and modify the work order bills and routes using 16.13.1 and 16.13.13 to document the procedure. Issue plastic jars to the rework orders for finished goods items to be reworked, and return to finished goods inventory.
5. Make the old lid a phantom using Item Master Maintenance 1.4.1. Use Product Structure Maintenance 13.5 to make the new lid a component of the old lid.

Answers to Formulas Study Questions

1. (Blank) Quantity Per Unit, (P) Percent of Batch, or (B) Quantity Per Batch
2. False. MRP plans scrapped quantities using that percentage
3. False. Both are sorted in the same place, but the latter is used whenever there is a batch size greater than 1 because it converts the run time/batch that you enter into an equivalent run time/unit.
4. Use Formula Code Maintenance and set Formula = Yes.

Answers to Formulas Study Workshop

1. Batch Size in Formula Code Maintenance 15.1 and Order Quantity in Item Planning Maintenance 1.4.7.
2. Qty Type is “B: for all items. We need 1440 liters of water per batch
3. Specify the process operation number from the process on the formula record.
4. No. You have specified this is a formula structure by using the Quantity Type B
5. Use Batch Quantity Change 15.9 to change the batch size.

Answers to Alternate Product Structures & Formulas Study Questions

1 Possibilities are different BOMs for different sites, different processes, or different batch sizes.

2 MRP and Repetitive

Answers to Alternate Product Structures & Formulas Workshop

1 [Set up an alternate formula & process - no answer applicable]

2 The alternate formula for Beer appears as a set of indented set components of the parent Beer formula

Appendix B

QAD Product Costing

Product Costing in QAD Enterprise Applications

A brief outline-for details refer to the course Product Costing

In the standard core product QAD Applications keep product costs in two cost sets; the current cost set and the GL (standard) cost set. Additional cost sets may be defined using functionality in the Cost Management Module.

All transactions are posted to the GL using the GL Cost Set data. In a Standard Cost environment the GL Cost set is kept fixed for a defined period of time, usually the GL fiscal year. The GL standards being reset on a regular schedule, usually the fiscal year. The GL cost set may be defined as an Average Cost using functionality in the Cost Management Module.

The current cost set may be updated automatically by the system using either the last cost (for purchase orders and work orders) or an average cost. There is an option to not have the system update current costs.

In a standard cost environment differences between the GL cost and the current cost are reported as variances, usually on a fiscal month basis. In an average cost environment costs are re-averaged as they occur and variances are not reported.

In the standard core product QAD Applications keep product costs in five cost categories in each of the two cost sets; these five categories are: Material, Labor, Burden, Overhead and Sub-Contract. Additional user defined Cost Elements may be defined as sub sets of these cost categories using functionality in the Cost Management Module.

Material costs are manually entered and are usually the purchase costs of raw materials and components.

Labor costs may be system calculated using rates defined in the Work Center records and times defined in the Route records.

Burden is variable overhead and Overhead is fixed overhead. Burden may be system calculated using rates defined in the Work Center records. Overhead is manually entered in the Item Cost record.

Sub-contract costs are entered manually and are treated as purchase costs.

The cost roll-up process begins with the Routing Cost Roll Up, and proceeds with the Product Structure Cost Roll Up. A common procedure is to do all cost setup and roll up work in the current cost set until costs are verified as correct. Costs may then be copied to the GL Cost Set. Either cost set may be frozen to prevent unintentional cost changes and to improve system response in new item cost roll ups.

Product costs may be modified at each site and may be viewed on numerous inquires and reports.

Appendix C

General Ledger Effects

Function	Notes	DR / CR	Account	Defaults From
Product Structure Cost Roll-Up		DR	Inventory	Inventory Account Maintenance*
		CR	Cost Revaluation	Inventory Account Maintenance*

***** The GL account defaults from the Inventory Item/Site Account 1.2.13 if one is set up; otherwise, from the Product Line 1.2.1.

Appendix D

Product Structure and Formula Reports

Product Structures Menu

Report	Function / Purpose
Product Structure Code Inquiry/Browse Product Structure Code Report	Displays product structure codes This report lists product structure codes.
Product Structure Inquiry	This inquiry displays product structures.
Where-Used Inquiry	This inquiry displays in which product structures selected components are used.
Alternate Structure Inquiry	This inquiry displays alternate structures associated with selected product structures.
Alternate Structure Report	This report lists alternate structures associated with all or selected product structures.
Item Substitution Browse/Inquiry	This program displays substitute items associated with selected parent items.
Item Substitution Report	This report lists information on substitute items associated with selected parent items.

Product Structures Reports Menu

Report	Function / Purpose
Product Structure by Item Report	This report lists details for product structure by top-level item number.
Product Structure by Nbr Report	This report lists the same information as the above report, but by sequence number within item number. This is useful when the sequence of assembly is important or, in the case of co- and by-products, to show the sequence of outputs.
Item-Site Structure Inquiry	This inquiry displays selected product structures at selected sites.
Item-Site Structure Report	This report lists selected structures, or a range of structures, at specified sites.
Where-Used Inquiry	This inquiry shows in which product structures selected items are used.
Where-Used Report	This report shows in which product structures selected items, or a range of items, are used.
Simulated Picklist Inquiry	This inquiry shows the component requirements for a specified quantity of a selected product structure.
Simulated Picklist Item Check	This inquiry shows the component requirements for a specified quantity of a selected product structure and also the quantity short, if any.

Product Structures Reports Menu

Report	Function / Purpose
Simulated Picklist Report	This report lists the component requirements for a specified quantity of a selected product structure or a range of product structures.
Materials Summary Report	This report lists product structures and shows quantity on-hand and summary usage for each component.

Cost and Lead Time Roll-Up Menu

Report	Function / Purpose
Cost Roll-Up Freeze Report	This report lists the status of items frozen or unfrozen for the cost roll-ups.
Product Structure Cost Report	This report shows you the costs determined by the latest roll-up.
Product Structure Cost Summary	This report summarizes the costs determined by the latest roll-up
Cumulative Lead Time Report	This report shows you the most recently calculated lead times.
Lead Time Picture Report	This report gives you a different view of the current lead times.

Formula/Process Menu

Report	Function / Purpose
Formula Code Inquiry/Browse	This program displays formula and product structure codes.
Formula Code Report	This report lists formula codes.
Formula Inquiry	This inquiry displays formulas and product structures.

Formula Reports Menu

	Report	Function / Purpose
	Formula by Component Report	This report lists formulas and product structures by components within parent item or code.
	Formula by Item Nbr Report	This report lists the same information as the above report, but by sequence number within item number. This is useful when the sequence of assembly is important or, in the case of co- and by-products, to show the sequence of outputs.
	Formula Cost Report	This report shows the costs for formulas, structures, and components as of the last roll-up.
	Item-Site Formula Inquiry	This inquiry displays formulas and structures at selected sites.
	Item-Site Formula Report	This report shows formulas and structures at selected sites.
	Where-Used Inquiry	This inquiry shows in which structures and formulas selected components are used.
	Where-Used Report	This report shows in which structures and formulas selected components are used.
	Simulated Batch Inquiry	This inquiry shows component requirements for specified quantities of selected parent items.
	Simulated Batch Ingredient Check	This inquiry shows component requirements and shortages for specified quantities of selected parent items.
	Simulated Batch Ingredient Report	This report shows component requirements and shortages for specified quantities of selected parent items.

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